

fitted with dual solid neoprene gaskets on perimeter, capable of providing a minimum Sound Transmission Class of STC35.

We emphasize that it is your responsibility to provide adequate noise abatement measures to ensure compliance. Please note that some installations may require more effective noise abatement measures than the above minimum recommendations.

If you have any questions regarding the above, please contact your vendor or technical consultant. If you need a copy of Publication NPC-205, please call the Ministry's Public Information Centre at (416) 325-4000 or toll free at 1-800-565-4923.

If you have any questions regarding the above, please contact me at the above phone number.

Yours truly,



Yvonne Hall, P. Eng.,
Director, Section 9,
Environmental Protection Act

c: District Manager, MOE Ottawa District Office
Jim Moffatt, Cumming Cockburn Ltd. ✓



Ontario

Ministry
of the
Environment Ministère
de
l'Environnement

CERTIFICATE OF APPROVAL
AIR
NUMBER 1586-4WKNNQ

Tenth Line Development Inc.
210 Gladstone Avenue, Suite 2001
Ottawa, Ontario
K2P 0Y6

Site Location: Briarbridge Sewage Pumping Station
Lot 9, Concession 4
Ottawa City, Regional Municipality Of Ottawa-Carleton, Ontario

You have applied in accordance with Section 9 of the Environmental Protection Act for approval of:

- one (1) standby diesel generator set, having a rating of 125 kilowatts, to provide power during emergency situations, exhausting to the atmosphere at a maximum volumetric flow of 0.57 actual cubic metre per second at an approximate temperature of 574 degrees Celsius, through a stack having an exit diameter of 0.1 metres, extending 1.0 metre above roof and 4.725 metres above grade;

all in accordance with the Application for a Certificate of Approval (Air), dated March 26, 2001 and signed by Jim Burghout, Development Manager, Tenth Line Development Inc., and all supporting information associated with the application.

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

DEFINITIONS

For the purpose of this Certificate of Approval:

- (i) "Act" means the *Environmental Protection Act*;
- (ii) "Certificate" means this Certificate of Approval issued in accordance with Section 9 of the Act;
- (iii) "Company" means Tenth Line Development Inc.;
- (iv) "Equipment" means the standby diesel generator set described in the Company's

application, this Certificate and in the supporting documentation submitted with the application, to the extent approved by this Certificate;

- (v) "Manual" means a document or a set of documents that provide written instructions to staff of the Company;
- (vi) "Ministry" means the Ontario Ministry of the Environment; and
- (vii) "Publication NPC-205" means Ministry Publication NPC-205, Sound Level Limits for Stationary Sources in Class 1 & 2 Areas (Urban), October, 1995.

You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

PERFORMANCE

1. The Company shall ensure that the noise emissions from the Equipment comply with the limits set out in Publication NPC-205.

OPERATION AND MAINTENANCE

2. The Company shall restrict the periodic testing of the Equipment to the daytime hours from 7:00 am to 7:00 pm.
3. The Company shall ensure that the Equipment is properly operated and maintained at all times. The Company shall:
 - (1) prepare, before commencement of operation of the Equipment (or not later than three (3) months after the date of this Certificate), and update, as necessary, a Manual outlining the operating procedures and a maintenance program for the Equipment, including:
 - (a) routine operating and maintenance procedures in accordance with good engineering practices and as recommended by the Equipment suppliers;
 - (b) emergency procedures;
 - (c) procedures for any record keeping activities relating to operation and maintenance of the Equipment; and
 - (d) all appropriate measures to minimize noise emissions from all potential sources;
 - (2) implement the recommendations of the Manual; and

- (3) retain, for a minimum of two (2) years from the date of their creation, all records on the maintenance, repair and inspection of the Equipment, and make these records available for review by staff of the Ministry upon request.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition No. 1 is included to provide the minimum performance requirement considered necessary to prevent an adverse effect resulting from the operation of the Equipment.
2. Condition No. 2 is included to ensure that the proposed operation, excluding emergency situations, is not extended beyond specific daytime hours to prevent an adverse effect resulting from the operation of the Equipment.
3. Condition No. 3 is included to emphasize that the Equipment must be maintained and operated according to a procedure that will result in compliance with the Act, the regulations and this Certificate. In addition the Company is required to keep records and provide information to staff of the Ministry so that compliance with the Act, the regulations and this Certificate can be verified.

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as amended, you may by written notice served upon me and the Environmental Appeal Board within 15 days after receipt of this Notice, require a hearing by the Board. Section 142 of the Environmental Protection Act, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Appeal Board
2300 Yonge St., 12th Floor
P.O. Box 2382
Toronto, Ontario
M4P 1E4

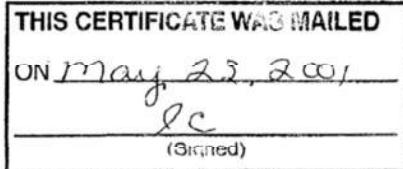
AND


The Director
Section 9, *Environmental Protection Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

* Further information on the Environmental Appeal Board's requirements for an appeal can be obtained directly from the Board at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca

The above noted works are approved under Section 9 of the Environmental Protection Act.

DATED AT TORONTO this 18th day of May, 2001



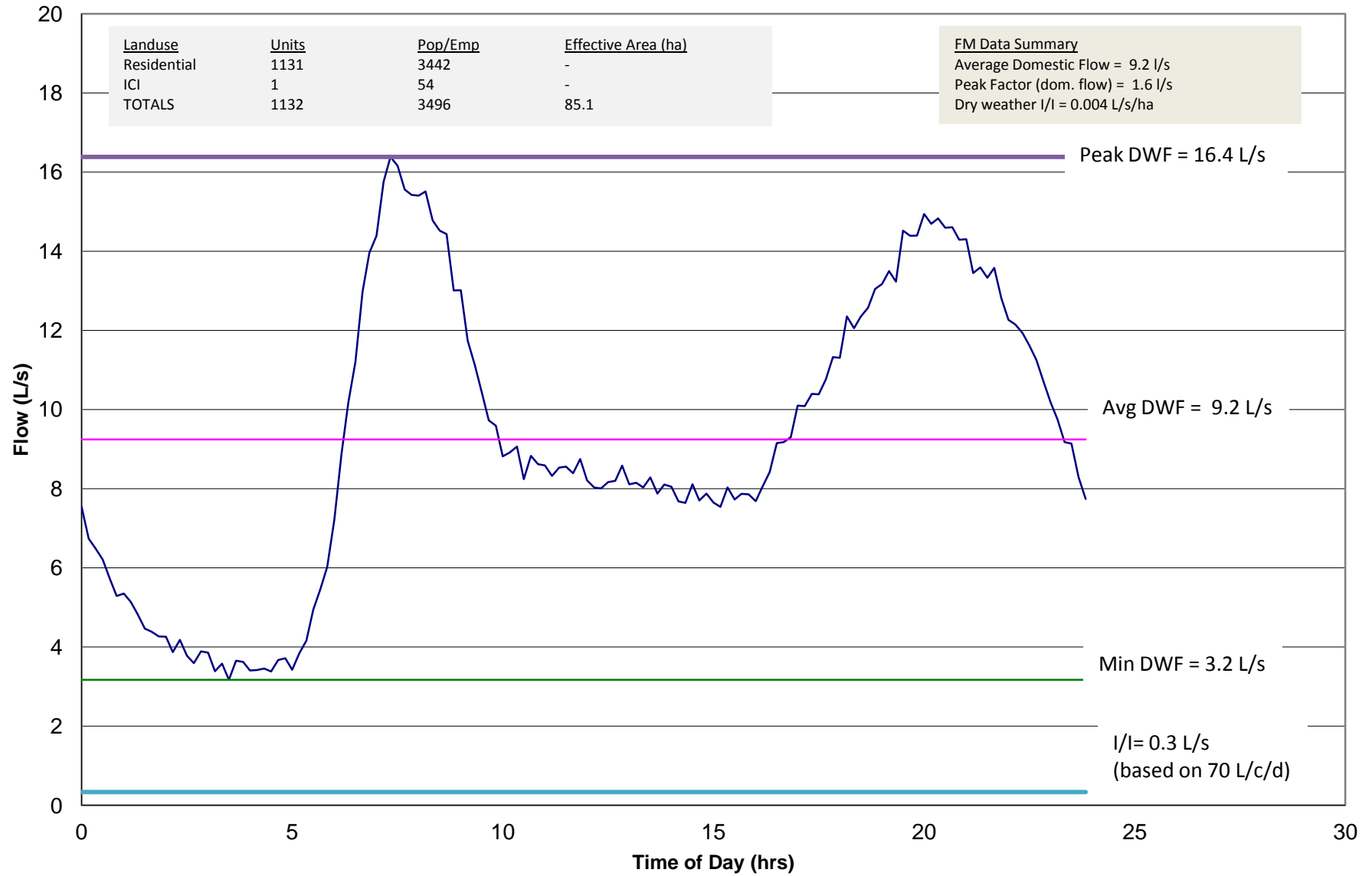


Yvonne Hall, P.Eng.
Director
Section 9, Environmental Protection Act

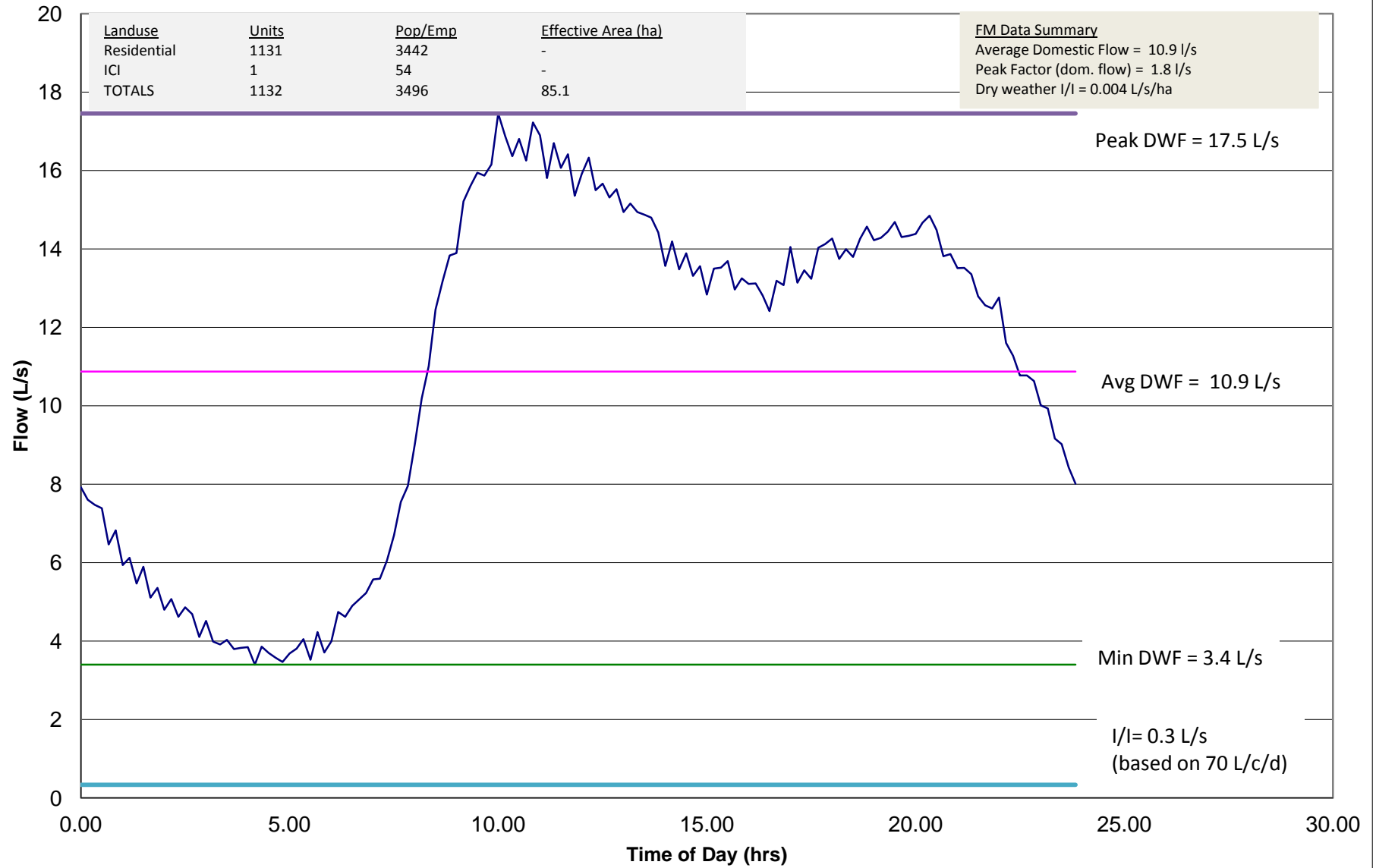
KP/

c: District Manager, MOE Ottawa District Office
Jim Moffatt, Cumming Cockburn Ltd. ✓

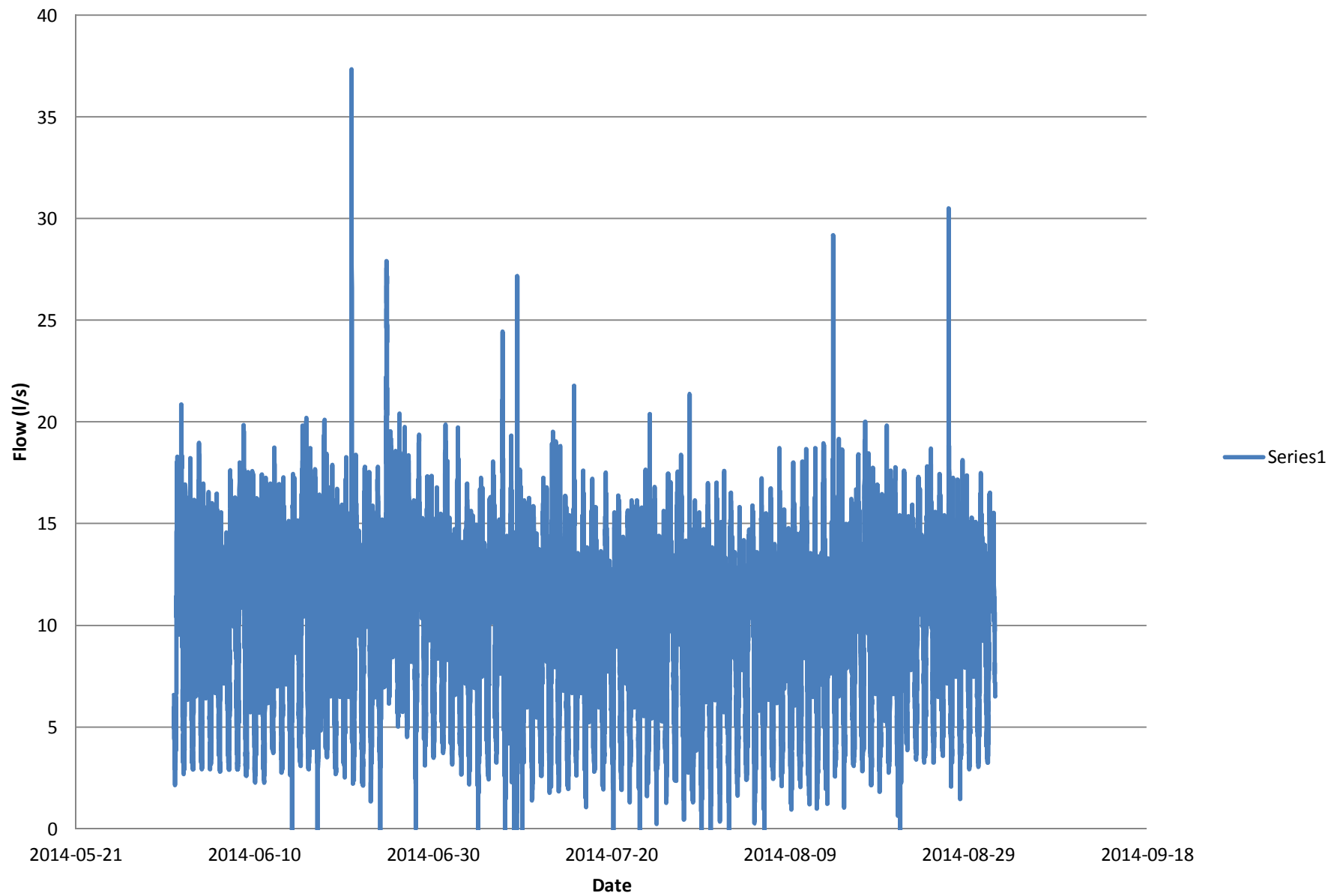
Briarridge PS Typical Weekday Dry Weather Flow January to February 2013



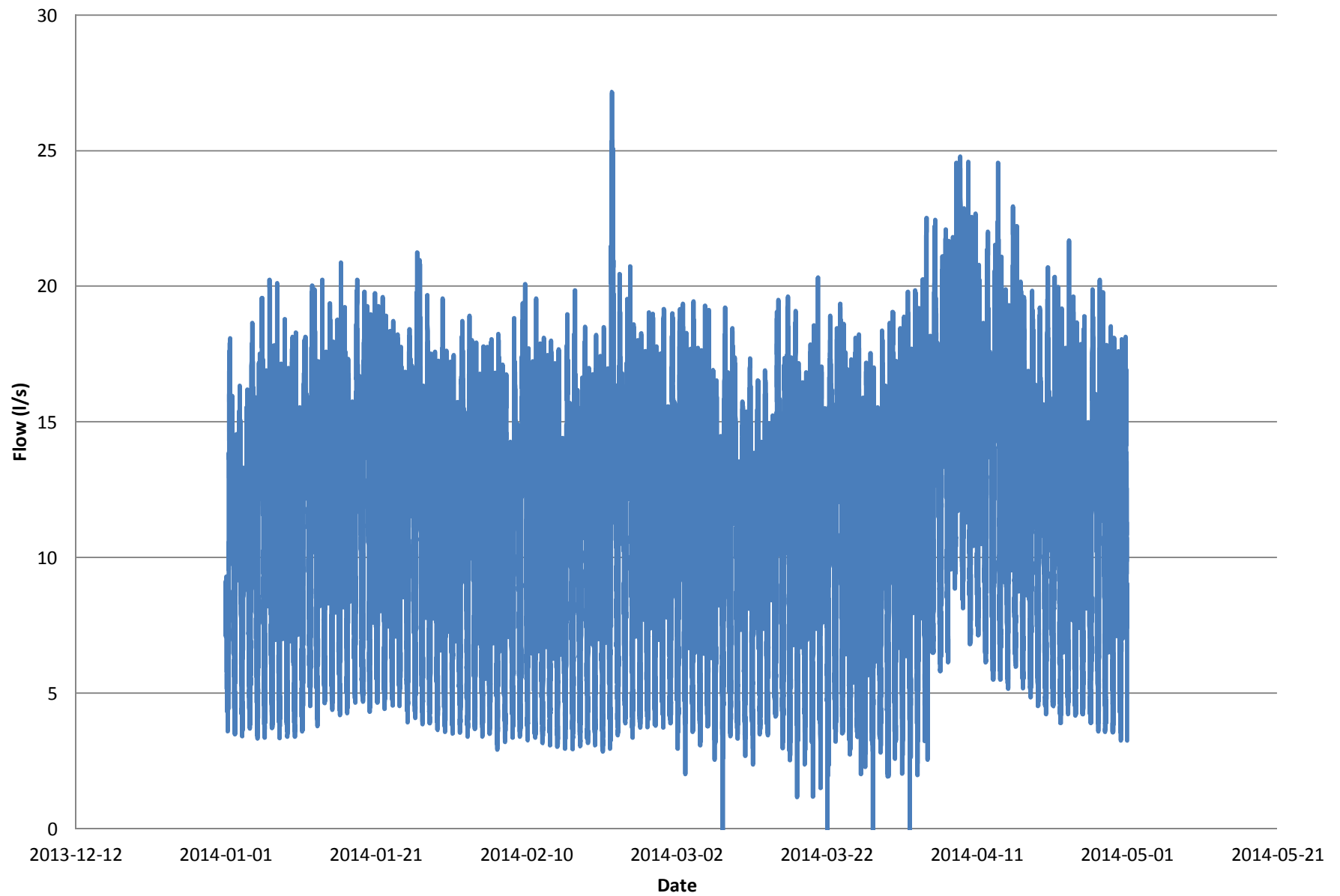
Briarridge PS Typical Weekend Dry Weather Flow January to February 2013



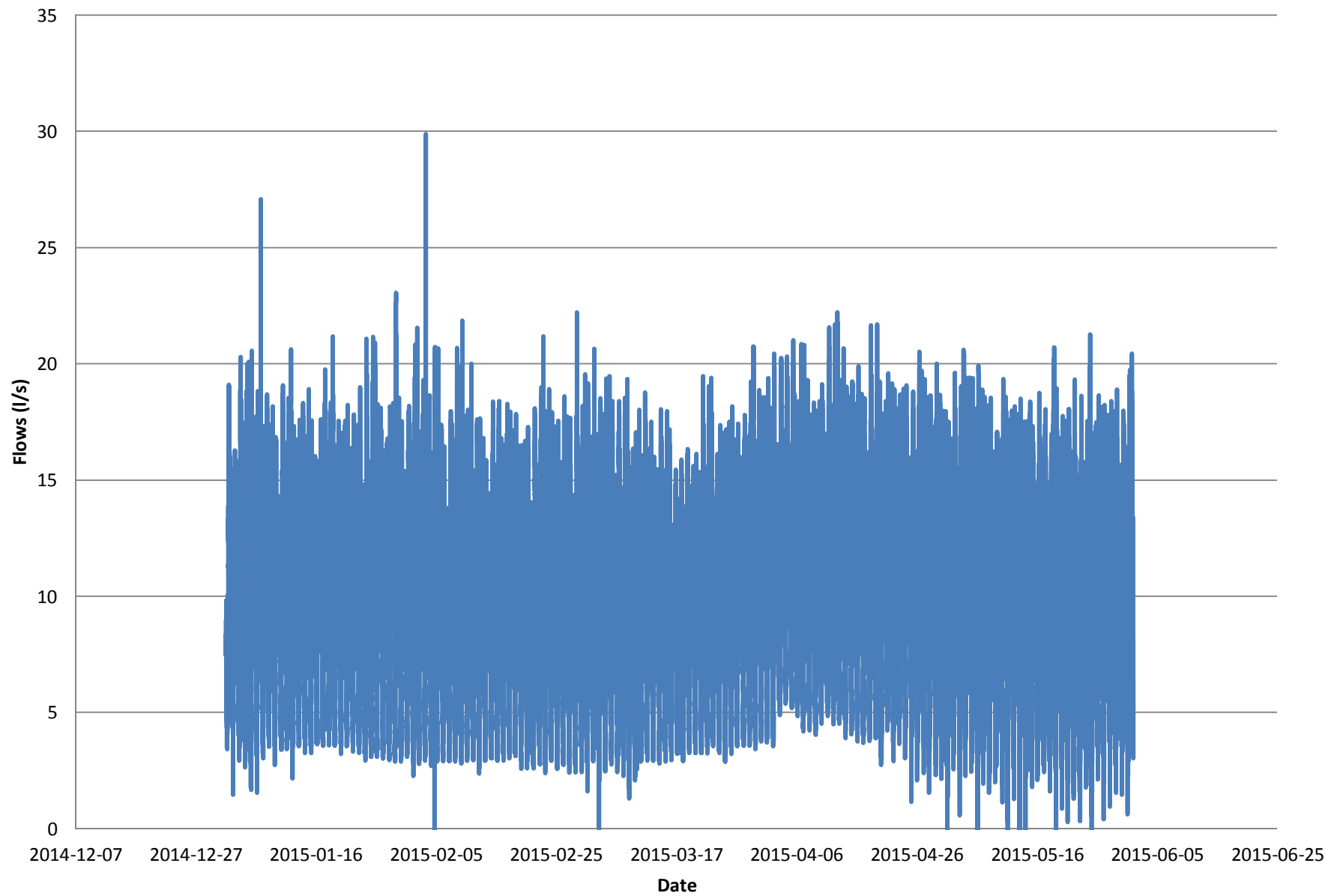
June and July 2014



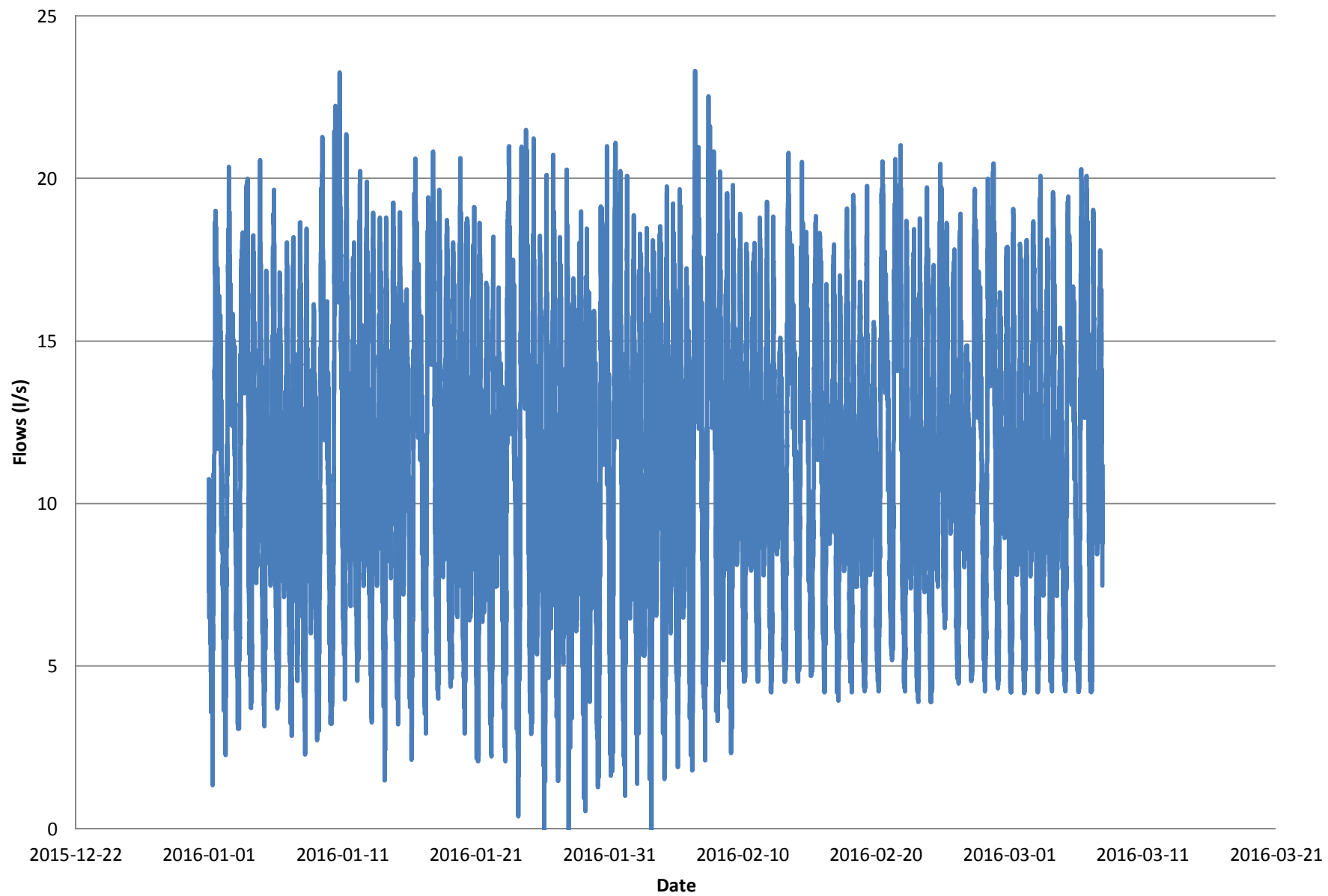
Winter 2014



Briarridge PS - 2015



Briarridge PS -2016



maximum pumping capacities for the various alternative forcemain configurations.

**TABLE 2
PUMPING CAPACITIES WITH ALTERNATIVE FM'S**

	20 YEAR DESIGN			BUILD-OUT DESIGN	
ALTERNATIVES	1	2	3	4	5
Pumping Capacity in Dedicated Forcemain					
Forcemain A (mmø)	200	200	200	250	250
1. Pump	69	69	69	86	86
2. Pumps	88	88	88	127	127
3. Pumps (1)	97	97	97	147	147
Forcemain B (mmø)	200	250	300	250	300
1. Pump	69	86	95	86	95
2. Pumps	88	127	155	127	155
3. Pumps	97	147	197	147	197
Firm Capacity (2)	155	173	183	182	190
Installed Capacity	188	220	247	244	± 265
Pumping Capacity in Combined Forcemains					
Forcemain A&B	200 + 200	200 + 250	200 + 300	250 + 250	250 + 300
1. Pump	94	97	99	99	101
2. Pumps	155	173	183	182	190
3. Pumps	188	220	247	244	± 265

Small F/M

Both FM's

Notes: (1) 20 yr installed (monitored) cap. = 61 l/s 20 yr F/M Cap. (Design) = 136 l/s
(2) B/O installed (monitored) cap. = 80 l/s B/O F/M Cap. (Design) = 175 l/s

For the build-out design approach, the pump/forcemain combination must deliver 175 l/s. From Table 2 alternatives 3, 4 and 5 will provide the required capacity to meet that criteria. Before making a final decision on the preferred forcemain design some consideration to the issue of low flows, system retention times and resultant impacts should be considered.

3.3 Low Flow Impacts and Mitigation

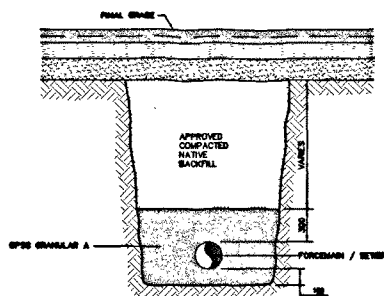
Hydrogen sulfide (H₂S) gas suppression and mitigation has direct bearing on the evaluation of the forcemain alternatives. H₂S forms in domestic wastewater under anerobic conditions (i.e. no oxygen environment). The opportunities for such events in the Briarridge Pumping Station will be in the wet well and in the forcemain. The longer the wastewater is held in anerobic

RECORD OF BOREHOLE: BH-2			
DEPTH (m)	SOIL PROFILE	DEPTH (m)	SOIL PROFILE
0.00	GROUND SURFACE	0.00	GROUND SURFACE
0.50	COMPACTED REMAINING BRICK	0.50	COMPACTED REMAINING BRICK
1.00	STIFF, GREY-BROWN, HEAVENLY CRUST SILTY CLAY	1.00	STIFF, GREY-BROWN, HEAVENLY CRUST SILTY CLAY
1.50	VERY STIFF, GREY SILTY CLAY	1.50	VERY STIFF, GREY SILTY CLAY
2.00	BLACK, FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY	2.00	BLACK, FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY
2.50	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY	2.50	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY
3.00	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY	3.00	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY
3.50	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY	3.50	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY
4.00	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY	4.00	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY
4.50	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY	4.50	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY
5.00	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY	5.00	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY
5.50	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY	5.50	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY
6.00	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY	6.00	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY
6.50	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY	6.50	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY
7.00	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY	7.00	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY
7.50	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY	7.50	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY
8.00	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY	8.00	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY
8.50	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY	8.50	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY
9.00	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY	9.00	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY
9.50	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY	9.50	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY
10.00	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY	10.00	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY

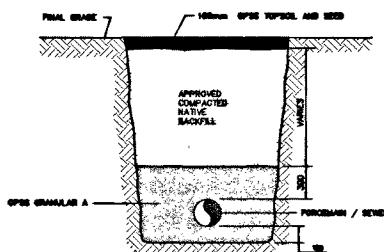
LOG BH-2
M.T.S.

RECORD OF BOREHOLE: BH-1			
DEPTH (m)	SOIL PROFILE	DEPTH (m)	SOIL PROFILE
0.00	GROUND SURFACE	0.00	GROUND SURFACE
0.50	COMPACTED REMAINING BRICK	0.50	COMPACTED REMAINING BRICK
1.00	STIFF, GREY-BROWN, HEAVENLY CRUST SILTY CLAY	1.00	STIFF, GREY-BROWN, HEAVENLY CRUST SILTY CLAY
1.50	VERY STIFF, GREY SILTY CLAY	1.50	VERY STIFF, GREY SILTY CLAY
2.00	BLACK, FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY	2.00	BLACK, FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY
2.50	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY	2.50	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY
3.00	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY	3.00	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY
3.50	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY	3.50	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY
4.00	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY	4.00	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY
4.50	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY	4.50	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY
5.00	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY	5.00	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY
5.50	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY	5.50	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY
6.00	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY	6.00	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY
6.50	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY	6.50	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY
7.00	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY	7.00	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY
7.50	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY	7.50	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY
8.00	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY	8.00	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY
8.50	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY	8.50	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY
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9.50	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY	9.50	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY
10.00	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY	10.00	RED BROWN FINE, COMPACT, GREY SILTY SAND-CLAY, SOME CLAY

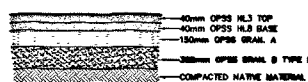
LOG BH-1
M.T.S.



TRENCH SECTION
IN PAVED AREAS
N.T.S.



TRENCH SECTION
IN LANDSCAPED AREAS
N.T.S.



SECTION ASPHALT DRIVE
N.T.S.

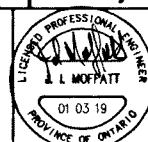
KANATA RESEARCH PARK

Conforms to Region of Ottawa-Carleton
Water Standards
Conforme aux standards d'eau
de la Région d'Ottawa-Carleton

Maxley Date Nov 14/21

#11019 1 of 2

No.	DATE	REVISIONS	BY	No.	DATE	REVISIONS	BY
0.	01-03-19	ISSUED FOR APPROVAL	D.P.S.				
1.	01-07-03	GENERAL REVISIONS	D.P.S.				
2.	01-08-24	ISSUED FOR CLIENT REVIEW	D.P.S.				



SCALES

1:125

Cumming Cockburn Limited
Consulting Engineers, Planners, and Environmental Scientists
Hull, Ottawa, Kingston, Toronto, Waterloo, London



DESIGN	J.J.M.
CHECKED	J.J.M.
DRAWN	D.S./CAD
CHECKED	J.J.M.
APPROVED	J.J.M.



CITY OF KANATA
DEPARTMENT OF ENGINEERING

BRIARRIDGE PUMPING STATION
AND FORCEMAINS
TENTH LINE DEVELOPMENT INC.

SITE PLAN

PROJ. No.	3345-LD
CONT. No.	
DATED	MARCH 2001
DWG. No.	C-1

NOTE:
REFER TO DRAWING C-3 FOR PROFILES
OF SANITARY SEWERS.

APPENDIX C-5

MEMORANDUM

DATE: APRIL 9, 2014

TO: ROMAN DIDUCH, JOSEPH ZAGORSKI, CHRIS ROGERS

FROM: CARA RUDDLE/LEE SHEETS/JOHN RIDDELL

RE: KANATA NORTH URBAN EXPANSION AREA – OFF-SITE
SANITARY SUMMARY

CC: WENDY TSE

The purpose of this memorandum is to present the findings of our review of the proposed off-site sanitary servicing options for the Kanata North Urban Expansion Area. To date the Terms of Reference and Existing Conditions Report have been presented to the City. The information presented in this memo reviews the options available for off-site servicing, evaluates the options and indicates the preferred servicing alternative. We are seeking input and comments from the City in order to complete the Master Servicing Study.

Off-Site Sanitary Servicing Alternatives and Evaluation

The outlet for the Kanata North Urban Expansion Area is the existing March Pump Station. The City has indicated that the inlet to the March Pump Station is a reasonable limit for wastewater analysis.

There are three trunk sewers that drain to the March Pump Station. These are the East March Trunk, Marchwood Trunk and the Kanata Lakes Trunk. The East March Trunk and Marchwood Trunk sewers are the two most viable options for extending to service the development. The Kanata Lakes Trunk Sewer is located farther from the development area and so is not a viable option for servicing the Kanata North Urban Expansion Area. Through review of the trunk sewers in terms of elevation and capacity it was determined that the East March Trunk Sewer was the preferred option to service the proposed development. Figure 1 shows the existing sanitary sewer infrastructure relative to the proposed development.

The connection point to the existing East March Trunk Sewer is on Shirley's Brook Drive at the intersection of Sandhill Road just east of March Road. Therefore off-site sanitary sewer infrastructure is required to service the development and connect to the existing East March Trunk Sewer. Five off-site sanitary servicing alternatives were developed and are summarized below. A figure illustrating each option is also attached for reference. The topography shows a ridge in that runs north-south through the eastern side of the property. This ridge is a natural drainage boundary as indicated in some of the servicing scenarios.

Option 1

This option proposes a new gravity sanitary sewer along March Road to Shirley's Brook Drive, to service the area west of the ridge by gravity. East of the ridge will drain by gravity to a small (51L/s) pump station that will outlet to the proposed sanitary sewer on March Road.

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Option 2

This option proposes a new gravity sanitary sewer along March Road to Shirley's Brook Drive, to service the area west of the ridge. East of the ridge will drain by gravity to the existing sewer along the rail corridor by the eastern property limit, and then to the Briar Ridge Pump Station (BRPS). Minimal upgrades to existing infrastructure along the rail corridor will be required. The BRPS can accommodate the flow from the Kanata North Urban Expansion Area (52L/s) within the ultimate design capacity of the station.

Option 3

This option proposes that all of the proposed development outlet to a new gravity sanitary sewer that drains easterly to the existing sewer along the rail corridor, and then to the BRPS. This option will require upgrading the existing sewers, the existing BRPS, and the existing forcemain to the EMT.

Option 4

This option proposes a single large (185.2L/s) pump station located east of the ridge which would service the entire proposed development area. The pump station would outlet via a proposed forcemain along March Road and connect to proposed gravity sanitary sewer on Shirley's Brook Drive.

Option 5 (Similar to Option 2)

This option proposes a new gravity sanitary sewer along March Road, to service the area west of March Road. East of March Road will drain by gravity to the existing sanitary sewer along the rail corridor, and then to the BRPS. This option will require upgrades to both the existing BRPS and the existing sanitary sewer along the rail corridor.

Option 5B (Similar to Option 2)

This option proposes a new gravity main along March Road, to service the area west of March Road and a portion of the lands east of March Road. The remainder of the lands east of March Road will drain by gravity to the existing sanitary sewer along the rail corridor, and then to the BRPS. This option will require upgrades to the existing sanitary sewer draining along the rail corridor.

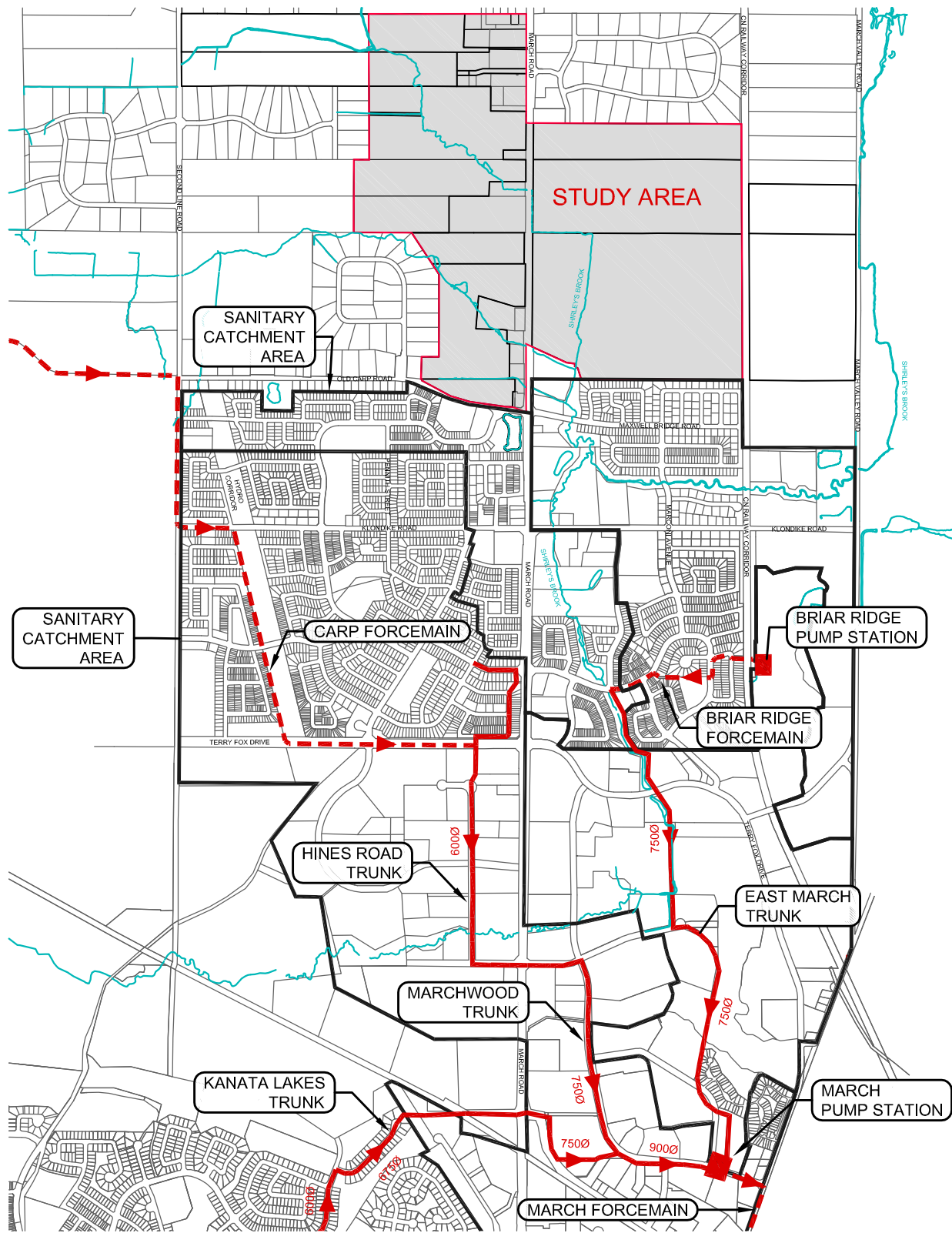
In order to evaluate the sanitary servicing alternatives, criteria and indicators were established. The evaluation and analysis is presented in the attached Evaluation Criteria Table. Preliminary cost estimates have also been prepared for each of the servicing alternatives and a summary table for comparison.

Based on our review and analysis of the servicing alternatives, the preferred sanitary servicing alternative is Option 2 for the following reasons:

- Maximizes the use of gravity sewers.
- Maximizes the use of existing infrastructure.
- A new pump station will not be required.
- This scenario uses the excess capacity within the BRPS.
- The gravity sewer on March Road can accommodate additional connections if required.
- Offers flexibility for future growth.
- Results in the lowest capital and operations and maintenance costs of all the options.

Attachments:

- Figure 1 – Existing Sanitary Infrastructure
- Sanitary Servicing Option Sketches
- Sanitary Evaluation Criteria Table
- Preliminary Sanitary Servicing Costs



NOVATECH ENGINEERING CONSULTANTS LTD.

ENGINEERS & PLANNERS
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada
K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Email: novainfo@novatech-eng.com

KANATA NORTH URBAN EXPANSION

NORTH KANATA WASTEWATER COLLECTION INFRASTRUCTURE

SCALE

N.T.S.

DATE

APR 2014

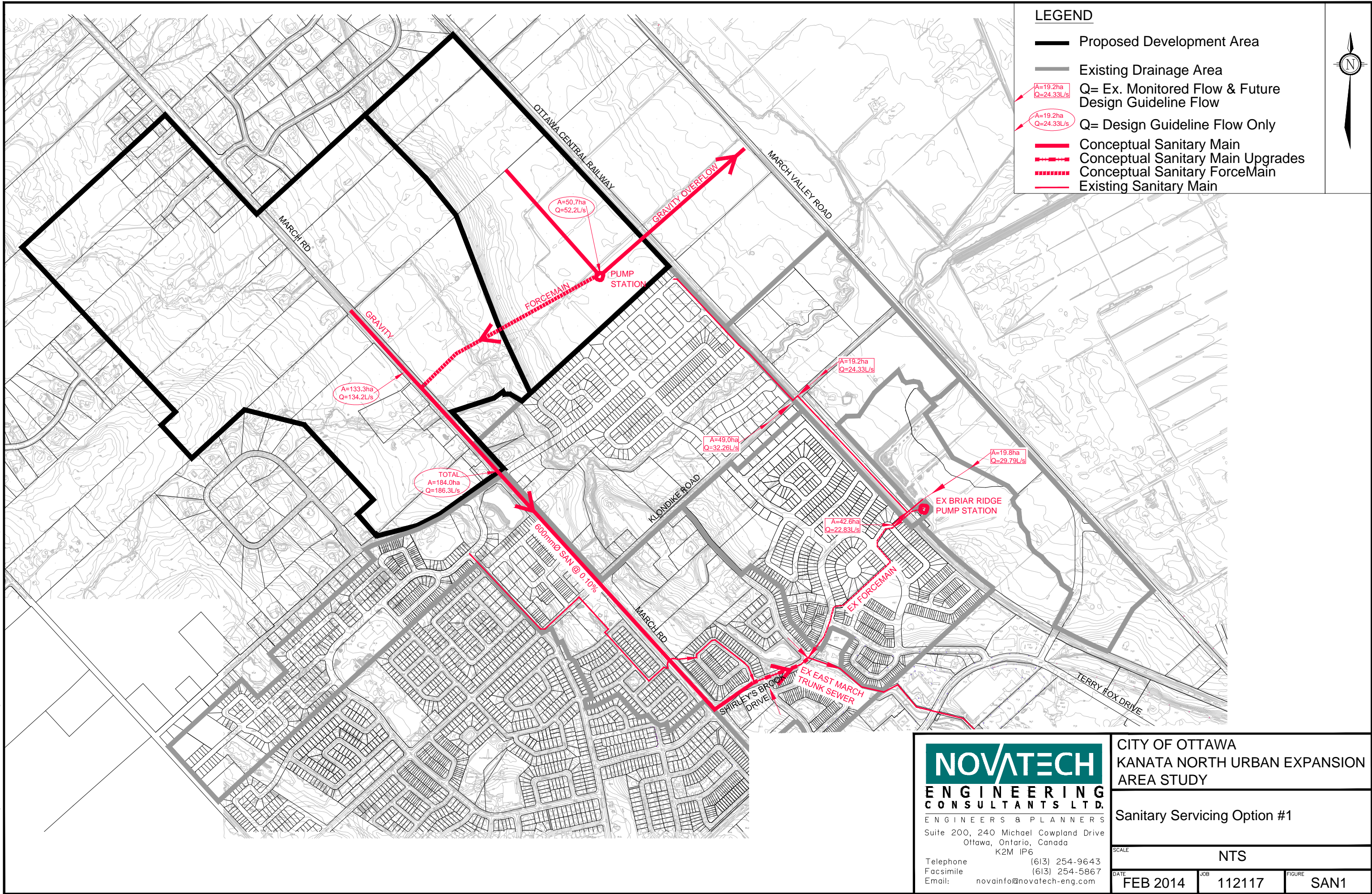
JOB

112117

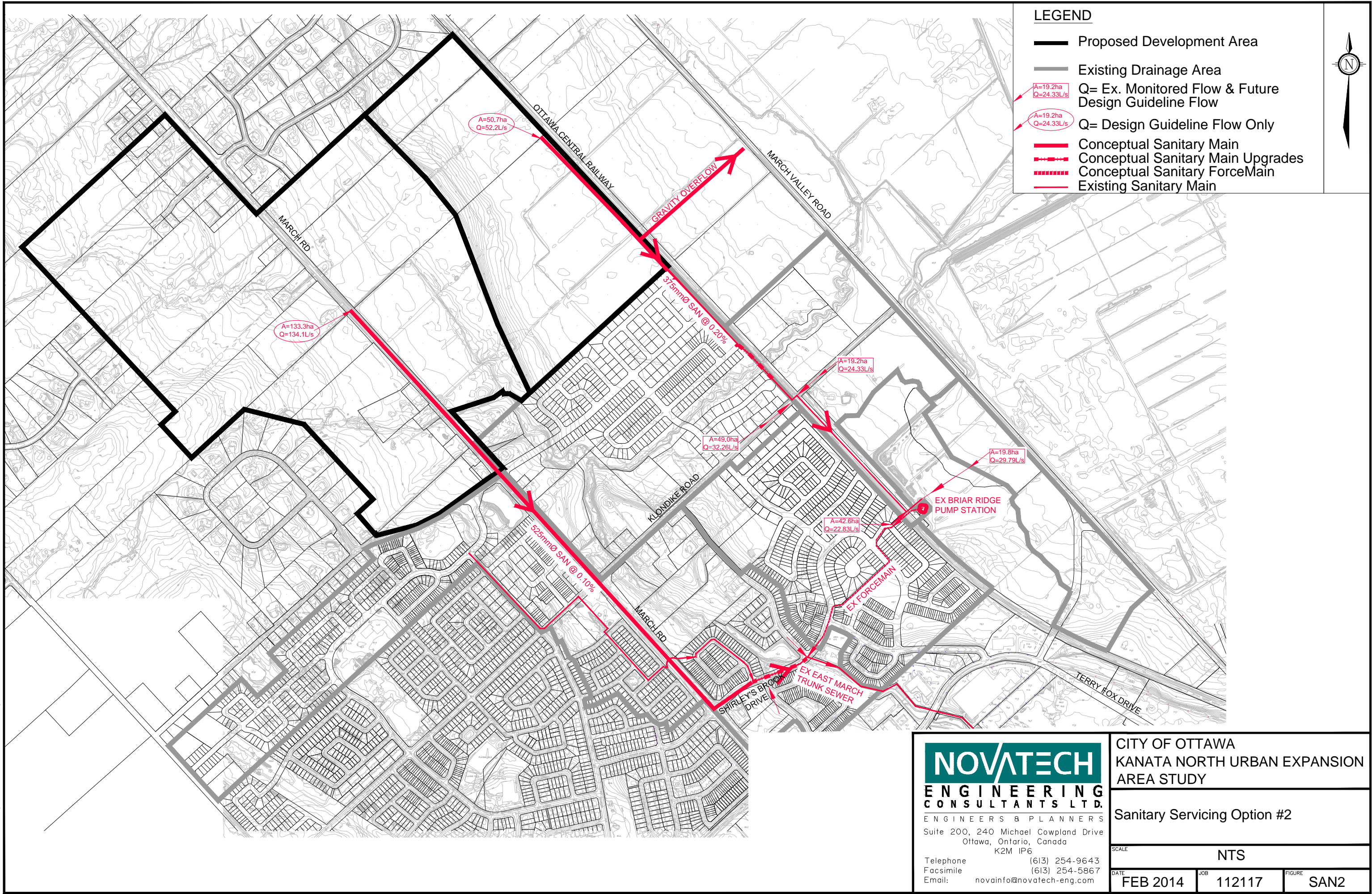
FIGURE

FIG-1

M:\2012\112117\CAD\Design\SAN\112117-SAN Options.dwg, 11x17 SAN OPT 1, Feb 14, 2014 - 12:17pm, amcauley



M:\2012\112117\CADD\Design\SAN\112117-SAN Options.dwg, 11x17 SAN OPT 2, Feb 14, 2014 - 12:17pm, amcauley



NOVATECH
ENGINEERING
CONSULTANTS LTD.

ENGINEERS & PLANNERS
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada
K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Email: novainfo@novatech-eng.com

CITY OF OTTAWA
KANATA NORTH URBAN EXPANSION
AREA STUDY

Sanitary Servicing Option #2

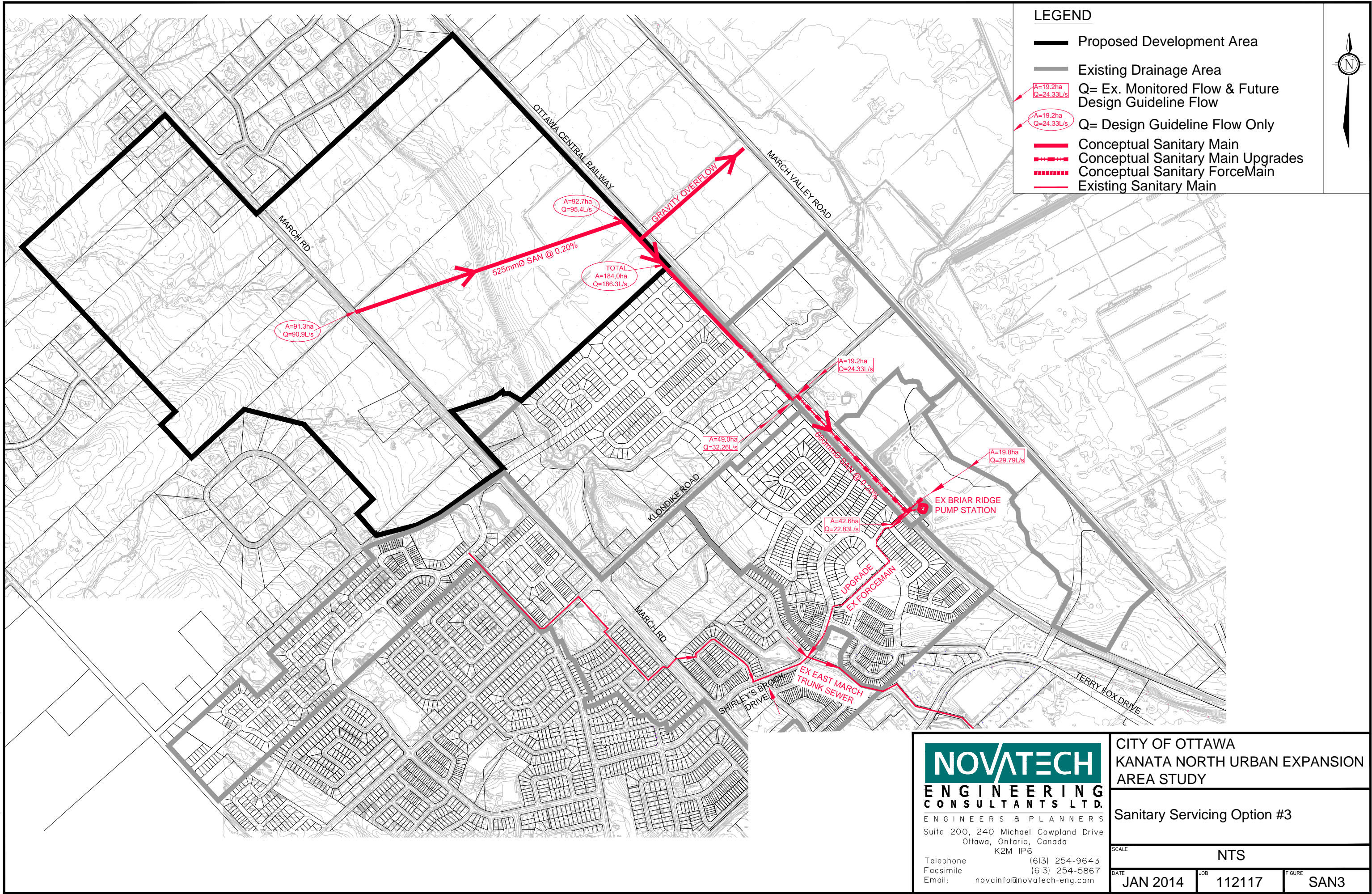
SCALE NTS

DATE FEB 2014

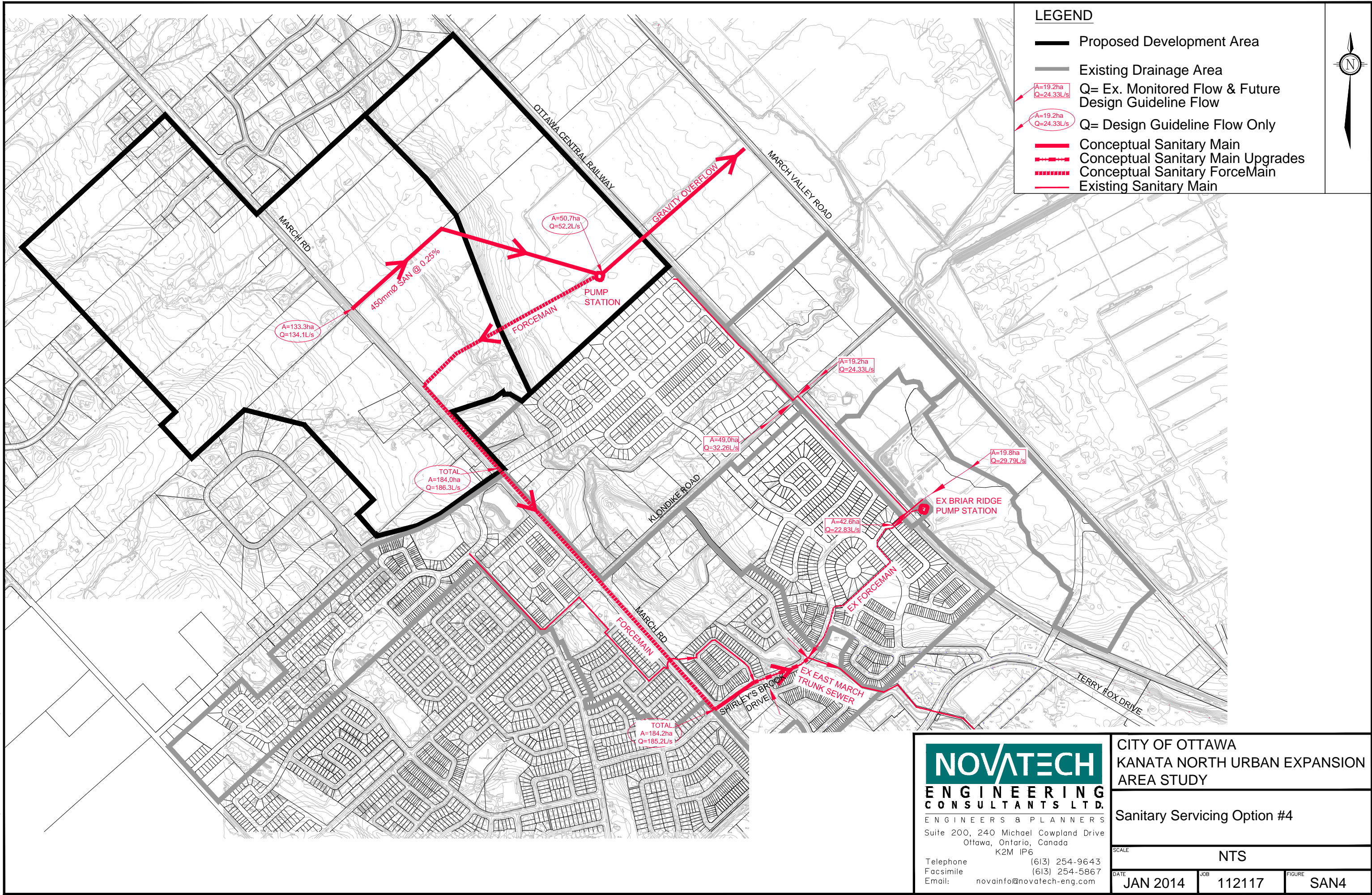
JOB 112117

FIGURE SAN2

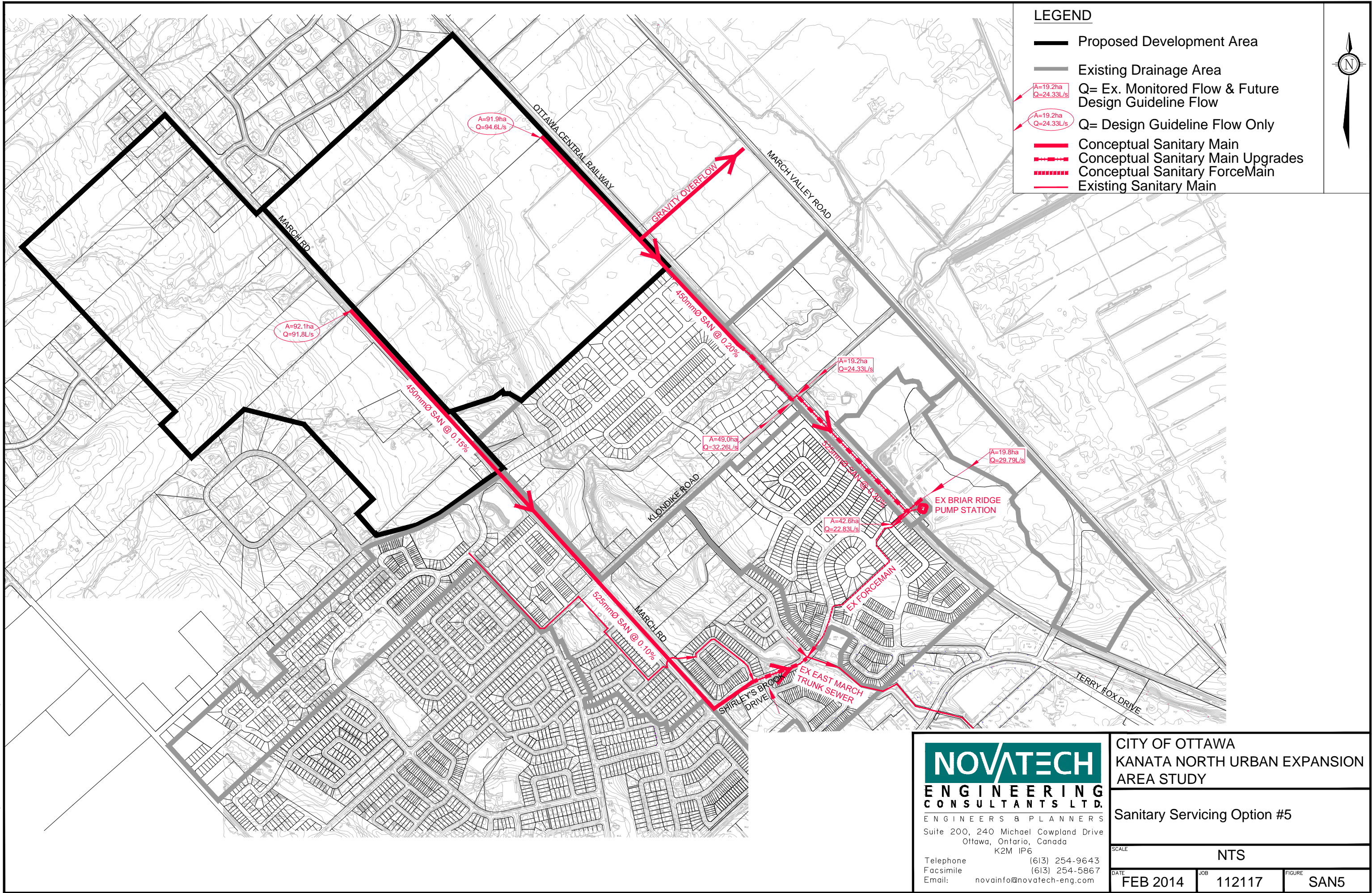
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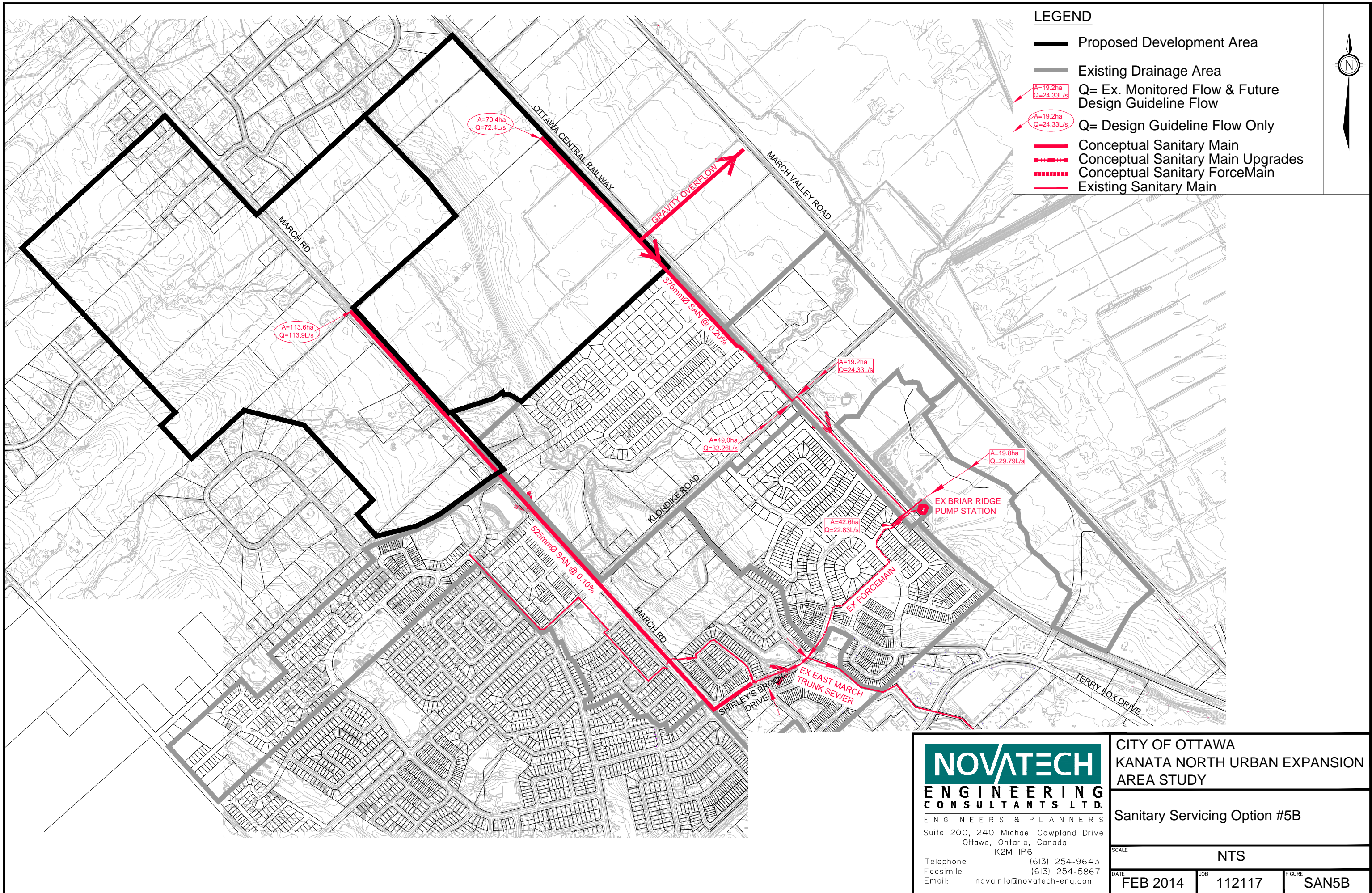
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NOVATECH						
	Kanata North Urban Expansion Area - Off-Site Sanitary Outlet Options					
			Option #1	Option #2	Option #3	Option #4
Criteria		Indicators	Area below ridge to local PS and total area gravity outlet to March Rd sewer	Area below ridge gravity outlet to BRPS, West area gravity outlet to March Rd sewer	Total area gravity outlet to BRPS	Total area outlet to local PS with forcemain along March Rd
	Design and Constructability/Functionality					
	Geotechnical issues and construction risks	Potential for encountering poor soils/rock and/or elevated groundwater conditions.	Lower end of March Rd - possible rock Upper end of March Rd - rock	Lower end of March Rd - possible rock Upper end of March Rd - rock Gravity outlet to BRPS - high groundwater and rock	Gravity outlet to BRPS - high groundwater and rock	Upper end of March Rd - rock
	Infrastructure requirements	Extent of works required.	Significant off-site works.	Significant off-site works. Flow to BRPS fits within firm capacity of station	Significant upgrades to BRPS and forcemain. New Shirley's Brook crossing.	Significant off-site works.
	Operational Impacts	Amount of maintenance intensive infrastructure required.	Substantial gravity sewer where no intensive maintenance is required. O & M required for proposed pump station and forcemain.	All gravity sewers - no intensive maintenance required. O & M required for BRPS	Substantial portion of the sewers are gravity so no intensive maintenance required. O & M required for upgraded pump station and forcemain.	O & M required for proposed pump station and forcemain.
	Construction Scheduling	Impact of construction on development timing.	Off-site works need to be in place prior to development.	Off-site works need to be in place prior to development.	Off-site gravity sewer needed immediately. PS upgrades required.	PS and off-site works need to be in place.
	Property Acquisition	Ease of property acquisition. (Depends on status of lands and adjacent lands ie. Vacant, leased or owner occupied).	All municipal ROW downstream. Requirement to cross under rail corridor for sanitary overflow on proponents land.	All municipal ROW downstream. Requirement to cross under rail corridor for sanitary overflow on proponents land.	All municipal ROW downstream. Requirement to cross under rail corridor for sanitary overflow on proponents land.	All municipal ROW downstream. Requirement to cross under rail corridor for sanitary overflow on proponents land.
	System Reliability	Proximity of a storm sewer, swm or other surface water for emergency overflow.	Adjacent existing watercourse will be used for emergency overflow on proponents land.	Adjacent existing watercourse will be used for emergency overflow on proponents land from gravity sewer to reduce HGL.	Adjacent existing watercourse will be used for emergency overflow on proponents land from gravity sewer to reduce HGL.	Adjacent existing watercourse will be used for emergency overflow on proponents land.
	Servicing Flexibility	Ease of accomodating potential changes in servicing plans.	On-site servicing is flexible for area above ridge. Area below ridge will require PS before development.	On-site servicing is flexible when outlets are in place.	On-site servicing is flexible when outlets are in place.	On-site servicing is flexible when outlets are in place.
	Phasing	Flexibility of design to allow multiple phasing options.	Phasing is flexible for area above ridge. Area below ridge can be flexible after the PS is installed.	Phasing is flexible when outlets are in place.	Phasing is flexible when outlets and PS upgrades are in place.	Phasing is flexible when outlets are in place.
	Caring and Healthy Communities					
	Displacement of Residents, Community/Recreation Facilities and Institutions	Affects areas of residence, instituions or businesses.	Substantial disruption to March Road corridor.	Disruption to March Road corridor. Disruption to Brookside Subdivision.	Gravity sewers off-site and forcemain through ex. residential neighbourhoods (Brookside and Briar Brook).	Substantial disruption to March Road corridor.
	Disruption to Existing Community	Extent of works affecting existing residences and businesses and visibility of additional infrastructure and traffic disruption.	March Rd traffic disruption (commuter). Potential business disruption.	Substantial March Rd traffic disruption (commuter). Potential business disruption.	Gravity sewers off-site and forcemain through ex. residential neighbourhoods (Brookside and Briar Brook). Local traffic disruptions.	March Rd traffic disruption (commuter). Potential business disruption.
	Natural Environment					
	Impact on Significant Natural Features	Loss of natural area due to installation of works.	None	None	None	None
	Impact on Aquatic Systems	Potential impact on fish habitat due to installation of works.	Overflow from PS to existing ditch. Rare emergency overflow may impact.	Overflow from sewer to existing ditch. Rare emergency overflow may impact.	Overflow from sewer to existing ditch. Rare emergency may impact.	Overflow from PS to existing ditch. Rare emergency overflow may impact.
	Impact on Quality and Quantity of Surface Water and Groundwater	Potential impact on water quality in Shirley's Brook and watershed resulting from rare emergency overflows to pump station failure.	Overflow from PS to existing ditch. Rare emergency overflow may impact.	Overflow from sewer to existing ditch. Rare emergency overflow may impact.	Overflow from sewer to existing ditch. Rare emergency may impact.	Overflow from PS to existing ditch. Rare emergency overflow may impact.
	Impact on Global Warming	Difference in carbon dioxide emissions resulting from occasional use of diesel generator.	Occasional use of genset.	None	Occasional use of genset.	Occasional use of genset.
	Effects on Urban Greenspace, Open Space and Vegetation (ie. Trees, shrubs, etc.)	Disruption to greenspace and trees.	None	None	None	None
	Economy					
	Potential to Use Combined Service Corridor	Length and area of service corridor.	March Rd gravity sewer shared with watermain extension.	March Rd gravity sewer shared with watermain extension.	No shared corridors.	March Rd gravity sewer shared with watermain extension.
	Efficiency of Use of Existing Infrastructure	Use of existing capacity.	Ex capacity in the East March Trunk will be utilized.	Ex capacity in the East March Trunk will be utilized. Ex design capacity in the BRPS will be utilized.	Will utilize ex capacity in BRPS and East March Trunk.	Ex capacity in the East March Trunk will be utilized.
	Energy Consumption	Pumping requirements.	Approx. 1/3 of site will be pumped.	Approx. 1/3 of site will be pumped.	Entire site pumped.	Entire site pumped.
	Impact on Future Lands/Development					
	Capital Costs					
	Operating Costs					
Novatech File: 112117						
14-Feb-14						

Option #5	Option #5b		
Area east of March Rd outlet to BRPS, West area outlet to March Rd gravity sewer	Valecraft below ridge and all of Metcalfe to BRPS, remainder of lands to March Rd gravity sewer		
			Additional Possible Points:
Lower end of March Rd - possible rock Upper end of March Rd - rock Gravity outlet to BRPS - high groundwater and rock	Lower end of March Rd - possible rock Upper end of March Rd - rock Gravity outlet to BRPS - high groundwater and rock		Allows possible connections to gravity sewer but not with forcemain.
Significant off-site works.	Significant off-site works.		Allows possible expansion to urban boundary.
All gravity sewers - no intensive maintenance required. O & M required for upgraded BRPS.	All gravity sewers - no intensive maintenance required. O & M required for upgraded BRPS.		All to March Road frees up future capacity in BRPS.
Off-site works need to be in place prior to development.	Off-site works need to be in place prior to development.		
All municipal ROW downstream. Requirement to cross under rail corridor for sanitary overflow on proponents land.	All municipal ROW downstream. Requirement to cross under rail corridor for sanitary overflow on proponents land.		
Adjacent existing watercourse will be used for emergency overflow on proponents land from gravity sewer to reduce HGL.	Adjacent existing watercourse will be used for emergency overflow on proponents land from gravity sewer to reduce HGL.		
On-site servicing is flexible when outlets are in place.	On-site servicing is flexible when outlets are in place.		
Phasing is flexible when outlets are in place.	Phasing is flexible when outlets are in place.		
Disruption to March Road corridor. Disruption to Brookside Subdivision.	Disruption to March Road corridor. Disruption to Brookside Subdivision.		
March Rd traffic disruption (commuter). Business disruption. Traffic and residential disruption in Brookside Subdivision.	March Rd traffic disruption (commuter). Business disruption. Traffic and residential disruption in Brookside Subdivision.		
None	None		
Overflow from sewer to existing ditch. Rare emergency overflow may impact.	Overflow from sewer to existing ditch. Rare emergency overflow may impact.		
Overflow from sewer to existing ditch. Rare emergency overflow may impact.	Overflow from sewer to existing ditch. Rare emergency overflow may impact.		
None	None		
None	None		
March Rd gravity sewer shared with watermain extension.	March Rd gravity sewer shared with watermain extension.		
Ex capacity in the East March Trunk will be utilized. Ex capacity in the BRPS will be utilized. BRPS capacity will need to be increased.	Ex capacity in the East March Trunk will be utilized. Ex capacity in the BRPS will be utilized. BRPS capacity will need to be increased.		

Kanata North

Flow Calculations

ITEM NO.	Unit	Option 1	Option 2	Option 3	Option 4	Option 5	Option 5B
Development Area							
Area (excluding March ROW)	ha	180.8	180.8	180.8	180.8	180.8	180.8
Flows	L/s	185.2	185.2	185.2	185.2	185.2	185.2
Unit Flow	L/s/ha	1.024	1.024	1.024	1.024	1.024	1.024

West Area (Upper)							
Onsite Tributary Area	ha	130.1	130.1	88.9	130.1	88.9	110.5
March Road ROW	ha	4.2	4.2	4.2	4.2	4.2	4.2
Total Area	ha	134.3	134.3	93.1	134.3	93.1	114.7
Design Flow	L/s	133.2	133.2	91	133.2	91	113.2
March Road ROW I/I (4.2ha)	L/s	1.2	1.2	1.2	1.2	1.2	1.2
Total Flow	L/s	134.4	134.4	92.2	134.4	92.2	114.4

East Area (Lower)							
Onsite Tributary Area	ha	50.7	50.7	91.9	50.7	91.9	70.3
Design Flow	L/s	51.9	51.9	94.1	51.9	94.1	72.0

Check							
Total Area	ha	185	185	185	185	185	185
Total Flows	L/s	186.3	186.3	186.3	186.3	186.3	186.4

Kanata North

Preliminary Sanitary Sewer Cost Summary

ITEM NO.	Unit	Option 1	Option 2	Option 3	Option 4	Option 5	Option 5B
Outlet - East March Trunk Sewer							
Total Area	ha	185.0	134.3	N/A	185.0	93.1	114.7
March Road ROW Area	ha	4.2	4.2	N/A	4.2	4.2	4.2
Net Development Area	ha	180.8	130.1	N/A	180.8	88.9	110.5
Design Flow	L/s	186.3	134.4	N/A	186.3	92.2	114.4
Gross Cost	\$	\$8,837,913	\$5,562,363	N/A	\$11,698,249	\$5,117,363	\$5,562,363
Gross Unit Flow Cost	\$ / (L/s)	\$47,439	\$41,387	N/A	\$62,793	\$55,503	\$48,622
Gross Development Area Cost	\$ / ha	\$48,882	\$42,755	N/A	\$64,703	\$57,563	\$50,338
DC Recoverables	\$	\$471,543	\$249,462	N/A	\$6,206,790	\$223,940	\$249,462
Carrying cost (6 yrs compound @ 6%, FV)	\$	\$197,350	\$104,404	N/A	\$2,597,660	\$80,619	\$89,806
Net Costs	\$	\$8,563,719	\$5,417,305	N/A	\$8,089,119	\$4,974,041	\$5,402,707
Net Unit Flow Cost	\$ / (L/s)	\$45,967	\$40,307	N/A	\$43,420	\$53,948	\$47,226
Net Development Area Cost	\$ / ha	\$47,366	\$41,640	N/A	\$44,741	\$55,951	\$48,893
Outlet - Briar Ridge Pump Station							
Tributary Area	ha	N/A	50.7	185.0	N/A	91.9	70.3
March Road ROW Area	ha	N/A		4.2	N/A		
Net Development Area	ha	N/A	50.7	180.8	N/A	91.9	70.3
Design Flow	L/s	N/A	51.9	186.3	N/A	94.1	72.0
Gross Cost	\$	N/A	\$2,945,388	\$10,130,311	N/A	\$5,538,774	\$3,223,912
Gross Unit Flow Cost	\$ / (L/s)	N/A	\$56,751	\$54,376	N/A	\$58,861	\$44,777
Gross Development Area Cost	\$ / ha	N/A	\$58,094	\$56,030	N/A	\$60,270	\$45,859
DC Recoverables	\$	N/A	\$506,512	\$3,466,714	N/A	\$1,119,553	\$505,663
Carrying cost (6 yrs compound @ 6%, FV)	\$	N/A	\$211,985	\$1,450,886	N/A	\$468,554	\$211,630
Net Costs	\$	N/A	\$2,650,860	\$8,114,483	N/A	\$4,887,775	\$2,929,878
Net Unit Flow Cost	\$ / (L/s)	N/A	\$51,076	\$43,556	N/A	\$51,942	\$40,693
Net Development Area Cost	\$ / ha	N/A	\$52,285	\$44,881	N/A	\$53,186	\$41,677
Total Net Costs	\$	\$8,563,719	\$8,068,166	\$8,114,483	\$8,089,119	\$9,861,816	\$8,332,586
Average Net Unit Flow Cost	\$ / (L/s)	\$45,967	\$43,307	\$43,556	\$43,420	\$52,935	\$44,703
Average Net Development Area Cost	\$ / ha	\$47,366	\$44,625	\$44,881	\$44,741	\$54,545	\$46,087
Total Gross Costs	\$	\$8,837,913	\$8,507,750	\$10,130,311	\$11,698,249	\$10,656,136	\$8,786,274
Average Gross Unit Flow Cost	\$ / (L/s)	\$47,439	\$45,667	\$54,376	\$62,793	\$57,199	\$47,137
Average Net Development Area Cost	\$ / ha	\$48,882	\$47,056	\$56,030	\$64,703	\$58,939	\$48,597

Kanata North
Preliminary Servicing Costs Sanitary Sewer Installation
Option 1

ITEM NO.	ITEM	EST. QTY	UNIT	UNIT PRICE	TOTAL AMOUNT
SECTION A - GENERAL					
1	Erosion and Sediment Control	1	LS	\$75,000.00	\$75,000.00
2	Ground Water Pumping & Management	1	LS	\$180,000.00	\$180,000.00
3	Traffic Control	1	LS	\$95,000.00	\$95,000.00
TOTAL SECTION A - GENERAL					\$350,000.00

SECTION B - SANITARY SEWER & APPURTENANCES					
1	Sanitary Sewer				
	i) 375mm dia. PVC (3 - 4m deep) [No Reinstat]	478	m	\$300.00	\$143,400.00
	ii) 600mm dia. Conc. 65-D (3 - 4m deep trench)	660	m	\$450.00	\$297,000.00
	iii) 600mm dia. Conc. 65-D (4 - 5m deep trench)	220	m	\$550.00	\$121,000.00
	iv) 600mm dia. Conc. 65-D (5 - 6m deep trench)	440	m	\$650.00	\$286,000.00
	v) 600mm dia. Conc. 65-D (6 - 7m deep trench)	220	m	\$750.00	\$165,000.00
	vi) 600mm dia. Conc. 65-D (7 - 8m deep trench)	291	m	\$850.00	\$247,350.00
	vii) Upsize Ex. 375 to 600mm (2 - 6m) (SB Drive)	201	m	\$1,300.00	\$261,300.00
2	Sanitary Manholes				
	i) 1200mm dia. (3m - 4m in height)	5	ea	\$6,000.00	\$30,000.00
	ii) 1200mm dia. (4m - 5m in height)	7	ea	\$7,000.00	\$49,000.00
	iii) 1200mm dia. (5m - 6m in height)	4	ea	\$9,000.00	\$36,000.00
	iv) 1200mm dia. (6m - 7m in height)	3	ea	\$10,000.00	\$30,000.00
	v) 1200mm dia. (7m - 8m in height)	2	ea	\$11,000.00	\$22,000.00
	vi) 1200mm dia. (8m - 9m in height)	3	ea	\$12,000.00	\$36,000.00
	vii) Upsize ex 1200mm MH to 1500mm	4	ea	\$20,000.00	\$80,000.00
3	Sanitary Overflow				
	i) 375mm dia. PVC (2 - 3m deep trench)	650	m	\$300.00	\$195,000.00
	ii) 1200mm dia. (2m - 3m in height)	6	ea	\$5,000.00	\$30,000.00
4	Rock Excavation	8,000	m ³	\$120.00	\$960,000.00
5	Roadway Reinstatment	11,400	m ²	\$100.00	\$1,140,000.00
6	Iron Adjustment	34	ea	\$500.00	\$17,000.00
7	TV (x2)	3,160	m	\$10.00	\$31,600.00
8	By Pass Pumping	201	m	\$200.00	\$40,200.00
9	Storm Sewer - Remove & Reinstat On Shirley's Brook Dr, parallel to Sanitary	1	LS	\$218,480.00	\$218,480.00
	Pump Station				
10	Pump Station (52L/s)	1	ea	\$2,000,000.00	\$2,000,000.00
11	Forcemain (twin - 200mm)	710	m	\$400.00	\$284,000.00
TOTAL SECTION B - SANITARY SEWER & APPURTENANCES					\$6,720,330.00

Construction Total		\$7,070,330.00
25% Soft Costs and Contingency		\$1,767,582.50
Total		\$8,837,912.50
Total Flow	L/s	186.3
Gross Cost	\$/ (L/s)	\$47,439.00

Note: DC recoverable Items are highlighted in blue

Preliminary Servicing Costs Sanitary Sewer Installation
Option 2

ITEM NO.	ITEM	EST. QTY	UNIT	UNIT PRICE	TOTAL AMOUNT
Outlet - East March Trunk Sewer					
SECTION A - GENERAL					
1	Erosion and Sediment Control	1	LS	\$75,000.00	\$75,000.00
2	Ground Water Pumping & Management	1	LS	\$180,000.00	\$180,000.00
3	Traffic Control	1	LS	\$95,000.00	\$95,000.00
TOTAL SECTION A - GENERAL					\$350,000.00

SECTION B - SANITARY SEWER & APPURTENANCES					
1	Sanitary Sewer				
	i) 525mm dia. Conc. 65-D (3 - 4m deep)	660	m	\$400.00	\$264,000.00
	ii) 525mm dia. Conc. 65-D (4 - 5m deep)	220	m	\$500.00	\$110,000.00
	iii) 525mm dia. Conc. 65-D (5 - 6m deep)	440	m	\$600.00	\$264,000.00
	iv) 525mm dia. Conc. 65-D (6 - 7m deep)	319	m	\$700.00	\$223,300.00
	v) 525mm dia. Conc. 65-D (7 - 8m deep)	291	m	\$800.00	\$232,800.00
	vi) Upsize Ex. 375 to 600mm (2 - 6m) (SB Drive)	201	m	\$1,300.00	\$261,300.00
2	Sanitary Manholes				
	i) 1200mm dia. (4m - 5m in height)	7	ea	\$7,000.00	\$49,000.00
	ii) 1200mm dia. (5m - 6m in height)	4	ea	\$9,000.00	\$36,000.00
	iii) 1200mm dia. (6m - 7m in height)	3	ea	\$10,000.00	\$30,000.00
	iv) 1200mm dia. (7m - 8m in height)	2	ea	\$11,000.00	\$22,000.00
	v) 1200mm dia. (8m - 9m in height)	3	ea	\$12,000.00	\$36,000.00
	vi) Upsize ex 1200mm MH to 1500mm	4	ea	\$20,000.00	\$80,000.00
3	Rock Excavation	8,000	m ³	\$120.00	\$960,000.00
4	Roadway Reinstatement	12,400	m ²	\$100.00	\$1,240,000.00
5	Iron Adjustment	23	ea	\$500.00	\$11,500.00
6	TV (x2)	2,131	m	\$10.00	\$21,310.00
7	By Pass Pumping	201	m	\$200.00	\$40,200.00
8	Storm Sewer - Remove & Reinstall On Shirley's Brook Dr. parallel to Sanitary	1	LS	\$218,480.00	\$218,480.00
TOTAL SECTION B - SANITARY SEWER & APPURTENANCES					\$4,099,890.00

Construction Total	\$4,449,890.00
25% Soft Costs and Contingency	\$1,112,472.50

Total	\$5,562,362.50
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Total Flow	L/s	134.4
Gross Cost	\$(L/s)	\$41,387.00

Outlet - Briar Ridge Pump Station					
SECTION A - GENERAL					
1	Erosion and Sediment Control	1	LS	\$10,000.00	\$10,000.00
2	Ground Water Pumping & Management	1	LS	\$20,000.00	\$20,000.00
3	Traffic Control	1	LS	\$10,000.00	\$10,000.00
TOTAL SECTION A - GENERAL					\$40,000.00

SECTION B - SANITARY SEWER & APPURTENANCES					
1	Sanitary Sewer				
	i) 375mm dia. PVC (3 - 4m deep) [no Reinstall]	627	m	\$300.00	\$188,100.00
	ii) 375mm dia. PVC (3 - 4m deep) [Reinstall]	191	m	\$300.00	\$57,300.00
	iii) 375mm dia. PVC (4 - 5m deep)	225	m	\$350.00	\$78,750.00
	iv) Upsize Ex. 375 to 450mm (3 - 6m) (Under SB)	164	m	\$1,300.00	\$213,200.00
2	Sanitary Manholes				
	i) 1200mm dia. (2m - 4m in height)	9	ea	\$6,000.00	\$54,000.00
	ii) 1200mm dia. (4m - 5m in height)	2	ea	\$7,000.00	\$14,000.00
	iii) 1200mm dia. (5m - 6m in height)	1	ea	\$9,000.00	\$9,000.00
	iv) Recore ex manholes	3	ea	\$5,000.00	\$15,000.00
3	Sanitary Overflow				
	i) 375mm dia. PVC (2 - 3m deep) [no Reinstall]	465	m	\$300.00	\$139,500.00
	ii) 1200mm dia. (2m - 3m in height)	4	ea	\$5,000.00	\$20,000.00
4	Roadway Reinstatement	2,800	m ²	\$100.00	\$280,000.00
5	Iron Adjustment	19	ea	\$500.00	\$9,500.00
6	TV (x2)	1,672	m	\$10.00	\$16,720.00
7	By Pass Pumping	164	m	\$200.00	\$32,800.00
8	BRPS Upgrades to meet firm capacity	1	LS	\$500,000.00	\$500,000.00
TOTAL SECTION B - SANITARY SEWER & APPURTENANCES					\$1,627,870.00

SECTION C - BRIAR RIDGE PUMP STATION COST SHARING					
1	BRPS/Forcemain = 51.9L/s / (51.9+183)L/s	22.1%	LS	\$1,866,101.90	\$412,408.52
2	Trunk Sewer Along Rail Corridor = 51.9L/s / Pipe Cap	41.0%	LS	\$673,248.00	\$276,031.68
TOTAL SECTION C - BRIAR RIDGE PUMP STATION COST SHARING					\$688,440.20

Construction Total	\$2,356,310.20
25% Soft Costs and Contingency	\$589,077.55

Total	\$2,945,387.75
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Total Flow	L/s	51.9
Gross Cost	\$(L/s)	\$56,751.00

Note: DC recoverable Items are highlighted in blue

Kanata North

Preliminary Servicing Costs Sanitary Sewer Installation Option 3

ITEM NO.	ITEM	EST. QTY	UNIT	UNIT PRICE	TOTAL AMOUNT
SECTION A - GENERAL					
1	Erosion and Sediment Control	1	LS	\$75,000.00	\$75,000.00
2	Ground Water Pumping & Management	1	LS	\$180,000.00	\$180,000.00
3	Traffic Control	1	LS	\$35,000.00	\$35,000.00
TOTAL SECTION A - GENERAL					\$290,000.00

SECTION B - SANITARY SEWER & APPURTENANCES					
1	Sanitary Sewer				
	i) 525mm dia. Conc. 65-D (2 - 3m deep)	892	m	\$350.00	\$312,200.00
	ii) 525mm dia. Conc. 65-D (3 - 4m deep)	110	m	\$400.00	\$44,000.00
	iii) 525mm dia. Conc. 65-D (4 - 5m deep)	549	m	\$500.00	\$274,500.00
	iv) Upsize Ex. 375/450 to 525mm (5 - 9m) (BRPS)	930	m	\$900.00	\$837,000.00
2	Sanitary Manholes				
	i) 1200mm dia. (2m - 3m in height)	7	ea	\$5,000.00	\$35,000.00
	ii) 1200mm dia. (3m - 4m in height)	5	ea	\$6,000.00	\$30,000.00
	iii) 1200mm dia. (4m - 5m in height)	3	ea	\$7,000.00	\$21,000.00
	iv) 1200mm dia. (5m - 6m in height)	2	ea	\$9,000.00	\$18,000.00
	v) Recore ex manholes	9	ea	\$5,000.00	\$45,000.00
	vi) Upsize ex 1200mm MH to 1500mm	5	ea	\$20,000.00	\$100,000.00
3	Sanitary Overflow				
	i) 525mm dia. PVC (2 - 3m deep trench) [no Reinst]	465	m	\$350.00	\$162,750.00
	ii) 1200mm dia. (2m - 3m in height)	4	ea	\$5,000.00	\$20,000.00
4	Rock Excavation (New trench only)	1,000	m ³	\$120.00	\$120,000.00
5	Roadway Reinstatement	17,900	m ²	\$100.00	\$1,790,000.00
6	Iron Adjustment	35	ea	\$500.00	\$17,500.00
7	TV (x2)	2,946	m	\$10.00	\$29,460.00
8	By Pass Pumping	930	m	\$200.00	\$186,000.00
9	BRPS Upgrades				
	i) Pump Station Upgrade (+113L/s) above firm cap	1	ea	\$3,000,000.00	\$3,000,000.00
	ii) Additional Forcemain (300mm dia)	800	m	\$300.00	\$240,000.00
TOTAL SECTION B - SANITARY SEWER & APPURTENANCES					\$7,282,410.00

SECTION C - BRIAR RIDGE PUMP STATION COST SHARING					
1	BRPS/Forcemain = 73L/s / (73+183)L/s	28.5%	LS	\$1,866,101.90	\$531,839.04
2	Trunk Sewer Along Rail Corridor - New + Upgrade - See 1.iv)				
TOTAL SECTION C - BRIAR RIDGE PUMP STATION COST SHARING					\$531,839.04

Construction Total		\$8,104,249.04
25% Soft Costs and Contingency		\$2,026,062.26
Total		\$10,130,311.30
Total Flow	L/s	186.3
Gross Cost	\$/L/s)	\$54,376.00

Note: DC recoverable Items are highlighted in blue

Kanata North

Preliminary Servicing Costs Sanitary Sewer Installation Option 4

ITEM NO.	ITEM	EST. QTY	UNIT	UNIT PRICE	TOTAL AMOUNT
SECTION A - GENERAL					
1	Erosion and Sediment Control	1	LS	\$75,000.00	\$75,000.00
2	Ground Water Pumping & Management	1	LS	\$180,000.00	\$180,000.00
3	Traffic Control	1	LS	\$95,000.00	\$95,000.00
TOTAL SECTION A - GENERAL					\$350,000.00

SECTION B - SANITARY SEWER & APPURTENANCES					
1	Pump Station (186 L/s)	1	ea	\$5,000,000.00	\$5,000,000.00
2	Forcemain (twin - 300mm)	2,240	m	\$500.00	\$1,120,000.00
3	Sanitary Sewer				
	i) 450mm dia. Conc. 65-D (3 - 4m deep) [No Re-in]	971	m	\$349.00	\$338,879.00
	ii) 525mm dia. Conc. 65-D (3m deep)	139	m	\$350.00	\$48,650.00
	iii) Upsize Ex. 375 to 600mm (2 - 6m) (SB Drive)	201	m	\$1,300.00	\$261,300.00
4	Sanitary Manholes				
	i) 1200mm dia. (2m - 3m in height)	2	ea	\$5,000.00	\$10,000.00
	ii) 1200mm dia. (3m - 4m in height)	11	ea	\$6,000.00	\$66,000.00
	iii) Upsize ex 1200mm MH to 1500mm	4	ea	\$20,000.00	\$80,000.00
5	Sanitary Overflow				
	i) 525mm dia. PVC (2 - 3m deep trench) [No Re-in]	650	m	\$350.00	\$227,500.00
	ii) 1200mm dia. (2m - 3m in height)	6	ea	\$5,000.00	\$30,000.00
6	Rock Excavation	3,400	m ³	\$120.00	\$408,000.00
7	Roadway Reinstatement	9,100	m ²	\$100.00	\$910,000.00
8	Iron Adjustment	23	ea	\$500.00	\$11,500.00
9	TV (x2)	1,961	m	\$10.00	\$19,610.00
10	By Pass Pumping	201	m	\$200.00	\$40,200.00
11	Storm Sewer - Remove & Reinstall On Shirley's Brook Dr, parallel to Sanitary	1	LS	\$218,480.00	\$218,480.00
TOTAL SECTION B - SANITARY SEWER & APPURTENANCES					\$8,790,119.00

Construction Total	\$9,358,599.00
25% Soft Costs and Contingency	\$2,339,649.75

Total	\$11,698,248.75
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Total Flow	L/s	186.3
Gross Cost	\$(/L/s)	\$62,793.00

Note: DC recoverable Items are highlighted in blue

**Preliminary Servicing Costs Sanitary Sewer Installation
Option 5**

ITEM NO.	ITEM	EST. QTY	UNIT	UNIT PRICE	TOTAL AMOUNT
Outlet - East March Trunk Sewer					
SECTION A - GENERAL					
1	Erosion and Sediment Control	1	LS	\$75,000.00	\$75,000.00
2	Ground Water Pumping & Management	1	LS	\$180,000.00	\$180,000.00
3	Traffic Control	1	LS	\$95,000.00	\$95,000.00
TOTAL SECTION A - GENERAL					\$350,000.00

SECTION B - SANITARY SEWER & APPURTENANCES					
1	Sanitary Sewer				
	i) 450mm dia. Conc. 65-D (2 - 4m deep)	1,100	m	\$350.00	\$385,000.00
	ii) 525mm dia. Conc. 65-D (5 - 6m deep)	220	m	\$600.00	\$132,000.00
	iii) 525mm dia. Conc. 65-D (6 - 7m deep)	319	m	\$700.00	\$223,300.00
	iv) 525mm dia. Conc. 65-D (7 - 8m deep)	291	m	\$800.00	\$232,800.00
	v) Upsize Ex. 375 to 600mm (2 - 6m) (SB Drive)	201	m	\$1,300.00	\$261,300.00
2	Sanitary Manholes				
	i) 1200mm dia. (2m - 4m in height)	5	ea	\$6,000.00	\$30,000.00
	ii) 1200mm dia. (4m - 5m in height)	5	ea	\$7,000.00	\$35,000.00
	iii) 1200mm dia. (5m - 6m in height)	1	ea	\$9,000.00	\$9,000.00
	iv) 1200mm dia. (6m - 7m in height)	3	ea	\$10,000.00	\$30,000.00
	v) 1200mm dia. (7m - 8m in height)	2	ea	\$11,000.00	\$22,000.00
	v) 1200mm dia. (8m - 9m in height)	3	ea	\$12,000.00	\$36,000.00
	vii) Upsize ex 1200mm MH to 1500mm	4	ea	\$20,000.00	\$80,000.00
4	Rock Excavation	6,800	m ³	\$120.00	\$816,000.00
5	Roadway Reinstatement	11,600	m ²	\$100.00	\$1,160,000.00
6	Iron Adjustment	23	ea	\$500.00	\$11,500.00
7	TV (x2)	2,131	m	\$10.00	\$21,310.00
8	By Pass Pumping	201	m	\$200.00	\$40,200.00
8	Storm Sewer - Remove & Reinstall On Shirley's Brook Dr. parallel to Sanitary	1	LS	\$218,480.00	\$218,480.00
TOTAL SECTION B - SANITARY SEWER & APPURTENANCES					\$3,743,890.00

Construction Total	\$4,093,890.00
25% Soft Costs and Contingency	\$1,023,472.50

Total	\$5,117,362.50
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Total Flow	L/s	92.2
Gross Cost	\$/L/s	\$55,503.00

Outlet - Briar Ridge Pump Station					
SECTION A - GENERAL					
1	Erosion and Sediment Control	1	LS	\$20,000.00	\$20,000.00
2	Ground Water Pumping & Management	1	LS	\$40,000.00	\$40,000.00
3	Traffic Control	1	LS	\$20,000.00	\$20,000.00
TOTAL SECTION A - GENERAL					\$80,000.00

SECTION B - SANITARY SEWER & APPURTENANCES					
1	Sanitary Sewer				
	i) 450mm dia. Conc. 65-D (3 - 4m deep) [no Reinst]	627	m	\$350.00	\$219,450.00
	ii) 450mm dia. Conc. 65-D (2 - 4m deep) [Reinstall]	191	m	\$350.00	\$66,850.00
	iii) 450mm dia. Conc. 65-D (4 - 5m deep)	225	m	\$450.00	\$101,250.00
	iv) Upsize Ex. 375/450 to 525mm (5 - 9m) (BRPS)	930	m	\$900.00	\$837,000.00
2	Sanitary Manholes				
	i) 1200mm dia. (2m - 4m in height)	9	ea	\$6,000.00	\$54,000.00
	ii) 1200mm dia. (4m - 5m in height)	2	ea	\$7,000.00	\$14,000.00
	iii) 1200mm dia. (5m - 6m in height)	1	ea	\$9,000.00	\$9,000.00
	iv) Recore ex manholes	8	ea	\$5,000.00	\$40,000.00
	v) Upsize ex 1200mm MH to 1500mm	5	ea	\$20,000.00	\$100,000.00
3	Sanitary Overflow				
	i) 450mm dia. PVC (2 - 3m deep trench) [no Reinst]	465	m	\$350.00	\$162,750.00
	ii) 1200mm dia. (2m - 3m in height)	4	ea	\$5,000.00	\$20,000.00
5	Roadway Reinstatement	9,700	m ²	\$100.00	\$970,000.00
6	Iron Adjustment	29	ea	\$500.00	\$14,500.00
7	TV (x2)	2,438	m	\$10.00	\$24,380.00
8	By Pass Pumping	930	m	\$200.00	\$186,000.00
9	BRPS Upgrades				
	i) Pump Station Upgrade (+22L/s) above firm cap	1	ea	\$500,000.00	\$500,000.00
	ii) BRPS Upgrades to meet firm capacity	1	LS	\$500,000.00	\$500,000.00
TOTAL SECTION B - SANITARY SEWER & APPURTENANCES					\$3,819,180.00

SECTION C - BRIAR RIDGE PUMP STATION COST SHARING					
1	BRPS/Forcemain = 73L/s / (73+183)L/s	28.5%	LS	\$1,866,101.90	\$531,839.04
2	Trunk Sewer Along Rail Corridor - New + Upgrade - See 1.iv)				
TOTAL SECTION C - BRIAR RIDGE PUMP STATION COST SHARING					\$531,839.04

Construction Total	\$4,431,019.04
25% Soft Costs and Contingency	\$1,107,754.76

Total	\$5,538,773.80
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Total Flow	L/s	94.1
Gross Cost	\$/L/s	\$58,861.00

Note: DC recoverable Items are highlighted in blue

Preliminary Servicing Costs Sanitary Sewer Installation
Option 5B

ITEM NO.	ITEM	EST. QTY	UNIT	UNIT PRICE	TOTAL AMOUNT
Outlet - East March Trunk Sewer					
SECTION A - GENERAL					
1	Erosion and Sediment Control	1	LS	\$75,000.00	\$75,000.00
2	Ground Water Pumping & Management	1	LS	\$180,000.00	\$180,000.00
3	Traffic Control	1	LS	\$95,000.00	\$95,000.00
TOTAL SECTION A - GENERAL					\$350,000.00

SECTION B - SANITARY SEWER & APPURTENANCES					
1	Sanitary Sewer				
	i) 525mm dia. Conc. 65-D (3 - 4m deep)	660	m	\$400.00	\$264,000.00
	ii) 525mm dia. Conc. 65-D (4 - 5m deep)	220	m	\$500.00	\$110,000.00
	iii) 525mm dia. Conc. 65-D (5 - 6m deep)	440	m	\$600.00	\$264,000.00
	iv) 525mm dia. Conc. 65-D (6 - 7m deep)	319	m	\$700.00	\$223,300.00
	v) 525mm dia. Conc. 65-D (7 - 8m deep)	291	m	\$800.00	\$232,800.00
	vi) Upsize Ex. 375 to 600mm (2 - 6m) (SB Drive)	201	m	\$1,300.00	\$261,300.00
2	Sanitary Manholes				
	i) 1200mm dia. (4m - 5m in height)	7	ea	\$7,000.00	\$49,000.00
	ii) 1200mm dia. (5m - 6m in height)	4	ea	\$9,000.00	\$36,000.00
	iii) 1200mm dia. (6m - 7m in height)	3	ea	\$10,000.00	\$30,000.00
	iv) 1200mm dia. (7m - 8m in height)	2	ea	\$11,000.00	\$22,000.00
	v) 1200mm dia. (8m - 9m in height)	3	ea	\$12,000.00	\$36,000.00
	vi) Upsize ex 1200mm MH to 1500mm	4	ea	\$20,000.00	\$80,000.00
3	Rock Excavation	8,000	m ³	\$120.00	\$960,000.00
4	Roadway Reinstatement	12,400	m ²	\$100.00	\$1,240,000.00
5	Iron Adjustment	23	ea	\$500.00	\$11,500.00
6	TV (x2)	2,131	m	\$10.00	\$21,310.00
7	By Pass Pumping	201	m	\$200.00	\$40,200.00
8	Storm Sewer - Remove & Reinstall On Shirley's Brook Dr. parallel to Sanitary	1	LS	\$218,480.00	\$218,480.00
TOTAL SECTION B - SANITARY SEWER & APPURTENANCES					\$4,099,890.00

Construction Total	\$4,449,890.00
25% Soft Costs and Contingency	\$1,112,472.50

Total	\$5,562,362.50
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Total Flow	L/s	114.4
Gross Cost	\$(/L/s)	\$48,622.00

Outlet - Briar Ridge Pump Station					
SECTION A - GENERAL					
1	Erosion and Sediment Control	1	LS	\$10,000.00	\$10,000.00
2	Ground Water Pumping & Management	1	LS	\$20,000.00	\$20,000.00
3	Traffic Control	1	LS	\$10,000.00	\$10,000.00
TOTAL SECTION A - GENERAL					\$40,000.00

SECTION B - SANITARY SEWER & APPURTENANCES					
1	Sanitary Sewer				
	i) 375mm dia. PVC (3 - 4m deep) [no Reinstall]	627	m	\$300.00	\$188,100.00
	ii) 375mm dia. PVC (3 - 4m deep) [Reinstall]	191	m	\$300.00	\$57,300.00
	iii) 375mm dia. PVC (4 - 5m deep)	225	m	\$350.00	\$78,750.00
	iv) Upsize Ex. 375 to 450mm (3 - 6m) (Under SB)	164	m	\$1,300.00	\$213,200.00
2	Sanitary Manholes				
	i) 1200mm dia. (2m - 4m in height)	9	ea	\$6,000.00	\$54,000.00
	ii) 1200mm dia. (4m - 5m in height)	2	ea	\$7,000.00	\$14,000.00
	iii) 1200mm dia. (5m - 6m in height)	1	ea	\$9,000.00	\$9,000.00
	iv) Recore ex manholes	3	ea	\$5,000.00	\$15,000.00
3	Sanitary Overflow				
	i) 375mm dia. PVC (2 - 3m deep) [no Reinstall]	465	m	\$300.00	\$139,500.00
	ii) 1200mm dia. (2m - 3m in height)	4	ea	\$5,000.00	\$20,000.00
4	Roadway Reinstatement	2,800	m ²	\$100.00	\$280,000.00
5	Iron Adjustment	19	ea	\$500.00	\$9,500.00
6	TV (x2)	1,672	m	\$10.00	\$16,720.00
7	By Pass Pumping	164	m	\$200.00	\$32,800.00
8	BRPS Upgrades to meet firm capacity	1	LS	\$500,000.00	\$500,000.00
TOTAL SECTION B - SANITARY SEWER & APPURTENANCES					\$1,627,870.00

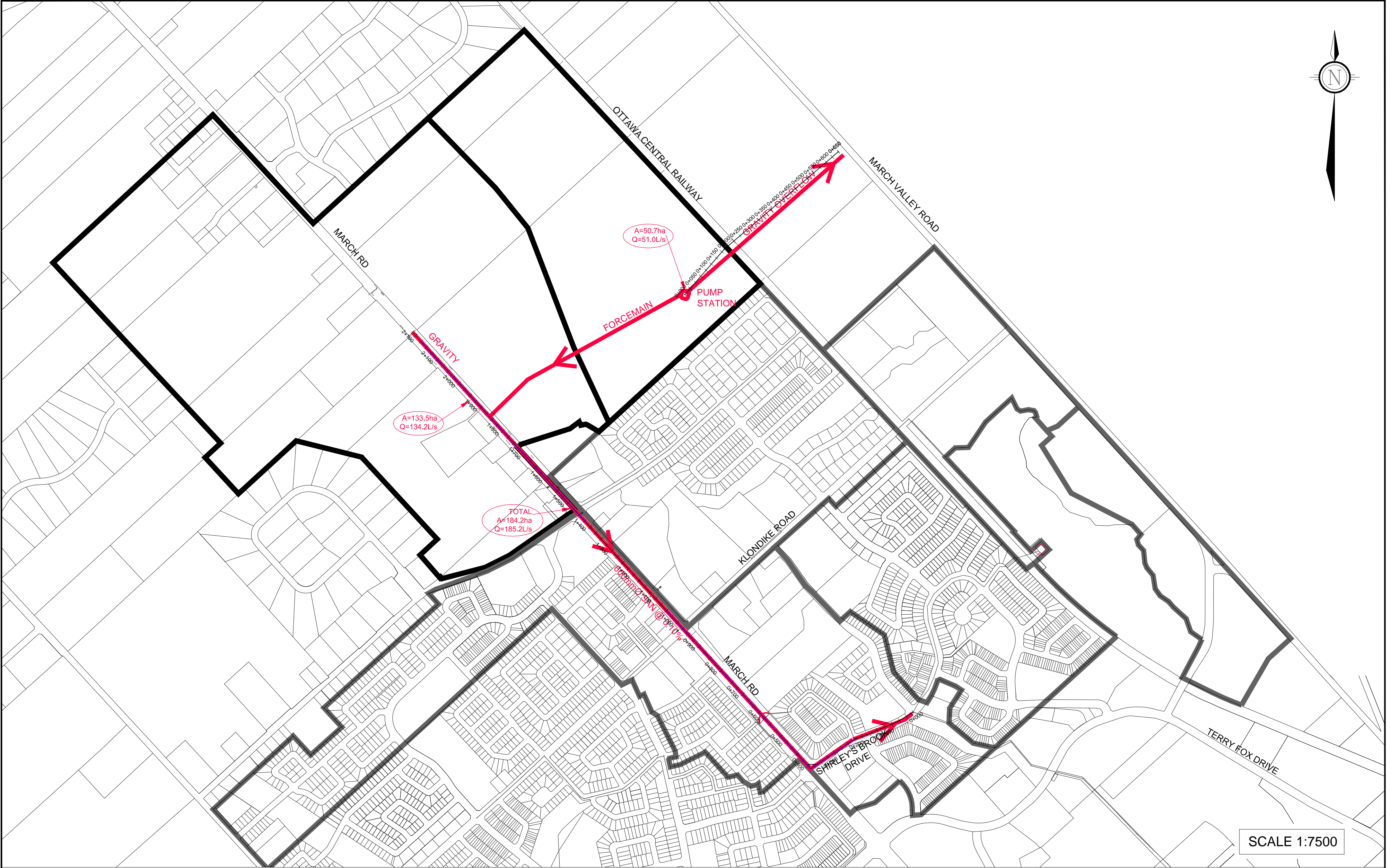
SECTION C - BRIAR RIDGE PUMP STATION COST SHARING					
1	BRPS/Forcemain = 72L/s / (72+183)L/s	28.2%	LS	\$1,866,101.90	\$526,240.74
2	Trunk Sewer Along Rail Corridor = 72L/s / Pipe Cap	57.2%	LS	\$673,248.00	\$385,018.71
TOTAL SECTION C - BRIAR RIDGE PUMP STATION COST SHARING					\$911,259.45

Construction Total	\$2,579,129.45
25% Soft Costs and Contingency	\$644,782.36

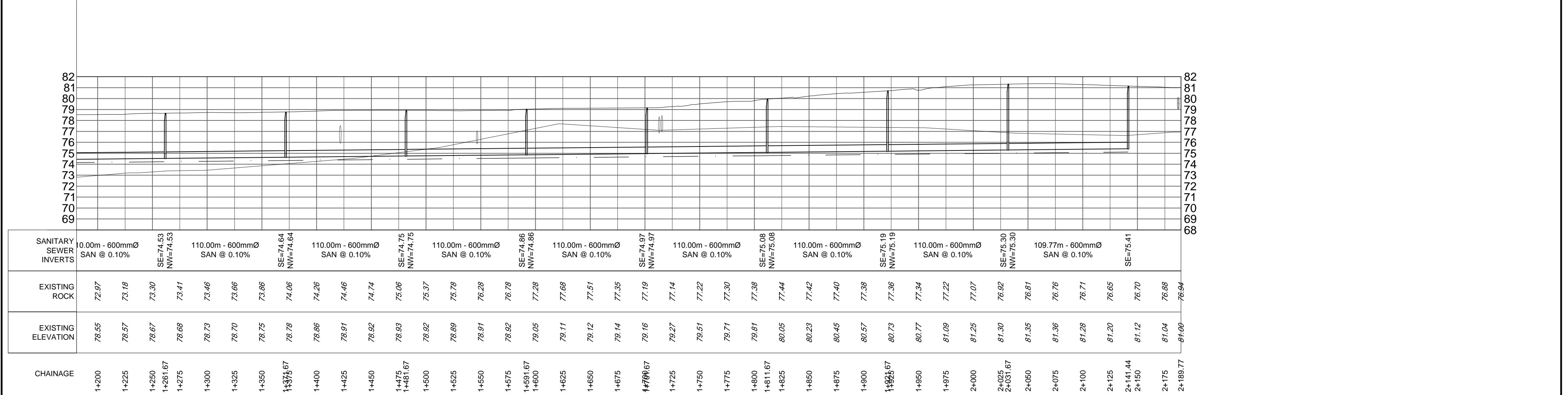
Total	\$3,223,911.81
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Total Flow	L/s	72.0
Gross Cost	\$(/L/s)	\$44,777.00

Note: DC recoverable Items are highlighted in blue



STA 1+200 TO 2+200
SCALE
H:1:2500
V:1:250



STA 0+000 TO 1+200
SCALE
H:1:2500
V:1:250

