Appendix C

Work Package 3 & 4 – Preferred Servicing Strategies and Implementation

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Work Package 3 & 4 - Preferred Servicing Strategies and Implementation Plan

Jarvis Master Servicing Plan Update

Table of Contents

List of Figures

List of Tables

List of Appendices

1.0 INTRODUCTION

1.1 Project Overview

The community of Jarvis is located approximately 15 kilometres north of Lake Erie in the western part of Haldimand County (the County) at the cross roads of Highway 6 and Highway 3. The community has a population of approximately 2,000 residents (Watson, 2018), and development is predominantly residential. Industrial, commercial, and institutional (ICI) development is concentrated in the north side of the community along Highway 6.

In 2010 the Jarvis Master Servicing Plan (MSP) for Water, Wastewater, Stormwater, and Transportation (Stantec, 2010) was completed. To support planned growth and intensification identified in the County's Official Plan, Haldimand County is undertaking an engineering study to update the 2010 Master Servicing Plan (MSP). The purpose of the study is to update the four (4) servicing components (water, wastewater, stormwater, and transportation) of the 2010 Jarvis MSP to reflect updated land use and growth forecasts in the study area, and identify updates to existing conditions and related assumptions based on growth that has since occurred.

1.2 Objectives of the Master Plan

The Master Plan update will consider the findings from the 2010 MSP, as well as changes to the environment (as defined in the EA Act) and infrastructure since it was completed. Each component of the MSP update will be provided in the framework provided below:

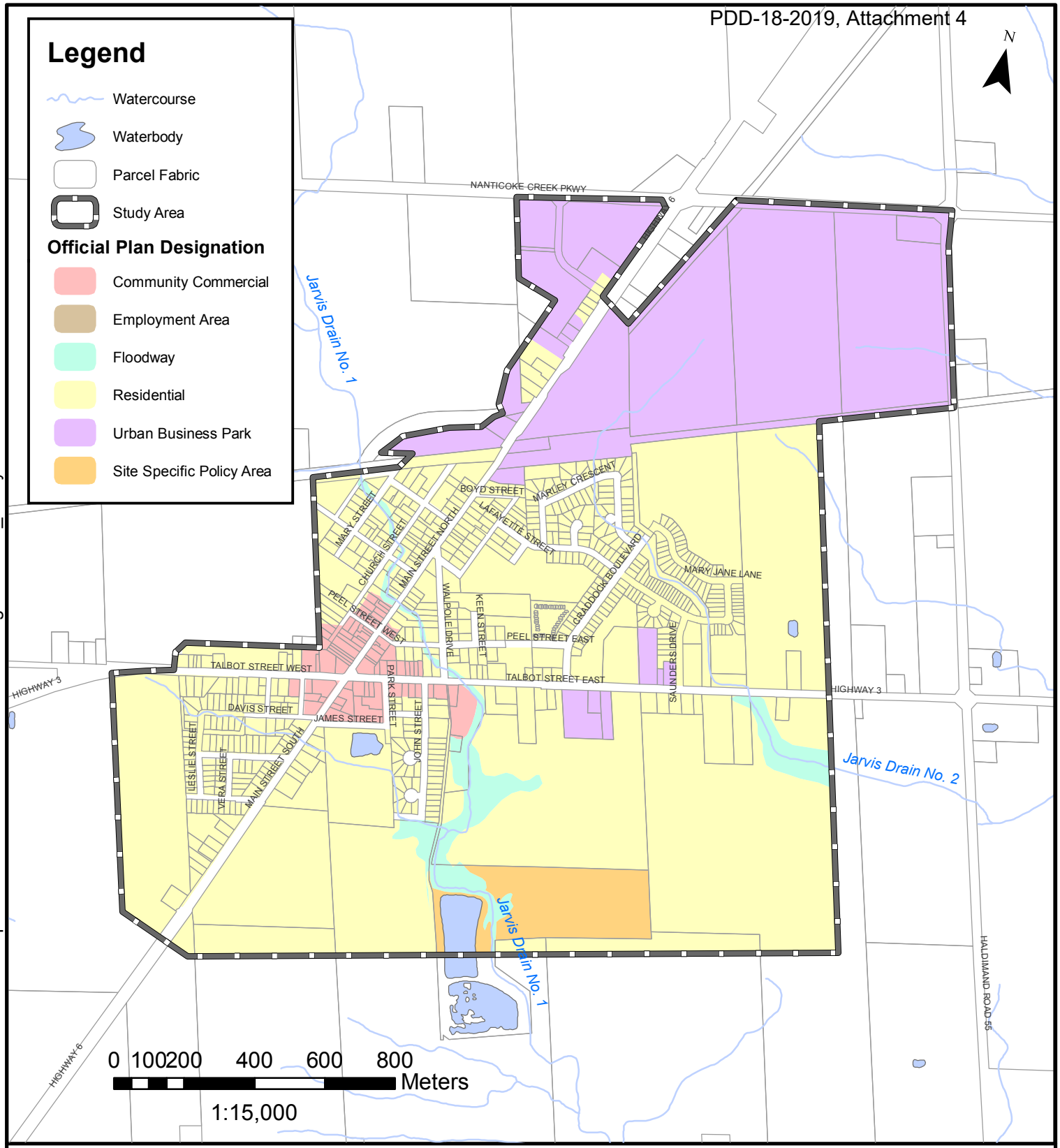
- Work Package 1 – Background Review and Updates to Existing Conditions
- Work Package 2 – Growth Forecast and Assessment of Future Needs
- Work Package 3 – Development of Preferred Servicing Strategies
- Work Package 4 – Implementation Plan, Final Report and Presentation.

As well as updating the MSP, the County is concurrently conducting a Class EA to determine the preferred alternative to increase wastewater treatment capacity for Jarvis. The Class EA will be documented in a separate report.

1.3 Study Area Overview

The study area for the MSP update encompasses the urban boundary of Jarvis, consistent with the 2010 Jarvis MSP study area. Figure 1 illustrates the study area boundary. Municipal infrastructure in Jarvis includes a municipal water and wastewater system, stormwater infrastructure, and a transportation network.

PDD-18-2019, Attachment 4



PROJECT:

JARVIS MASTER SERVICING PLAN UPDATE

JARVIS, HALDIMAND COUNTY, ONTARIO

DRAWING:

STUDY AREA BOUNDARY AND DESIGNATED LAND USES

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FIGURE 1

File Location: V:\28000\28176 Jarvis Water Model Backup\3-JLR DWG\1-Civil\GIS\Work Package 2\28176_StudyArea.mxd

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Community water is supplied via a transmission main from the Nanticoke Water Treatment Plant (WTP) and stored in a shared elevated tank north of Townsend. Wastewater in Jarvis is conveyed to the Jarvis wastewater treatment lagoons which are owned and operated by the County. The storm system in Jarvis generally consists of traditional stormwater management infrastructure (e.g. ditches, urban curb and gutter networks) and two (2) stormwater management (SWM) facilitates. The community of Jarvis is built adjacent to Highway 6 (Main Street) and Highway 3 (Talbot Street). Both those highways are “connecting links” in the Provincial highway network.

1.4 Previous Studies

In 2010, a Master Servicing Plan (MSP) was prepared (Stantec, 2010) to help guide the development of water, wastewater, storm and transportation services with respect to the County’s Official Plan to accommodate future development. Further details of the report findings are discussed in Work Package 1.

In addition to the 2010 MSP referenced throughout this report, the following studies related to water, wastewater, stormwater, and transportation infrastructure in Jarvis are referenced in the preparation of this Master Servicing Plan Update.

2010 MSP – present

Haldimand County Services and Planning Division. *Design Criteria*, Version 4.0, April 2015.

Ministry of Municipal Affairs and Housing. Ontario Government, *Provincial Policy Statement, 2014*, Section 3 Planning Act, 30 April 2014.

Haldimand County Planning & Economic Development Department. *The Haldimand County Official Plan*, Council adopted 26 June 2006, Ministry approved 8 June 2009.

Lake Erie Region Source Protection Committee. Long Point Region Source Protection Area Approved Source Protection Plan, Under Clean Water Act 2006, 4 November 2015.

Watson & Associates Economists Limited. *Population, Housing and Employment Projections Study Update*, 2016-2046 - Preliminary Draft Findings. October 2018.

Upper Canada Consultants. *Topographic Volumetric Survey of Jarvis Sewage Lagoons*, 17 July 2018.

Dave Chapman (CPO Inc.). *Jarvis lagoons: Capacity Assessment & Contingency and Abatement Plan Technical Memo,* 6 June 2011.

CPO Inc. and Haldimand County. *Jarvis lagoon Effluent Phosphorous Offsetting,* 20 July 2016.

Stantec Consulting Ltd. *Jarvis Master Servicing Plan Water, Wastewater, Stormwater, and Transportation*, September 2010.

Prior to 2010 MSP

Stantec Consulting Ltd. *Jarvis Inflow and Infiltration Study*, March 2010.

2.0 CLASS ENVIRONMENTAL ASSESSMENT

2.1 Class Environmental Assessment and Master Planning Process

The Ontario Environmental Assessment Act (Act) sets out a planning and decision-making process to consider potential environmental effects before a project begins. The purpose of the Act is to provide for the protection and conservation of the natural environment (R.S.O. 1990, c.E.18, s.2).

The Municipal Class EA process is followed for common types of projects to streamline the review process while ensuring that the project meets the requirements of the Act. In 1987, the first Class EA document prepared by the Municipal Engineers Association (MEA) on behalf of Ontario Municipalities was approved under the Act. Updates and amendments were subsequently made in 1993, 2000, 2007, 2011 and 2015.

This Master Servicing Plan Update is being completed with sufficient detail to fulfil the requirements for Schedule B projects (Approach #2) concurrently with a Class Environmental Assessment, for additional wastewater treatment capacity at the Jarvis Wastewater Treatment Lagoons.

Projects categorized as Schedule B or Schedule C undertakings have the potential for significant environmental impacts, and are required to follow specific phases under the Municipal Class EA. This includes consultation with all parties that may potentially be affected by the project, and the preparation of a Class EA Project File or Environmental Study Report that documents the Class EA process.

For the Master Servicing Plan Update, a Project File or Environmental Study Report shall be made available for public and agency review at the completion of the Class EA process for a mandatory 30-day period. If there are no requests to the Minister of the Environment, Conservation and Parks (MECP) for a ‘Part II Order’ within the review period, then the project may proceed to implementation (Phase 5).

2.2 Problem Statement

To support planned growth and intensification identified in the County’s Official Plan, Haldimand County is undertaking an engineering study to update the 2010 Master Servicing Plan (MSP) The purpose of the Master Servicing Plan Update is to evaluate the community’s long-term infrastructure needs and identify a preferred solution to be implemented to match growth in Jarvis over the next 20 years.

The Class EA framework will enable consideration of options and identify a preferred solution that is environmentally, socially, and financially responsible and sustainable.

The study will consider the needs and viewpoints of all participating stakeholders including, but not limited to, residents, government agencies, the general population, and Indigenous communities.

2.3 Public Consultation Plan

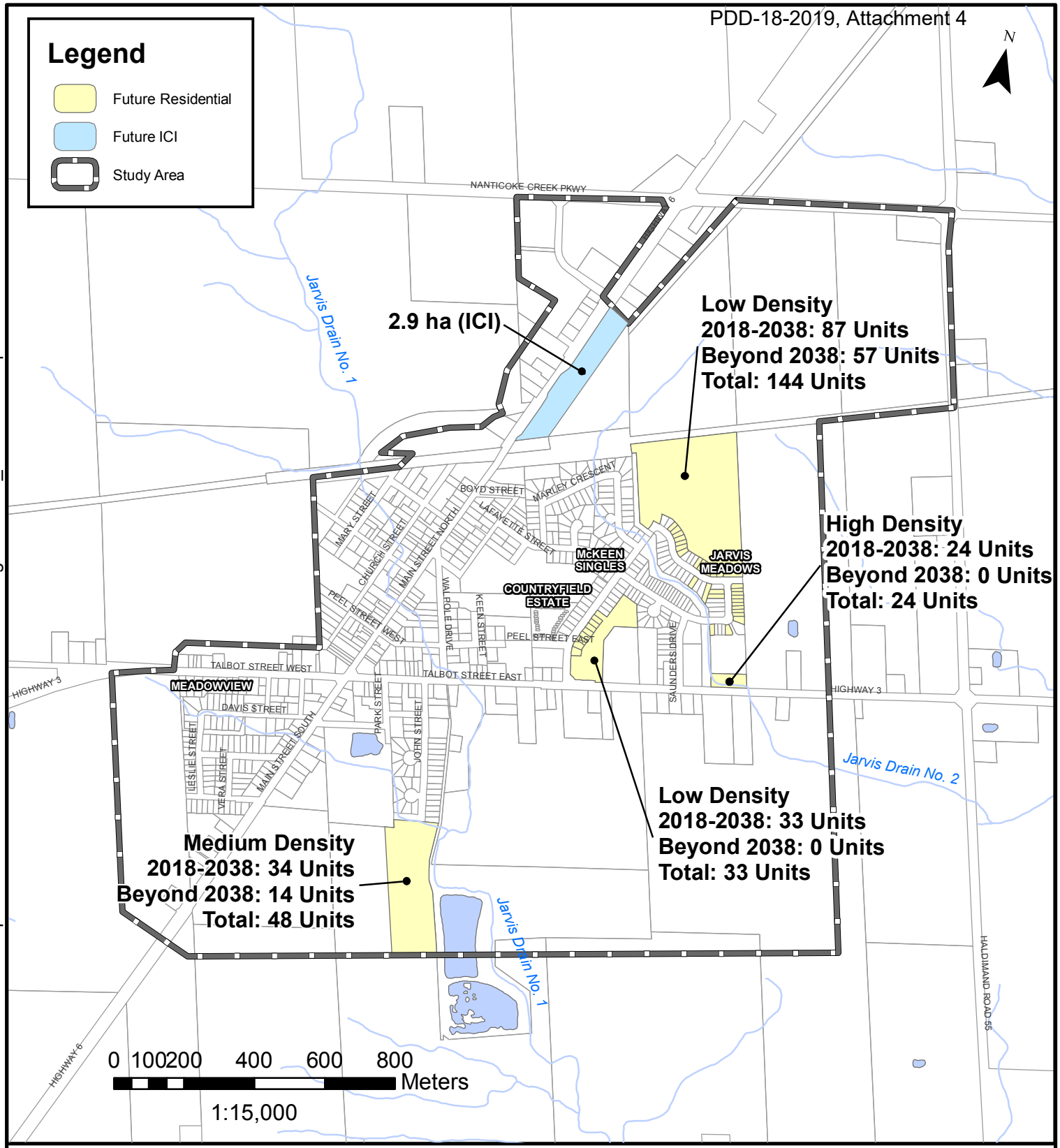
Public and agency consultation for this assignment is anticipated to consist of:

- Notice of Commencement
- Meetings with Review Agencies (as required)
- Project Committee Meetings
- Public Information Centre(s)
- Filing of the Project File/ESR and Notice of Completion

Consultation activities undertaken as part of the MSP Update will be documented in the Project File report.

3.0 FUTURE CONDITIONS

In Work Package 2 (JLR, June 7, 2019), future residential growth was distributed based on approved development in Jarvis and residential density. Anticipated growth in Jarvis is approximately 6.54 ha (120 units) of low density residential land, 1.85 ha (34 units) of medium density residential land, 0.35 ha (24 units) of high density residential land and 2.91 ha of ICI land to be developed. See Figure 2 for the distribution of future residential and ICI development from 2018-2038.



PROJECT:

JARVIS MASTER SERVICING PLAN UPDATE

JARVIS, HALDIMAND COUNTY, ONTARIO

DRAWING:

ANTICIPATED DEVELOPMENT FROM 2018 TO 2038

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FIGURE 2

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4.0 WATER SERVICING ALTERNATIVES UPDATE

4.1 Future Servicing Requirements and Evaluation

4.1.1 Water Distribution System

In Work Package 2 (JLR, June 7, 2019) the water model was updated to include future population growth to 2038. The extended future water distribution system is shown in Figure 3. Watermain extensions to serve development anticipated in the 20-year planning horizon (2038) and create loops are shown in orange. In the 2010 Master Servicing Plan, consideration was given to servicing vacant lands beyond the 20-year planning horizon. Watermain extensions to serve these vacant lands are shown in grey.

To improve redundancy of supply and system looping the 2010 MSP proposed a secondary connection from the Nanticoke WTP to Jarvis. Two alternatives were reviewed. Alternative 1 included new feedermain on Highway 6 and Alternative 2 consisted of a new feedermain on Talbot Street West. It was proposed for both alternatives that the new feedermain would extend the existing 400 mm watermain on Main Street North. System pressures under peak hour demands and maximum day fire flow results were updated and reviewed for both alternatives (refer to Appendix A). As found in the 2010 MSP, both options perform similarly in terms of satisfying pressure and supply constraints.

Alternative 2 continues to be preferred, due to the lower cost of implementation. However, in 2018, the Nanticoke to Caledonia Water Supply Feasibility Study (Wood, 2018) was completed to assess the current Nanticoke and Caledonia water supply systems. As part of the study, consideration was given to the replacement of the existing watermain connecting Nanticoke Water Treatment Plant to Townsend with a new feedermain along Highway 55. Prior to implementation of a new feedermain on Talbot Street West, consideration should be given to the possible construction of a new feedermain on Highway 55 to service Jarvis and Caledonia.

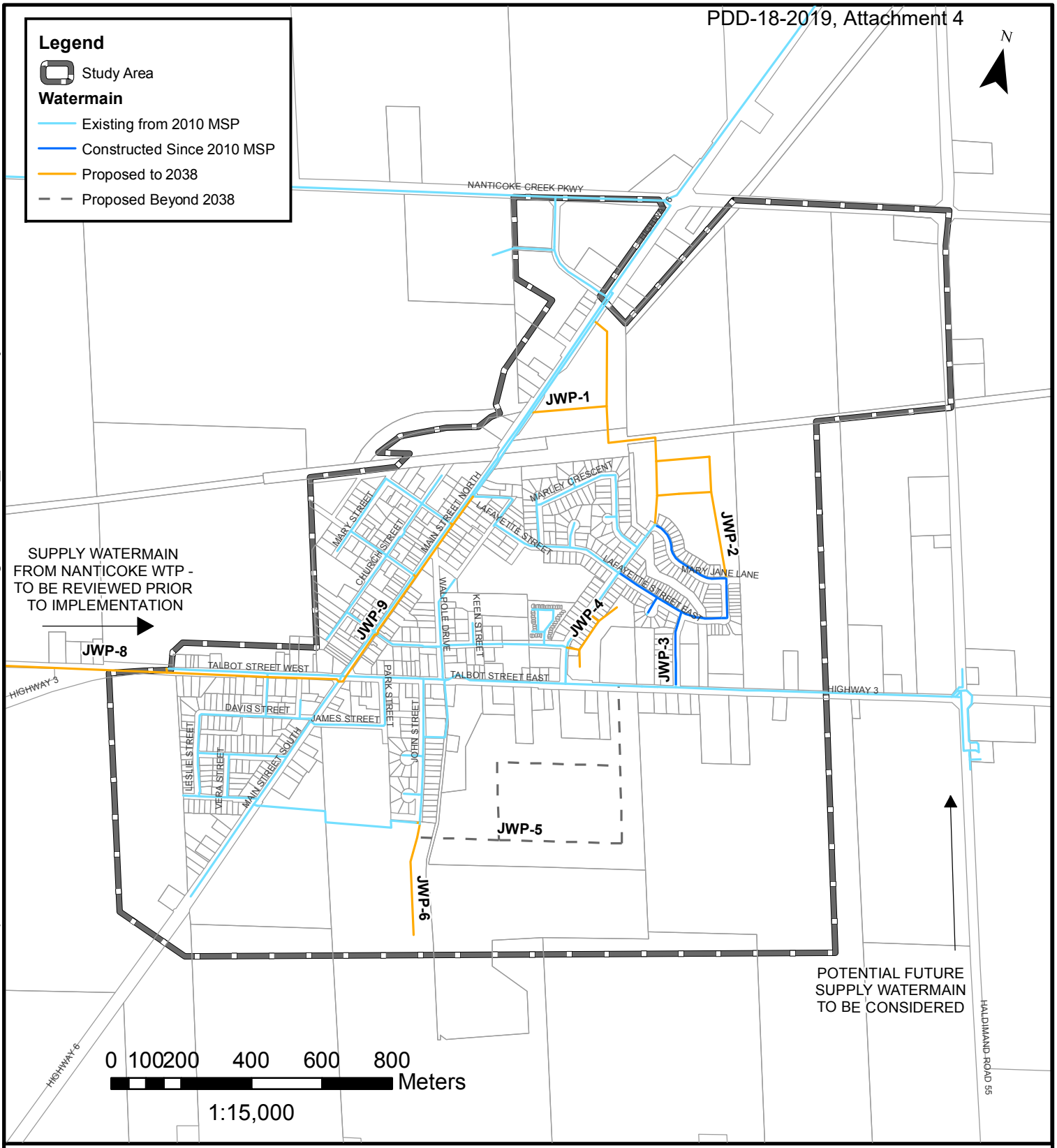
Updates to the proposed water distribution system since the 2010 MSP are summarized in Section 4.2.

4.1.2 Water Storage

An elevated storage tank located at the north-east of Townsend provides storage for both Jarvis and Townsend. The storage volume provided by the tank is 2,300 m^3 and there is adequate storage to serve anticipated 20-year growth.

4.2 Updated Preferred Alternative and Implementation

Required projects and cost estimates were updated for the various water distribution projects proposed in the 2010 MSP. A summary of the projects and costs is provided in Figure 3 and Table 1. The total cost of the proposed upgrades to meet 20-year projected demands is $4,636,000.



PROJECT:

JARVIS MASTER SERVICING PLAN UPDATE

JARVIS, HALDIMAND COUNTY, ONTARIO

DRAWING:

FUTURE (2038) WATER DISTRIBUTION SYSTEM

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FIGURE 3

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Table 1 Cost Estimates and Timing of Preferred Water Servicing Alternative

2010 MSP System Component	Description	Review Comment	Updated Cost Estimate 2018-2038 (2018$)	Updated Cost Estimate >2038 (2018$)	Funding		Trigger/ Timing
					County	Developer	
JWP-1	150/250 mm ø Watermain Aligned on Vacant Parcel B in North End of Town	No change from 2010 MSP, updated for inflation.	$323,000	$0	0%	100%	Development
JWP-2	150/200/250 mm ø Watermain Aligned on Northern Portion of Jarvis Meadows	Partially constructed since 2010 MSP, cost adjusted and updated for inflation.	$822,000	$0	0%	100%	Development
JWP-3	200mm ø Watermain Aligned on Southern Portion of Jarvis Meadows	Constructed since 2010 MSP, no longer required.	n/a	n/a	0%	100%	Development
JWP-4	150mm ø Watermain Aligned on Walker Development	No change from 2010 MSP, updated for inflation.	$178,000	$0	0%	100%	Development
JWP-5	150/200 mm ø Watermain Aligned on Vacant Parcel 14 in South End of Town	Required beyond 20-year (2038) planning horizon.	$0	$1,059,000	0%	100%	Development
JWP-6	150 mm ø Watermain Aligned on Milmont and 200 mm ø Watermain adjoining to Main St.	No change from 2010 MSP, updated for inflation.	$558,000	$0	0%	100%	Development
JWP-8	400 mm ø Watermain Aligned West Concession 7, and Main Street South of Talbot (From Nanticoke)	No change from 2010 MSP, updated for inflation.	$2,197,000	$0	To be determined	To be determined	Allocation and timing subject to further assessment
JWP-9	400 mm ø Watermain Aligned on Main Street North of Talbot	No change from 2010 MSP, updated for inflation.	$558,000	$0	0%	100%	Development
Total Watermain Cost to 2038			**$4,636,000**	**$1,059,000**			

5.0 WASTEWATER SERVICING ALTERNATIVES UPDATE

5.1 Future Servicing Requirements and Evaluation

5.1.1 Wastewater Collection System

In Work Package 2 (JLR, June 7, 2019) the wastewater collection model was updated to include future population growth to 2038. In the 2010 MSP, two alternatives were considered. The primary difference between Alternative 1 and 2 was the servicing of vacant lots located at the north end of Jarvis on the east and west side of Highway 6 and the servicing of a vacant lot on the southeast side of Jarvis. The flow to pipe capacity ratio was updated and reviewed for both alternatives (refer to Appendix B). As found in the 2010 MSP, both options perform similarly in terms of addressing issues related to pipe capacity. Alternative 1 continues to be the preferred, due to the lower cost of implementation and operation.

The extended future collection system is shown in Figure 4. Sewermain extensions to serve development anticipated in the 20-year planning horizon (2038) are shown in orange. In the 2010 Master Servicing Plan, consideration was given to servicing vacant lands beyond the 20-year planning horizon. Sewermain extensions to serve these vacant lands are shown in grey. Updates to the proposed collection system since the 2010 MSP are summarized in Section 5.2.

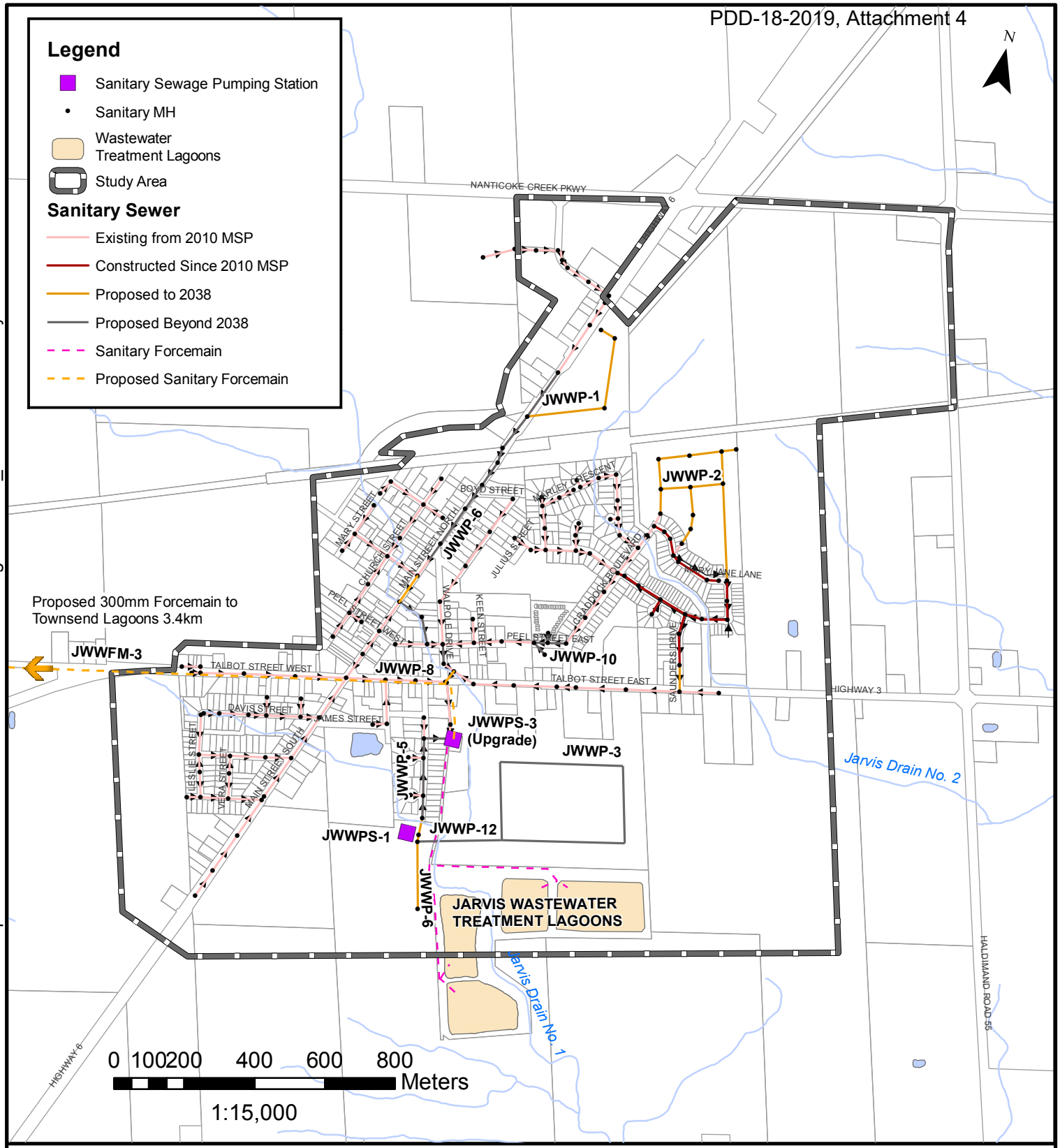
5.1.2 Jarvis Wastewater Pumping Station and Lagoons

The capacity of the Jarvis Wastewater Pumping Station and Lagoons was reviewed as part of a separate Municipal Class EA for Additional Treatment Capacity for Jarvis (JLR, 2019). The preferred alternative arising from the Class EA is to construct a forcemain to the Townsend Sewage Pumping Station (or directly to the Townsend Lagoon) and upgrade the pumps at the Jarvis Sewage Pumping Station. The projects are included in Section 5.2 and details can be found in the Jarvis Wastewater Treatment Capacity Class EA, to be presented to council June 2019.

5.2 Updated Preferred Alternative and Implementation

Required projects and cost estimates were updated for the various collection system projects proposed in the 2010 MSP. A summary of the projects and costs is provided in Figure 4 and Table 2. The total cost of the proposed upgrades to meet 20-year projected demands is $7,524,000.

PDD-18-2019, Attachment 4



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JARVIS MASTER SERVICING PLAN UPDATE

JARVIS, HALDIMAND COUNTY, ONTARIO

DRAWING:

FUTURE (2038) WASTEWATER COLLECTION SYSTEM

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FIGURE 4

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Table 2 Cost Estimate and Timing of Preferred Wastewater Servicing Alternative

2010 MSP System Component	Description	Review Comment	Updated Cost Estimate 2018-2038 (2018$)	Updated Cost Estimate >2038 (2018$)	Funding		Trigger/ Timing
					County	Developer	
JWWPS-1	Milmont 20.0 L/s PS	To meet 20-year demands an initial pump capacity (~5L/s - 15L/s) is recommended to avoid downstream collection system upgrades. Cost updated for inflation.	$781,000	$200,000	0%	100%	Development
JWWFM-1	Forcemain from Milmont PS to Existing John Street Sewer	No change from 2010 MSP, updated for inflation.	$45,000	$0	0%	100%	Development
JWWPS-3	Jarvis SPS Upgrade, replacement of three (3) existing pumps with three larger pumps	Refer to Class EA for Additional Treatment Capacity for Jarvis (JLR, 2019).	$440,000	$0	0%	100%	2019
JWWFM-3	Forcemain from Jarvis SPS to Townsend	Refer to Class EA for Additional Treatment Capacity for Jarvis (JLR, 2019).	$4,960,000	$0	0%	100%	2019
Pumping Stations and Forcemain to 2038 Sub-Total			**$6,226,000**	**$200,000**			
JWWP-1	Vacant Lots ‘A’, ‘B’, and ‘C’ (200 mm ø)	No change from 2010 MSP, updated for inflation.	$301,000	$0	0%	100%	Development
JWWP-2	Jarvis Meadows Subdivision (200 mm ø)	Partially constructed since 2010 MSP, cost estimate adjusted and updated for inflation.	$708,000	$0	0%	100%	Development

2010 MSP System Component	Description	Review Comment	Updated Cost Estimate 2018-2038 (2018$)	Updated Cost Estimate >2038 (2018$)	Funding		Trigger/ Timing
					County	Developer	
JWWP-3	Vacant Lot 14 Development (200 mm ø)	Required beyond 20-year (2038) planning horizon.	$0	$680,000	0%	100%	Development
JWWP-4	Milmont Subdivision (200 mm ø)	No change from 2010 MSP, updated for inflation.	$190,000	$0	0%	100%	Development
JWWP-5	Pipe Upgrade – John Street from Reynolds Court (250 mm ø) to Jarvis PS (450 mm ø)	Not required in 20-year planning horizon due to altered PS downstream, could be upsized in future if lifecycle is reached, pump could then be also replaced to facilitate greater development with same wet well.	$0	$178,000	0%	100%	Development
JWWP-6	Pipe Upgrade – Main Street from 280 m North of CN-CP Right-of- Way to Peel Street (250 to 375 mm ø)	Only some portions required in 20-year (2038) planning horizon, adjusted lengths and updated for inflation.	$98,000	$492,000	0%	100%	Development
JWWP-8	Pipe Upgrade – Walpole Street from Peel Street to Talbot Street (300 to 375 mm ø)	Only some portions required in 20-year (2038) planning horizon. Pipe upgrade – Walpole Street from Peel Street to Talbot Street - must be regraded to allow sufficient flow (300 to 375 mm ø). Costs updated for adjusted lengths and inflation.	$19,000	$93,000	0%	100%	Development

2010 MSP System Component	Description	Review Comment	Updated Cost Estimate 2018-2038 (2018$)	Updated Cost Estimate >2038 (2018$)	Funding		Trigger/ Timing
					County	Developer	
JWWP-10	Pipe Replacement – Peel Street East at Craddock Boulevard (200 mm ø)	Sections are operating at between 90% and 100% of capacity however entire stretch of Craddock is 200mm and all would need upgraded to avoid downsizing pipes or regraded to achieve slopes - no flooding issues recorded, do not upgrade.	n/a	n/a	0%	100%	Development
JWWP-12	Vacant Lot 14 Development – Drain Crossing (200 mm ø)	Required beyond 20-year (2038) planning horizon.	$0	$167,000	0%	100%	Development
Sewermain to 2038 Sub-Total			**$1,316,000**	**$1,610,000**			
Total Wastewater Cost to 2038			**$7,524,000**	**$1,810,000**			

6.0 STORMWATER SERVICING ALTERNATIVES UPDATE

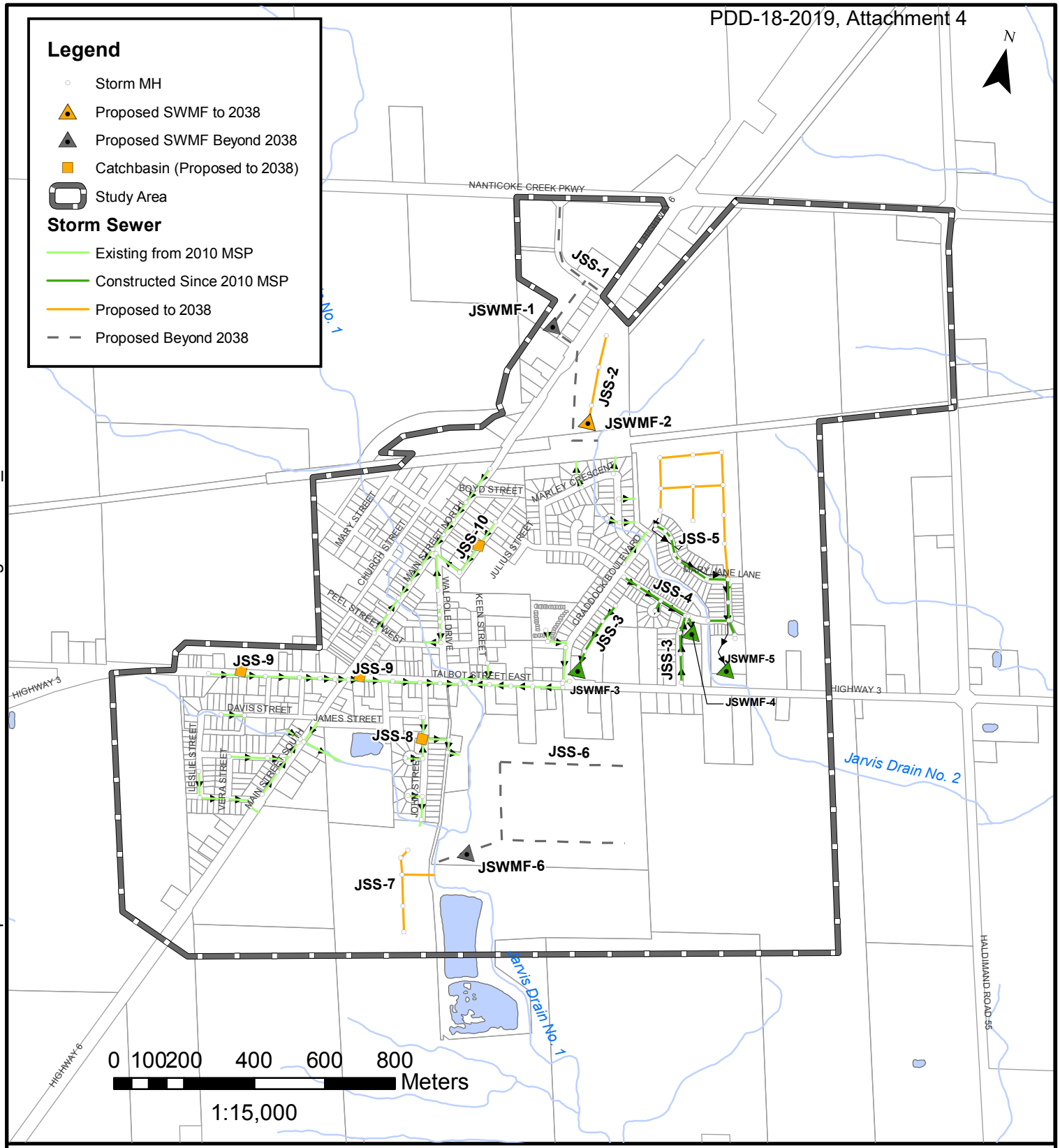
6.1 Future Servicing Requirements and Evaluation

In Work Package 2 (JLR, June 7, 2019) the stormwater conveyance model was updated to include future population growth to 2038. In the 2010 MSP a long list of potential storm water servicing strategies was developed to identify feasible stormwater management options for each of the main development areas. The list was comprehensive and covers a wide range of options available today. The flow capacity of storm sewers was updated and reviewed under the proposed storm water management solution (refer to Appendix C). As found in the 2010 MSP, the proposed solution was able to address the issues identified under the 20-year growth scenario.

The proposed storm water management system is shown in Figure 6. Stormwater infrastructure to serve development anticipated in the 20-year planning horizon (2038) is shown in orange. In the 2010 Master Servicing Plan, consideration was given to servicing vacant lands beyond to 20-year planning horizon. Stormwater infrastructure to serve these vacant lands are shown in grey. Updates to the proposed collection system since the 2010 MSP are summarized in Section 6.2.

6.2 Updated Preferred Alternative and Implementation

Required projects and cost estimates were updated for the various stormwater management projects proposed in the 2010 MSP. A summary of the projects and costs is provided in Figure 5 and Table 3. The total cost of the proposed upgrades to meet 20-year projected demands is $1,516,000.



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JARVIS MASTER SERVICING PLAN UPDATE

JARVIS, HALDIMAND COUNTY, ONTARIO

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FUTURE (2038) STORMWATER DRAINAGE SYSTEM

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FIGURE 5

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Table 3 Cost Estimate and Timing of Preferred Stormwater Servicing Alternative

2010 MSP System Component	Description	Review Comment	Updated Cost Estimate 2018-2038 (2018$)	Updated Cost Estimate >2038 (2018$)	Funding		Trigger/ Timing
					County	Developer	
JSS-1	525-900 mm ø Site Sewer	Required beyond 20-year (2038) planning horizon.	$0	$1,227,000	0%	100%	Developer
JSS-2	450-600 mm ø Site Sewer	No change from 2010 MSP, updated for inflation.	$268,000	$0	0%	100%	Developer
JSS-3	450 mm ø Site Sewer	Constructed since 2010 MSP, no longer required.	n/a	n/a	0%	100%	Developer
JSS-4	300-750 mm ø Site Sewer	Constructed since 2010 MSP, no longer required.	n/a	n/a	0%	100%	Developer
JSS-5	300-900 mm ø Site Sewer	Constructed since 2010 MSP, no longer required.	n/a	n/a	0%	100%	Developer
JSS-6	675-975 mm ø Site Sewer	Required beyond 20-year (2038) planning horizon.	$0	$1,583,000	0%	100%	Developer
JSS-7	300-450 mm ø Site Sewer	No change from 2010 MSP, updated for inflation.	$925,000	$0	0%	100%	Developer
JSS-8	Catchbasin Inlet Control Device on John Street	No surcharge to surface in model, upgrade if there is a flooding issue or lifecycle renewals are required.	n/a	n/a	100%	0%	Not required
JSS-9	Catchbasin Inlet Control Device on Talbot Street West End; Additional Inlet Capacity at Talbot Street and Main Street	No surcharge to surface in model, upgrade if there is a flooding issue or lifecycle renewals are required.	n/a	n/a	100%	0%	Not required
JSS-10	Catchbasin Inlet Control Device on Monson Street	Not required due to Monson Street upgrades.	n/a	n/a	100%	0%	Not required

2010 MSP System Component	Description	Review Comment	Updated Cost Estimate 2018-2038 (2018$)	Updated Cost Estimate >2038 (2018$)	Funding		Trigger/ Timing
					County	Developer	
JSS-11	375-750 mm ø Sewer Aligned on Lafayette, Craddock and Peel St.	Not required due to alternative solution under construction.	n/a	n/a	75%	25%	Under construction
Stormsewers to 2038 Sub-Total			**$1,193,000**	**$2,810,000**			
JSWMF-1	Quantity and Quality Control Wet Pond	Required beyond 20-year (2038) planning horizon.	$0	$413,000	0%	100%	Development
JSWMF-2	Quantity and Quality Control Wet Pond	No change from 2010 MSP, updated for inflation.	$323,000	$0	0%	100%	Development
JSWMF-3	Quantity and Quality Control Wet Pond	Constructed since 2010 MSP, no longer required.	n/a	n/a	0%	100%	Development
JSWMF-4	Quantity and Quality Control Wet Pond	Constructed since 2010 MSP, no longer required.	n/a	n/a	0%	100%	Development
JSWMF-5	Quantity and Quality Control Wet Pond	Constructed since 2010 MSP, no longer required.	n/a	n/a	0%	100%	Development
JSWMF-6	Quantity and Quality Control Wet Pond	Required beyond 20-year (2038) planning horizon.	$0	$691,000	0%	100%	Development
Stormwater Management Facility to 2038 Sub-Total			**$323,000**	**$1,104,000**			
Total Stormwater Infrastructure Costs to 2038			**$1,516,000**	**$3,914,000**			

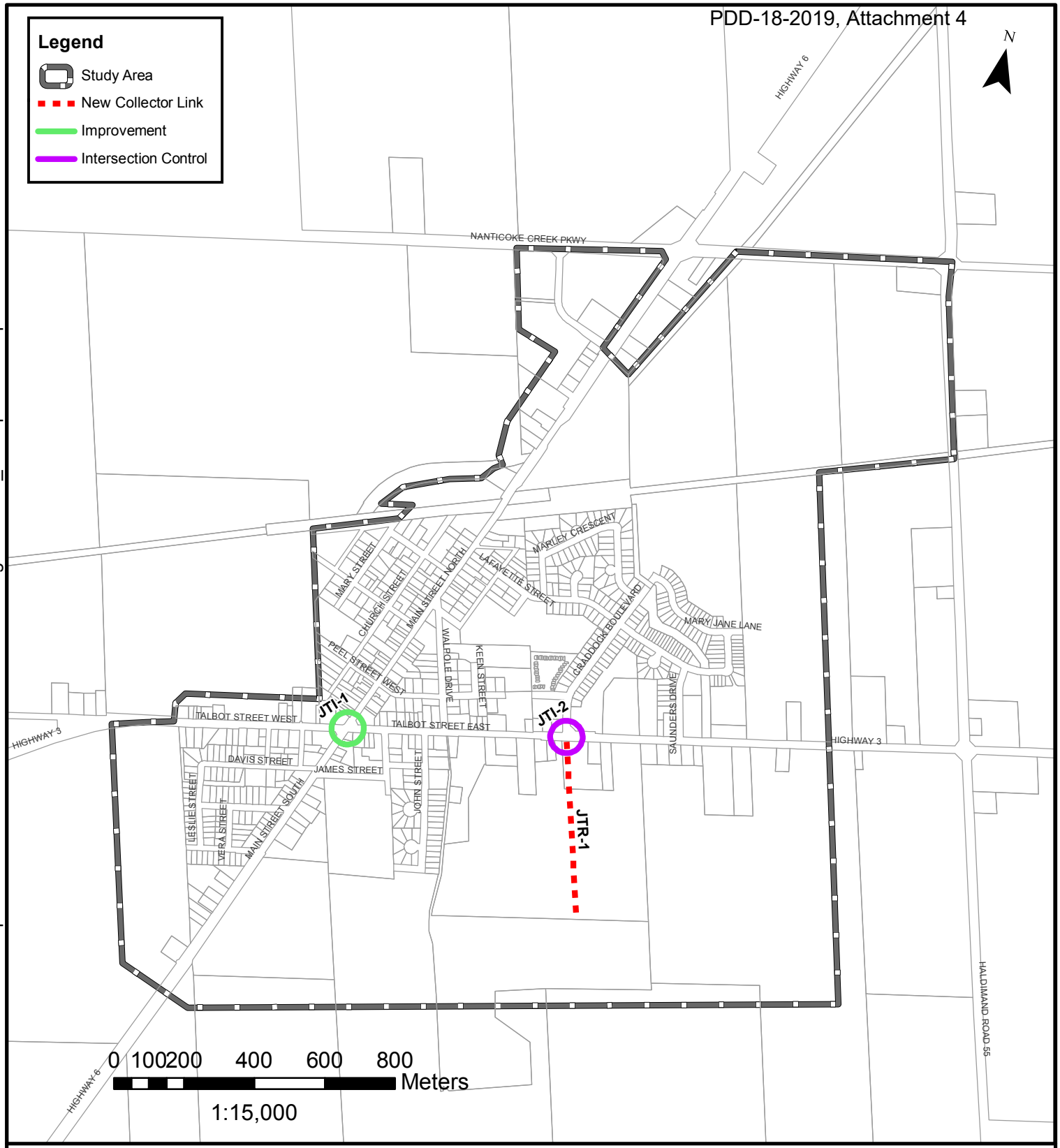
7.0 TRANSPORTATION SERVICING ALTERNATIVES UPDATE

7.1 Future Servicing Requirements and Evaluation

In Work Package 2 (JLR, June 7 2019) the transportation model was updated to include future population growth to 2038. The proposed transportation system is shown in Figure 6. Updates to the proposed transportation system since the 2010 MSP are summarized in Section 7.2.

7.2 Updated Preferred Alternative and Implementation

Required projects and cost estimates were updated for the various transportation projects proposed in the 2010 MSP. A summary of the projects and costs is provided in Figure 6 and Table 4. The total cost of the proposed upgrades to meet 20-year projected growth is $1,060,000.



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JARVIS MASTER SERVICING PLAN UPDATE

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TRANSPORTATION IMPROVEMENTS

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FIGURE 6

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Table 4 Cost Estimate and Timing of Preferred Transportation Alternative

2010 MSP System Component	Description	Review Comment	Updated Cost Estimate 2018-2038 (2018$)	Updated Cost Estimate >2038 (2018$)	Funding		Trigger/ Timing
					County	Developer	
JTI-1	Talbot Street West – Main Street South. Intersection Improvement – provide auxiliary lanes	No change from 2010 MSP, updated for inflation (may need to deduct for work already completed).	$446,000	$0	100%	0%	0 - 5 years
JTI-2	Talbot Street East – New Collector. Intersection Improvement – signalization	This is not required to service 20-year growth projections. Project would have to meet MTO warrents and is being considered as part of MTO's planning.	n/a	$0	TBD	TBD	Development
JTR-1	New Collector	Required beyond 20-year (2038) planning horizon. Updated for inflation.	$0	$2,230,000	0%	100%	Development
JTR-2	Main Street North. Improved Street Design.	No longer required.	n/a	n/a	100%	0%	0 - 5 years
JTR-3	Talbot Street. Improved bicycle and pedestrian environment.	No longer required.	n/a	n/a	100%	0%	Development
Transportation to 2038 Total			**$1,060,000**	**$2,230,000**			

8.0 CONCLUSION

This work package has been prepared for the exclusive use of Haldimand County, for the stated purpose. Its discussions and conclusions are summary in nature and cannot be properly used, interpreted or extended to other purposes without a detailed understanding and discussions with the client as to its mandated purpose, scope and limitations. This report was prepared for the sole benefit and use of Haldimand County and may not be used or relied on by any other party without the express written consent of J.L. Richards & Associates Limited.

J.L. RICHARDS & ASSOCIATES LIMITED

Prepared by:

Jane Wilson, P.Eng.
Environmental Engineer

Reviewed by

Michael Troop, P.Eng.
Senior Environmental Engineer

9.0 REFERENCES

Haldimand County Services and Planning Division. Design Criteria, Version 4.0, April 2015.

Ministry of the Environment, Conservation and Parks. *Design Guidelines for Sewage Works*, 2008.

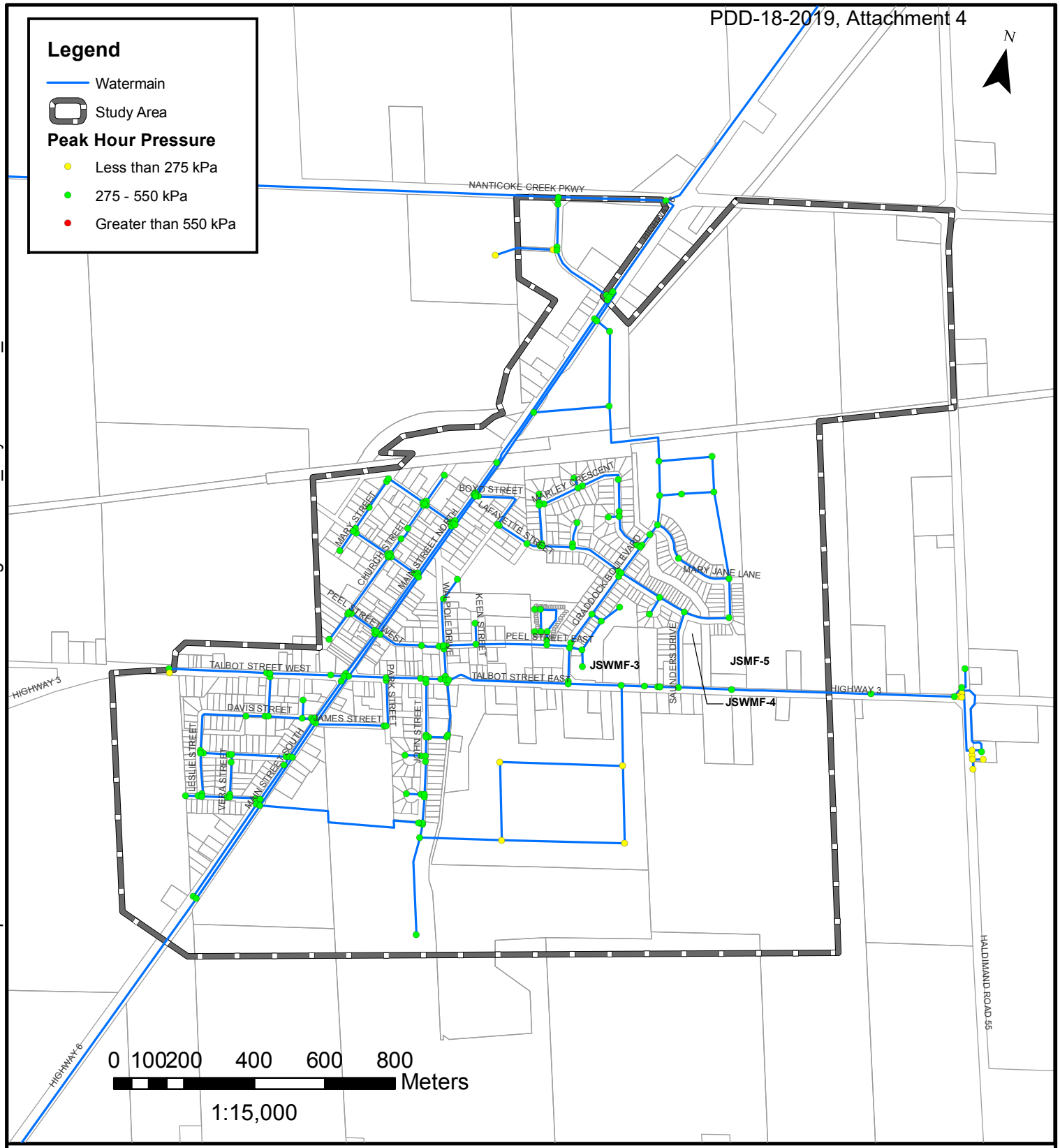
Watson & Associates Economists Limited. *Population, Housing and Employment Projections Study Update, 2016-2046 - Preliminary Draft Findings*. October 2018.

Watson & Associates Economists Limited. *Haldimand County Development Charge Background Study*, April 2014.

Appendix A

Water

PDD-18-2019, Attachment 4



PROJECT:

JARVIS MASTER SERVICING PLAN UPDATE

JARVIS, HALDIMAND COUNTY, ONTARIO

DRAWING:

PROPOSED SYSTEM PRESSURES UNDER PEAK HOUR DEMAND - ALTERNATIVE 1

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ENGINEERS · ARCHITECTS · PLANNERS
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DESIGN:	BP
DRAWN:	KTK
CHECKED:	JW
JLR #:	28176

DRAWING #: A1

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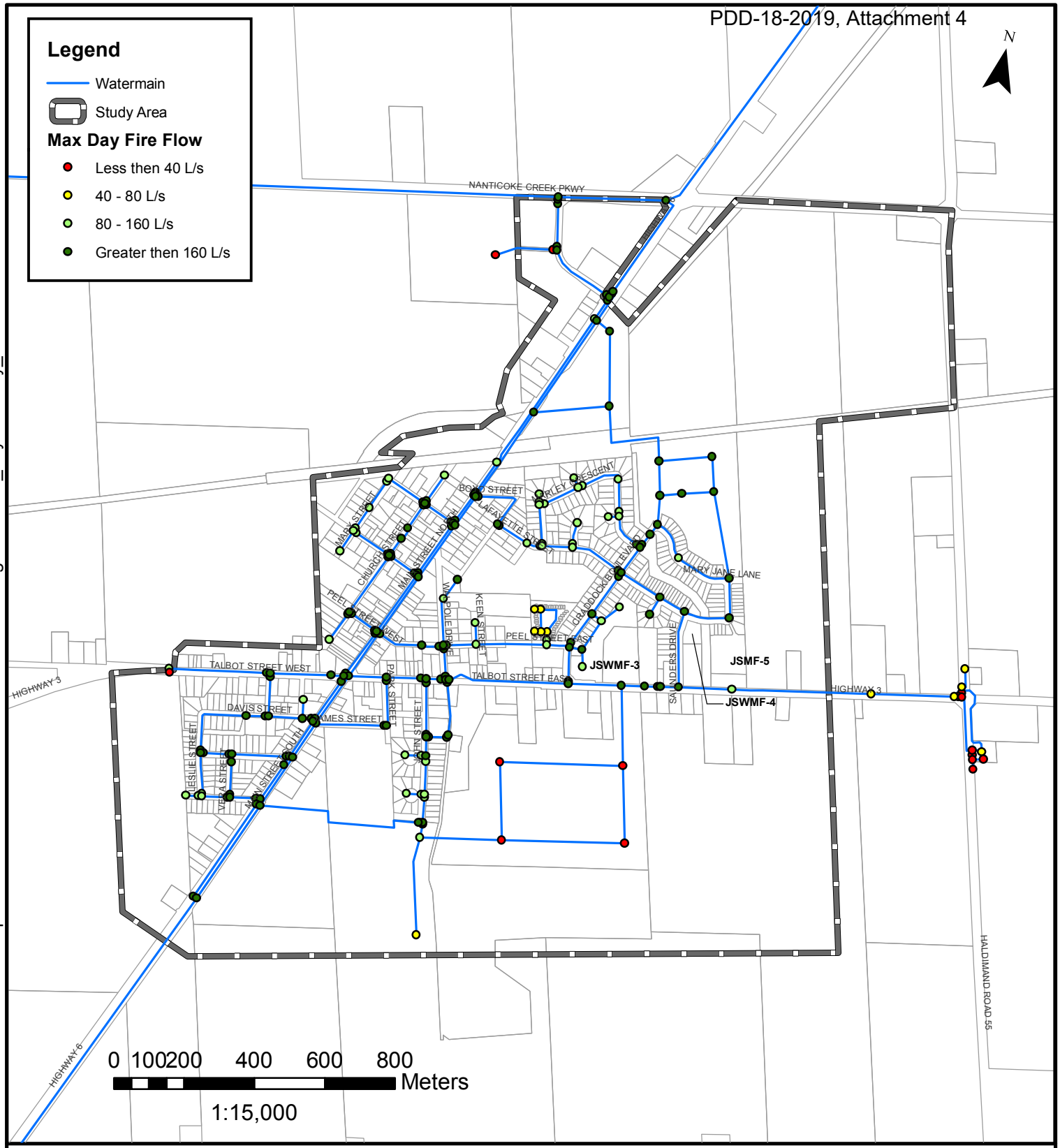

PROJECT:

JARVIS MASTER SERVICING PLAN UPDATE

JARVIS, HALDIMAND COUNTY, ONTARIO

DRAWING:

PROPOSED AVAILABLE FIRE FLOW UNDER MAXIMUM DAY DEMAND - ALTERNATIVE 1

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DESIGN:	BP
DRAWN:	KTK
CHECKED:	JW
JLR #:	28176

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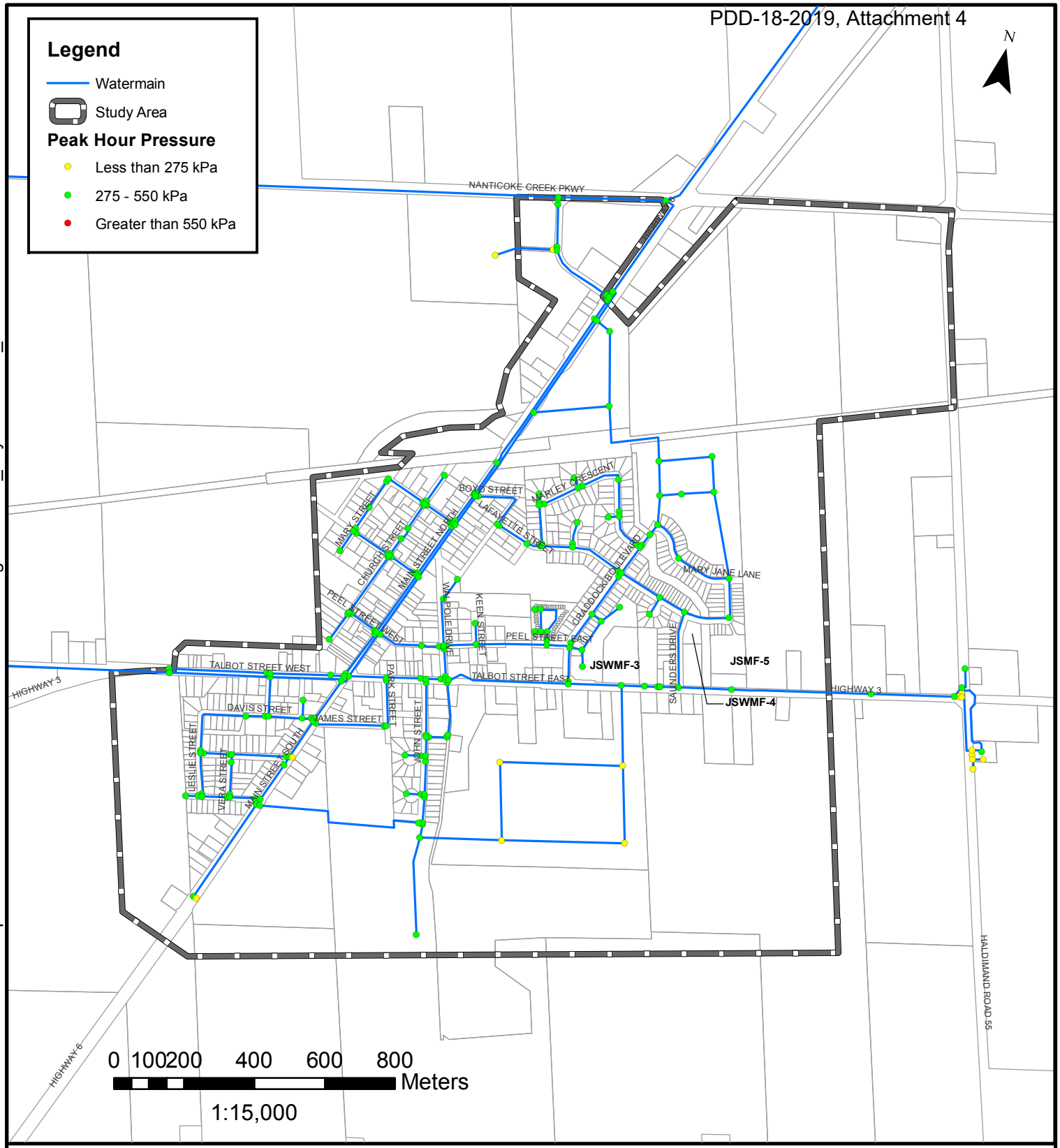

PROJECT:

JARVIS MASTER SERVICING PLAN UPDATE

JARVIS, HALDIMAND COUNTY, ONTARIO

DRAWING:

PROPOSED SYSTEM PRESSURES UNDER PEAK HOUR DEMAND - ALTERNATIVE 2

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DESIGN:	BP
DRAWN:	KTK
CHECKED:	JW
JLR #:	28176

DRAWING #: A3

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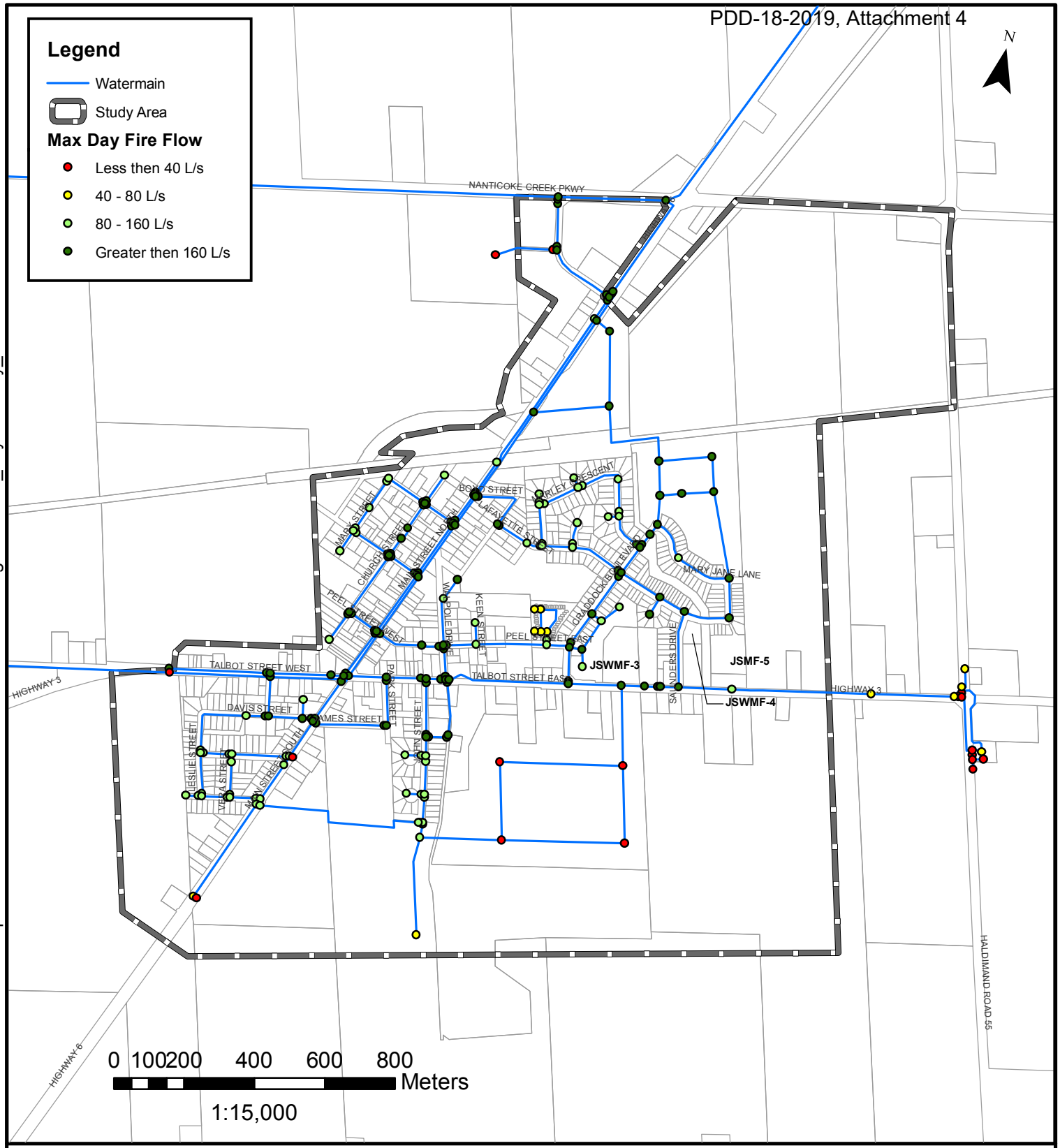

PROJECT:

JARVIS MASTER SERVICING PLAN UPDATE

JARVIS, HALDIMAND COUNTY, ONTARIO

DRAWING:

PROPOSED AVAILABLE FIRE FLOW UNDER MAXIMUM DAY DEMAND - ALTERNATIVE 2

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DESIGN:	BP
DRAWN:	KTK
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JLR #:	28176

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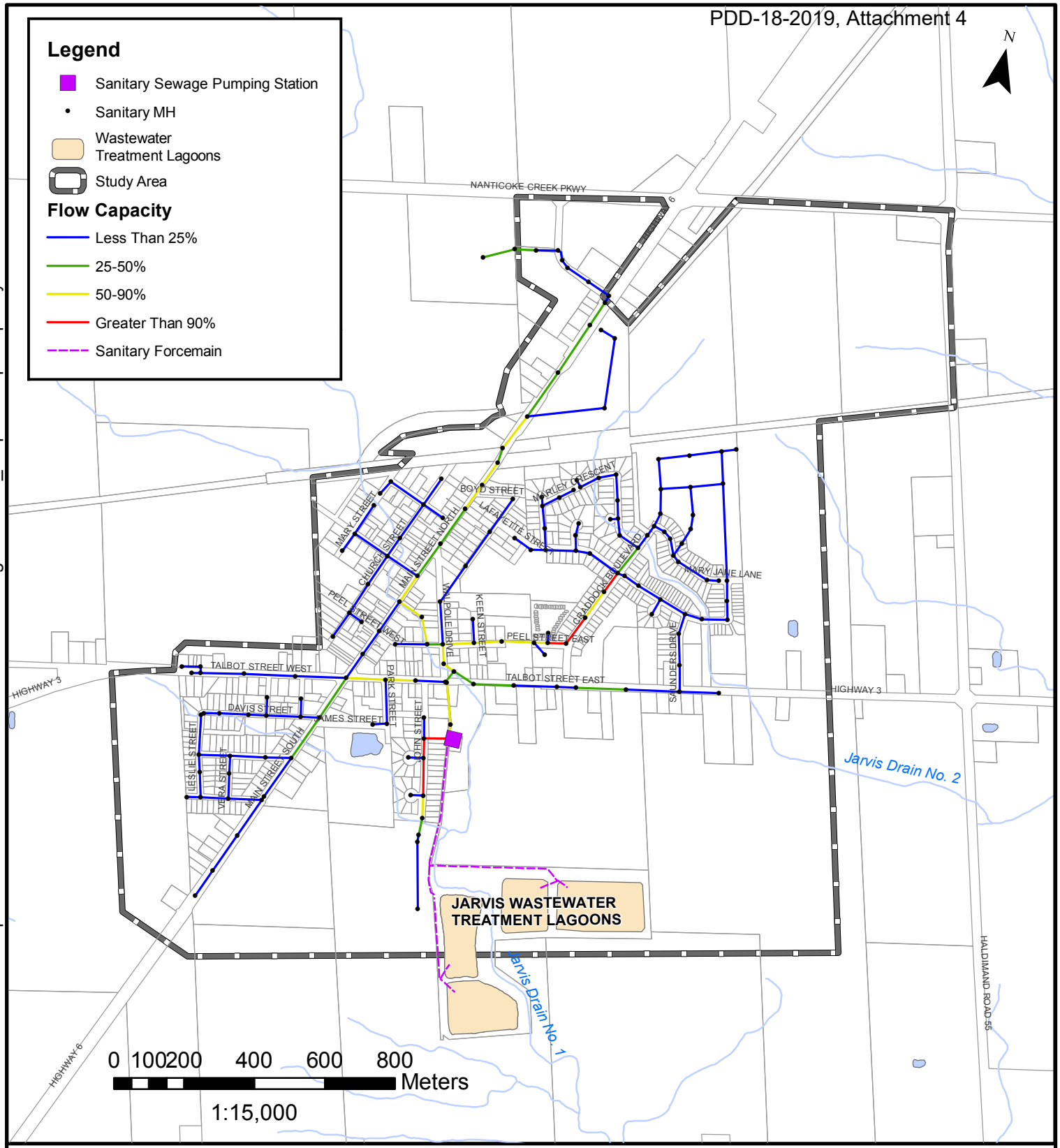
Appendix B

Wastewater

PDD-18-2019, Attachment 4



PROJECT:

JARVIS MASTER SERVICING PLAN UPDATE

JARVIS, HALDIMAND COUNTY, ONTARIO

DRAWING:

PROPOSED (2038) FLOW TO PIPE CAPACITY RATIO

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DESIGN:	BP
DRAWN:	KTK
CHECKED:	JW
JLR #:	28176

DRAWING #: A5

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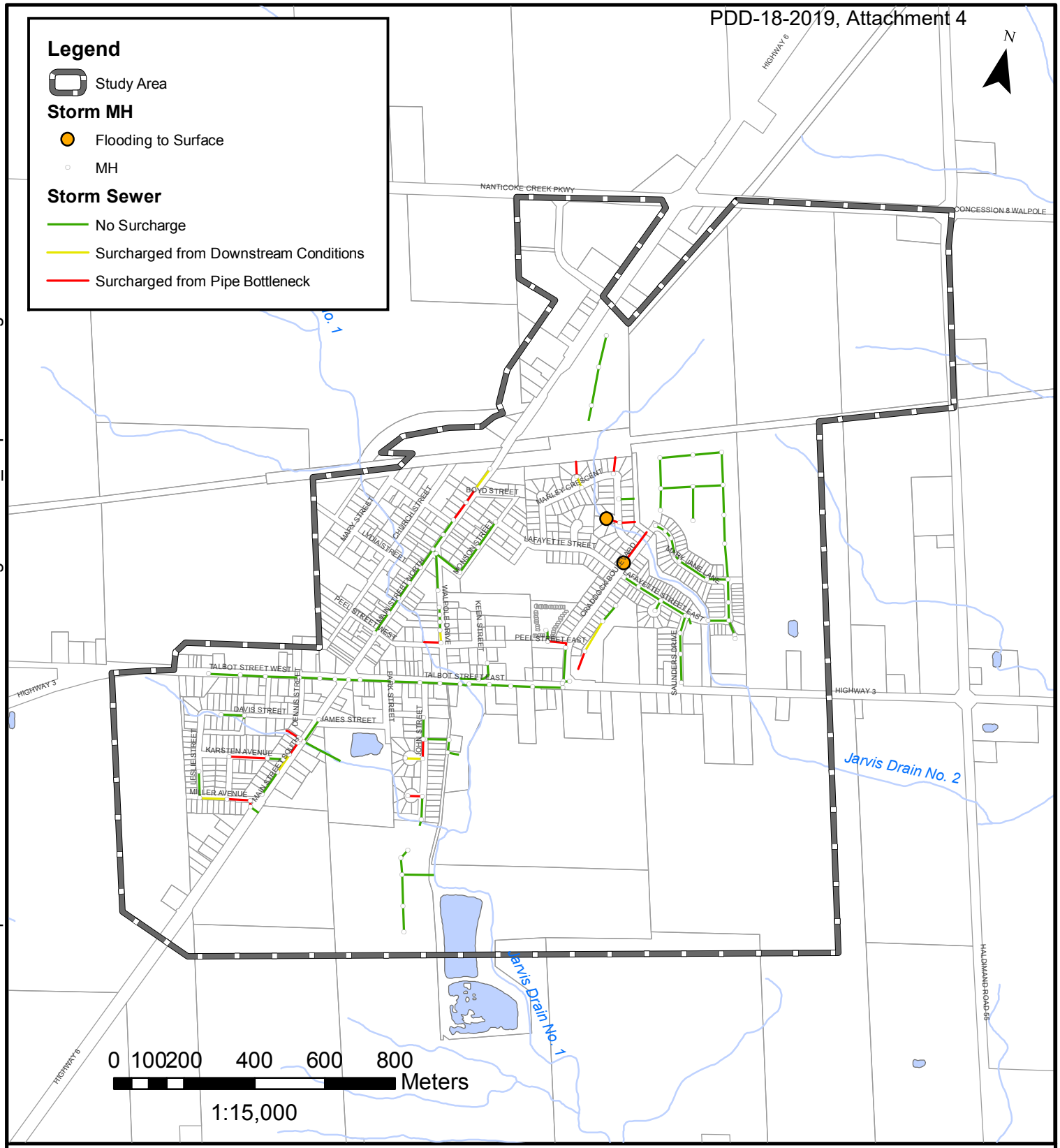
Plot Date: May 14, 2019 10:06:18 AM

Appendix C

Stormwater



PROJECT:

JARVIS MASTER SERVICING PLAN UPDATE

JARVIS, HALDIMAND COUNTY, ONTARIO

DRAWING:

PROPOSED (2038) SURCHARGE TO SURFACE MAP UNDER 5-YEAR

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DESIGN:	BP
DRAWN:	KTK
CHECKED:	JW
JLR #:	28176

DRAWING #: A6

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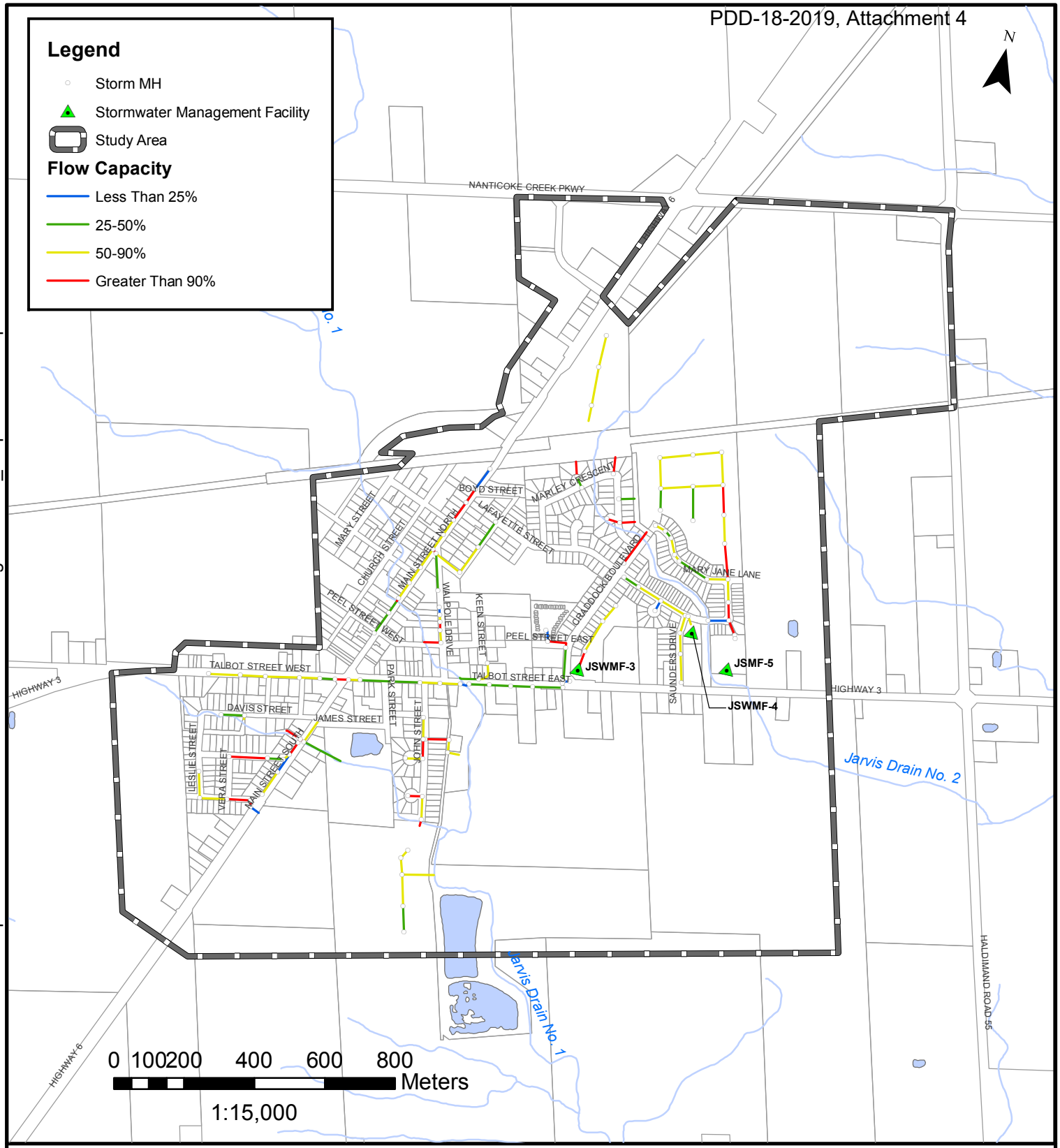
PDD-18-2019, Attachment 4



PROJECT:

JARVIS MASTER SERVICING PLAN UPDATE

JARVIS, HALDIMAND COUNTY, ONTARIO

DRAWING:

PROPOSED (2038) FLOW TO PIPE CAPACITY RATIO

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DESIGN:	BP
DRAWN:	KTK
CHECKED:	JW
JLR #:	28176

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File Location: P:\28000\28176-000 - Jarvis Master Plan Update\3-Production\1-Civil\GIS\Work Package 3\28176_ProposedStmCapFlow.mxd

Plot Date: May 14, 2019 8:18:32 AM

Appendix D

Transportation Report

Memorandum

07 June 2019
Project: 180197

To
Jane Wilson
Environmental Engineer
J.L. Richards & Associates Limited

From
Rajan Philips, P.Eng.
Senior Transportation Consultant
Paradigm Transportation Solutions Limited

RE: JARVIS MASTER SERVICING PLAN, TECHNICAL MEMORADUM 3, 2010 MSP REVIEW

Haldimand County is undertaking an update of the 2010 Master Servicing Plan (MSP) for the community of Jarvis in support of planned growth and intensification identified in the County's Official Plan. This Memo (**Table 1**) summarizes the transportation recommendations of the 2010 MSP, and their current review status.

TABLE 1: REVIEW OF 2010 MSP RECOMMENDATIONS

2010 MSP Recommendations	Review Comments
1. Monitoring and implementing mitigative measures (i.e. parking restrictions, revised lane designations) to improve intersection operations at Talbot Street (Highway 3) and Main Street (Highway 6) intersection. <u>Cost Estimate:$400,000</u>	• Talbot/MainStreet intersection is identified for improvements in the current update. • Nanticoke Creek Parkway and Highway 6 intersection is also identified for improvements. • Potential improvements will require MTO review/approval. <u>Cost Allocation:</u> Allocate $400,000, subject to deducting for work already completed.

2. Highway 6 By-pass: Need for a new collector road connecting to Highway 3 (Talbot Street) to accommodate developments in southwest Jarvis. Cost Estimate: $550,000	• This is not required to service 20-year growth projections. Also, it is beyond the scope of the Jarvis Master Plan, and is being considered as part of MTO's planning. Cost Allocation: Not required
3. Main Street North. Improved Street Design. $300,000	• No further improvements are required. Cost Allocation: Not required.
4. Talbot Street. Improved bicycle and pedestrian environment. Cost Estimate: $250,000	• No further improvements are required. Cost Allocation: Not required.

The 2010 MSP recommended $950,000.00 for Talbot Street / Main Street improvements. The updated cost allocation totals about $400,00 subject to detailed cost estimates.

Yours very truly,

PARADIGM TRANSPORTATION SOLUTIONS LIMITED

Rajan Philips
M.A.Sc., P.Eng, FITE
Senior Transportation Consultant