BARRHAVEN CONSERVANCY WEST: WATER DISTRIBUTION SYSTEM ANALYSIS
Final Report

January 13, 2023

Prepared for:
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Prepared by:
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Project Number:
163401817

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1	Final	AMG	20230111	AP	20230113	AP	20230113

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1 Introduction

To support David Schaeffer Engineering Ltd (DSEL) with their conceptual design submission for the Barrhaven Conservancy West development lands, Stantec Consulting Ltd. (Stantec) was requested to provide engineering services to complete a water distribution system analysis for this proposed development located within the City of Ottawa's (City) South Urban Community (SUC). The purpose of the analysis is to confirm associated watermain sizing and redundancy needs.

For this assignment, Stantec's scope of work included the following tasks:

1. Reviewing background information and establishing updated water demands for the Conservancy West development area based on the most current draft plan;
2. Preparing and submitting a boundary condition request to the City;
3. Updating the stand-alone hydraulic model, developed for the Conservancy East lands in a previous assignment (Stantec Consulting Ltd., 2022), to include the distribution system within the Conservancy West lands using boundary conditions provided by the City;
4. Assessing Fire Underwriters Survey (FUS) fire flow requirements;
5. Setting up and running model simulations for average day (AVDY), peak hour (PKHR), and maximum day (MXDY) plus fire flow demands to identify watermain sizing and redundancy needs required for the water distribution system within the development lands to meet design criteria; and,
6. Documenting the approach used, findings and recommendations from the analysis.

1.1 Study Area

The study area, referred to as the Barrhaven Conservancy development lands, is located in the City's southwestern suburban neighbourhood of Barrhaven. The lands are situated between Strandherd Dr to the north, the Jock River to the south, Fraser-Clark Drain to the east, and bisected by Borrisokane Rd through the western portion. The Conservancy West development lands will proceed once all phases within the East development lands have been built out. The distribution network within the Conservancy East lands was analyzed under a previous assignment (Stantec Consulting Ltd., 2022).

Based on the latest draft plan provided by DSEL (dated December 1, 2022), the proposed Conservancy West development will comprise a total of 462 single family home (SFH) units and 499 townhouse (MLT) units (consisting of a combination of back-to-back and standard townhouse units) for a total estimated population of 2,918 persons. More details on phasing and population estimates are provided in **Section 1.2**.

Based on a previously completed serviceability study for these lands (Stantec Consulting Ltd., 2021, Stantec Consulting Ltd., 2022), this residential community, which is currently situated adjacent to Pressure Zone 3SW (previously known as Zone BARR), is ultimately planned to be serviced by the future Zone SUC. In 2015, the City embarked on a large initiative to reconfigure the pressure zones servicing Barrhaven and the southern reaches of Ottawa (i.e., SUC).

The latest information provided by the City indicates that the pressure zone reconfiguration is planned to be completed by mid 2025.The purpose of the zone reconfiguration is to improve reliability and efficiencies, and to provide increased pumping capacity for future growth. As such, these development lands are to be serviced by two existing connections to the existing distribution network, both of which are currently part of Zone 3SW and will ultimately be part of Zone SUC, as well as a future connection located south of the Jock River. The connections include the following locations as shown in **Figure 1-1**:

1. The existing 305 mm stub extending from Chapman Mills Dr (east of Kennedy-Burnett Pond);
2. The T-junction on the existing 203 mm watermain at Danson Gardens Grv and Darjeeling Ave; and
3. A future 305 mm stub at the intersection of Flagstaff Drive and Borrisokane Road, which requires crossing the Jock River.

Previous studies analyzed the serviceability of the Barrhaven Conservancy Lands via the two (2) existing connections only, as well as with all three (3) connections. This study will only consider the three (3) connections, as it is the City's preferred option.

As previously mentioned, the development area will ultimately be serviced by the pressure Zone SUC once the reconfiguration is complete (planned by mid 2025). As such, the analysis and proposed watermain sizing and layout documented in this report only considers the Zone SUC servicing conditions.

1.2 Phasing Of Barrhaven Conservancy

For the purpose of this assessment, development within the Barrhaven Conservancy lands, as shown in **Figure 1-2**, is assumed to occur in the following phasing order:

1. Conservancy East lands – Comprising 782 SFH units, 606 MTL units, and three (3) parks for a total estimated population of 4,295 persons.
2. Conservancy West lands – Comprising 462 SFH units, 499 MTL units, and three (3) parks for a total estimated population of 2,918 persons.

Several subphases are planned for both the East and West lands, however only the ultimate buildout conditions of both phases (i.e., the buildout conditions of the Barrhaven Conservancy lands) will be analyzed herein. **Figure 1-2** also shows the proposed building types throughout the Conservancy lands.

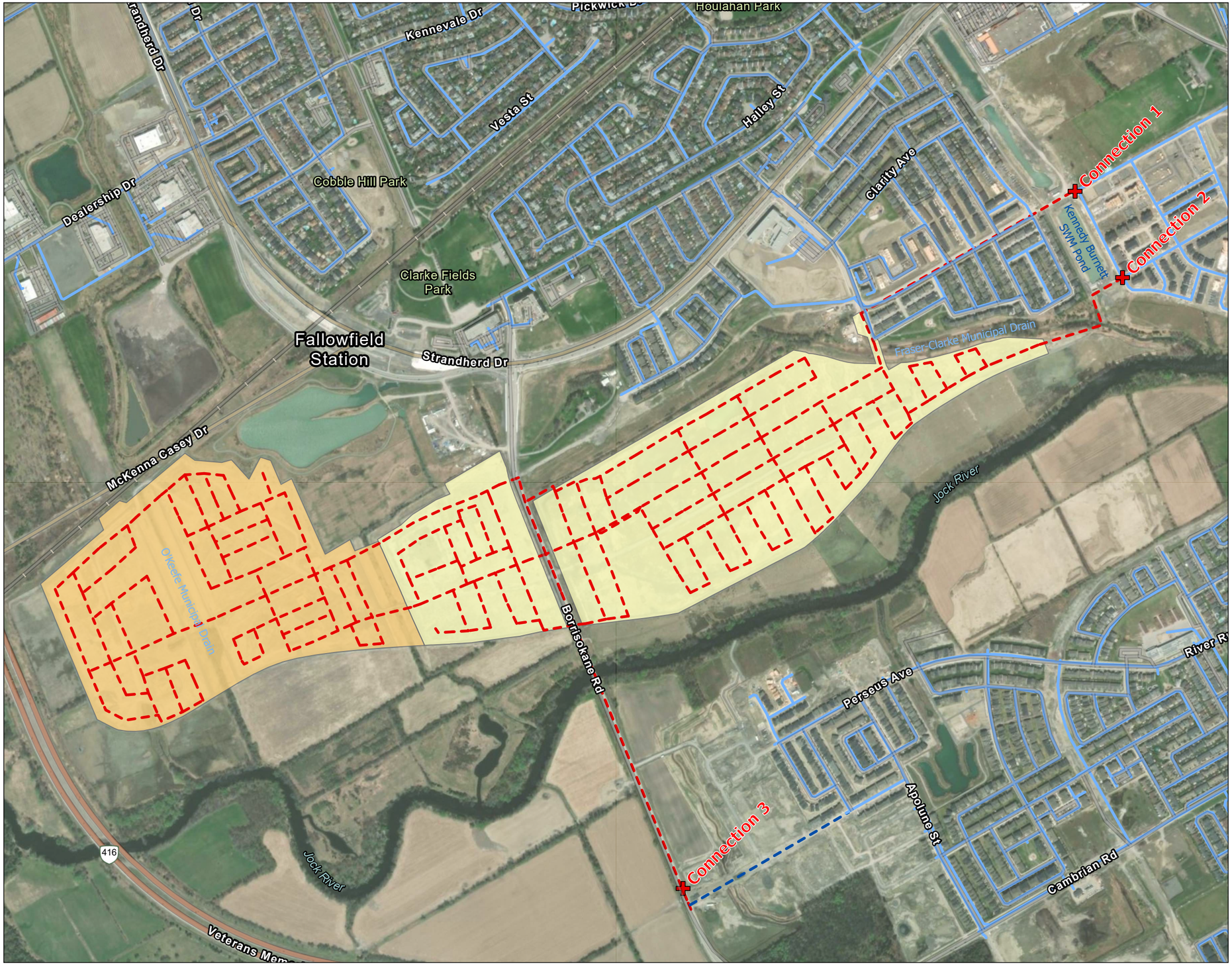


Figure No.

1-1

Title

Connections to Existing Water Distribution Network

Client/Project

David Schaeffer Engineering Ltd
Barrhaven Conservancy West: Water Distribution System Analysis

Project Location

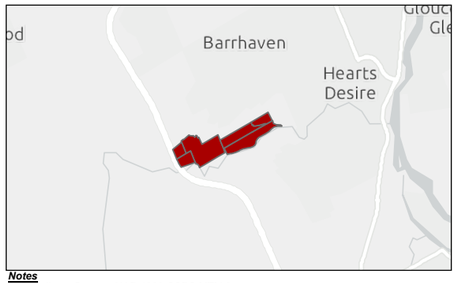
Ottawa, Ontario, Canada

N

0 150 300 Meters
(At original document size of 11x17)
1:10,000

Legend

- Barrhaven Conservancy West
- Barrhaven Conservancy East
- Existing Distribution Watermain
- Connection Location
- Future Distribution Watermain
- Future Watermain to Service Barrhaven Conservancy Lands



Notes

1. Coordinate System: NAD 1983 CSRS MTM 9
2. Background: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
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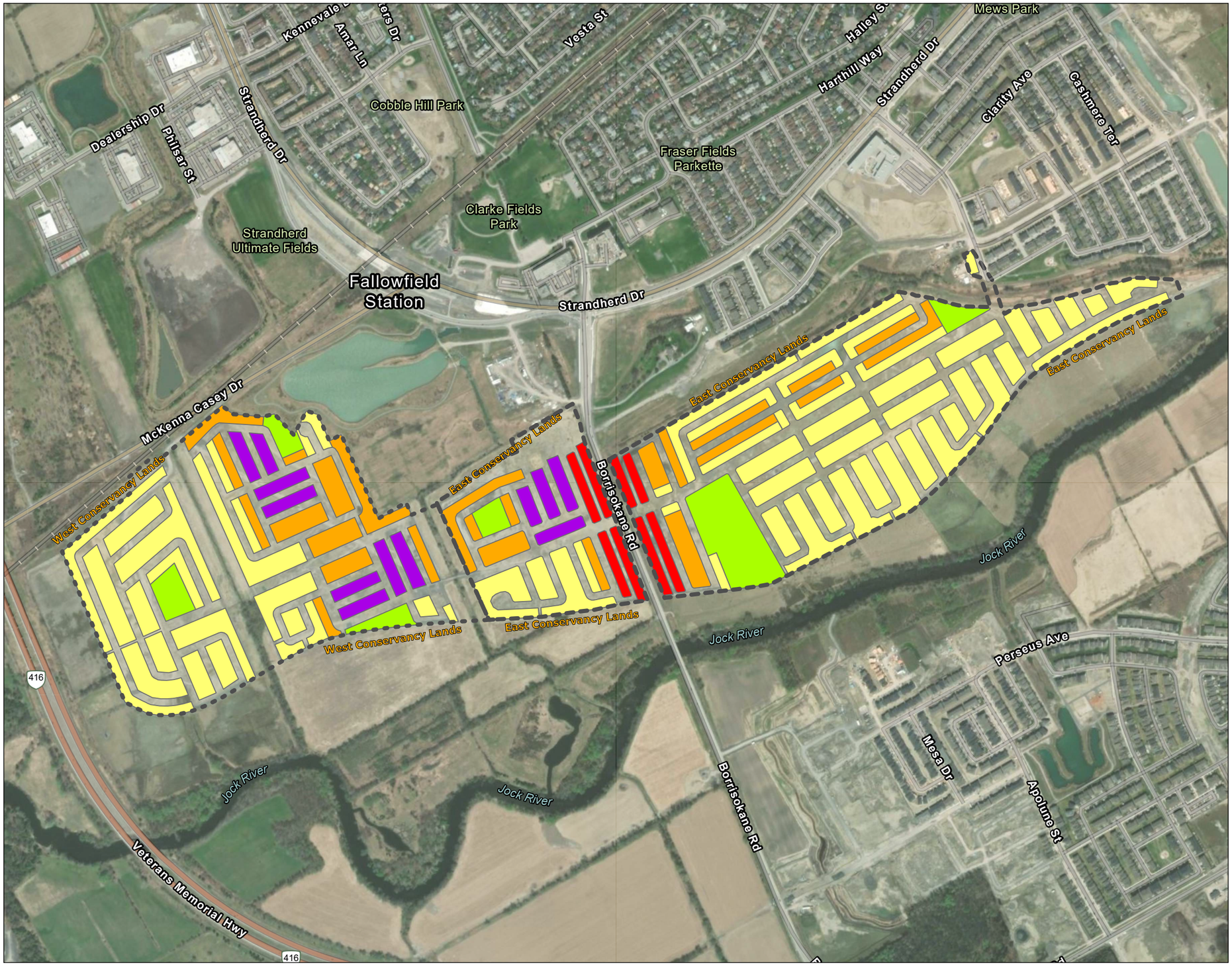


Figure No.

1-2

Title

Phasing Plan of Barrhaven Conservancy Lands

Client/Project

David Schaeffer Engineering Ltd
Barrhaven Conservancy West: Water Distribution System Analysis

Project Location

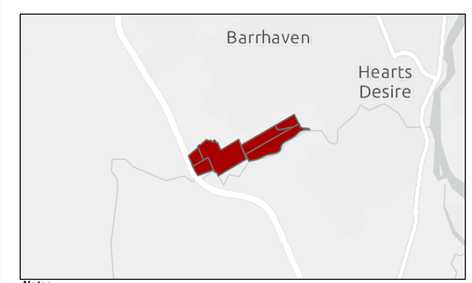
Ottawa, Ontario, Canada

N

0 150 300 Meters
(At original document size of 11x17)
1:9,000

Legend

- Development Phase Boundary
- Single Family Home (SFH)
- Standard Townhouse (STND TH)
- Rear-Lane Townhouse (RLTH)
- Back-to-Back Townhouse (B2B)
- Park



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2 Hydraulic Assessment

The City of Ottawa Water Design Guidelines (City of Ottawa, 2010) and criteria outlined in the 2013 Water Master Plan (WMP) were used to establish water demands, level of service and pressure objectives during normal and emergency conditions. As per the City's design guidelines and Technical Bulletin ISTB-2021-03, since this is a new development involving the design of new watermains, the design shall consider a required fire flow established using the calculation method published by the Fire Underwriters Survey (FUS).

2.1 Serviceability

2.1.1 SYSTEM PRESSURES

As per the City's Water Design Guidelines, the desired range of pressure under average day (AVDY), maximum day (MXDY) and peak hour (PKHR) demands is 345 to 552 kPa (50 to 80 psi) and no less than 276 kPa (40 psi) at ground elevation (i.e., at street level). The maximum pressure at any point in the water distribution system should not exceed 552 kPa (80 psi). Pressure reducing measures are required to service areas where pressures greater than 552 kPa (80 psi) are anticipated.

Under emergency fire conditions, the system must be able to supply appropriate fire flow while maintaining a residual pressure of 138 kPa (20 psi).

Figure 2-1 shows the elevations of each model junction within the Conservancy West lands. Proposed grades range from 92.5 m to 93.8 m, based on the grading plan provided by DSEL. Elevations in the Conservancy East lands range from 92.4 m to 93.5 m.

2.1.2 FIRE FLOWS

The City requires a fire flow assessment to be completed to demonstrate that local watermains can provide the objective fire flows. However, information regarding unit sizes and unit separation is not available at this time and as such, FUS calculations have not been completed.

As a result, the required fire flow for the governing unit design established for the Conservancy East lands (Stantec Consulting Ltd., 2022) of 13,000 L/min will be used for this analysis to ensure that the local watermains can provide this minimum fire flow at a residual pressure of 20 psi.

It is recommended that FUS calculations for the Conservancy West lands be reviewed at the detailed design stage to ensure that fire flow requirements are met across the site.

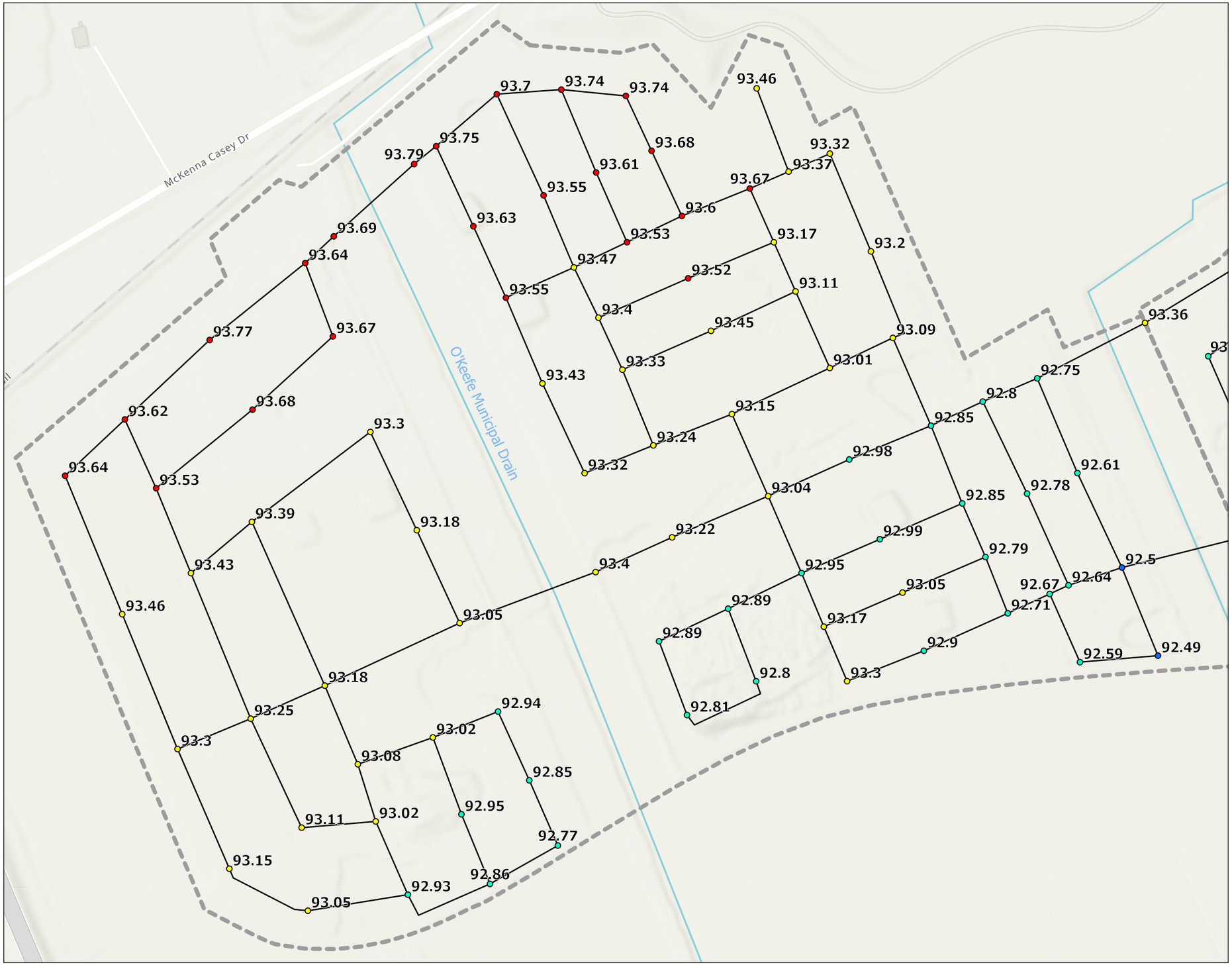


Figure No.
2-1

Title
Junction Elevation

Client/Project
David Schaeffer Engineering Ltd
Barrhaven Conservancy West: Water Distribution System Analysis

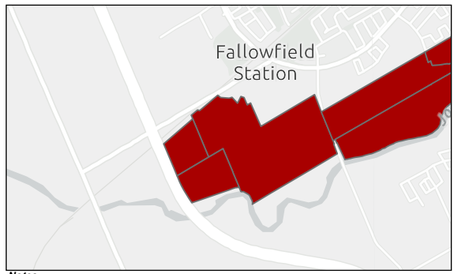
Project Location
Ottawa, Ontario, Canada

N

0 50 100 Meters
(At original document size of 11x17)
1:3,000

Legend
- Development Phase Boundary
- Future Watermain to Service Barrhaven Conservancy Lands

Ground Elevation (m)
- <92.5
- 92.5 - 93.0
- 93.0 - 93.5
- 93.5 - 94



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2.2 Growth Projections

The estimated residential population for Barrhaven Conservancy lands was estimated based on projected household sizes as per population densities (or persons per unit, PPU) specified in the City's Water Design Guidelines.

Table 2-1 shows the estimated number of units per phase of these development lands and the projected populations based on the distribution of residential types. The total number of units across the entire Barrhaven Conservancy lands is estimated to be 2,349 with a residential population of 7,213 persons.

Table 2-1: Estimated Unit Counts and Populations for Barrhaven Conservancy Lands

Phase	Unit Types	Units	PPU	Population
East	Singles	782	3.4	2,659
	Towns	606	2.7	1,636
	East Phase Sub-total	*1,388*	-	*4,295*
West	Singles	462	3.4	1,571
	Towns	499	2.7	1,347
	West Phase Sub-total	*961*	-	*2,918*
	Total	***2,349***		***7,213***

2.3 Demand Projections

As part of the 2022 Study (Stantec Consulting Ltd.) that analyzed the serviceability of the Conservancy East lands, the City requested that the criteria outlined in the City's Water Design Guidelines and Technical Bulletin ISTB-2021-03 were followed to establish water demands. This was considered a conservative approach, as the criteria in the City's Water Design Guidelines are more restrictive in comparison to the ones outlined in the 2013 City's Water Master Plan (WMP).

As such, the demand rates and peaking factors from the Water Design Guidelines and Technical Bulletin ISTB-2021-03 were applied to the population projections presented in **Table 2-2** based on land-use. For residential land-use, SFH and MLT units were assigned an average day (AVDY) consumption rate of 280 L/cap/d. To determine maximum day (MXDY) demands, the AVDY demands were multiplied by a residential peaking factor of 2.5. Peak hour (PKHR) demands were established by multiplying MXDY demands by a residential peaking factor of 2.2. Estimated AVDY, MXDY and PKHR demand projections are summarized in **Table 2-2**.

Table 2-2: Estimated Demand Projections for Barrhaven Conservancy Lands

Phase	Units	Population	AVDY (L/s)	MXDY (L/s)	PKHR (L/s)
East	1,388	4,295	13.92	34.80	76.55
West	961	2,918	9.46	23.64	52.01
Total	***2,349***	***7,213***	***23.38***	***58.44***	***128.57***

2.4 Model Development

Innovyze's InfoWater Pro (Version 3.5, Update #1) was used as a hydraulic modelling platform for the water distribution system analysis of the proposed West Conservancy development lands, and includes the previously assessed East Conservancy lands (Stantec Consulting Ltd., 2022). The model was developed to reflect the most current draft plan for the West Conservancy lands, including the proposed watermain layout (based on proposed road alignment) and water demands.

Watermains added to the model were assigned Hazen-Williams coefficients ("C-Factors") in accordance with the City's Water Design Guidelines. These factors are listed in **Table 2-3.**

Table 2-3: Hazen-Williams Coefficients by Watermain Size

Watermain Diameter (mm)	Coefficient
152	100
203 - 305	110
350 - 600	120
> 600	130

2.4.1 BOUNDARY CONDITIONS

The proposed development has three (3) connection points to the existing water distribution system. The boundary conditions provided by the City include hydraulic gradeline (HGL) values for Zone SUC servicing conditions. Values are provided in **Appendix A** and summarized in **Table 2-4**, and have been simulated in the hydraulic model using fixed head reservoirs to which HGLs have been applied for the respective demand scenarios.

Note that minor changes were made to the conceptual plans following the request for boundary conditions. Those changes include a net increase of 34 units (37 additional SFH units, 3 less MTL units), which have a minimal impact on residential water demands (+0.39 L/s for AVDY, and +2.10 L/s for PKHR). As such, boundary conditions listed in **Table 2-4** were used for this study, and updated boundary conditions will be requested from the City for a subsequent submission.

Table 2-4: HGL Boundary Conditions

HGL (m) Zone SUC Servicing Conditions			
Demand Scenario	**Three Connections**		
	Connection 1 (1)	**Connection 2** (2)	**Connection 3** (3)
AVDY	146.7	146.7	146.6
PKHR	141.4	141.3	141.0
AVDY +FF (4)	139.7	138.1	139.8
MXDY+FF (4)	137.9	136.2	137.9

Notes

(1) Ground elevation @ Connection 1 (Chapman Mills Dr) = 93.1 m.
(2) Ground elevation @ Connection 2 (Danson Gardens Grv / Darjeeling Ave) = 91.8 m.
(3) Ground elevation @ Connection 3 (Flagstaff Dr) = 92.3 m.
(4) FF of 13,000 L/min or 216.67 L/s.

2.4.2 PROPOSED WATERMAIN SIZING & LAYOUT

The layout and sizing of the watermains within the proposed development (both East and West) is shown in **Figure 2-2**. Within the Conservancy West lands, the network is proposed to consist of 152 mm, 203 mm, 254 mm, and 305 mm, with the 305 mm watermains acting as the hydraulic backbone throughout the development lands. The 305 mm backbone watermains connect at two (2) locations to the watermains within Conservancy East lands and extend west crossing the O'Keefe municipal drain at two (2) locations. Note that **Figure 2-2** is a schematic representation of the hydraulic model layout. The specific configuration of dead-end watermains, among other infrastructure, are not presented in the figure.

The proposed watermain layout contains two (2) dead-end watermains in the Conservancy West lands (noted on **Figure 2-2)**. This includes a dead-end watermain along the cul-de-sac, as well as another single looped watermain east of the O'Keefe municipal drain.

As per the City of Ottawa Water Distribution Design Guidelines, dead ends should be avoided as much as possible to limit potential water quality issues. Where dead-end watermains cannot be avoided, the guidelines specify a maximum watermain size of 150 mm, unless a larger size is needed for supply reasons. Dead-end #1 is proposed to be serviced by a 203 mm diameter watermain, whereas dead-end #2 is proposed to be serviced by a combination of 203 and 254 mm diameter watermains. <u>These pipe sizes are recommended to meet demands under fire flow conditions</u>. The configuration of the dead-end watermains will be as per de City's standard details and will be reviewed at the detailed design stage.

Furthermore, the maximum number of units along a dead-end watermain should not exceed 49 to avoid the creation of a vulnerable service area. Based on the latest concept plans, each dead-end watermain within the Conservancy West lands services fewer than 49 single-family units.

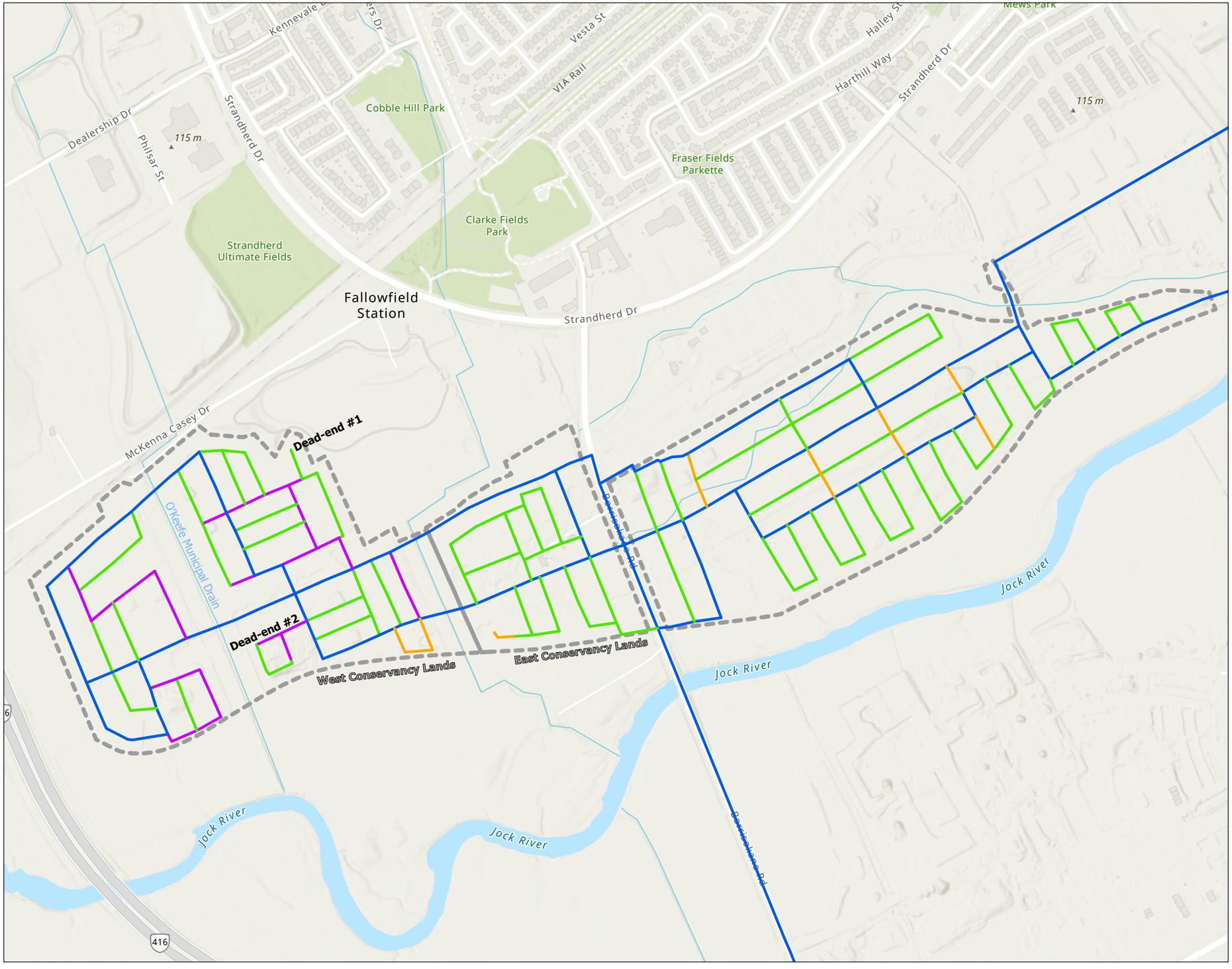


Figure No.

2-2

Title

Proposed Watermain Sizing & Layout

Client/Project

David Schaeffer Engineering Ltd
Barrhaven Conservancy West: Water Distribution System Analysis

Project Location

Ottawa, Ontario, Canada

N

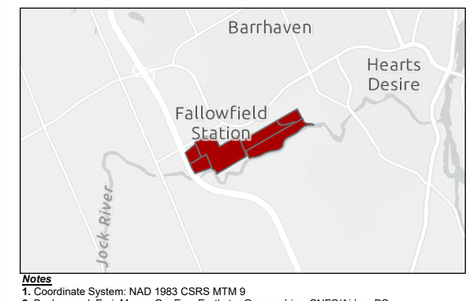
0 150 300 Meters
(At original document size of 11x17)
1:8,500

Legend

Development Phase Boundary

Proposed Watermain Diameter (mm)

- 152
- 203
- 254
- 305



Notes

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3 Hydraulic Modelling Results

Hydraulic modelling was completed for ultimate buildout conditions of the development lands, under SUC servicing conditions, to verify how the network would respond. The following subsections present the modelling results under AVDY, PKHR, and under emergency MXDY fire flow conditions. Furthermore, a reliability analysis was performed to assess the network's performance under emergency AVDY fire flow conditions in the event of a watermain break at key points within the proposed network. **Figure B-1** (**Appendix B**) provides the model system map, while detailed modelling results for all scenarios are provided in **Appendix C.**

3.1 Average Day & Peak Hour Demands

Under AVDY demands, maximum modelled pressures under buildout conditions are 78 psi. These maximum pressures are less than the City's maximum pressure objective of 80 psi.

Under PKHR demands, minimum modelled pressures under buildout conditions are 64 psi. These pressures fall within the desired pressure range of 50 to 80 psi and are thus considered acceptable.

3.2 Maximum Day Plus Fire Flow

Available fire flows across the proposed development lands must meet or exceed the RFF of 13,000 L/min (216.7 L/s) as described in **Section 2.1.2**.

Under full buildout maximum day + fire flow (MXDY+FF) conditions, model results show that fire flows greater than 13,000 L/min are achievable, with a residual pressure of 138 kPa (20 psi), in most locations within the Conservancy West lands. However, there are a few locations outlined in Table C-3 of **Appendix C** (nodes J363, J365 and J369), where the residual pressures during fire flow conditions are below 138 kPa (20 psi). The worst-case scenario occurs at node J365 where a maximum fire flow of 10,502 L/min is available at a residual pressure of 138 kPa (20 psi).

Fire flow requirements across the Conservancy West lands are to be confirmed at the detailed design stage and fire control measures are to be included as required. These fire control measures may include adding ordinary construction units, the addition of firewalls and/or using the alternative hydrant placing procedure outlined in Appendix I of ISDTB-2018-02 to avoid oversizing local pipes.

These results show that the proposed watermain sizing and layout along with fire control measures at a few locations will meet serviceability requirements.

3.3 Reliability Analysis

As per the City of Ottawa Design Guidelines, the system must be able to provide average day demand plus fire flow (AVDY+FF) while meeting serviceability requirements during a major failure (i.e., watermain break). To assess reliability and resiliency against major failures, a number of reliability scenarios were completed to confirm sufficient pressure and flow can be achieved during a major failure. These scenarios included the following and are shown in **Figure 3-1** :

1. **Break Scenario 1 –** Break in the backbone watermain from Connection 1;
2. **Break Scenario 2 –** Break in the backbone watermain from Connection 2;
3. **Break Scenario 3 –** Break in the backbone watermain from Connection 3 (crossing the Jock River);
4. **Break Scenario 4 –** Break along the southern east-west backbone watermain connecting to Conservancy East lands;
5. **Break Scenario 5 –** Break along the northern east-west backbone watermain connecting to Conservancy East lands;
6. **Break Scenario 6 –** Break in the south backbone watermain crossing O'Keefe municipal drain; and,
7. **Break Scenario 7** – Break in the north backbone watermain crossing O'Keefe municipal drain.

Under Break Scenario 1, all junctions meet the 13,000 L/min required fire flows, with the exception of nodes J363, J365 and J369, which can provide a minimum of 10,715 L/min. Fire flow requirements and fire flow measures are to be confirmed at the detailed design stage.

Under Break Scenario 2, all junctions meet the 13,000 L/min required fire flows, with the exception of nodes J363, J365 and J369, which can provide a minimum of 10,836 L/min. Fire flow requirements and fire flow measures are to be confirmed at the detailed design stage.

Under Break Scenario 3, all junctions meet the 13,000 L/min required fire flows, with the exception of nodes J239, J309, J313, J355, J363, J365 and J369, which can provide a minimum of 10,115 L/min. Fire flow requirements and fire flow measures are to be confirmed at the detailed design stage.

Under Break Scenario 4, all junctions meet the 13,000 L/min required fire flows, with the exception of nodes J237, J239, J241, J259, J261, J271, J285, J289, J297, J301, J309, J313, J329, J343, J345, J347, J349, J351, J353, J355, J363, J365 and J369, which can provide a minimum of 9,679 L/min. Fire flow requirements and fire flow measures are to be confirmed at the detailed design stage.

Under Break Scenario 5, all junctions meet the 13,000 L/min required fire flows, with the exception of nodes J363, J365 and J369, which can provide a minimum of 10,552 L/min. Fire flow requirements and fire flow measures are to be confirmed at the detailed design stage.

Under Break Scenario 6, all junctions meet the 13,000 L/min required fire flows, with the exception of nodes J313, J329, J331, J343, J345, J347, J349, J351, J353, J355, J363, J365 and J369, which can

provide a minimum of 11,449 L/min. Fire flow requirements and fire flow measures are to be confirmed at the detailed design stage.

Under Break Scenario 7, all junctions meet the 13,000 L/min required fire flows, with the exception of nodes J305, J309, J313, J363, J365 and J369, which can provide a minimum of 11,448 L/min. Fire flow requirements and fire flow measures are to be confirmed at the detailed design stage.

At the detailed design stage, fire flow requirements across the site are to be confirmed and the required fire flow measures to meet City criteria under all watermain break scenarios are to be determined. These fire control measures may include adding ordinary construction units, the addition of firewalls and/or using the alternative hydrant placing procedure outlined in Appendix I of ISDTB-2018-02 to avoid oversizing local pipes.

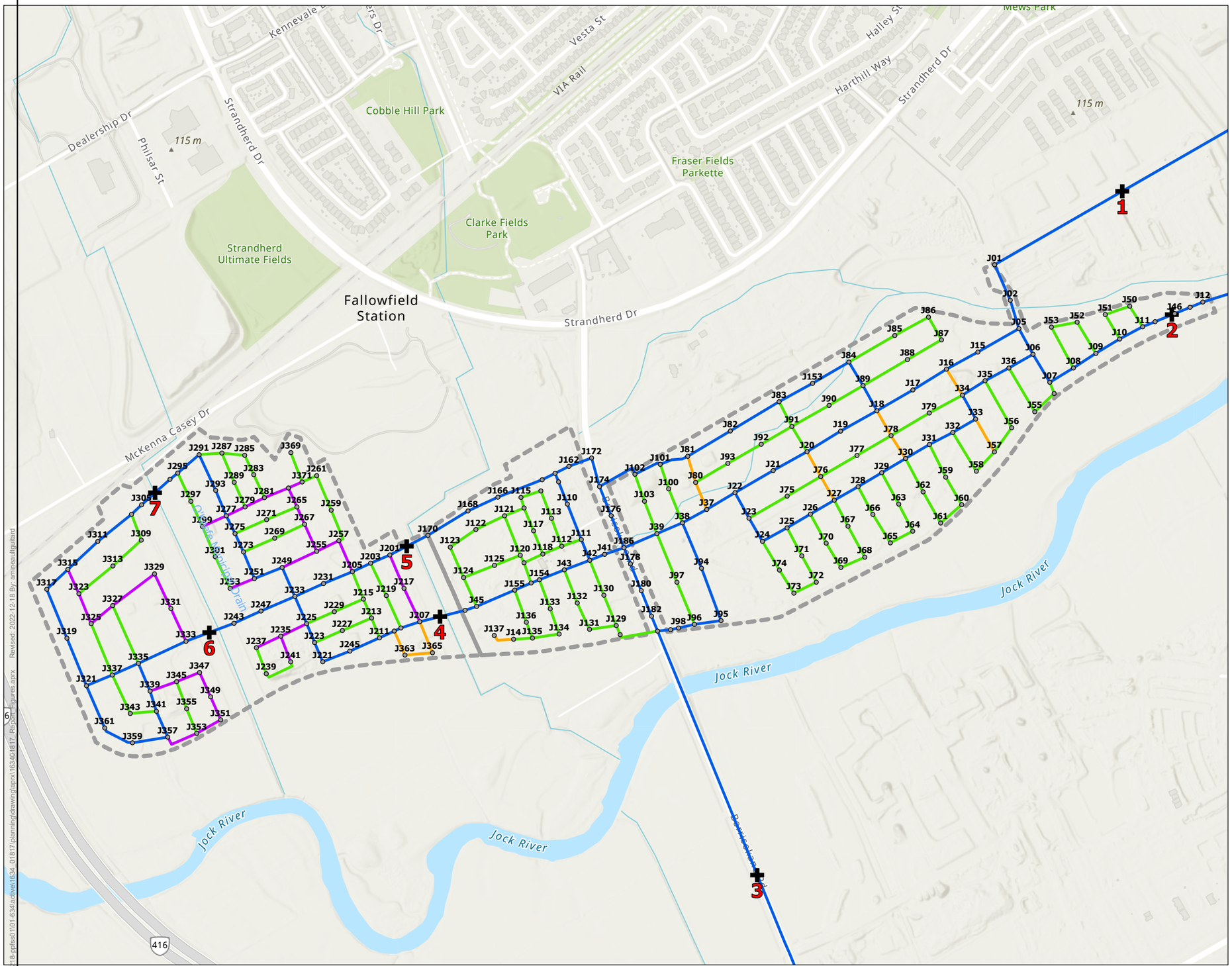


Figure No.
3-1

Title
Reliability Analysis Watermain Break Locations

Client/Project
David Schaeffer Engineering Ltd
Barrhaven Conservancy West: Water Distribution System Analysis

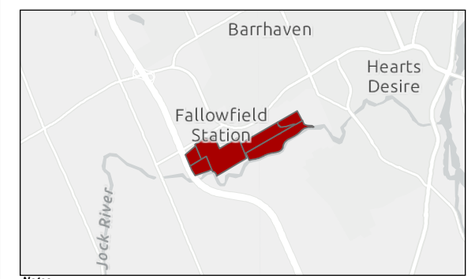
Project Location
Ottawa, Ontario, Canada

N

0 150 300 Meters
(At original document size of 11x17)
1:8,500

Legend
- Development Phase Boundary
- Model Node
- Watermain Break Location/Scenario

Proposed Watermain Diameter (mm)
- 152
- 203
- 254
- 305



Notes
1. Coordinate System: NAD 1983 CSRS MTM 9
2. Background: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

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4 Conclusion and Recommendations

A water distribution system hydraulic analysis was completed for the Barrhaven Conservancy West development lands. The purpose of this analysis was to confirm associated watermain sizing and redundancy needs. Based on the hydraulic analysis, the following conclusions and recommendations were made:

- Based on the most current site plan layout, the estimated AVDY, MXDY and PKHR demand projections for the Conservancy West lands are 9.46 L/s, 23.64 L/s, and 52.01 L/s, respectively. With the Conservancy East lands, the total estimated AVDY, MXDY and PKHR demands for the entire development are 23.38 L/s, 58.44 L/s, and 128.57 L/s, respectively.
- Information regarding proposed unit sizes and unit spacing is not available at this time and as such, FUS calculations have not been completed. The previously fire flow objective of 13,000 L/min as established in the analysis of the Conservancy East lands (Stantec Consulting Ltd., 2022) was used for this analysis. It is recommended that the FUS calculations be reviewed during the detailed design stage to ensure that fire flow requirements are met across the site.
- Previous studies related to the Conservancy lands analyzed the serviceability of the development via two (2) and three (3) connections scenarios. This study only considered the scenario with three (3) connections. Furthermore, the analysis in this report considers the future zone SUC servicing conditions only.
- Within the Conservancy West lands, the network is proposed to consist of 152 mm, 203 mm, 254 mm, and 305 mm. The 305 mm backbone watermains connect at two (2) different locations to the Conservancy East lands network and extend west crossing the O'Keefe municipal drain at two (2) locations.
- The maximum number of units along a dead-end watermain should not exceed 49 to avoid the creation of a vulnerable service area. Based on the latest concept plans, each dead-end watermain within the Conservancy West lands services fewer than 49 single-family units.
- Under AVDY demand conditions, model results suggest that maximum pressures are below the allowable maximum pressure of 80 psi in accordance with the City of Ottawa Design Guidelines. Under PKHR demand conditions, the minimum pressures are in accordance with the City's system pressure requirements.
- Under MXDY+FF demand conditions, the assumed required fire flow of 13,000 L/min can be achieved across most of the proposed network at full build out conditions, with the exception of a few locations, where the worst-case scenario results in a maximum fire flow of 10,502 L/min available at a residual pressure of 138 kPa (20 psi). Fire flow requirements across the Conservancy West lands are to be confirmed at the detailed design stage and fire control measures are to be included as required. These fire control measures may include adding ordinary construction units, the addition of firewalls and/or using the alternative hydrant placing procedure outlined in Appendix I of ISDTB-2018-02 to avoid oversizing local pipes.

- To assess reliability and resiliency against major failures, a number of reliability scenarios were completed under AVDY+FF demand conditions to confirm sufficient pressure and flow can be achieved during a major failure. Under all break scenarios, some locations are slightly below the RFF of 13,000 L/min. At the detailed design stage, fire flow requirements across the site are to be confirmed and the required fire flow measures to meet City criteria under all watermain break scenarios are to be determined.

5 References

City of Ottawa. (2010). Ottawa Design Guidelines - Water Distribution. Ottawa.

City of Ottawa. (2018). Technical Bulletin ISTB-2018-02. Ottawa.

City of Ottawa. (2021). Technical Bulletin ISTB-2021-03. Ottawa.

Stantec Consulting Ltd. (2013). City of Ottawa 2013 Water Master Plan. Ottawa.

Stantec Consulting Ltd. (2021). Hydraulic Potable Water Assessment for Barrhaven Conservancy Development Corporation. Ottawa.

Stantec Consulting Ltd. (2022). Barrhaven Conservancy East (Phases 2, 3, 4 & Jock River): Water Distribution System Analysis. Ottawa.

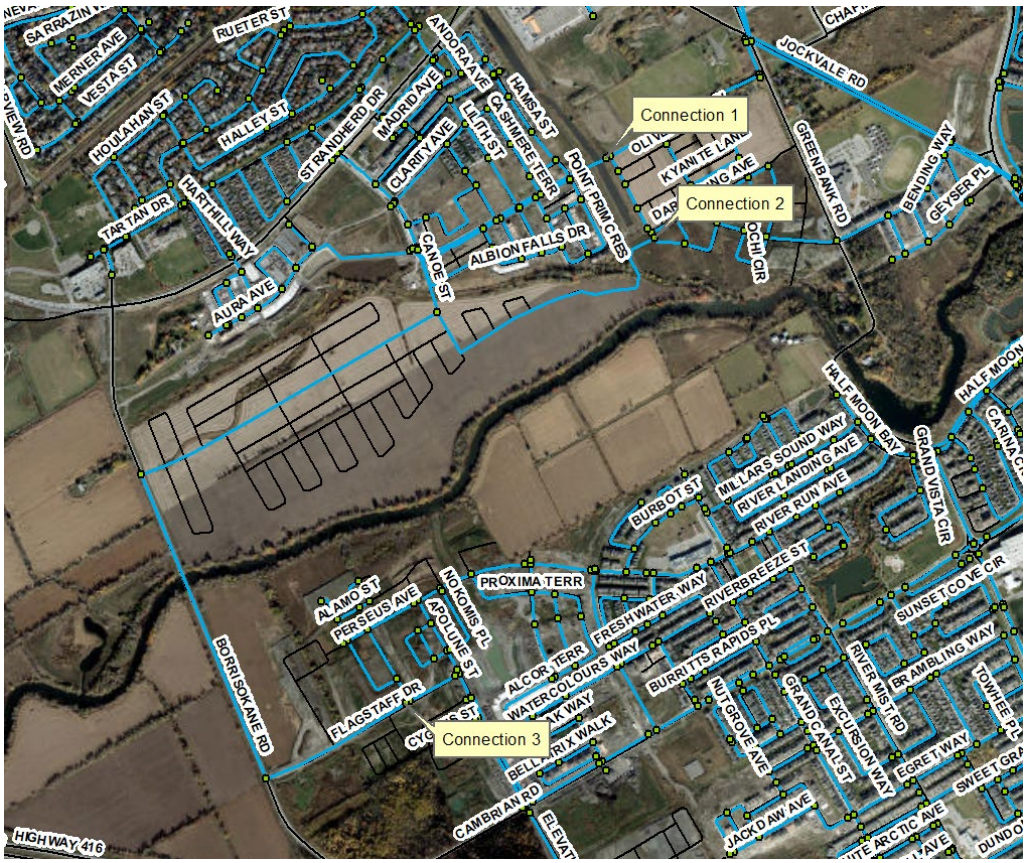
Appendix A Boundary Conditions

Boundary Conditions
Barrhaven Conservancy West

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	1,379	22.99
Maximum Daily Demand	3,449	57.49
Peak Hour	7,588	126.47
Fire Flow Demand #1	13,000	216.67

Location



Results – SUC Zone Reconfiguration

Connection 1 – Chapman Mills Dr.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	146.7	76.2
Peak Hour	141.4	68.7
Basic Day plus Fire 1	139.7	66.3
Max Day plus Fire 1	137.9	63.7

Ground Elevation = 93.1 m

Connection 2 – Danson Gardens Grove / Darjeeling Ave.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	146.7	78.0
Peak Hour	141.3	70.4
Basic Day plus Fire 1	138.1	65.9
Max Day plus Fire 1	136.2	63.2

Ground Elevation = 91.8 m

Connection 3 – Langstaff Dr. / Borrisokane Rd.

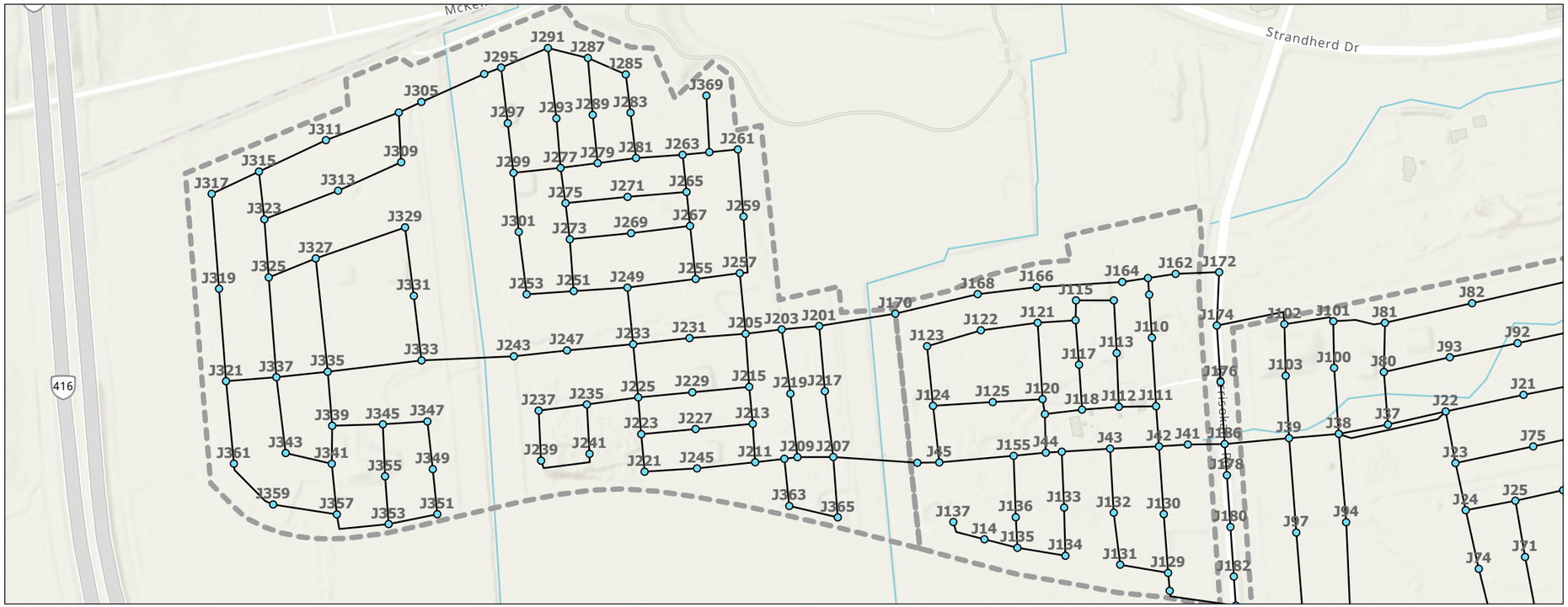
Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	146.6	77.2
Peak Hour	141.0	69.3
Basic Day plus Fire 1	139.8	67.5
Max Day plus Fire 1	137.9	64.8

Ground Elevation = 92.3 m

Disclaimer

The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

Appendix B Junction IDS



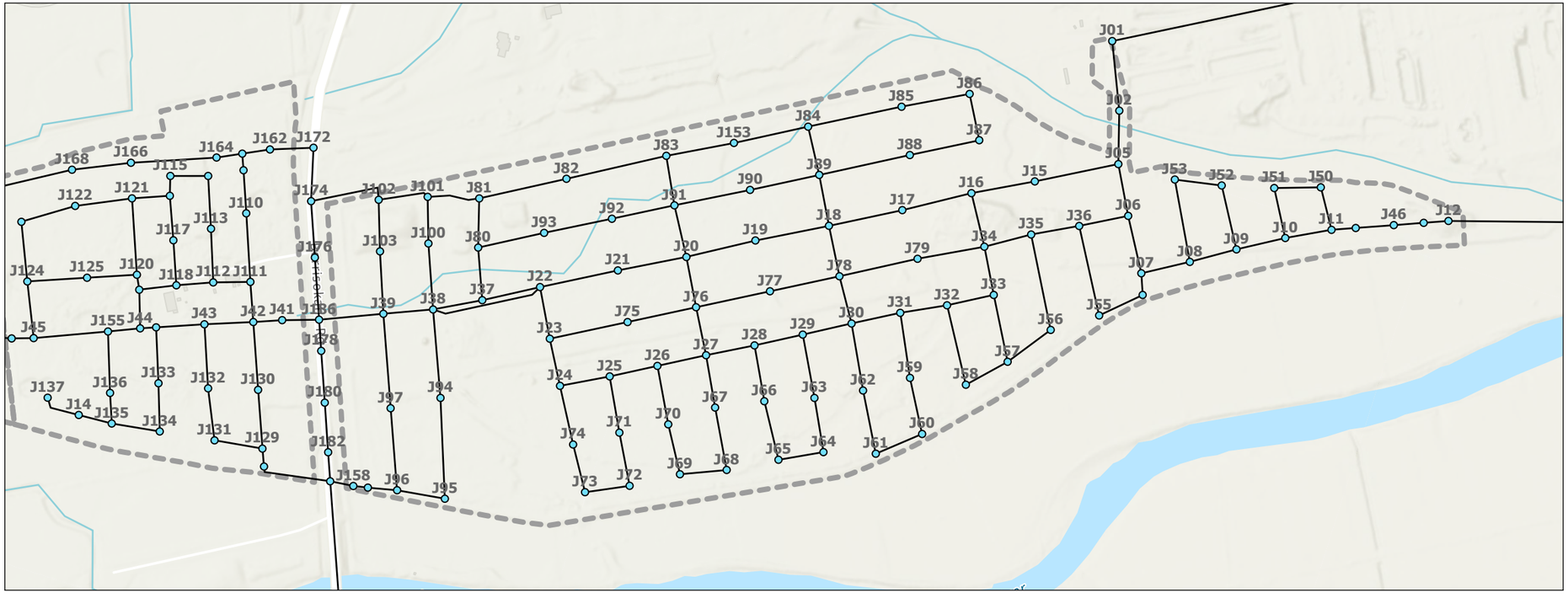


Figure No.
B-1

Title
Model System Map

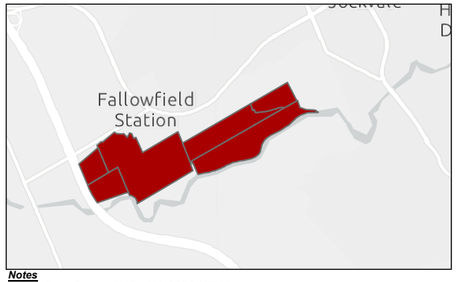
Client/Project
David Schaeffer Engineering Ltd
Barrhaven Conservancy West: Water Distribution System Analysis

Project Location
Ottawa, Ontario, Canada

N

0 100 200 Meters
(At original document size of 11x17)
1:6,000

Legend
- Development Phase Boundary
- Future Watermain
- Model Node



Notes
1. Coordinate System: NAD 1983 CSRS MTM 9
2. Background: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

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Appendix C Model Results

163401817 - Barrhaven Conservancy West: Water Distribution System Analysis

Table C-1: Model Results - AVDY

Junction ID	Demand (L/s)	Head (m)	Pressure (psi)
Maximum	*0.15*	*146.66*	*77.54*
Minimum	*0.00*	*146.55*	*75.01*
J01	0.07	146.64	75.54
J02	0.00	146.63	76.14
J05	0.07	146.63	76.63
J06	0.07	146.63	76.78
J07	0.11	146.63	76.94
J08	0.11	146.64	76.82
J09	0.11	146.64	76.31
J10	0.11	146.64	76.57
J100	0.15	146.59	75.96
J101	0.15	146.59	76.11
J102	0.15	146.58	75.99
J103	0.15	146.59	75.84
J109	0.11	146.57	76.10
J11	0.11	146.65	76.46
J110	0.11	146.57	76.27
J111	0.11	146.57	76.34
J112	0.11	146.57	76.23
J113	0.11	146.57	76.15
J114	0.11	146.57	76.01
J115	0.11	146.56	75.98
J116	0.11	146.56	76.02
J117	0.11	146.56	76.15
J118	0.11	146.57	76.23
J119	0.11	146.56	76.36
J12	0.11	146.66	76.34
J120	0.11	146.56	76.36
J121	0.11	146.56	76.16
J122	0.11	146.56	76.00
J123	0.11	146.56	76.15
J124	0.11	146.56	76.29
J125	0.11	146.56	76.47
J128	0.00	146.57	76.83
J129	0.11	146.57	76.81
J130	0.11	146.57	76.59
J131	0.11	146.57	76.71
J132	0.11	146.57	76.55
J133	0.11	146.56	76.63
J134	0.11	146.56	76.76
J135	0.11	146.56	76.86
J136	0.11	146.56	76.73
J137	0.11	146.56	76.64
J14	0.11	146.56	76.77
J15	0.07	146.62	76.48
J152	0.11	146.63	76.98
J153	0.15	146.60	75.94
J154	0.11	146.57	76.49
J155	0.11	146.56	76.60
J156	0.00	146.56	76.36
J158	0.00	146.58	76.88
J16	0.07	146.61	76.63
J162	0.00	146.57	75.98
J164	0.00	146.57	76.05
J166	0.00	146.57	75.86
J168	0.00	146.56	76.15
J17	0.07	146.61	76.45
J170	0.00	146.56	75.63
J172	0.00	146.57	75.99
J174	0.15	146.58	76.16
J176	0.15	146.57	76.27
J178	0.08	146.57	76.49
J18	0.07	146.60	76.23
J180	0.08	146.58	76.70
J182	0.08	146.58	76.82
J184	0.08	146.58	76.88
J186	0.08	146.57	76.39
J188	0.00	146.57	76.02
J19	0.10	146.60	76.01
J20	0.10	146.60	76.48
J201	0.11	146.56	76.49
J203	0.11	146.56	76.42
J205	0.11	146.56	76.35
J207	0.11	146.56	76.85
J209	0.11	146.56	76.65
J21	0.10	146.60	76.32
J211	0.11	146.56	76.55
J213	0.11	146.56	76.43
J215	0.11	146.56	76.35
J217	0.11	146.56	76.69
J219	0.11	146.56	76.45
J22	0.10	146.60	76.38
J221	0.11	146.56	75.71
J223	0.11	146.56	75.89
J225	0.11	146.56	76.20
J227	0.11	146.56	76.06
J229	0.11	146.56	77.54
J23	0.10	146.60	76.51
J231	0.11	146.56	76.16
J233	0.11	146.55	76.08
J235	0.11	146.56	76.29
J237	0.11	146.56	76.29
J239	0.11	146.56	76.40
J24	0.10	146.60	76.64
J241	0.11	146.56	76.42
J243	0.11	146.55	75.56
J245	0.11	146.56	76.28
J247	0.11	146.55	75.82
J249	0.11	146.55	75.92
J25	0.10	146.60	76.52
J251	0.11	146.55	75.79
J253	0.11	146.55	75.68
J255	0.11	146.55	76.12
J257	0.11	146.55	76.00
J259	0.11	146.55	75.85
J26	0.10	146.60	76.62
J261	0.11	146.55	75.68
J263	0.11	146.55	75.18
J265	0.11	146.55	75.89
J267	0.11	146.55	75.98
J269	0.11	146.55	75.49
J27	0.10	146.60	76.75
J271	0.11	146.55	75.39
J273	0.11	146.55	75.66
J275	0.11	146.55	75.56
J277	0.11	146.55	75.46
J279	0.11	146.55	75.38
J28	0.10	146.60	76.68
J281	0.11	146.55	75.28
J283	0.11	146.55	77.21
J285	0.11	146.55	75.08
J287	0.11	146.55	75.08
J289	0.11	146.55	75.26
J29	0.10	146.60	76.69
J291	0.11	146.55	75.14
J293	0.11	146.55	75.35
J295	0.11	146.55	75.06
J297	0.11	146.55	75.24
J299	0.11	146.55	75.35
J30	0.07	146.61	76.62
J301	0.11	146.55	75.52
J303	0.00	146.55	75.01
J305	0.00	146.55	75.15
J307	0.11	146.55	75.22
J309	0.11	146.55	75.18
J31	0.07	146.61	76.75
J311	0.11	146.55	75.04
J313	0.11	146.55	75.16
J315	0.11	146.55	75.25
J317	0.11	146.55	75.22
J319	0.11	146.55	75.48
J32	0.07	146.61	76.65
J321	0.11	146.55	75.70
J323	0.11	146.55	75.38
J325	0.11	146.55	75.52
J327	0.11	146.55	75.58
J329	0.11	146.55	75.70
J33	0.07	146.61	76.88
J331	0.11	146.55	75.87
J333	0.11	146.55	76.06
J335	0.11	146.55	75.87
J337	0.11	146.55	75.77
J339	0.11	146.55	76.02
J34	0.07	146.61	76.76
J341	0.11	146.55	76.10
J343	0.11	146.55	75.97
J345	0.11	146.55	76.10
J347	0.11	146.55	76.22
J349	0.11	146.55	76.34
J35	0.07	146.62	76.72
J351	0.11	146.55	76.46
J353	0.11	146.55	76.33
J355	0.11	146.55	76.20
J357	0.11	146.55	76.23
J359	0.11	146.55	76.06
J36	0.07	146.62	76.86
J361	0.11	146.55	75.92
J363	0.11	146.56	76.72
J365	0.11	146.56	76.86
J367	0.11	146.56	76.61
J369	0.11	146.55	75.48
J37	0.08	146.60	76.29
J371	0.11	146.55	75.61
J38	0.08	146.59	76.42
J39	0.08	146.59	76.41
J40	0.11	146.66	76.37
J41	0.11	146.57	76.44
J42	0.11	146.57	76.48
J43	0.11	146.57	76.38
J44	0.11	146.56	76.53
J45	0.11	146.56	76.41
J46	0.11	146.66	76.40
J48	0.11	146.65	76.44
J50	0.11	146.65	76.35
J51	0.11	146.65	76.49
J52	0.11	146.64	76.51
J53	0.11	146.64	76.60
J55	0.11	146.63	77.09
J56	0.11	146.61	76.93
J57	0.11	146.61	77.07
J58	0.11	146.61	76.94
J59	0.11	146.61	76.83
J60	0.11	146.61	77.06
J61	0.11	146.61	76.93
J62	0.11	146.61	76.83
J63	0.11	146.60	76.88
J64	0.11	146.60	77.00
J65	0.11	146.60	77.01
J66	0.11	146.60	76.84
J67	0.11	146.60	76.91
J68	0.11	146.60	77.05
J69	0.11	146.60	76.91
J70	0.11	146.60	76.74
J71	0.11	146.60	76.69
J72	0.11	146.60	76.79
J73	0.11	146.60	76.91
J74	0.11	146.60	76.81
J75	0.10	146.60	76.45
J76	0.10	146.60	76.62
J77	0.10	146.60	76.34
J78	0.07	146.61	76.50
J79	0.07	146.61	76.60
J80	0.15	146.59	76.15
J81	0.15	146.59	75.96
J82	0.15	146.59	76.00
J83	0.15	146.60	76.22
J84	0.15	146.60	76.10
J85	0.15	146.60	76.19
J86	0.15	146.60	76.41
J87	0.15	146.60	76.37
J88	0.15	146.60	76.22
J89	0.15	146.60	76.22
J90	0.15	146.60	76.05
J91	0.15	146.60	76.35
J92	0.15	146.60	76.16
J93	0.15	146.60	76.05
J94	0.08	146.59	76.67
J95	0.08	146.59	76.90
J96	0.08	146.59	76.77
J97	0.08	146.59	76.53
J98	0.00	146.59	76.69

163401817 - Barrhaven Conservancy West: Water Distribution System Analysis

Table C-2: Model Results - PKHR

Junction ID	Demand (L/s)	Head (m)	Pressure (psi)
Maximum	*0.83*	*140.68*	*67.84*
Minimum	*0.00*	*138.90*	*64.14*
J01	0.39	140.37	66.62
J02	0.00	140.23	67.04
J05	0.39	140.13	67.39
J06	0.39	140.12	67.53
J07	0.58	140.17	67.76
J08	0.58	140.25	67.74
J09	0.58	140.31	67.31
J10	0.58	140.39	67.68
J100	0.83	139.57	65.98
J101	0.83	139.55	66.10
J102	0.83	139.51	65.93
J103	0.83	139.55	65.83
J109	0.59	139.28	65.73
J11	0.58	140.45	67.66
J110	0.59	139.27	65.90
J111	0.59	139.27	65.97
J112	0.59	139.21	65.78
J113	0.59	139.20	65.68
J114	0.59	139.19	65.52
J115	0.59	139.18	65.49
J116	0.59	139.18	65.52
J117	0.59	139.19	65.66
J118	0.59	139.19	65.75
J119	0.59	139.18	65.86
J12	0.58	140.68	67.84
J120	0.59	139.17	65.85
J121	0.59	139.17	65.66
J122	0.59	139.16	65.48
J123	0.59	139.16	65.61
J124	0.59	139.15	65.75
J125	0.59	139.16	65.95
J128	0.00	139.25	66.43
J129	0.59	139.25	66.41
J130	0.59	139.26	66.21
J131	0.59	139.25	66.30
J132	0.59	139.24	66.13
J133	0.59	139.18	66.13
J134	0.59	139.17	66.25
J135	0.59	139.17	66.34
J136	0.59	139.17	66.21
J137	0.59	139.16	66.12
J14	0.59	139.17	66.25
J15	0.39	140.01	67.08
J152	0.58	140.16	67.78
J153	0.83	139.66	66.07
J154	0.59	139.19	66.01
J155	0.59	139.16	66.08
J156	0.00	139.11	65.76
J158	0.00	139.68	67.06
J16	0.39	139.92	67.11
J162	0.00	139.31	65.66
J164	0.00	139.26	65.66
J166	0.00	139.19	65.38
J168	0.00	139.15	65.61
J17	0.39	139.82	66.80
J170	0.00	139.09	65.01
J172	0.00	139.35	65.72
J174	0.83	139.41	65.97
J176	0.83	139.41	66.08
J178	0.44	139.46	66.38
J18	0.39	139.72	66.45
J180	0.44	139.56	66.73
J182	0.44	139.65	66.98
J184	0.44	139.71	67.11
J186	0.44	139.40	66.20
J188	0.00	139.28	65.66
J19	0.56	139.70	66.21
J20	0.56	139.68	66.65
J201	0.62	139.03	65.79
J203	0.62	139.00	65.68
J205	0.62	138.97	65.57
J207	0.62	139.03	66.15
J209	0.62	139.01	65.92
J21	0.56	139.68	66.48
J211	0.62	138.99	65.79
J213	0.62	138.97	65.66
J215	0.62	138.97	65.56
J217	0.62	139.03	65.99
J219	0.62	139.01	65.71
J22	0.56	139.67	66.53
J221	0.62	138.97	64.93
J223	0.62	138.97	65.10
J225	0.62	138.96	65.40
J227	0.62	138.97	65.28
J229	0.62	138.96	66.75
J23	0.56	139.68	66.67
J231	0.62	138.96	65.36
J233	0.62	138.95	65.26
J235	0.62	138.96	65.49
J237	0.62	138.96	65.49
J239	0.62	138.96	65.60
J24	0.56	139.69	66.81
J241	0.62	138.96	65.61
J243	0.62	138.92	64.72
J245	0.62	138.98	65.51
J247	0.62	138.93	64.99
J249	0.62	138.94	65.09
J25	0.56	139.69	66.71
J251	0.62	138.93	64.95
J253	0.62	138.92	64.83
J255	0.62	138.94	65.29
J257	0.62	138.94	65.18
J259	0.62	138.93	65.01
J26	0.56	139.70	66.82
J261	0.62	138.92	64.83
J263	0.62	138.92	64.33
J265	0.62	138.92	65.04
J267	0.62	138.93	65.13
J269	0.62	138.92	64.64
J27	0.56	139.72	66.97
J271	0.62	138.92	64.54
J273	0.62	138.92	64.81
J275	0.62	138.92	64.71
J277	0.62	138.92	64.61
J279	0.62	138.92	64.52
J28	0.56	139.74	66.93
J281	0.62	138.92	64.42
J283	0.62	138.91	66.35
J285	0.62	138.91	64.22
J287	0.62	138.91	64.22
J289	0.62	138.91	64.40
J29	0.56	139.76	66.95
J291	0.62	138.91	64.27
J293	0.62	138.91	64.49
J295	0.62	138.91	64.20
J297	0.62	138.91	64.37
J299	0.62	138.92	64.49
J30	0.39	139.79	66.92
J301	0.62	138.92	64.67
J303	0.00	138.91	64.14
J305	0.00	138.91	64.28
J307	0.62	138.90	64.35
J309	0.62	138.90	64.30
J31	0.39	139.82	67.10
J311	0.62	138.90	64.16
J313	0.62	138.90	64.29
J315	0.62	138.90	64.37
J317	0.62	138.90	64.34
J319	0.62	138.90	64.60
J32	0.39	139.86	67.05
J321	0.62	138.90	64.82
J323	0.62	138.90	64.50
J325	0.62	138.90	64.64
J327	0.62	138.90	64.70
J329	0.62	138.90	64.83
J33	0.39	139.89	67.32
J331	0.62	138.91	65.00
J333	0.62	138.91	65.19
J335	0.62	138.90	65.00
J337	0.62	138.90	64.90
J339	0.62	138.90	65.14
J34	0.39	139.92	67.24
J341	0.62	138.90	65.22
J343	0.62	138.90	65.09
J345	0.62	138.90	65.22
J347	0.62	138.90	65.33
J349	0.62	138.90	65.46
J35	0.39	139.98	67.28
J351	0.62	138.90	65.58
J353	0.62	138.90	65.45
J355	0.62	138.90	65.32
J357	0.62	138.90	65.35
J359	0.62	138.90	65.18
J36	0.39	140.06	67.53
J361	0.62	138.90	65.04
J363	0.62	139.01	65.99
J365	0.62	139.02	66.14
J367	0.62	139.01	65.87
J369	0.62	138.92	64.63
J37	0.44	139.63	66.39
J371	0.62	138.92	64.75
J38	0.44	139.61	66.49
J39	0.44	139.60	66.48
J40	0.58	140.63	67.80
J41	0.59	139.33	66.15
J42	0.59	139.28	66.12
J43	0.59	139.24	65.96
J44	0.59	139.18	66.04
J45	0.59	139.12	65.84
J46	0.58	140.57	67.75
J48	0.58	140.50	67.69
J50	0.58	140.43	67.51
J51	0.58	140.41	67.62
J52	0.58	140.28	67.47
J53	0.58	140.27	67.55
J55	0.58	140.12	67.84
J56	0.58	139.92	67.41
J57	0.58	139.89	67.52
J58	0.58	139.88	67.37
J59	0.58	139.81	67.16
J60	0.58	139.80	67.38
J61	0.58	139.79	67.25
J62	0.58	139.79	67.14
J63	0.58	139.75	67.14
J64	0.58	139.74	67.25
J65	0.58	139.74	67.26
J66	0.58	139.74	67.08
J67	0.58	139.71	67.12
J68	0.58	139.71	67.25
J69	0.58	139.71	67.11
J70	0.58	139.70	66.94
J71	0.58	139.69	66.87
J72	0.58	139.69	66.97
J73	0.58	139.69	67.08
J74	0.58	139.69	66.98
J75	0.56	139.69	66.63
J76	0.56	139.71	66.83
J77	0.56	139.74	66.59
J78	0.39	139.78	66.79
J79	0.39	139.85	66.99
J80	0.83	139.62	66.23
J81	0.83	139.57	65.98
J82	0.83	139.60	66.07
J83	0.83	139.64	66.33
J84	0.80	139.68	66.25
J85	0.80	139.68	66.35
J86	0.80	139.68	66.57
J87	0.80	139.68	66.53
J88	0.80	139.68	66.39
J89	0.80	139.69	66.40
J90	0.83	139.67	66.21
J91	0.83	139.66	66.48
J92	0.83	139.64	66.28
J93	0.83	139.63	66.14
J94	0.44	139.61	66.74
J95	0.44	139.61	66.97
J96	0.44	139.61	66.84
J97	0.44	139.60	66.59
J98	0.00	139.64	66.82

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Table C-3: Model Results - MXDY+FF

Junction ID	Base Demand (L/s)	Required Fire Flow (L/s)	Residual Pressure (psi)	Available Fire Flow @ Residual 20 psi (L/s)
Maximum	*0.38*	*216.67*	*54.79*	*584.55*
Minimum	*0.00*	*216.67*	*0.10*	*175.04*
J01	0.18	216.67	53.29	542.93
J02	0.00	216.67	54.00	560.49
J05	0.18	216.67	54.74	584.55
J06	0.18	216.67	54.79	584.31
J07	0.27	216.67	54.68	570.89
J08	0.27	216.67	54.32	557.22
J09	0.27	216.67	53.72	548.42
J10	0.27	216.67	53.98	548.55
J100	0.38	216.67	44.68	362.52
J101	0.38	216.67	50.37	464.39
J102	0.38	216.67	50.16	462.49
J103	0.38	216.67	44.16	357.02
J109	0.27	216.67	46.63	394.47
J11	0.27	216.67	53.95	549.78
J110	0.27	216.67	46.50	390.36
J111	0.27	216.67	46.99	397.64
J112	0.27	216.67	42.15	335.80
J113	0.27	216.67	34.16	274.72
J114	0.27	216.67	32.99	268.45
J115	0.27	216.67	35.58	283.78
J116	0.27	216.67	38.40	303.52
J117	0.27	216.67	36.70	290.70
J118	0.27	216.67	41.22	326.79
J119	0.27	216.67	42.63	340.67
J12	0.27	216.67	54.61	578.41
J120	0.27	216.67	41.29	327.02
J121	0.27	216.67	38.52	303.99
J122	0.27	216.67	32.22	264.43
J123	0.27	216.67	32.45	265.45
J124	0.27	216.67	39.28	309.74
J125	0.27	216.67	36.34	287.51
J129	0.27	216.67	31.10	257.49
J130	0.27	216.67	34.67	276.45
J131	0.27	216.67	31.21	258.15
J132	0.27	216.67	34.67	276.66
J133	0.27	216.67	34.97	278.55
J134	0.27	216.67	31.90	261.69
J135	0.27	216.67	32.36	263.87
J136	0.27	216.67	34.34	274.76
J15	0.18	216.67	52.92	518.63
J152	0.27	216.67	50.00	430.38
J153	0.38	216.67	49.38	440.96
J154	0.27	216.67	45.62	376.70
J155	0.27	216.67	45.06	368.60
J156	0.00	216.67	43.64	353.23
J16	0.18	216.67	52.68	508.86
J162	0.00	216.67	46.98	400.66
J164	0.00	216.67	45.90	383.64
J166	0.00	216.67	43.58	354.78
J168	0.00	216.67	42.91	345.63
J17	0.18	216.67	51.96	493.38
J170	0.00	216.67	41.59	335.12
J172	0.00	216.67	47.63	411.14
J174	0.38	216.67	49.30	441.35
J176	0.38	216.67	48.70	426.37
J178	0.20	216.67	49.28	433.66
J18	0.18	216.67	51.84	498.20
J180	0.20	216.67	49.58	433.56
J182	0.20	216.67	49.86	434.87
J184	0.20	216.67	50.06	436.46
J186	0.20	216.67	49.18	434.93
J188	0.00	216.67	46.80	397.83
J19	0.25	216.67	50.63	468.94
J20	0.25	216.67	51.36	479.48
J201	0.28	216.67	42.19	337.51
J203	0.28	216.67	41.47	330.97
J205	0.28	216.67	40.66	323.82
J207	0.28	216.67	42.90	342.84
J209	0.28	216.67	41.96	334.43
J21	0.25	216.67	50.65	463.94
J211	0.28	216.67	40.99	325.65
J213	0.28	216.67	37.98	300.69
J215	0.28	216.67	37.51	297.48
J217	0.28	216.67	40.49	319.80
J219	0.28	216.67	34.69	278.17
J22	0.25	216.67	51.23	478.56
J221	0.28	216.67	38.90	310.92
J223	0.28	216.67	39.30	313.66
J225	0.28	216.67	39.66	315.57
J227	0.28	216.67	33.37	271.45
J229	0.28	216.67	34.77	276.51
J23	0.25	216.67	50.88	466.32
J231	0.28	216.67	39.48	314.19
J233	0.28	216.67	39.53	315.14
J235	0.28	216.67	32.41	265.89
J237	0.28	216.67	28.36	246.57
J239	0.28	216.67	24.12	230.14
J24	0.25	216.67	50.43	452.49
J241	0.28	216.67	28.44	246.79
J243	0.28	216.67	35.42	285.68
J245	0.28	216.67	39.66	314.91
J247	0.28	216.67	36.89	295.15
J249	0.28	216.67	38.37	306.15
J25	0.25	216.67	50.10	446.35
J251	0.28	216.67	37.36	298.79
J253	0.28	216.67	33.54	273.52
J255	0.28	216.67	37.82	301.00
J257	0.28	216.67	37.85	301.57
J259	0.28	216.67	28.83	249.09
J26	0.25	216.67	50.19	446.51
J261	0.28	216.67	30.03	254.86
J263	0.28	216.67	35.25	285.53
J265	0.28	216.67	36.27	290.51
J267	0.28	216.67	36.66	292.96
J269	0.28	216.67	30.29	256.34
J27	0.25	216.67	50.53	451.84
J271	0.28	216.67	29.92	254.69
J273	0.28	216.67	36.89	295.69
J275	0.28	216.67	36.70	294.65
J277	0.28	216.67	36.54	293.86
J279	0.28	216.67	35.29	285.31
J28	0.25	216.67	50.42	450.01
J281	0.28	216.67	34.96	283.33
J283	0.28	216.67	30.50	255.24
J285	0.28	216.67	27.97	246.08
J287	0.28	216.67	31.96	265.72
J289	0.28	216.67	29.18	251.36
J29	0.25	216.67	50.58	453.31
J291	0.28	216.67	35.23	285.61
J293	0.28	216.67	35.50	286.85
J295	0.28	216.67	34.87	283.41
J297	0.28	216.67	29.85	254.57
J299	0.28	216.67	34.34	279.20
J30	0.18	216.67	50.98	463.67
J301	0.28	216.67	28.91	249.84
J303	0.00	216.67	34.50	280.87
J305	0.00	216.67	33.75	275.79
J307	0.28	216.67	33.59	274.98
J309	0.28	216.67	24.82	233.24
J31	0.18	216.67	51.24	467.28
J311	0.28	216.67	32.55	269.27
J313	0.28	216.67	22.70	225.66
J315	0.28	216.67	32.92	271.00
J317	0.28	216.67	32.02	265.93
J319	0.28	216.67	31.78	264.23
J32	0.18	216.67	51.60	478.08
J321	0.28	216.67	32.75	269.20
J323	0.28	216.67	32.20	266.66
J325	0.28	216.67	31.93	264.93
J327	0.28	216.67	31.36	261.84
J329	0.28	216.67	29.44	252.16
J33	0.18	216.67	52.24	490.37
J331	0.28	216.67	30.65	257.80
J333	0.28	216.67	34.58	279.20
J335	0.28	216.67	33.52	273.26
J337	0.28	216.67	33.07	270.85
J339	0.28	216.67	32.47	267.08
J34	0.18	216.67	52.84	511.38
J341	0.28	216.67	32.20	265.50
J343	0.28	216.67	26.40	238.92
J345	0.28	216.67	29.68	252.92
J347	0.28	216.67	27.64	243.81
J349	0.28	216.67	27.00	241.10
J35	0.18	216.67	53.20	523.53
J351	0.28	216.67	27.63	243.57
J353	0.28	216.67	29.52	251.92
J355	0.28	216.67	24.73	232.48
J357	0.28	216.67	32.10	264.74
J359	0.28	216.67	31.50	261.87
J36	0.18	216.67	54.07	550.36
J361	0.28	216.67	31.56	262.39
J363	0.28	216.67	3.54	180.50
J365	0.28	216.67	0.10	175.04
J367	0.28	216.67	41.63	331.43
J369	0.28	216.67	9.96	191.72
J37	0.20	216.67	50.45	460.25
J371	0.28	216.67	33.79	275.20
J38	0.20	216.67	49.92	445.86
J39	0.20	216.67	48.87	423.56
J40	0.27	216.67	54.40	568.96
J41	0.27	216.67	48.18	416.33
J42	0.27	216.67	47.65	407.29
J43	0.27	216.67	46.33	387.53
J44	0.27	216.67	45.49	374.67
J45	0.27	216.67	44.14	358.89
J46	0.27	216.67	54.21	560.26
J48	0.27	216.67	54.03	552.70
J50	0.27	216.67	46.80	381.60
J51	0.27	216.67	46.49	376.02
J52	0.27	216.67	43.83	344.45
J53	0.27	216.67	43.15	336.82
J55	0.27	216.67	46.05	366.57
J56	0.27	216.67	41.67	322.45
J57	0.27	216.67	43.72	341.36
J58	0.27	216.67	42.37	328.88
J59	0.27	216.67	38.47	298.27
J60	0.27	216.67	34.53	273.32
J61	0.27	216.67	34.12	271.37
J62	0.27	216.67	38.21	296.44
J63	0.27	216.67	38.53	298.65
J64	0.27	216.67	35.03	276.33
J65	0.27	216.67	35.12	276.77
J66	0.27	216.67	39.34	304.72
J67	0.27	216.67	39.87	308.63
J68	0.27	216.67	35.37	278.22
J69	0.27	216.67	35.40	278.71
J70	0.27	216.67	38.90	301.94
J71	0.27	216.67	39.30	305.16
J72	0.27	216.67	35.66	280.57
J73	0.27	216.67	35.84	281.38
J74	0.27	216.67	39.11	303.38
J75	0.25	216.67	42.09	329.70
J76	0.25	216.67	46.62	381.47
J77	0.25	216.67	41.50	324.43
J78	0.18	216.67	47.17	389.86
J79	0.18	216.67	43.70	344.12
J80	0.38	216.67	39.09	305.87
J81	0.38	216.67	49.90	454.28
J82	0.38	216.67	49.29	438.57
J83	0.38	216.67	50.02	450.97
J84	0.36	216.67	50.05	453.41
J85	0.36	216.67	33.14	267.82
J86	0.36	216.67	29.44	250.00
J87	0.36	216.67	29.45	250.08
J88	0.36	216.67	33.57	270.05
J89	0.36	216.67	50.89	472.00
J90	0.38	216.67	42.50	336.31
J91	0.38	216.67	49.26	431.73
J92	0.38	216.67	38.81	303.65
J93	0.38	216.67	35.73	282.96
J94	0.20	216.67	46.67	383.00
J95	0.20	216.67	44.14	348.87
J96	0.20	216.67	42.96	337.07
J97	0.20	216.67	37.89	295.61

Sufficient hydrant coverage to meet the RFF.

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Table C-4: Model Results - AVDY+FF (Reliability Analysis Scenarios 1 to 3)

	Break Scenario 1 (Connection 1 Break)				Break Scenario 2 (Connection 2 Break)				Break Scenario 3 (Connection 3 Break)			
Junction ID	Base Demand (L/s)	Required Fire Flow (L/s)	Residual Pressure (psi)	Available Fire Flow @ Residual 20 psi (L/s)	Base Demand (L/s)	Required Fire Flow (L/s)	Residual Pressure (psi)	Available Fire Flow @ Residual 20 psi (L/s)	Base Demand (L/s)	Required Fire Flow (L/s)	Residual Pressure (psi)	Available Fire Flow @ Residual 20 psi (L/s)
Maximum	*0.15*	*216.67*	*55.44*	*522.37*	*0.15*	*216.67*	*53.02*	*446.25*	*0.15*	*216.67*	*55.87*	*537.74*
Minimum	*0.00*	*216.67*	*0.79*	*178.58*	*0.00*	*216.67*	*1.66*	*180.60*	*0.00*	*216.67*	*-6.01*	*168.59*
J01	0.07	216.67	42.49	322.62	0.07	216.67	52.82	446.25	0.07	216.67	52.83	464.85
J02	0.00	216.67	47.13	365.68	0.00	216.67	52.77	438.21	0.00	216.67	52.92	459.83
J05	0.07	216.67	50.69	411.50	0.07	216.67	52.88	434.80	0.07	216.67	53.15	459.24
J06	0.07	216.67	51.96	432.12	0.07	216.67	51.89	415.95	0.07	216.67	53.24	459.48
J07	0.11	216.67	52.48	439.60	0.11	216.67	49.68	382.07	0.11	216.67	53.56	463.66
J08	0.11	216.67	52.75	446.29	0.11	216.67	46.66	348.62	0.11	216.67	53.70	468.32
J09	0.11	216.67	52.58	450.30	0.11	216.67	44.03	327.08	0.11	216.67	53.45	470.90
J10	0.11	216.67	53.39	463.44	0.11	216.67	41.39	305.95	0.11	216.67	54.14	482.54
J100	0.15	216.67	43.99	333.80	0.15	216.67	44.88	336.33	0.15	216.67	37.28	286.45
J101	0.15	216.67	47.86	375.22	0.15	216.67	48.76	377.58	0.15	216.67	42.97	327.73
J102	0.15	216.67	46.62	360.84	0.15	216.67	47.52	363.29	0.15	216.67	42.38	323.25
J103	0.15	216.67	43.40	329.08	0.15	216.67	44.29	331.64	0.15	216.67	36.33	281.18
J109	0.11	216.67	46.33	358.13	0.11	216.67	47.20	360.58	0.11	216.67	39.82	303.26
J11	0.11	216.67	53.71	472.60	0.11	216.67	39.31	292.75	0.11	216.67	54.39	490.72
J110	0.11	216.67	46.39	357.53	0.11	216.67	47.25	359.97	0.11	216.67	39.71	301.87
J111	0.11	216.67	47.08	365.09	0.11	216.67	47.95	367.49	0.11	216.67	40.23	305.37
J112	0.11	216.67	42.39	319.64	0.11	216.67	43.26	322.19	0.11	216.67	35.52	276.11
J113	0.11	216.67	34.46	269.36	0.11	216.67	35.33	271.88	0.11	216.67	27.59	240.74
J114	0.11	216.67	33.31	263.99	0.11	216.67	34.17	266.50	0.11	216.67	26.43	236.68
J115	0.11	216.67	35.90	277.23	0.11	216.67	36.77	279.77	0.11	216.67	29.03	246.38
J116	0.11	216.67	38.72	293.85	0.11	216.67	39.59	296.42	0.11	216.67	31.85	258.26
J117	0.11	216.67	37.01	283.09	0.11	216.67	37.88	285.63	0.11	216.67	30.14	250.71
J118	0.11	216.67	41.51	312.72	0.11	216.67	42.38	315.28	0.11	216.67	34.64	271.43
J119	0.11	216.67	42.96	323.92	0.11	216.67	43.83	326.45	0.11	216.67	36.08	279.03
J12	0.11	216.67	55.44	522.37	0.11	216.67	47.03	361.41	0.11	216.67	55.87	537.74
J120	0.11	216.67	41.62	313.12	0.11	216.67	42.49	315.67	0.11	216.67	34.75	271.80
J121	0.11	216.67	38.85	294.33	0.11	216.67	39.72	296.89	0.11	216.67	31.98	258.69
J122	0.11	216.67	32.58	260.62	0.11	216.67	33.45	263.13	0.11	216.67	25.71	234.18
J123	0.11	216.67	32.82	261.55	0.11	216.67	33.69	264.05	0.11	216.67	25.95	234.95
J124	0.11	216.67	39.64	299.18	0.11	216.67	40.51	301.74	0.11	216.67	32.78	262.21
J125	0.11	216.67	36.69	280.57	0.11	216.67	37.56	283.10	0.11	216.67	29.82	249.11
J129	0.11	216.67	31.40	254.45	0.11	216.67	32.27	256.88	0.11	216.67	24.44	229.69
J130	0.11	216.67	34.95	271.00	0.11	216.67	35.82	273.49	0.11	216.67	27.99	241.89
J131	0.11	216.67	31.51	255.02	0.11	216.67	32.38	257.46	0.11	216.67	24.56	230.09
J132	0.11	216.67	34.96	271.17	0.11	216.67	35.83	273.67	0.11	216.67	28.02	242.07
J133	0.11	216.67	35.34	273.05	0.11	216.67	36.21	275.55	0.11	216.67	28.46	243.67
J134	0.11	216.67	32.30	258.44	0.11	216.67	33.17	260.89	0.11	216.67	25.42	232.88
J135	0.11	216.67	32.77	260.42	0.11	216.67	33.64	262.88	0.11	216.67	25.89	234.43
J136	0.11	216.67	34.74	269.86	0.11	216.67	35.61	272.35	0.11	216.67	27.86	241.40
J15	0.07	216.67	49.79	398.82	0.07	216.67	51.34	410.27	0.07	216.67	50.50	412.08
J152	0.11	216.67	47.64	365.50	0.11	216.67	45.78	339.11	0.11	216.67	48.72	379.19
J153	0.15	216.67	48.09	379.82	0.15	216.67	49.02	382.42	0.15	216.67	43.93	336.59
J154	0.11	216.67	45.93	351.46	0.11	216.67	46.80	353.92	0.11	216.67	39.04	296.82
J155	0.11	216.67	45.41	345.56	0.11	216.67	46.28	348.03	0.11	216.67	38.55	293.31
J156	0.00	216.67	44.09	334.21	0.00	216.67	44.96	336.74	0.00	216.67	37.26	285.93
J158	0.00	216.67	51.65	423.38	0.00	216.67	52.51	425.35	0.00	216.67	41.24	310.32
J16	0.07	216.67	50.06	401.37	0.07	216.67	51.34	408.70	0.07	216.67	49.65	398.05
J162	0.00	216.67	46.27	357.96	0.00	216.67	47.14	360.41	0.00	216.67	40.07	305.27
J164	0.00	216.67	45.64	350.80	0.00	216.67	46.51	353.28	0.00	216.67	39.15	298.60
J166	0.00	216.67	43.63	332.13	0.00	216.67	44.50	334.68	0.00	216.67	37.00	285.40
J168	0.00	216.67	43.12	326.41	0.00	216.67	43.99	328.96	0.00	216.67	36.44	281.49
J17	0.07	216.67	49.85	399.95	0.07	216.67	50.97	404.93	0.07	216.67	48.15	379.45
J170	0.00	216.67	42.00	319.35	0.00	216.67	42.86	321.94	0.00	216.67	35.26	275.97
J172	0.00	216.67	46.32	358.33	0.00	216.67	47.19	360.78	0.00	216.67	40.56	308.75
J174	0.15	216.67	46.88	363.57	0.15	216.67	47.75	365.98	0.15	216.67	41.91	318.80
J176	0.15	216.67	47.87	374.73	0.15	216.67	48.74	377.08	0.15	216.67	41.59	315.72
J178	0.08	216.67	49.99	401.91	0.08	216.67	50.86	404.05	0.08	216.67	41.92	317.38
J18	0.07	216.67	50.32	410.01	0.07	216.67	51.30	412.99	0.07	216.67	47.14	369.30
J180	0.08	216.67	50.47	406.63	0.08	216.67	51.34	408.73	0.08	216.67	41.40	312.36
J182	0.08	216.67	51.35	419.29	0.08	216.67	52.21	421.30	0.08	216.67	41.18	310.26
J184	0.08	216.67	52.17	432.78	0.08	216.67	53.02	434.69	0.08	216.67	41.20	310.11
J186	0.08	216.67	49.96	402.89	0.08	216.67	50.83	405.03	0.08	216.67	42.53	322.92
J188	0.00	216.67	46.41	359.34	0.00	216.67	47.28	361.79	0.00	216.67	39.98	304.52
J19	0.10	216.67	49.38	397.41	0.10	216.67	50.32	399.91	0.10	216.67	45.68	353.78
J20	0.10	216.67	50.31	406.99	0.10	216.67	51.22	409.00	0.10	216.67	46.26	357.33
J201	0.11	216.67	42.77	322.44	0.11	216.67	43.64	324.99	0.11	216.67	35.99	278.54
J203	0.11	216.67	42.14	317.70	0.11	216.67	43.01	320.25	0.11	216.67	35.36	275.22
J205	0.11	216.67	41.41	312.36	0.11	216.67	42.28	314.93	0.11	216.67	34.62	271.51
J207	0.11	216.67	43.48	326.85	0.11	216.67	44.35	329.37	0.11	216.67	36.68	281.65
J209	0.11	216.67	42.60	320.41	0.11	216.67	43.47	322.94	0.11	216.67	35.80	277.19
J21	0.10	216.67	49.82	401.01	0.10	216.67	50.72	402.88	0.10	216.67	45.45	349.67
J211	0.11	216.67	41.68	313.61	0.11	216.67	42.55	316.16	0.11	216.67	34.89	272.51
J213	0.11	216.67	38.72	293.21	0.11	216.67	39.59	295.77	0.11	216.67	31.92	258.30
J215	0.11	216.67	38.26	290.57	0.11	216.67	39.13	293.13	0.11	216.67	31.47	256.37
J217	0.11	216.67	41.08	308.36	0.11	216.67	41.95	310.90	0.11	216.67	34.28	269.08
J219	0.11	216.67	35.35	273.69	0.11	216.67	36.22	276.21	0.11	216.67	28.56	244.28
J22	0.10	216.67	50.72	415.04	0.10	216.67	51.60	416.61	0.10	216.67	45.93	354.74
J221	0.11	216.67	39.65	301.65	0.11	216.67	40.52	304.26	0.11	216.67	32.86	263.67
J223	0.11	216.67	40.07	304.04	0.11	216.67	40.94	306.63	0.11	216.67	33.28	265.44
J225	0.11	216.67	40.46	305.79	0.11	216.67	41.32	308.37	0.11	216.67	33.66	266.88
J227	0.11	216.67	34.13	268.21	0.11	216.67	35.00	270.74	0.11	216.67	27.34	240.00
J229	0.11	216.67	35.54	272.80	0.11	216.67	36.41	275.27	0.11	216.67	28.75	244.22
J23	0.10	216.67	50.08	403.15	0.10	216.67	50.95	404.60	0.10	216.67	45.91	353.43
J231	0.11	216.67	40.28	304.64	0.11	216.67	41.14	307.22	0.11	216.67	33.48	266.06
J233	0.11	216.67	40.36	305.61	0.11	216.67	41.23	308.20	0.11	216.67	33.57	266.65
J235	0.11	216.67	33.25	263.63	0.11	216.67	34.12	266.14	0.11	216.67	26.45	236.72
J237	0.11	216.67	29.21	246.39	0.11	216.67	30.08	248.84	0.11	216.67	22.42	223.66
J239	0.11	216.67	24.98	231.38	0.11	216.67	25.85	233.75	0.11	216.67	18.18	212.00
J24	0.10	216.67	49.45	392.32	0.10	216.67	50.30	393.57	0.10	216.67	45.68	349.99
J241	0.11	216.67	29.29	246.58	0.11	216.67	30.15	249.03	0.11	216.67	22.49	223.87
J243	0.11	216.67	36.37	281.31	0.11	216.67	37.24	283.91	0.11	216.67	29.58	249.19
J245	0.11	216.67	40.38	304.95	0.11	216.67	41.25	307.52	0.11	216.67	33.59	266.37
J247	0.11	216.67	37.80	289.23	0.11	216.67	38.67	291.82	0.11	216.67	31.01	255.02
J249	0.11	216.67	39.24	298.31	0.11	216.67	40.11	300.91	0.11	216.67	32.45	261.48
J25	0.10	216.67	48.98	386.74	0.10	216.67	49.81	387.79	0.10	216.67	45.51	348.77
J251	0.11	216.67	38.27	292.27	0.11	216.67	39.14	294.87	0.11	216.67	31.48	257.15
J253	0.11	216.67	34.46	270.64	0.11	216.67	35.33	273.20	0.11	216.67	27.67	241.54
J255	0.11	216.67	38.69	294.02	0.11	216.67	39.55	296.60	0.11	216.67	31.89	258.62
J257	0.11	216.67	38.69	294.34	0.11	216.67	39.56	296.93	0.11	216.67	31.90	258.78
J259	0.11	216.67	29.72	248.82	0.11	216.67	30.59	251.31	0.11	216.67	22.93	225.31
J26	0.10	216.67	48.93	385.07	0.10	216.67	49.73	385.80	0.10	216.67	45.81	351.20
J261	0.11	216.67	30.95	254.10	0.11	216.67	31.82	256.61	0.11	216.67	24.16	229.23
J263	0.11	216.67	36.18	281.03	0.11	216.67	37.05	283.65	0.11	216.67	29.39	248.75
J265	0.11	216.67	37.19	285.32	0.11	216.67	38.06	287.91	0.11	216.67	30.39	252.29
J267	0.11	216.67	37.56	287.35	0.11	216.67	38.43	289.93	0.11	216.67	30.77	253.80
J269	0.11	216.67	31.21	255.45	0.11	216.67	32.08	257.98	0.11	216.67	24.42	230.15
J27	0.10	216.67	49.15	387.00	0.10	216.67	49.94	387.40	0.10	216.67	46.33	355.83
J271	0.11	216.67	30.85	254.01	0.11	216.67	31.72	256.54	0.11	216.67	24.06	229.01
J273	0.11	216.67	37.81	289.70	0.11	216.67	38.68	292.30	0.11	216.67	31.01	255.24
J275	0.11	216.67	37.63	288.85	0.11	216.67	38.50	291.46	0.11	216.67	30.84	254.57
J277	0.11	216.67	37.49	288.22	0.11	216.67	38.35	290.84	0.11	216.67	30.69	254.06
J279	0.11	216.67	36.24	280.93	0.11	216.67	37.10	283.54	0.11	216.67	29.44	248.81
J28	0.10	216.67	48.89	384.00	0.10	216.67	49.64	384.01	0.10	216.67	46.48	357.70
J281	0.11	216.67	35.90	279.21	0.11	216.67	36.77	281.82	0.11	216.67	29.11	247.51
J283	0.11	216.67	31.46	254.62	0.11	216.67	32.33	257.06	0.11	216.67	24.67	230.38
J285	0.11	216.67	28.94	246.37	0.11	216.67	29.81	248.89	0.11	216.67	22.15	223.05
J287	0.11	216.67	32.92	263.92	0.11	216.67	33.79	266.51	0.11	216.67	26.13	236.24
J289	0.11	216.67	30.14	251.11	0.11	216.67	31.01	253.64	0.11	216.67	23.35	226.75
J29	0.10	216.67	48.93	384.63	0.10	216.67	49.67	384.30	0.10	216.67	46.83	361.54
J291	0.11	216.67	36.19	281.24	0.11	216.67	37.06	283.86	0.11	216.67	29.40	248.86
J293	0.11	216.67	36.45	282.27	0.11	216.67	37.32	284.88	0.11	216.67	29.66	249.75
J295	0.11	216.67	35.85	279.40	0.11	216.67	36.72	282.02	0.11	216.67	29.05	247.50
J297	0.11	216.67	30.81	253.99	0.11	216.67	31.68	256.54	0.11	216.67	24.02	228.92
J299	0.11	216.67	35.29	275.65	0.11	216.67	36.16	278.25	0.11	216.67	28.50	244.99
J30	0.07	216.67	49.19	388.83	0.07	216.67	49.90	387.89	0.07	216.67	47.48	369.40
J301	0.11	216.67	29.85	249.66	0.11	216.67	30.72	252.17	0.11	216.67	23.06	225.78
J303	0.00	216.67	35.49	277.35	0.00	216.67	36.35	279.98	0.00	216.67	28.69	245.96
J305	0.00	216.67	34.75	273.07	0.00	216.67	35.62	275.68	0.00	216.67	27.96	242.94
J307	0.11	216.67	34.61	272.28	0.11	216.67	35.48	274.88	0.11	216.67	27.82	242.44
J309	0.11	216.67	25.87	234.90	0.11	216.67	26.74	237.37	0.11	216.67	19.07	214.23
J31	0.07	216.67	49.35	389.84	0.07	216.67	50.02	388.38	0.07	216.67	47.93	373.84
J311	0.11	216.67	33.59	267.33	0.11	216.67	34.46	269.93	0.11	216.67	26.80	238.70
J313	0.11	216.67	23.76	227.89	0.11	216.67	24.62	230.32	0.11	216.67	16.96	208.73
J315	0.11	216.67	33.97	268.91	0.11	216.67	34.84	271.50	0.11	216.67	27.18	239.99
J317	0.11	216.67	33.07	264.47	0.11	216.67	33.94	267.05	0.11	216.67	26.28	236.70
J319	0.11	216.67	32.84	262.99	0.11	216.67	33.71	265.56	0.11	216.67	26.05	235.75
J32	0.07	216.67	49.58	393.97	0.07	216.67	50.18	391.49	0.07	216.67	48.49	381.57
J321	0.11	216.67	33.82	267.43	0.11	216.67	34.69	269.99	0.11	216.67	27.03	239.16
J323	0.11	216.67	33.25	265.11	0.11	216.67	34.12	267.68	0.11	216.67	26.46	237.27
J325	0.11	216.67	32.98	263.59	0.11	216.67	33.85	266.15	0.11	216.67	26.19	236.22
J327	0.11	216.67	32.42	260.84	0.11	216.67	33.28	263.39	0.11	216.67	25.62	234.21
J329	0.11	216.67	30.49	252.15	0.11	216.67	31.35	254.66	0.11	216.67	23.69	227.74
J33	0.07	216.67	50.10	399.41	0.07	216.67	50.65	395.85	0.07	216.67	49.26	390.08
J331	0.11	216.67	31.70	257.20	0.11	216.67	32.57	259.72	0.11	216.67	24.91	231.64
J333	0.11	216.67	35.60	276.03	0.11	216.67	36.47	278.59	0.11	216.67	28.81	245.68
J335	0.11	216.67	34.58	270.98	0.11	216.67	35.45	273.54	0.11	216.67	27.79	241.87
J337	0.11	216.67	34.13	268.88	0.11	216.67	35.00	271.44	0.11	216.67	27.34	240.27
J339	0.11	216.67	33.55	265.61	0.11	216.67	34.42	268.15	0.11	216.67	26.76	237.99
J34	0.07	216.67	50.58	408.34	0.07	216.67	51.07	403.39	0.07	216.67	50.08	403.22
J341	0.11	216.67	33.29	264.21	0.11	216.67	34.15	266.74	0.11	216.67	26.49	237.00
J343	0.11	216.67	27.48	240.21	0.11	216.67	28.35	242.65	0.11	216.67	20.69	218.70
J345	0.11	216.67	30.79	253.02	0.11	216.67	31.65	255.51	0.11	216.67	23.99	228.59
J347	0.11	216.67	28.75	244.76	0.11	216.67	29.62	247.22	0.11	216.67	21.96	222.33
J349	0.11	216.67	28.12	242.29	0.11	216.67	28.98	244.72	0.11	216.67	21.32	220.47
J35	0.07	216.67	50.81	412.57	0.07	216.67	51.13	404.66	0.07	216.67	50.78	414.37
J351	0.11	216.67	28.74	244.54	0.11	216.67	29.61	246.98	0.11	216.67	21.95	222.27
J353	0.11	216.67	30.63	252.12	0.11	216.67	31.50	254.60	0.11	216.67	23.83	228.02
J355	0.11	216.67	25.84	234.34	0.11	216.67	26.71	236.75	0.11	216.67	19.05	214.22
J357	0.11	216.67	33.19	263.56	0.11	216.67	34.05	266.08	0.11	216.67	26.39	236.58
J359	0.11	216.67	32.58	260.99	0.11	216.67	33.45	263.51	0.11	216.67	25.79	234.57
J36	0.07	216.67	51.52	422.97	0.07	216.67	51.52	409.22	0.07	216.67	52.15	436.53
J361	0.11	216.67	32.64	261.43	0.11	216.67	33.51	263.96	0.11	216.67	25.85	234.82
J363	0.11	216.67	4.24	183.93	0.11	216.67	5.11	185.99	0.11	216.67	-2.56	173.13
J365	0.11	216.67	0.79	178.58	0.11	216.67	1.66	180.60	0.11	216.67	-6.01	168.59
J367	0.11	216.67	42.29	318.09	0.11	216.67	43.16	320.63	0.11	216.67	35.49	275.59
J369	0.11	216.67	10.92	195.45	0.11	216.67	11.79	197.67	0.11	216.67	4.13	182.53
J37	0.08	216.67	50.76	416.60	0.08	216.67	51.64	418.34	0.08	216.67	44.62	342.00
J371	0.11	216.67	34.72	272.12	0.11	216.67	35.59	274.70	0.11	216.67	27.93	242.58
J38	0.08	216.67	51.28	424.31	0.08	216.67	52.16	426.10	0.08	216.67	43.80	333.80
J39	0.08	216.67	50.91	417.95	0.08	216.67	51.79	419.89	0.08	216.67	43.06	327.24
J40	0.11	216.67	55.02	509.00	0.11	216.67	33.88	264.29	0.11	216.67	55.50	524.89
J41	0.11	216.67	48.58	382.87	0.11	216.67	49.45	385.16	0.11	216.67	41.44	314.01
J42	0.11	216.67	47.88	373.82	0.11	216.67	48.75	376.16	0.11	216.67	40.91	309.94
J43	0.11	216.67	46.59	359.27	0.11	216.67	47.46	361.70	0.11	216.67	39.67	301.38
J44	0.11	216.67	45.81	350.00	0.11	216.67	46.68	352.47	0.11	216.67	38.93	295.98
J45	0.11	216.67	44.55	338.33	0.11	216.67	45.42	340.84	0.11	216.67	37.72	288.65
J46	0.11	216.67	54.56	495.21	0.11	216.67	35.64	272.66	0.11	216.67	55.10	511.77
J48	0.11	216.67	54.02	480.52	0.11	216.67	37.88	284.45	0.11	216.67	54.64	498.01
J50	0.11	216.67	46.45	355.53	0.11	216.67	33.28	261.60	0.11	216.67	47.14	363.56
J51	0.11	216.67	46.11	351.01	0.11	216.67	33.37	261.82	0.11	216.67	46.81	358.81
J52	0.11	216.67	42.54	318.55	0.11	216.67	35.35	270.96	0.11	216.67	43.44	326.07
J53	0.11	216.67	41.84	312.72	0.11	216.67	34.97	268.96	0.11	216.67	42.74	319.86
J55	0.11	216.67	43.62	325.15	0.11	216.67	42.52	311.99	0.11	216.67	44.61	334.02
J56	0.11	216.67	39.41	295.12	0.11	216.67	39.85	294.68	0.11	216.67	39.07	293.58
J57	0.11	216.67	41.51	308.93	0.11	216.67	41.98	308.28	0.11	216.67	41.00	306.16
J58	0.11	216.67	40.20	300.26	0.11	216.67	40.71	300.08	0.11	216.67	39.55	296.72
J59	0.11	216.67	36.67	279.29	0.11	216.67	37.35	280.58	0.11	216.67	35.15	271.93
J60	0.11	216.67	32.74	259.77	0.11	216.67	33.43	261.28	0.11	216.67	31.21	253.61
J61	0.11	216.67	32.34	258.18	0.11	216.67	33.03	259.71	0.11	216.67	30.80	252.06
J62	0.11	216.67	36.42	277.96	0.11	216.67	37.11	279.30	0.11	216.67	34.85	270.43
J63	0.11	216.67	36.97	280.82	0.11	216.67	37.71	282.43	0.11	216.67	34.76	270.00
J64	0.11	216.67	33.49	263.19	0.11	216.67	34.24	264.95	0.11	216.67	31.27	253.99
J65	0.11	216.67	33.57	263.56	0.11	216.67	34.32	265.32	0.11	216.67	31.34	254.29
J66	0.11	216.67	37.79	285.60	0.11	216.67	38.54	287.19	0.11	216.67	35.52	273.99
J67	0.11	216.67	38.56	289.97	0.11	216.67	39.36	291.83	0.11	216.67	35.65	274.59
J68	0.11	216.67	34.09	265.89	0.11	216.67	34.89	267.89	0.11	216.67	31.16	253.55
J69	0.11	216.67	34.13	266.27	0.11	216.67	34.92	268.27	0.11	216.67	31.18	253.79
J70	0.11	216.67	37.62	284.82	0.11	216.67	38.42	286.74	0.11	216.67	34.64	269.79
J71	0.11	216.67	38.28	288.81	0.11	216.67	39.12	290.97	0.11	216.67	34.68	270.09
J72	0.11	216.67	34.68	269.11	0.11	216.67	35.52	271.34	0.11	216.67	31.04	253.37
J73	0.11	216.67	34.87	269.84	0.11	216.67	35.71	272.06	0.11	216.67	31.22	253.97
J74	0.11	216.67	38.12	287.59	0.11	216.67	38.97	289.77	0.11	216.67	34.46	268.84
J75	0.10	216.67	40.98	307.20	0.10	216.67	41.83	309.36	0.10	216.67	37.44	285.57
J76	0.10	216.67	45.38	343.58	0.10	216.67	46.23	345.42	0.10	216.67	42.15	317.25
J77	0.10	216.67	40.00	300.70	0.10	216.67	40.82	302.63	0.10	216.67	37.43	285.55
J78	0.07	216.67	45.47	345.13	0.07	216.67	46.25	346.23	0.07	216.67	43.41	327.79
J79	0.07	216.67	41.73	312.19	0.07	216.67	42.41	312.95	0.07	216.67	40.45	303.97
J80	0.15	216.67	38.26	290.04	0.15	216.67	39.16	292.66	0.15	216.67	33.09	263.39
J81	0.15	216.67	47.84	376.21	0.15	216.67	48.74	378.60	0.15	216.67	43.00	328.54
J82	0.15	216.67	47.65	373.44	0.15	216.67	48.56	375.90	0.15	216.67	43.03	328.33
J83	0.15	216.67	48.68	385.27	0.15	216.67	49.60	387.74	0.15	216.67	44.33	339.10
J84	0.15	216.67	48.75	387.46	0.15	216.67	49.69	390.12	0.15	216.67	44.83	344.50
J85	0.15	216.67	31.91	257.20	0.15	216.67	32.86	259.94	0.15	216.67	28.09	242.34
J86	0.15	216.67	28.23	242.36	0.15	216.67	29.18	245.01	0.15	216.67	24.44	229.73
J87	0.15	216.67	28.23	242.41	0.15	216.67	29.18	245.07	0.15	216.67	24.46	229.82
J88	0.15	216.67	32.32	258.99	0.15	216.67	33.27	261.74	0.15	216.67	28.57	244.11
J89	0.15	216.67	49.54	397.83	0.15	216.67	50.50	400.54	0.15	216.67	45.83	354.24
J90	0.15	216.67	41.27	310.82	0.15	216.67	42.20	313.61	0.15	216.67	37.27	285.68
J91	0.15	216.67	48.09	376.24	0.15	216.67	49.02	378.78	0.15	216.67	43.86	333.74
J92	0.15	216.67	37.81	287.29	0.15	216.67	38.72	289.95	0.15	216.67	33.17	263.73
J93	0.15	216.67	34.83	271.11	0.15	216.67	35.74	273.73	0.15	216.67	29.96	249.76
J94	0.08	216.67	50.14	401.56	0.08	216.67	51.01	403.65	0.08	216.67	41.80	315.51
J95	0.08	216.67	50.43	403.45	0.08	216.67	51.30	405.55	0.08	216.67	41.36	311.24
J96	0.08	216.67	50.95	413.28	0.08	216.67	51.82	415.32	0.08	216.67	41.37	311.88
J97	0.08	216.67	41.52	310.65	0.08	216.67	42.39	313.17	0.08	216.67	32.90	262.11
J98	0.00	216.67	51.21	418.21	0.00	216.67	52.07	420.22	0.00	216.67	41.10	310.00

(shaded) Sufficient hydrant coverage to meet the RFF.

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Table C-5: Model Results - AVDY+FF (Reliability Analysis Scenarios 4 to 5)

	Break Scenario 4				Break Scenario 5			
Junction ID	Base Demand (L/s)	Required Fire Flow (L/s)	Residual Pressure (psi)	Available Fire Flow @ Residual 20 psi (L/s)	Base Demand (L/s)	Required Fire Flow (L/s)	Residual Pressure (psi)	Available Fire Flow @ Residual 20 psi (L/s)
Maximum	*0.15*	*216.67*	*59.58*	*658.81*	*0.15*	*216.67*	*59.58*	*658.83*
Minimum	*0.00*	*216.67*	*-12.56*	*161.32*	*0.00*	*216.67*	*-1.27*	*175.86*
J01	0.07	216.67	57.58	594.76	0.07	216.67	57.58	594.77
J02	0.00	216.67	58.54	622.33	0.00	216.67	58.54	622.35
J05	0.07	216.67	59.50	658.52	0.07	216.67	59.50	658.54
J06	0.07	216.67	59.58	658.81	0.07	216.67	59.58	658.83
J07	0.11	216.67	59.32	636.57	0.11	216.67	59.32	636.59
J08	0.11	216.67	58.78	614.73	0.11	216.67	58.78	614.75
J09	0.11	216.67	58.06	601.57	0.11	216.67	58.06	601.58
J10	0.11	216.67	58.17	597.16	0.11	216.67	58.17	597.17
J100	0.15	216.67	50.47	403.99	0.15	216.67	50.47	404.02
J101	0.15	216.67	55.79	520.05	0.15	216.67	55.80	520.22
J102	0.15	216.67	55.61	517.94	0.15	216.67	55.63	518.19
J103	0.15	216.67	49.91	396.85	0.15	216.67	49.91	396.88
J109	0.11	216.67	53.32	457.86	0.11	216.67	53.45	459.21
J11	0.11	216.67	58.03	596.05	0.11	216.67	58.03	596.06
J110	0.11	216.67	53.51	458.73	0.11	216.67	53.57	459.36
J111	0.11	216.67	54.11	470.95	0.11	216.67	54.07	470.41
J112	0.11	216.67	48.97	381.19	0.11	216.67	48.78	379.79
J113	0.11	216.67	40.89	304.72	0.11	216.67	40.66	303.63
J114	0.11	216.67	39.66	296.94	0.11	216.67	39.42	295.83
J115	0.11	216.67	42.18	314.79	0.11	216.67	41.93	313.48
J116	0.11	216.67	44.94	337.90	0.11	216.67	44.67	336.33
J117	0.11	216.67	43.27	322.71	0.11	216.67	43.02	321.32
J118	0.11	216.67	47.82	366.80	0.11	216.67	47.57	365.11
J119	0.11	216.67	48.96	380.02	0.11	216.67	48.67	377.86
J12	0.11	216.67	58.34	619.64	0.11	216.67	58.34	619.65
J120	0.11	216.67	47.58	363.15	0.11	216.67	47.27	361.08
J121	0.11	216.67	44.90	336.80	0.11	216.67	44.60	335.07
J122	0.11	216.67	38.48	289.58	0.11	216.67	38.16	288.15
J123	0.11	216.67	38.54	289.57	0.11	216.67	38.18	288.00
J124	0.11	216.67	45.01	337.21	0.11	216.67	44.61	334.82
J125	0.11	216.67	42.46	314.96	0.11	216.67	42.11	313.19
J129	0.11	216.67	38.14	285.65	0.11	216.67	38.03	285.16
J130	0.11	216.67	41.73	309.08	0.11	216.67	41.63	308.58
J131	0.11	216.67	38.22	286.31	0.11	216.67	38.09	285.76
J132	0.11	216.67	41.62	308.49	0.11	216.67	41.48	307.77
J133	0.11	216.67	41.13	304.88	0.11	216.67	40.81	303.32
J134	0.11	216.67	38.04	285.23	0.11	216.67	37.71	283.81
J135	0.11	216.67	38.44	287.30	0.11	216.67	38.09	285.80
J136	0.11	216.67	40.34	299.28	0.11	216.67	39.98	297.61
J15	0.07	216.67	57.84	581.27	0.07	216.67	57.85	581.29
J152	0.11	216.67	54.71	469.88	0.11	216.67	54.71	469.89
J153	0.15	216.67	54.89	496.54	0.15	216.67	54.89	496.58
J154	0.11	216.67	51.81	421.61	0.11	216.67	51.50	418.89
J155	0.11	216.67	50.67	401.74	0.11	216.67	50.26	398.43
J156	0.00	216.67	47.04	357.02	0.00	216.67	46.34	352.46
J158	0.00	216.67	57.12	540.57	0.00	216.67	57.11	540.54
J16	0.07	216.67	57.73	571.92	0.07	216.67	57.73	571.94
J162	0.00	216.67	53.52	463.80	0.00	216.67	53.65	465.20
J164	0.00	216.67	51.72	427.18	0.00	216.67	52.00	429.77
J166	0.00	216.67	46.21	353.65	0.00	216.67	46.89	358.19
J168	0.00	216.67	42.81	321.07	0.00	216.67	43.77	326.41
J17	0.07	216.67	57.18	556.73	0.07	216.67	57.18	556.75
J170	0.00	216.67	37.04	283.61	0.00	216.67	38.40	289.72
J172	0.00	216.67	54.14	478.00	0.00	216.67	54.23	479.02
J174	0.15	216.67	55.58	513.49	0.15	216.67	55.62	513.98
J176	0.15	216.67	55.46	506.60	0.15	216.67	55.48	506.74
J178	0.08	216.67	56.27	525.30	0.08	216.67	56.26	525.19
J18	0.07	216.67	57.26	568.56	0.07	216.67	57.26	568.59
J180	0.08	216.67	56.39	522.76	0.08	216.67	56.39	522.69
J182	0.08	216.67	56.96	537.38	0.08	216.67	56.96	537.33
J184	0.08	216.67	57.55	555.84	0.08	216.67	57.54	555.79
J186	0.08	216.67	56.52	537.40	0.08	216.67	56.51	537.26
J188	0.00	216.67	53.31	458.82	0.00	216.67	53.46	460.47
J19	0.10	216.67	56.16	533.84	0.10	216.67	56.16	533.86
J20	0.10	216.67	56.97	549.30	0.10	216.67	56.97	549.31
J201	0.11	216.67	33.11	262.27	0.11	216.67	37.43	284.03
J203	0.11	216.67	31.53	255.43	0.11	216.67	37.70	285.79
J205	0.11	216.67	30.38	250.79	0.11	216.67	37.47	284.70
J207	0.11	216.67	29.68	247.56	0.11	216.67	41.61	309.76
J209	0.11	216.67	29.74	247.96	0.11	216.67	40.09	299.95
J21	0.10	216.67	56.38	532.99	0.10	216.67	56.38	533.01
J211	0.11	216.67	29.50	247.12	0.11	216.67	38.83	292.25
J213	0.11	216.67	27.08	238.30	0.11	216.67	35.59	274.11
J215	0.11	216.67	26.90	237.72	0.11	216.67	34.84	270.47
J217	0.11	216.67	29.70	247.72	0.11	216.67	37.80	285.59
J219	0.11	216.67	23.96	228.09	0.11	216.67	32.24	258.14
J22	0.10	216.67	57.18	560.84	0.10	216.67	57.18	560.85
J221	0.11	216.67	27.98	242.02	0.11	216.67	36.53	280.64
J223	0.11	216.67	28.54	243.97	0.11	216.67	36.82	281.91
J225	0.11	216.67	29.06	245.74	0.11	216.67	37.04	282.55
J227	0.11	216.67	22.52	223.85	0.11	216.67	30.93	253.03
J229	0.11	216.67	24.16	228.40	0.11	216.67	32.10	256.34
J23	0.10	216.67	56.68	538.08	0.10	216.67	56.68	538.09
J231	0.11	216.67	29.15	246.09	0.11	216.67	36.49	279.54
J233	0.11	216.67	29.15	246.19	0.11	216.67	36.73	281.10
J235	0.11	216.67	21.86	221.90	0.11	216.67	29.83	248.43
J237	0.11	216.67	17.82	211.18	0.11	216.67	25.80	233.91
J239	0.11	216.67	13.59	201.44	0.11	216.67	21.56	221.03
J24	0.10	216.67	56.14	516.98	0.10	216.67	56.14	516.99
J241	0.11	216.67	17.89	211.38	0.11	216.67	25.87	234.10
J243	0.11	216.67	25.17	232.26	0.11	216.67	32.72	261.60
J245	0.11	216.67	28.54	243.68	0.11	216.67	37.38	284.26
J247	0.11	216.67	26.59	236.98	0.11	216.67	34.15	268.05
J249	0.11	216.67	28.06	242.20	0.11	216.67	35.55	275.02
J25	0.10	216.67	55.75	507.61	0.10	216.67	55.75	507.62
J251	0.11	216.67	27.09	238.76	0.11	216.67	34.57	270.15
J253	0.11	216.67	23.29	226.24	0.11	216.67	30.76	252.80
J255	0.11	216.67	27.53	240.14	0.11	216.67	34.94	271.46
J257	0.11	216.67	27.58	240.35	0.11	216.67	34.88	271.36
J259	0.11	216.67	18.58	213.06	0.11	216.67	25.96	234.66
J26	0.10	216.67	55.77	505.95	0.10	216.67	55.77	505.96
J261	0.11	216.67	19.80	216.23	0.11	216.67	27.20	239.06
J263	0.11	216.67	25.01	231.90	0.11	216.67	32.46	260.88
J265	0.11	216.67	26.02	234.98	0.11	216.67	33.47	264.61
J267	0.11	216.67	26.40	236.22	0.11	216.67	33.83	266.23
J269	0.11	216.67	20.04	216.89	0.11	216.67	27.50	240.25
J27	0.10	216.67	56.06	511.26	0.10	216.67	56.06	511.27
J271	0.11	216.67	19.68	215.92	0.11	216.67	27.14	239.02
J273	0.11	216.67	26.63	237.21	0.11	216.67	34.10	268.05
J275	0.11	216.67	26.46	236.64	0.11	216.67	33.93	267.34
J277	0.11	216.67	26.31	236.19	0.11	216.67	33.78	266.81
J279	0.11	216.67	25.06	231.99	0.11	216.67	32.53	260.95
J28	0.10	216.67	55.88	507.38	0.10	216.67	55.88	507.39
J281	0.11	216.67	24.73	230.92	0.11	216.67	32.19	259.51
J283	0.11	216.67	20.29	217.54	0.11	216.67	27.76	240.10
J285	0.11	216.67	17.77	210.89	0.11	216.67	25.23	232.57
J287	0.11	216.67	21.75	221.74	0.11	216.67	29.22	247.10
J289	0.11	216.67	18.97	214.01	0.11	216.67	26.43	236.58
J29	0.10	216.67	55.98	510.34	0.10	216.67	55.98	510.36
J291	0.11	216.67	25.02	231.93	0.11	216.67	32.50	261.14
J293	0.11	216.67	25.28	232.72	0.11	216.67	32.75	262.04
J295	0.11	216.67	24.67	230.80	0.11	216.67	32.16	259.67
J297	0.11	216.67	19.63	215.78	0.11	216.67	27.11	239.00
J299	0.11	216.67	24.11	228.91	0.11	216.67	31.59	256.74
J30	0.07	216.67	56.31	522.05	0.07	216.67	56.31	522.06
J301	0.11	216.67	18.68	213.27	0.11	216.67	26.15	235.47
J303	0.00	216.67	24.30	229.52	0.00	216.67	31.80	258.00
J305	0.00	216.67	23.57	227.13	0.00	216.67	31.08	254.64
J307	0.11	216.67	23.42	226.77	0.11	216.67	30.93	254.06
J309	0.11	216.67	14.68	203.48	0.11	216.67	22.20	223.01
J31	0.07	216.67	56.52	525.20	0.07	216.67	56.52	525.21
J311	0.11	216.67	22.40	223.68	0.11	216.67	29.92	249.98
J313	0.11	216.67	12.56	198.81	0.11	216.67	20.08	217.01
J315	0.11	216.67	22.78	224.78	0.11	216.67	30.30	251.36
J317	0.11	216.67	21.88	222.10	0.11	216.67	29.40	247.74
J319	0.11	216.67	21.65	221.40	0.11	216.67	29.18	246.62
J32	0.07	216.67	56.81	537.32	0.07	216.67	56.81	537.34
J321	0.11	216.67	22.62	224.24	0.11	216.67	30.16	250.34
J323	0.11	216.67	22.06	222.61	0.11	216.67	29.58	248.32
J325	0.11	216.67	21.78	221.80	0.11	216.67	29.32	247.13
J327	0.11	216.67	21.22	220.17	0.11	216.67	28.75	244.90
J329	0.11	216.67	19.29	214.88	0.11	216.67	26.83	237.74
J33	0.07	216.67	57.38	550.81	0.07	216.67	57.38	550.82
J331	0.11	216.67	20.50	218.14	0.11	216.67	28.04	242.00
J333	0.11	216.67	24.40	229.62	0.11	216.67	31.95	257.50
J335	0.11	216.67	23.38	226.49	0.11	216.67	30.92	253.31
J337	0.11	216.67	22.94	225.16	0.11	216.67	30.47	251.56
J339	0.11	216.67	22.35	223.39	0.11	216.67	29.89	248.97
J34	0.07	216.67	57.91	575.62	0.07	216.67	57.91	575.64
J341	0.11	216.67	22.09	222.60	0.11	216.67	29.62	247.85
J343	0.11	216.67	16.29	207.41	0.11	216.67	23.82	227.76
J345	0.11	216.67	19.59	215.69	0.11	216.67	27.12	238.57
J347	0.11	216.67	17.55	210.51	0.11	216.67	25.09	231.68
J349	0.11	216.67	16.92	208.98	0.11	216.67	24.46	229.62
J35	0.07	216.67	58.18	588.65	0.07	216.67	58.19	588.66
J351	0.11	216.67	17.55	210.52	0.11	216.67	25.08	231.56
J353	0.11	216.67	19.43	215.28	0.11	216.67	26.97	237.89
J355	0.11	216.67	14.64	203.68	0.11	216.67	22.18	222.81
J357	0.11	216.67	21.99	222.30	0.11	216.67	29.53	247.35
J359	0.11	216.67	21.39	220.60	0.11	216.67	28.92	245.18
J36	0.07	216.67	58.93	618.89	0.07	216.67	58.93	618.91
J361	0.11	216.67	21.44	220.77	0.11	216.67	28.98	245.49
J363	0.11	216.67	-8.97	165.39	0.11	216.67	2.01	180.66
J365	0.11	216.67	-12.56	161.32	0.11	216.67	-1.27	175.86
J367	0.11	216.67	29.65	247.64	0.11	216.67	39.65	297.23
J369	0.11	216.67	-0.24	176.16	0.11	216.67	7.19	188.53
J37	0.08	216.67	56.94	554.56	0.08	216.67	56.94	554.56
J371	0.11	216.67	23.56	227.11	0.11	216.67	30.99	253.86
J38	0.08	216.67	57.19	560.11	0.08	216.67	57.19	560.10
J39	0.08	216.67	56.78	545.53	0.08	216.67	56.78	545.50
J40	0.11	216.67	58.20	610.92	0.11	216.67	58.20	610.93
J41	0.11	216.67	55.31	499.26	0.11	216.67	55.26	498.61
J42	0.11	216.67	54.70	482.46	0.11	216.67	54.61	481.50
J43	0.11	216.67	53.05	446.61	0.11	216.67	52.86	444.68
J44	0.11	216.67	51.53	416.27	0.11	216.67	51.19	413.37
J45	0.11	216.67	48.36	371.96	0.11	216.67	47.77	367.78
J46	0.11	216.67	58.10	603.33	0.11	216.67	58.10	603.33
J48	0.11	216.67	58.03	597.57	0.11	216.67	58.03	597.58
J50	0.11	216.67	50.93	407.64	0.11	216.67	50.93	407.65
J51	0.11	216.67	50.63	401.45	0.11	216.67	50.63	401.45
J52	0.11	216.67	48.26	369.00	0.11	216.67	48.26	369.00
J53	0.11	216.67	47.58	360.51	0.11	216.67	47.58	360.52
J55	0.11	216.67	50.81	396.87	0.11	216.67	50.81	396.87
J56	0.11	216.67	46.74	349.26	0.11	216.67	46.74	349.26
J57	0.11	216.67	48.83	371.15	0.11	216.67	48.83	371.15
J58	0.11	216.67	47.50	357.09	0.11	216.67	47.50	357.10
J59	0.11	216.67	43.81	323.53	0.11	216.67	43.82	323.53
J60	0.11	216.67	39.89	295.05	0.11	216.67	39.89	295.05
J61	0.11	216.67	39.48	292.92	0.11	216.67	39.49	292.92
J62	0.11	216.67	43.56	321.49	0.11	216.67	43.56	321.49
J63	0.11	216.67	43.99	324.77	0.11	216.67	43.99	324.78
J64	0.11	216.67	40.51	299.17	0.11	216.67	40.51	299.18
J65	0.11	216.67	40.59	299.67	0.11	216.67	40.60	299.67
J66	0.11	216.67	44.81	331.87	0.11	216.67	44.81	331.87
J67	0.11	216.67	45.45	337.24	0.11	216.67	45.45	337.25
J68	0.11	216.67	40.97	302.04	0.11	216.67	40.97	302.04
J69	0.11	216.67	41.01	302.69	0.11	216.67	41.01	302.70
J70	0.11	216.67	44.49	329.66	0.11	216.67	44.49	329.67
J71	0.11	216.67	45.01	334.43	0.11	216.67	45.01	334.44
J72	0.11	216.67	41.40	305.76	0.11	216.67	41.40	305.77
J73	0.11	216.67	41.58	306.65	0.11	216.67	41.59	306.65
J74	0.11	216.67	44.84	332.35	0.11	216.67	44.84	332.35
J75	0.10	216.67	47.72	362.93	0.10	216.67	47.72	362.93
J76	0.10	216.67	52.17	424.18	0.10	216.67	52.17	424.19
J77	0.10	216.67	46.94	354.97	0.10	216.67	46.94	354.98
J78	0.07	216.67	52.51	431.52	0.07	216.67	52.51	431.53
J79	0.07	216.67	48.92	375.89	0.07	216.67	48.92	375.90
J80	0.15	216.67	44.78	335.16	0.15	216.67	44.78	335.18
J81	0.15	216.67	55.31	508.75	0.15	216.67	55.32	508.88
J82	0.15	216.67	54.73	490.98	0.15	216.67	54.74	491.07
J83	0.15	216.67	55.51	508.04	0.15	216.67	55.51	508.09
J84	0.15	216.67	55.56	512.41	0.15	216.67	55.56	512.44
J85	0.15	216.67	38.73	290.34	0.15	216.67	38.73	290.35
J86	0.15	216.67	35.05	270.05	0.15	216.67	35.06	270.06
J87	0.15	216.67	35.06	270.16	0.15	216.67	35.06	270.17
J88	0.15	216.67	39.15	292.85	0.15	216.67	39.16	292.86
J89	0.15	216.67	56.38	535.81	0.15	216.67	56.38	535.85
J90	0.15	216.67	48.04	369.70	0.15	216.67	48.04	369.72
J91	0.15	216.67	54.81	485.70	0.15	216.67	54.82	485.73
J92	0.15	216.67	44.44	332.05	0.15	216.67	44.45	332.07
J93	0.15	216.67	41.41	308.37	0.15	216.67	41.41	308.39
J94	0.08	216.67	55.84	506.78	0.08	216.67	55.84	506.76
J95	0.08	216.67	56.04	507.16	0.08	216.67	56.04	507.14
J96	0.08	216.67	56.53	525.04	0.08	216.67	56.53	525.02
J97	0.08	216.67	47.20	356.64	0.08	216.67	47.20	356.62
J98	0.00	216.67	56.72	532.70	0.00	216.67	56.72	532.67

Sufficient hydrant coverage to meet the RFF.

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Table C-6: Model Results - AVDY+FF (Reliability Analysis Scenarios 6 to 7)

	Break Scenario 6				Break Scenario 7			
Junction ID	Base Demand (L/s)	Required Fire Flow (L/s)	Residual Pressure (psi)	Available Fire Flow @ Residual 20 psi (L/s)	Base Demand (L/s)	Required Fire Flow (L/s)	Residual Pressure (psi)	Available Fire Flow @ Residual 20 psi (L/s)
Maximum	*0.15*	*216.67*	*59.58*	*658.83*	*0.15*	*216.67*	*59.58*	*658.83*
Minimum	*0.00*	*216.67*	*7.91*	*190.81*	*0.00*	*216.67*	*7.91*	*190.80*
J01	0.07	216.67	57.58	594.77	0.07	216.67	57.58	594.77
J02	0.00	216.67	58.54	622.35	0.00	216.67	58.54	622.35
J05	0.07	216.67	59.50	658.54	0.07	216.67	59.50	658.54
J06	0.07	216.67	59.58	658.83	0.07	216.67	59.58	658.83
J07	0.11	216.67	59.32	636.59	0.11	216.67	59.32	636.59
J08	0.11	216.67	58.78	614.75	0.11	216.67	58.78	614.75
J09	0.11	216.67	58.06	601.58	0.11	216.67	58.06	601.58
J10	0.11	216.67	58.17	597.17	0.11	216.67	58.17	597.17
J100	0.15	216.67	50.47	404.04	0.15	216.67	50.47	404.04
J101	0.15	216.67	55.80	520.48	0.15	216.67	55.80	520.48
J102	0.15	216.67	55.64	518.66	0.15	216.67	55.64	518.66
J103	0.15	216.67	49.91	396.89	0.15	216.67	49.91	396.89
J109	0.11	216.67	53.73	466.34	0.11	216.67	53.73	466.34
J11	0.11	216.67	58.03	596.06	0.11	216.67	58.03	596.06
J110	0.11	216.67	53.62	460.95	0.11	216.67	53.62	460.95
J111	0.11	216.67	54.15	472.16	0.11	216.67	54.15	472.16
J112	0.11	216.67	49.45	387.99	0.11	216.67	49.45	387.99
J113	0.11	216.67	41.51	309.33	0.11	216.67	41.51	309.33
J114	0.11	216.67	40.36	301.73	0.11	216.67	40.36	301.73
J115	0.11	216.67	42.96	321.10	0.11	216.67	42.96	321.10
J116	0.11	216.67	45.78	346.40	0.11	216.67	45.78	346.40
J117	0.11	216.67	44.07	329.66	0.11	216.67	44.07	329.66
J118	0.11	216.67	48.56	376.40	0.11	216.67	48.56	376.40
J119	0.11	216.67	50.01	395.10	0.11	216.67	50.01	395.10
J12	0.11	216.67	58.34	619.65	0.11	216.67	58.34	619.65
J120	0.11	216.67	48.67	376.87	0.11	216.67	48.67	376.87
J121	0.11	216.67	45.91	346.95	0.11	216.67	45.91	346.95
J122	0.11	216.67	39.64	296.97	0.11	216.67	39.64	296.97
J123	0.11	216.67	39.88	298.17	0.11	216.67	39.88	298.17
J124	0.11	216.67	46.71	354.53	0.11	216.67	46.71	354.53
J125	0.11	216.67	43.75	325.52	0.11	216.67	43.75	325.52
J129	0.11	216.67	38.37	287.02	0.11	216.67	38.37	287.02
J130	0.11	216.67	41.92	310.53	0.11	216.67	41.92	310.53
J131	0.11	216.67	38.49	287.94	0.11	216.67	38.49	287.94
J132	0.11	216.67	41.95	310.99	0.11	216.67	41.95	310.99
J133	0.11	216.67	42.38	314.11	0.11	216.67	42.38	314.11
J134	0.11	216.67	39.34	293.10	0.11	216.67	39.34	293.09
J135	0.11	216.67	39.82	295.81	0.11	216.67	39.82	295.81
J136	0.11	216.67	41.79	309.43	0.11	216.67	41.79	309.43
J15	0.07	216.67	57.85	581.29	0.07	216.67	57.85	581.29
J152	0.11	216.67	54.71	469.89	0.11	216.67	54.71	469.89
J153	0.15	216.67	54.89	496.60	0.15	216.67	54.89	496.60
J154	0.11	216.67	52.97	444.47	0.11	216.67	52.97	444.47
J155	0.11	216.67	52.47	433.48	0.11	216.67	52.47	433.48
J156	0.00	216.67	51.18	414.23	0.00	216.67	51.18	414.23
J158	0.00	216.67	57.12	540.58	0.00	216.67	57.12	540.58
J16	0.07	216.67	57.73	571.95	0.07	216.67	57.73	571.95
J162	0.00	216.67	53.95	473.27	0.00	216.67	53.95	473.27
J164	0.00	216.67	53.05	452.02	0.00	216.67	53.05	452.02
J166	0.00	216.67	50.91	414.59	0.00	216.67	50.91	414.59
J168	0.00	216.67	50.35	402.81	0.00	216.67	50.35	402.82
J17	0.07	216.67	57.18	556.75	0.07	216.67	57.18	556.75
J170	0.00	216.67	49.17	390.89	0.00	216.67	49.17	390.90
J172	0.00	216.67	54.39	483.82	0.00	216.67	54.39	483.82
J174	0.15	216.67	55.66	515.40	0.15	216.67	55.66	515.40
J176	0.15	216.67	55.48	506.93	0.15	216.67	55.48	506.93
J178	0.08	216.67	56.27	525.39	0.08	216.67	56.27	525.39
J18	0.07	216.67	57.26	568.59	0.07	216.67	57.26	568.59
J180	0.08	216.67	56.39	522.81	0.08	216.67	56.39	522.81
J182	0.08	216.67	56.96	537.41	0.08	216.67	56.96	537.41
J184	0.08	216.67	57.55	555.85	0.08	216.67	57.55	555.85
J186	0.08	216.67	56.52	537.56	0.08	216.67	56.52	537.56
J188	0.00	216.67	53.88	471.10	0.00	216.67	53.88	471.11
J19	0.10	216.67	56.16	533.87	0.10	216.67	56.16	533.87
J20	0.10	216.67	56.97	549.32	0.10	216.67	56.97	549.32
J201	0.11	216.67	49.91	393.92	0.11	216.67	49.91	393.93
J203	0.11	216.67	49.27	385.88	0.11	216.67	49.28	385.89
J205	0.11	216.67	48.54	377.03	0.11	216.67	48.54	377.04
J207	0.11	216.67	50.60	400.47	0.11	216.67	50.60	400.47
J209	0.11	216.67	49.73	389.88	0.11	216.67	49.72	389.88
J21	0.10	216.67	56.38	533.00	0.10	216.67	56.38	533.00
J211	0.11	216.67	48.81	378.64	0.11	216.67	48.81	378.63
J213	0.11	216.67	45.84	345.83	0.11	216.67	45.84	345.82
J215	0.11	216.67	45.39	341.85	0.11	216.67	45.39	341.85
J217	0.11	216.67	48.20	369.60	0.11	216.67	48.20	369.60
J219	0.11	216.67	42.48	316.07	0.11	216.67	42.48	316.07
J22	0.10	216.67	57.18	560.84	0.10	216.67	57.18	560.84
J221	0.11	216.67	46.78	360.47	0.11	216.67	46.77	360.45
J223	0.11	216.67	47.19	364.03	0.11	216.67	47.19	364.01
J225	0.11	216.67	47.58	366.34	0.11	216.67	47.57	366.31
J227	0.11	216.67	41.26	308.50	0.11	216.67	41.25	308.49
J229	0.11	216.67	42.67	313.58	0.11	216.67	42.67	313.57
J23	0.10	216.67	56.68	538.09	0.10	216.67	56.68	538.09
J231	0.11	216.67	47.40	364.60	0.11	216.67	47.40	364.59
J233	0.11	216.67	47.47	366.19	0.11	216.67	47.47	366.14
J235	0.11	216.67	40.37	301.62	0.11	216.67	40.36	301.60
J237	0.11	216.67	36.33	277.40	0.11	216.67	36.33	277.38
J239	0.11	216.67	32.10	257.07	0.11	216.67	32.09	257.05
J24	0.10	216.67	56.14	516.99	0.10	216.67	56.14	516.99
J241	0.11	216.67	36.41	277.56	0.11	216.67	36.40	277.54
J243	0.11	216.67	40.06	301.83	0.11	216.67	39.87	300.87
J245	0.11	216.67	47.51	364.84	0.11	216.67	47.51	364.82
J247	0.11	216.67	43.39	326.47	0.11	216.67	43.28	325.84
J249	0.11	216.67	46.08	351.83	0.11	216.67	46.11	352.07
J25	0.10	216.67	55.75	507.62	0.10	216.67	55.75	507.62
J251	0.11	216.67	44.65	338.40	0.11	216.67	44.72	338.80
J253	0.11	216.67	40.70	306.15	0.11	216.67	40.77	306.52
J255	0.11	216.67	45.44	344.06	0.11	216.67	45.48	344.31
J257	0.11	216.67	45.56	345.86	0.11	216.67	45.59	346.07
J259	0.11	216.67	36.39	278.69	0.11	216.67	36.44	278.89
J26	0.10	216.67	55.77	505.96	0.10	216.67	55.77	505.96
J261	0.11	216.67	37.40	284.80	0.11	216.67	37.46	285.08
J263	0.11	216.67	42.33	320.72	0.11	216.67	42.41	321.16
J265	0.11	216.67	43.45	327.00	0.11	216.67	43.52	327.41
J267	0.11	216.67	44.00	331.42	0.11	216.67	44.07	331.78
J269	0.11	216.67	37.46	285.63	0.11	216.67	37.54	285.95
J27	0.10	216.67	56.06	511.27	0.10	216.67	56.06	511.27
J271	0.11	216.67	36.90	282.61	0.11	216.67	36.98	282.97
J273	0.11	216.67	43.96	332.69	0.11	216.67	44.04	333.15
J275	0.11	216.67	43.54	329.38	0.11	216.67	43.63	329.92
J277	0.11	216.67	43.03	325.49	0.11	216.67	43.14	326.11
J279	0.11	216.67	41.91	316.53	0.11	216.67	42.01	317.09
J28	0.10	216.67	55.88	507.39	0.10	216.67	55.88	507.39
J281	0.11	216.67	41.74	315.60	0.11	216.67	41.84	316.11
J283	0.11	216.67	37.12	280.00	0.11	216.67	37.22	280.44
J285	0.11	216.67	34.45	270.02	0.11	216.67	34.56	270.49
J287	0.11	216.67	38.20	291.31	0.11	216.67	38.33	291.90
J289	0.11	216.67	35.69	276.19	0.11	216.67	35.80	276.66
J29	0.10	216.67	55.98	510.35	0.10	216.67	55.98	510.35
J291	0.11	216.67	40.49	306.79	0.11	216.67	40.66	307.64
J293	0.11	216.67	41.52	313.71	0.11	216.67	41.66	314.43
J295	0.11	216.67	39.02	296.81	0.11	216.67	39.23	297.81
J297	0.11	216.67	35.64	276.02	0.11	216.67	35.79	276.64
J299	0.11	216.67	40.86	308.60	0.11	216.67	40.97	309.16
J30	0.07	216.67	56.31	522.06	0.07	216.67	56.31	522.06
J301	0.11	216.67	35.88	276.68	0.11	216.67	35.97	277.04
J303	0.00	216.67	37.90	289.66	0.00	216.67	38.14	290.76
J305	0.00	216.67	33.99	267.71	0.00	216.67	19.82	216.18
J307	0.11	216.67	32.59	261.06	0.11	216.67	21.32	220.44
J309	0.11	216.67	22.74	224.59	0.11	216.67	15.43	205.34
J31	0.07	216.67	56.52	525.21	0.07	216.67	56.52	525.21
J311	0.11	216.67	29.13	246.55	0.11	216.67	23.35	226.46
J313	0.11	216.67	19.34	215.02	0.11	216.67	14.94	204.23
J315	0.11	216.67	27.05	238.66	0.11	216.67	26.28	235.91
J317	0.11	216.67	25.20	232.33	0.11	216.67	26.41	236.38
J319	0.11	216.67	23.66	227.32	0.11	216.67	27.59	240.41
J32	0.07	216.67	56.81	537.34	0.07	216.67	56.81	537.34
J321	0.11	216.67	23.11	225.61	0.11	216.67	29.86	248.81
J323	0.11	216.67	25.68	233.85	0.11	216.67	26.60	236.94
J325	0.11	216.67	23.36	226.40	0.11	216.67	28.48	243.64
J327	0.11	216.67	21.49	220.89	0.11	216.67	29.02	245.66
J329	0.11	216.67	18.25	212.24	0.11	216.67	28.42	243.27
J33	0.07	216.67	57.38	550.82	0.07	216.67	57.38	550.82
J331	0.11	216.67	18.44	212.72	0.11	216.67	30.29	250.33
J333	0.11	216.67	20.57	218.32	0.11	216.67	34.92	270.89
J335	0.11	216.67	22.83	224.72	0.11	216.67	31.51	255.45
J337	0.11	216.67	22.96	225.15	0.11	216.67	30.58	251.67
J339	0.11	216.67	22.16	222.77	0.11	216.67	30.33	250.40
J34	0.07	216.67	57.91	575.64	0.07	216.67	57.91	575.64
J341	0.11	216.67	21.96	222.17	0.11	216.67	30.02	249.11
J343	0.11	216.67	16.18	207.26	0.11	216.67	24.09	228.47
J345	0.11	216.67	19.44	215.31	0.11	216.67	27.54	239.83
J347	0.11	216.67	17.41	210.22	0.11	216.67	25.50	232.87
J349	0.11	216.67	16.78	208.73	0.11	216.67	24.86	230.79
J35	0.07	216.67	58.18	588.66	0.07	216.67	58.18	588.66
J351	0.11	216.67	17.41	210.25	0.11	216.67	25.49	232.73
J353	0.11	216.67	19.30	214.96	0.11	216.67	27.36	239.07
J355	0.11	216.67	14.50	203.49	0.11	216.67	22.59	223.94
J357	0.11	216.67	21.91	222.02	0.11	216.67	29.86	248.36
J359	0.11	216.67	21.40	220.60	0.11	216.67	29.10	245.59
J36	0.07	216.67	58.93	618.91	0.07	216.67	58.93	618.91
J361	0.11	216.67	21.56	221.07	0.11	216.67	29.00	245.30
J363	0.11	216.67	11.36	197.23	0.11	216.67	11.36	197.23
J365	0.11	216.67	7.91	190.81	0.11	216.67	7.91	190.80
J367	0.11	216.67	49.41	386.04	0.11	216.67	49.41	386.03
J369	0.11	216.67	17.18	209.60	0.11	216.67	17.26	209.79
J37	0.08	216.67	56.94	554.56	0.08	216.67	56.94	554.56
J371	0.11	216.67	40.98	308.52	0.11	216.67	41.06	308.89
J38	0.08	216.67	57.19	560.10	0.08	216.67	57.19	560.10
J39	0.08	216.67	56.78	545.53	0.08	216.67	56.78	545.53
J40	0.11	216.67	58.20	610.93	0.11	216.67	58.20	610.93
J41	0.11	216.67	55.38	501.51	0.11	216.67	55.38	501.51
J42	0.11	216.67	54.84	486.81	0.11	216.67	54.84	486.81
J43	0.11	216.67	53.60	459.18	0.11	216.67	53.60	459.18
J44	0.11	216.67	52.86	441.74	0.11	216.67	52.86	441.74
J45	0.11	216.67	51.64	421.27	0.11	216.67	51.64	421.27
J46	0.11	216.67	58.10	603.33	0.11	216.67	58.10	603.33
J48	0.11	216.67	58.03	597.57	0.11	216.67	58.03	597.57
J50	0.11	216.67	50.93	407.65	0.11	216.67	50.93	407.65
J51	0.11	216.67	50.63	401.45	0.11	216.67	50.63	401.45
J52	0.11	216.67	48.26	369.00	0.11	216.67	48.26	369.00
J53	0.11	216.67	47.58	360.52	0.11	216.67	47.58	360.52
J55	0.11	216.67	50.81	396.87	0.11	216.67	50.81	396.87
J56	0.11	216.67	46.74	349.26	0.11	216.67	46.74	349.26
J57	0.11	216.67	48.83	371.15	0.11	216.67	48.83	371.15
J58	0.11	216.67	47.50	357.10	0.11	216.67	47.50	357.10
J59	0.11	216.67	43.82	323.53	0.11	216.67	43.82	323.53
J60	0.11	216.67	39.89	295.05	0.11	216.67	39.89	295.05
J61	0.11	216.67	39.49	292.92	0.11	216.67	39.49	292.92
J62	0.11	216.67	43.56	321.49	0.11	216.67	43.56	321.49
J63	0.11	216.67	43.99	324.78	0.11	216.67	43.99	324.78
J64	0.11	216.67	40.51	299.18	0.11	216.67	40.51	299.18
J65	0.11	216.67	40.60	299.67	0.11	216.67	40.60	299.67
J66	0.11	216.67	44.81	331.87	0.11	216.67	44.81	331.87
J67	0.11	216.67	45.45	337.25	0.11	216.67	45.45	337.25
J68	0.11	216.67	40.97	302.04	0.11	216.67	40.97	302.04
J69	0.11	216.67	41.01	302.70	0.11	216.67	41.01	302.70
J70	0.11	216.67	44.49	329.67	0.11	216.67	44.49	329.67
J71	0.11	216.67	45.01	334.43	0.11	216.67	45.01	334.43
J72	0.11	216.67	41.40	305.77	0.11	216.67	41.40	305.77
J73	0.11	216.67	41.58	306.65	0.11	216.67	41.58	306.65
J74	0.11	216.67	44.84	332.35	0.11	216.67	44.84	332.35
J75	0.10	216.67	47.72	362.93	0.10	216.67	47.72	362.93
J76	0.10	216.67	52.17	424.19	0.10	216.67	52.17	424.19
J77	0.10	216.67	46.94	354.98	0.10	216.67	46.94	354.98
J78	0.07	216.67	52.51	431.53	0.07	216.67	52.51	431.53
J79	0.07	216.67	48.92	375.90	0.07	216.67	48.92	375.90
J80	0.15	216.67	44.78	335.18	0.15	216.67	44.78	335.18
J81	0.15	216.67	55.32	509.04	0.15	216.67	55.32	509.04
J82	0.15	216.67	54.74	491.15	0.15	216.67	54.74	491.15
J83	0.15	216.67	55.51	508.13	0.15	216.67	55.51	508.13
J84	0.15	216.67	55.56	512.45	0.15	216.67	55.56	512.45
J85	0.15	216.67	38.73	290.35	0.15	216.67	38.73	290.35
J86	0.15	216.67	35.05	270.05	0.15	216.67	35.05	270.05
J87	0.15	216.67	35.06	270.17	0.15	216.67	35.06	270.17
J88	0.15	216.67	39.16	292.86	0.15	216.67	39.16	292.86
J89	0.15	216.67	56.38	535.86	0.15	216.67	56.38	535.86
J90	0.15	216.67	48.04	369.72	0.15	216.67	48.04	369.72
J91	0.15	216.67	54.82	485.74	0.15	216.67	54.82	485.74
J92	0.15	216.67	44.45	332.07	0.15	216.67	44.45	332.07
J93	0.15	216.67	41.41	308.39	0.15	216.67	41.41	308.39
J94	0.08	216.67	55.84	506.78	0.08	216.67	55.84	506.78
J95	0.08	216.67	56.04	507.16	0.08	216.67	56.04	507.16
J96	0.08	216.67	56.53	525.05	0.08	216.67	56.53	525.05
J97	0.08	216.67	47.20	356.63	0.08	216.67	47.20	356.63
J98	0.00	216.67	56.72	532.71	0.00	216.67	56.72	532.71

Sufficient hydrant coverage to meet the RFF.