SOUTH MERIVALE BUSINESS PARK
99 BILL LEATHEM DRIVE, 2 LEIKIN DRIVE AND 20 LEIKIN DRIVE
OTTAWA, ONTARIO

SERVICEABILITY REPORT

Prepared by:

NOVATECH
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario
K2M 1P6

March 25, 2021

Ref: R-2021-034
Novatech File: 120187

March 25, 2021

City of Ottawa
Planning and Growth Management Department
110 Laurier Avenue West, 4th Floor
Ottawa, Ontario
K1P 1J1

Attention: Sean Moore RPP/MCIP

Dear Mr. Moore:

Re: SOUTH MERIVALE BUSINESS PARK
99 BILL LEATHEM DRIVE, 2 LEIKIN DRIVE AND 20 LEIKIN DRIVE
Serviceability Report
Our File No.: 120187

Please find enclosed the complete pdf copy of the above noted report dated March 25, 2021. This report is submitted in support of a Rezoning Application and is hereby submitted for review and approval.

If you have any questions, please contact the undersigned.

Yours truly,

NOVATECH

Cara Ruddle, P.Eng.
Senior Project Manager, Land Development Engineering

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1.0. INTRODUCTION

Novatech has been retained to review the servicing for a proposed development located at 99 Bill Leathem Drive, 2 Leikin Drive and 20 Leikin Drive within the South Merivale Business Park within the City of Ottawa to support a Rezoning Application. ***Figure 1*** is a Key Plan showing the site location. The purpose of this report is to demonstrate that the existing municipal infrastructure within South Merivale Business Park can support the proposed additional uses.

2.0. EXISTING AND PROPOSED DEVELOPMENT

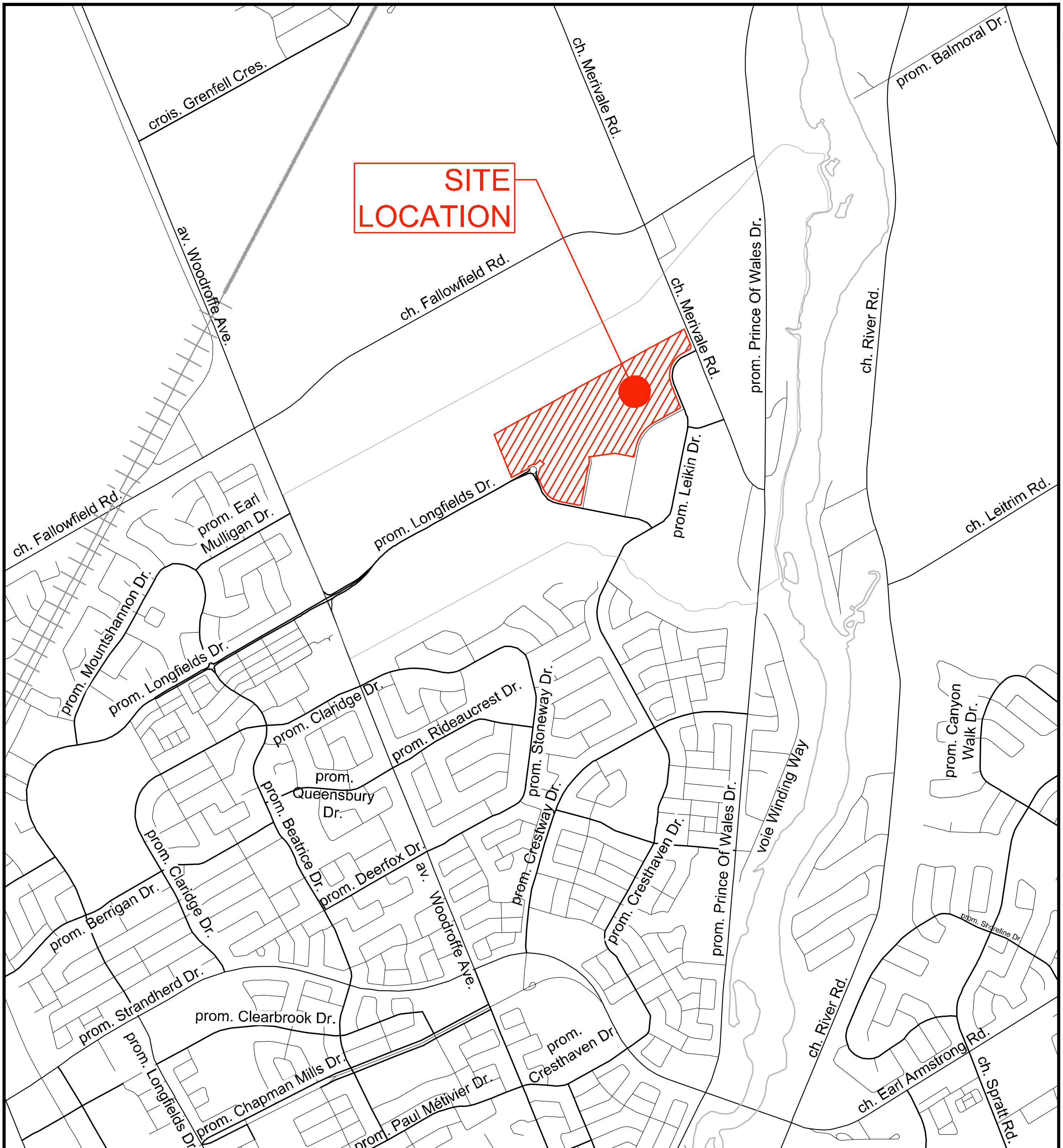
The property is approximately 30.57 hectares in size, and currently consists of undeveloped vacant land, and cultivated farm field. The property can be accessed from Bill Leathem Drive, Paragon Avenue, and Lekin Drive. There are existing easements containing a sanitary trunk sewer and overhead hydro lines that crosses through the property.

The property is bound by agricultural lands that are part of the City of Ottawa Greenbelt to the north and west and by the remainder of the South Merivale Business Park to the south and east including Leikin Drive, Paragon Avenue, Bill Leathem Drive, a 3-storey office building and vacant parcels. ***Figure 2*** shows the existing site conditions.

In 1992 the City of Nepean prepared a Development Plan (R-Plan by Farley, Smith & Murray Surveying Ltd.) for the South Merivale Business Park. However, this plan did not include a connection to Woodroffe Avenue via Longfields Drive. In 2009/2010 a connection between Woodroffe Avenue to Bill Leatham Drive was designed and constructed to provide westerly connectivity from the South Merivale Business Park. A contemplated draft plan was developed which revised the alignment of the future section of Bill Leatham Drive from Longfields Drive to Leikin Drive but was never deposited. In early 2021, the City of Ottawa removed the requirement for a connection from Bill Leatham Drive to Leikin Drive by returning unopened road allowances to the owners. Copies of the legal plans described above are provided in **Appendix A** for reference.

A servicing concept for the South Merivale Business Park has been completed and initial phases have been constructed (i.e. Leikin Drive, Bill Leathem Drive, Paragon Avenue). The servicing design information is provided in a report entitled 'City of Nepean, South Merivale Business Park, Phase II and III, Services Design Report' prepared by Novatech, dated June 23, 1992, hereafter referred to as SMBP Servicing Report. This report outlines the servicing for the roadways with consideration of future lot development. A copy of this report is provided in ***Appendix E*** for reference.

The proposed conceptual development consists of office, warehouse and truck transport uses. The site is expected to include a private east-west roadway that connects the Longfields roundabout, Paragon Avenue, and Leikin Drive. A preliminary Concept Plan is provided in **Appendix A** for reference. It is anticipated that the development will be phased.



NOVATECH

Engineers, Planners & Landscape Architects

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

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

SOUTH MERIVALE BUSINESS PARK

99 BILL LEATHEM DRIVE, 2 LEIKIN DRIVE
AND 20 LEIKIN DRIVE, CITY OF OTTAWA

PROPERTY LOCATION MAP

SCALE	N.T.S	
DATE: MARCH 2021	JOB: 120187	FIGURE: 1

M:\2020\120187\CAD\Design\Figures\Report Figures\KEY PLAN.dwg, 8x11 portrait, Mar 04, 2021 - 9:23am, amestwarp

SHT8X11.DWG - 216mmx279mm

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LEGEND

PROPERTY LINE

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SOUTH MERIVALE BUSINESS PARK

99 BILL LEATHEM DRIVE, 2 LEIKIN DRIVE
AND 20 LEIKIN DRIVE, CITY OF OTTAWA

EXISTING CONDITIONS PLAN

SCALE	DATE	JOB	FIGURE
1 : 3000	MARCH 2021	120187	2

0 30 60 90 120

SHT11X17.DWG - 279mmX432mm

3.0. WATER SERVICING

There are existing 300mm diameter watermains within Bill Leathem Drive and Paragon Avenue rights-of-ways, and an existing 400mm diameter watermain within the Leiken Drive right-of-way. There are also, existing 300mm diameter stubs at the end of Bill Leathem Drive, Paragon Avenue and Leiken Drive for use as future service connections to service the subject property. ***Figure 3*** shows the existing services surrounding the site.

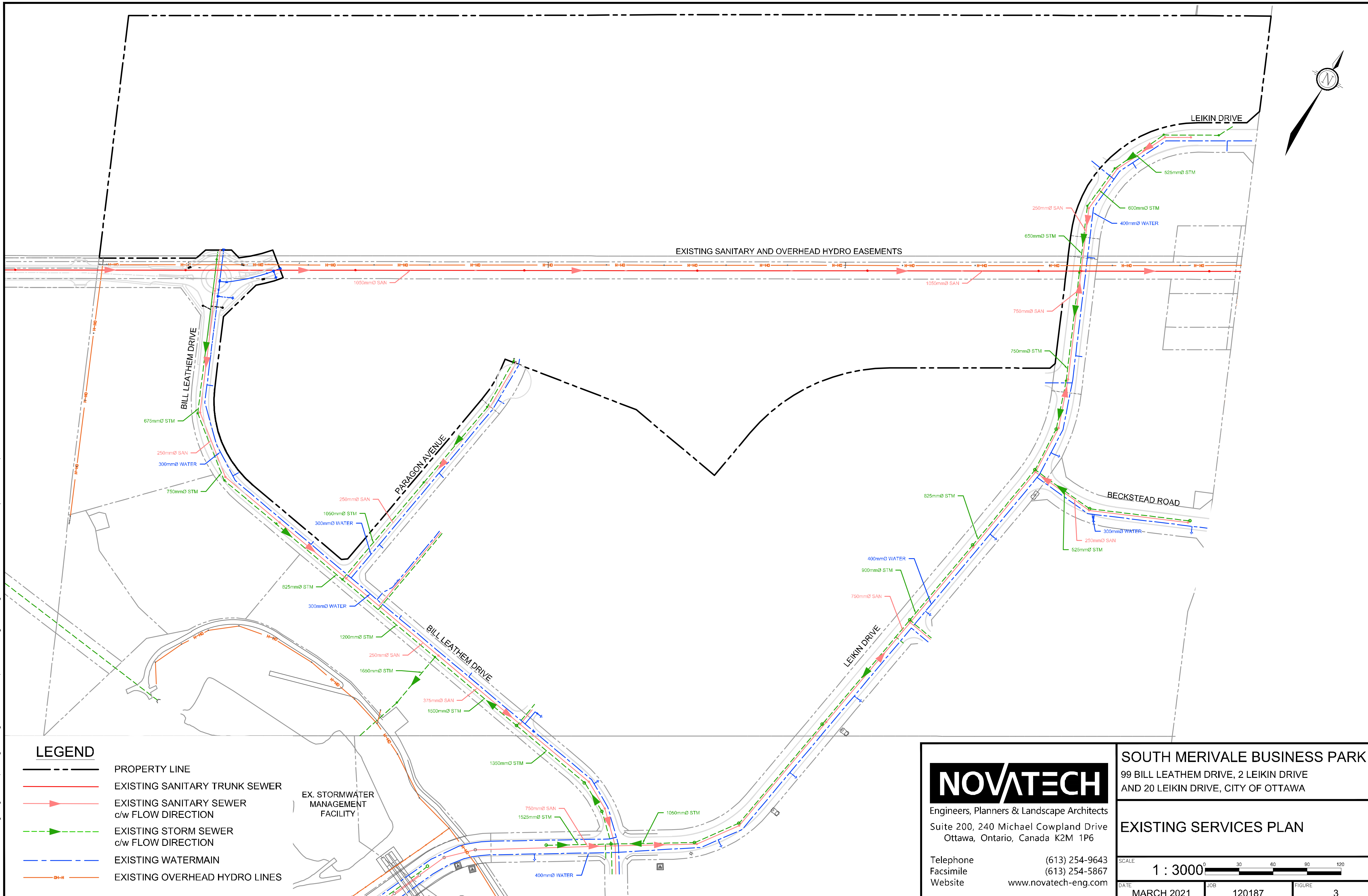
It is proposed to service the proposed development with private watermain and with connections between Bill Leathem Drive, Paragon Avenue and Leiken Drive to provide redundancy and watermain looping. ***Figure 4*** shows the conceptual service connection locations.

Water demand and fire flow calculations have been calculated from criteria in Section 4 of the City of Ottawa Design Guidelines for Water Distribution Systems. To determine the design flows for the proposed development it has been assumed that property will be 50% light industrial, and 50% commercial. The required fire demands for the subject site have been calculated using the Fire Underwriters Survey (CGI, 1999) document (FUS). Detailed FUS calculations were completed using assumptions on building construction and setback requirements. Preliminary water demand and fire flows are summarized in table below and supporting calculations are provided in **Appendix B**.

Table 3.1 Water Demand Summary

Use	Ave. Daily Demand (L/s)	Max. Daily Demand (L/s)	Peak Hour Demand (L/s)	Fire Flow (L/s)
Light Industrial/ Commercial	11.14	18.6	33.42	267

The above water demand information was submitted to the City of Ottawa for boundary conditions provided from the City's water model. The boundary conditions will determine whether the existing watermain infrastructure surrounding the development has capacity for the proposed development. The boundary conditions are provided in **Table 3.2**.



LEGEND

- PROPERTY LINE
- EXISTING SANITARY TRUNK SEWER
- EXISTING SANITARY SEWER c/w FLOW DIRECTION
- EXISTING STORM SEWER c/w FLOW DIRECTION
- EXISTING WATERMAIN
- EXISTING OVERHEAD HYDRO LINES

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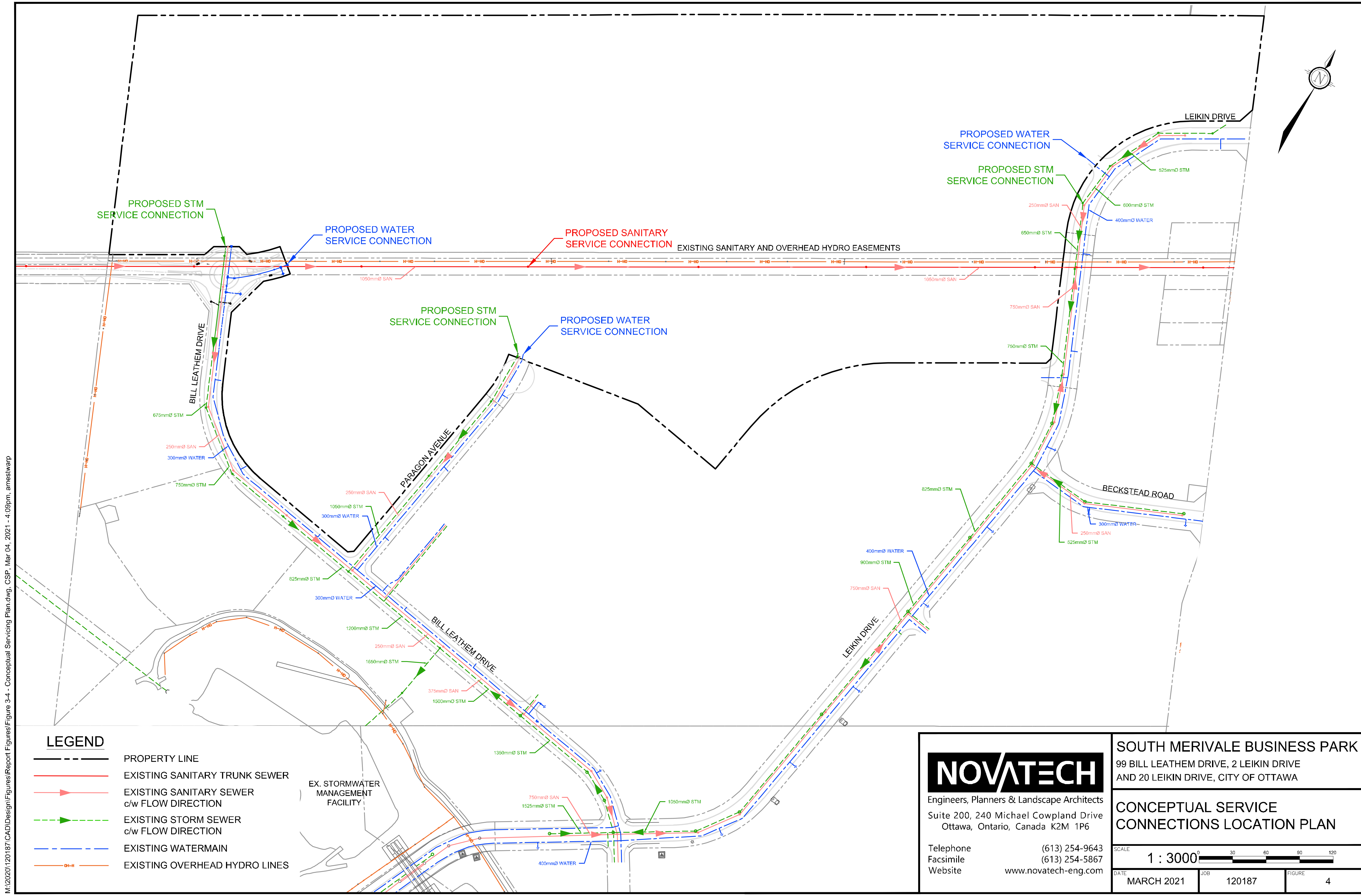
SOUTH MERIVALE BUSINESS PARK
99 BILL LEATHEM DRIVE, 2 LEIKIN DRIVE
AND 20 LEIKIN DRIVE, CITY OF OTTAWA

EXISTING SERVICES PLAN

SCALE	DATE	JOB	FIGURE
1 : 3000 (0 30 60 90 120)	MARCH 2021	120187	3


PROPOSED STM SERVICE CONNECTION
PROPOSED WATER SERVICE CONNECTION
PROPOSED SANITARY SERVICE CONNECTION
EXISTING SANITARY AND OVERHEAD HYDRO EASEMENTS
LEIKIN DRIVE
BILL LEATHEM DRIVE
PARAGON AVENUE
BECKSTEAD ROAD
1050mmØ SAN
250mmØ SAN
750mmØ SAN
675mmØ STM
300mmØ WATER
750mmØ STM
825mmØ STM
1050mmØ STM
1200mmØ STM
1650mmØ STM
375mmØ SAN
1500mmØ STM
1350mmØ STM
1525mmØ STM
400mmØ WATER
525mmØ STM
600mmØ STM
650mmØ STM
900mmØ STM
EX. STORMWATER MANAGEMENT FACILITY
LEGEND
PROPERTY LINE
EXISTING SANITARY TRUNK SEWER
EXISTING SANITARY SEWER c/w FLOW DIRECTION
EXISTING STORM SEWER c/w FLOW DIRECTION
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SOUTH MERIVALE BUSINESS PARK
99 BILL LEATHEM DRIVE, 2 LEIKIN DRIVE AND 20 LEIKIN DRIVE, CITY OF OTTAWA
CONCEPTUAL SERVICE CONNECTIONS LOCATION PLAN
SCALE 1 : 3000
DATE MARCH 2021
JOB 120187
FIGURE 4
M:\2020\120187\CAD\Design\Figures\Report Figures\Figure 3-4 - Conceptual Servicing Plan.dwg, CSP, Mar 04, 2021 - 4:09pm, arnestwarp

Table 3.2 Water Boundary Conditions

Criteria	Head (m)
Connection to Existing 300mm Watermain Bill Leathem Drive	
Minimum HGL	132.7
Maximum HGL	125.0
Max Day + Fire Flow HGL	105.5
Connection to Existing 300mm Watermain in Paragon Avenue	
Minimum HGL	132.7
Maximum HGL	125.0
Max Day + Fire Flow HGL	109.9
Connection to Existing 300mm Watermain in Leikin Drive	
Minimum HGL	132.7
Minimum HGL	125.0
Minimum HGL	124.1

The above boundary conditions were used to create a hydraulic model using EPANET for analyzing the performance of the proposed watermain system for three theoretical conditions: 1) High Pressure check under Average Day conditions, 2) Peak Hour demand, 3) Maximum Day + Fire Flow Demand. The following **Table 3.3** summarizes the results from the hydraulic water analysis.

Table 3.3 Water Analysis Results Summary

Condition	Demand (L/s)	Min/Max Allowable Operating Pressures (psi)	Limits of Design Operating Pressures (psi)
High Pressure	11.14	80psi (Max)	60.4
Max Day + Fire Flow	285.6	20psi (Min)	21.1
Peak Hour	33.42	40psi (Min)	48.3

Through correspondence with the City it is understood that planned watermain improvements (SUC Zone reconfiguration), will result in altered boundary conditions for the site. The future boundary conditions are provided in **Table 3.4**.

Table 3.4 Future Water Boundary Conditions

Criteria	Head (m)
Connection to Existing 300mm Watermain Bill Leathem Drive	
Minimum HGL	145.7
Maximum HGL	143.1
Max Day + Fire Flow HGL	118.1
Connection to Existing 300mm Watermain in Paragon Avenue	
Minimum HGL	145.6
Maximum HGL	143.1
Max Day + Fire Flow HGL	122.5
Connection to Existing 300mm Watermain in Leikin Drive	
Minimum HGL	132.3
Minimum HGL	127.7
Minimum HGL	114.4

As per the above the SUC zone configuration will result in a notable increase in available head at the proposed Bill Leathem Drive, and Paragon Avenue connections, and a negligible decrease in the available head at the Leikin Drive connection. The future pressures at Bill Leathem Drive and Paragon avenue will be +/- 78 psi, which is just below the allowable 80 psi threshold. Thus, it is suggested that a pressure reducing valve be installed at the property limits to prevent high pressures within the private watermain system. The SUC Zone reconfiguration will improve the pressures to the site and will not adversely affect the feasibility of the subject development.

Based on the proceeding analysis it can be concluded that the watermain will provide adequate flow and pressures for the fire flow + maximum day demand and peak hour demand. Existing and proposed fire hydrants surrounding the development will provide fire protection for the proposed development. Refer to **Appendix B** for hydraulic calculations and City of Ottawa boundary conditions.

4.0. SANITARY SERVICING

There is existing 250m diameter sanitary sewers along Paragon Avenue, Bill Leathem Drive and Leiken Drive (north of the existing sanitary trunk sewer easement). There is an existing 750mm diameter sanitary sewer along Leikin Drive south of the easement and the trunk sewer within the easement is a 1050mm diameter sanitary sewer known as the Barrhaven Trunk Sanitary Sewer. Refer to **Figure 3** for existing servicing information.

The sanitary sewer outlet for the South Merivale Business Park is the Barrhaven Trunk Sanitary Sewer which flows to the West Rideau Collector Sewer. Existing sanitary manhole 62 is indicated as the outlet point to connect to the existing Barrhaven Trunk Sanitary Sewer which is located within the subject property. As envisioned in the SMBP Servicing Report, two drop pipes will be constructed to permit north and south access to the existing trunk sewer. It is also anticipated that clay seals will be required as part of sewer construction due to the depth of the existing sanitary sewer.

It is proposed to service the subject development with private sanitary services and connect directly to the Barrhaven Trunk Sanitary Sewer as per the original design intent. A sanitary drainage area plan for the proposed development is included in ***Appendix C*** for reference and shows the connection location to the existing sanitary sewer.

Preliminary sanitary flow calculations have been completed for the proposed development using criteria provided in the SMBP Servicing Report. Peak sanitary flows are calculated to be 48 L/s using a population equivalent of 100 persons per hectare as noted in the SMBP Servicing Report. Preliminary calculations are provided in ***Appendix C*** for reference.

The subject property was included in a previous design concept for the South Merivale Business Park to outlet to the Barrhaven Trunk Sanitary Sewer and the proposed rezoning sanitary sewer demands do not exceed the original sanitary flows from the previous Novatech design. Therefore, the existing infrastructure can service the proposed additional uses.

5.0. STORM SERVICING & STORMWATER MANAGEMENT

The topography of the site is generally flat and stormwater currently sheet drains in a southerly direction. There is an existing 675mm diameter storm sewer along Bill Leathem Drive with a similar size stub left for future development. There is an existing 1050mm diameter storm sewer along Paragon Avenue with a manhole provided for connection by future development. The existing storm sewer along Leikin Drive ranges in size from 650mm diameter to 900mm diameter. ***Figure 3*** shows the existing services surrounding the site.

The South Merivale Business Park is currently serviced by an existing stormwater management facility, south of Bill Leathem Drive, that flows into Barrhaven Creek. The subject property was included in the service area of the existing stormwater management facility. Coordination with the City has resulted in revised criteria for the stormwater management design for the site development. Correspondence with the City is provided in Appendix D. The stormwater management criteria for the subject property is as follows:

- Stormwater is to be controlled to a 5 year release rate using a runoff coefficient of 0.65 and a time of concentration of 15 minutes. Stormwater is to be controlled up to and including the 100 year storm event.
- Quality control of stormwater is provided by the existing stormwater management facility.

Preliminary stormwater management calculations have been completed for the proposed development. The allowable release rate was calculated using the above noted criteria and the original drainage areas from the original design concept for the South Merivale Business Park. The drainage areas from the original design concept are shown on the Existing Storm Drainage Areas Plan included in Appendix D.

The original concept included a portion of the site (area EX-04 on the Existing Storm Drainage Areas Plan) to drain to ‘Street C’ that has not been constructed. Therefore, this area does not currently have an outlet. It is proposed to redirect drainage from this area to another outlet within the subject property. Therefore, site drainage will need to be overcontrolled so as not to exceed the allowable release rate for the remaining existing drainage areas nor exceed the capacity of the existing downstream storm sewers. The allowable release rates are provided in the table below and detailed calculations are provided in ***Appendix D***.

Table 5.1 – Allowable Release Rates

Area	Outlet Location	Allowable Release Rate (L/s)
EX-01	Bill Leathem Drive	725.9
EX-02	Paragon Avenue	3025.4
EX-03	Leikin Drive	169.5

It is anticipated that stormwater storage could be provided within the proposed development on building roofs, on the surface around catchbasins or underground with orifice controls used to control the release of stormwater to the allowable release rate. Preliminary calculations were completed assuming a post-development runoff coefficient of 0.9. Stormwater storage requirements for each of the proposed drainage areas is summarized below and detailed calculations are included in Appendix D. This relates to a per hectare storage of approximately 222 m^3/ha which is a reasonable quantity of storage to provide given the type of development.

Table 5.2 – Stormwater Storage Summary

Area ID	Area (ha)	Outlet Location	2 Year Required Storage (m^3)	5 Year Required Storage (m^3)	100 Year Required Storage (m^3)
A-01	4.81	Bill Leathem Dr.	155.96	316.4	1065.42
A-02	23.90	Paragon Avenue	950.07	1922.44	5931.60
A-03	1.12	Leikin Dr.	36.40	73.88	248.78

It should be noted that the existing storm sewers at each of the potential connection points are 3 to 4m deep which means there is adequate cover to extend a storm sewer to service the subject property.

During storms in excess of the 100-year storm event, site grading will provide an overland flow route from the site. Per the original business park design, the overland flow route should be directed to existing road right-of-ways (Bill Leathem Drive, Paragon Avenue and Leikin Drive). These existing right-of-ways will direct overland storm drainage to the existing stormwater management facility and Barrhaven Creek.

In summary, the existing storm sewer infrastructure can service the proposed development and appropriate stormwater management methods can be used to meet the allowable release rate. Refer to **Appendix D** for preliminary stormwater management calculations and pre and post development drainage area figures.

6.0. EROSION AND SEDIMENT CONTROL MEASURES

Temporary erosion and sediment control measures will be required on-site during construction in accordance with the Best Management Practices for Erosion and Sediment Control. This includes the following temporary measures:

- Filter socks will be placed in existing catchbasins and manholes, and will remain in place until vegetation has been established and construction is completed;
- Silt fencing will be placed along the surrounding construction limits;
- Mud mats will be installed at the site entrances;
- The contractor will be required to perform regular street sweeping and cleaning as required, to suppress dust and to provide safe and clean roadways adjacent to the construction site;

The erosion and sediment control measures will be required prior to construction and will remain in place during all phases of construction. Regular inspection and maintenance of the erosion control measures will be undertaken

7.0. CONCLUSIONS AND RECOMMENDATIONS

The conclusions of this report are as follows:

- Water servicing, including both domestic and fire protection, can be provided by connection to the existing watermain infrastructure surrounding the site. It is proposed to provide internal watermain connections to Bill Leathem Drive, Paragon Avenue and Leikin Drive for looping and redundancy purposes.
- Sanitary servicing can be provided with an outlet to the existing Barrhaven Trunk Sanitary Sewer as per the original design concept for the business park.
- Storm servicing can be provided for the proposed development. Revised stormwater management criteria has been provided by the City. Stormwater quantity control can be provided within the proposed development through roof storage and/or underground storage tanks with orifice controls to control stormwater to the allowable release rate.
- An overland flow route will be provided to the existing surrounding right-of-ways which drain towards the existing stormwater management facility and Barrhaven Creek.
- Erosion and sediment control measures will be required during construction.

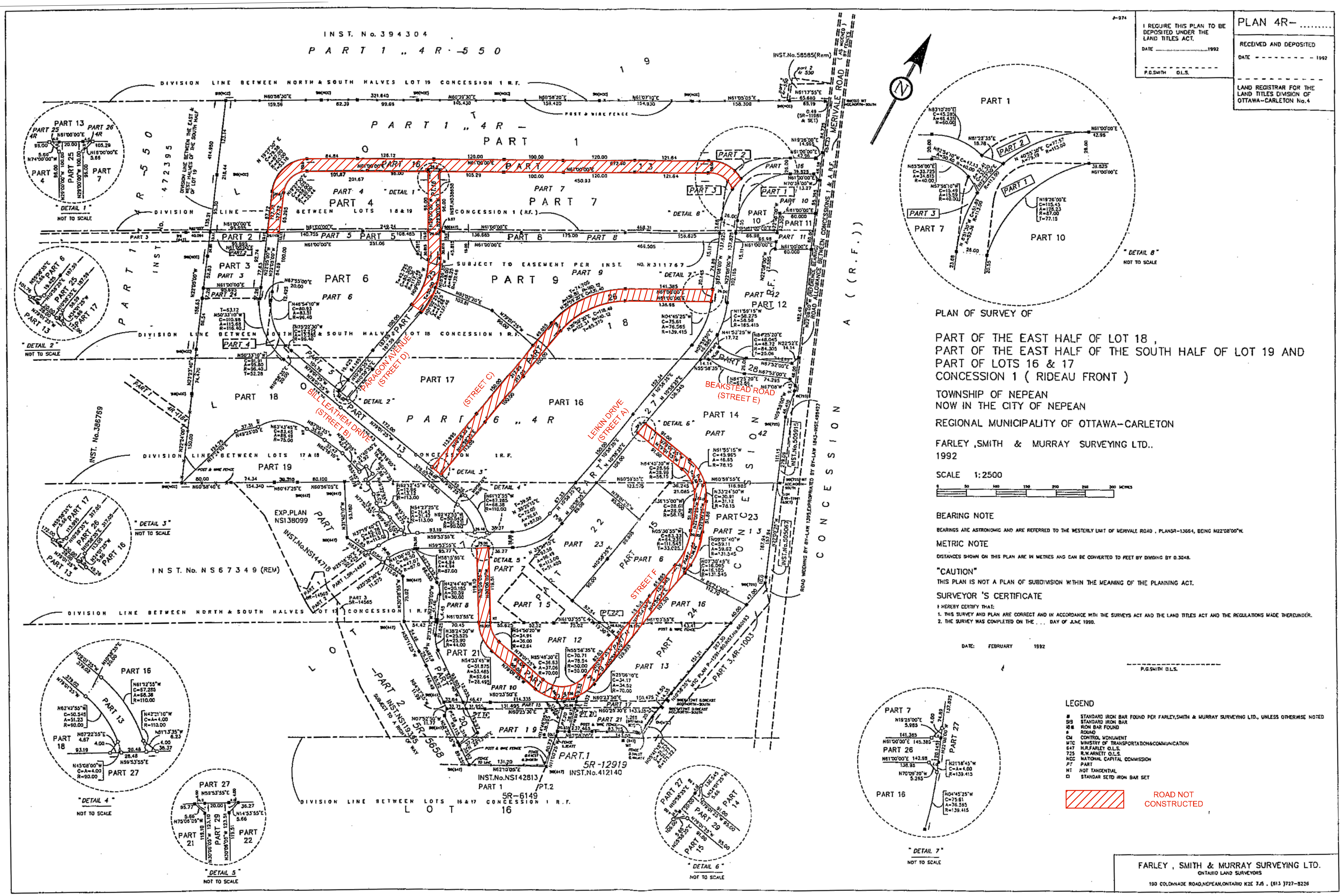
The preceding report is respectfully submitted for review and approval. Please contact the undersigned should you have any questions or require additional information.

NOVATECH

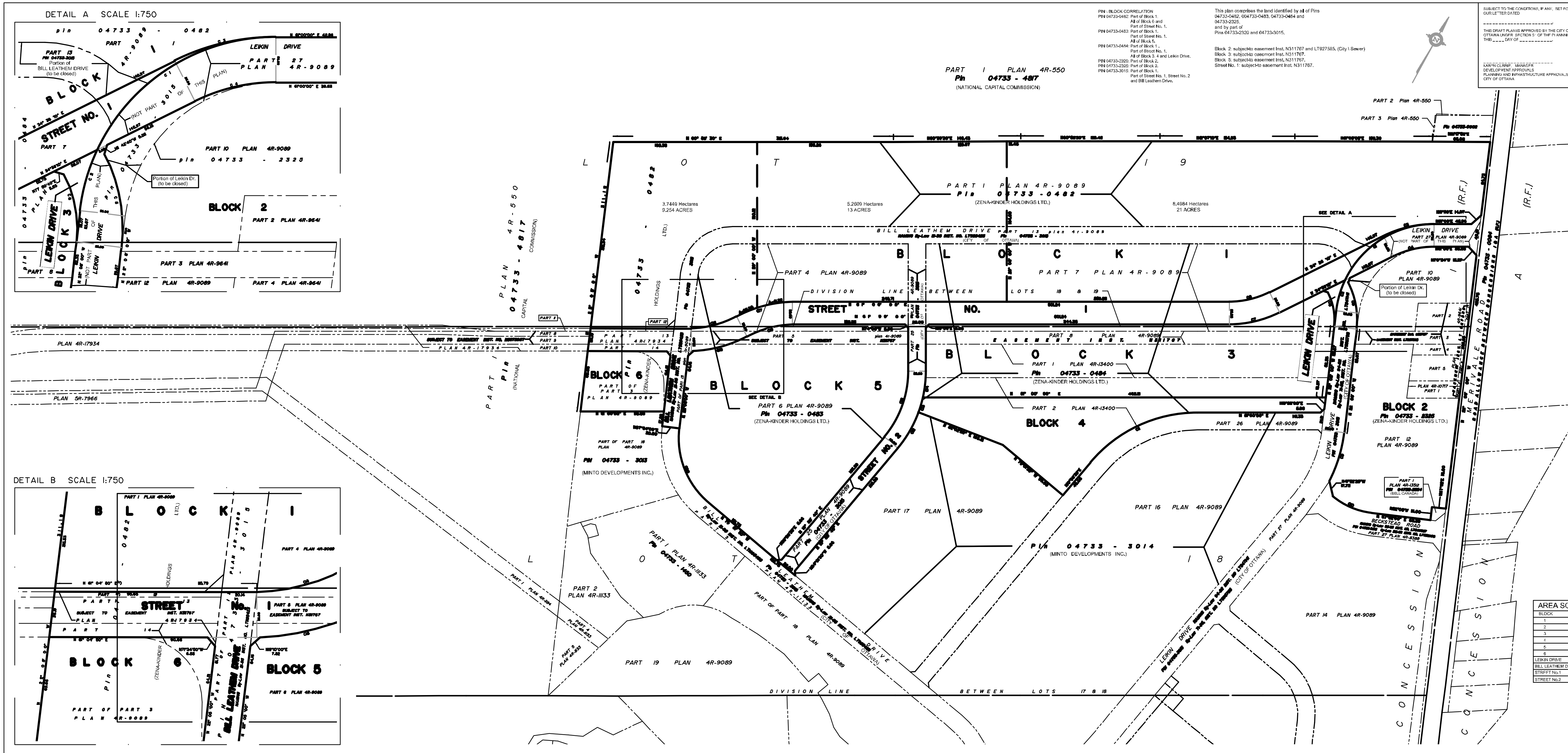
Prepared by:	Reviewed by:
LICENSED PROFESSIONAL ENGINEER C.J. RUDDLE Apr 1/21 PROVINCE OF ONTARIO	
Cara Ruddle, P.Eng. Senior Project Manager Land Development Engineering	J. Lee Sheets, C.E.T. Director Land Development & Public Sector Infrastructure

APPENDIX A

Legal Plans and Preliminary Concept Plan



I REQUIRE THIS PLAN TO BE DEPOSITED UNDER THE LAND TITLES ACT.
DATE 1992
P.G.SMITH O.L.S.
PLAN 4R- ....
RECEIVED AND DEPOSITED
DATE - - - - - - - - - 1992
LAND REGISTRAR FOR THE LAND TITLES DIVISION OF OTTAWA-CARLETON No.4
INST. No. 394304
PART 1 „ 4R-550
MERIVALE ROAD
PARAGON AVENUE (STREET D)
BILL LEATHEM DRIVE (STREET B)
(STREET C)
LEIKIN DRIVE (STREET A)
BEAKSTEAD ROAD (STREET E)
STREET F
PLAN OF SURVEY OF
PART OF THE EAST HALF OF LOT 18 ,
PART OF THE EAST HALF OF THE SOUTH HALF OF LOT 19 AND
PART OF LOTS 16 & 17
CONCESSION 1 (RIDEAU FRONT)
TOWNSHIP OF NEPEAN
NOW IN THE CITY OF NEPEAN
REGIONAL MUNICIPALITY OF OTTAWA-CARLETON
FARLEY ,SMITH & MURRAY SURVEYING LTD..
1992
SCALE 1:2500
0 50 100 150 200 250 300 METRES
BEARING NOTE
BEARINGS ARE ASTRONOMIC AND ARE REFERRED TO THE WESTERLY LIMIT OF MERIVALE ROAD , PLAN5R-13664, BEING N22°08'00"W.
METRIC NOTE
DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.
"CAUTION"
THIS PLAN IS NOT A PLAN OF SUBDIVISION WITHIN THE MEANING OF THE PLANNING ACT.
SURVEYOR 'S CERTIFICATE
I HEREBY CERTIFY THAT:
1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT AND THE LAND TITLES ACT AND THE REGULATIONS MADE THEREUNDER.
2. THE SURVEY WAS COMPLETED ON THE . . . DAY OF JUNE 1990.
DATE: FEBRUARY 1992
P.G.SMITH O.L.S.
LEGEND
STANDARD IRON BAR FOUND PER FARLEY,SMITH & MURRAY SURVEYING LTD., UNLESS OTHERWISE NOTED
SIB STANDARD IRON BAR
IB IRON BAR FOUND
ROUND
CM CONTROL MONUMENT
MTC MINISTRY OF TRANSPORTATION&COMMUNICATION
647 H.R.FARLEY O.L.S.
725 R.W.ARNETT O.L.S.
NCC NATIONAL CAPITAL COMMISSION
PT PART
NT NOT TANGENTIAL
STANDAR SETD IRON BAR SET
ROAD NOT CONSTRUCTED
FARLEY , SMITH & MURRAY SURVEYING LTD.
ONTARIO LAND SURVEYORS
190 COLONNADE ROAD,NEPEAN,ONTARIO K2E 7J5 , (613)727-8226



PIN \ BLOCK CORRELATION
PIN 04733-0482: Part of Block 1.
All of Block 6 and
Part of Street No. 1.
PIN 04733-0483: Part of Block 1.
Part of Street No. 1.
All of Block 5.
PIN 04733-0484: Part of Block 1 .
Part of Street No. 1.
All of Block 3. 4 and Leikin Drive.
PIN 04733-2320: Part of Block 2.
PIN 04733-2325: Part of Block 2.
PIN 04733-3015: Part of Block 1.
Part of Street No. 1, Street No. 2
and Bill Leathem Drive.

This plan comprises the land identified by all of Pins
04733-0482, 004733-0483, 04733-0484 and
04733-2325,
and by part of
Pins 04733-2320 and 04733-3015.

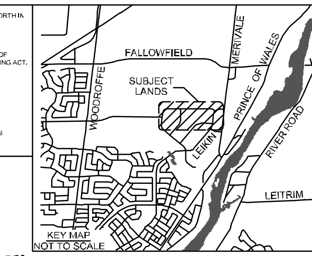
Block 2: subject-to easement Inst. N311767 and LT927585. (City \ Sewer)
Block 3: subject-to easement Inst. N311767.
Block 5: subject-to easement Inst. N311767.
Street No. 1: subject-to easement Inst. N311767.

SUBJECT TO THE CONDITIONS, IF ANY, SET FORTH IN OUR LETTER DATED

_______________________.

THIS DRAFT PLAN IS APPROVED BY THE CITY OF OTTAWA UNDER SECTION 51 OF THE PLANNNING ACT.
THIS ____ DAY OF ___________.

____
KAREN CURRIE, MANAGER
DEVELOPMENT APPROVALS
PLANNING AND INFRASTRUCTURE APPROVALS
CITY OF OTTAWA



DRAFT PLAN OF SUBDIVISION OF

PART OF LOT 18 AND 19
CONCESSION 1 (Rideau Front)
Geographic Township of Nepean
CITY OF OTTAWA

Scale 1 : 1500

60 45 30 15 0 30 60 Metres

Metric

DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

SURVEYOR'S CERTIFICATE

I CERTIFY THAT :
The boundaries of the lands to be subdivided and their relationship to adjoining lands have been accurately and correctly shown.

__________ Date

________________ E. H. Herweyer
ONTARIO LAND SURVEYOR

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51-17 OF THE PLANNING ACT

(a) see plan
(b) see plan
(c) see plan
(d) Business Park \ Commercial Development
(e) see plan
(f) see plan
(g) see plan
(h) City of Ottawa
(i) see soils report
(j) see plan
(k) (municipal services available or to be available)
(l) see plan

NOTES AND LEGEND

	denotes	Survey Monument Planted.
	"	" " Found.
SIB	"	Standard Iron Bar.
SSIB	"	Short Standard Iron Bar.
CC	"	Cut Cross.
IB	"	Iron Bar.
CLF	"	Chain Link Fence
BF	"	Board Fence
(AOG)	"	Annis, O'Sullivan, Vollebekk Ltd.

Boundary information compiled from Plans 4R-9089, 4R-9641, 4R-10717, 4R-11133, 4R-13400, 4R-13512 and 4R-17934.

AREA SCHEDULE

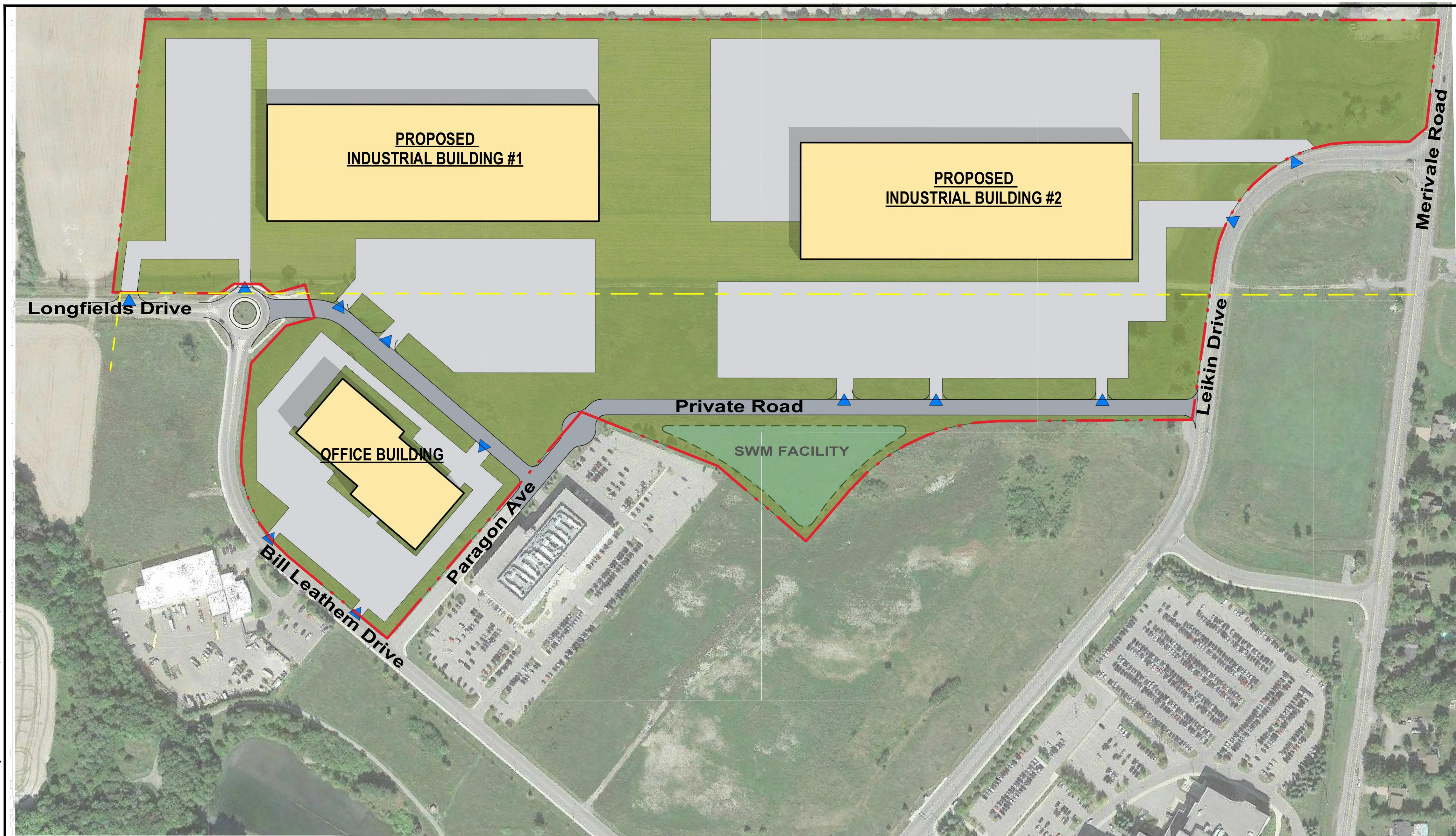
BLOCK	Square Meters
1	175,062
2	38,643
3	40,898
4	18,811
5	49,841
6	6,597
LEIKIN DRIVE	316
BILL LEATHEM DRIVE	1,784
STREET No.1	23,503
STREET No.2	6,631

CURVE SCHEDULE

NUM	RADIUS	ARC	CHORD	BEARING
C1	112.99	127.37	120.73	N28°42'10"E
C2	112.99	36.56	36.40	N12°51'50"W
C3	130.34	60.05	59.52	N47°48'00"E
C4	104.35	48.08	47.65	N47°48'00"E
C5	91.48	55.20	54.37	N39°22'30"W
C6	65.48	40.03	39.41	N39°38'50"W
C7	130.00	59.90	59.37	N47°48'00"E
C8	104.00	47.92	47.49	N47°48'00"E
C9	165.42	58.57	58.27	N11°59'20"W
C10	84.30	48.71	48.04	N64°25'10"E
C11	160.11	139.79	135.39	N35°59'20"E
C12	137.46	47.69	47.45	N 1°02'10"E
C13	137.46	17.62	17.61	N12°34'40"W
C14	137.46	30.60	30.54	N22°37'20"W
C15	117.46	81.96	80.31	N9°00'40"W
C16	117.00	53.91	53.44	N46°07'30"E
C17	143.00	67.18	66.56	N46°10'30"E
C18	143.00	64.80	64.25	N45°55'00"E
C19	117.00	54.46	53.97	N45°59'30"E
C20	96.40	95.80	91.91	N50°33'10"W

ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 Concourse Gate, Suite 500
Nepean, Ont. K2E 7S5
Phone: (613) 727-0850 / Fax: (613) 727-1079
Email: Nepean@aovltd.com
Ontario Land Surveyors

Job No. 7620-06 LeikenGrp PrtLts18&19 C1 RF NP D 03



NOVATECH
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SOUTH MERIVALE BUSINESS PARK
99 BILL LEATHEM DRIVE, 2 LEIKIN DRIVE
AND 20 LEIKIN DRIVE, CITY OF OTTAWA

CONCEPT PLAN

SCALE		
N.T.S		
DATE MARCH 2021	JOB 120187	FIGURE CP

M:\2020\120187\CAD\Design\Figures\Concept Plan\CONCEPT PLAN.dwg, CP, Mar 24, 2021 - 12:29pm, amestwarp

SHT11X17.DWG - 279mmX432mm

APPENDIX B

Watermain Information

Table 1

Water Demand

	Area (ha)	Demand (L/s)		
		Avg Day	Max. Daily	Peak Hour
Light Industrial use	**15.29**	6.19	11.14	20.05
Commercial Use	**15.29**	4.95	7.43	13.37
Total	30.57	11.14	18.6	33.42

Avg. Daily Demand (City of Ottawa Sewer Design Guidelines):

- Light Industrial	35000	L/ha/day
- Commercial	28000	L/ha/day

Commercial / Industrial Peaking Factors (City of Ottawa Water Distrubution Guidelines)

Max. Daily Demand:	1.5	x Avg. Day
Peak Hourly Demand:	1.8	x Max. Day

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 120187
Project Name: 99 Bill Leathem Dr., 2 Leikin Dr., and 20 Leikin Dr
Date: 3/4/2021
Input By: Anthony Mestwarp
Reviewed By: Cara Ruddle

Legend: Input by User; No Information or Input Required

Building Description: Industrial
Fire Resistive Construction

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction C	Wood frame		1.5	0.6	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Modified Fire resistive construction (2 hrs)	Yes	0.6		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	37200			
		Number of Floors/Storeys	5			
		Protected Openings (1 hr)	Yes			
		Area of structure considered (m^2)			**55,800**	
	F	**Base fire flow without reductions**				**31,000**
		$F = 220\ C\ (A)^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**			**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	0%	**31,000**
		Limited combustible		-15%		
		Combustible	Yes	0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**			**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-15,500**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Total	**-50%**	
5	**Exposure Surcharge (cumulative %)**				**Surcharge**	
	(3)	North Side	> 45.1m		0%	**0**
		East Side	> 45.1m		0%	
		South Side	> 45.1m		0%	
		West Side	> 45.1m		0%	
				Cumulative Total	**0%**	
Results						
6	(1) + (2) + (3)	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**16,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**267**
				or	USGPM	4,227
7	**Storage Volume**	Required Duration of Fire Flow (hours)			Hours	3.5
		Required Volume of Fire Flow (m^3)			m^3	3360

From: Sharif, Golam <sharif.sharif@ottawa.ca>
Sent: Tuesday, February 23, 2021 4:45 PM
To: Cara Ruddle <c.ruddle@novatech-eng.com>
Subject: RE: South Merivale Business Park - boundary conditions request

Hi Cara,

Please see the attached boundary condition. Please see the note, watermain looping is require to meet the pressure requirement. If you have any question, please let me know. Thanks.

Sharif

From: Cara Ruddle <c.ruddle@novatech-eng.com>
Sent: February 08, 2021 2:02 PM
To: Sharif, Golam <sharif.sharif@ottawa.ca>
Subject: RE: South Merivale Business Park - boundary conditions request

Please find attached a form which includes the FUS calculation as requested.

Thanks.

Cara Ruddle, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 220 | Cell: 613.261.7719 | Fax: 613.254.5867

From: Sharif, Golam <sharif.sharif@ottawa.ca>
Sent: Monday, February 8, 2021 12:53 PM
To: Cara Ruddle <c.ruddle@novatech-eng.com>
Subject: RE: South Merivale Business Park - boundary conditions request

Hi Cara,

Please provide the fire flow (FUS) calculation. Thanks.

Sharif

From: Cara Ruddle <c.ruddle@novatech-eng.com>
Sent: February 06, 2021 8:57 AM
To: Sharif, Golam <sharif.sharif@ottawa.ca>
Subject: FW: South Merivale Business Park - boundary conditions request

I tried to send the email below previously but I think I had your email address input incorrectly so I am resending my request for boundary conditions. Please let me know an approximate timeframe for receiving boundary conditions.

Thanks.

Cara Ruddle, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 220 | Cell: 613.261.7719 | Fax: 613.254.5867

From: Cara Ruddle
Sent: Tuesday, February 2, 2021 3:48 PM
To: 'sharif.golam@ottawa.ca' <sharif.golam@ottawa.ca>
Cc: Lee Sheets <l.sheets@novatech-eng.com>
Subject: South Merivale Business Park - boundary conditions request

Sharif:
I am looking to obtain boundary conditions for existing watermain for a potential development within the South Merivale Business Park to support an application to the City. Please find below water demand information for the proposed development (which includes addresses 99 Bill Leathem Drive, 2 Leikin Drive And 20 Leikin Drive). Also, attached is a key plan, showing the site location, and a geomap image showing the existing water infrastructure. Can you please provide boundary conditions for the existing watermain infrastructure at the round-about of Bill Leathem Drive and Longfield Drive, the end of Paragon Avenue, and the existing stub off of Leikin Drive, as highlighted on the attached plan as potential connection points, so we can review the servicing requirements for the site.

Water Demands proposed development:

AVG DAY = 11.14 L/s
MAX DAY = 18.6 L/s
PEAK HOUR = 33.42 L/s
MAX DAY + FIRE =285.6 L/s

Please let us know if you require any further information.

Thanks,

Cara Ruddle, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 220 | Cell: 613.261.7719 | Fax: 613.254.5867

'

'

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```
*******************************************************************
*                           E P A N E T                           *
*                   Hydraulic and Water Quality                   *
*                   Analysis for Pipe Networks                    *
*                         Version 2.0                             *
*******************************************************************
```

Input File: AD.net (Average Day-Existing)

120187 - South Merivale Business Park,
99 Bill Leathem Drive, 2 Leikin Drive, and 20 Lekin Drive

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	RESERVOIR1	1	50	297
2	1	2	148.5	297
5	2	4	526	297
6	RESERVOIR3	4	10	297
4	3	RESERVOIR2	10	297
3	2	3	111.2	297

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality	
1	3.71	132.70	42.20	0.00	
3	3.71	132.70	42.50	0.00	
2	0.00	132.70	41.70	0.00	
4	3.71	132.70	41.70	0.00	
RESERVOIR1	-2.77	132.70	0.00	0.00	Reservoir
RESERVOIR2	-4.33	132.70	0.00	0.00	Reservoir
RESERVOIR3	-4.03	132.70	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
1	2.77	0.04	0.01	Open
2	-0.94	0.01	0.00	Open
5	-0.32	0.00	0.00	Open
6	4.03	0.06	0.02	Open
4	-4.33	0.06	0.02	Open
3	-0.62	0.01	0.00	Open

```
**********************************************************************
*                             E P A N E T                            *
*                    Hydraulic and Water Quality                     *
*                    Analysis for Pipe Networks                      *
*                          Version 2.0                               *
**********************************************************************
```

Input File: PH.net (Peak Hour-Existing)

120187 -   120187 - South Merivale Business Park,
99 Bill Leathem Drive, 2 Leikin Drive, and 20 Lekin Drive

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	RESERVOIR1	1	50	297
2	1	2	148.5	297
5	2	4	526	297
6	RESERVOIR3	4	10	297
4	3	RESERVOIR2	10	297
3	2	3	111.2	297

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality	
1	11.14	125.00	34.50	0.00	
3	11.14	125.00	34.80	0.00	
2	0.00	125.00	34.00	0.00	
4	11.14	125.00	34.00	0.00	
RESERVOIR1	-8.31	125.00	0.00	0.00	Reservoir
RESERVOIR2	-13.00	125.00	0.00	0.00	Reservoir
RESERVOIR3	-12.11	125.00	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
1	8.31	0.12	0.08	Open
2	-2.83	0.04	0.01	Open
5	-0.97	0.01	0.00	Open
6	12.11	0.17	0.16	Open
4	-13.00	0.19	0.18	Open
3	-1.86	0.03	0.00	Open

```
*********************************************************************
*                           E P A N E T                             *
*                   Hydraulic and Water Quality                     *
*                   Analysis for Pipe Networks                      *
*                         Version 2.0                               *
*********************************************************************
```

Input File: MD-FF.net (Max Day + Fire Flow, Node 1-Existing)

120187 -   120187 - South Merivale Business Park,
99 Bill Leathem Drive, 2 Leikin Drive, and 20 Lekin Drive

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	RESERVOIR1	1	50	297
2	1	2	148.5	297
5	2	4	526	297
6	RESERVOIR3	4	10	297
4	3	RESERVOIR2	10	297
3	2	3	111.2	297

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality	
1	273.20	105.33	14.83	0.00	
3	6.20	109.90	19.70	0.00	
2	0.00	109.87	18.87	0.00	
4	6.20	123.82	32.82	0.00	
RESERVOIR1	-64.47	105.50	0.00	0.00	Reservoir
RESERVOIR2	-21.65	109.90	0.00	0.00	Reservoir
RESERVOIR3	-199.48	124.10	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
1	64.47	0.93	3.47	Open
2	-208.73	3.01	30.58	Open
5	-193.28	2.79	26.52	Open
6	199.48	2.88	28.12	Open
4	-21.65	0.31	0.46	Open
3	-15.45	0.22	0.25	Open

```
**********************************************************************
*                           E P A N E T                              *
*                   Hydraulic and Water Quality                      *
*                   Analysis for Pipe Networks                       *
*                         Version 2.0                                *
**********************************************************************
```

Input File: MD-FF.net (Max Day + Fire Flow, Node 3-Existing)

120187 - SMBP

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	RESERVOIR1	1	50	297
2	1	2	148.5	297
5	2	4	526	297
6	RESERVOIR3	4	10	297
4	3	RESERVOIR2	10	297
3	2	3	111.2	297

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality	
1	6.20	106.47	15.97	0.00	
3	273.20	109.48	19.28	0.00	
2	0.00	109.55	18.55	0.00	
4	6.20	123.81	32.81	0.00	
RESERVOIR1	163.21	105.50	0.00	0.00	Reservoir
RESERVOIR2	-247.04	109.90	0.00	0.00	Reservoir
RESERVOIR3	-201.77	124.10	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
1	-163.21	2.36	19.39	Open
2	-169.41	2.45	20.78	Open
5	-195.57	2.82	27.11	Open
6	201.77	2.91	28.72	Open
4	-247.04	3.57	41.78	Open
3	26.16	0.38	0.65	Open

```
*******************************************************************
*                           E P A N E T                           *
*                   Hydraulic and Water Quality                   *
*                   Analysis for Pipe Networks                    *
*                         Version 2.0                             *
*******************************************************************
```

Input File: MD-FF.net (Max Day + Fire Flow, Node 4-Existing)

120187 - SMBP

Link - Node Table:

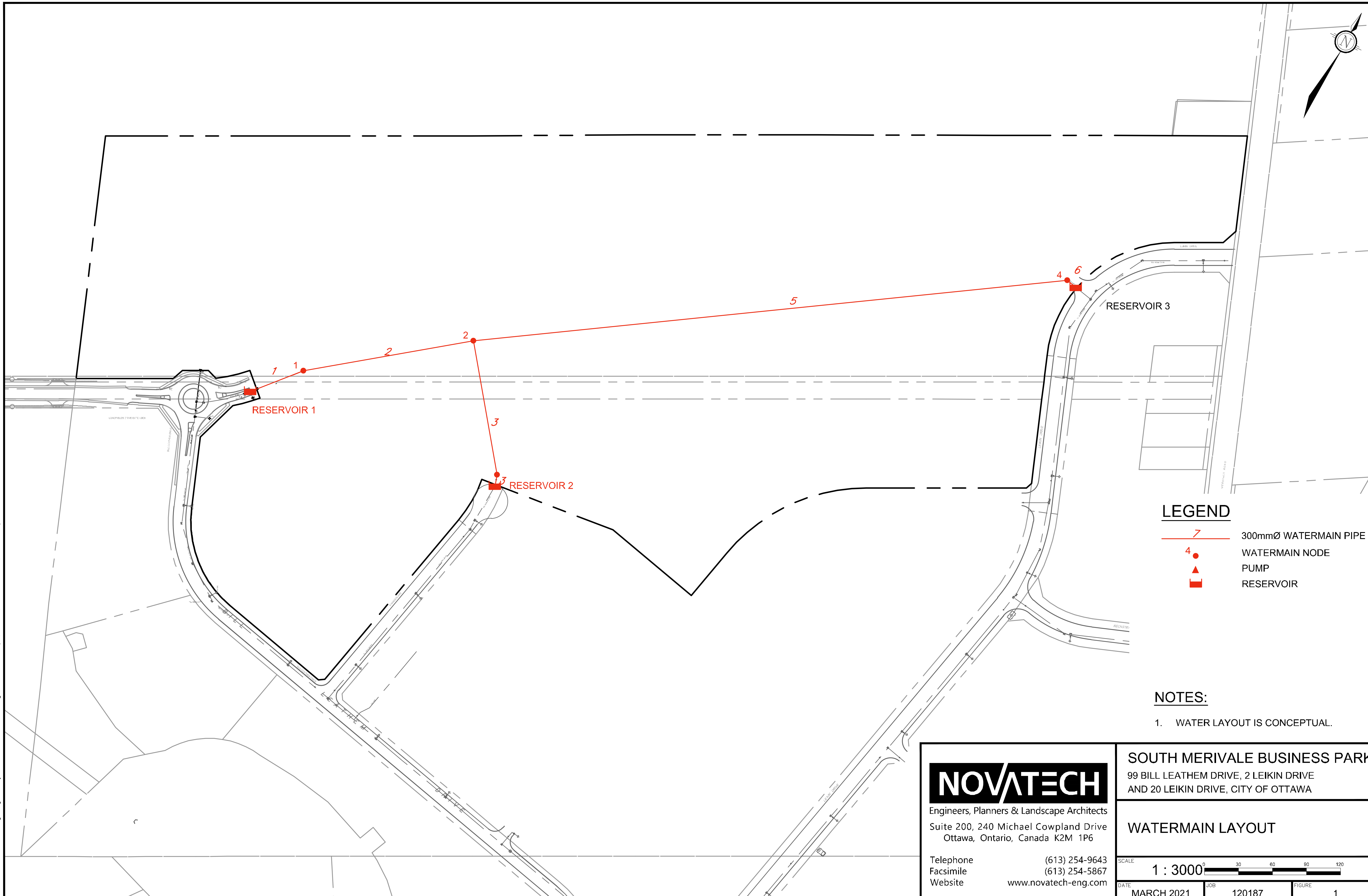
Link ID	Start Node	End Node	Length m	Diameter mm
1	RESERVOIR1	1	50	297
2	1	2	148.5	297
5	2	4	526	297
6	RESERVOIR3	4	10	297
4	3	RESERVOIR2	10	297
3	2	3	111.2	297

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality	
1	6.20	106.56	16.06	0.00	
3	6.20	109.90	19.70	0.00	
2	0.00	109.91	18.91	0.00	
4	273.20	122.79	31.79	0.00	
RESERVOIR1	170.95	105.50	0.00	0.00	Reservoir
RESERVOIR2	1.77	109.90	0.00	0.00	Reservoir
RESERVOIR3	-458.32	124.10	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
1	-170.95	2.47	21.13	Open
2	-177.15	2.56	22.57	Open
5	-185.12	2.67	24.49	Open
6	458.32	6.62	131.24	Open
4	1.77	0.03	0.00	Open
3	7.97	0.12	0.07	Open



NOTES:

1. WATER LAYOUT IS CONCEPTUAL.

NOVATECH

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Website www.novatech-eng.com

SOUTH MERIVALE BUSINESS PARK
99 BILL LEATHEM DRIVE, 2 LEIKIN DRIVE
AND 20 LEIKIN DRIVE, CITY OF OTTAWA

WATERMAIN LAYOUT

SCALE	DATE	JOB	FIGURE
1 : 3000	MARCH 2021	120187	1

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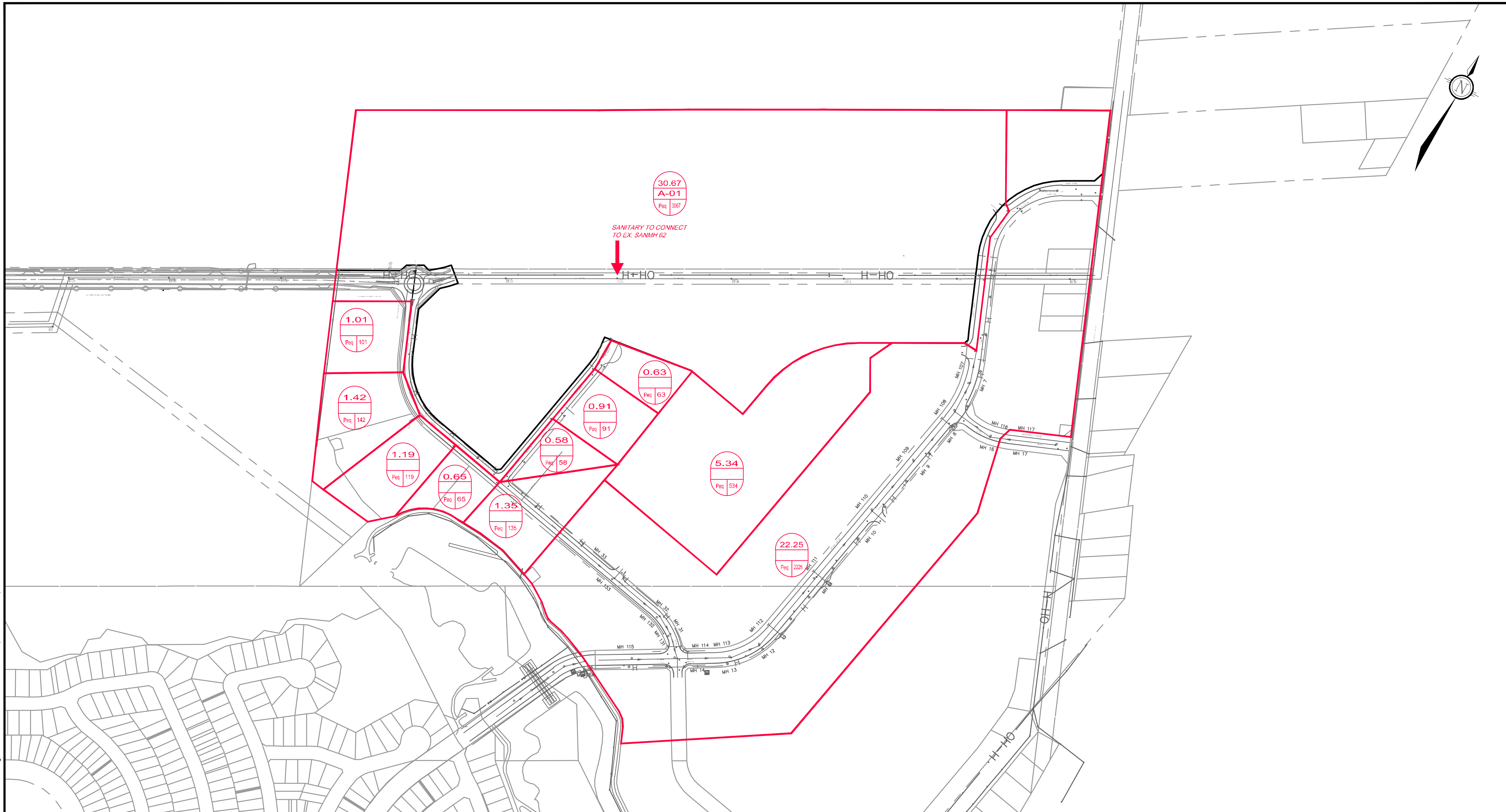
APPENDIX C

Sanitary Sewer Information



LEGEND

PROPERTY LINE

DIRECTION OF FLOW

SAN MH

EXISTING SANITARY MANHOLE & SEWER

SANITARY SEWER DRAINAGE AREA BOUNDARY

6.388 — DRAINAGE AREA (ha)

A-01 — SAN SEWER PIPE RUN

N/A | N/A — POPULATION / NO. UNITS

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SOUTH MERIVALE BUSINESS PARK

99 BILL LEATHEM DRIVE, 2 LEIKIN DRIVE
AND 20 LEIKIN DRIVE, CITY OF OTTAWA

PROPOSED SANITARY OUTLET LOCATIONS

SCALE	DATE	JOB	FIGURE
1 : 5000	MARCH 2021	120187	SAN

M:\2020\120187\CAD\Design\Figures\SAN\Prelim\120187-SAN.dwg, FIGURE 5, Mar 03, 2021 - 5:53pm, amestwarp

Project No. 120187
Project Name: 99 Bill Leathem, 2 Leikin, 20 Leikin Drive
Project Location: City of Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date: October 2020

Sanitary Sewer Design Sheet

LOCATION			COMMERCIAL / INDUTRIAL FLOW								PIPE					
AREA ID	FROM	TO	AREA (ha)	ACCUM AREA (ha)	Equivalent Population	PEAK FACTOR	PEAK FLOW (l/s)	ACCUM PEAK FLOW (l/s)	INFIL. FLOW (l/s)	TOTAL PEAK FLOW (l/s)	PIPE SIZE (mm)	PIPE SLOPE (%)	LENGTH (m)	CAPACITY (l/s)	VELOCITY (m/s)	Q/Qfull
A-01	SITE	EX. MH 62	30.670	30.670	3067	2.8	44.73	44.73	3.37	48.10	300	0.50	20.0	68.3	1.0	70.4%

Design Parameters:
(From: City of Nepean South Merivale Business Park Phase II and III Services Design Report By Novatech Engineering consultants Ltd., Dated June 23,1992)

Industrial Flow	44880	L/ha/day
Average Daily per capita flow	450	L/cap/day
Population Equivalent	100	Per/ha
Peaking Factor (Light Industrial Flow)	2.8	
Extraneous Flow	0.11	L/ha/s

APPENDIX D

Stormwater Management Calculations

NOVATECH
Engineers, Planners & Landscape Architects

Pre-Development Runoff Coefficient "C" - EX-01

Area	C_{avg}	$^{*}C_{100}$
Total 4.807	0.65	0.81

Runoff Coefficient Equation
$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$
* Runoff

Pre-Development Flows - EX-01

Outlet Options	Area (ha)	C_{avg}	Tc (min)	$Q2_{Year}$ (L/s)	$Q_{5\ Year}$ (L/s)	$Q_{100\ Year}$ (L/s)
Street D	4.807	0.65	15	**536.6**	**725.9**	**1551.6**

Pre-Development Runoff Coefficient "C" - EX-02

Area	Surface	C_{avg}	$^{*}C_{100}$
Total	Hard	0.65	0.81
20.037	Soft		

Runoff Coefficient Equation
$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$
* Runoff

Pre-Development Flows -EX-02

Outlet Options	Area (ha)	C_{avg}	Tc (min)	$Q2_{Year}$ (L/s)	$Q_{5\ Year}$ (L/s)	$Q_{100\ Year}$ (L/s)
Street D	20.037	0.65	15	**2236.4**	**3025.4**	**6467.2**

Pre-Development Runoff Coefficient "C" - EX-03

Area	C_{avg}	$^{*}C_{100}$
Total 1.123	0.65	0.81

Runoff Coefficient Equation
$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$
* Runoff

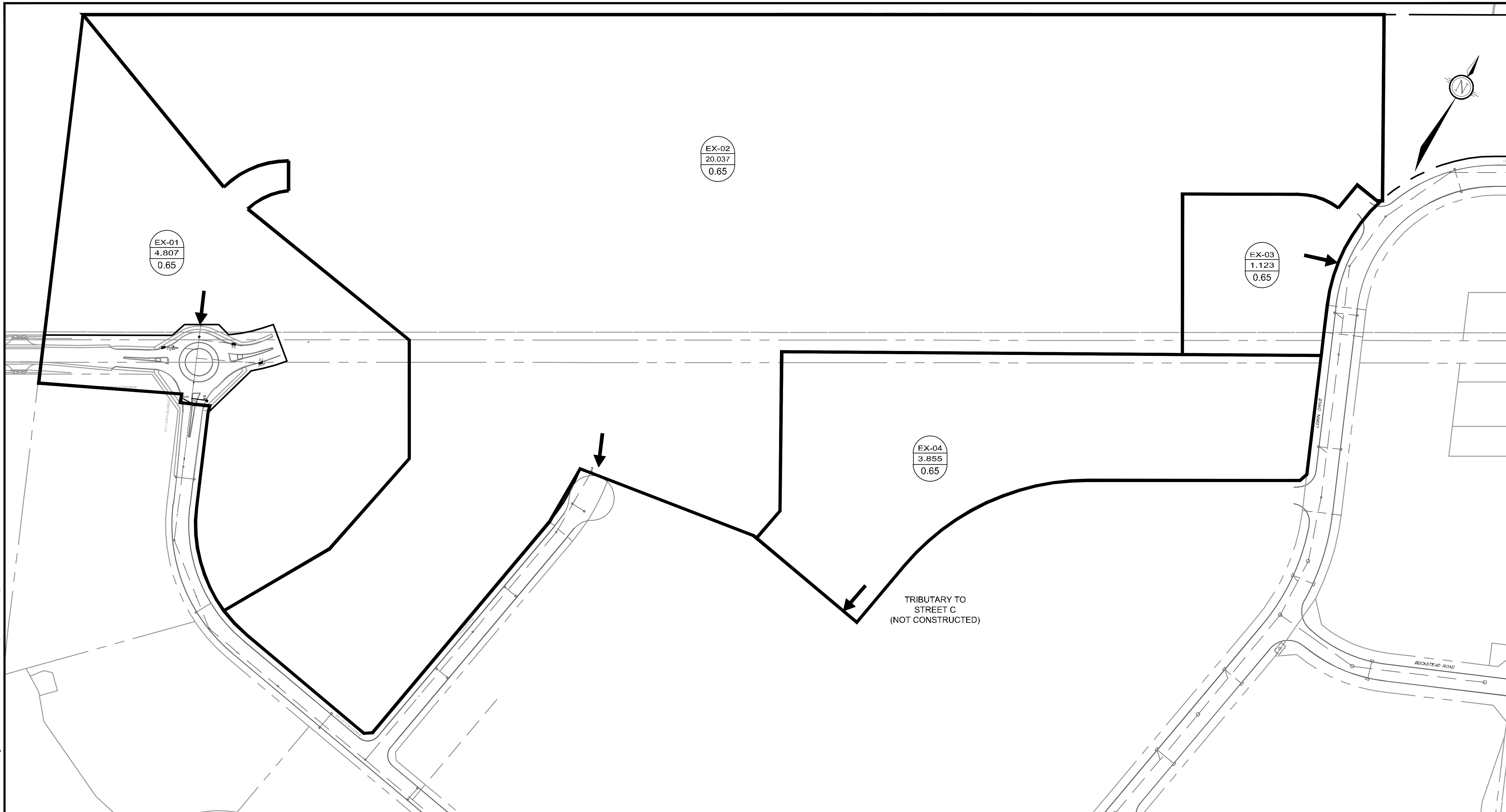
Pre-Development Flows - EX-03

Outlet Options	Area (ha)	C_{avg}	Tc (min)	$Q2_{Year}$ (L/s)	$Q_{5\ Year}$ (L/s)	$Q_{100\ Year}$ (L/s)
Street D	1.123	0.65	15	**125.3**	**169.5**	**362.3**

Time of Concentration	Tc=	15.0	min
Intensity (2 Year Event)	I_2=	61.77	mm/hr
Intensity (5 Year Event)	I_5=	83.56	mm/hr
Intensity (100 Year Event)	I_{100}=	142.89	mm/hr

100 year Intensity = $1735.688 / (\text{Time in min} + 6.014)^{0.820}$
5 year Intensity = $998.071 / (\text{Time in min} + 6.053)^{0.814}$
2 year Intensity = $732.951 / (\text{Time in min} + 6.199)^{0.810}$

Equations:
Flow Equation
$Q = 2.78 \times C \times I \times A$
Where:
C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area



LEGEND

POST STORM DRAINAGE AREA

OUTLET LOCATION

A-2	DRAINAGE AREA ID
0.559	DRAINAGE AREA (ha)
0.90	RUNOFF COEFFICIENT

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

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SOUTH MERIVALE BUSINESS PARK
99 BILL LEATHEM DRIVE, 2 LEIKIN DRIVE
AND 20 LEIKIN DRIVE, CITY OF OTTAWA

EXISTING STORM
DRAINAGE AREAS

SCALE	DATE	JOB	FIGURE
1 : 2500	MARCH 2021	120187	EX STM

TABLE 1A: Post-Development Runoff Coefficient "C" - A-01

	5 Year Event	100 Year Event
Area	C_{avg}	*C_{avg}
Total		
4.807	0.90	1.00

TABLE 1B: 2 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-01

4.807 =Area (ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
2 YEAR	-5	632.75	7610.70	725.9	6884.80	-2065.44
	0	167.22	2011.35	725.9	1285.45	0.00
	5	**103.57**	**1245.76**	**725.9**	**519.86**	**155.96**
	10	76.81	923.81	725.9	197.91	118.75
	15	61.77	742.94	725.9	17.04	15.33

TABLE 1C: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-01

4.807 =Area (ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
5 YEAR	0	230.48	2772.24	725.9	2046.34	0.00
	5	141.18	1698.09	725.9	972.19	291.66
	10	**104.19**	**1253.23**	**725.9**	**527.33**	**316.40**
	15	83.56	1005.03	725.9	279.13	251.21
	20	70.25	844.98	725.9	119.08	142.90

TABLE 1D: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-01

4.807 =Area (ha)
1.00 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	5	242.70	3243.60	725.9	2517.70	755.31
	10	178.56	2386.34	725.9	1660.44	996.27
	15	**142.89**	**1909.70**	**725.9**	**1183.80**	**1065.42**
	20	119.95	1603.07	725.9	877.17	1052.60
	25	103.85	1387.86	725.9	661.96	992.94

Equations:
Flow Equation
Q = 2.78 x C x I x A
Where:
C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation
$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$
$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

100 year Intensity = 1735.688 / (Time in min + 6.014)$^{0.820}$
5 year Intensity = 998.071 / (Time in min + 6.053)$^{0.814}$
2 year Intensity = 732.951 / (Time in min + 6.199)$^{0.810}$

TABLE 2A: Post-Development Runoff Coefficient "C" - A-02

Area	5 Year Event C_{avg}	100 Year Event $^*C_{avg}$
Total 23.896	0.90	1.00

TABLE 2B: 2 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-01

23.896 =Area (ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
2 YEAR	-5	632.75	37830.62	3025.4	34805.22	-10441.57
	0	167.22	9997.85	3025.4	6972.45	0.00
	5	**103.57**	**6192.30**	**3025.4**	**3166.90**	**950.07**
	10	76.81	4592.00	3025.4	1566.60	939.96
	15	61.77	3692.93	3025.4	667.53	600.78

TABLE 2C: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-02

23.896 =Area (ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
5 YEAR	0	230.48	13780.00	3025.4	10754.60	0.00
	5	141.18	8440.74	3025.4	5415.34	1624.60
	10	**104.19**	**6229.46**	**3025.4**	**3204.06**	**1922.44**
	15	83.56	4995.69	3025.4	1970.29	1773.27
	20	70.25	4200.15	3025.4	1174.75	1409.71

TABLE 2D: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-02

23.896 =Area (ha)
1.00 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	10	178.56	11861.82	3025.4	8836.42	5301.85
	15	142.89	9492.57	3025.4	6467.17	5820.46
	20	**119.95**	**7968.40**	**3025.4**	**4943.00**	**5931.60**
	25	103.85	6898.65	3025.4	3873.25	5809.87
	30	91.87	6102.88	3025.4	3077.48	5539.46

Equations:
Flow Equation
$Q = 2.78 \times C \times I \times A$
Where:
C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation
$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$
$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

100 year Intensity = $1735.688 / (\text{Time in min} + 6.014)^{0.820}$
5 year Intensity = $998.071 / (\text{Time in min} + 6.053)^{0.814}$
2 year Intensity = $732.951 / (\text{Time in min} + 6.199)^{0.810}$

TABLE 3A: Post-Development Runoff Coefficient "C" - A-03

	5 Year Event	100 Year Event
Area	C_{avg}	*C_{avg}
Total		
1.123	0.90	1.00

TABLE 3B: 2 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-03

1.123 =Area (ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
2 YEAR	-5	632.75	1777.15	169.6	1607.59	-482.28
	0	167.22	469.66	169.6	300.10	0.00
	5	**103.57**	**290.89**	**169.6**	**121.33**	**36.40**
	10	76.81	215.72	169.6	46.16	27.69
	15	61.77	173.48	169.6	3.92	3.53

TABLE 3C: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-03

1.123 =Area (ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
5 YEAR	0	230.48	647.34	169.5	477.84	0.00
	5	141.18	396.52	169.5	227.02	68.10
	10	**104.19**	**292.64**	**169.5**	**123.14**	**73.88**
	15	83.56	234.68	169.5	65.18	58.66
	20	70.25	197.31	169.5	27.81	33.37

TABLE 3D: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-03

1.123 =Area (ha)
1.00 = C

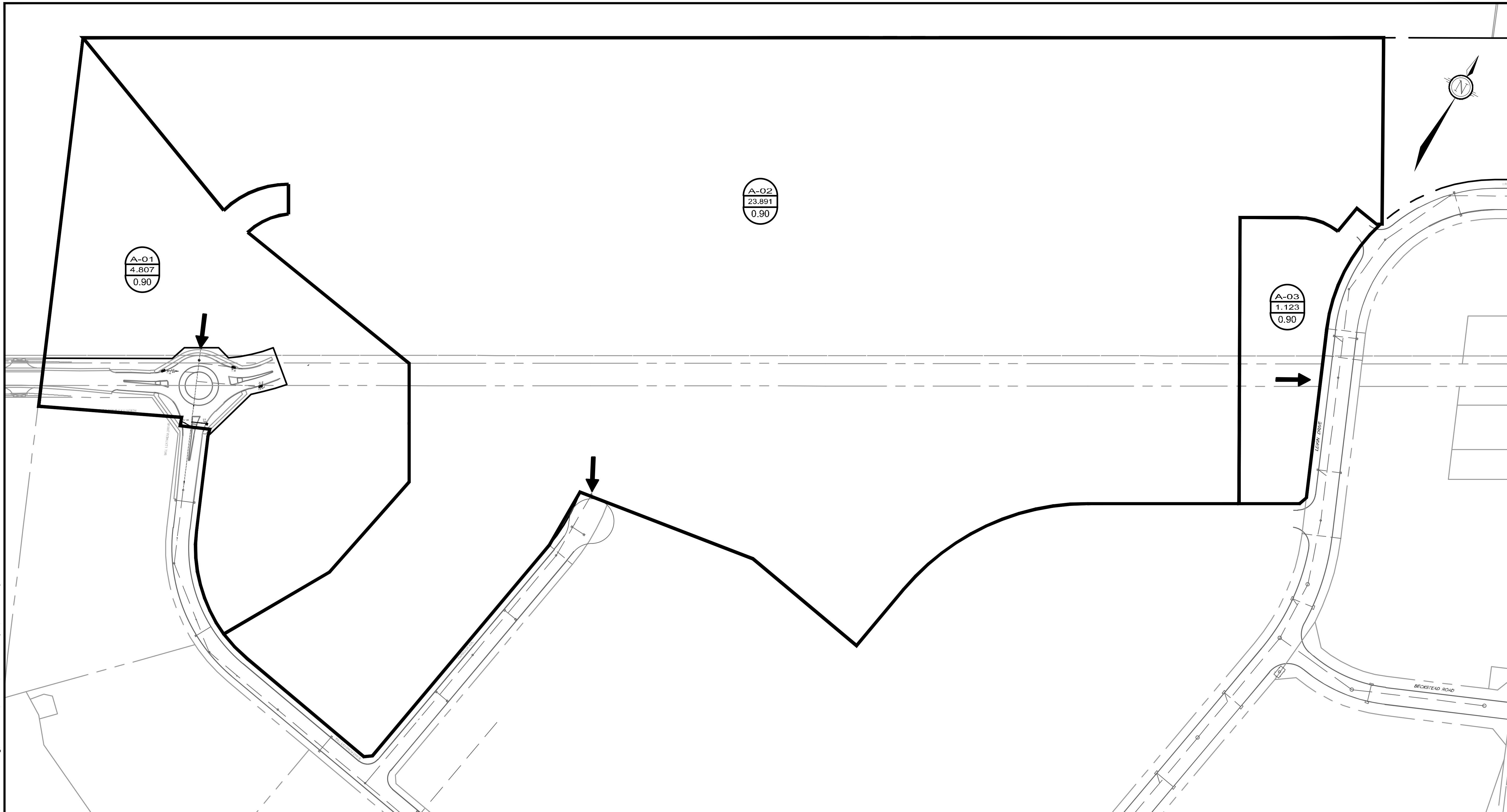
Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	5	242.70	757.40	169.5	587.90	176.37
	10	178.56	557.23	169.5	387.73	232.64
	15	**142.89**	**445.93**	**169.5**	**276.43**	**248.78**
	20	119.95	374.33	169.5	204.83	245.79
	25	103.85	324.07	169.5	154.57	231.86

Equations:
Flow Equation
$Q = 2.78 \times C \times I \times A$
Where:
C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation
$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$
$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

100 year Intensity = $1735.688 / (\text{Time in min} + 6.014)^{0.820}$
5 year Intensity = $998.071 / (\text{Time in min} + 6.053)^{0.814}$
2 year Intensity = $732.951 / (\text{Time in min} + 6.199)^{0.810}$

Table 5: Post-Development Stormwater Mangement Summary							
				2-yr	5-yr	100-yr	
Area ID	Area (ha)	1:5 Year Weighted Cw	Oulet Location	Req'd Vol (cu.m)	Req'd Vol (cu.m)	Req'd Vol (cu.m)	Required storage per ha (100-yr)
A-01	4.807	0.90	Bill Leathem Dr.	155.96	316.4	1065.42	**221.62**
A-02	23.896	0.90	Pargon Ave.	950.07	1922.44	5931.60	**248.23**
A-03	1.123	0.90	Leikin Dr.	36.40	73.88	248.78	**221.62**
Total				**1142.4**	**2312.7**	**7245.8**	**N/A**



LEGEND

PROPERTY LINE

OUTLET LOCATION

POST STORM DRAINAGE AREA

A-2 / 0.559 / 0.90

DRAINAGE AREA ID

DRAINAGE AREA (ha)

RUNOFF COEFFICIENT

NOVATECH

Engineers, Planners & Landscape Architects

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Ottawa, Ontario, Canada K2M 1P6

Telephone	(613) 254-9643
Facsimile	(613) 254-5867
Website	www.novatech-eng.com

SOUTH MERIVALE BUSINESS PARK

99 BILL LEATHEM DRIVE, 2 LEIKIN DRIVE
AND 20 LEIKIN DRIVE, CITY OF OTTAWA

STORM SEWER OUTLET LOCATIONS

SCALE 1 : 2500 (0, 25, 50, 75, 100)

DATE	JOB	FIGURE
MARCH 2021	120187	STM

From: Shillington, Jeffrey <jeff.shillington@ottawa.ca>
Sent: Thursday, October 8, 2020 9:32 AM
To: Lee Sheets <l.sheets@novatech-eng.com>
Subject: RE: South Merivale Business Park

Hi Lee,

I've confirmed with Eric Tousignant that the following SWM can be used for the South Merivale Business Park. His rational is below. I've also located the June 1992 and the link is below.

[redacted]

Regards,

Jeff Shillington, P.Eng.
Senior Project Manager, Development Review, South Branch
Planning, Infrastructure and Economic Development
City of Ottawa
tel: 580-2424 x 16960
email: jeff.shillington@ottawa.ca

From Eric T.:

The 1991 report was based on wrong assumptions, but to be fair, SWM was still in its infancy at the time and they did the best they could with the information at hand. I revised the analysis and came up with something more realistic. I therefore recommend that future development in this business park follow the conclusion below (I am pasting my original email below):

I looked at the 1991 Novatech report that you attached and I don't agree with the approach Novatech took to come up with the allowable release rate. I am explaining my thought process here, but you can simply jump to the conclusion if you want the recommended release rate.

First of all, the entire area is allowed a peak flow of 4.6 cms to the pond as per the pond's design report. It is also assumed that the vast majority of the flow will be contained in the areas and bled back into the minor system, therefore it can be assumed that no major system flow is spilling to the pond. Finally, is it assumed that the ultimate average runoff coefficient for the entire drainage area will be 0.75.

Novatech took the total allowable flow and divided it by the area to obtain an average release rate of 54.4 L/s/ha (assuming that all land is controlled equally and released constantly over the entire duration of the storm, which is <u>way too conservative</u> and unrealistic since is does not account for flow attenuation).

They then used the rational method equation and worked backwards from the peak flow to get the runoff coefficient that corresponds to the peak flow of 4.6 cms. This is where they made a mistake, They assume a 15 TC when this 84.4 ha drainage area will have a TC of somewhere between 70 and 75 minutes. Using a 70 minutes TC I get a 5 year intensity of approximately 29 mm/hr, **therefore the Average runoff coefficient is more like 0.67 to come up with a flow of 4.6 cms and not 0.24 as noted in the report**.

This means that C=0.67 of not far from the ultimate runoff coefficient of 0.75 for the entire area and means that the allowable release rate from the development sites does not have to be too restrictive.

Novatech then tried to come up with an allowable release rate for each sub-area by subtracting the ROW release rate. The problem is that they apply an ICD release rate as a constant when even ICD flow is attenuated by the time it reaches the outlet due to the fact that the storm does not keep a peak intensity throughout its duration.

Therefore this is how I would account for the ROW flow:

Based on the existing roadway areas, there are approximately 12 CB per ha each but they are releasing approximately 15 L/s due to the use of ICDs (in fact two CB are connected together releasing a total of 30 L/s using a type B ICD). This means that the peak 5 year capture in the ROW is 180 L/s per ha. To generate this flow with a 5 year event and a TC of 15 minutes, we need a C=0.78. Therefore we can assume that the ROW is being controlled to a C=0.78. There are 8.8 ha or ROW within the 84.4 ha sewershed, therefore the remaining developable lands need to be controlled to a C=0.65 so that the overall 84.4 ha is controlled to an equivalent C=0.67

The allowable release rate for each site should therefore be based on the 5 year storm, using a C=0.65 and a computed TC of 15 minutes to remain consistent with the original storm sewer design that used a TC of 15 minutes. .

Conclusion: Based on the above analysis, 4.6 cms is equivalent to a 5 year release rate for a 84.4 ha area having a C=0.67. If we remove the allowance for the ROW drainage (C=0.78), the allowable release rate for the remaining development lands should be based on a C=0.65.

<u>I would therefore ask that they provide SWM to control the 100 year event to a release rate based on the 5 year event, with a C=0.65 and TC=15 minutes.</u>

From: Lee Sheets <l.sheets@novatech-eng.com>
Sent: October 06, 2020 9:24 AM

To: Shillington, Jeffrey <jeff.shillington@ottawa.ca>
Subject: South Merivale Business Park

CAUTION: This email originated from an External Sender. Please do not click links or open attachments unless you recognize the source.

ATTENTION : Ce courriel provient d'un expéditeur externe. Ne cliquez sur aucun lien et n'ouvrez pas de pièce jointe, excepté si vous connaissez l'expéditeur.

I'm trying to understand the SWM criteria for the remaining lands in the SMBP. I understand that quality control is handled in the Belanger SWM facility. The quantity control requirements are the reason for my e-mail.
Please feel free to give me a call on my cel if you have any questions.
Lee

J. Lee Sheets, C.E.T., Director | Land Development & Public Sector Infrastructure
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 209 | Cell: 613.262.3121 | Fax: 613.254.5867

APPENDIX E

Novatech SMBP Phase II and III Services Design Report

NOVATECH

CITY OF NEPEAN
SOUTH MERIVALE BUSINESS PARK
PHASE II AND III
SERVICES DESIGN REPORT

Prepared by:

NOVATECH ENGINEERING CONSULTANTS LTD.

June 23, 1992

NOVATECH ENGINEERING CONSULTANTS LTD.

CIVIL ENGINEERS AND PLANNERS

July 10, 1992

BY COURIER

City of Nepean
Engineering Department
101 Centrepointe Drive
3rd Floor
Nepean, Ontario
K2G 5K7

Attention: Ms. Sue Johns, P.Eng.

Dear Madam:

Re: South Merivale Business Park
Our File No. 92019

We are pleased to submit two copies of the Services Design Report for your review.

The report outlines sanitary, watermain and surface works servicing for the above noted project. In addition an overall earthwork calculation is provided for the full Business Park.

We ask that you provide comments to us as soon as is convenient. If you have any questions that are best addressed immediately, please do not hesitate to contact us.

Yours truly,

NOVATECH ENGINEERING CONSULTANTS LTD.

Lee Jablonski, P.Eng.

LJ/ml

c.c. Udo Boehme

SUITE 17 • 77 AURIGA DRIVE • NEPEAN , ONTARIO • K2E 7Z7 • FAX 727-6972 • TEL. (613) 727-1658

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APPENDICES

1.0 INTRODUCTION

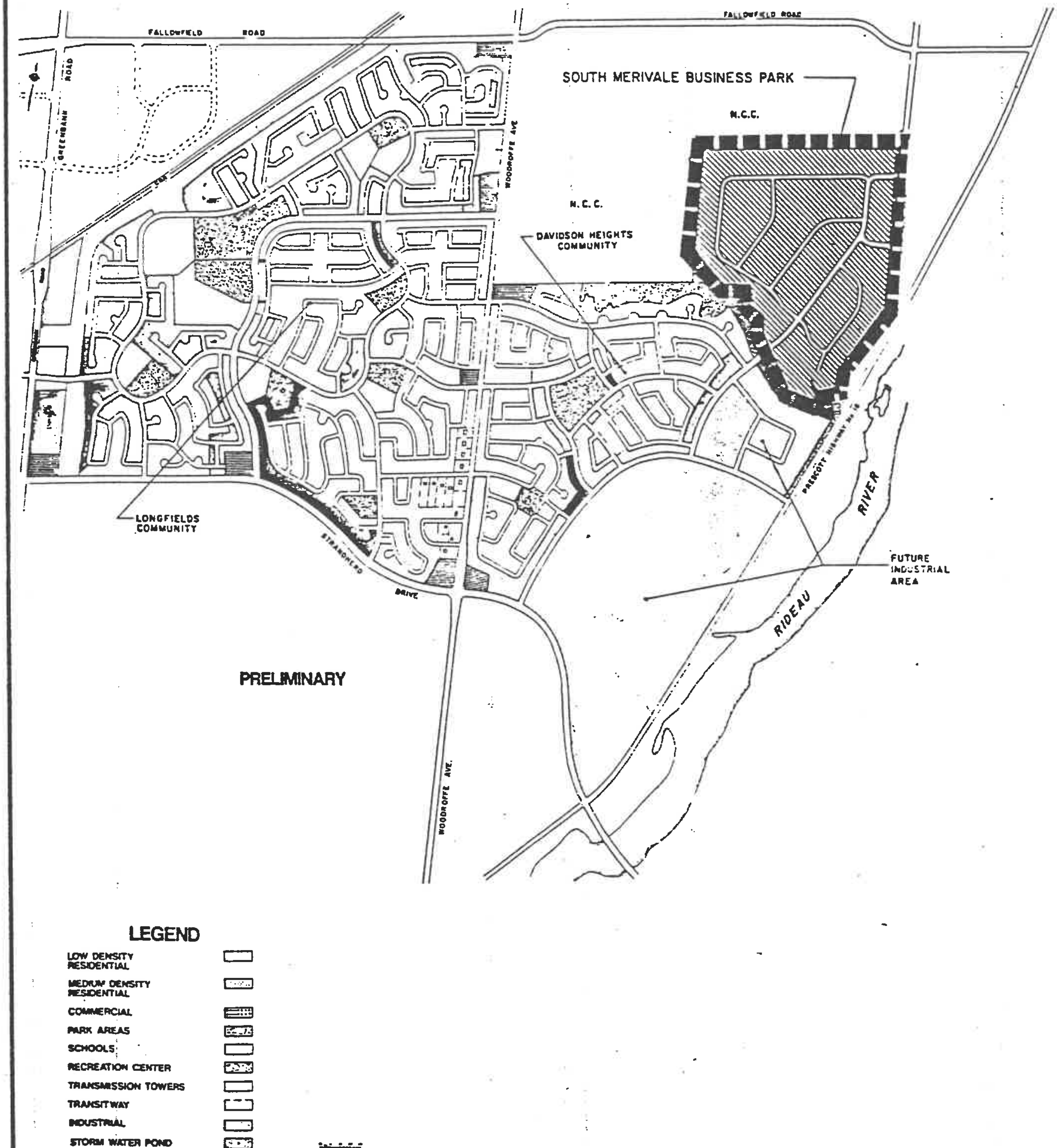
The South Merivale Business Park (SMBP) consists of approximately 85 hectares. It is bounded on the north and the northwest by the National Capital Commission (NCC) Greenbelt on the south and southwest by Barrhaven Creek and the Longfields/Davidson Heights Stormwater Management Facility and on the east by Merivale Road and Queen Anne Crescent. The site location is shown on Figure 1.

Land within the SMBP will be fully serviced within a dedicated right-of-way. Complete sanitary, storm sewer, water and utility servicing will be constructed under an urban section roadway in preparation for future lot development by individual owners.

Construction of the SMBP site servicing has been phased. Construction of Phase I expected to be complete by Summer 1992. Services Design Report [Novatech Engineering December 31, 1992] outlines the information and design assumptions used to prepared Phase I construction drawings, it also provided a summary for full subdivision servicing. This report updates criteria and design assumption used for the preparation of construction drawings for the proposed SMBP Phase II and III.

Figure 1A shows the updated phasing schedule for the SMBP and is detailed below for each street.

Phase	Street	Construction of Services
1	A	1992
2	E,F	1993
3	B,D	1993
4	C	1994



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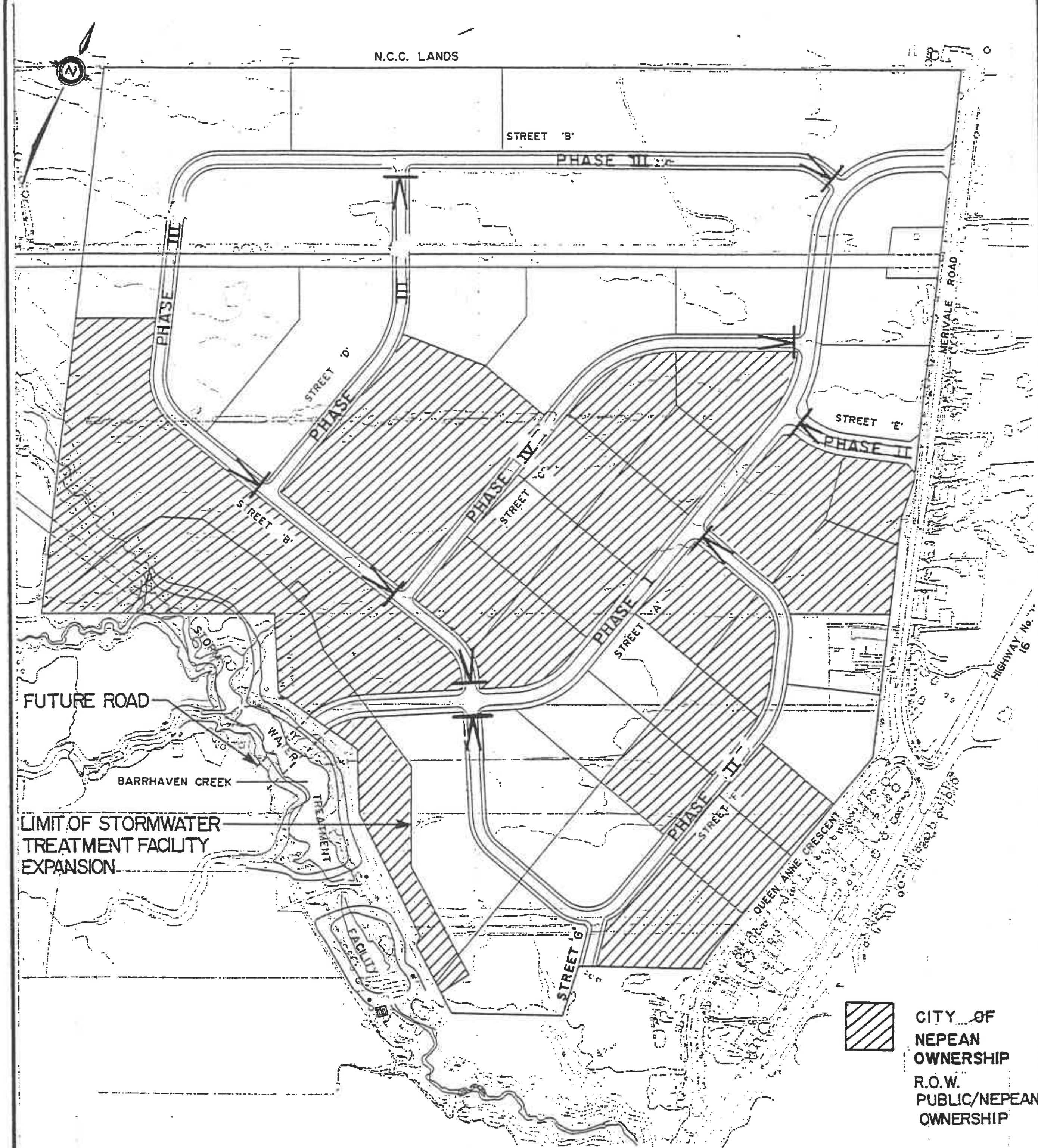
CITY OF NEPEAN

SOUTH MERIVALE BUSINESS PARK

KEY PLAN

DATE: AUG. 91

FIG. No. 1



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CITY OF NEPEAN

SOUTH MERIVALE BUSINESS PARK

PHASING AND OWNERSHIP PLAN

DATE: JULY 1992

FIG. No. 1A

2.0 SANITARY SEWER SYSTEM

2.1 Sanitary Sewer Outlet

The sanitary sewer outlet for the SMBP is the Barrhaven Trunk Sanitary Sewer (BTSS). The BTSS originates east of Greenbank Road and flows in an easterly direction to the Merivale Road Pumping Station at Merivale Road. The 1050 mm BTSS is shown on Drawing No. 92019-S2 where it crosses the SMBP within an existing easement.

The Merivale Road Pumping Station will be eliminated when the West Rideau Collector is extended south along Merivale to intercept the BTSS. The Regional Municipality of Ottawa-Carleton (RMOC) Environmental Services Department has indicated that this is scheduled to occur in 1994 or 1995. The capacity of the Pumping Station is 152 L/s. Of this, 86 L/s has been reserved for anticipated flows from the Barrhaven community leaving 66 L/s of theoretically available capacity.

Table 1 is based on growth projections provided by the City of Nepean for Davidson Heights, Longfield and SMBP and shows that if there is no increase in projected flow from Barrhaven, the 152 L/s capacity of the Pumping Station will not be reached until 1992/1993. If Barrhaven flows increase or if development proceeds at a higher rate, then modifications will be required to increase the Pumping Station capacity. This expansion is currently being studied.

A 750 mm diameter trunk sanitary sewer is proposed along Street A. This trunk sewer will provide sanitary outlet for a substantial portion of the Davidson Heights Community. Due to the constraining elevation at the proposed Barrhaven Creek crossing, the connection to the existing 1050 mm sanitary is invert to invert. Based on the timing of the West Rideau Collector and coupled with the growth projections for the Davidson Heights and Longfields Communities, excessive surcharging of the 750 diameter sanitary is not expected.

TABLE 1

PROJECTED GROWTH AND SANITARY FLOWS

YEAR	RESIDENTIAL UNITS	RESIDENTIAL AREA (ha)	RESIDENTIAL POPULATION	INDUSTRIAL AREA (ha)	PEAK FLOW L/S
1991	500	38	1524	-	33
1992	1300	100	3965	8	99
1993	2500	192	7625	16	176
1994	3800	292	11590	24	250
1995	5000	384	15250	32	320

2.2 Internal Sanitary Sewer System

A sanitary sewer system layout and design has been prepared for the SMBP during the Phase I detailed design. The sanitary drainage areas are shown on the Sanitary Drainage Area Plan (Drawing No. 92019-SAN). Sewer routing and manhole locations for Phases II and III are shown on the General Plan of Services (Drawing No. 92019-S1).

Sanitary sewers will be constructed on Street B, D and F and connections made from these sewers to those previously constructed along Street A. During Phase I a 240 mm length of 375 mm sanitary pipe was constructed under Street B. Provision was made at that time for connection of a 250 mm sanitary upstream of MH 34. Connection will be made at the point during this construction phase. Sanitary pipe from approximately station 4 + 240 F, 4 + 750 on Street B and station 7 + 000 to 7 + 250 on Street D will route flows to this point.

Sanitary flows generated from properties adjacent to Street F will be conveyed to previously constructed 250 mm diameter connection stubs at Street A.

The remaining sanitary flows generated adjacent to Streets B and D will be conveyed to an existing manhole 62. Two drop pipes will be constructed to permit north and southward access to the existing 1050 mm BTSS.

Water stops are proposed for inclusion in the trenches to prevent groundwater movement through the bedding material. The groundwater table is above the top of the sanitary pipe in most locations. Clay barriers are required to maintain the existing groundwater table height. Lowering of the groundwater table adjacent the trench could result in settlement of nearby structures.

2.3 Sanitary Sewer Design Sheets

The sanitary sewer design sheets for Phase II and III of the business park are included in Appendix 'A'. The design assumptions are as follows:

External sanitary flow:

Peak design flow = Q = 249.45 L/s
(from Delcan correspondence, dated Oct. 21/91 - Appendix B)

Population equivalent:

P_{eq} = 100 persons/ha
Industrial flow = 44,880 L/ha/day
(from City of Nepean Standard Subdivision Agreement)

Average daily per capita flow = q = 450 L/cap/day

$$P_{eq} = 44{,}880 \text{ L/ha/day} \times \frac{1}{450 \text{ L/cap/day}} = 100 \text{ persons/ha}$$

Peaking factor:

M = 2.8 for Light Industrial Flow
(from RMOC Design Guidelines - Appendix C)

Sanitary sewer design sheets for Phase I are included to confirm that flows calculated for Phases II and III can be conveyed by sewers detailed during the Phase I design.

2.4 Sanitary Service Connections

Private sanitary service connections will be made at the development stage of each site when capacity and location requirements are known.

3.0 WATERMAIN

3.1 Background

The Regional Municipality of Ottawa-Carleton, in consultation with Nepean and Gloucester, has been developing a trunk watermain scheme to serve the South Urban Community. This includes Longfields, Davidson Heights and the SMBP on the Nepean Side. The layout currently being contemplated consists of an extension of the 1050 mm watermain at Fallowfield and Woodroffe south along Woodroffe to the realigned Strandherd Drive watermain. Feeder mains will connect to this trunk off Woodroffe to service the Davidson Heights and Longfields Communities, as well as future areas to the south (Figure 2). Eventually, this trunk will extend eastward to cross the Rideau River in one or possibly two locations and continue through the Gloucester portion of the South Urban Community.

3.2 Watermain Supply Source

The SMBP will be supplied by twin 400 mm mains extending into the business park from the northeast sector of the Davidson Heights development. These mains will be the extension of the distribution system originating from the proposed 1050 mm trunk on Woodroffe and routed along the Davidson Heights street alignments.

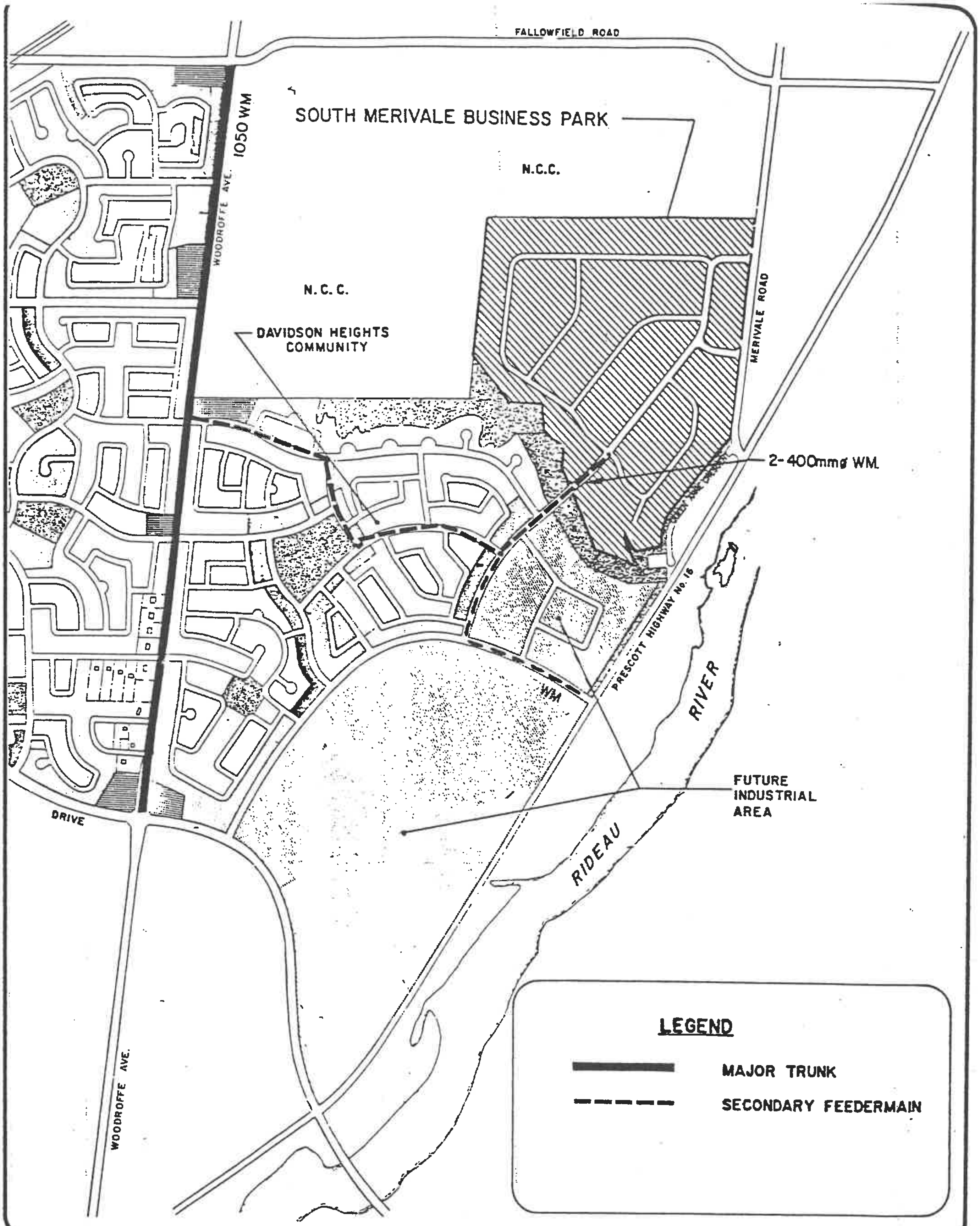
Extension of the 1050 Woodroffe Avenue watermain is complete.

3.3 Internal Watermain System

The internal watermain design is shown on the General Plan of Services (Drawing Nos. 92019-S1, S2 and S3). The pipe sizes have been confirmed by RMOC Environmental Services and are as follows:

Trunk Watermain	400 mm diameter
Secondary Watermain	300 mm diameter

Delcan has designed the twin 400 mm diameter watermains across the Longfields/Davidson Heights Stormwater Management Facility expansion. The twin 400 mm diameter watermains on Street 'A' of the business park has been connected to these watermains at the property limit. A 400 mm diameter link has been installed between the two watermains at the intersection with Street A and B to provide a looped system.



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CITY OF NEPEAN

SOUTH MERIVALE BUSINESS PARK

WATERMAIN SUPPLY

DATE: AUG. 91

FIG. No. 2

3.4 Thrust Block Design

Thrust block design calculations for the 400 mm diameter watermain are summarized in the following table. The design is based on a test pressure of 1035 KPa (150 psi). Because of the width of excavation that will be required to install the sanitary sewer, imported material will be used to support the watermain. The bearing capacity of the soil is assumed to be 95.7 KPa for sand and 143.6 KPa for sand and gravel. Fondex Ltd. has confirmed that this bearing capacity can be achieved by compacting the imported material to 100%.

Fitting (400 mm dia. watermain)	Thrust (N per 150 psi)	Thrust Block (m^2)	
		Sand	Sand and Gravel
Valves, Tees, Dead Ends	134,100	1.40	0.93
90° Bends	187,800	1.96	1.31
45° Bends	102,750	1.07	0.71
22½° Bends	53,100	0.55	0.37
11¼° Bends	26,850	0.28	0.19

The 300 mm watermain thrust blocks will be constructed as per OPSD detail 1103.01.

3.5 Phase II and III Construction

Several 300 mm diameter watermain loops will be constructed in SMBP that branch from the main 400 mm on Street A. A 300 mm diameter and loop will be completed on Streets B and F and a sub-loop will be constructed on Street D providing connections at the north and south intersection with Street B. A stub complete with a cap and thrust block for future connection will be constructed on Street E.

4.0 STORM SEWER DESIGN

A comprehensive Stormwater Management Report, dated June, 1992 has been prepared by Novatech Engineering Consultants Ltd. for the SMBP Phase II and III. The report contains the criteria used to design the storm sewer system. The report is prepared under separate cover.

5.0 MERIVALE ROAD/STREET 'E' INTERSECTION

5.1 Final Design

Final intersection design is currently underway. Discussions have taken place with the Regional Transportation Department to establish geometrics and criteria. The design shall accommodate future widening of Merivale Road to provide a 4 lane facility.

Initially, the minimum requirements include a northbound left turn lane and southbound right turn taper which will be provided during first phase of development. Subsequent improvements to ultimate design will be undertaken as warranted by demand/capacity. The ultimate intersection design for Street A is complete and given approval at RMOC staff level. Final intersection design drawings for Street E and Merivale Road are currently being prepared and will be forwarded separately for approval.

6.0 UTILITIES

A composite utility plan will be prepared when the requisite information and design criteria has been assembled. The plan will be submitted separately for approval.

7.0 ROADS AND GRADING

7.1 Street Layout

Street layout for Phases II and III construction along Streets B, D, E and F is as described in previous preliminary design reports and as outlined on Figure 1A.

7.2 Cross Section

The local streets developed during Phase II and III will have a 20 m wide right-of-way and will have a roadway width of 12.0 m except for Street E which has a 26 m right-of-way and an 11.0 m roadway width. All streets are proposed to be constructed to a typical urban cross section complete with barrier curbs and boulevards that slope upwards to the property line. Figure 7-1 details the typical roadway cross section for these phases.

7.3 Grading

The topography of the SMBP site is relatively flat and gradually slopes to Barrhaven Creek. The lack of physical relief is disadvantageous when consideration of the grading is concerned. A grading design seeks to establish a compromise between the following two objectives.

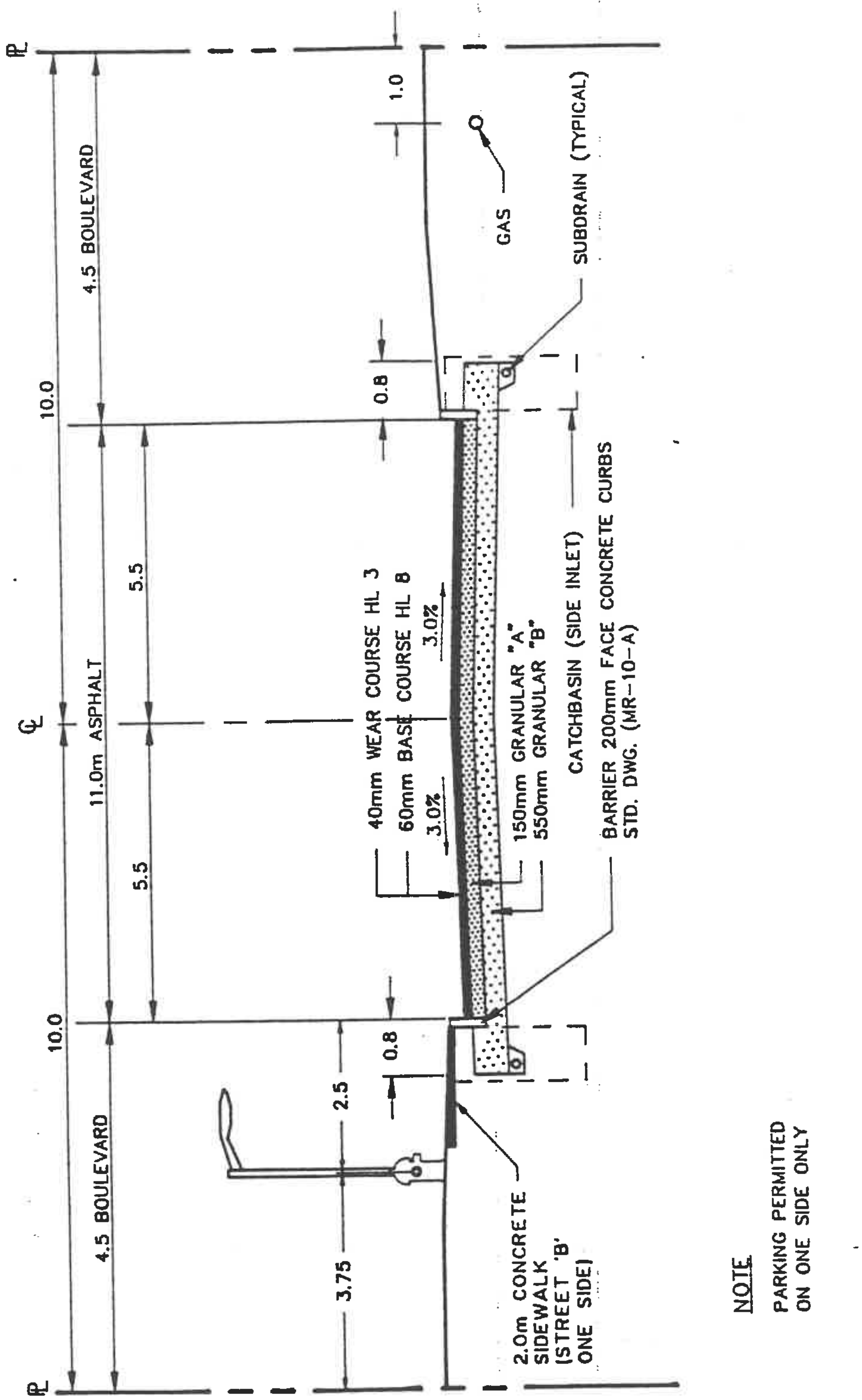
1) balancing the cut/fill i.e. minimizing costs required to haul material onto or off the site,

2) provide a major overland flow route for the most infrequent storm events.

Because the area is relatively flat, it will have to be shaped to allow major overland flow to drain along the streets and the back lot areas to the Barrhaven Treatment facility. Initially the grading plan was constructed based upon two assumptions:

i) 0.2 to 0.3 m of topsoil would be stripped from the entire site, and

ii) fill originating from the construction of the Barrhaven Creek Facility would be available.



NOVATECH
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OTTAWA, ONTARIO

CITY OF NEPEAN

SOUTH MERIVALE BUSINESS PARK

TYPICAL CROSS SECTION

20.0m R.O.W.

DATE: NOV.30, 1990

FIG. No. 7-1

7.4 Cut/Fill Analysis

A cut/fill analysis for the entire SMBP site was completed to determine the impact that the absence of Barrhaven Treatment Facility fill would have on Phase II and III cut/fill quantities.

The overall grading plan presented in the Phase I construction drawings was used as a first step to determining the required cut and/or fill. This initial analysis determined that if the grades were established as shown on this plan, then approximately 250,000 m^3 of fill would be required.

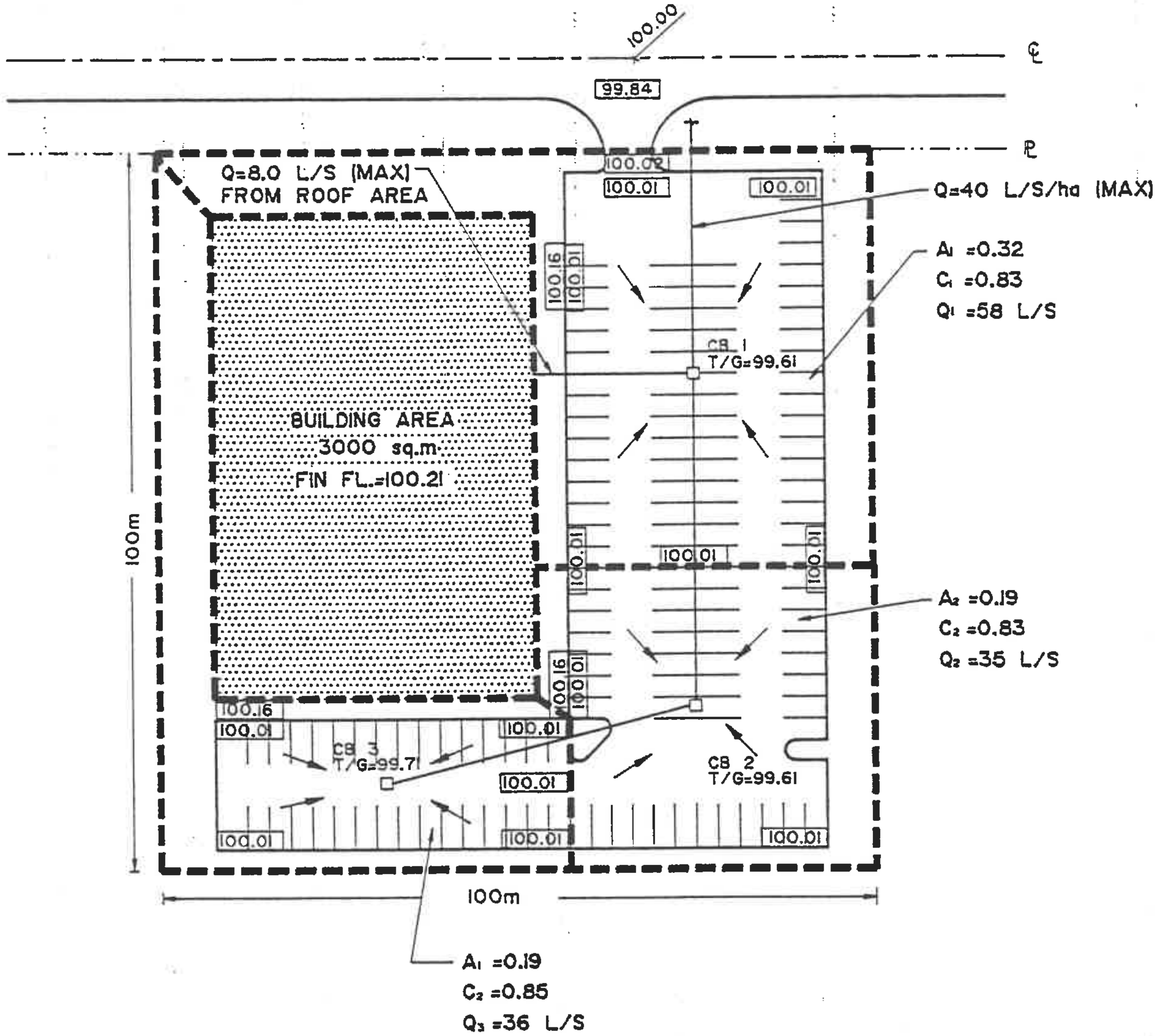
A second calculation of the required cut/fill was conducted. For this calculation, the final grade elevations along all the streets and property corners was lowered by 0.3 m. Street C was lowered marginally more. Because construction had begun on Street A, no change was made to the final grades. Street F has also been left as originally designed to provide gravity outlet for private storm systems and maintain overland major system flow routing.

Appendix D includes tables that detail the calculations used to quantity the cut/fill required along the right-of-way and the individual lots, Along the right-of-way a total of 18,148 m^3 of fill will be generated by the removal of overburden material for the pipe installation. On the private lots, a total of 93,673 m^3 of fill will be required to raise the sites to final grades which permit major overland flow drainage. This results in a total fill requirement of approximately 75,000 m^3 and represents a fill depth of about 100 mm over the site area.

The analysis was based on a typical site plan design as presented in Figure 7-2.

7.5 Final Grading

Drawing 92019-GR1 details the proposed grading for the proposed Phase II and III construction. The grading plan reflects the lower final elevations along the Streets B, C, D, E and F and adjacent property limits.



$$\text{REQUIRED DETENTION} = \frac{\{(58.5 + 35 + 36 + 8) - 40 \text{ L/S}\} \times 35\text{min.} \times 60\text{min.}}{1000 \text{ L/m}^3}$$

$$= 203.7\text{m}^3$$

DEPTH OF PONDING DURING 1:100 YEAR STORM EVENT APPROXIMATELY 0.3m ABOVE T/G AT CB 1

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CITY OF NEPEAN

SOUTH MERIVALE BUSINESS PARK

TYPICAL SITE GRADING PLAN

DATE: July, 1990

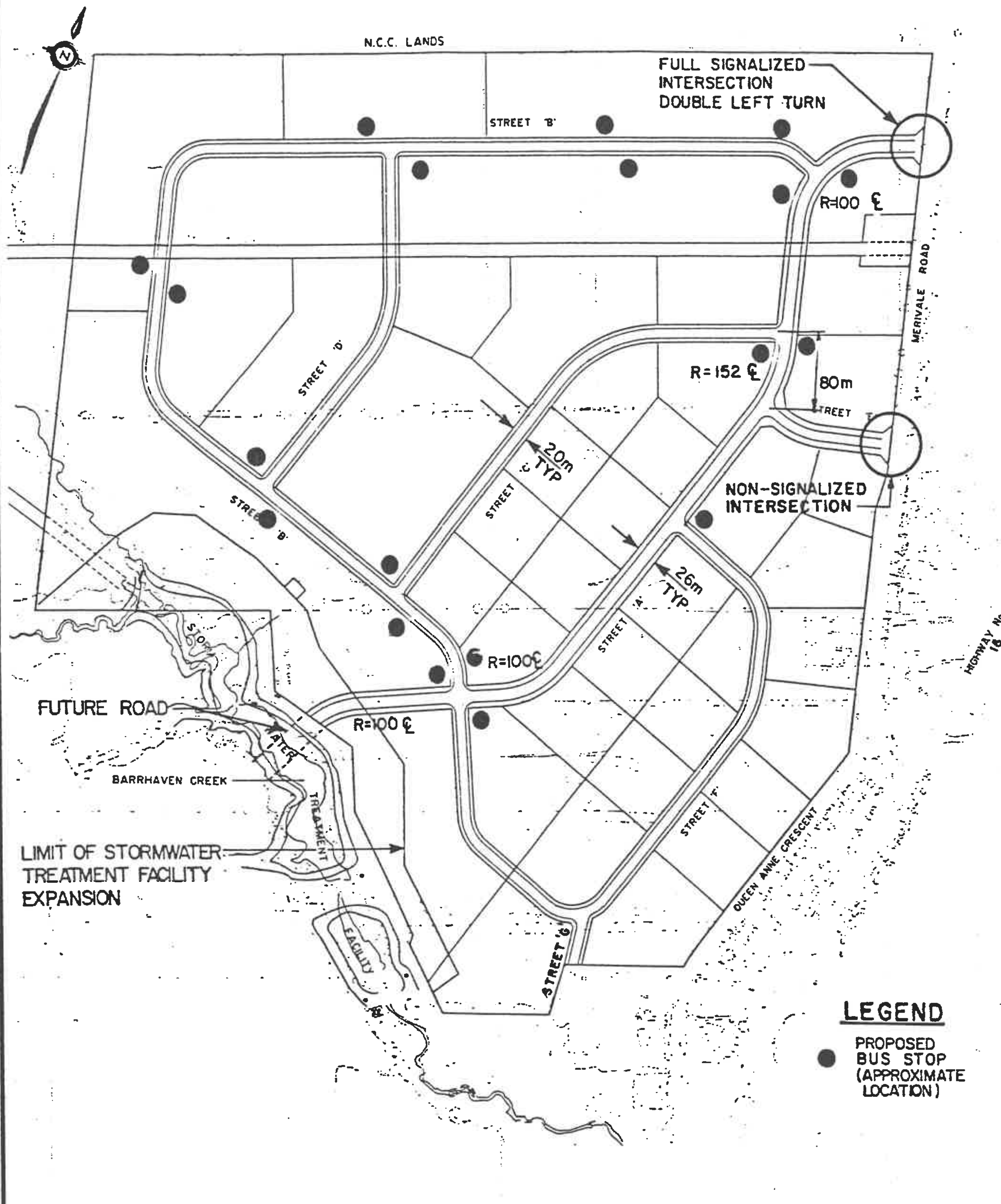
FIG. No. 7-2

8.0 BUS SERVICE AND POSTAL SERVICE

OC Transpo will provide bus service to the SMBP, however at this time they cannot confirm when service will be initiated. OC Transpo Operational Planning has confirmed:

- the bus stop locations shown on Figure 3
- that bus bays are not required
- that the requirement for bus shelter bases will be specified as a condition of site plan approval

Canada Post has confirmed that the business park will be serviced via group mail boxes, supplied by Canada Post, as required. Buildings with three or more businesses can install a centralized mailing facility. The purchasing, installation and maintenance of this facility is the building owner or developer's responsibility.



NOVATECH ENGINEERING CONSULTANTS LTD OTTAWA, ONTARIO	CITY OF NEPEAN	**SOUTH MERIVALE BUSINESS PARK**	
		INTERNAL ROAD SYSTEM	DATE: AUG. 91
			FIG. No. 3

CORPORATE AUTHORIZATION

This document entitled City of Nepean South Merivale Business Park, Phase 2 and 3 Services Design Report was prepared by Novatech Engineering Consultants Ltd.

Prepared by:

Lee Jablonski, P.Eng.

Reviewed By:

Udo Boehme, P.Eng.

APPENDIX A

SANITARY SEWER DESIGN SHEETS

SANITARY SEWER DESIGN SHEET

DESIGNED BY : LJ	PROJECT:	SOUTH MERIVALE BUSINESS PARK Phases II and III	
CHECKED BY :	DEVELOPER:	CITY OF NEPEAN	DATE: June 22, 1992
	ENGINEERS:	NOVATECH ENGINEERING CONSULTANTS LTD.	Revision:

LOCATION			INDIVIDUAL		CUMMULATIVE		PEAKING	POP FLOW	PEAK EXTRAN.	PEAK DESIGN	PROPOSED SEWER					
STREET	FROM M.H.	TO M.H.	POP	AREA (ha)	POP	AREA (ha)	FACTOR M	Q (p) (L/s)	FLOW Q (i) (L/s)	FLOW Q (d) (L/s)	LENGTH (m)	PIPE SIZE (mm)	TYPE OF PIPE	GRADE %	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)
'F'	19	10	190	1.9	190	1.9	2.80	2.77	0.21	2.98	154.0	250	PVC	0.30	33.98	0.67
'F'	20	21	120	1.2	120	1.2	2.80	1.75	0.13	1.88	58.0	250	PVC	0.30	33.98	0.67
'F'	21	22	210	2.1	330	3.3	2.80	4.81	0.36	5.18	80.0	250	PVC	0.30	33.98	0.67
'F'	22	23	250	2.5	580	5.8	2.80	8.46	0.64	9.10	111.0	250	PVC	0.30	33.98	0.67
'F'	23	24	150	1.5	730	7.3	2.80	10.65	0.80	11.45	80.0	250	PVC	0.30	33.98	0.67
Flow From Future Development Into Manhole																
			170	1.7												
'F'	24	26	210	2.1	1110	11.1	2.80	16.19	1.22	17.41	64.0	250	PVC	0.30	33.98	0.67

q = average daily per cap. flow (450 L/cap. d)
I = unit of peak extraneous flow (0.11 L/ha/s)
M = peaking factor =2.8

Q (p) = peak population flow (L/s)
Q (i) = peak extraneous flow (L/s)
Q (d) = peak design flow (L/s)

Q (p) = (P*q*M)/(86,400) (L/s) n = 0.013
Q (i) = I*A (L/s), A in hectares
Q (d) = Q (p) + Q (i) (L/s)

SANITARY SEWER DESIGN SHEET

DESIGNED BY : LJ

CHECKED BY :

PROJECT: SOUTH MERIVALE BUSINESS PARK Phases II and III

DEVELOPER: CITY OF NEPEAN

ENGINEERS: NOVATECH ENGINEERING CONSULTANTS LTD.

DATE: SEPTEMBER 6, 1990

Revision:

LOCATION			INDIVIDUAL		CUMMULATIVE		PEAKING	POP FLOW	PEAK EXTRAN.	PEAK DESIGN	PROPOSED SEWER					
STREET	FROM M.H.	TO M.H.	POP	AREA (ha)	POP	AREA (ha)	FACTOR M	Q (p) (L/s)	FLOW Q (i) (L/s)	FLOW Q (d) (L/s)	LENGTH (m)	PIPE SIZE (mm)	TYPE OF PIPE	GRADE %	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)
'F'	26	27	130	1.3	1240.0	12.4	2.80	18.08	1.36	19.45	64.0	250	PVC	0.30	33.98	0.67
'F'	27	28	120	1.2	1360	13.6	2.80	19.83	1.50	21.33	66.0	250	PVC	0.30	33.98	0.67
'F'	28	29	60	0.6	1420	14.2	2.80	20.71	1.56	22.27	24.0	250	PVC	0.30	33.98	0.67
'F'	29	14	70	0.7	1490	14.9	2.80	21.73	1.64	23.37	150.0	250	PVC	0.30	33.98	0.67
'D'	62	59	130	1.3	130	1.3	2.80	1.90	0.14	2.04	44.0	250	PVC	0.30	33.98	0.67
'D'	59	58	190	1.9	320	3.2	2.80	4.67	0.35	5.02	87.0	250	PVC	0.30	33.98	0.67
'D'	58	35	120	1.2	440	4.4	2.80	6.42	0.48	6.90	110.0	250	PVC	0.31	33.98	0.67

q = average daily per cap. flow (450 L/cap. d)

I = unit of peak extraneous flow (0.11 l/ha/s)

M = peaking factor = 2.8

Q (p) = peak population flow (L/s)

Q (i) = peak extraneous flow (L/s)

Q (d) = peak design flow (L/s)

Q (p) = (P*q*M)/(86,400) (L/s)   n = 0.013

Q (i) = I*A (L/s), A in hectares

Q (d) = Q (p) + Q (i) (L/s)

PROJECT: SOUTH MERIVALE BUSINESS PARK Phases II and III

DEVELOPER: CITY OF NEPEAN

ENGINEERS: NOVATECH ENGINEERING CONSULTANTS LTD.

DATE: June 22, 1992

Revision:

DESIGNED BY : SG

CHECKED BY : LJ

LOCATION			INDIVIDUAL		CUMMULATIVE		PEAKING	POP FLOW	PEAK EXTRAN.	PEAK DESIGN	PROPOSED SEWER					
STREET	FROM M.H.	TO M.H.	POP	AREA (ha)	POP	AREA (ha)	FACTOR M	Q (p) (L/s)	FLOW Q (i) (L/s)	FLOW Q (d) (L/s)	LENGTH (m)	PIPE SIZE (mm)	TYPE OF PIPE	GRADE %	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)
'B'	40	39	360	3.6	360	3.6	2.80	5.25	0.40	5.65	113.0	250	PVC	0.30	33.98	0.67
'B'	39	38	240	2.4	600	6.0	2.80	8.75	0.66	9.41	95.0	250	PVC	0.30	33.98	0.67
'B'	38	37	160	1.6	760	7.6	2.80	11.08	0.84	11.92	61.0	250	PVC	0.30	33.98	0.67
'B'	37	36	160	1.6	920	9.2	2.80	13.42	1.01	14.43	60.8	250	PVC	0.30	33.98	0.67
'B'	36	35	90	0.9	1010	10.1	2.80	14.73	1.11	15.84	75.0	250	PVC	0.30	33.98	0.67
'B'	35	34	130	1.3	1580	15.8	2.80	23.04	1.74	24.78	106.0	250	PVC	0.30	33.98	0.67
'B'	41	42	290	2.9	290	2.9	2.80	4.23	0.32	4.55	110.0	250	PVC	0.30	33.98	0.67
'B'	42	43	190	1.9	480	4.8	2.80	7.00	0.53	7.53	113.0	250	PVC	0.30	33.98	0.67

q = average daily per cap. flow (450 L/cap. d)

I = unit of peak extraneous flow (0.11 l/ha/s)

Q (p) = peak population flow (L/s)

Q (i) = peak extraneous flow (L/s)

Q (p) = (P*q*M)/(86,400) (L/s)

Q (i) = I*A (L/s), A in hectares

n = 0.013

SANITARY SEWER DESIGN SHEET

PROJECT: **SOUTH MERIVALE BUSINESS PARK Phases II and III**

DESIGNED BY : LJ

DEVELOPER: **CITY OF NEPEAN**

DATE: SEPTEMBER 6, 1990

CHECKED BY :

ENGINEERS: **NOVATECH ENGINEERING CONSULTANTS LTD.**

Revision:

LOCATION			INDIVIDUAL		CUMMULATIVE		PEAKING	POP FLOW	PEAK EXTRAN.	PEAK DESIGN	PROPOSED SEWER					
STREET	FROM M.H.	TO M.H.	POP	AREA (ha)	POP	AREA (ha)	FACTOR M	Q (p) (L/s)	FLOW Q (i) (L/s)	FLOW Q (d) (L/s)	LENGTH (m)	PIPE SIZE (mm)	TYPE OF PIPE	GRADE %	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)
'B'	49	47	170	1.7	170	1.7	2.80	2.48	0.19	2.67	105.0	250	PVC	0.30	33.98	0.67
'B'	47	46	200	2.0	370	3.7	2.80	5.40	0.41	5.80	86.0	250	PVC	0.30	33.98	0.67
'B'	46	45	220	2.2	590	5.9	2.80	8.60	0.65	9.25	99.0	250	PVC	0.30	33.98	0.67
'B'	45	44	230	2.3	820	8.2	2.80	11.96	0.90	12.86	101.0	250	PVC	0.30	33.98	0.67
'B'	44	43	160	1.6	980	9.8	2.80	14.29	1.08	15.37	97.0	250	PVC	0.30	33.98	0.67
'D'	43	62	120	1.2	1580	15.8	2.80	23.04	1.74	24.78	118.0	250	PVC	0.30	33.98	0.67
'D'	61	62	160	1.6	160	1.6	2.80	2.33	0.18	2.51	38.0	250	PVC	0.30	33.98	0.67

q = average daily per cap. flow (450 L/cap. d)
I = unit of peak extraneous flow (0.11 l/ha/s)
M = peaking factor = 2.8

Q (p) = peak population flow (L/s)
Q (i) = peak extraneous flow (L/s)
Q (d) = peak design flow (L/s)

Q (p) = (P*q*M)/(86,400) (L/s)
Q (i) = I*A (L/s), A in hectares
Q (d) = Q (p) + Q (i) (L/s)

n = 0.013

SANITARY SEWER DESIGN SHEET

PROJECT: **SOUTH MERIVALE BUSINESS PARK Phases II and III** — PAGE: 5 of 5

DESIGNED BY : LJ — DEVELOPER: **CITY OF NEPEAN** — DATE: June 22, 1992

CHECKED BY : — ENGINEERS: **NOVATECH ENGINEERING CONSULTANTS LTD.** — Revision:

LOCATION			INDIVIDUAL		CUMMULATIVE		PEAKING	POP FLOW	PEAK EXTRAN.	PEAK DESIGN	PROPOSED SEWER					
STREET	FROM M.H.	TO M.H.	POP	AREA (ha)	POP	AREA (ha)	FACTOR M	Q (p) (L/s)	FLOW Q (i) (L/s)	FLOW Q (d) (L/s)	LENGTH (m)	PIPE SIZE (mm)	TYPE OF PIPE	GRADE %	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)
'E'	17	8	120	1.2	120	1.2	2.80	1.75	0.13	1.88	111.3	250	PVC	0.30	33.98	0.67

q = average daily per cap. flow (450 L/cap. d)

I = unit of peak extraneous flow (0.11 l/ha/s)

M = peaking factor = 2.8

Q (p) = peak population flow (L/s)

Q (i) = peak extraneous flow (L/s)

Q (d) = peak design flow (L/s)

Q (p) = (P*q*M)/(86,400) (L/s)

Q (i) = I*A (L/s), A in hectares

Q (d) = Q (p) + Q (i) (L/s)

n = 0.013

SANITARY SEWER DESIGN SHEET

DESIGNED BY : SG
CHECKED BY : LJ

PROJECT: SOUTH MERIVALE BUSINESS PARK - PHASE 1
DEVELOPER: CITY OF NEPEAN
ENGINEERS: NOVATECH ENGINEERING CONSULTANTS LTD.

DATE: NOV. 5, 1991
Revision: Dec. 31/91

LOCATION			INDIVIDUAL		CUMULATIVE		PEAKING	POP FLOW	PEAK EXTRAN.	PEAK DESIGN	PROPOSED SEWER					
STREET	FROM M.H.	TO M.H.	POP	AREA (ha)	POP	AREA (ha)	FACTOR M	Q (p) (L/s)	FLOW Q (I) (L/s)	FLOW Q (d) (L/s)	LENGTH (m)	PIPE SIZE (mm)	TYPE OF PIPE	GRADE %	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)
'A'	EXT.	15A	Constant Flow from Longfield-Davidson Heights = 249.45 L/s*							249.45		750	CONC	0.15	449.81	0.99
	15A	15								249.45	18.0	750	CONC	0.15	449.81	0.99
	15	14	200	2.0	200	2.0	2.80	2.92	0.22	252.59	105.0	750	CONC	0.15	449.81	0.99
Flow from Street 'B' into MH 34:			1580	15.8												
'B'	34	33	170	1.7	1750	17.5	2.80	25.52	1.83	27.45	84.0	375	CONC	0.18	77.60	0.68
Flow from Street 'C' into MH 33:			830	8.3												
'B'	33	32	110	1.1	2690	26.9	2.80	39.23	2.96	42.19	79.0	375	CONC	0.18	77.60	0.68
	32	31			2690	26.9	2.80	39.23	2.96	42.19	27.5	375	CONC	0.18	77.60	0.68
	31	14			2690	26.9	2.80	39.23	2.96	42.19	34.0	375	CONC	0.18	77.60	0.68

* Constant flow from external area = 249.45 L/s per Delcan Design Sheet dated 91.10.21

q = average daily per cap. flow (450 L/cap. d)
I = unit of peak extraneous flow (0.11 l/ha/s)
M = peaking factor = 2.8 for Light Industrial land use

Q (p) = peak population flow (L/s)
Q (I) = peak extraneous flow (L/s)
Q (d) = peak design flow (L/s)

Q (p) = (P*q*M)/(86,400) (L/s)
Q (I) = I*A (L/s), A in hectares
Q (d) = Q (p) + Q (I) (L/s)

n = 0.013

SANITARY SEWER DESIGN SHEET

DESIGNED BY : SG
CHECKED BY : LJ

PROJECT: SOUTH MERIVALE BUSINESS PARK - PHASE 1
DEVELOPER: CITY OF NEPEAN
ENGINEERS: NOVATECH ENGINEERING CONSULTANTS LTD.

DATE: NOV. 4, 1991
Revision: Dec. 31/91

LOCATION			INDIVIDUAL		CUMULATIVE		PEAKING	POP FLOW	PEAK EXTRAN.	PEAK DESIGN	PROPOSED SEWER					
STREET	FROM M.H.	TO M.H.	POP	AREA (ha)	POP	AREA (ha)	FACTOR M	Q (p) (L/s)	FLOW Q (i) (L/s)	FLOW Q (d) (L/s)	LENGTH (m)	PIPE SIZE (mm)	TYPE OF PIPE	GRADE %	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)
Flow from Street 'F' into MH 14:			1540	15.4												
'A'	14	13	120	1.2	4550	45.5	2.80	66.35	5.01	320.81	72.0	750	CONC	0.14	434.56	0.95
	13	12	120	1.2	4670	46.7	2.80	68.10	5.14	322.69	40.5	750	CONC	0.14	434.56	0.95
	12	11	220	2.2	4890	48.9	2.80	71.31	5.38	326.14	119.0	750	CONC	0.15	449.81	0.99
	11	10	260	2.6	5150	51.5	2.80	75.10	5.67	330.22	115.0	750	CONC	0.15	449.81	0.99
Flow from Street 'F' into MH 10:			190	1.9												
'A'	10	9	180	1.8	5520	55.2	2.80	80.50	6.07	336.02	86.5	750	CONC	0.15	449.81	0.99
	9	8	140	1.4	5660	56.6	2.80	82.54	6.23	338.22	86.0	750	CONC.	0.15	449.81	0.99

q = average daily per cap. flow (450 L/cap. d)
I = unit of peak extraneous flow (0.11 l/ha/s)
M = peaking factor = 2.8 for Light Industrial land use

Q (p) = peak population flow (L/s)
Q (i) = peak extraneous flow (L/s)
Q (d) = peak design flow (L/s)

Q (p) = (P*q*M)/(86,400) (L/s)
Q (i) = I*A (L/s), A in hectares
Q (d) = Q (p) + Q (i) (L/s)

n = 0.013

SANITARY SEWER DESIGN SHEET

PROJECT: SOUTH MERIVALE BUSINESS PARK - PHASE 1

DEVELOPER: CITY OF NEPEAN

ENGINEERS: NOVATECH ENGINEERING CONSULTANTS LTD.

DATE: NOV.4, 1991

Revision: Dec. 31/91

DESIGNED BY : SG

CHECKED BY : LJ

LOCATION			INDIVIDUAL		CUMULATIVE		PEAKING	POP FLOW	PEAK EXTRAN.	PEAK DESIGN	PROPOSED SEWER					
STREET	FROM M.H.	TO M.H.	POP	AREA (ha)	POP	AREA (ha)	FACTOR M	Q (p) (L/s)	FLOW Q (i) (L/s)	FLOW Q (d) (L/s)	LENGTH (m)	PIPE SIZE (mm)	TYPE OF PIPE	GRADE %	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)
Flow from Street 'E' into MH 8:			-120	1.2												
'A'	8	7	250	2.5	6030	60.3	2.80	87.94	6.63	344.02	44.0	750	CONC	0.16	464.57	1.02
	7	6			6030	60.3	2.80	87.94	6.63	344.02	44.0	750	CONC	0.16	464.57	1.02
	6	5	250	2.5	6280	62.8	2.80	91.58	6.91	347.94	96.0	750	CONC	0.16	464.57	1.02
'A'	1	2	230	2.3	230	2.3	2.80	3.35	0.25	3.61	23.5	250	PVC	0.30	33.98	0.67
	2	3			230	2.3	2.80	3.35	0.25	3.61	49.0	250	PVC	0.30	33.98	0.67
	3	4	190	1.9	420	4.2	2.80	6.13	0.46	6.59	43.0	250	PVC	0.30	33.98	0.67
	4	5			420	4.2	2.80	6.13	0.46	6.59	56.0	250	PVC	0.30	33.98	0.67
'A'	* Service Connections:															
		S9			290	2.9	2.80	4.23	0.32	4.55		250	PVC	1.00	62.04	1.22

q = average daily per cap. flow (450 L/cap. d)

I = unit of peak extraneous flow (0.11 l/ha/s)

M = peaking factor = 2.8 for Light Industrial land use

Q (p) = peak population flow (L/s)

Q (i) = peak extraneous flow (L/s)

Q (d) = peak design flow (L/s)

Q (p) = (P*q*M)/(86,400) (L/s)

Q (i) = I*A (L/s), A in hectares

Q (d) = Q (p) + Q (i) (L/s)

n = 0.013

* Note: 10 service connections - worst case @ manhole S9

APPENDIX B

DELCAN CORRESPONDENCE DATED OCTOBER 21, 1991

REÇU/RECEIVED
OCT 28 1991
30041

DELCAN

ENGINEERS
PLANNERS
ARCHITECTS

35 YEARS

1991 10 21

Our Ref: 04-1917-G-00

Mrs. Susan Gordon, P.Eng.
Novatech Engineering Consultants Ltd.
Suite 17
77 Auriga Drive
Nepean, Ontario
K2E 7Z7

Dear Susan:

We are pleased to transmit herein, on behalf of the City of Nepean, copies of the sanitary sewer design sheets, dated October 91, for Longfields/Davidson as prepared by Oliver, Mangione, McCalla and Associates Limited and Delcan's design sheet for the sanitary sewers located in the collector road crossing the ravine. Sanitary sewer design for the collector road sewers is based on OMM design flows as shown. Please note that the review of the derivation of these flows is beyond our terms of reference.

Should you have any questions, please do not hesitate to call.

Yours very truly,

J.R. Allen, P.Eng.
Project Manager

PJH:lmb

Encl.

cc: Wayne Newell, P.Eng.
City of Nepean

FOR CIRCULATION

INFO	ACTION	NAME
		MH
		DM
		JR
	7B	UB
		RC
		BA
		JD
		GM
		DW
		ED
		TG
		KS
		PF
		AH
		GC
		LC
		CAD
✓		SG.

DELCAN CORPORATION
2001 THURSTON DRIVE, P.O. BOX 8004, OTTAWA, ONTARIO, K1G 3H6 • (613) 738-4160 TELEX 05-9666-89
FAX (613) 739-7105
ST. JOHNS, TORONTO, MONTREAL, HAMILTON, NIAGARA FALLS, LONDON, THUNDER BAY, WINNIPEG, REGINA, SASKATOON
CALGARY, VICTORIA, VANCOUVER, NANAIMO

OLIVER, MANGIONE, McCAL' \ ASSOCIATES LIMITED

CONSULTING ENGINEERS, HYDROGEOLOGISTS & PLANNERS

Job: 87-5765

October 18, 1991

Sanitary Sewer Computation Sheets

Criteria Used

The following flows were utilized in the design of the sanitary trunk sewer system.

Description	Design Criteria	Peaking Factor
Residential	454 L/cap/day	Harmon William Equation
Commercial	37,128 L/ha/day (85 persons/ha)	Harmon William Equation
Institutional	37,128 L/ha/day (85 persons/ha)	Harmon William Equation
Infiltration	0.11 L/ha/day	MOE Graph

The following densities taken from the City of Nepean Planning Committee report, South Urban Center.

1. Low and medium density residential is assumed to consist of 44.5 people per ha.
2. Medium and high density residential 190 people per ha.
3. Transitway and parkland have been included as low and medium density residential.

SANITARY SEWER DESIGN SHEET

q = average daily per capita flow (___ L/cap.d)
I = unit of peak extraneous flow (___ L/ha.s)
M = peaking factor
Q(p) = peak population flow (L/s)
Q(i) = peak extraneous flow (L/s)
Q(d) = peak design flow

$M = 1 + \frac{14}{4 + P^{0.5}}$ where P = population in 1000's

$Q(p) = \frac{PqM}{86.4}$ (L/s)

Q(i) = IA (L/s) where A = area in hectares
Q(d) = Q(p) + Q(i) (L/s)

LOCATION			INDIVIDUAL		CUMULATIVE		Peaking factor M	Pop. flow Q(p) (L/s)	Peak extraneous flow Q(i) (L/s)	Peak design flow Q(d) (L/s)	PROPOSED SEWER						
STREET	FROM	TO	Pop.	Area A (hectares)	Pop.	Area A (hectares)					Length (m)	Pipe size (mm)	Type of pipe	Grade %	Capacity (L/s) n =	Full flow velocity (m/s)	Actual vel at Q(d)
*Collector Rd.	South P.L.	North P.L.	-	-	8623	193.31	2.99	145.3	22.81	168.16							
						65.19	2.70	75.4	5.89	81.29							
										249.45	171	675	Conc	0.15%	339.5	0.95	
											28	2-450	Conc	0.35%	352.4	1.073	

*See Oliver Mangione McCalla Design Sheets Dated Oct., 1991

DelCan DE LEUW CATHER CANADA LTD
CONSULTING ENGINEERS AND PLANNERS

DESIGN J.R. Allen	PROJECT Longfields/Davidson
CHECKED P.J. Hunt	Stormwater Management Facility
DATE 91.10.21	SHEET No. 1 of 1

Sanitary Sewer Design Sheet

OLIVER, MANGIONE, McCALLA
& ASSOCIATES LIMITED
CONSULTING ENGINEERS
154 COLONNADE ROAD SOUTH,
NEPEAN, ONTARIO K2E 7J5

PROJECT: LONGFIELDS COMMUNITY 87-5765
DEVELOPER:
ENGINEER:

DATE: OCT. 1991
DESIGNED BY: RPP
CHECKED BY:

LOCATION			INDIVIDUAL		CUMULATIVE		Peaking factor M	Population flow Q(p) (L/s)	Peak extraneous flow Q(I) (L/s)	Peak design flow Q(d) (L/s)	PROPOSED SEWER					
AREA No	FROM MANHOLE	TO MANHOLE	Population	Area A (hectares)	Population	Area A (hectares)					Length (m)	Pipe size (mm)	Type of pipe	Grade %	Capacity (L/s) n=.013	Full flow velocity (m/s)
59,61,62,60	39	41	920	20.69	920	20.69	3.85	18.60	2.27	20.88	220	250	P.V.C.	1.5	76.0	1.50
65,66,63,64,67	41	45	1232	27.7	2152	48.47	3.60	40.70	5.32	46.03	232	250	P.V.C.	0.9	58.9	1.16
301,302,303,304,305	55	53	1366	30.7												
80,81,82,198			623	14.0	1989	44.7	3.59	37.52	4.92	42.44	80	375	conc.	0.15	70.8	0.62
77,78,79	53	51	102	2.29	2091	46.99	3.57	39.23	5.17	44.40	106	375	conc	0.15	70.8	0.6[illegible]
73,74,75,76	51	49	1076	24.18	3167	71.17	3.42	56.91	7.83	64.74	198	375	conc.	0.15	70.8	0.62
71,72,52	49	47	330	7.4	3496	78.57	3.39	62.27	8.64	70.91	63	375	conc	0.15	70.8	0.62
69,70,573	47	45	51	4.78	3709	83.35	3.36	65.48	9.17	74.65	155	375	conc	0.17	74.9	0.64
AREAS SOUTH RES.			5785	110.0												
AREAS SOUTH COMM.			4165	49.0												
	345	45			9950	179	2.95	154.2	19.67	173.89	620	600	conc	0.10	202.55	0.78

q = Average daily per capita flow (450 L/cap.d.)
I = Unit of peak extraneous flow (0.11 L/sec)
M = Peaking factor

Q(p) = Peak population flow (L/S)
Q(I) = Peak extraneous flow (L/S)
Q(d) = Peak design flow (L/S)

Q(I) = IA (L/S) Where A = Area in Hectares
Q(d) = Q(p) + Q(I) (L/S)

$M = 1 + \frac{14}{4 + p^{0.5}}$ Where P = Population in 1000's

$Q(p) = \frac{PqM}{86.4}$ (L/S)

Sanitary Sewer Design Sheet

OLIVER, MANGIONE, McCALLA
& ASSOCIATES LIMITED
CONSULTING ENGINEERS
154 COLONNADE ROAD SOUTH,
NEPEAN, ONTARIO K2E 7J5

PROJECT: LONGFIELDS COMMUNITY 87-5765
DEVELOPER:
ENGINEER:

DATE: OCT 91
DESIGNED BY: RPP
CHECKED BY:

LOCATION			INDIVIDUAL		CUMULATIVE		Peaking factor M	Population flow Q(p) (L/s)	Peak extraneous flow Q(i) (L/s)	Peak design flow Q(d) (L/s)	PROPOSED SEWER					
AREA No.	FROM MANHOLE	TO MANHOLE	Population	Area A (hectares)	Population	Area A (hectares)					Length (m)	Pipe size (mm)	Type of pipe	Grade %	Capacity (L/s) n=0.013	Full flow velocity (m/s)
MH 41 → 45			2152	48.42												
- 47 - 45	45		5709	83.35												
13, 50, 51, 68	45	307	811	18.23	16,622	329.0	2.75	238.4	36.19	274.63	450	600	CONC	0.15	280	0.94
53, 56, 58, 24	307	210	1133	25.48	17,755	354.48	2.71	252.04	38.99	291.04	270	675	CONC	0.12	303.69	0.75
1, 2, 3			106	2.40							155	250	P.V.C.	1.0	62.0	1.22
200.1 COMMERCIAL	1	3	511	14.39	617	16.79	3.92	12.7	1.84	14.54						
4, 5	3	5	134	3.00	645	25.19	3.91	13.25	2.77	16.02	175	250	P.VC.	1.0	62.0	1.22
6,	5	7	25	0.56	670	25.75	3.90	13.73	2.83	16.66	75	250	PVC	1.0	62.0	1.22
7, 8, 9, 16, 15	7	9	749	16.83	1418	42.58	3.70	27.56	4.68	32.25	70	250	P.VC.	0.60	48.1	0.95
10, 11, 17, 18	9	11	579	15.02	2004	58.60	3.58	37.75	6.11	43.86	170	250	P.VC.	0.60	48.1	0.95
12, 14	11	203	350	7.87	2354	63.47	3.52	43.66	6.98	50.64	205	250	P.VC.	0.64	50.55	0.98

q = Average daily per capita flow (450 L/cap.d.)
I = Unit of peak extraneous flow (0.11 L/sec)
M = Peaking factor

Q(p) = Peak population flow (L/S)
Q(i) = Peak extraneous flow (L/S)
Q(d) = Peak design flow (L/S)

Q(i) = IA (L/S) Where A = Area in Hectares
Q(d) = Q(p) + Q(i) (L/S)

$M = 1 + \frac{14}{4 + P^{0.5}}$ Where P = Population in 1000's

$Q(p) = \frac{PqM}{86.4}$ (L/S)

Sanitary Sewer Design Sheet

OLIVER, MANGIONE, McCALLA
& ASSOCIATES LIMITED
CONSULTING ENGINEERS
154 COLONNADE ROAD SOUTH,
NEPEAN, ONTARIO K2E 7J5

PROJECT: LONGFIELDS COMMUNITY 87-5765
DEVELOPER:
ENGINEER:

DATE: OCT. 1991
DESIGNED BY: RPP
CHECKED BY:

LOCATION			INDIVIDUAL		CUMULATIVE		Peaking factor M	Population flow Q(p) (L/s)	Peak extraneous flow Q(i) (L/s)	Peak design flow Q(d) (L/s)	PROPOSED SEWER					
AREA No.	FROM MANHOLE	TO MANHOLE	Population	Area A (hectares)	Population	Area A (hectares)					Length (m)	Pipe size (mm)	Type of pipe	Grade %	Capacity (L/s) n=0.013	Full flow velocity (m/s)
19, 20, 21, 22, 23	15	209	746	16.77	746	16.77	3.88	15.20	1.84	17.05	250	250	P.V.C.	0.40	39.2	0.77
25, 26, 27, 28	19	211	477	10.72	477	10.72	4.00	10.00	1.1	11.20	200	250	P.V.C.	0.30	34.0	0.67
29, 30, 31, 32, 33, 34, 36	23	215	751	16.89	751	16.89	3.89	15.55	1.86	17.20	345	250	P.V.C.	0.30	34.0	0.67
35, 37, 38, 39	29	31	483	10.85	483	10.85	4.00	10.15	1.19	11.34	230	250	P.V.C.	0.30	34.0	0.67
41, 48, 94C	31	33	453	10.17	936	21.02										
49 (school)			240	2.82	1176	23.84	3.75	23.19	2.62	25.82	215	300	P.V.C.	0.30	55.3	0.76
40	33	35	266	5.97	1442	29.81	3.68	29.24	3.22	32.52	95	375	CONC.	0.20	81.8	0.72
46	35	217	187	4.19	1629	34.00	3.64	31.15	3.74	34.89	155	375	CONC.	0.20	81.8	0.72

q = Average daily per capita flow (454 L/cap.d.)
I = Unit of peak extraneous flow (0.11 L/sec)
M = Peaking factor

Q(p) = Peak population flow (L/S)
Q(i) = Peak extraneous flow (L/S)
Q(d) = Peak design flow (L/S)

Q(i) = IA (L/S) Where A = Area in Hectares
Q(d) = Q(p) + Q(i) (L/S)

$M = 1 + \frac{14}{4 + P^{0.5}}$ Where P = Population in 1000's

$Q(p) = \frac{PqM}{86.4}$ (L/S)

Sanitary Sewer Design Sheet

OLIVER, MANGIONE, McCALLA
& ASSOCIATES LIMITED
CONSULTING ENGINEERS
154 COLONNADE ROAD SOUTH,
NEPEAN, ONTARIO K2E 7J5

PROJECT: LONGFIELDS COMMUNITY 87-5765
DEVELOPER:
ENGINEER:

DATE: OCT. 1991
DESIGNED BY: RPP
CHECKED BY:

LOCATION			INDIVIDUAL		CUMULATIVE		Peaking factor M	Population flow Q(p) (L/s)	Peak extraneous flow Q(i) (L/s)	Peak design flow Q(d) (L/s)	PROPOSED SEWER					
AREA No	FROM MANHOLE	TO MANHOLE	Population	Area A (hectares)	Population	Area A (hectares)					Length (m)	Pipe size (mm)	Type of pipe	Grade %	Capacity (L/s) n=0.013	Full flow velocity (m/s)
84,85,98,97	57	107	606	13.62	606	13.62	3.93	12.51	1.50	14.01	370	250	PVC	0.30	34.0	0.67
86,87,89,95,96	107	105	724	16.27	1330	29.89	3.72	26.00	3.29	29.29	110	250	PVC	0.30	34.0	0.67
54,55,91,92	105	217	779	17.51	2109	47.40	3.57	39.56	5.21	44.77	290	250	PVC	0.60	48.10	0.95
88,93	-	219	396	8.91	396	8.91	4.02	8.36	0.98	9.34		250	PVC	0.40	39.2	0.77
42,43,44,45	819	919	883	19.85	883	19.85	3.83	17.77	2.18	19.95	129	250	PVC	0.40	39.2	0.77
948,949	919	219	510	9.82	1393	29.67	3.70	27.08	3.26	30.34	269	250	P.V.C.	0.30	34.0	0.67
57	-	217	123	2.76	123	2.76	4.22	2.77	0.30	3.07		250	PVC	0.50	43.9	0.87
90.	-	219	163	3.66	163	3.66	4.18	3.58	0.46	4.04		250	PVC	0.50	43.9	0.87

q = Average daily per capita flow (454 L/cap.d.)
I = Unit of peak extraneous flow (0.11 L/sec)
M = Peaking factor

Q(p) = Peak population flow (L/S)
Q(i) = Peak extraneous flow (L/S)
Q(d) = Peak design flow (L/S)

Q(i) = IA (L/S) Where A = Area in Hectares
Q(d) = Q(p) + Q(i) (L/S)

$M = 1 + \frac{14}{4 + P^{0.5}}$ Where P = Population in 1000's

$Q(p) = \frac{PqM}{86.4}$ (L/S)

OLIVER, MANGIONE, McCALLA
& ASSOCIATES LIMITED
CONSULTING ENGINEERS
154 COLONNADE ROAD SOUTH,
NEPEAN, ONTARIO K2E 7J5

Sanitary Sewer Design Sheet

PROJECT: DAVIDSON HEIGHTS 89-7257
DEVELOPER:
ENGINEER:

DATE: OCT 1991
DESIGNED BY: R.PP
CHECKED BY:

LOCATION			INDIVIDUAL		CUMULATIVE		Peaking factor M	Population flow Q(p) (L/s)	Peak extraneous flow Q(i) (L/s)	Peak design flow Q(d) (L/s)	PROPOSED SEWER					
AREA No	FROM MANHOLE	TO MANHOLE	Population	Area A (hectares)	Population	Area A (hectares)					Length (m)	Pipe size (mm)	Type of pipe	Grade %	Capacity (L/s) n=0.013	Full flow velocity (m/s)
139, 143	111	113	246	5.52	246	5.52	4.11	5.31	0.61	5.92	130	250	PVC.	0.40	39.2	0.77
144	113	115	168	3.78	414	9.30	4.02	8.74	1.02	9.76	144	250	PVC.	0.40	39.2	0.77
145	115	117	24	0.53	438	9.83	4.00	9.21	1.08	10.29	84	250	PVC.	0.40	39.2	0.77
146, 147	117	121	139	3.12	577	12.95	3.94	11.94	1.42	13.36	157	250	PVC.	0.40	39.2	0.77
140, 141, 142, 148, 149, 150	121	75	620	13.94												
153, 155			166	3.73	1363	30.62	3.71	26.57	3.37	29.94	240	300	PVC.	0.20	45.1	0.6

q = Average daily per capita flow (454 L/cap.d.)
I = Unit of peak extraneous flow (0.11 L/sec)
M = Peaking factor

Q(p) = Peak population flow (L/S)
Q(i) = Peak extraneous flow (L/S)
Q(d) = Peak design flow (L/S)

Q(i) = IA (L/S) Where A = Area in Hectares
Q(d) = Q(p) + Q(i) (L/S)

$M = 1 + \frac{14}{4 + P^{0.5}}$ Where P = Population in 1000's

$Q(p) = \frac{P q M}{86.4}$ (L/S)

OLIVER, MANGIONE, McCALLA
& ASSOCIATES LIMITED
CONSULTING ENGINEERS
154 COLONNADE ROAD SOUTH,
NEPEAN, ONTARIO K2E 7J5

Sanitary Sewer Design Sheet

PROJECT: DAVIDSON HEIGHTS 59-7257
DEVELOPER:
ENGINEER:

DATE: OCT. 1991
DESIGNED BY: RPP
CHECKED BY:

LOCATION			INDIVIDUAL		CUMULATIVE		Peaking factor M	Population flow Q(p) (L/s)	Peak extraneous flow Q(i) (L/s)	Peak design flow Q(d) (L/s)	PROPOSED SEWER					
AREA No.	FROM MANHOLE	TO MANHOLE	Population	Area A (hectares)	Population	Area A (hectares)					Length (m)	Pipe size (mm)	Type of pipe	Grade %	Capacity (L/s) n=0.013	Full flow velocity (m/s)
99 100 199	59	61	233	5.24	233	5.24	4.12	5.04	0.58	5.62	170	250	P.V.C.	1.0	62.0	1.22
AREA 100 2.25 ha RES. 0.5 ha COMM.																
101, 102, 105	61	63	510	11.46												
100 (comm)			43	0.50	786	17.20	3.86	15.94	1.89	17.83	254	250	P.V.C.	0.30	34.0	0.67
103, 104	63	65	221	4.96	1007	22.16	3.80	20.11	2.44	22.55	114	300	P.V.C.	0.20	45.1	0.62
106	65	67	134	3.02	1141	25.18	3.76	22.54	2.77	25.31	100	300	P.V.C.	0.20	45.1	0.62
	67	69			1141	25.18	3.76	22.54	2.77	25.31	97	300	P.V.C.	0.20	45.1	0.62
107, 108, 109, 110	69	71	349	7.85	1490	33.03	3.68	29.41	3.63	32.44	138	300	P.V.C.	0.20	45.1	0.62
112, 113, 114, 115, 116, 119, 120	71	73	598	13.43												
121, 122, 111			132	2.96	2220	49.42	3.55	41.41	5.44	46.85	86	375	CONC.	0.16	73.62	0.65
123, 124, 125	73	75	259	5.81	2479	55.23	3.51	45.72	6.08	51.80	105	375	CONC.	0.16	73.62	0.65
150 444	75	77	178	4.00												
FROM PG.5 (MH121 → MH75)			1363	30.62												
MH75→775			2479	55.23	4020	89.85	3.33	70.34	9.88	80.22	130	375	CONC.	0.25	91.30	0.80

q = Average daily per capita flow (450 L/cap.d.)
I = Unit of peak extraneous flow (0.11 L/sec)
M = Peaking factor

Q(p) = Peak population flow (L/S)
Q(i) = Peak extraneous flow (L/S)
Q(d) = Peak design flow (L/S)

Q(i) = IA (L/S) Where A = Area in Hectares

Q(d) = Q(p) + Q(i) (L/S)

$M = 1 + \frac{14}{4 + P^{0.5}}$ Where P = Population in 1000's

$Q(p) = \frac{P q M}{86.4}$ (L/S)

OLIVER, MANGIONE, McCALLA
& ASSOCIATES LIMITED
CONSULTING ENGINEERS
154 COLONNADE ROAD SOUTH,
NEPEAN, ONTARIO K2E 7J5

Sanitary Sewer Design Sheet

PROJECT: DAVIDSON HEIGHTS 89-7257
DEVELOPER:
ENGINEER:

DATE: OCT. 1991
DESIGNED BY: RHP
CHECKED BY:

LOCATION			INDIVIDUAL		CUMULATIVE		Peaking factor M	Population flow Q(p) (L/s)	Peak extraneous flow Q(I) (L/s)	Peak design flow Q(d) (L/s)	PROPOSED SEWER					
AREA No.	FROM MANHOLE	TO MANHOLE	Population	Area A (hectares)	Population	Area A (hectares)					Length (m)	Pipe size (mm)	Type of pipe	Grade %	Capacity (L/s) n=0.013	Full flow velocity (m/s)
127, 129, 137, 138	77	79	377	8.47	4397	98.32	3.30	76.24	10.81	87.06	290	375	CONC.	0.25	91.50	0.80
128, 136, 154	79	81	452	10.16	4849	108.48	3.25	82.80	11.93	94.34	50	375	CONC.	0.30	100.20	0.88
MH 79 → MH 81	81	85	4849	108.48												
FUTURE AREA SOUTH OF DAVIDSON RD.			3382	76.00	6746	196.05	3.00	137.85	9.60	147.46						
120, 117, [illegible], 131, 132, 135,			5154	11.57												
FUTURE AREA SOUTH OF DAVIDSON (END), 232 (MID)				42.25		42.25	3.20	70.4	4.64	75.04						
										222.52	214	675	CONC.	0.12	303.56	0.82
133, 134, 151, 152	85	89	506	11.39	9251	207.45	2.95	145.3	22.81	168.16						
235 END.				11.37		55.62	2.70	75.4	5.89	81.29						
										249.45	211	675	CONC.	0.15	339.52	0.95

q = Average daily per capita flow (450 L/cap.d.)
I = Unit of peak extraneous flow (0.11 L/sec)
M = Peaking factor

Q(p) = Peak population flow (L/S)
Q(I) = Peak extraneous flow (L/S)
Q(d) = Peak design flow (L/S)

Q(I) = IA (L/S) Where A = Area in Hectares
Q(d) = Q(p) + Q(I) (L/S)

$M = 1 + \frac{14}{4 + P^{0.5}}$ Where P = Population in 1000's

$Q(p) = \frac{PqM}{86.4}$ (L/S)

Sanitary Sewer Design Sheet

OLIVER, MANGIONE, McCALLA
& ASSOCIATES LIMITED
CONSULTING ENGINEERS
154 COLONNADE ROAD SOUTH,
NEPEAN, ONTARIO K2E 7J5

PROJECT: LONGFIELDS COMMUNITY 87-576S
DEVELOPER:
ENGINEER:

DATE: OCT 1991
DESIGNED BY: SP
CHECKED BY:

LOCATION			INDIVIDUAL		CUMULATIVE		Peaking factor M	Population flow Q(p) (L/s)	Peak extraneous flow Q(I) (L/s)	Peak design flow Q(d) (L/s)	PROPOSED SEWER					
STREET	FROM MANHOLE	TO MANHOLE	Population	Area A (hectares)	Population	Area A (hectares)					Length (m)	Pipe size (mm)	Type of pipe	Grade %	Capacity (L/s) n=.013	Full flow velocity (m/s)
EXISTING SEWER	201	203														
EXIST. BARRHAVEN			18,423	414	18,423	414	2.67	258	45.5	304	110	750	CONC	.86	1077	2.36
EXIST. BARRHAVEN	203	210	18,423	414												
11-203			2,354	63.47	10,777	477	2.63	2876	52.4	340	500	750	CONC	.3	636.2	1.39
EXIST BARRHAVEN	210	211	21,195	4763												
11-203			2354	63.47												
307-210			12,755	35448												
15-209			746	16.77	42,050	910.72	2.3	508.2	100.17	608.3	220	900	CONC	.14	706.6	1.28
	211	213	42,050	910.72												
19-211			477	10.72	42,527	921.44	2.33	520.60	101.35	622.02	287	900	CONC	.14	706.6	1.28
	215	217	42,527	921.44												
23-215			751	16.89	43278	938.33	2.32	527.59	103.21	630.80	190	900	CONC	.14	706.6	1.28
	217	219	42527	921.44												
105-217			2109	47.4												
217			123	2.76	44759	971.16	2.31	543.29	106.82	650.12	450	900	CONC	.14	706.6	1.28

q = Average daily per capita flow (___ L/cap.d.)
I = Unit of peak extraneous flow (___ L/sec)
M = Peaking factor

Q(p) = Peak population flow (L/S)
Q(I) = Peak extraneous flow (L/S)
Q(d) = Peak design flow (L/S)

Q(I) = IA (L/S) Where A = Area in Hectares
Q(d) = Q(p) + Q(I) (L/S)

$M = 1 + \frac{14}{4 + P^{0.5}}$ Where P = Population in 1000's

$Q(p) = \frac{PqM}{86.4}$ (L/S)

Sanitary Sewer Design Sheet

OLIVER, MANGIONE, McCALLA & ASSOCIATES LIMITED
CONSULTING ENGINEERS
154 COLONNADE ROAD SOUTH,
NEPEAN, ONTARIO K2E 7J5

PROJECT: LONGFIELDS COMMUNITY 87-5765
DEVELOPER:
ENGINEER:

DATE: OCT 1991
DESIGNED BY: SP
CHECKED BY:

LOCATION			INDIVIDUAL		CUMULATIVE		Peaking factor M	Population flow Q(p) (L/s)	Peak extraneous flow Q(i) (L/s)	Peak design flow Q(d) (L/s)	PROPOSED SEWER					
STREET	FROM MANHOLE	TO MANHOLE	Population	Area A (hectares)	Population	Area A (hectares)					Length (m)	Pipe size (mm)	Type of pipe	Grade %	Capacity (L/s) n=.013	Full flow velocity (m/s)
	219	GOODARD??	44759	971.16												
919-219			1393	29.67												
			163	3.66	46,315	1,004.49	2.29	557.3	110.49	667.8	160	900	Conc	.14	706.6	1.18

q = Average daily per capita flow (___ L/cap.d.)
I = Unit of peak extraneous flow (___ L/sec)
M = Peaking factor

Q(p) = Peak population flow (L/S)
Q(i) = Peak extraneous flow (L/S)
Q(d) = Peak design flow (L/S)

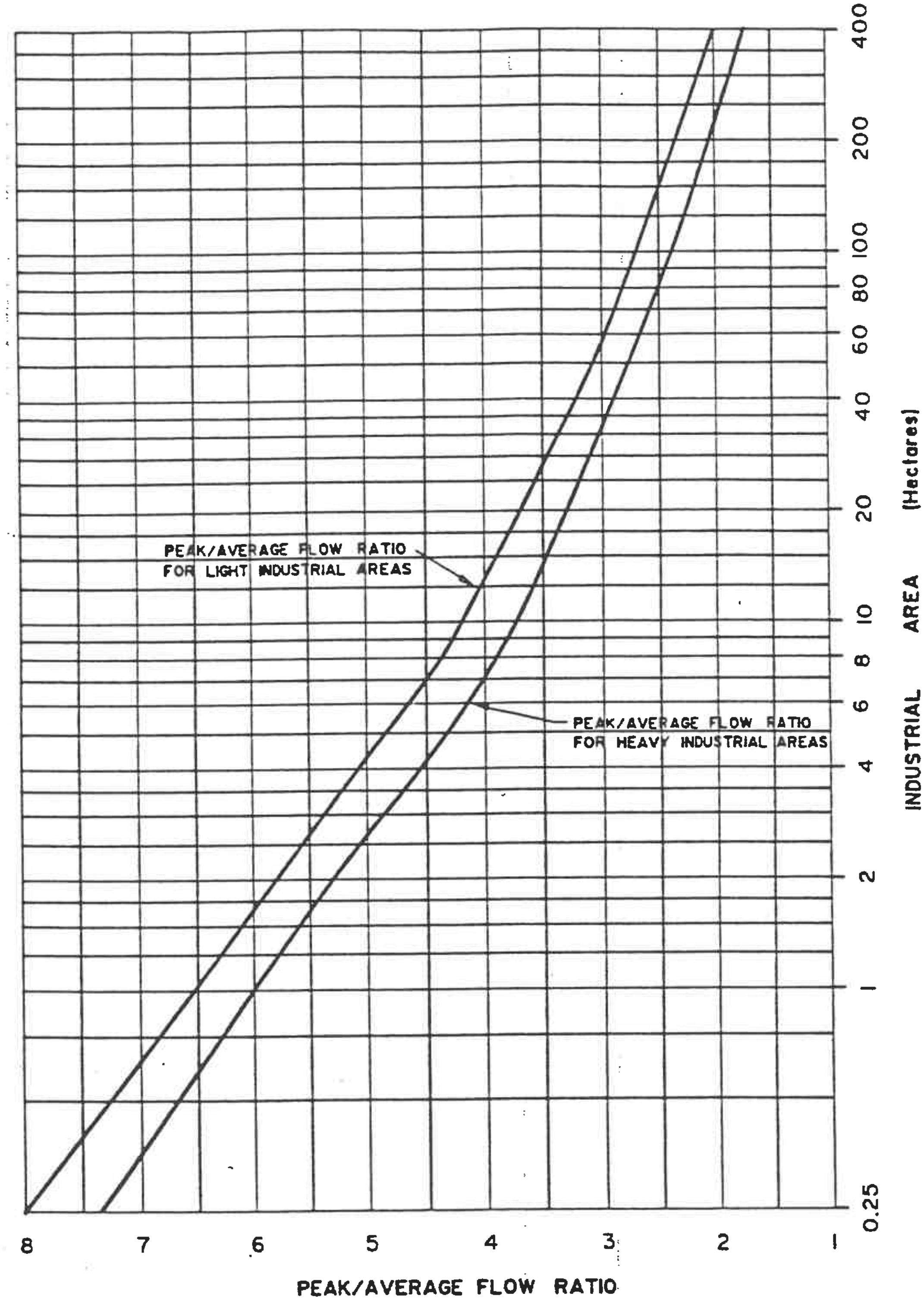
Q(i) = IA (L/S) Where A = Area in Hectares
Q(d) = Q(p) + Q(i) (L/S)

$M = 1 + \frac{14}{4 + P^{0.5}}$ Where P = Population in 1000's

$Q(p) = \frac{PqM}{86.4}$ (L/S)

APPENDIX C

INDUSTRIAL SEWAGE FLOW - PEAKING FACTORS



Regional Municipality of Ottawa - Carleton Environmental Services Department

DESIGN GUIDELINES

SECTION 7 - SANITARY SEWER DESIGN

TYPICAL INDUSTRIAL SEWAGE FLOW PEAKING FACTORS

APPENDIX E

Date: JUNE 1991

Rev.:

Figure: 1

APPENDIX D

CUT/FILL TABLES AND INFORMATION SHEETS FOR LOTS AND RIGHT-OF-WAY

South Merivale Business Park Cut Fill Analysis
June 12, 1992

Street	Station	Existing Elev.	Final Elev.	Sub-bas Elev.	Delta E	Average Cut / Fill Area	Cut/Fill Volume	Base San Trench	San Trench Width	San Trench Area	T/Stm Elev.	Base Stm Trench	Trench Width	Stm Trench Area	Trench Cut Area	San/Stm Cut Vol	Total Cut / Fill
A	R.O.W. = 26 m		Lane width = 14 m														
	1000	89.25	89.90	89.10	-0.15	1.1		82.31	1.15	1.38	0.00	0.00	2.00	0.00	1.38		
	1050	89.30	90.12	89.32	0.02	6.3	187	82.24	1.15	1.38	87.20	86.22	2.00	1.96	3.34	-118	68
	1100	89.30	90.07	89.27	-0.03	6.3	316	82.16	1.15	1.38	87.14	86.16	2.00	1.96	3.34	-167	149
	1150	89.30	90.01	89.21	-0.09	3.7	251	82.08	1.15	1.38	87.11	85.61	2.00	3.00	4.38	-193	58
	1200	89.25	90.06	89.26	0.01	6.3	252	82.00	1.15	1.38	87.30	85.80	2.00	3.00	4.38	-219	33
	1250	89.20	90.01	89.21	0.01	6.3	316	81.92	1.15	1.38	87.41	85.91	2.00	3.00	4.38	-219	97
	1300	89.10	90.06	89.26	0.16	11.5	445	81.84	1.15	1.38	87.50	86.00	2.00	3.00	4.38	-219	226
	1350	89.05	90.21	89.41	0.36	16.7	706	81.76	1.15	1.38	87.60	86.10	2.00	3.00	4.38	-219	487
	1400	88.95	90.16	89.36	0.41	16.7	837	81.68	1.15	1.38	87.68	86.18	2.00	3.00	4.38	-219	618
	1450	88.90	90.11	89.31	0.41	16.7	836	81.60	1.15	1.38	87.76	86.26	2.00	3.00	4.38	-219	617
	1500	88.85	90.26	89.46	0.61	21.9	965	81.52	1.15	1.38	87.83	86.48	2.00	2.70	4.08	-212	754
	1550	88.90	90.31	89.51	0.61	21.9	1095	81.44	1.15	1.38	87.91	86.56	2.00	2.70	4.08	-204	891
	1600	89.15	90.26	89.46	0.31	14.1	900	81.36	1.15	1.38	87.99	86.64	2.00	2.70	4.08	-204	696
	1650	89.30	90.41	89.61	0.31	14.1	705	81.28	1.15	1.38	88.09	86.81	2.00	2.56	3.94	-201	505
	1700	89.40	90.47	89.67	0.27	14.1	705	81.20	1.15	1.38	88.20	86.92	2.00	2.56	3.94	-197	508
	1750	89.60	90.49	89.69	0.09	8.9	575	81.12	1.15	1.38	88.28	87.00	2.00	2.56	3.94	-197	378
	1800	89.75	90.63	89.83	0.08	8.9	445	81.04	1.15	1.38	88.36	87.08	2.00	2.56	3.94	-197	248
	1850	89.80	90.56	89.76	-0.04	6.3	381	86.58	1.15	2.12	88.42	87.37	2.00	2.10	4.22	-204	177
	1900	89.85	90.99	90.19	0.34	14.1	511	86.75	1.00	1.79	88.54	87.49	2.00	2.10	3.89	-203	308
	1950	89.90	91.01	90.21	0.31	14.1	705	86.94	1.00	1.69	88.63	87.66	2.00	1.94	3.63	-188	517
	2000	90.05	91.05	90.25	0.20	11.5	640	87.11	1.00	1.68	88.79	87.81	2.00	1.96	3.64	-182	458
	2050	90.02	90.98	90.18	0.16	11.5	575	0.00 **	1.00	0.00	0.00	0.00	2.00	0.00	0.00	0	575
B	R.O.W. = 20 m		Lane Width = 12 m														
	4100	89.48	89.29	88.49	-0.99	-15.8		83.82	1.00	5.23	89.05	87.40	2.00	3.30	8.53		
	4250	89.33	89.16	88.36	-0.97	-15.8	-2370	84.19	1.00	2.52	86.71	85.06	2.00	3.30	5.82	-1076	-3446
	4275	89.17	89.54	88.74	-0.43	-3.8	-245	84.26	1.00	2.50	86.76	85.11	2.00	3.30	5.80	-145	-390
	4300	89.43	89.42	88.62	-0.81	-11.8	-195	84.34	1.00	2.47	86.81	85.16	2.00	3.30	5.77	-145	-340
	4350	89.50	89.91	89.11	-0.39	-3.8	-390	84.69	1.00	2.27	86.96	85.26	2.00	3.40	5.67	-286	-676
	4450	89.68	90.50	89.70	0.02	4.2	20	85.02	1.00	2.02	87.04	85.42	2.00	3.24	5.26	-547	-527
	4500	90.08	90.35	89.55	-0.53	-5.8	-40	85.20	1.00	1.94	87.14	85.59	2.00	3.10	5.04	-258	-298
	4525	90.04	90.47	89.67	-0.37	-3.8	-120	85.28	1.00	1.89	87.17	85.62	2.00	3.10	4.99	-125	-245
	4550	90.07	90.50	89.70	-0.37	-3.8	-95	85.18	1.00	2.03	87.21	85.73	2.00	2.96	4.99	-125	-220
	4600	90.60	* 90.45	89.65	-0.70	-9.8	-340	85.33	1.00	1.91	87.24	85.76	2.00	2.96	4.87	-246	-586
	4650	90.63	* 90.50	89.70	-0.68	-9.8	-490	85.50	1.00	1.85	87.35	86.03	2.00	2.64	4.49	-234	-724
	4700	90.73	* 90.55	89.75	-0.73	-9.8	-490	85.66	1.00	1.78	87.44	86.12	2.00	2.64	4.42	-223	-713
	4750	90.66	* 90.50	89.70	-0.71	-9.8	-490	85.81	1.00	1.72	87.53	86.23	2.00	2.60	4.32	-219	-709

South Merivale Business Park Cut Fill Analysis
June 12, 1992

Street	Station	Existing Elev.		Final Elev.	Sub-bas Elev.	Delta E	Average Cut / Fill Area	Cut/Fill Volume	Base San Trench		San Trench Width	San Trench Area	T/Stm Elev.	Base Stm Trench	Trench Width	Stm Trench Area	Trench Cut Area	San/Stm Cut Vol	Total Cut / Fill
	4800	90.61	*	90.65	89.85	-0.51	-5.8	-390	87.06		1.00	1.73	88.79	87.46	2.00	2.66	4.39		-390
	4850	90.64	*	90.50	89.70	-0.69	-9.8	-390	86.91		1.00	1.79	88.70	87.37	2.00	2.66	4.45	-221	-611
	4900	90.65	*	90.75	89.95	-0.45	-5.8	-390	86.76		1.00	1.85	88.61	87.28	2.00	2.66	4.51	-224	-614
	4950	90.52	*	90.50	89.70	-0.57	-7.8	-340	86.58		1.00	1.97	88.55	87.07	2.00	2.96	4.93	-236	-576
	5000	90.56	*	90.65	89.85	-0.46	-5.8	-340	86.43		1.00	2.06	88.49	87.01	2.00	2.96	5.02	-249	-589
	5025	90.60	*	90.52	89.72	-0.63	-7.8	-170	85.66		1.00	2.56	88.22	86.59	2.00	3.26	5.82	-136	-306
	5050	90.60	*	90.50	89.70	-0.65	-9.8	-220	85.74		1.00	2.51	88.25	86.62	2.00	3.26	5.77	-145	-365
	5075	90.58	*	90.40	89.60	-0.73	-9.8	-245	85.81		1.00	2.47	88.28	86.65	2.00	3.26	5.73	-144	-389
	5100	90.65	*	90.65	89.85	-0.55	-7.8	-220	85.89		1.00	2.42	88.31	86.68	2.00	3.26	5.68	-143	-363
	5150	90.56	*	90.50	89.70	-0.61	-7.8	-390	86.07		1.00	2.28	88.35	86.80	2.00	3.10	5.38	-277	-667
	5250	90.59	*	90.70	89.90	-0.44	-3.8	-580	86.39		1.00	2.12	88.51	87.04	2.00	2.94	5.06	-522	-1102
	5300	90.60	*	90.65	89.85	-0.50	-5.8	-240	86.47		1.00	2.10	88.57	87.10	2.00	2.94	5.04	-253	-493
	5325	90.66	*	90.67	89.87	-0.54	-5.8	-145	86.65		1.00	1.95	88.60	87.28	2.00	2.64	4.59	-120	-265
	5400	90.64	*	90.65	89.85	-0.54	-5.8	-435	86.88		1.00	1.85	88.73	87.41	2.00	2.64	4.49	-341	-776
	5425	90.56	*	90.76	89.96	-0.35	-3.8	-120	86.97		1.00	1.83	88.80	87.48	2.00	2.64	4.47	-112	-232
	5450	90.46	*	90.88	90.08	-0.13	2.2	-20	87.04		1.00	1.80	88.84	87.52	2.00	2.64	4.44	-111	-131
	5525	90.41		90.79	89.99	-0.42	-3.8	-60	87.27		1.00	1.71	88.98	87.65	2.00	2.66	4.37	-330	-390
	5550	90.30	*	90.60	89.80	-0.25	-1.8	-70	0.00	**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	
							Subtotal	-10010											
C	R.O.W. = 20 m			Lane Width = 12 m															
	9000	89.46		89.49	88.69	-0.77	-11.8												
	9040	90.00		89.64	88.84	-1.16	-19.8	-632	Detailed design to be completed in future.								4.00	-80	-712
	9110	90.05		89.64	88.84	-1.21	-19.8	-1386	Trench Cut areas assumed similar to other stations.								4.00	-280	-1666
	9150	90.05		89.44	88.64	-1.41	-23.8	-872									4.00	-160	-1032
	9220	90.07		89.79	88.99	-1.08	-17.8	-1456									4.00	-280	-1736
	9270	90.07		89.59	88.79	-1.28	-21.8	-990									4.00	-200	-1190
	9340	90.10		89.94	89.14	-0.96	-15.8	-1316									4.00	-280	-1596
	9380	90.20		89.74	88.94	-1.26	-21.8	-752									4.00	-160	-912
	9450	90.20		90.09	89.29	-0.91	-13.8	-1246									4.00	-280	-1526
	9500	90.45		89.94	89.14	-1.31	-21.8	-890									4.00	-200	-1090
							Subtotal	-9540											
D	R.O.W. = 20 m			Lane Width = 12 m															
	7000	89.50		89.95	89.15	-0.35	-3.8		84.75		1.00	2.79	87.54	85.54	2.00	4.00	6.79		
	7025	89.66		90.25	89.45	-0.21	0.2	-45	84.83		1.00	2.73	87.56	85.56	2.00	4.00	6.73	-169	-214

South Merivale Business Park Cut Fill Analysis
June 12, 1992

Street	Station	Existing Elev.	Final Elev.	Sub-bas Elev.	Delta E	Average Cut / Fill Area	Cut/Fill Volume	Base San Trench	San Trench Width	San Trench Area	T/Stm Elev.	Base Stm Trench	Trench Width	Stm Trench Area	Trench Cut Area	San/Stm Cut Vol	Total Cut / Fill
	7050	89.88	90.22	89.42	-0.46	-5.8	-70	84.91	1.00	2.67	87.58	85.58	2.00	4.00	6.67	-168	-238
	7075	89.89	90.09	89.29	-0.60	-7.8	-170	84.97	1.00	2.63	87.60	85.60	2.00	4.00	6.63	-166	-336
	7100	90.44	90.20	89.40	-1.04	-15.8	-295	85.05	1.00	2.57	87.62	85.62	2.00	4.00	6.57	-165	-460
	7150	90.39	90.16	89.36	-1.03	-15.8	-790	85.23	1.00	2.47	87.70	85.85	2.00	3.70	6.17	-319	-1109
	7225	90.39	90.24	89.44	-0.95	-15.8	-1185	85.64	1.00	2.20	87.84	85.99	2.00	3.70	5.90	-453	-1638
	7250	90.46	* 90.39	89.59	-0.62	-7.8	-295	85.72	1.00	2.15	87.87	86.02	2.00	3.70	5.85	-147	-442
	7275	90.57	* 90.28	89.48	-0.84	-11.8	-245	0.00	** 0.00	0.00	87.90	86.05	2.00	3.70	3.70	-119	-364
	7300	90.55	* 90.32	89.52	-0.78	-11.8	-295	85.22	1.00	2.76	87.98	86.13	2.00	3.70	6.46	-127	-422
	7325	90.61	* 90.44	89.64	-0.72	-9.8	-270	85.11	1.00	2.91	88.02	86.17	2.00	3.70	6.61	-163	-433
	7350	90.46	* 90.31	89.51	-0.70	-9.8	-245	85.19	1.00	2.86	88.05	85.20	2.00	5.70	8.56	-190	-435
	7400	90.71	* 90.48	89.68	-0.78	-11.8	-540	85.27	1.00	2.81	88.08	85.23	2.00	5.70	8.51	-427	-967
	7425	90.55	* 90.40	89.60	-0.70	-9.8	-270	85.30	1.00	2.81	88.11	85.26	2.00	5.70	8.51	-213	-483
	7450	90.60	* 90.37	89.57	-0.78	-11.8	-270	85.33	1.00	2.81	88.14	85.29	2.00	5.70	8.51	-213	-483
						Subtotal	-4985										
E	R.O.W. = 26 m		Lane Width = 11 m														
	8000	88.85	90.46	89.66	0.81	30.5		86.58	1.00	1.51	88.09	87.11	2.00	1.96	3.47		
	8050	89.02	90.37	89.57	0.55	25.3	1395	86.73	1.00	1.45	88.18	87.20	2.00	1.96	3.41	-172	1223
	8163	89.21	89.84	89.04	-0.17	4.5	1684	87.04	1.00	1.33	88.37	87.39	2.00	1.96	3.29	-379	1305
						Subtotal	3079										
F	R.O.W. = 20 m		Lane Width = 12 m														
	3093.6	89.85	90.12	89.32	-0.53	-5.8		84.36	1.00	2.17	86.53	85.55	2.00	1.96	4.13		
	3100	89.55	89.91	89.11	-0.44	-3.8	-31	84.37	1.00	2.17	86.54	85.56	2.00	1.96	4.13	-26	-57
	3150	89.55	90.48	89.68	0.13	6.2	60	84.46	1.00	2.17	86.63	85.65	2.00	1.96	4.13	-207	-147
	3175	89.14	90.36	89.56	0.42	12.2	230	84.50	1.00	2.17	86.67	85.69	2.00	1.96	4.13	-103	127
	3200	89.02	90.43	89.63	0.61	16.2	355	84.54	1.00	2.17	86.71	85.73	2.00	1.96	4.13	-103	252
	3250	88.89	90.55	89.75	0.86	22.2	960	84.85	1.00	1.97	86.82	85.84	2.00	1.96	3.93	-201	759
	3275	89.21	90.48	89.68	0.47	14.2	455	84.89	1.00	1.97	86.86	85.88	2.00	1.96	3.93	-98	357
	3300	89.16	90.61	89.81	0.65	18.2	405	86.86	1.00	1.40	88.26	87.28	2.00	1.96	3.36	-91	314
	3350	89.22	90.59	89.79	0.57	16.2	860	86.76	1.00	1.41	88.17	87.19	2.00	1.96	3.37	-168	692
	3400	89.13	90.92	90.12	0.99	24.2	1010	86.56	1.00	1.48	88.04	87.06	2.00	1.96	3.44	-170	840
	3475	89.23	90.79	89.99	0.76	20.2	1666	86.31	1.00	1.67	87.98	86.86	2.00	2.24	3.91	-276	1391
	3525	89.28	90.57	89.77	0.49	14.2	861	86.16	1.00	1.74	87.90	86.78	2.00	2.24	3.98	-197	663

South Merivale Business Park Cut Fill Analysis
June 12, 1992

Street	Station	Existing Elev.	Final Elev.	Sub-bas Elev.	Delta E	Average Cut / Fill Area	Cut/Fill Volume	Base San Trench	San Trench Width	San Trench Area	T/Stm Elev.	Base Stm Trench	Trench Width	Stm Trench Area	Trench Cut Area	San/Stm Cut Vol	Total Cut / Fill
	3625	89.32	90.57	89.77	0.45	14.2	1420	85.86	1.00	1.89	87.75	86.63	2.00	2.24	4.13	-406	1015
	3675	89.21	90.41	89.61	0.40	12.2	660	85.71	1.00	1.97	87.68	86.38	2.00	2.60	4.57	-218	442
	3700	89.05	90.47	89.67	0.62	16.2	355	85.51	1.00	2.14	87.65	86.22	2.00	2.86	5.00	-120	235
	3775	89.21	90.34	89.54	0.33	10.2	990	85.24	1.00	2.31	87.55	86.12	2.00	2.86	5.17	-381	609
	3825	89.26	90.25	89.45	0.19	8.2	460	85.09	1.00	2.38	87.47	86.05	2.00	2.84	5.22	-260	200
	3875	89.39	90.30	89.50	0.11	6.2	360	84.88	1.00	2.46	87.34	85.91	2.00	2.86	5.32	-264	96
	3950	89.41	90.22	89.42	0.01	4.2	390	84.63	1.00	2.56	87.19	85.76	2.00	2.86	5.42	-403	-13
	4000	89.48	89.96	89.16	-0.32	-1.8	60	84.48	1.00	2.26	86.74	85.31	2.00	2.86	5.12	-263	-203
						Subtotal	11526									Total	-18148
						Total	80										

* Existing Elevation Less assumed 0.25 m Layer of Topsoil
** No Storm or Sanitary Sewer Between this and previous Station.

June 11, 1992

Street	Lot	Average Existing Elevation,m (a)	Final Average Elevation,m (b)	Average Cut / Fill Depth,m =-(a-b+0.6) (c)	Lot Area ha (d)	Volume Cut / Fill (c) * (d) *10000 m3
A	A0 *	89.53	89.96	0.08	0.74	592
	A1 *	89.46	90.11	0.30	0.93	2790
	A2 *	89.49	90.33	0.49	1.47	7203
	A3 *	89.45	90.18	0.38	0.77	2926
	A4 *	89.43	90.39	0.61	1.06	6466
	A5	89.38	90.25	0.27	0.88	2376
	A6	89.27	90.45	0.58	0.84	4872
	A7	89.37	90.31	0.34	0.91	3094
	A8	89.28	90.51	0.63	1.16	7308
	A9	89.41	90.38	0.37	0.90	3330
	A10	89.23	90.59	0.76	1.25	9500
	A11	89.66	90.61	0.35	1.03	3605
	A12	89.41	90.09	0.08	1.26	1008
	A13 *	90.10	90.86	0.41	1.33	5453
	A14 *	89.88	90.84	0.61	1.44	8784
	A15 *	90.07	91.19	0.77	1.13	8701
	A16 *	90.25	91.13	0.53	1.39	7367
B	B0	89.64	89.93	-0.31	0.86	-2666
	B1	89.63	89.49	-0.74	0.77	-5698
	B2	89.80	89.80	-0.60	0.67	-4020
	B3	89.67	89.78	-0.49	0.60	-2940
	B4	89.69	90.06	-0.23	0.72	-1656
	B5	89.79	90.14	-0.25	0.86	-2150
	B6	89.81	90.36	-0.05	0.82	-410
	B7	89.58	90.35	0.17	1.27	2159
	B8 *	90.09	90.60	0.16	1.04	1664
	B9 *	89.86	90.50	0.29	1.03	2987
	B10 *	90.45	90.61	-0.19	1.02	-1938
	B11 *	90.48	90.87	0.04	0.91	364
	B12 *	90.61	90.74	-0.22	1.21	-2662
	B13 *	90.60	90.60	-0.35	0.78	-2730
	B14 *	90.59	90.64	-0.30	1.31	-3930
	B15 *	90.65	90.50	-0.50	1.28	-6400
	B16 *	90.60	90.68	-0.27	1.22	-3294
	B17 *	90.58	90.65	-0.28	1.30	-3640
	B18 *	90.58	90.64	-0.29	1.14	-3306
	B19 *	90.57	90.66	-0.26	1.21	-3146
	B20 *	90.58	90.66	-0.27	1.07	-2889
	B21 *	90.61	90.74	-0.22	1.05	-2310
	B22 *	90.63	90.71	-0.27	0.99	-2673
	B23 *	90.67	90.78	-0.24	0.99	-2376
	B24 *	90.38	90.75	0.02	1.56	312
	B25 *	90.64	90.82	-0.17	0.91	-1547
	B26 *	90.49	90.75	-0.09	0.94	-846
C	C1	90.15	89.94	-0.81	0.76	-6156
	C2	89.90	89.97	-0.53	0.94	-4982
	C3	90.20	90.00	-0.80	0.91	-7280
	C4	89.95	90.07	-0.48	0.95	-4560
	C5 *	90.40	90.16	-0.59	1.08	-6372
	C6 *	90.00	90.25	-0.10	1.04	-1040
	C7 *	90.40	90.23	-0.52	1.08	-5616
	C8 *	90.40	90.32	-0.43	0.83	-3569
D	D1 *	90.23	90.44	-0.14	0.70	-980
	D2	90.17	90.19	-0.58	0.76	-4408
	D3 *	90.51	90.53	-0.33	1.22	-4026
	D4 *	90.38	90.36	-0.37	0.75	-2775
	D5 *	90.48	90.45	-0.38	1.18	-4484
E	E1	88.99	90.93	1.34	0.98	13132
F	F1	88.94	90.59	1.05	1.23	12915
	F2	89.21	90.78	0.97	0.82	7954

LOTCUT2.XLS

June 11, 1992

Street	Lot	Average Existing Elevation,m (a)	Final Average Elevation,m (b)	Average Cut / Fill Depth,m =-(a-b+0.6) (c)	Lot Area ha (d)	Volume Cut / Fill (c) * (d) *10000 m3
	F3	89.05	90.63	0.98	0.99	9702
	F4	89.17	90.85	1.08	1.14	12312
	F5	89.30	90.81	0.91	0.85	7735
	F6	89.23	90.90	1.07	1.09	11663
	F7	89.36	90.75	0.79	0.82	6478
	F8	89.25	90.80	0.95	1.03	9785
	F9	89.30	90.68	0.78	1.13	8814
	F10	89.27	90.74	0.87	1.11	9657
	F11	89.26	90.47	0.61	0.96	5856
	F12 *	89.46	90.15	0.34	1.26	4284
				Total	71.63	93673

* Additional 0.25 m fill added for 0.25 m topsoil stripping.
c = - (a - b + 0.6 - 0.25)

Note: 1. Negative volume indicates cut.
Positive volume indicates fill.

Cross-Section Cut Fill Analysis

Area of Cut/Fill for Varying Depths of Cover, H

L=	14 m	Road s =	3 %
R=	26 m	ROW g =	2 %

	H														
	-1		-0.9		-0.8		-0.7		-0.6		-0.5		-0.4		-0.3
	Elevation	Distance	Elevation	Distance											
a, subbase	99.00	0.00	99.10	0.00	99.20	0.00	99.30	0.00	99.40	0.00	99.50	0.00	99.60	0.00	99.70
b	98.79	7.00	98.89	7.00	98.99	7.00	99.09	7.00	99.19	7.00	99.29	7.00	99.39	7.00	99.49
c	99.59	7.00	99.69	7.00	99.79	7.00	99.89	7.00	99.99	7.00	100.09	7.00	100.19	7.00	100.29
d	99.71	13.00	99.81	13.00	99.91	13.00	100.01	13.00	100.11	13.00	100.21	13.00	100.31	13.00	100.41
e	100.00	13.00	100.00	13.00	100.00	13.00	100.00	13.00	100.00	13.00	100.00	13.00	100.00	13.00	100.00
f, existing	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00
g	100.00	-13.00	100.00	-13.00	100.00	-13.00	100.00	-13.00	100.00	-13.00	100.00	-13.00	100.00	-13.00	100.00
h	99.71	-13.00	99.81	-13.00	99.91	-13.00	100.01	-13.00	100.11	-13.00	100.21	-13.00	100.31	-13.00	100.41
i	99.59	-7.00	99.69	-7.00	99.79	-7.00	99.89	-7.00	99.99	-7.00	100.09	-7.00	100.19	-7.00	100.29
j	98.79	-7.00	98.89	-7.00	98.99	-7.00	99.09	-7.00	99.19	-7.00	99.29	-7.00	99.39	-7.00	99.49
Area,m2	-19.67		-17.07		-14.47		-11.87		-9.27		-6.67		-4.07		-1.47

	-0.2		-0.1		0		0.1		0.2		0.3		0.4		0.5		0.6
0.00	99.80	0.00	99.90	0.00	100.00	0.00	100.10	0.00	100.20	0.00	100.30	0.00	100.40	0.00	100.50	0.00	100.60
7.00	99.59	7.00	99.69	7.00	99.79	7.00	99.89	7.00	99.99	7.00	100.09	7.00	100.19	7.00	100.29	7.00	100.39
7.00	100.39	7.00	100.49	7.00	100.59	7.00	100.69	7.00	100.79	7.00	100.89	7.00	100.99	7.00	101.09	7.00	101.19
13.00	100.51	13.00	100.61	13.00	100.71	13.00	100.81	13.00	100.91	13.00	101.01	13.00	101.11	13.00	101.21	13.00	101.31
13.00	100.00	13.00	100.00	13.00	100.00	13.00	100.00	13.00	100.00	13.00	100.00	13.00	100.00	13.00	100.00	13.00	100.00
0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00
-13.00	100.00	-13.00	100.00	-13.00	100.00	-13.00	100.00	-13.00	100.00	-13.00	100.00	-13.00	100.00	-13.00	100.00	-13.00	100.00
-13.00	100.51	-13.00	100.61	-13.00	100.71	-13.00	100.81	-13.00	100.91	-13.00	101.01	-13.00	101.11	-13.00	101.21	-13.00	101.31
-7.00	100.39	-7.00	100.49	-7.00	100.59	-7.00	100.69	-7.00	100.79	-7.00	100.89	-7.00	100.99	-7.00	101.09	-7.00	101.19
-7.00	99.59	-7.00	99.69	-7.00	99.79	-7.00	99.89	-7.00	99.99	-7.00	100.09	-7.00	100.19	-7.00	100.29	-7.00	100.39
	1.13		3.73		6.33		8.93		11.53		14.13		16.73		19.33		21.93

	0.7		0.8		0.9		1	
0.00	100.70	0.00	100.80	0.00	100.90	0.00	101.00	0.00
7.00	100.49	7.00	100.59	7.00	100.69	7.00	100.79	7.00
7.00	101.29	7.00	101.39	7.00	101.49	7.00	101.59	7.00
13.00	101.41	13.00	101.51	13.00	101.61	13.00	101.71	13.00
13.00	100.00	13.00	100.00	13.00	100.00	13.00	100.00	13.00
0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00
-13.00	100.00	-13.00	100.00	-13.00	100.00	-13.00	100.00	-13.00
-13.00	101.41	-13.00	101.51	-13.00	101.61	-13.00	101.71	-13.00
-7.00	101.29	-7.00	101.39	-7.00	101.49	-7.00	101.59	-7.00
-7.00	100.49	-7.00	100.59	-7.00	100.69	-7.00	100.79	-7.00
	24.53		27.13		29.73		32.33	

Cross-Section Cut Fill Analysis

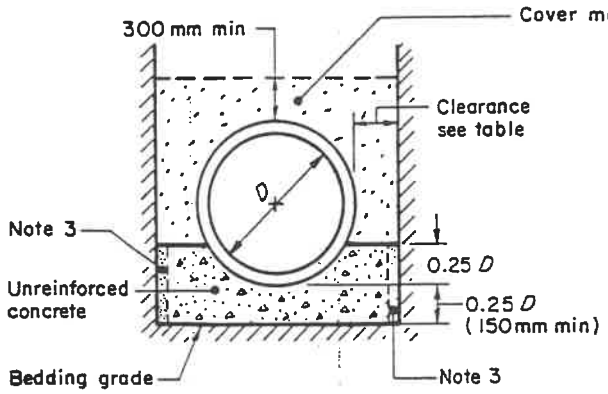
Area of Cut/Fill for Varying Depths of Cover, H

L=	12 m	Road s =	3 %
R=	20 m	ROW g =	2 %

H	-1		-0.9		-0.8		-0.7		-0.6		-0.5		-0.4		-0.3
	Elevation	Distance	Elevation	Distance											
a, subbase	99.00	0.00	99.10	0.00	99.20	0.00	99.30	0.00	99.40	0.00	99.50	0.00	99.60	0.00	99.70
b	98.82	6.00	98.92	6.00	99.02	6.00	99.12	6.00	99.22	6.00	99.32	6.00	99.42	6.00	99.52
c	99.62	6.00	99.72	6.00	99.82	6.00	99.92	6.00	100.02	6.00	100.12	6.00	100.22	6.00	100.32
d	99.70	10.00	99.80	10.00	99.90	10.00	100.00	10.00	100.10	10.00	100.20	10.00	100.30	10.00	100.40
e	100.00	10.00	100.00	10.00	100.00	10.00	100.00	10.00	100.00	10.00	100.00	10.00	100.00	10.00	100.00
f, existing	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00
g	100.00	-10.00	100.00	-10.00	100.00	-10.00	100.00	-10.00	100.00	-10.00	100.00	-10.00	100.00	-10.00	100.00
h	99.70	-10.00	99.80	-10.00	99.90	-10.00	100.00	-10.00	100.10	-10.00	100.20	-10.00	100.30	-10.00	100.40
i	99.62	-6.00	99.72	-6.00	99.82	-6.00	99.92	-6.00	100.02	-6.00	100.12	-6.00	100.22	-6.00	100.32
j	98.82	-6.00	98.92	-6.00	99.02	-6.00	99.12	-6.00	99.22	-6.00	99.32	-6.00	99.42	-6.00	99.52
Area,m2	-15.80		-13.80		-11.80		-9.80		-7.80		-5.80		-3.80		-1.80

	-0.2		-0.1		0		0.1		0.2		0.3		0.4		0.5		0.6
0.00	99.80	0.00	99.90	0.00	100.00	0.00	100.10	0.00	100.20	0.00	100.30	0.00	100.40	0.00	100.50	0.00	100.60
6.00	99.62	6.00	99.72	6.00	99.82	6.00	99.92	6.00	100.02	6.00	100.12	6.00	100.22	6.00	100.32	6.00	100.42
6.00	100.42	6.00	100.52	6.00	100.62	6.00	100.72	6.00	100.82	6.00	100.92	6.00	101.02	6.00	101.12	6.00	101.22
10.00	100.50	10.00	100.60	10.00	100.70	10.00	100.80	10.00	100.90	10.00	101.00	10.00	101.10	10.00	101.20	10.00	101.30
10.00	100.00	10.00	100.00	10.00	100.00	10.00	100.00	10.00	100.00	10.00	100.00	10.00	100.00	10.00	100.00	10.00	100.00
0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00
-10.00	100.00	-10.00	100.00	-10.00	100.00	-10.00	100.00	-10.00	100.00	-10.00	100.00	-10.00	100.00	-10.00	100.00	-10.00	100.00
-10.00	100.50	-10.00	100.60	-10.00	100.70	-10.00	100.80	-10.00	100.90	-10.00	101.00	-10.00	101.10	-10.00	101.20	-10.00	101.30
-6.00	100.42	-6.00	100.52	-6.00	100.62	-6.00	100.72	-6.00	100.82	-6.00	100.92	-6.00	101.02	-6.00	101.12	-6.00	101.22
-6.00	99.62	-6.00	99.72	-6.00	99.82	-6.00	99.92	-6.00	100.02	-6.00	100.12	-6.00	100.22	-6.00	100.32	-6.00	100.42
	0.20		2.20		4.20		6.20		8.20		10.20		12.20		14.20		16.20

	0.7		0.8		0.9		1	
0.00	100.70	0.00	100.80	0.00	100.90	0.00	101.00	0.00
6.00	100.52	6.00	100.62	6.00	100.72	6.00	100.82	6.00
6.00	101.32	6.00	101.42	6.00	101.52	6.00	101.62	6.00
10.00	101.40	10.00	101.50	10.00	101.60	10.00	101.70	10.00
10.00	100.00	10.00	100.00	10.00	100.00	10.00	100.00	10.00
0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00
-10.00	100.00	-10.00	100.00	-10.00	100.00	-10.00	100.00	-10.00
-10.00	101.40	-10.00	101.50	-10.00	101.60	-10.00	101.70	-10.00
-6.00	101.32	-6.00	101.42	-6.00	101.52	-6.00	101.62	-6.00
-6.00	100.52	-6.00	100.62	-6.00	100.72	-6.00	100.82	-6.00
	18.20		20.20		22.20		24.20	



CLASS A

CONCRETE CRADLE

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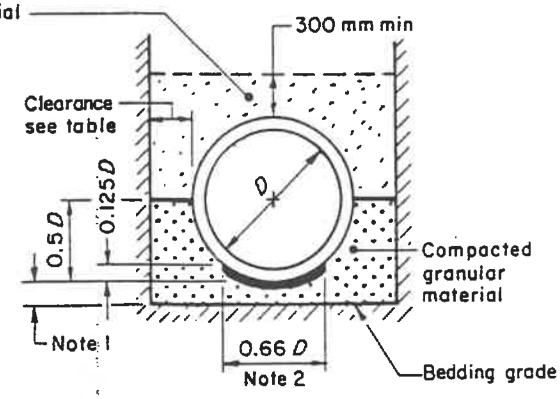
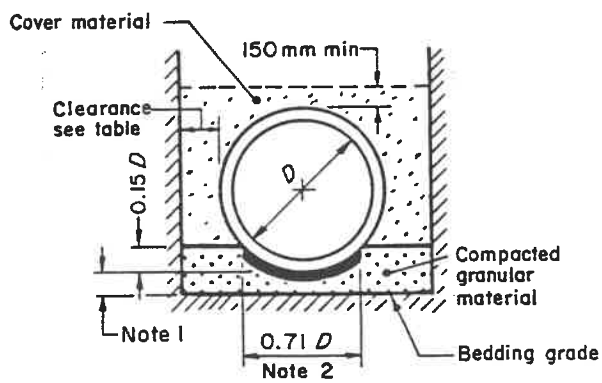


CLASS B

GRANULAR FOUNDATION

$L_f = 1.9$



CLASS C-2

GRANULAR FOUNDATION

$L_f = 1.5$

NOTES:

1 The min dimension shall be 0.15 *D* or 150 mm whichever is the greater except in an unyielding foundation the min dimension shall be 0.25 *D* or 300 mm whichever is the lesser.

2 The pipe bed is to be carefully shaped to receive the bottom of the pipe.

3 In rock excavation provide a 50 mm layer of compressible material between the trench walls and concrete cradle.

A This standard to be applied in stable conditions or after trench has been brought to stable conditions.

B Where the trench is sheathed, the clearance is the distance between the inside face of sheathing and the pipe.

Pipe Inside diameter (mm)	Clearance (mm)
900 or less	300
Over 900	500

LEGEND:

L_f = Load factor

D = Inside diameter

C L_f = The load factor used for the calculation of the bedding class.

D Backfill according to OPSD-803.04.

E All dimensions are in millimetres unless otherwise shown.

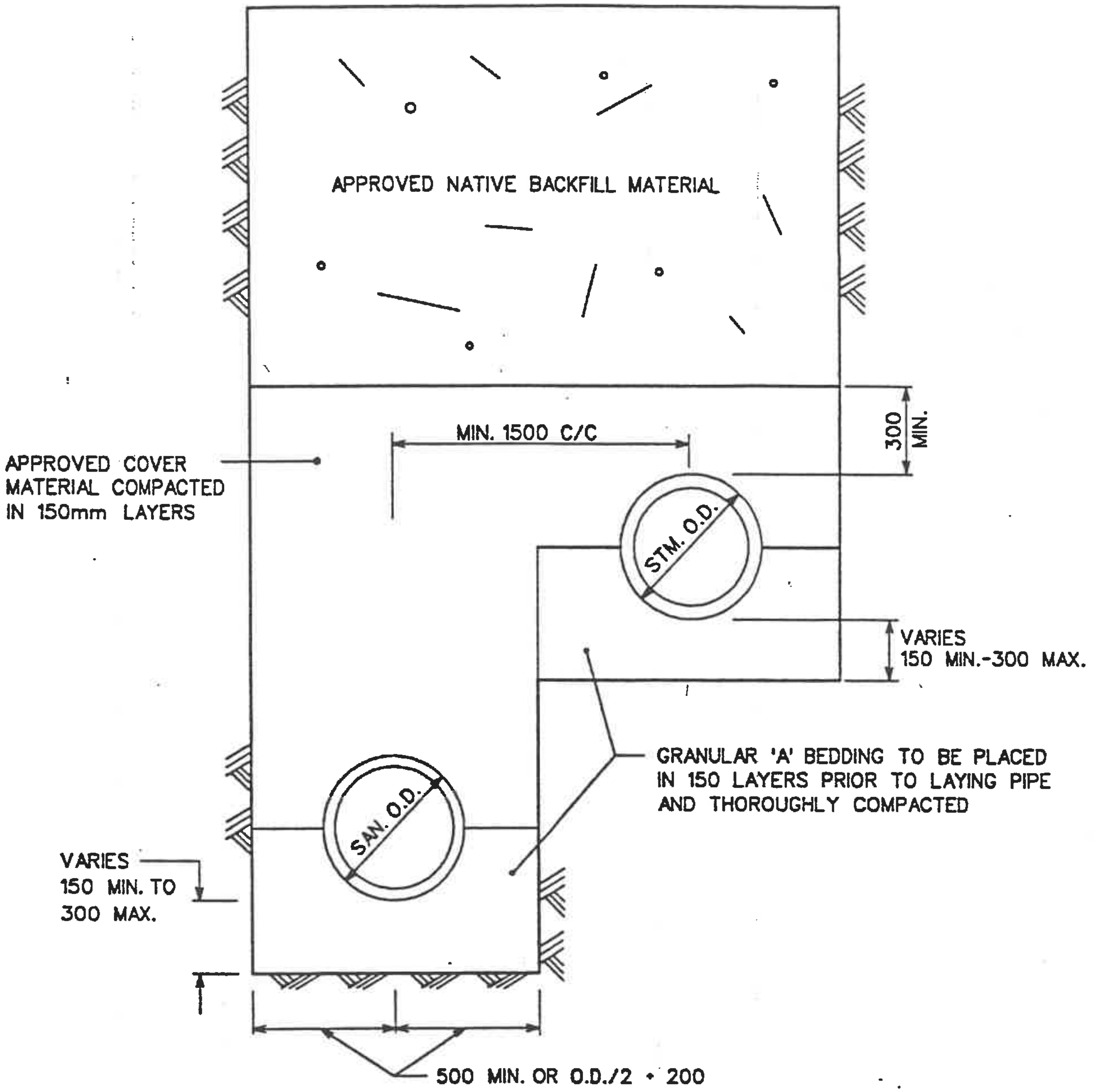
ONTARIO PROVINCIAL STANDARD DRAWING	Date	1989 05 01	Rev	2

TRENCH BEDDING FOR SANITARY SEWERS UP TO 1800mm Dia

RIGID PIPE

Date ______

OPSD - 1005.01



NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.
2. PIPE SIDEWALL CLEARANCE AS PER O.P.S.D. - 1005.01.

SCALE: N.T.S.	CITY OF NEPEAN PUBLIC WORKS DEPARTMENT	REV: 1
DRAWN: S.T.P.		DATE: AUG. 1991
APPR.: W.R.N.	BENCHED TRENCH	DRAWING NO.: NS-1000

APPENDIX E

SANITARY DRAINAGE AREA PLAN

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY
1	REVISED PER R.M.O.C. COMMENTS	01.06.92	JFB

LICENSED PROFESSIONAL ENGINEER UDO BOEHME PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER R.S. CEBRYK PROVINCE OF ONTARIO

NOVATECH
ENGINEERING CONSULTANTS LTD.
OTTAWA, ONTARIO

DESIGN UB/JFB
CHECKED UB
DRAWN JFB
CHECKED UB
APPROVED RSC

SCALE
1 : 2500 HORIZONTAL
VERTICAL

CITY OF NEPEAN

NEPEAN

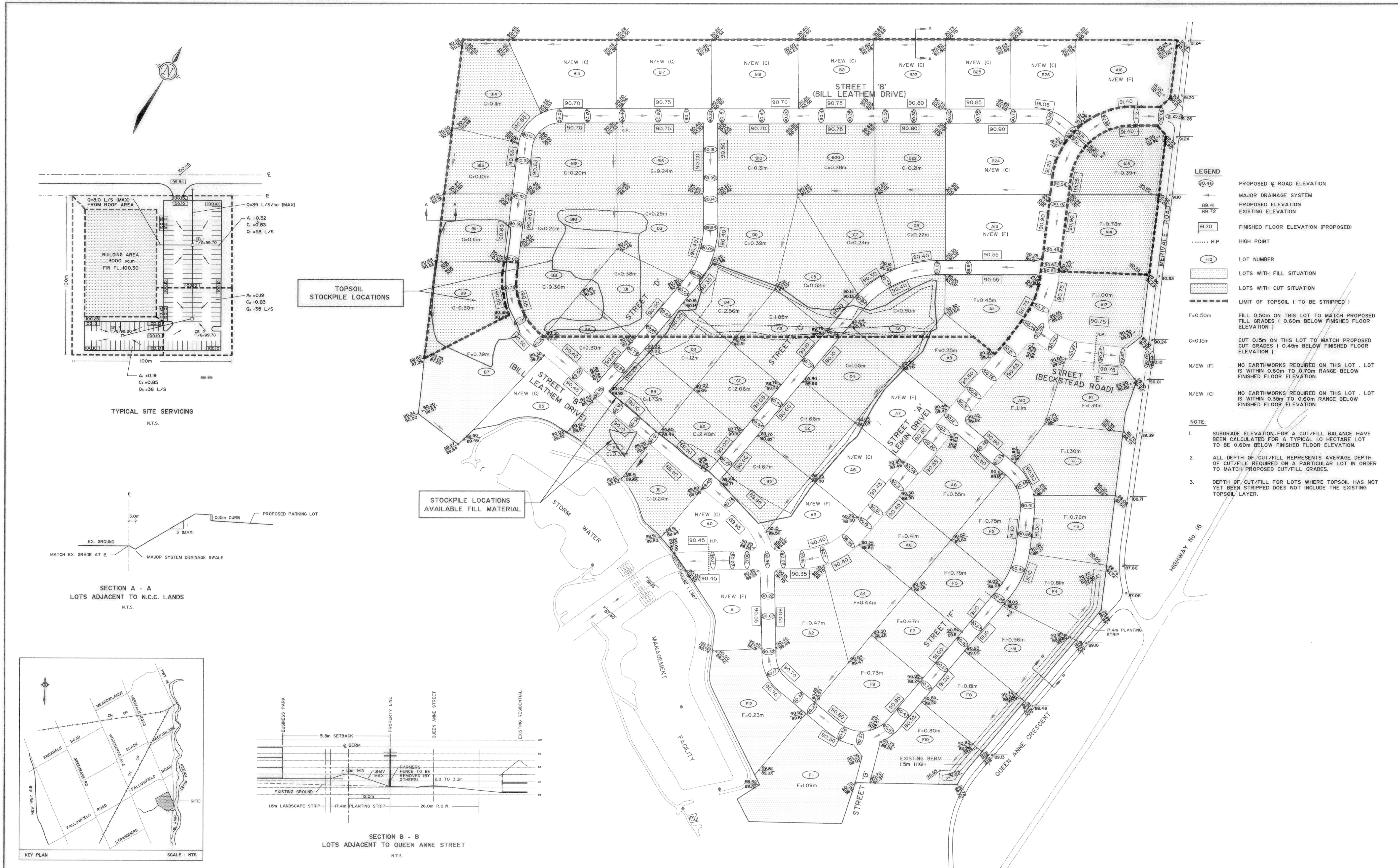
SOUTH MERIVALE BUSINESS PARK - PHASE 2 & 3

SANITARY DRAINAGE AREA PLAN

CONTRACT No. 92019
DATE JULY 1992
DRAWING No. 92019-SAN

APPENDIX F

SMBP ENGINEERING DRAWINGS



Jan 31, 1996 - 10:31:07   DWG Name: D:\NOVA\9403\9403ICFI.DWG   Updated By: JFB

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY	No.	REVISION	DATE	BY
				5	REVISIONS - CONTRACT 1994	10.08.94	AR
				4	REVISED FOR FILL REPORT	12.07.94	AR
8	ISSUED TO THE CITY OF NEPEAN	JAN.30/96	JFB	3	REVISED AS PER R.M.O.C. COMMENTS	01.11.92	JFB
7	ISSUED FOR TENDER	03.04.95	AR	2	ISSUED FOR M.O.E. APPROVAL	17.09.92	UB
6	REVISED AS PER CITY OF NEPEAN	22.11.94	AR	1	REVISED PER R.M.O.C. COMMENTS	01.06.92	JFB

LICENSED PROFESSIONAL ENGINEER UDO BOEHME PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER R.S. CEBRYK PROVINCE OF ONTARIO

NOVATECH
ENGINEERING CONSULTANTS LTD.
OTTAWA, ONTARIO

DESIGN UB/JFB
CHECKED UB
DRAWN JFB
CHECKED UB
APPROVED RSC

SCALE
1 : 2500 HORIZONTAL
VERTICAL

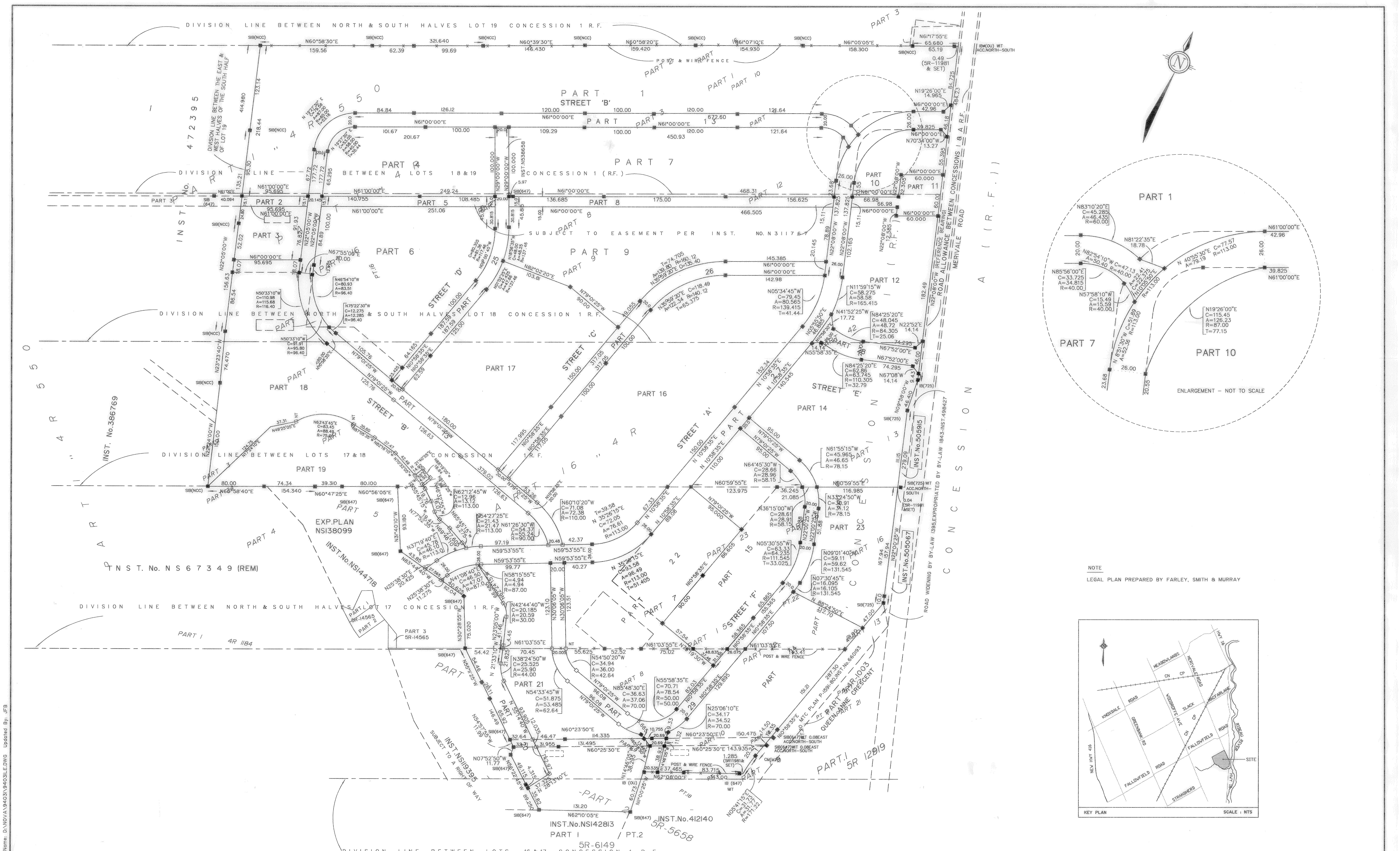
CITY OF NEPEAN

NEPEAN

SOUTH MERIVALE BUSINESS PARK

CUT/FILL AND GRADING PLAN

CONTRACT No. 94031
DATE JANUARY 1996
DRAWING No. 94031-CF1



NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY
1	ISSUED TO THE CITY OF NEPEAN	JAN.30/96	JFB

LICENSED PROFESSIONAL ENGINEER UDO BOEHME PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER S.M. GORDON PROVINCE OF ONTARIO

NOVATECH
ENGINEERING CONSULTANTS LTD
OTTAWA, ONTARIO

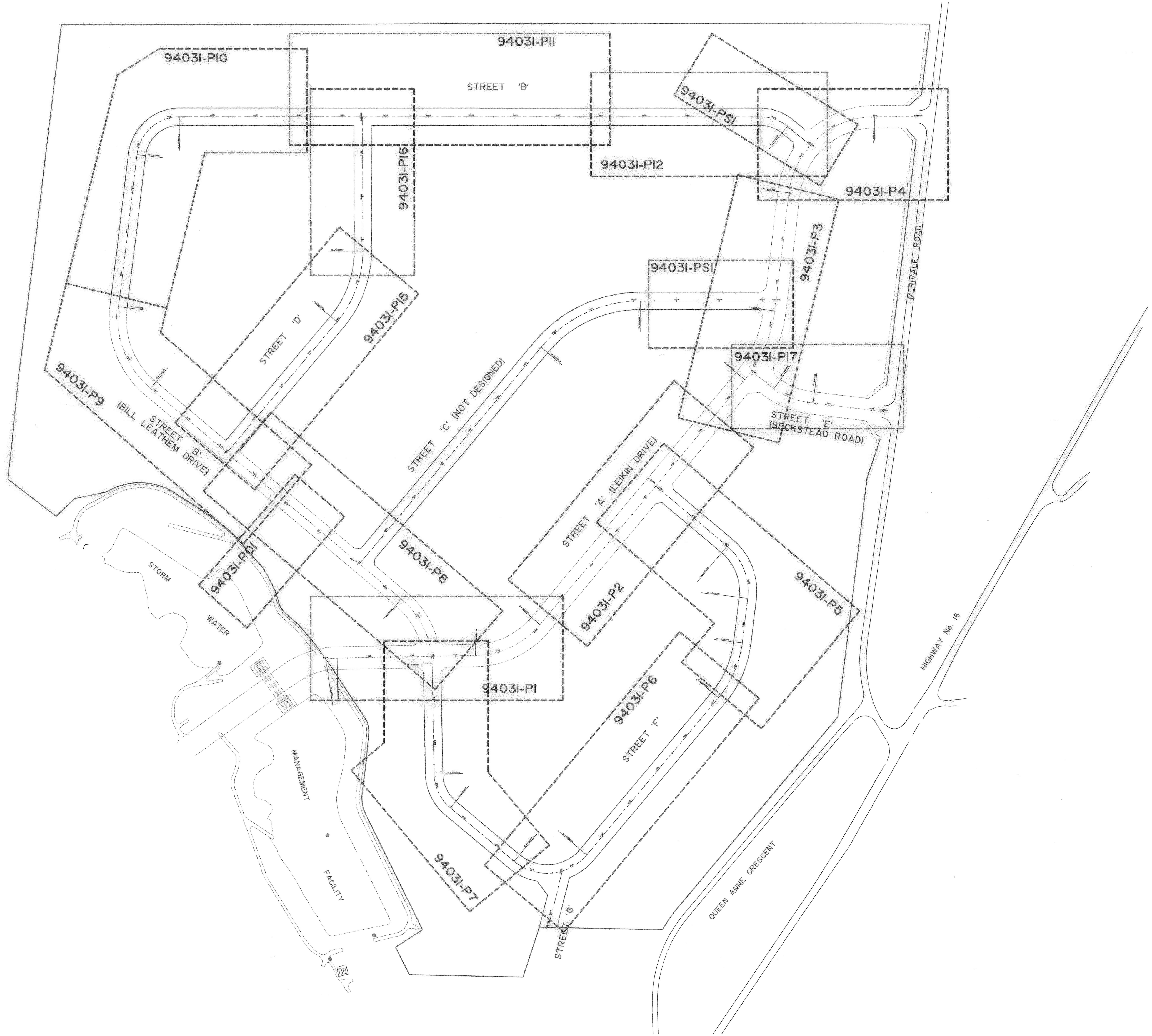
DESIGN	SG
CHECKED	UB
DRAWN	JFB
CHECKED	UB
APPROVED	MJH

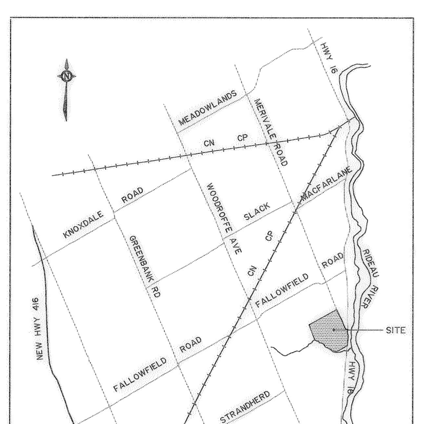
SCALE
1 : 2500 HORIZONTAL
VERTICAL

CITY OF NEPEAN

NEPEAN
SOUTH MERIVALE BUSINESS PARK
REFERENCE PLAN

CONTRACT No. 9403I
DATE JANUARY 1996
DRAWING No. 9403I-LE





Jan 31, 1996 - 10:17:48 DWG Name: D:\NOVA\94031\94031PL1.DWG Updated By: JFB

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY
3	ISSUED TO THE CITY OF NEPEAN	JAN.30/96	JFB
2	ISSUED FOR M.O.E.E.APPROVAL	17.09.92	UB
1	REVISED PER R.M.O.C. COMMENTS	01.06.92	JFB

LICENSED PROFESSIONAL ENGINEER UDO BOEHME PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER R.S. CEBRYK PROVINCE OF ONTARIO

NOVATECH
ENGINEERING CONSULTANTS LTD.
OTTAWA, ONTARIO

DESIGN	UB/JFB	SCALE
CHECKED	UB	1 : 2500
DRAWN	JFB	HORIZONTAL
CHECKED	UB	
APPROVED	RSC	VERTICAL

CITY OF NEPEAN

NEPEAN

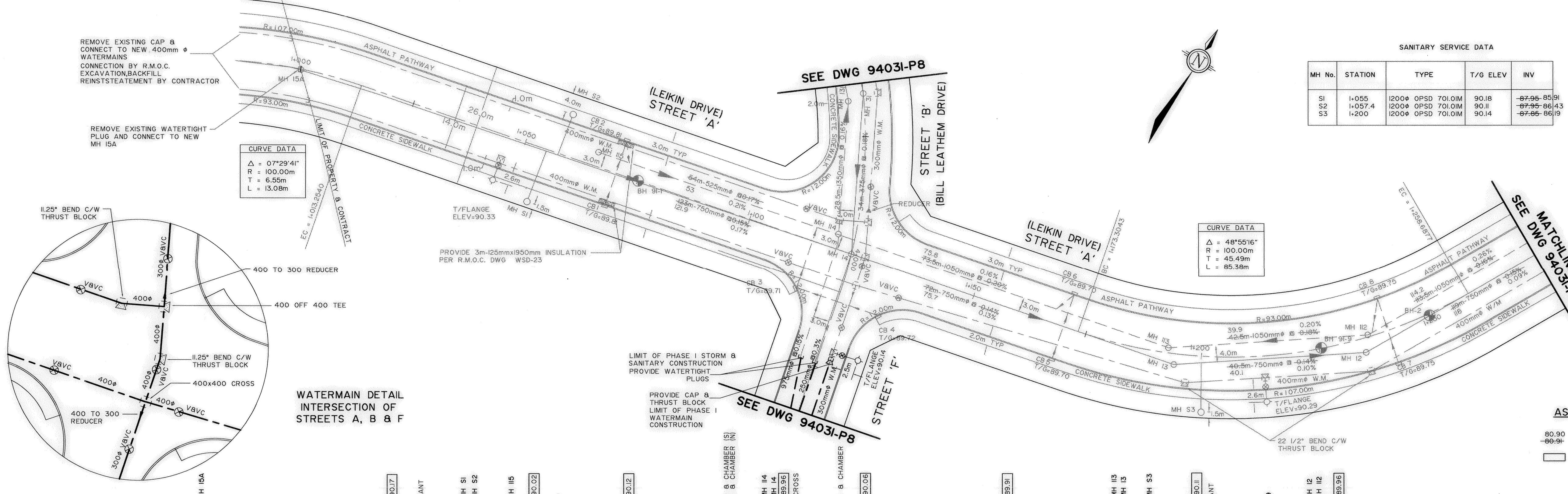
SOUTH MERIVALE BUSINESS PARK

PLAN AND PROFILE LOCATION PLAN

CONTRACT No. 94031

DATE JANUARY 1996

DRAWING No. 94031-PL1



SANITARY SERVICE DATA

MH No.	STATION	TYPE	T/G ELEV	INV
S1	1+055	1200ϕ OPSD 701.01M	90.18	~~87.95~~ 85.91
S2	1+057.4	1200ϕ OPSD 701.01M	90.11	~~87.95~~ 86.43
S3	1+200	1200ϕ OPSD 701.01M	90.14	~~87.85~~ 86.19

STORM MANHOLE DATA

No.	STATION	TYPE	T.G ELEVATION
112	1+235.4	1800ϕ OPSD 701.02M	89.97
113	1+192.7	1800ϕ OPSD 701.02M	89.98
114	1+119.3	1650ϕx2400ϕ M6	89.88
115	1+065.3	1200ϕ OPSD 701.01M	89.95

SANITARY MANHOLE DATA

No.	STATION	TYPE	T.G ELEVATION
12	1+234.2	1500ϕ OPSD 701.04	89.90
13	1+194.5	1500ϕ OPSD 701.04	89.97
14	1+122.7	1200ϕ x 1200ϕ M4	89.96
15A	1+000	1500ϕ OPSD 701.04	89.90
MH 14		DROP OPSD 1003.01M	

CATCHBASIN DATA

No.	STATION	OUTLET INVERT ELEVATION	INLET INVERT ELEVATION	℄ ICD ELEV	℄ ICD TYPE
1	1+070	88.58	-	-	-
2	1+070	88.41	88.44	88.51	B
3	1+114	88.46	88.47	88.56	B
4	1+132	88.57	-	-	-
5	1+170	88.53	-	-	-
6	1+170	88.35	88.38	88.45	B
7	1+240	88.58	-	-	-
8	1+240	88.40	88.43	88.50	B

AS-BUILTS LEGEND

80.90 ~~80.91~~ AS BUILT INFO

ADDITIONAL AS-BUILT INFO

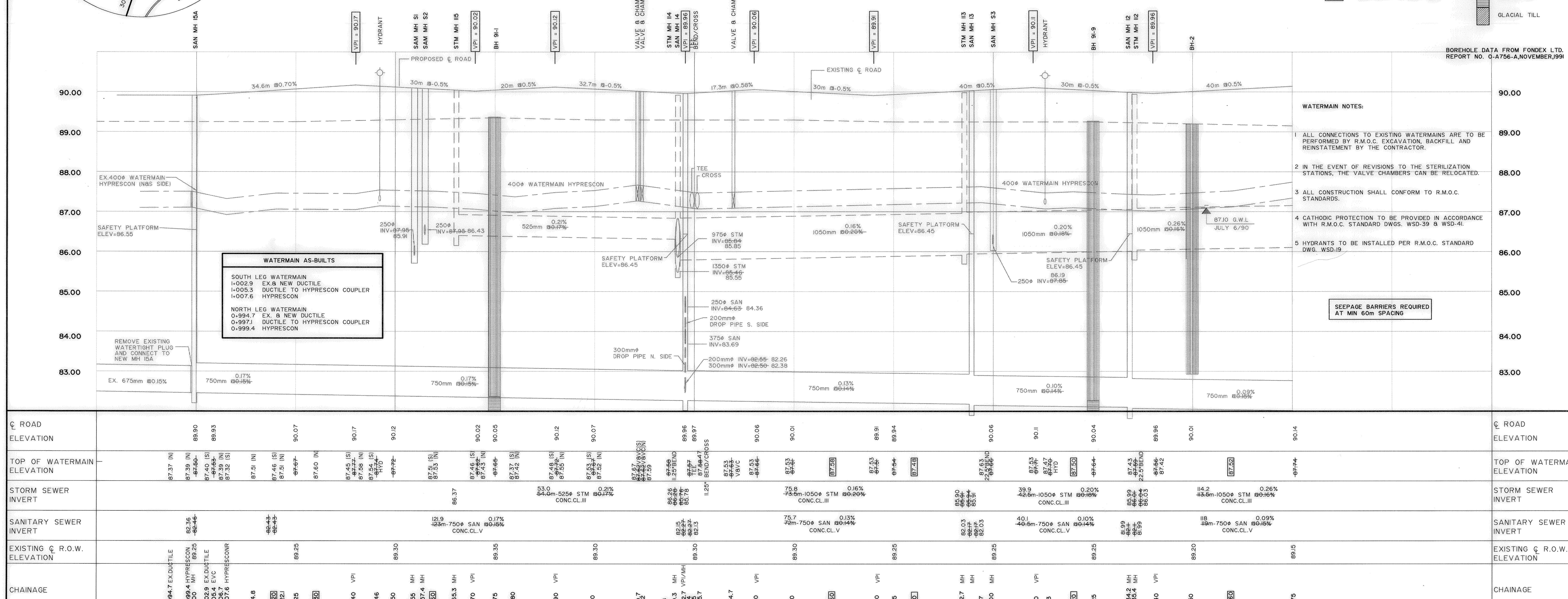
BOREHOLE LEGEND

SILTY CLAY

CLAYEY SILT

GLACIAL TILL

BOREHOLE DATA FROM FONDEX LTD. REPORT NO. C-A756-A,NOVEMBER,1991



WATERMAIN NOTES:

1. ALL CONNECTIONS TO EXISTING WATERMAINS ARE TO BE PERFORMED BY R.M.O.C. EXCAVATION, BACKFILL AND REINSTATEMENT BY THE CONTRACTOR.
2. IN THE EVENT OF REVISIONS TO THE STERILIZATION STATIONS, THE VALVE CHAMBERS CAN BE RELOCATED.
3. ALL CONSTRUCTION SHALL CONFORM TO R.M.O.C. STANDARDS.
4. CATHODIC PROTECTION TO BE PROVIDED IN ACCORDANCE WITH R.M.O.C. STANDARD DWGS. WSD-39 & WSD-41.
5. HYDRANTS TO BE INSTALLED PER R.M.O.C. STANDARD DWG. WSD-19

SEEPAGE BARRIERS REQUIRED AT MIN 60m SPACING

NOTE:
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10	ISSUED TO THE CITY OF NEPEAN	JAN. 30/96	JFB
9	AS-BUILTS AS PER NEPEAN COMMENTS	MAY 10/93	JFB
8	AS-BUILTS AS PER NEPEAN COMMENTS	MAR.26/93	JFB
7	WATERMAIN OFFSET 4.0m	APR.20/92	UB
6	REVISED AS PER NEPEAN COMMENTS	FEB.14/92	SG
5	REVISED AS PER NEPEAN COMMENTS	FEB.3/92	SG
4	REVISED AS PER R.M.O.C. COMMENTS	JAN.17/92	SG
3	ISSUED FOR TENDER	JAN.15/92	SG
2	REVISED AS PER R.M.O.C. COMMENTS	DEC.9/91	SG
1	REVISED AS PER NEPEAN COMMENTS	NOV.28/91	SG

LICENSED PROFESSIONAL ENGINEER S.M. GORDON PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER UDO BOEHME PROVINCE OF ONTARIO

NOVATECH
ENGINEERING CONSULTANTS LTD
OTTAWA, ONTARIO

DESIGN SG
CHECKED UB
DRAWN JFB
CHECKED SG
APPROVED

SCALE
1:500 HORIZONTAL
1:50

NEPEAN

SOUTH MERIVALE BUSINESS PARK AS-BUILTS

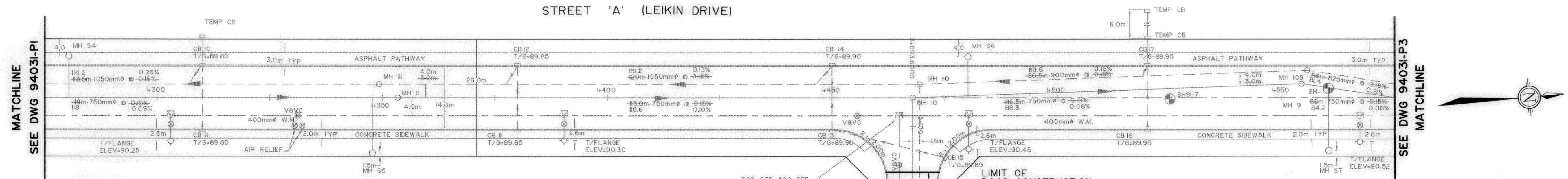
PLAN AND PROFILE (LEIKIN DRIVE)

STREET A - STATION 1+000 TO 1+275

PROJECT No. 9403I
FIELD BOOK
DATE JANUARY 1996
DRAWING No. 9403I-P1

DWG Name: D:\NOVA\9403I\9403IP1.DWG Updated By: JFB
31, 1996 - 11:05:54

STREET 'A' (LEIKIN DRIVE)



CATCHBASIN DATA

No.	STATION	OUTLET INVERT ELEVATION	INLET INVERT ELEVATION	℄ ICD ELEV	℄ ICD TYPE
9	1+310	88.63	-	-	-
10	1+310	88.45	88.48	88.55	B
11	1+380	88.68	-	-	-
12	1+380	88.50	88.53	88.60	B
13	1+450	88.72	88.75	-	-
14	1+450	88.55	88.58	88.65	B
15	1+476	89.00	-	-	-
16	1+520	88.78	-	-	-
17	1+520	88.60	88.63	88.70	B

SANITARY SERVICE DATA

MH No.	STATION	TYPE	T/G ELEV	INV	
S4	1+280	1200φ OPSD 701.01M	90.19	~~87.90~~	85.51
S5	1+347.8	1200φ OPSD 701.01M	90.28	~~87.95~~	86.84
S6	1+480	1200φ OPSD 701.01M	90.29	~~88.05~~	86.09
S7	1+560	1200φ OPSD 701.01M	90.44	~~88.15~~	87.22

STREET 'F' NORTH DATA

SERVICE	STATION	TYPE	ELEVATION
VALVE & CHAMBER	3+108.6		87.80 ~~87.67~~ T\WM
WATERMAIN STUB	3+115		87.59 ~~87.73~~ T\WM
STORM STUB	3+116	PVC CL.150 CONC CL.III	86.96 ~~86.99~~ INV
SANITARY STUB	3+117	PVC SDR 35	86.24 ~~86.41~~ INV
END OF ASPHALT	3+110.6		90.09 ℄ ROAD

STORM MANHOLE DATA

No.	STATION	TYPE	T.G ELEVATION
109	1+555.6	1800φ OPSD 701.02M	90.25
110	1+469.3	1500x1800 M5	90.12
111	1+349.3	1800φ OPSD 701.02M	90.12

SANITARY MANHOLE DATA

No.	STATION	TYPE	T.G ELEVATION
9	1+554.3	1500φ OPSD 701.04	90.33
10	1+467.8	1800φ OPSD 701.05	90.20
11	1+352.8	1500φ OPSD 701.04	90.20
MH 10		DROP OPSD 1003.01M	

AS-BUILTS LEGEND

80.90 ~~80.91~~ AS BUILT INFO

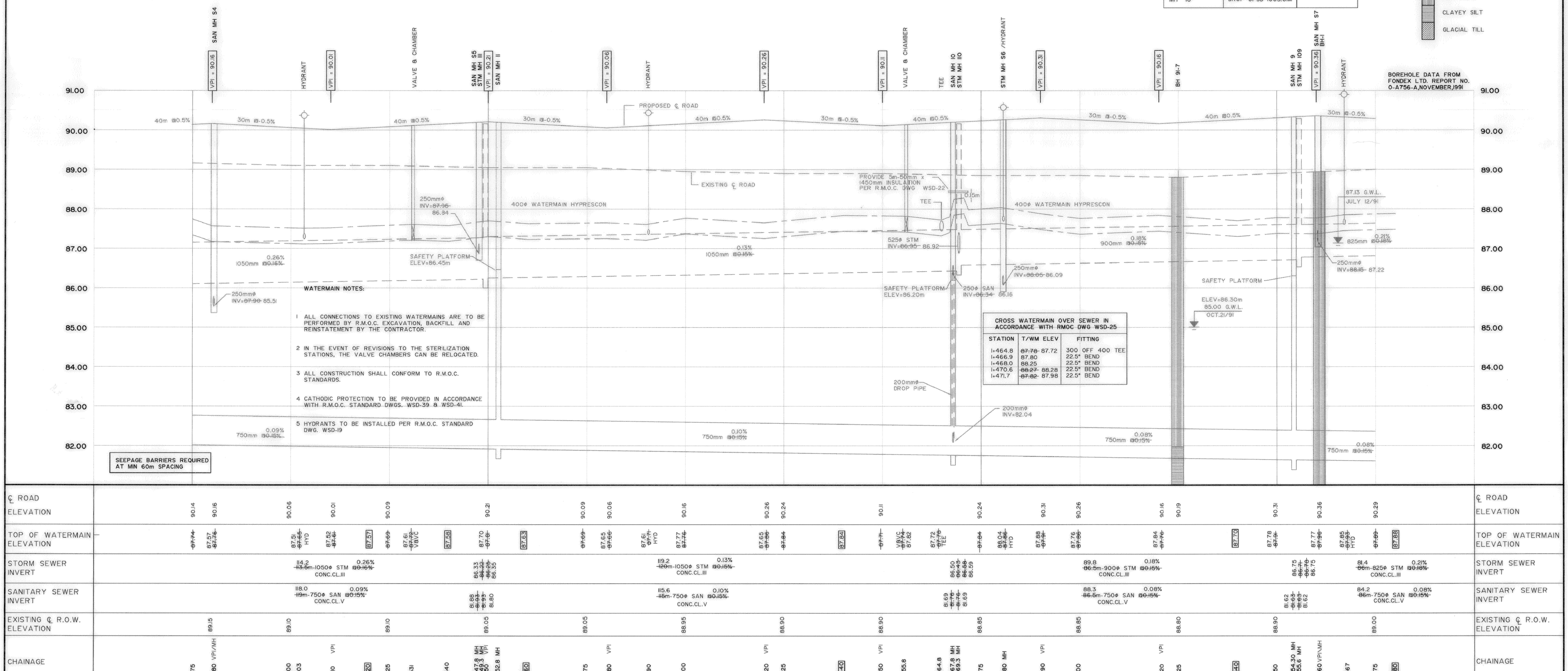
ADDITIONAL AS-BUILT INFO

BOREHOLE LEGEND

SILTY CLAY

CLAYEY SILT

GLACIAL TILL



BOREHOLE DATA FROM FONDEX LTD. REPORT NO. 0-A756-A,NOVEMBER,1991

WATERMAIN NOTES:

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5. HYDRANTS TO BE INSTALLED PER R.M.O.C. STANDARD DWG. WSD-19

CROSS WATERMAIN OVER SEWER IN ACCORDANCE WITH RMOC DWG WSD-25

STATION	T/WM ELEV	FITTING
1+464.8	~~87.78~~ 87.72	300 OFF 400 TEE
1+466.9	87.80	22.5° BEND
1+468.0	88.25	22.5° BEND
1+470.6	~~88.27~~ 88.28	22.5° BEND
1+471.7	~~87.82~~ 87.98	22.5° BEND

SEEPAGE BARRIERS REQUIRED AT MIN 60m SPACING

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10	ISSUED TO THE CITY OF NEPEAN	JAN.30/96	JFB
9	AS-BUILTS AS PER NEPEAN COMMENTS	MAY 04/93	JFB
8	AS-BUILTS AS PER NEPEAN COMMENTS	MAR.26/93	JFB
7	WATERMAIN OFFSET 4.0m	APR.20/92	UB
6	REVISED AS PER NEPEAN COMMENTS	FEB.14/92	SG
5	REVISED AS PER NEPEAN COMMENTS	FEB.3/92	SG
4	REVISED AS PER R.M.O.C. COMMENTS	JAN.17/92	SG
3	ISSUED FOR TENDER	JAN.15/92	SG
2	REVISED AS PER R.M.O.C. COMMENTS	DEC.9/91	SG
1	REVISED AS PER NEPEAN COMMENTS	NOV.28/91	SG

LICENSED PROFESSIONAL ENGINEER S.M. GORDON PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER UDO BOEHME PROVINCE OF ONTARIO

NOVATECH
ENGINEERING CONSULTANTS LTD.
OTTAWA, ONTARIO

DESIGN UB/JFB
CHECKED UB
DRAWN JFB
CHECKED UB
APPROVED

SCALE
1:500 HORIZONTAL
1:50

NEPEAN

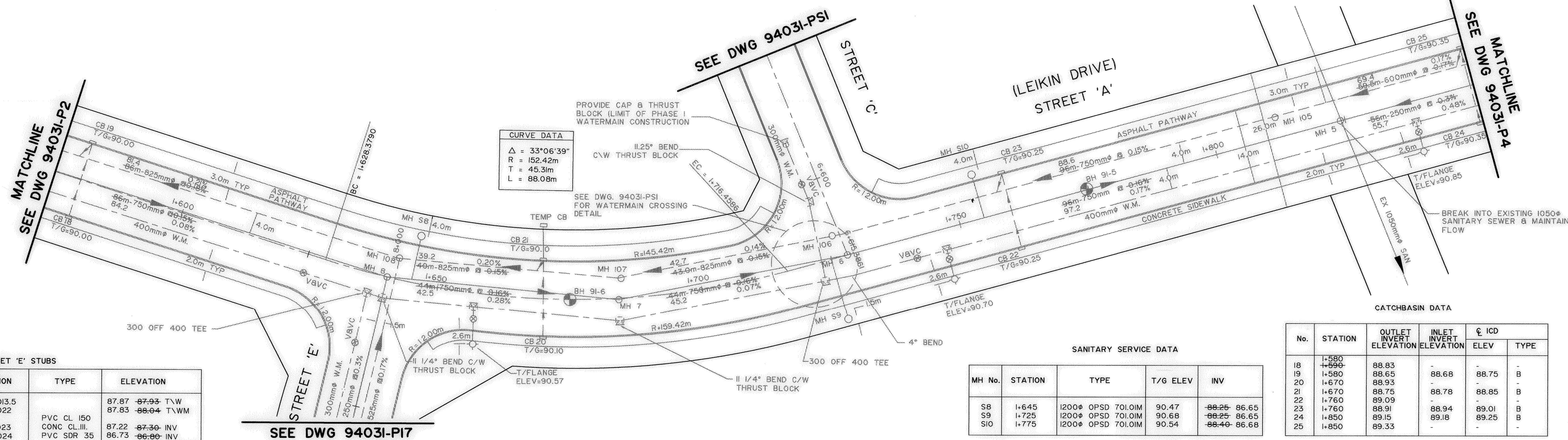
SOUTH MERIVALE BUSINESS PARK AS-BUILTS

PLAN AND PROFILE (LEIKIN DRIVE)

STREET A - STATION 1+275 TO 1+575

PROJECT No. 94031
FIELD BOOK
DATE JANUARY 1996
DRAWING No. 94031-P2

DWG Name: D:\NOVA\94031\94031P2.DWG Updated By: JFB



STREET 'E' STUBS

SERVICE	STATION	TYPE	ELEVATION
VALVE & CHAMBER	8+013.5		87.87 ~~87.93~~ T\W
WATERMAIN STUB	8+022	PVC CL 150	87.83 ~~88.04~~ T\WM
STORM STUB	8+023	CONC CL.III.	87.22 ~~87.30~~ INV
SAN STUB	8+024	PVC SDR 35	86.73 ~~86.80~~ INV
END OF ASPHALT	8+017		90.37 ℄ ROAD

SANITARY SERVICE DATA

MH No.	STATION	TYPE	T/G ELEV	INV
S8	1+645	1200ϕ OPSD 701.01M	90.47	~~88.25~~ 86.65
S9	1+725	1200ϕ OPSD 701.01M	90.68	~~88.25~~ 86.65
S10	1+775	1200ϕ OPSD 701.01M	90.54	~~88.40~~ 86.68

CATCHBASIN DATA

No.	STATION	OUTLET INVERT ELEVATION	INLET INVERT ELEVATION	℄ ICD ELEV	℄ ICD TYPE
18	1+580 ~~1+590~~	88.83	-	-	-
19	1+580	88.65	88.68	88.75	B
20	1+670	88.93	-	-	-
21	1+670	88.75	88.78	88.85	B
22	1+760	89.09	-	-	-
23	1+760	88.91	88.94	89.01	B
24	1+850	89.15	89.18	89.25	B
25	1+850	89.33	-	-	-

STORM MANHOLE DATA

No.	STATION	TYPE	T.G ELEVATION
105	1+822.6	1500ϕ OPSD 701.02M	90.66
106	1+726.5	1500ϕ OPSD 701.02M	90.52
107	1+682.8	1500ϕ OPSD 701.02M	90.29
108	1+641.8	1800ϕ OPSD 701.02M	90.36

SANITARY MANHOLE DATA

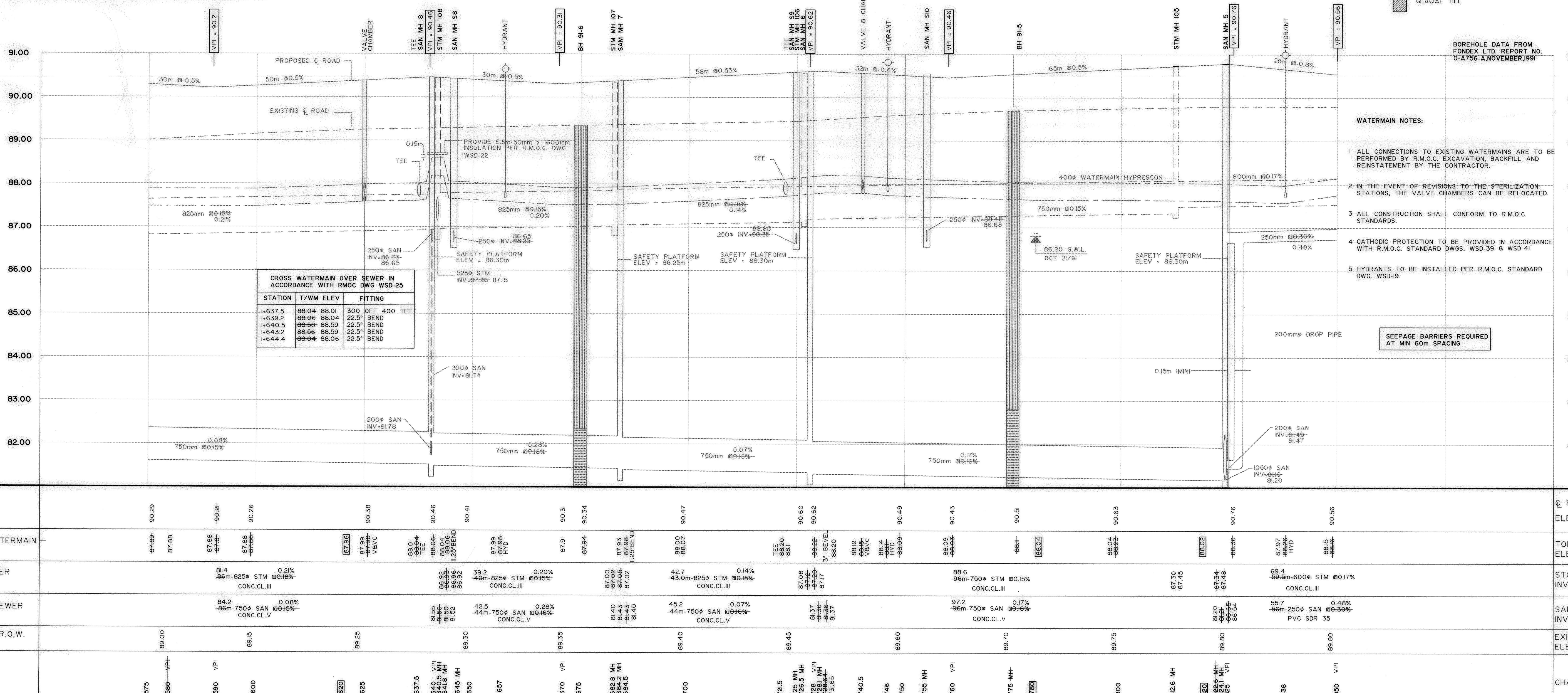
No.	STATION	TYPE	T.G ELEVATION
5	1+824.1	1500ϕ x 1800 M5	90.76
6	1+728.1	1500ϕ OPSD 701.04	90.62
7	1+684.2	1500ϕ OPSD 701.04	90.38
8	1+640.5	1800ϕ OPSD 701.05	90.46
MH'S 5 AND 8		DROP OPSD 1003.01 M	

BOREHOLE LEGEND

- SILTY CLAY
- CLAYEY SILT
- GLACIAL TILL

AS-BUILTS LEGEND

- 80.90 ~~80.91~~ AS BUILT INFO
- ADDITIONAL AS-BUILT INFO



BOREHOLE DATA FROM FONDEX LTD. REPORT NO. 0-A756-A, NOVEMBER, 1991

CROSS WATERMAIN OVER SEWER IN ACCORDANCE WITH RMOC DWG WSD-25

STATION	T/WM ELEV	FITTING
1+637.5	~~88.04~~ 88.01	300 OFF 400 TEE
1+639.2	~~88.06~~ 88.04	22.5° BEND
1+640.5	~~88.58~~ 88.59	22.5° BEND
1+643.2	~~88.56~~ 88.59	22.5° BEND
1+644.4	~~88.04~~ 88.06	22.5° BEND

WATERMAIN NOTES:

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5. HYDRANTS TO BE INSTALLED PER R.M.O.C. STANDARD DWG. WSD-19

SEEPAGE BARRIERS REQUIRED AT MIN 60m SPACING

NOTE:
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No.	REVISION	DATE	BY
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9	AS-BUILTS AS PER NEPEAN COMMENTS	MAY 04/93	JFB
8	AS-BUILTS AS PER NEPEAN COMMENTS	MAR.26/93	JFB
7	WATERMAIN OFFSET 4.0m	APR.20/92	UB
6	REVISED AS PER NEPEAN COMMENTS	FEB.14/92	SG
5	REVISED AS PER NEPEAN COMMENTS	FEB.3/92	SG
4	REVISED AS PER R.M.O.C. COMMENTS	JAN.17/92	SG
3	ISSUED FOR TENDER	JAN.15/92	SG
2	REVISED AS PER R.M.O.C. COMMENTS	DEC.9/91	SG
1	REVISED AS PER NEPEAN COMMENTS	NOV.28/91	SG

LICENSED PROFESSIONAL ENGINEER S.M. GORDON PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER UDO BOEHME PROVINCE OF ONTARIO

NOVATECH
ENGINEERING CONSULTANTS LTD
OTTAWA, ONTARIO

DESIGN	UB/JFB
CHECKED	UB
DRAWN	JFB
CHECKED	UB
APPROVED	

SCALE
1:500 HORIZONTAL (0 5 10 15 20)
1:50 (0 0.5 1.0 1.5 2.0)

NEPEAN

SOUTH MERIVALE BUSINESS PARK
AS-BUILTS

PLAN AND PROFILE (LEIKIN DRIVE)
STREET A - STATION 1+575 TO 1+850

PROJECT No.	94031
FIELD BOOK	
DATE	JANUARY 1996
DRAWING No.	94031-P3

DWG Name: D:\NOVA\94031\94031P3.DWG Updated By: JFB
... 31, 1996 - 14:23:05

STORM MANHOLE DATA

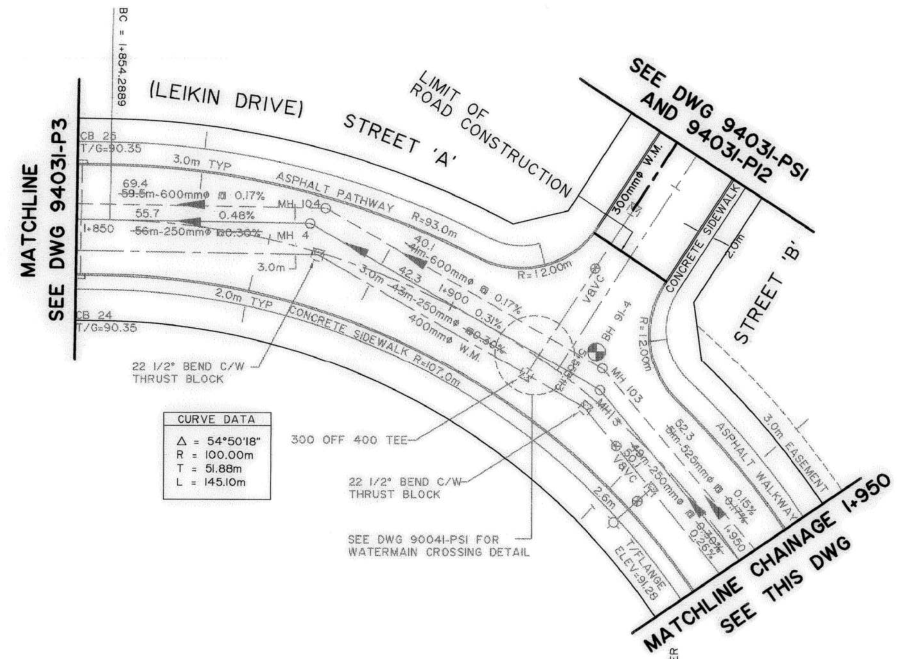
No.	STATION	TYPE	T.G ELEVATION
101	2+017.1	1200ϕ OPSD 701.01M	90.79
102	1+969.5	1200ϕ OPSD 701.01M	90.73
103	1+920.4	1200ϕ OPSD 701.01M	91.08
104	1+880.9	1200ϕ OPSD 701.01M	90.68

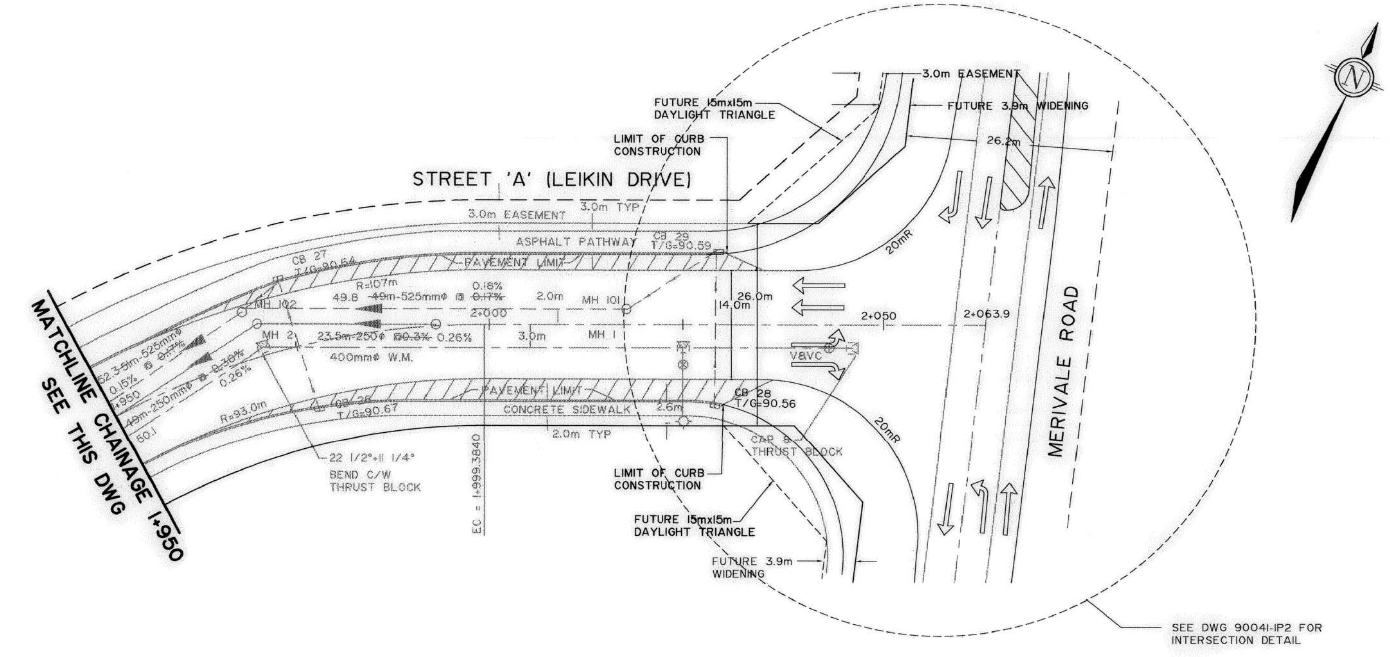
SANITARY MANHOLE DATA

No.	STATION	TYPE	T.G ELEVATION
1	1+993.9	1200ϕ OPSD 701.01M	91.03
2	1+970.4	1200ϕ OPSD 701.01M	90.79
3	1+921.9	1200ϕ OPSD 701.01M	91.10
4	1+879.5	1200ϕ OPSD 701.01M	90.72

CATCH BASIN DATA

No.	STATION	OUTLET INVERT ELEVATION	INLET INVERT ELEVATION	℄ ICD ELEVATION	ICD TYPE
24	1+850	89.15	89.18	89.25	B
25	1+850	89.33	-	-	-
26	1+975	89.64	-	-	-
27	1+975	89.45	89.48	89.55	B
28	2+030	89.54	-	-	-
29	2+030	89.45	89.46	89.55	B





BOREHOLE LEGEND

SILTY CLAY

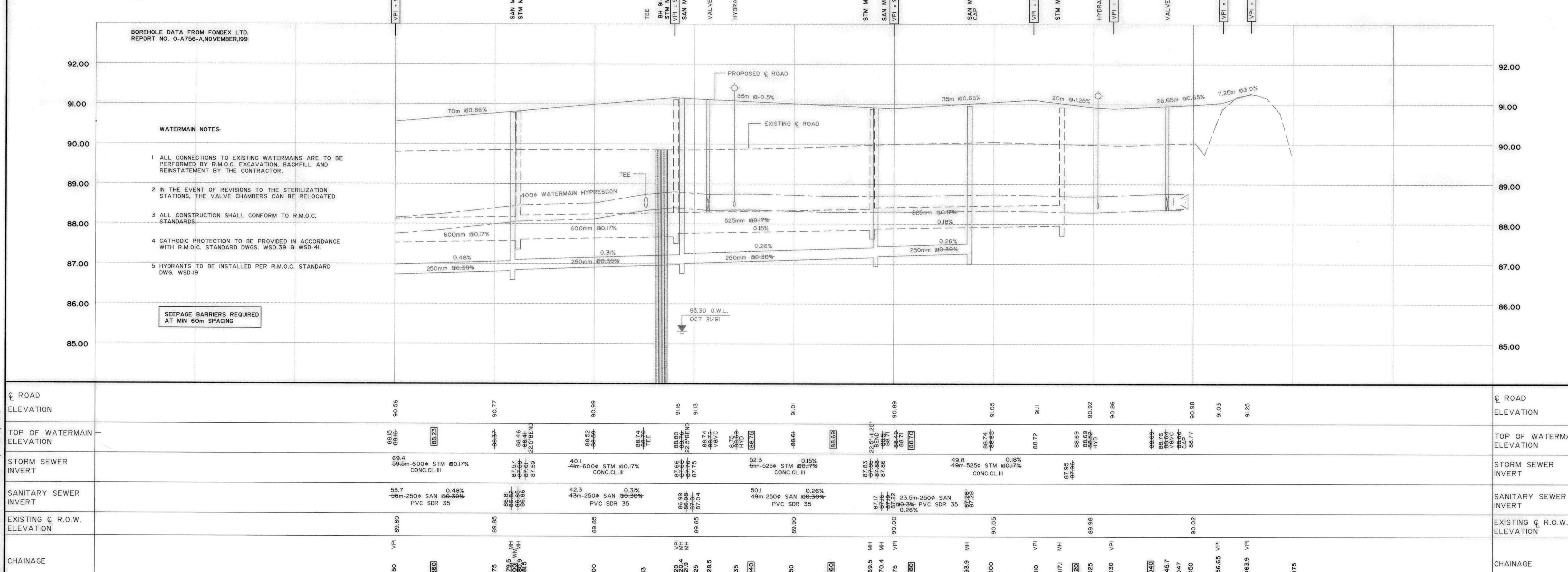
CLAYEY SILT

GLACIAL TILL

AS-BUILTS LEGEND

80.90 ~~80.91~~ AS BUILT INFO

ADDITIONAL AS-BUILT INFO



NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

10	ISSUED TO THE CITY OF NEPEAN	JAN. 30/96	JFB
9	AS-BUILTS AS PER NEPEAN COMMENTS	MAY 10/93	JFB
8	AS-BUILTS AS PER NEPEAN COMMENTS	MAR.26/93	JFB
7	WATERMAIN OFFSET 4.0m	APR.20/92	UB
6	REVISED AS PER NEPEAN COMMENTS	FEB.14/92	SG
5	REVISED AS PER NEPEAN COMMENTS	FEB.3/92	SG
4	REVISED AS PER R.M.O.C. COMMENTS	JAN.17/92	SG
3	ISSUED FOR TENDER	JAN.15/92	SG
2	REVISED AS PER R.M.O.C. COMMENTS	DEC.9/91	SG
1	REVISED AS PER NEPEAN COMMENTS	NOV.28/91	SG

LICENSED PROFESSIONAL ENGINEER S.M. GORDON PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER UDO BOEHME PROVINCE OF ONTARIO

NOVATECH
ENGINEERING CONSULTANTS LTD.
OTTAWA, ONTARIO

DESIGN UB/JFB
CHECKED UB
DRAWN JFB
CHECKED UB
APPROVED

SCALE
1:500
HORIZONTAL
1:50

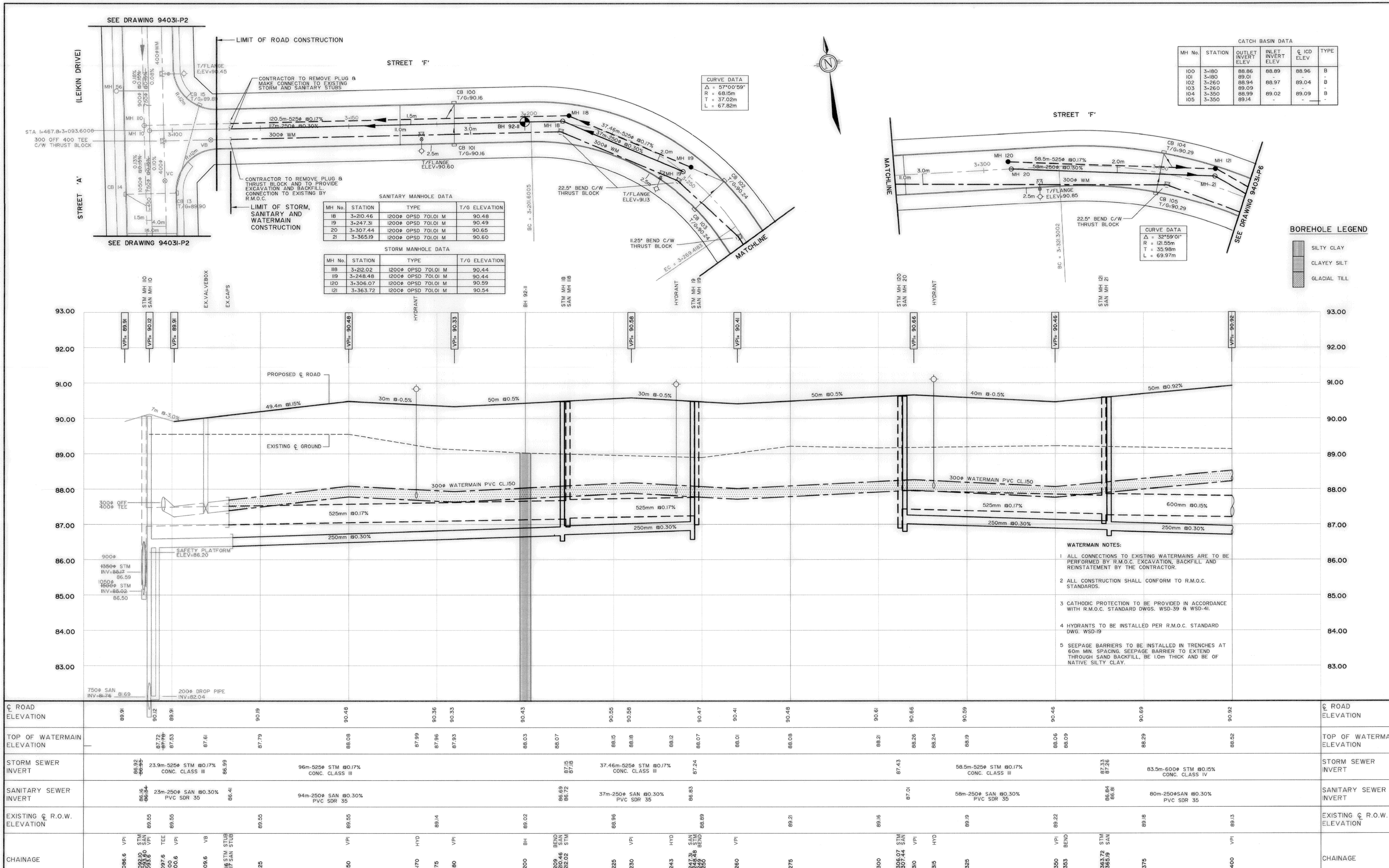
NEPEAN

SOUTH MERIVALE BUSINESS PARK AS-BUILTS

PLAN AND PROFILE (LEIKIN DRIVE)

PROJECT No. 94031
FIELD BOOK
DATE JANUARY 1996
DRAWING No.

DWG Name: D:\NOVA\9403\9403IP4.DWG Updated By: JFB



CATCH BASIN DATA

MH No.	STATION	OUTLET INVERT ELEV	INLET INVERT ELEV	℄ ICD ELEV	TYPE
100	3+180	88.86	88.89	88.96	B
101	3+180	89.01	-	-	-
102	3+260	88.94	88.97	89.04	B
103	3+260	89.09	-	-	-
104	3+350	88.99	89.02	89.09	B
105	3+350	89.14	-	-	-

SANITARY MANHOLE DATA

MH No.	STATION	TYPE	T/G ELEVATION
18	3+210.46	1200ϕ OPSD 701.01 M	90.48
19	3+247.31	1200ϕ OPSD 701.01 M	90.49
20	3+307.44	1200ϕ OPSD 701.01 M	90.65
21	3+365.19	1200ϕ OPSD 701.01 M	90.60

STORM MANHOLE DATA

MH No.	STATION	TYPE	T/G ELEVATION
118	3+212.02	1200ϕ OPSD 701.01 M	90.44
119	3+248.48	1200ϕ OPSD 701.01 M	90.44
120	3+306.07	1200ϕ OPSD 701.01 M	90.59
121	3+363.72	1200ϕ OPSD 701.01 M	90.54

WATERMAIN NOTES:

1 ALL CONNECTIONS TO EXISTING WATERMAINS ARE TO BE PERFORMED BY R.M.O.C. EXCAVATION, BACKFILL AND REINSTATEMENT BY THE CONTRACTOR.

2 ALL CONSTRUCTION SHALL CONFORM TO R.M.O.C. STANDARDS.

3 CATHODIC PROTECTION TO BE PROVIDED IN ACCORDANCE WITH R.M.O.C. STANDARD DWGS. WSD-39 & WSD-41.

4 HYDRANTS TO BE INSTALLED PER R.M.O.C. STANDARD DWG. WSD-19

5 SEEPAGE BARRIERS TO BE INSTALLED IN TRENCHES AT 60m MIN. SPACING. SEEPAGE BARRIER TO EXTEND THROUGH SAND BACKFILL, BE 1.0m THICK AND BE OF NATIVE SILTY CLAY.

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

4	ISSUED TO THE CITY OF NEPEAN	JAN.30/96	JFB
3	REVISED AS PER R.M.O.C. COMMENTS	20.11.92	JFB
2	ISSUED FOR M.O.E. APPROVAL	17.09.92	UB
1	REVISED AS PER R.M.O.C. COMMENTS	01.06.92	JFB

LICENSED PROFESSIONAL ENGINEER R.S. CEBRYK PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER UDO BOEHME PROVINCE OF ONTARIO

NOVATECH
ENGINEERING CONSULTANTS LTD.
OTTAWA, ONTARIO

DESIGN UB/JFB
CHECKED UB
DRAWN JFB
CHECKED UB
APPROVED

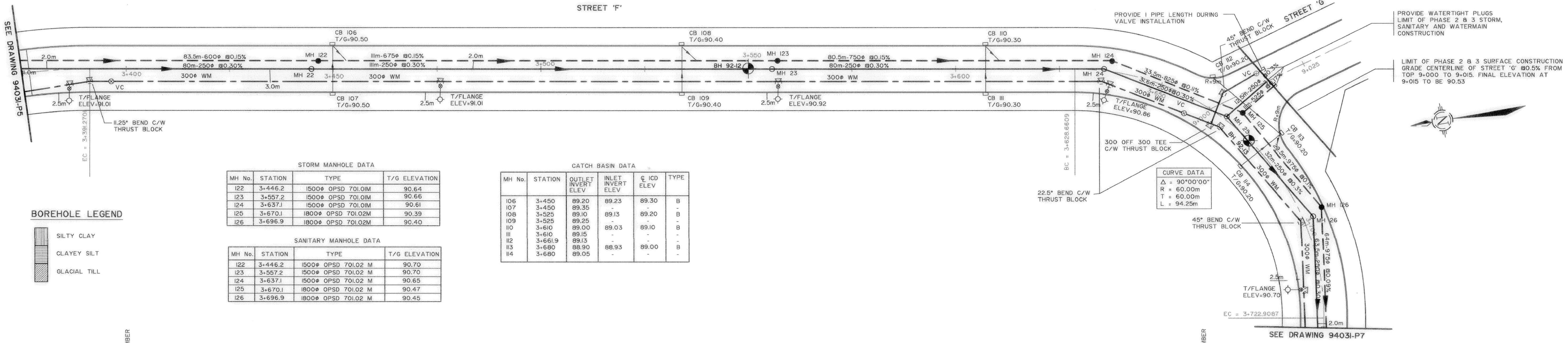
SCALE
1:500 HORIZONTAL
1:50

NEPEAN

SOUTH MERIVALE BUSINESS PARK AS-BUILTS

PLAN AND PROFILE
STREET F - STATION 3+100 TO 3+375

PROJECT No. 94031
FIELD BOOK
DATE JANUARY 1996
DRAWING No. 9403I-P5



BOREHOLE LEGEND

- SILTY CLAY
- CLAYEY SILT
- GLACIAL TILL

STORM MANHOLE DATA

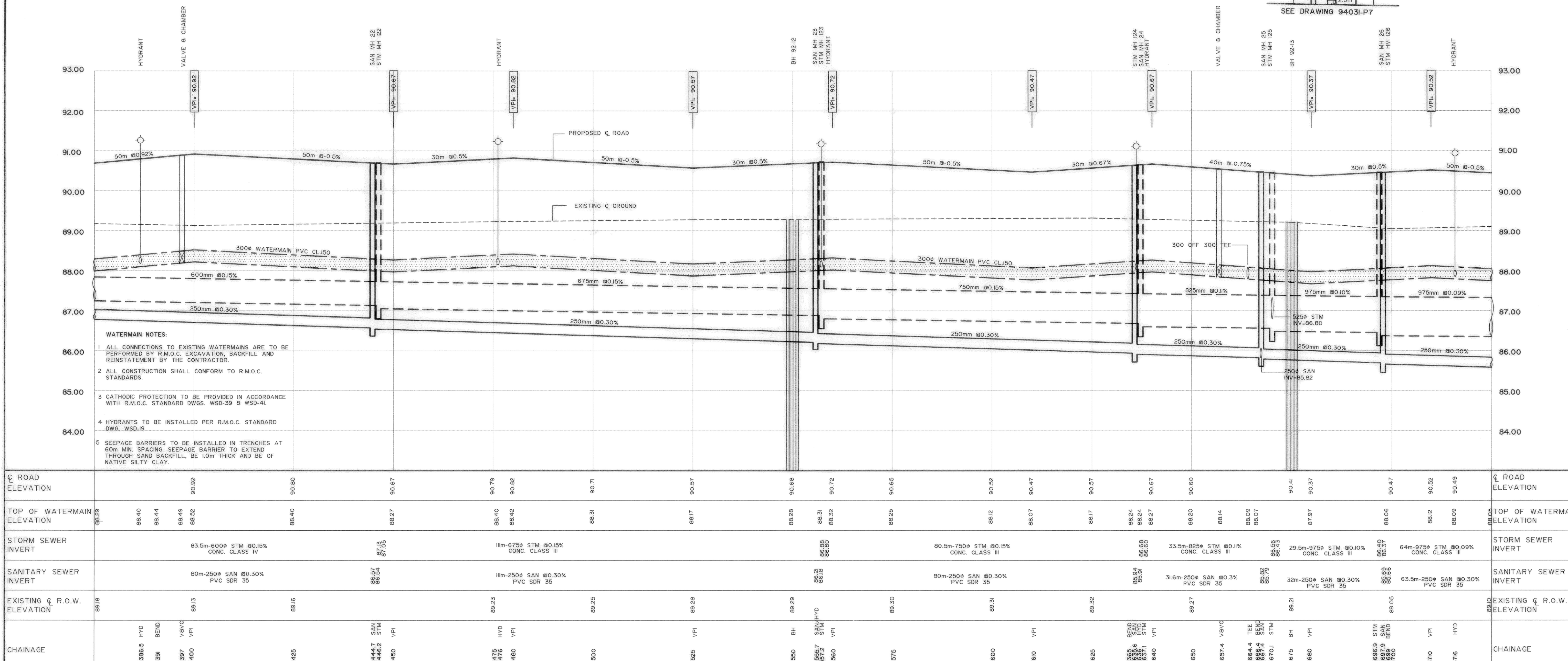
MH No.	STATION	TYPE	T/G ELEVATION
I22	3+446.2	I500φ OPSD 70I.0IM	90.64
I23	3+557.2	I500φ OPSD 70I.0IM	90.66
I24	3+637.I	I500φ OPSD 70I.0IM	90.6I
I25	3+670.I	I800φ OPSD 70I.02M	90.39
I26	3+696.9	I800φ OPSD 70I.02M	90.40

SANITARY MANHOLE DATA

MH No.	STATION	TYPE	T/G ELEVATION
I22	3+446.2	I500φ OPSD 70I.02 M	90.70
I23	3+557.2	I500φ OPSD 70I.02 M	90.70
I24	3+637.I	I500φ OPSD 70I.02 M	90.65
I25	3+670.I	I800φ OPSD 70I.02 M	90.47
I26	3+696.9	I800φ OPSD 70I.02 M	90.45

CATCH BASIN DATA

MH No.	STATION	OUTLET INVERT ELEV	INLET INVERT ELEV	℄ ICD ELEV	TYPE
I06	3+450	89.20	89.23	89.30	B
I07	3+450	89.35	-	-	-
I08	3+525	89.I0	89.I3	89.20	B
I09	3+525	89.25	-	-	-
II0	3+6I0	89.00	89.03	89.I0	B
III	3+6I0	89.I5	-	-	-
II2	3+66I.9	89.I3	-	-	-
II3	3+680	88.90	88.93	89.00	B
II4	3+680	89.05	-	-	-



WATERMAIN NOTES:

1. ALL CONNECTIONS TO EXISTING WATERMAINS ARE TO BE PERFORMED BY R.M.O.C. EXCAVATION, BACKFILL AND REINSTATEMENT BY THE CONTRACTOR.
2. ALL CONSTRUCTION SHALL CONFORM TO R.M.O.C. STANDARDS.
3. CATHODIC PROTECTION TO BE PROVIDED IN ACCORDANCE WITH R.M.O.C. STANDARD DWGS. WSD-39 & WSD-4I.
4. HYDRANTS TO BE INSTALLED PER R.M.O.C. STANDARD DWG. WSD-I9
5. SEEPAGE BARRIERS TO BE INSTALLED IN TRENCHES AT 60m MIN. SPACING. SEEPAGE BARRIER TO EXTEND THROUGH SAND BACKFILL, BE I.0m THICK AND BE OF NATIVE SILTY CLAY.

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY
4	ISSUED TO THE CITY OF NEPEAN	JAN.30/96	JFB
3	REVISED AS PER R.M.O.C. COMMENTS	0I.II.92	JFB
2	ISSUED FOR M.O.E. APPROVAL	I7.09.92	UB
I	REVISED AS PER R.M.O.C. COMMENTS	0I.06.92	JFB

LICENSED PROFESSIONAL ENGINEER R.S. CEBRYK PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER UDO BOEHME PROVINCE OF ONTARIO

NOVATECH
ENGINEERING CONSULTANTS LTD.
OTTAWA, ONTARIO

DESIGN	UB/JFB
CHECKED	UB
DRAWN	JFB
CHECKED	UB
APPROVED	JGR

SCALE
HORIZONTAL I:500
VERTICAL I:50

NEPEAN
SOUTH MERIVALE BUSINESS PARK
PLAN AND PROFILE
STREET F - STATION 3+375 TO 3+725

PROJECT No. 9403I
FIELD BOOK
DATE JANUARY 1996
DRAWING No. 9403I-P6

Jan 31, 1996 - 15:25:48 DWG Name: D:\NOVA\9403\9403IP6.DWG Updated By: JFB

STORM MANHOLE DATA

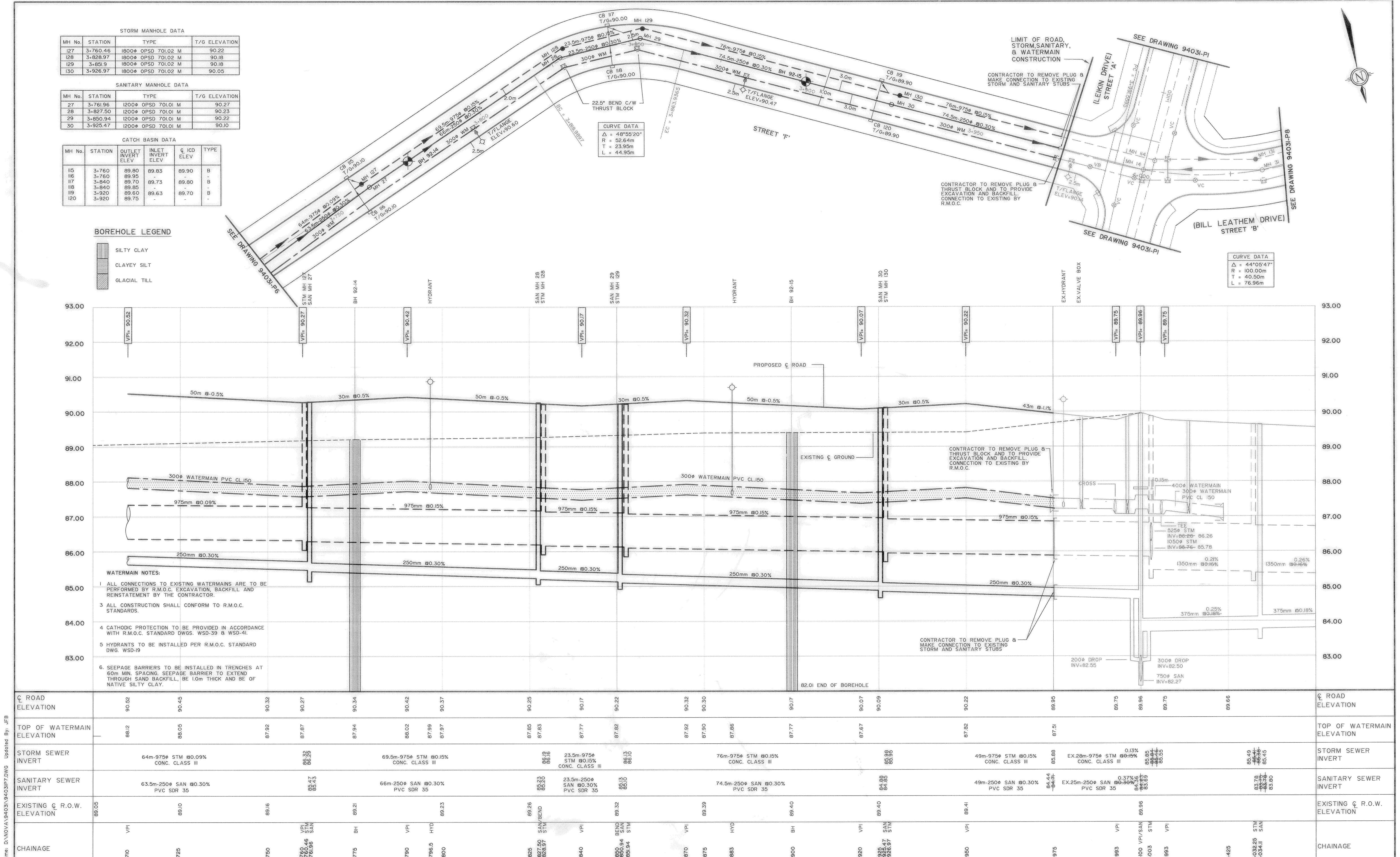
MH No.	STATION	TYPE	T/G ELEVATION
127	3+760.46	1800φ OPSD 701.02 M	90.22
128	3+828.97	1800φ OPSD 701.02 M	90.18
129	3+851.9	1800φ OPSD 701.02 M	90.18
130	3+926.97	1800φ OPSD 701.02 M	90.05

SANITARY MANHOLE DATA

MH No.	STATION	TYPE	T/G ELEVATION
27	3+761.96	1200φ OPSD 701.01 M	90.27
28	3+827.50	1200φ OPSD 701.01 M	90.23
29	3+850.94	1200φ OPSD 701.01 M	90.22
30	3+925.47	1200φ OPSD 701.01 M	90.10

CATCH BASIN DATA

MH No.	STATION	OUTLET INVERT ELEV	INLET INVERT ELEV	℄ ICD ELEV	TYPE
115	3+760	89.80	89.83	89.90	B
116	3+760	89.95	-	-	-
117	3+840	89.70	89.73	89.80	B
118	3+840	89.85	-	-	-
119	3+920	89.60	89.63	89.70	B
120	3+920	89.75	-	-	-



WATERMAIN NOTES:

1. ALL CONNECTIONS TO EXISTING WATERMAINS ARE TO BE PERFORMED BY R.M.O.C. EXCAVATION, BACKFILL AND REINSTATEMENT BY THE CONTRACTOR.
3. ALL CONSTRUCTION SHALL CONFORM TO R.M.O.C. STANDARDS.
4. CATHODIC PROTECTION TO BE PROVIDED IN ACCORDANCE WITH R.M.O.C. STANDARD DWGS. WSD-39 & WSD-41.
5. HYDRANTS TO BE INSTALLED PER R.M.O.C. STANDARD DWG. WSD-19
6. SEEPAGE BARRIERS TO BE INSTALLED IN TRENCHES AT 60m MIN. SPACING. SEEPAGE BARRIER TO EXTEND THROUGH SAND BACKFILL, BE 1.0m THICK AND BE OF NATIVE SILTY CLAY.

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY
4	ISSUED TO THE CITY OF NEPEAN	JAN.30 /96	JFB
3	REVISED AS PER R.M.O.C. COMMENTS	01.11.92	JFB
2	ISSUED FOR M.O.E. APPROVAL	17.09.92	UB
1	REVISED AS PER R.M.O.C. COMMENTS	01.06.92	JFB

LICENSED PROFESSIONAL ENGINEER R.S. CEBRYK PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER UDO BOEHME PROVINCE OF ONTARIO

NOVATECH
ENGINEERING CONSULTANTS LTD.
OTTAWA, ONTARIO

DESIGN	UB/JFB
CHECKED	UB
DRAWN	JFB
CHECKED	UB
APPROVED	JGR

SCALE
1:500 HORIZONTAL
1:50 VERTICAL

NEPEAN

SOUTH MERIVALE BUSINESS PARK AS-BUILTS

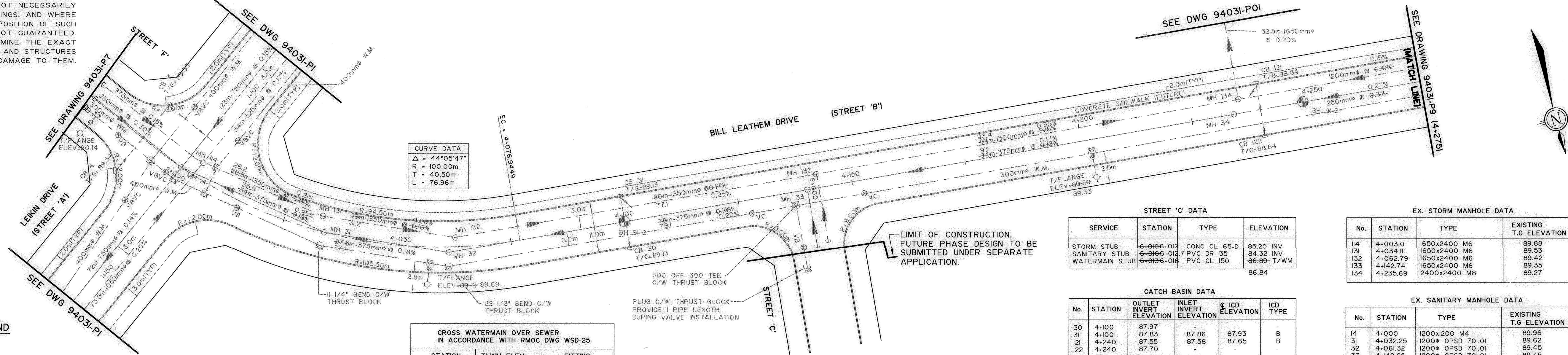
PLAN AND PROFILE

STREET F - STATION 3+725 TO 4+000

PROJECT No. 94031
FIELD BOOK
DATE JANUARY 1996
DRAWING No. 94031-P7

DWG Name: D:\NOVA\94031\94031P7.DWG Updated By: JFB

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.



CURVE DATA
Δ = 44°05'47"
R = 100.00m
T = 40.50m
L = 76.96m

EC = 4+076.9449

CROSS WATERMAIN OVER SEWER IN ACCORDANCE WITH RMOC DWG WSD-25		
STATION	T\WM ELEV.	FITTING
3+994	87.58	400 x 400 CROSS
3+998	87.56	V&VC 400ϕ
4+001.1	87.54	22.5° BEND
4+001.3	87.65	22.5° BEND
4+004.7	87.63	22.5° BEND
4+004.9	87.52	22.5° BEND
4+007	87.51	300 OFF 400 TEE

STREET 'C' DATA

SERVICE	STATION	TYPE	ELEVATION
STORM STUB	~~6+0106~~+012	CONC CL 65-D	85.20 INV
SANITARY STUB	~~6+0106~~+012.7	PVC DR 35	84.32 INV
WATERMAIN STUB	~~6+0136~~+018	PVC CL 150	~~86.89~~ T/WM 86.84

CATCH BASIN DATA

No.	STATION	OUTLET INVERT ELEVATION	INLET INVERT ELEVATION	℄ ICD ELEVATION	ICD TYPE
30	4+100	87.97	-	-	-
31	4+100	87.83	87.86	87.93	B
121	4+240	87.55	87.58	87.65	B
122	4+240	87.70	-	-	-

EX. STORM MANHOLE DATA

No.	STATION	TYPE	EXISTING T.G ELEVATION	PROPOSED T.G ELEVATION
114	4+003.0	1650x2400 M6	89.88	89.88
131	4+034.11	1650x2400 M6	89.53	89.53
132	4+062.79	1650x2400 M6	89.42	89.38
133	4+142.74	1650x2400 M6	89.35	89.41
134	4+235.69	2400x2400 M8	89.27	88.94

EX. SANITARY MANHOLE DATA

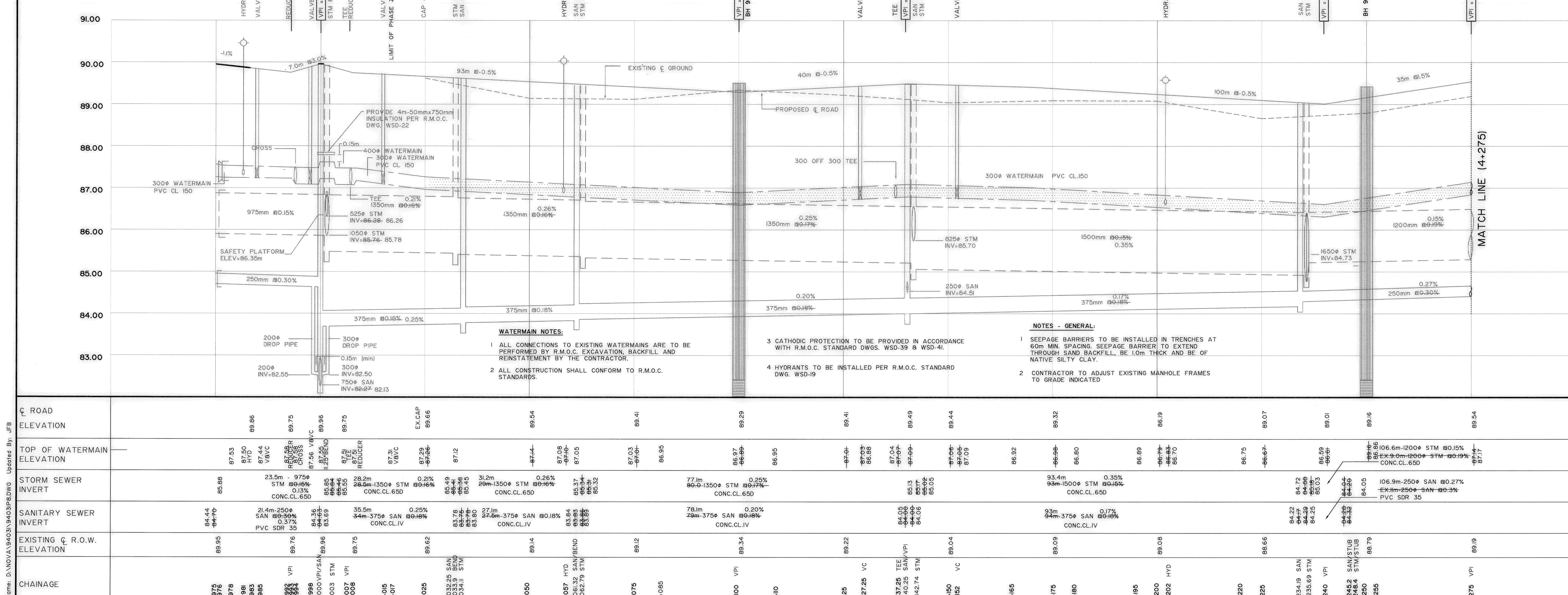
No.	STATION	TYPE	EXISTING T.G ELEVATION	PROPOSED T.G ELEVATION
14	4+000	1200x1200 M4	89.96	89.96
31	4+032.25	1200ϕ OPSD 701.01	89.62	89.62
32	4+061.32	1200ϕ OPSD 701.01	89.45	89.48
33	4+140.25	1200ϕ OPSD 701.01	89.45	89.49
34	4+234.19	1200ϕ OPSD 701.01	89.37	89.04
MH 14		DROP OPSD 1003.01M		

NOTES

- ALL SEWERS TO BE CONSTRUCTED WITH GRANULAR "A" CLASSS "B" BEDDING, GRANULAR "A" COVER AND APPROVED NATIVE BACKFILL TO SUBGRADE.
- ROAD REINSTATEMENT TO BE AS FOLLOWS:
  STREET A: 40mm HL 4, 45mm HL 8, 150mm GRANULAR "A", 600mm GRANULAR "B"
  STREET B: 50mm HL 4, 150mm GRANULAR "A", 550mm GRANULAR "B"

BOREHOLE LEGEND
SILTY CLAY
CLAYEY SILT
GLACIAL TILL

BOREHOLE DATA FROM FONDEX LTD. REPORT NO. 0-A756-A,NOVEMBER,1991



WATERMAIN NOTES:

1. ALL CONNECTIONS TO EXISTING WATERMAINS ARE TO BE PERFORMED BY R.M.O.C. EXCAVATION, BACKFILL AND REINSTATEMENT BY THE CONTRACTOR.
2. ALL CONSTRUCTION SHALL CONFORM TO R.M.O.C. STANDARDS.
3. CATHODIC PROTECTION TO BE PROVIDED IN ACCORDANCE WITH R.M.O.C. STANDARD DWGS. WSD-39 & WSD-41.
4. HYDRANTS TO BE INSTALLED PER R.M.O.C. STANDARD DWG. WSD-19

NOTES - GENERAL:

1. SEEPAGE BARRIERS TO BE INSTALLED IN TRENCHES AT 60m MIN. SPACING. SEEPAGE BARRIER TO EXTEND THROUGH SAND BACKFILL, BE 1.0m THICK AND BE OF NATIVE SILTY CLAY.
2. CONTRACTOR TO ADJUST EXISTING MANHOLE FRAMES TO GRADE INDICATED

No.	REVISION	DATE	BY
18	ISSUED TO THE CITY OF NEPEAN	JAN.30 /96	JFB
17	AS-BUILT SEWERS AND WATERMAIN	JAN.10 /96	JFB
16	ISSUED FOR TENDER	03.04.95	AR
15	STREETNAMES ADDED	27.02.95	AR
14	CB 30/31 - NOTES - AS BUILT	13.02.95	AR
13	REVISIONS AS PER CITY OF NEPEAN	22.11.94	AR
12	REVISIONS - CONTRACT 1994	10.08.94	AR
11	ISSUED FOR APPROVAL	22.07.94	AR
10	REVISED AS PER R.M.O.C. COMMENTS	20.11.92	JFB
9	ISSUED FOR M.O.E. APPROVAL	17.09.92	UB
8	REVISED AS PER R.M.O.C. COMMENTS	01.06.92	JFB
7	WATERMAIN OFFSET 4.0m	APR.20/92	UB
6	REVISED AS PER NEPEAN COMMENTS	FEB.14/92	SG
5	REVISED AS PER NEPEAN COMMENTS	FEB.3/92	SG
4	REVISED AS PER R.M.O.C. COMMENTS	JAN.17/92	SG
3	ISSUED FOR TENDER	JAN.15/92	SG
2	REVISED AS PER R.M.O.C. COMMENTS	DEC.9/91	SG
1	REVISED AS PER NEPEAN COMMENTS	NOV.28/91	SG

LICENSED PROFESSIONAL ENGINEER R.S. CEBRYK PROVINCE OF ONTARIO
LICENSED PROFESSIONAL ENGINEER UDO BOEHME PROVINCE OF ONTARIO

NOVATECH ENGINEERING CONSULTANTS LTD. OTTAWA, ONTARIO

DESIGN UB/JFB
CHECKED UB
DRAWN JFB
CHECKED UB
APPROVED

SCALE 1:500 HORIZONTAL; 1:50

NEPEAN

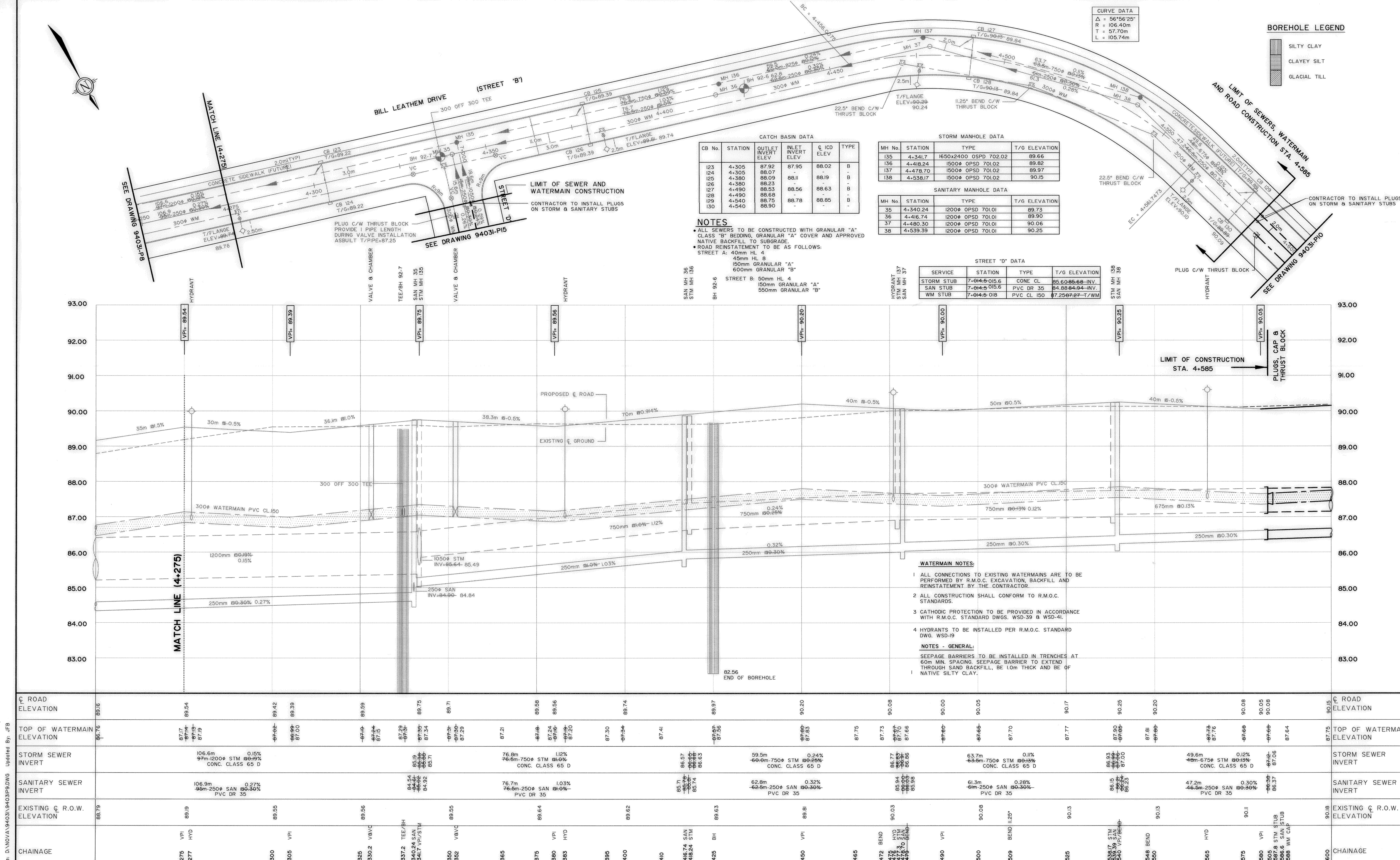
SOUTH MERIVALE BUSINESS PARK AS-BUILTS

PLAN AND PROFILE (BILL LEATHEM DRIVE)

STREET B - STATION 3+975 TO 4+275

PROJECT No. 94031
FIELD BOOK
DATE JANUARY 1996
DRAWING No. 94031-P8

DWG Name: D:\NOVA\94031\94031P8.DWG Updated By: JFB 06, 1996 - 11:25:52



CATCH BASIN DATA

CB No.	STATION	OUTLET INVERT ELEV	INLET INVERT ELEV	℄ ICD ELEV	TYPE
123	4+305	87.92	87.95	88.02	B
124	4+305	88.07	-	-	-
125	4+380	88.09	88.11	88.19	B
126	4+380	88.23	-	-	-
127	4+490	88.53	88.56	88.63	B
128	4+490	88.68	-	-	-
129	4+540	88.75	88.78	88.85	B
130	4+540	88.90	-	-	-

STORM MANHOLE DATA

MH No.	STATION	TYPE	T/G ELEVATION
135	4+341.7	1650x2400 OSPD 702.02	89.66
136	4+418.24	1500φ OPSD 701.02	89.82
137	4+478.70	1500φ OPSD 701.02	89.97
138	4+538.17	1500φ OPSD 701.02	90.15

SANITARY MANHOLE DATA

MH No.	STATION	TYPE	T/G ELEVATION
35	4+340.24	1200φ OPSD 701.01	89.73
36	4+416.74	1200φ OPSD 701.01	89.90
37	4+480.30	1200φ OPSD 701.01	90.06
38	4+539.39	1200φ OPSD 701.01	90.25

STREET "D" DATA

SERVICE	STATION	TYPE	T/G ELEVATION
STORM STUB	7+~~014.5~~ 015.6	CONE CL	85.60 ~~85.68~~ INV.
SAN STUB	7+~~014.5~~ 015.6	PVC DR 35	84.88 ~~84.94~~ INV.
WM STUB	7+~~014.5~~ 018	PVC CL 150	87.25 ~~87.27~~ T/WM

NOTES

- ALL SEWERS TO BE CONSTRUCTED WITH GRANULAR "A" CLASS "B" BEDDING, GRANULAR "A" COVER AND APPROVED NATIVE BACKFILL TO SUBGRADE.
- ROAD REINSTATEMENT TO BE AS FOLLOWS:
  STREET A: 40mm HL 4
  45mm HL 8
  150mm GRANULAR "A"
  600mm GRANULAR "B"
  STREET B: 50mm HL 4
  150mm GRANULAR "A"
  550mm GRANULAR "B"

WATERMAIN NOTES:

1 ALL CONNECTIONS TO EXISTING WATERMAINS ARE TO BE PERFORMED BY R.M.O.C. EXCAVATION, BACKFILL AND REINSTATEMENT BY THE CONTRACTOR.

2 ALL CONSTRUCTION SHALL CONFORM TO R.M.O.C. STANDARDS.

3 CATHODIC PROTECTION TO BE PROVIDED IN ACCORDANCE WITH R.M.O.C. STANDARD DWGS. WSD-39 & WSD-41.

4 HYDRANTS TO BE INSTALLED PER R.M.O.C. STANDARD DWG. WSD-19

NOTES - GENERAL:

1 SEEPAGE BARRIERS TO BE INSTALLED IN TRENCHES AT 60m MIN. SPACING. SEEPAGE BARRIER TO EXTEND THROUGH SAND BACKFILL, BE 1.0m THICK AND BE OF NATIVE SILTY CLAY.

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY
12	ISSUED TO THE CITY OF NEPEAN	JAN.30 /96	JFB
11	ASBUILT SEWER AND WATERMAIN	JAN.10 /96	JFB
10	ISSUED FOR TENDER	03-04-95	AR
9	STREETNAME ADDED	27/02/95	AR
8	REVISION TO STM SEWER & NOTES	13/02/95	AR
7	REVISED AS PER CITY OF NEPEAN COMMENTS	10.08.94	AR
6	REVISION - CONTRACT 1994	10.08.94	AR
5	ISSUED FOR APPROVAL	22.07.94	AR
4	REVISIONS TO ROAD GRADES WATERMAIN	13.07.94	AR
3	REVISED AS PER R.M.O.C. COMMENTS	01.11.92	JFB
2	ISSUED FOR M.O.E. APPROVAL	17.09.92	UB
1	REVISED AS PER R.M.O.C. COMMENTS	01.06.92	JFB

LICENSED PROFESSIONAL ENGINEER R.S. CEBRYK PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER UDO BOEHME PROVINCE OF ONTARIO

NOVATECH
ENGINEERING CONSULTANTS LTD.
OTTAWA, ONTARIO

DESIGN	UB/JFB
CHECKED	UB
DRAWN	JFB
CHECKED	UB
APPROVED	JGR

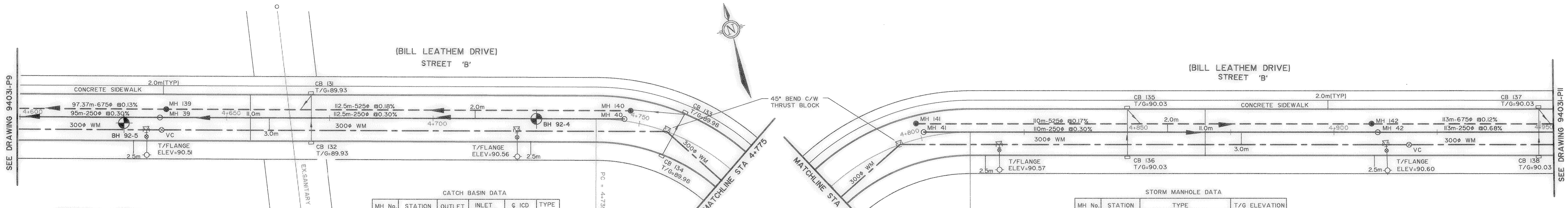
SCALE
1:500 HORIZONTAL (0 5 10 15 20)
1:50 VERTICAL (0 0.5 1.0 1.5 2.0)

NEPEAN

SOUTH MERIVALE BUSINESS PARK
AS-BUILTS

PLAN AND PROFILE (BILL LEATHEM DRIVE)
STREET B - STATION 4+275 TO 4+600

PROJECT No. 94031
FIELD BOOK
DATE JANUARY 1996
DRAWING No. 94031-P9



BOREHOLE LEGEND

- SILTY CLAY
- CLAYEY SILT
- GLACIAL TILL

CATCH BASIN DATA

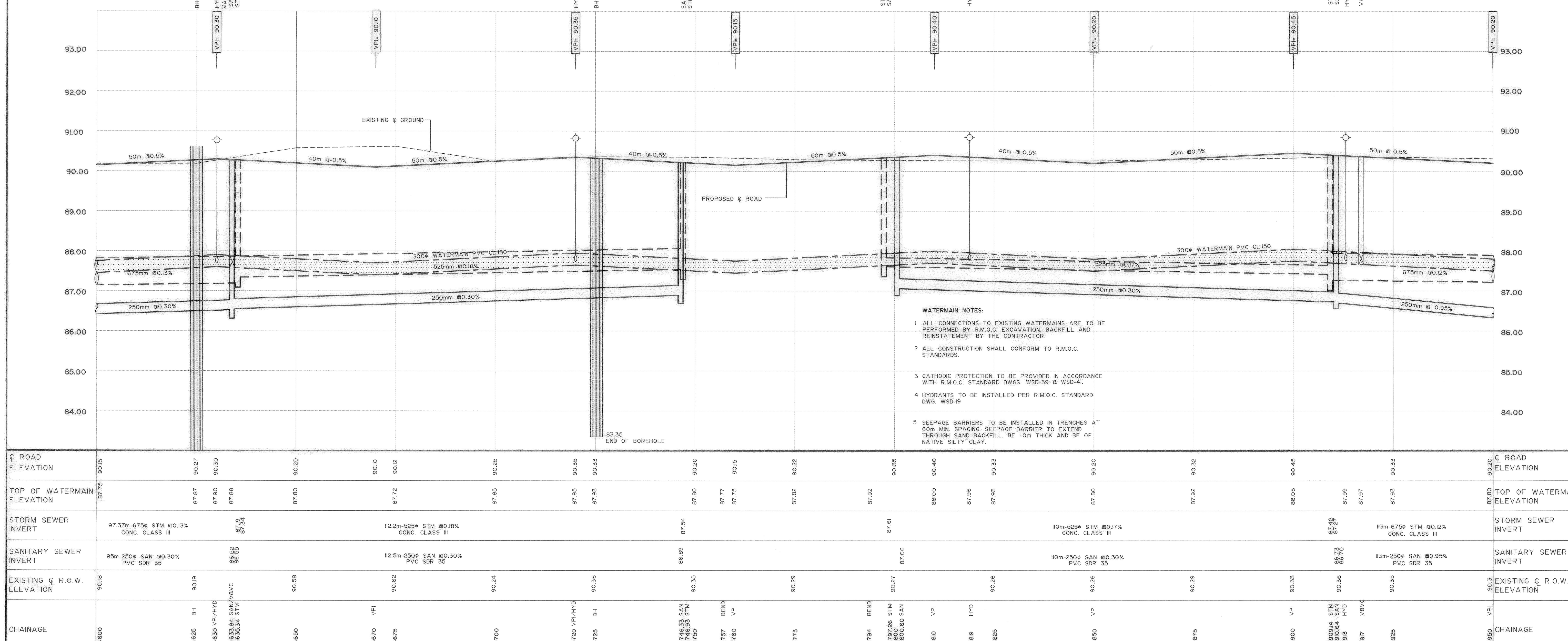
MH No.	STATION	OUTLET INVERT ELEV	INLET INVERT ELEV	℄ ICD ELEV	TYPE
131	4+670	88.63	88.66	88.73	B
132	4+670	88.78	-	-	-
133	4+720	88.68	88.71	88.78	B
134	4+720	88.83	-	-	-
135	4+810	88.73	88.76	88.83	B
136	4+810	88.88	-	-	-
137	4+900	88.73	88.76	88.83	B
138	4+900	88.88	-	-	-

STORM MANHOLE DATA

MH No.	STATION	TYPE	T/G ELEVATION
139	4+635.34	1500φ OPSD 701.02 M	90.32
140	4+746.93	1200φ OPSD 701.01 M	90.17
141	4+797.26	1200φ OPSD 701.01 M	90.29
142	4+909.14	1500φ OPSD 701.02 M	90.35

SANITARY MANHOLE DATA

MH No.	STATION	TYPE	T/G ELEVATION
39	4+633.84	1200φ OPSD 701.01 M	90.28
40	4+746.33	1200φ OPSD 701.01 M	90.22
41	4+800.60	1200φ OPSD 701.01 M	90.35
42	4+910.64	1200φ OPSD 701.01 M	90.40



WATERMAIN NOTES:

1. ALL CONNECTIONS TO EXISTING WATERMAINS ARE TO BE PERFORMED BY R.M.O.C. EXCAVATION, BACKFILL AND REINSTATEMENT BY THE CONTRACTOR.
2. ALL CONSTRUCTION SHALL CONFORM TO R.M.O.C. STANDARDS.
3. CATHODIC PROTECTION TO BE PROVIDED IN ACCORDANCE WITH R.M.O.C. STANDARD DWGS. WSD-39 & WSD-41.
4. HYDRANTS TO BE INSTALLED PER R.M.O.C. STANDARD DWG. WSD-19
5. SEEPAGE BARRIERS TO BE INSTALLED IN TRENCHES AT 60m MIN. SPACING. SEEPAGE BARRIER TO EXTEND THROUGH SAND BACKFILL, BE 1.0m THICK AND BE OF NATIVE SILTY CLAY.

DWG Name: D:\NOVA\94031\94031P10.DWG Updated By: JFB
Feb 06, 1996 - 10:05:06

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY
5	ISSUED TO THE CITY OF NEPEAN	JAN.30/96	JFB
4	REVISIONS TO ROAD GRADES	13.07.94	AR
3	REVISED AS PER R.M.O.C. COMMENTS	01.11.92	JFB
2	ISSUED FOR M.O.E. APPROVAL	17.09.92	UB
1	REVISED AS PER R.M.O.C. COMMENTS	01.06.92	JFB

LICENSED PROFESSIONAL ENGINEER R.S. CEBRYK PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER UDO BOEHME PROVINCE OF ONTARIO

NOVATECH ENGINEERING CONSULTANTS LTD. OTTAWA, ONTARIO

DESIGN	UB/JFB	SCALE	
CHECKED	UB	1:500 HORIZONTAL	
DRAWN	JFB		
CHECKED	UB	1:50 VERTICAL	
APPROVED	JGR		

NEPEAN

SOUTH MERIVALE BUSINESS PARK

PLAN AND PROFILE (BILL LEATHEM DRIVE)

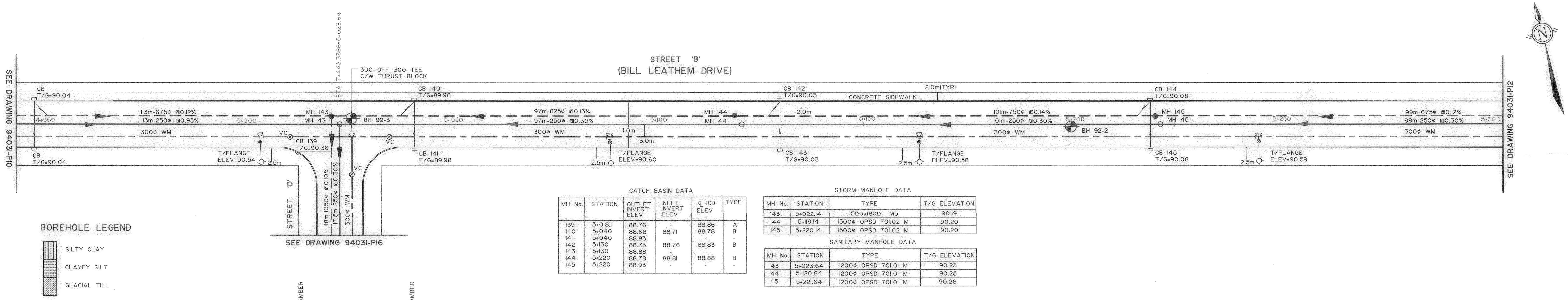
STREET B - STATION 4+600 TO 4+950

PROJECT No. 94031

FIELD BOOK

DATE JANUARY 1996

DRAWING No. 94031-P10



CATCH BASIN DATA

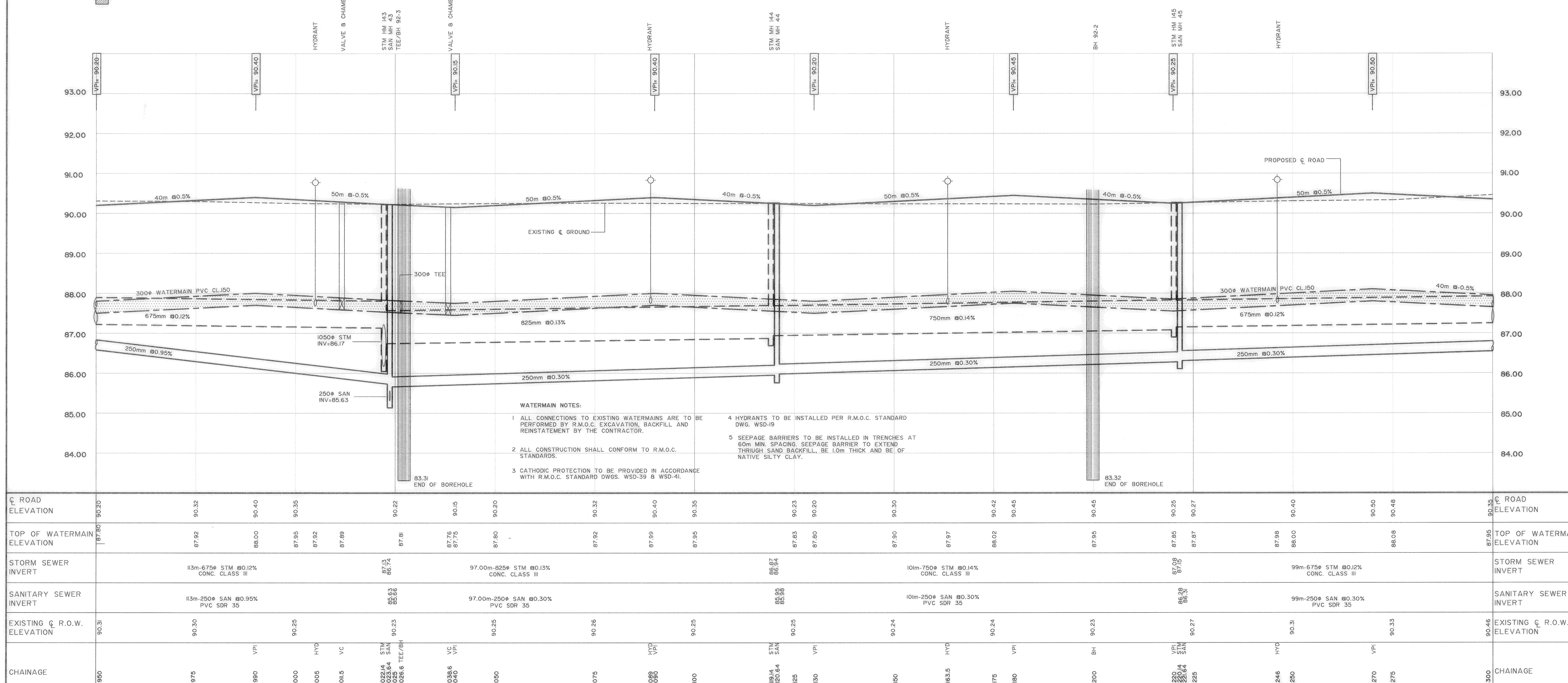
MH No.	STATION	OUTLET INVERT ELEV	INLET INVERT ELEV	℄ ICD ELEV	TYPE
139	5+018.1	88.76	-	88.86	A
140	5+040	88.68	88.71	88.78	B
141	5+040	88.83	-	-	-
142	5+130	88.73	88.76	88.83	B
143	5+130	88.88	-	-	-
144	5+220	88.78	88.81	88.88	B
145	5+220	88.93	-	-	-

STORM MANHOLE DATA

MH No.	STATION	TYPE	T/G ELEVATION
143	5+022.14	1500x1800 M5	90.19
144	5+119.14	1500φ OPSD 701.02 M	90.20
145	5+220.14	1500φ OPSD 701.02 M	90.20

SANITARY MANHOLE DATA

MH No.	STATION	TYPE	T/G ELEVATION
43	5+023.64	1200φ OPSD 701.01 M	90.23
44	5+120.64	1200φ OPSD 701.01 M	90.25
45	5+221.64	1200φ OPSD 701.01 M	90.26



WATERMAIN NOTES:

1 ALL CONNECTIONS TO EXISTING WATERMAINS ARE TO BE PERFORMED BY R.M.O.C. EXCAVATION, BACKFILL AND REINSTATEMENT BY THE CONTRACTOR.

2 ALL CONSTRUCTION SHALL CONFORM TO R.M.O.C. STANDARDS.

3 CATHODIC PROTECTION TO BE PROVIDED IN ACCORDANCE WITH R.M.O.C. STANDARD DWGS. WSD-39 & WSD-41.

4 HYDRANTS TO BE INSTALLED PER R.M.O.C. STANDARD DWG. WSD-19

5 SEEPAGE BARRIERS TO BE INSTALLED IN TRENCHES AT 60m MIN. SPACING. SEEPAGE BARRIER TO EXTEND THRIUGH SAND BACKFILL, BE 1.0m THICK AND BE OF NATIVE SILTY CLAY.

NOTE:
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No.	REVISION	DATE	BY
5	ISSUED TO THE CITY OF NEPEAN	JAN.30/96	JFB
4	REVISIONS TO ROAD GRADES	13.07.94	AR
3	REVISED AS PER R.M.O.C. COMMENTS	01.11.92	JFB
2	ISSUED FOR M.O.E. APPROVAL	17.09.92	UB
1	REVISED AS PER R.M.O.C. COMMENTS	01.06.92	JFB

LICENSED PROFESSIONAL ENGINEER R.S. CEBRYK PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER UDO BOEHME PROVINCE OF ONTARIO

NOVATECH
ENGINEERING CONSULTANTS LTD.
OTTAWA, ONTARIO

DESIGN UB/JFB
CHECKED UB
DRAWN JFB
CHECKED UB
APPROVED JGR

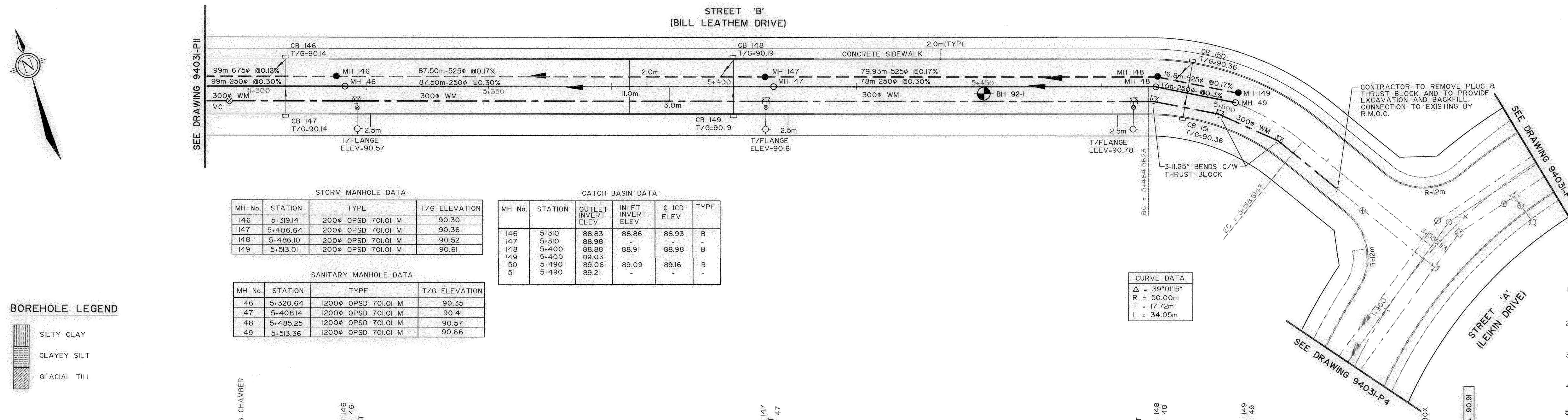
SCALE
1:500 HORIZONTAL
1:50 VERTICAL

NEPEAN
SOUTH MERIVALE BUSINESS PARK

PLAN AND PROFILE (BILL LEATHEM DRIVE)
STREET B - STATION 4+950 TO 5+300

PROJECT No. 9403I
FIELD BOOK
DATE JANUARY 1996
DRAWING No. 9403I-PII

DWG Name: D:\NOVA\9403I\9403IPII.DWG Updated By: JFB
Feb 06, 1996 - 10:47:05



STORM MANHOLE DATA

MH No.	STATION	TYPE	T/G ELEVATION
146	5+319.14	1200φ OPSD 701.01 M	90.30
147	5+406.64	1200φ OPSD 701.01 M	90.36
148	5+486.10	1200φ OPSD 701.01 M	90.52
149	5+513.01	1200φ OPSD 701.01 M	90.61

SANITARY MANHOLE DATA

MH No.	STATION	TYPE	T/G ELEVATION
46	5+320.64	1200φ OPSD 701.01 M	90.35
47	5+408.14	1200φ OPSD 701.01 M	90.41
48	5+485.25	1200φ OPSD 701.01 M	90.57
49	5+513.36	1200φ OPSD 701.01 M	90.66

CATCH BASIN DATA

MH No.	STATION	OUTLET INVERT ELEV	INLET INVERT ELEV	℄ ICD ELEV	TYPE
146	5+310	88.83	88.86	88.93	B
147	5+310	88.98	-	-	-
148	5+400	88.88	88.91	88.98	B
149	5+400	89.03	-	-	-
150	5+490	89.06	89.09	89.16	B
151	5+490	89.21	-	-	-

CURVE DATA

Δ = 39°01'15"
R = 50.00m
T = 17.72m
L = 34.05m

BOREHOLE LEGEND

- SILTY CLAY
- CLAYEY SILT
- GLACIAL TILL

WATERMAIN NOTES:

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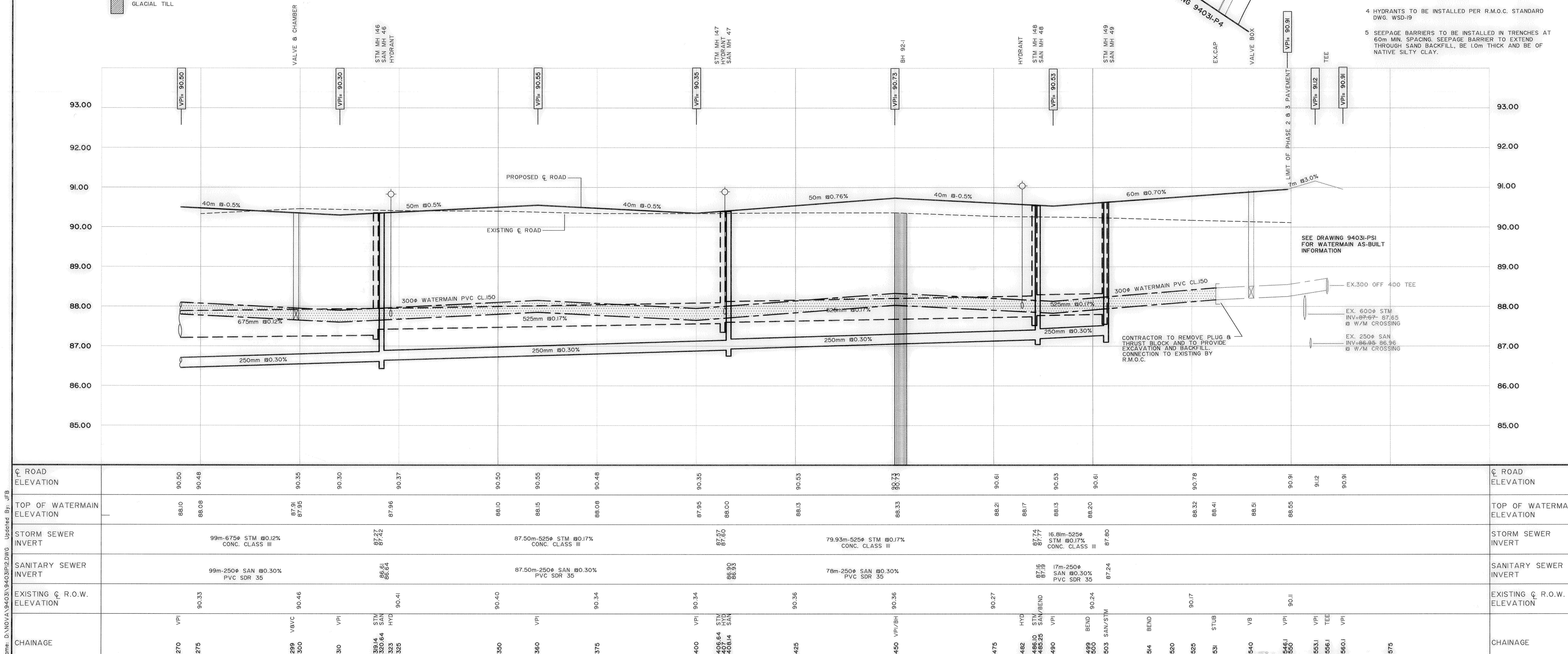

NOTE:
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5	ISSUED TO THE CITY OF NEPEAN	JAN.30/96	JFB
4	REVISIONS TO ROAD GRADES	13.07.94	AR
3	REVISED AS PER R.M.O.C. COMMENTS	20.11.92	JFB
2	ISSUED FOR M.O.E. APPROVAL	17.09.92	UB
1	REVISED AS PER R.M.O.C. COMMENTS	01.06.92	JFB

LICENSED PROFESSIONAL ENGINEER R.S. CEBRYK PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER UDO BOEHME PROVINCE OF ONTARIO

NOVATECH
ENGINEERING CONSULTANTS LTD.
OTTAWA, ONTARIO

DESIGN UB/JFB
CHECKED UB
DRAWN JFB
CHECKED UB
APPROVED IGR

SCALE
1:500 HORIZONTAL
1:50

NEPEAN

SOUTH MERIVALE BUSINESS PARK AS-BUILTS

PLAN AND PROFILE (BILL LEATHEM DRIVE)

STREET B - STATION 5+300 TO 5+575

PROJECT No. 94031
FIELD BOOK
DATE JANUARY 1996
DRAWING No. 94031-P12

DWG Name: D:\NOVA\94031\94031P12.DWG Updated By: JFB
31, 1996 - 15:03:23

STORM MANHOLE DATA

MH No.	STATION	TYPE	T/G ELEVATION
135	6+997	1650x2400 M6	89.66
158	7+108.52	2400x2400 M6	90.02
159	7+195.37	1800ϕ OPSD 701.02 M	89.94
160	7+242.52	1800ϕ OPSD 701.02 M	89.98

SANITARY MANHOLE DATA

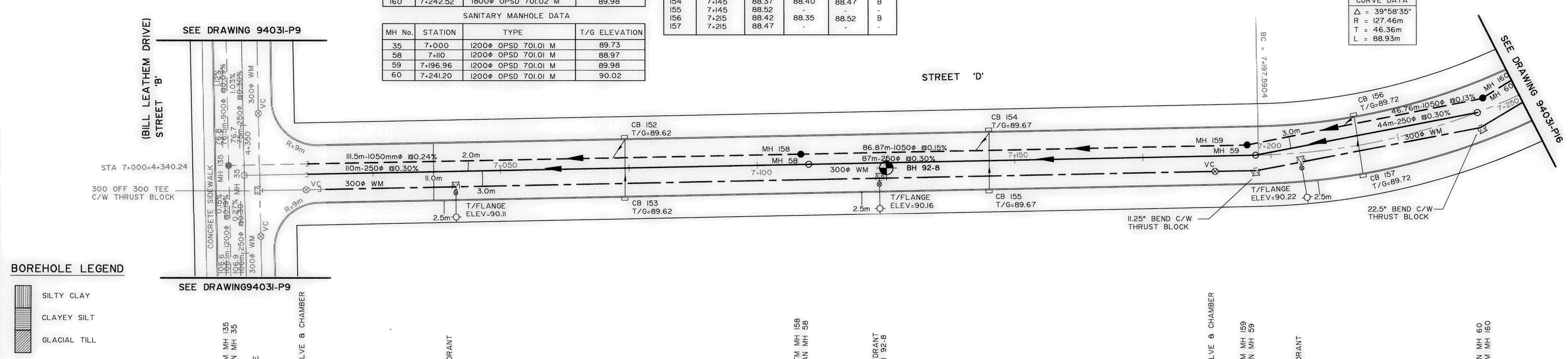
MH No.	STATION	TYPE	T/G ELEVATION
35	7+000	1200ϕ OPSD 701.01 M	89.73
58	7+110	1200ϕ OPSD 701.01 M	88.97
59	7+196.96	1200ϕ OPSD 701.01 M	89.98
60	7+241.20	1200ϕ OPSD 701.01 M	90.02

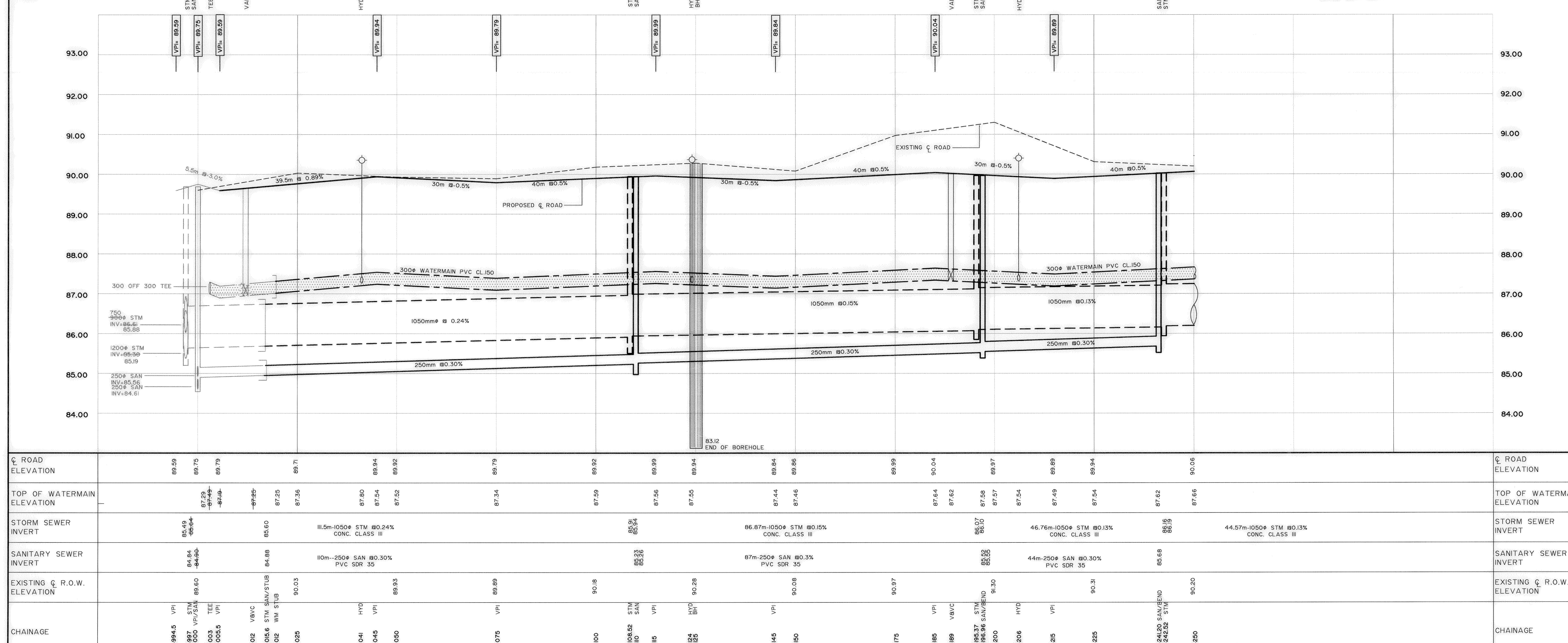
CATCH BASIN DATA

MH No.	STATION	OUTLET INVERT ELEV	INLET INVERT ELEV	℄ ICD ELEV	TYPE
152	7+075	88.32	88.35	88.42	B
153	7+075	88.47	-	-	-
154	7+145	88.37	88.40	88.47	B
155	7+145	88.52	-	-	-
156	7+215	88.42	88.35	88.52	B
157	7+215	88.47	-	-	-

CURVE DATA

Δ = 39°58'35"
R = 127.46m
T = 46.36m
L = 88.93m





WATERMAIN NOTES:

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5. SEEPAGE BARRIERS TO BE INSTALLED IN TRENCHES AT 60m MIN. SPACING. SEEPAGE BARRIER TO EXTEND THROUGH SAND BACKFILL, BE 1.0m THICK AND BE OF NATIVE SILTY CLAY.

NOTE:
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5	ISSUED TO THE CITY OF NEPEAN	JAN.30/96	JFB
4	REVISIONS TO ROAD GRADES	13.7.94	AR
3	REVISED AS PER R.M.O.C. COMMENTS	01.11.92	JFB
2	ISSUED FOR M.O.E. APPROVAL	17.09.92	UB
1	REVISED AS PER R.M.O.C. COMMENTS	01.06.92	JFB

LICENSED PROFESSIONAL ENGINEER R.S. CEBRYK PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER UDO BOEHME PROVINCE OF ONTARIO

NOVATECH
ENGINEERING CONSULTANTS LTD.
OTTAWA, ONTARIO

DESIGN UB/JFB
CHECKED UB
DRAWN JFB
CHECKED UB
APPROVED

SCALE
1:500 HORIZONTAL
1:50

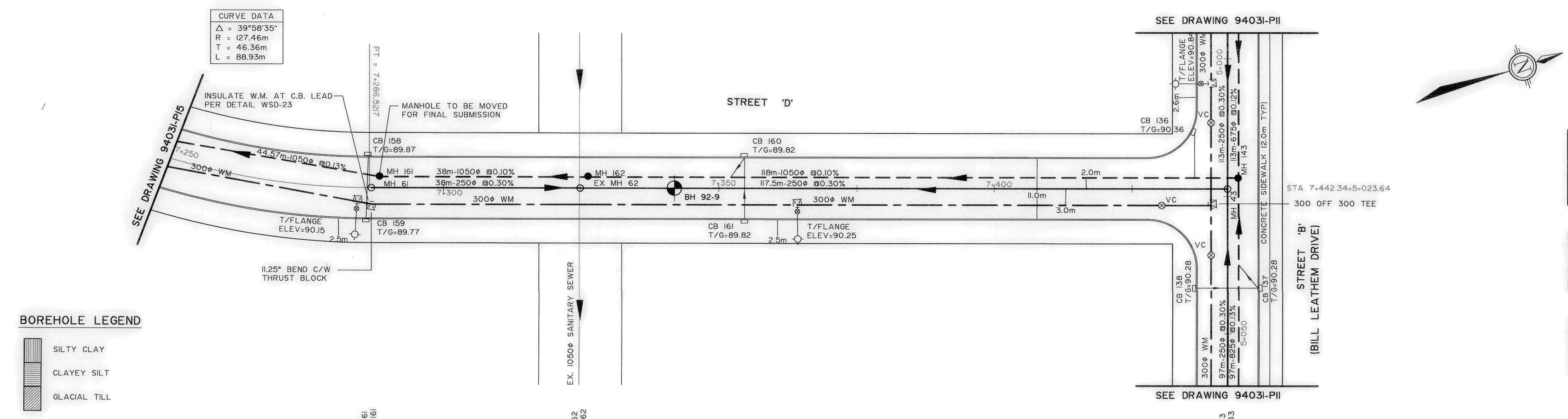
NEPEAN

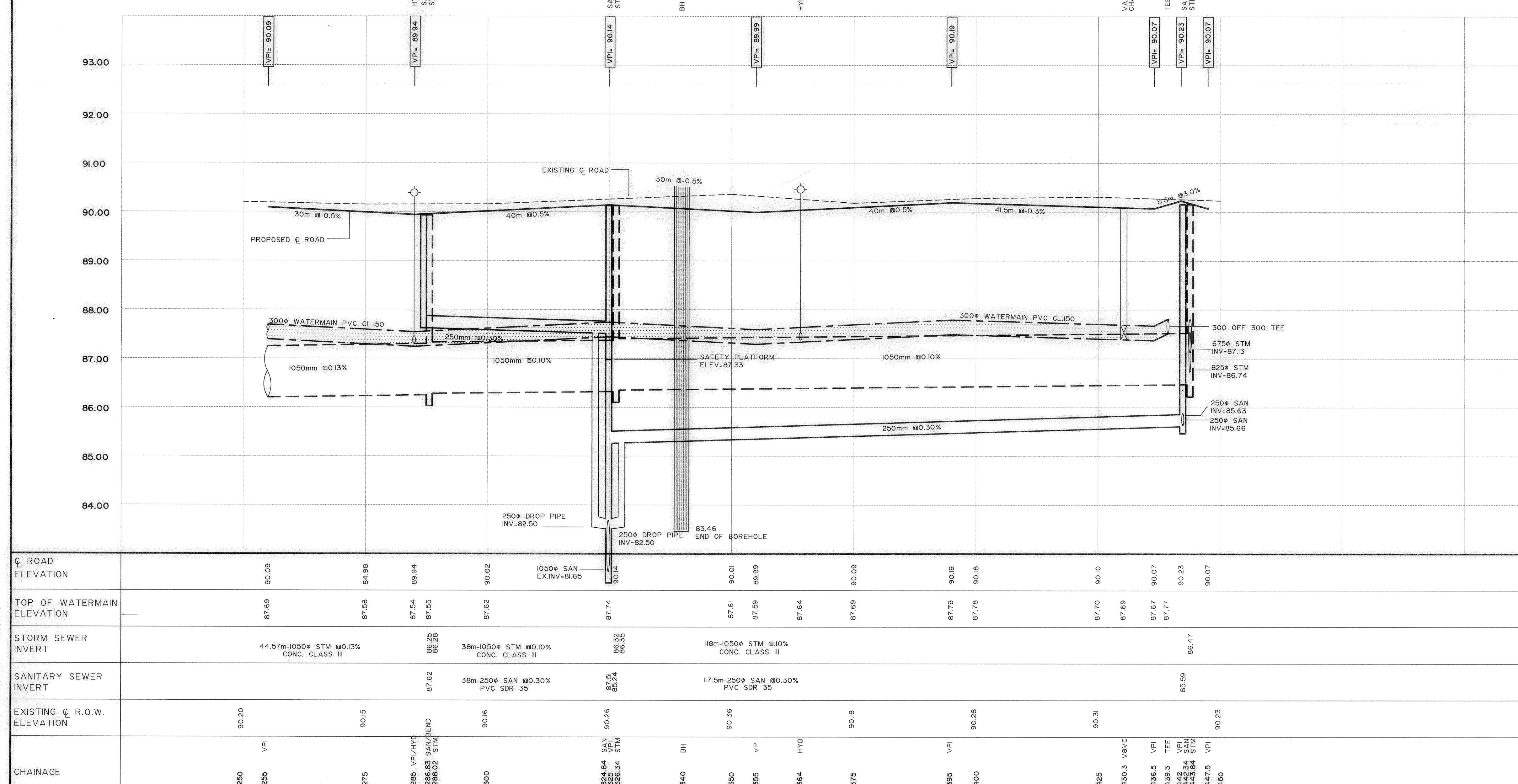
SOUTH MERIVALE BUSINESS PARK AS-BUILTS

PLAN AND PROFILE
STREET D - STATION 7+000 TO 7+275

PROJECT No. 94031
FIELD BOOK
DATE JANUARY 1996
DRAWING No. 94031-P15

DWG Name: D:\NOVA\94031\94031P15.DWG Updated By: JFB
06, 1996 - 12:27:25





WATERMAIN NOTES:

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CATCH BASIN DATA

MH No.	STATION	OUTLET INVERT ELEV	INLET INVERT ELEV	℄ ICD ELEV	TYPE
158	7+285	88.47	88.50	88.57	B
159	7+285	88.62	-	-	-
160	7+355	88.52	88.55	88.62	B
161	7+355	88.67	-	-	-

STORM MANHOLE DATA

MH No.	STATION	TYPE	T/G ELEVATION
160	7+242.52	1800φ OPSD 701.02 M	89.98
161	7+288.02	1800φ OPSD 701.02 M	89.91
162	7+326.34	1800φ OPSD 701.02 M	90.09
143	7+443.84	1800φ OPSD 701.02 M	90.19

SANITARY MANHOLE DATA

MH No.	STATION	TYPE	T/G ELEVATION
60	7+241.20	1200φ OPSD 701.01 M	90.02
61	7+286.83	1200φ OPSD 701.01 M	89.95
62	7+324.84	1200φ OPSD 701.01 M	90.14
43	7+442.34	1200φ OPSD 701.01 M	90.33

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5	ISSUED TO THE CITY OF NEPEAN	JAN.30/96	JFB
4	REVISED AS PER ROAD PROFILES	13.7.94	AR
3	REVISED AS PER R.M.O.C. COMMENTS	01.11.92	JFB
2	ISSUED FOR M.O.E. APPROVAL	17.09.92	UB
1	REVISED AS PER R.M.O.C. COMMENTS	01.06.92	JFB

LICENSED PROFESSIONAL ENGINEER R.S. CEBRYK PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER UDO BOEHME PROVINCE OF ONTARIO

NOVATECH
ENGINEERING CONSULTANTS LTD.
OTTAWA, ONTARIO

DESIGN	UB/JFB
CHECKED	UB
DRAWN	JFB
CHECKED	UB
APPROVED	

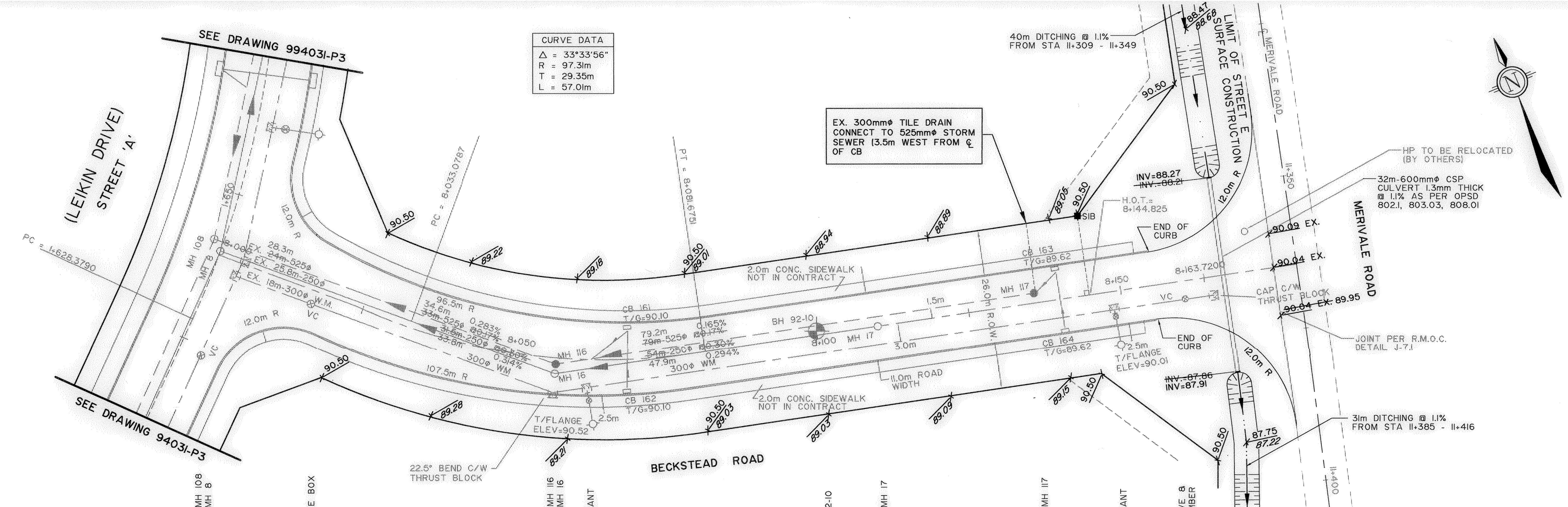
SCALE
1:500 HORIZONTAL
1:50

NEPEAN
SOUTH MERIVALE BUSINESS PARK

PLAN AND PROFILE
STREET D - STATION 7+275 TO 7+450

PROJECT No.	94031
FIELD BOOK	
DATE	JANUARY 1996
DRAWING No.	94031-PI6

DWG Name: D:\NOVA\94031\94031PI6.DWG Updated By: JFB
01. 1996 - 10:03:15



CURVE DATA
Δ = 33°33'56"
R = 97.31m
T = 29.35m
L = 57.01m

CATCH BASIN DATA

MH No.	STATION	OUTLET INVERT ELEV	INLET INVERT ELEV	℄ ICD ELEV	TYPE
161	8+070	88.97	88.86	88.90	*
162	8+070			-	-
163	8+140	88.42	88.31	88.38	*
164	8+140			-	-

* ORIFICE SIZE IN SCEPTER PLATE TO BE SPECIFIED BY ENGINEER

NOTE: ALL CB INVERT ELEVATIONS TO BE DETERMINED IN THE FIELD

STORM MANHOLE DATA

MH No.	STATION	TYPE	T/G ELEVATION
116	8+057.10	1200φ OPSD ~~701.02~~ 701.01 M	90.28
117	8+136.00	1200φ OPSD ~~701.02~~ 701.01 M	89.84

SANITARY MANHOLE DATA

MH No.	STATION	TYPE	T/G ELEVATION
16	8+057.18	1200φ OPSD 701.01 M	90.33
17	8+110.00	1200φ OPSD 701.01 M	90.47

LEGEND

95.87 ~~95.78~~ AS BUILT GRADE

DESIGN GRADE

EXISTING GRADE

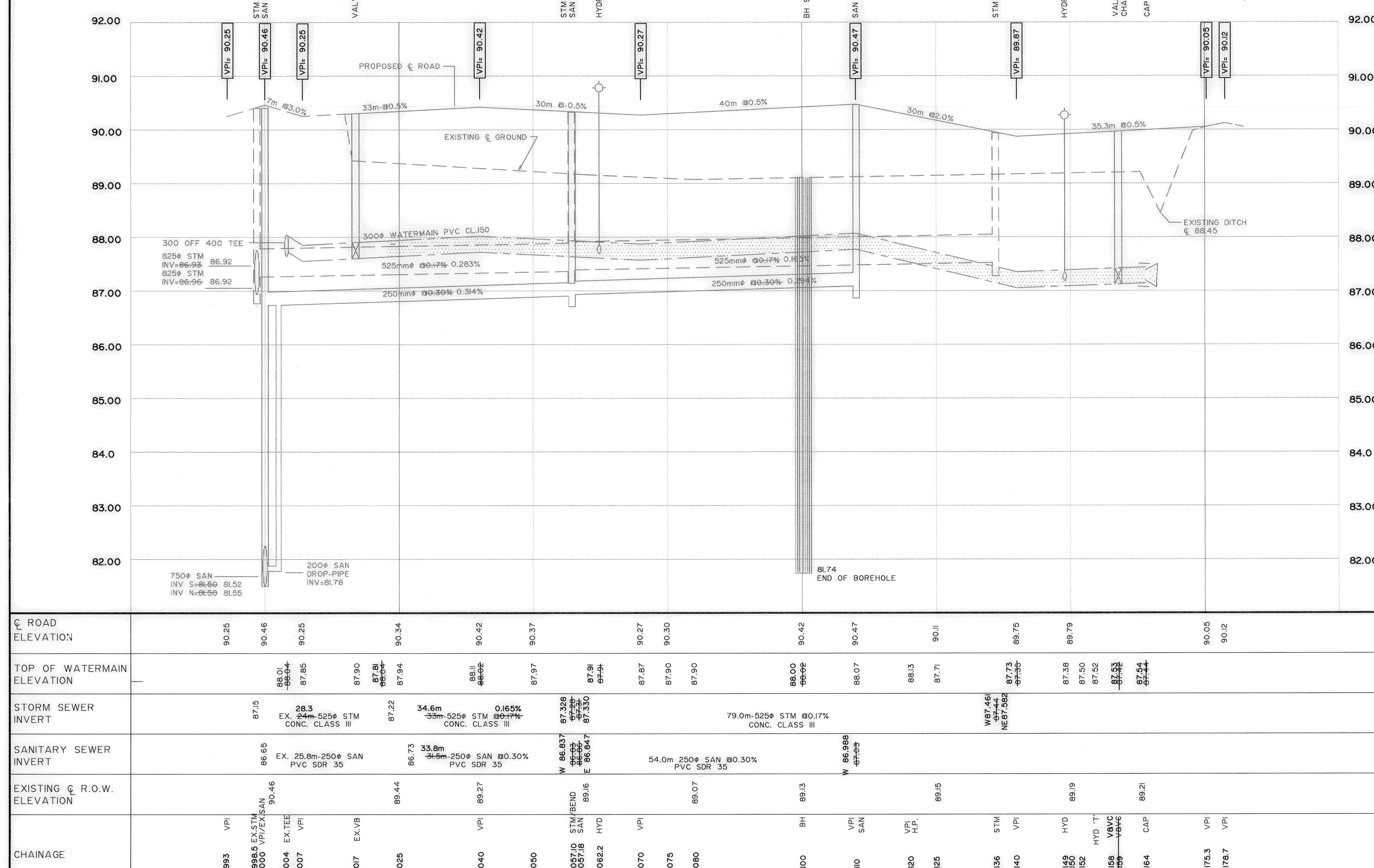
PROPOSED DITCHING

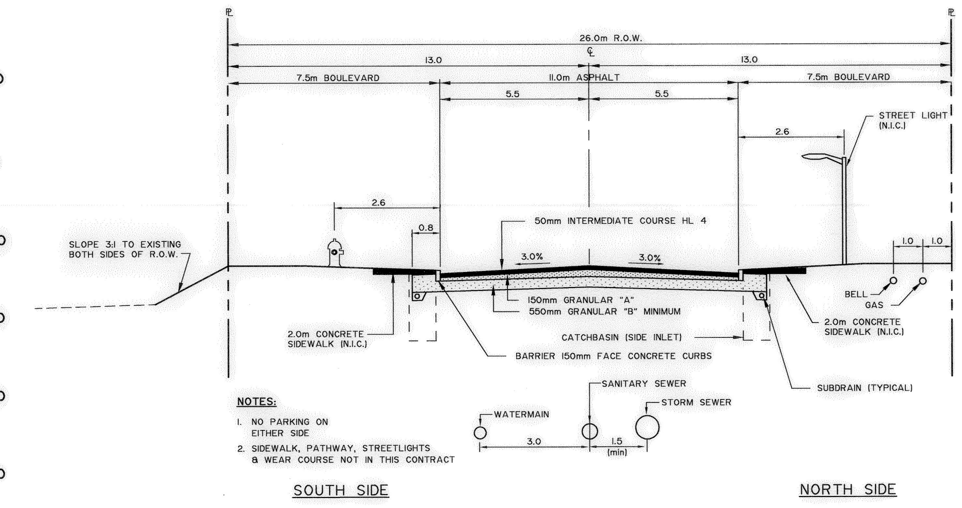
BOREHOLE LEGEND

SILTY CLAY

CLAYEY SILT

GLACIAL TILL





NOTES:

1. NO PARKING ON EITHER SIDE
2. SIDEWALK, PATHWAY, STREETLIGHTS & WEAR COURSE NOT IN THIS CONTRACT

BECKSTEAD ROAD CROSS SECTION

N.T.S.

WATERMAIN NOTES:

1 ALL CONNECTIONS TO EXISTING WATERMAINS ARE TO BE PERFORMED BY R.M.O.C. EXCAVATION, BACKFILL AND REINSTATEMENT BY THE CONTRACTOR.

3 ALL CONSTRUCTION SHALL CONFORM TO R.M.O.C. STANDARDS.

4 CATHODIC PROTECTION TO BE PROVIDED IN ACCORDANCE WITH R.M.O.C. STANDARD DWGS. WSD-39 & WSD-41.

5 HYDRANTS TO BE INSTALLED PER R.M.O.C. STANDARD DWG. WSD-19

6. SEEPAGE BARRIERS TO BE INSTALLED IN TRENCHES AT 60m MIN. SPACING. SEEPAGE BARRIER TO EXTEND THROUGH SAND BACKFILL, BE 1.0m THICK AND BE OF NATIVE SILTY CLAY.

7. INSULATE CATCH BASINS AS REQUIRED TO R.M.O.C. WSD-23.

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY
6	ISSUED TO THE CITY OF NEPEAN	JAN.30/96	JFB
5	AS BUILT	03.07.95	JFB
4	REVISED AS PER R.M.O.C. COMMENTS	20.11.92	JFB
3	ISSUED FOR M.O.E. APPROVAL	17.09.92	UB
2	REVISED AS PER CITY OF NEPEAN COMMENTS	11.09.92	LJ
1	REVISED AS PER R.M.O.C. COMMENTS	01.06.92	JFB

LICENSED PROFESSIONAL ENGINEER R.S. CEBRYK PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER UDO BOEHME PROVINCE OF ONTARIO

NOVATECH
ENGINEERING CONSULTANTS LTD
OTTAWA, ONTARIO

DESIGN	UB/JFB	SCALE	
CHECKED	UB	1:500 HORIZONTAL	
DRAWN	JFB		
CHECKED	UB	1:50 VERTICAL	
APPROVED	JGR		

NEPEAN

SOUTH MERIVALE BUSINESS PARK AS-BUILTS

PLAN AND PROFILE (BECKSTEAD ROAD)

STREET E - STATION 8+000 TO 8+170

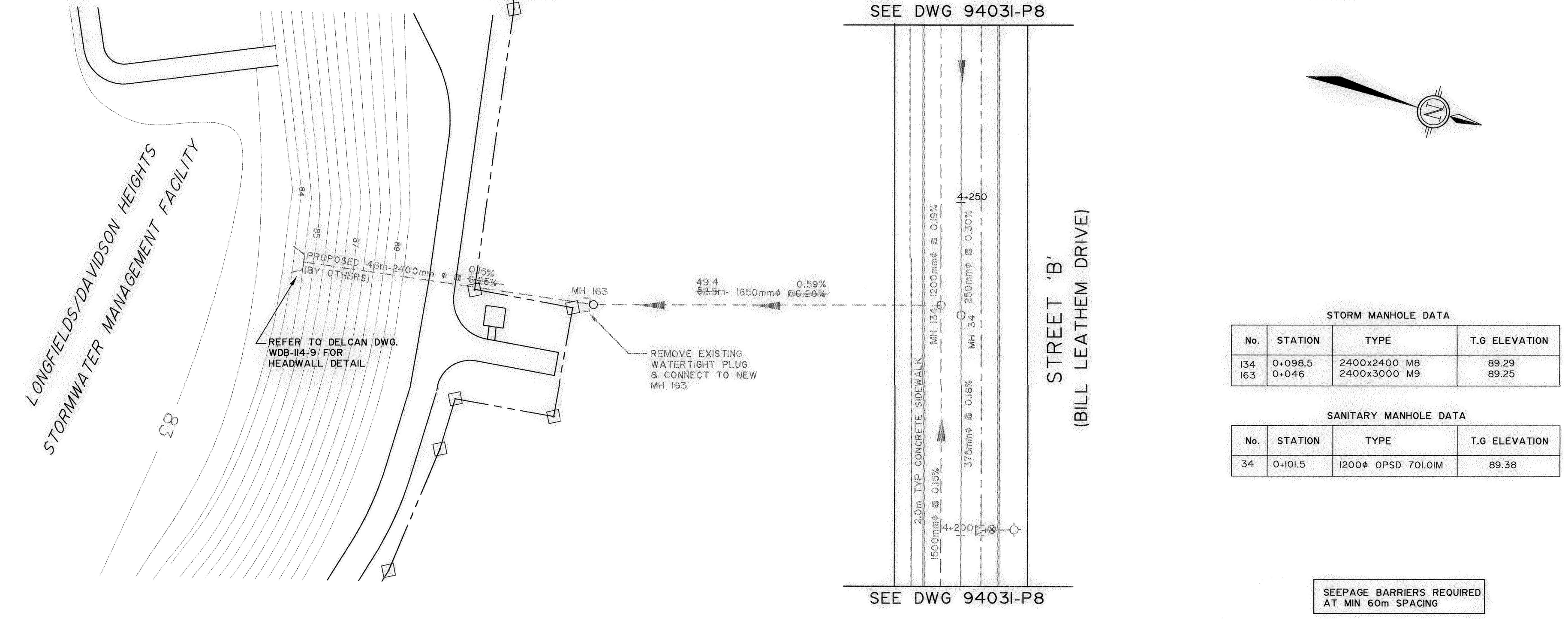
PROJECT No. 94031

FIELD BOOK

DATE JANUARY 1996

DRAWING No. 94031-P17

DWG Name: D:\NOVA\94031\94031P17.DWG Updated By: JFB Feb 05, 1996 - 09:24:03



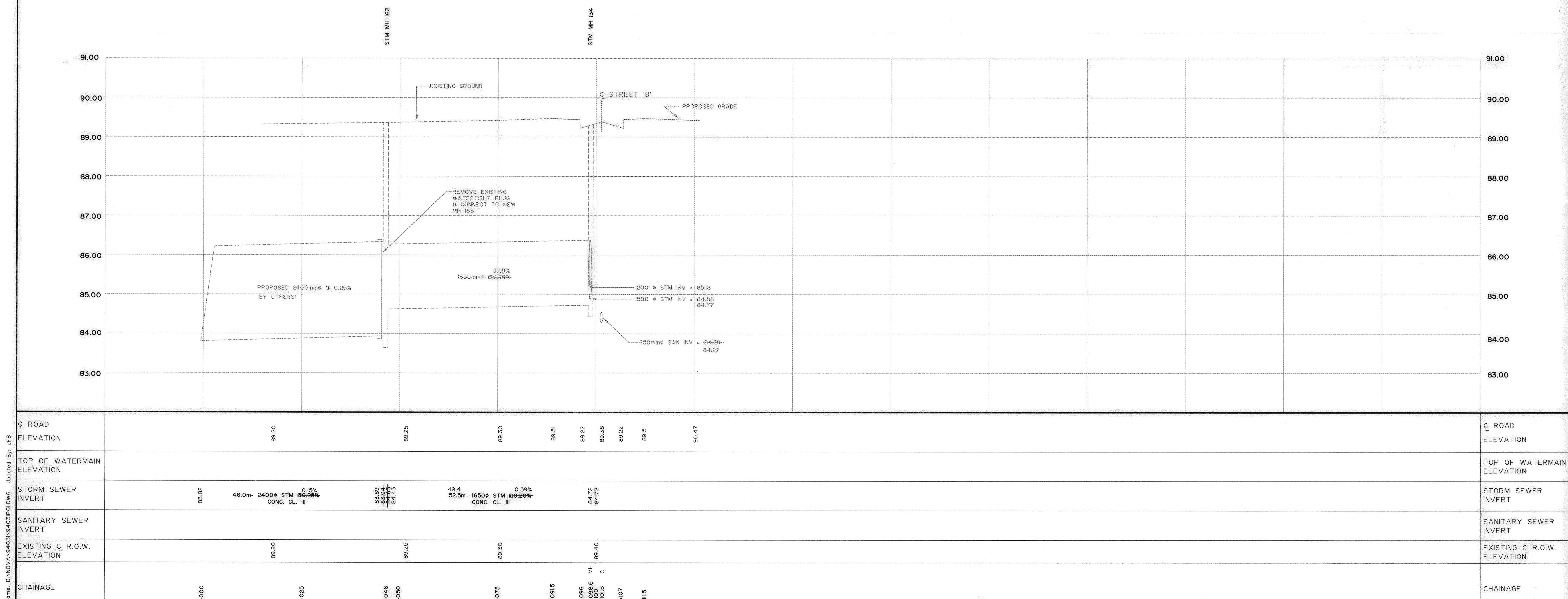
STORM MANHOLE DATA

No.	STATION	TYPE	T.G ELEVATION
134	0+098.5	2400x2400 M8	89.29
163	0+046	2400x3000 M9	89.25

SANITARY MANHOLE DATA

No.	STATION	TYPE	T.G ELEVATION
34	0+101.5	1200⌀ OPSD 701.01M	89.38

SEEPAGE BARRIERS REQUIRED AT MIN 60m SPACING



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No.	REVISION	DATE	BY
10	ISSUED TO THE CITY OF NEPEAN	JAN. 30/96	JFB
9	AS-BUILTS AS PER NEPEAN COMMENTS	MAY 10/93	JFB
8	AS-BUILTS AS PER NEPEAN COMMENTS	MAR.26/93	JFB
6	WATERMAIN OFFSET 4.0m	APR.20/92	UB
5	REVISED AS PER NEPEAN COMMENTS	FEB.14/92	SG
4	REVISED AS PER NEPEAN COMMENTS	FEB.3/92	SG
3	ISSUED FOR TENDER	JAN.15/92	SG
2	REVISED AS PER R.M.O.C. COMMENTS	DEC.9/91	SG
1	REVISED AS PER NEPEAN COMMENTS	NOV.28/91	SG

LICENSED PROFESSIONAL ENGINEER S.M. GORDON PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER UDO BOEHME PROVINCE OF ONTARIO

NOVATECH
ENGINEERING CONSULTANTS LTD.
OTTAWA, ONTARIO

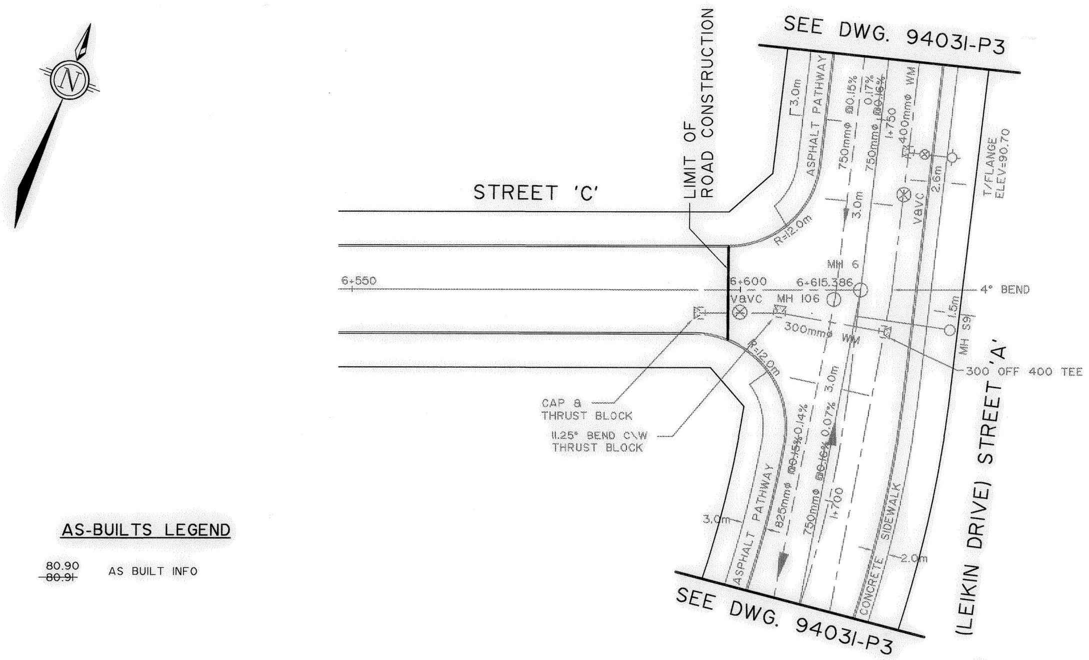
DESIGN UB/JFB
CHECKED UB
DRAWN JFB
CHECKED UB
APPROVED

SCALE
1:500 HORIZONTAL
1:50

NEPEAN
SOUTH MERIVALE BUSINESS PARK AS-BUILTS
PLAN AND PROFILE

PROJECT No. 94031
FIELD BOOK
DATE JANUARY 1996
DRAWING No.

DWG Name: D:\NOVA\94031\94031POI.DWG Updated By: JFB



AS-BUILTS LEGEND

~~80.91~~ 80.90 AS BUILT INFO

STORM MANHOLE DATA

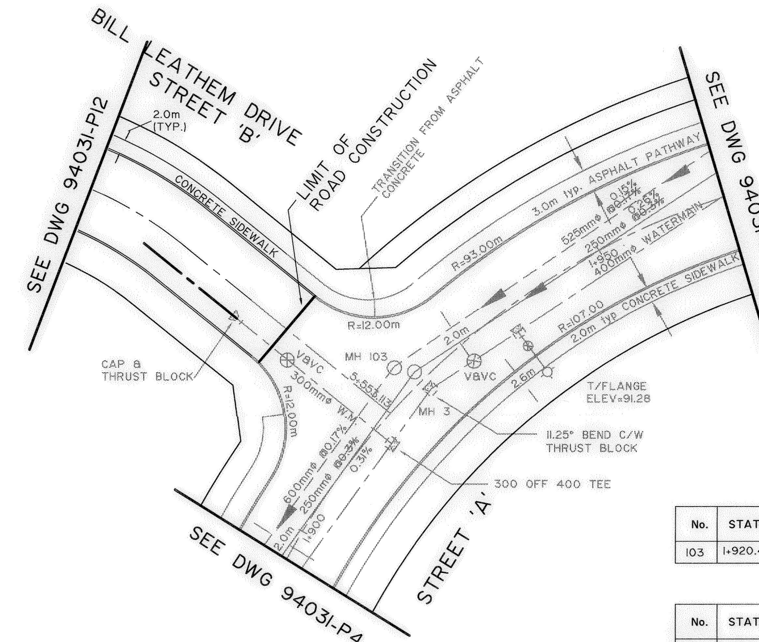
No.	STATION	TYPE	T.G ELEVATION
106	1+726.5	1500φ OPSD 701.02M	90.52

SANITARY MANHOLE DATA

No.	STATION	TYPE	T.G ELEVATION
6	1+728.1	1500φ OPSD 701.04	90.62

SANITARY SERVICE DATA

No.	STATION	TYPE	T.G ELEVATION	INVERT
S9	1+725	1200φ OPSD 701.01M	90.68	88.25



STORM MANHOLE DATA

No.	STATION	TYPE	T.G ELEVATION
103	1+920.4	1200φ OPSD 701.01M	91.08

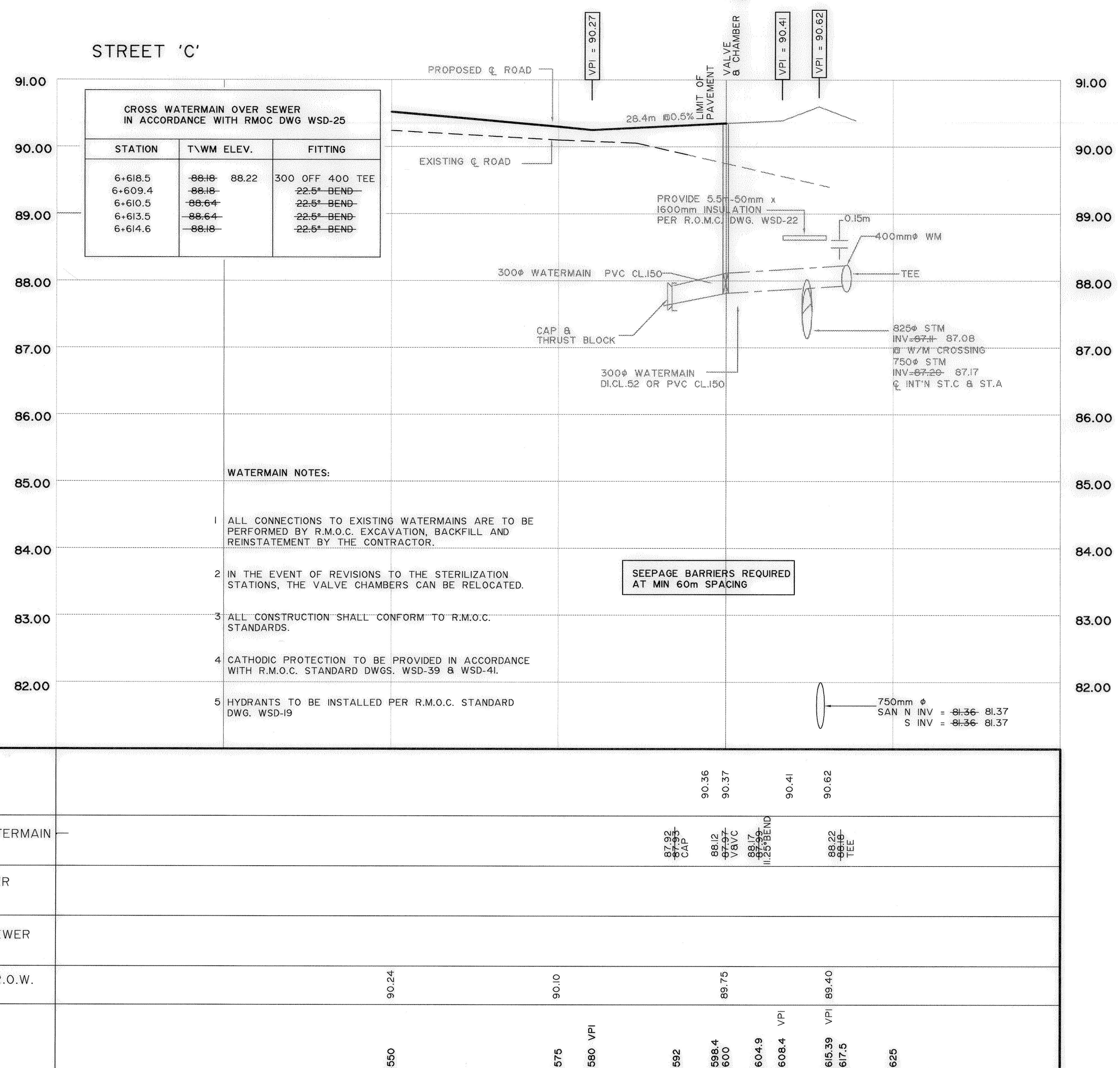
SANITARY MANHOLE DATA

No.	STATION	TYPE	T.G ELEVATION
3	1+921.9	1200φ OPSD 701.01M	91.10

STREET 'C'

CROSS WATERMAIN OVER SEWER IN ACCORDANCE WITH RMOC DWG WSD-25

STATION	T\WM ELEV.	FITTING
6+618.5	~~88.18~~ 88.22	300 OFF 400 TEE
6+609.4	~~88.18~~	~~22.5° BEND~~
6+610.5	~~88.64~~	~~22.5° BEND~~
6+613.5	~~88.64~~	~~22.5° BEND~~
6+614.6	~~88.18~~	~~22.5° BEND~~



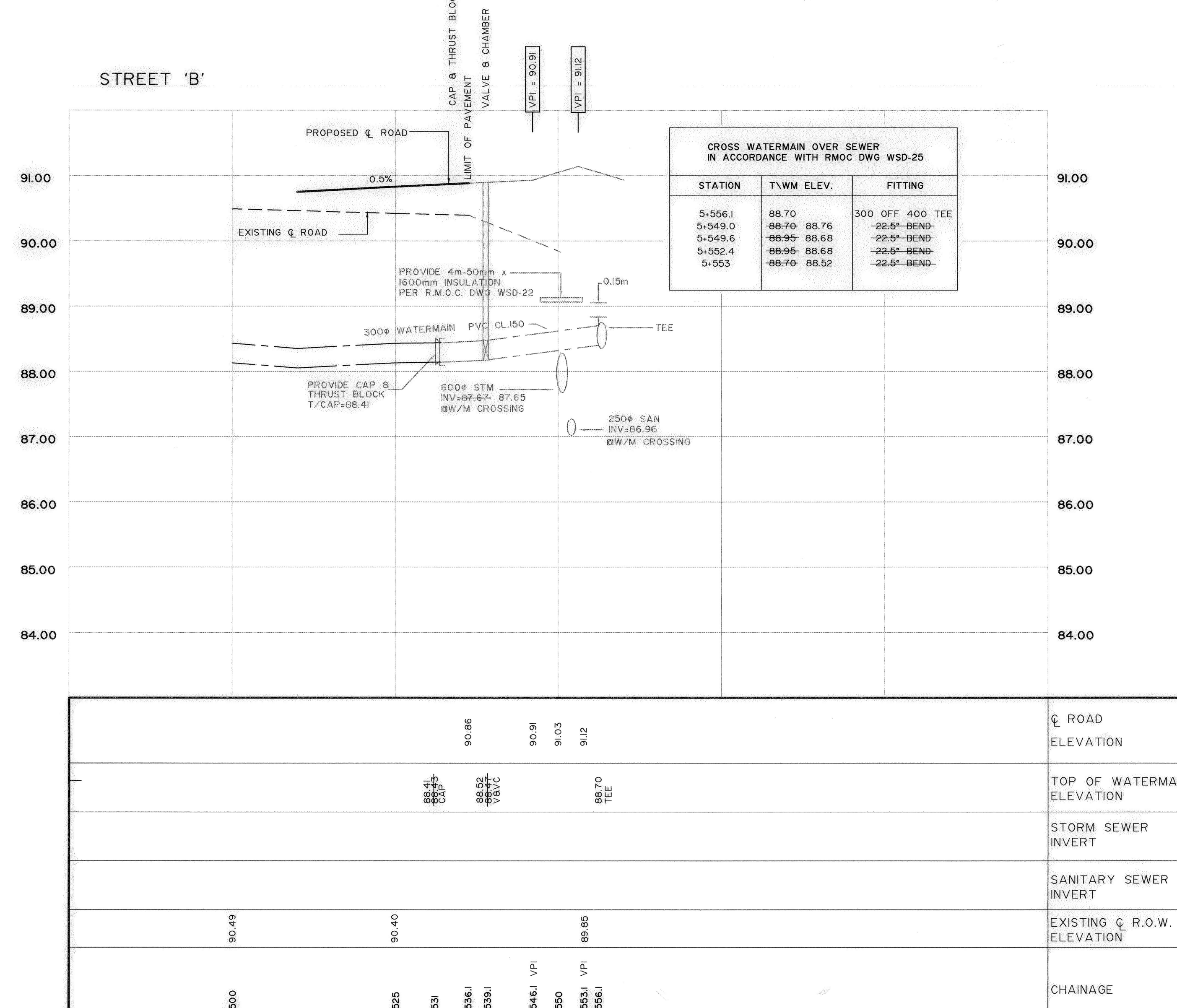
WATERMAIN NOTES:

1. ALL CONNECTIONS TO EXISTING WATERMAINS ARE TO BE PERFORMED BY R.M.O.C. EXCAVATION, BACKFILL AND REINSTATEMENT BY THE CONTRACTOR.
2. IN THE EVENT OF REVISIONS TO THE STERILIZATION STATIONS, THE VALVE CHAMBERS CAN BE RELOCATED.
3. ALL CONSTRUCTION SHALL CONFORM TO R.M.O.C. STANDARDS.
4. CATHODIC PROTECTION TO BE PROVIDED IN ACCORDANCE WITH R.M.O.C. STANDARD DWGS. WSD-39 & WSD-41.
5. HYDRANTS TO BE INSTALLED PER R.M.O.C. STANDARD DWG. WSD-19

STREET 'B'

CROSS WATERMAIN OVER SEWER IN ACCORDANCE WITH RMOC DWG WSD-25

STATION	T\WM ELEV.	FITTING
5+556.1	88.70	300 OFF 400 TEE
5+549.0	~~88.70~~ 88.76	~~22.5° BEND~~
5+549.6	~~88.95~~ 88.68	~~22.5° BEND~~
5+552.4	~~88.95~~ 88.68	~~22.5° BEND~~
5+553	~~88.70~~ 88.52	~~22.5° BEND~~



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No.	REVISION	DATE	BY
10	ISSUED TO THE CITY OF NEPEAN	JAN. 30/96	JFB
9	AS-BUILTS AS PER NEPEAN COMMENTS	MAY 10/93	JFB
8	AS-BUILTS AS PER NEPEAN COMMENTS	MAR.26/93	JFB
7	WATERMAIN OFFSET 4.0m	APR.20/92	UB
6	REVISED AS PER NEPEAN COMMENTS	FEB.14/92	SG
5	REVISED AS PER NEPEAN COMMENTS	FEB.3/92	SG
4	REVISED AS PER R.M.O.C. COMMENTS	JAN.17/92	SG
3	ISSUED FOR TENDER	JAN.15/92	SG
2	REVISED AS PER R.M.O.C. COMMENTS	DEC.9 /91	SG
1	REVISED AS PER NEPEAN COMMENTS	NOV.28 /91	SG

LICENSED PROFESSIONAL ENGINEER S.M. GORDON PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER UDO BOEHME PROVINCE OF ONTARIO

NOVATECH
ENGINEERING CONSULTANTS LTD.
OTTAWA, ONTARIO

DESIGN UB/JFB
CHECKED UB
DRAWN JFB
CHECKED UB
APPROVED JCP

SCALE
1:500 HORIZONTAL
1:50

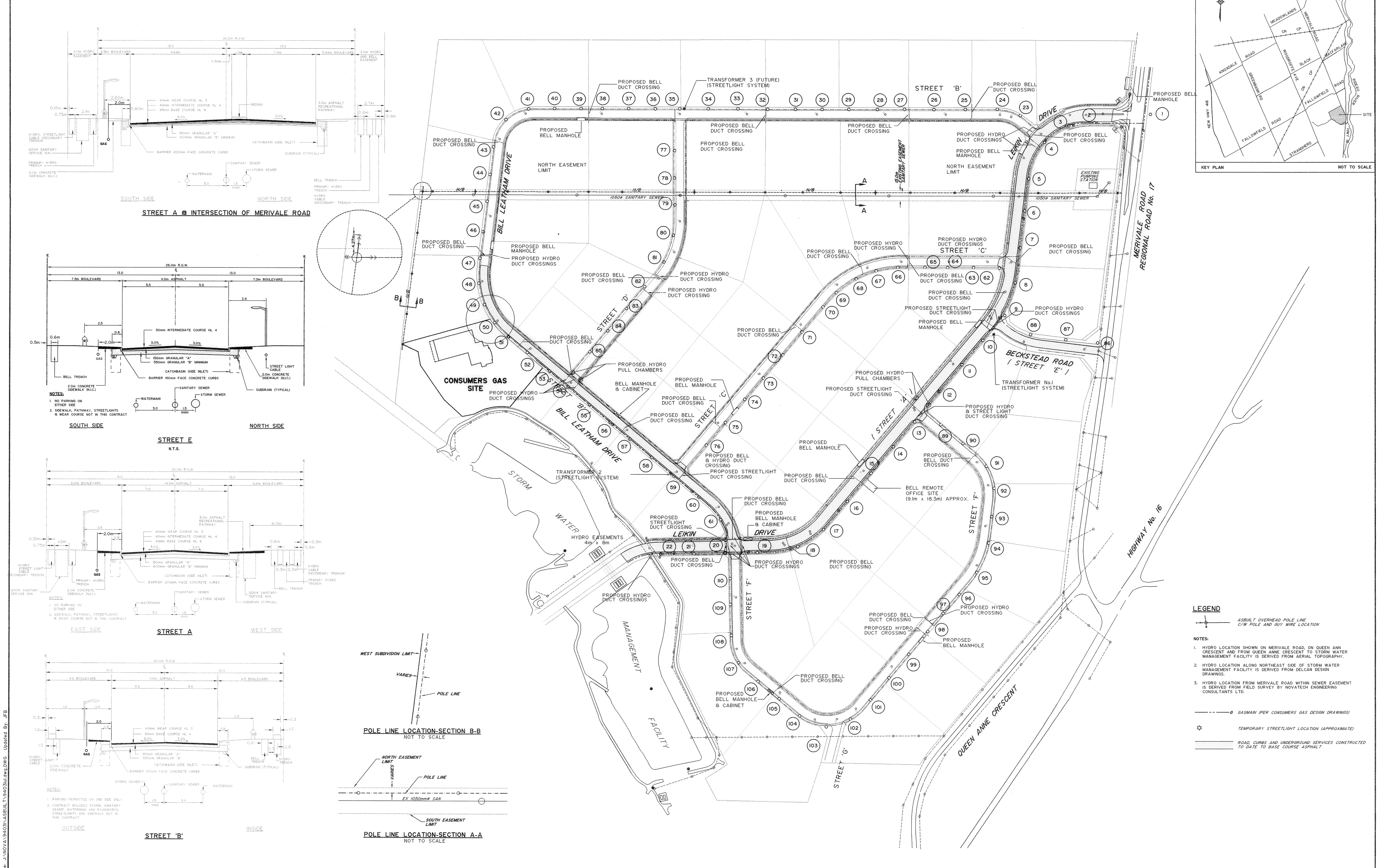
NEPEAN

SOUTH MERIVALE BUSINESS PARK
AS-BUILTS

PLAN AND PROFILE (BILL LEATHAM DRIVE)
STREET C - STATION 6+550 TO 6+615.4
STREET B - STATION 5+500 TO 5+557.1

PROJECT No. 94031
FIELD BOOK
DATE JANUARY 1996
DRAWING No. 94031-PS1

DWG Name: D:\NOVA\9403\9403PS1.DWG Updated By: JFB
31, 1996 - 14:03:50



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LICENSED PROFESSIONAL ENGINEER
UDO BOEHME

NOVATECH
ENGINEERING CONSULTANTS LTD

DESIGN	
CHECKED	SG
DRAWN	GMH
CHECKED	UB

SCALE
1 : 2500

NEPEAN

SOUTH MERIVALE BUSINESS PARK - PHASE 2 & 3

UTILITY COMPOSITE

PROJECT No. WB-148
DATE NOVEMBER 1995
DRAWING No.