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**Brookstreet Apartments** 525 Legget Drive 359 Terry Fox Drive

Servicing and Stormwater Management Brief

# BROOKSTREET APARTMENTS 525 LEGGET DRIVE 359 TERRY FOX DRIVE

# SITE SERVICING AND SWM BRIEF

Prepared for:

**KRP** Properties

Prepared by:

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

Issued: October 1, 2021

Ref: R-2021-131 Novatech File No. 120202



October 1, 2021

City of Ottawa 110 Laurier Ave. West, 4<sup>th</sup> Floor Ottawa, Ontario K1P 1J1

#### Attention: Mr. Damien Whittaker

#### Re: Brookstreet Apartments 525 Legget Drive and 359 Terry Fox Drive Site Servicing and Stormwater Management Brief

Please find enclosed the Site Servicing and Stormwater Management Brief for the proposed development at 525 Legget Drive and 359 Terry Fox Drive. This report is submitted in support of a zoning amendment and site plan control application on behalf of KRP Properties.

If you have any questions, please contact the undersigned.

Sincerely,

NOVATECH

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Greg MacDonald, P.Eng. Director | Land Development & Public Sector Infrastructure

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## **1.0 INTRODUCTION**

This Site Servicing and Stormwater Management Brief has been prepared in support of a zoning amendment and site plan control application for the construction of a 28 – story apartment building attached to the existing hotel expansion constructed in 2016. The building will contain 224 apartment units, ground floor amenities, an extension of the existing ball room and a roof top restaurant. Two levels of underground parking will provide 110 parking spaces. The existing parking structure will provide another 288 spaces on the two lower levels. Refer to **Figure 1 – Brookstreet Apartments** for an overview.



Figure 1 Brookstreet Apartments

The stormwater management for the site will continue in the current pattern with little impact from the additional building. The storm flows will be conveyed in the existing storm sewer to the existing stormwater management pond. The existing stormwater pond has surplus capacity for this development.

The sanitary service for the expansion will be provided by connecting to an existing 250mm sanitary service in the vicinity of the hotel building. The existing sanitary service only services the underground parking facility and the recently constructed expansion and has excess capacity to service the proposed apartment building.

The apartment building will connect to the existing municipal water service on Terry Fox Drive. Dual water services will be provided.

Servicing and Grading Plans for the development are included in Appendix A.

## 2.0 GEOTECHNICAL INVESTIGATION

A subsurface investigation was carried out at the site by Paterson Group. The results of that investigation are provided in the report entitled "Geotechnical Investigation, Proposed Brookstreet Development, Report No. PG5673-1, June 10, 2021". The principal findings of the geotechnical investigations are as follows:

- A surficial layer of pavement structure and/or topsoil and surficial fill of thickness from 0.3m to 0.6m.
- A silty sand and silty clay layer of thickness up to 2 metres was encountered below the pavement structure/topsoil in all boreholes.
- A glacial till layer at depths of 1.5m to 2.5m below existing ground surface
- The boreholes were terminated in bedrock at depths of about 1.5m to 2.5m below ground surface.

### 3.0 STORMWATER MANAGEMENT

The stormwater management strategy for the Kanata Research Park is described in the Kanata Research Park Stormwater Management Report (April, 2000) for the 188 ha site. In brief, there are four SWM ponds (Pond 1, Pond 2, Pond 3, and the Duck Pond) which were used to control post-development peak flows to pre-development levels up to the 100-year storm as well as to provide water quality control. The Brookstreet Apartment lands are part of Area 1 in that SWM plan and drain to Pond 1. Area 1 is 19.85 ha in size with an imperviousness of 80%. Pond 1 has a 100-year required storage volume of 5210 m<sup>3</sup> and a maximum allowable 100-year release rate of 1.514m<sup>3</sup>/s.

The proposed building footprint is approximately  $1300 \text{ m}^2 \text{ most}$  of which is situated over existing impervious areas. The additional impervious areas because of hard landscaping are approximately  $1500 \text{ m}^2$ . In the 100-year rainfall event, this additional impervious area is projected to create  $144 \text{ m}^3$  of additional runoff resulting in an increase in pond depth of 9.6 mm. Refer to **Appendix B** for calculations.

The increase in volume represents a 2.7 % increase in the required volume of the pond and less than a 10mm increase in the total water level in the pond. These increases are negligble and will not affect the function of Pond 1 and are within the modelling error tolerance for the SWM facility. Moreover, while Pond 1 only requires 5210 m<sup>3</sup> of storage, according to the MOE Certificate of Approval the total available storage capacity of the constructed pond is 28,920 m<sup>3</sup>. The pond has been oversized and has substantial additional storage capacity to accommodate development in the area.

The expansion is proposed to drain via roof drains and an internal drainage system to the storm sewer which runs along the west side of the existing parking structure. This storm sewer is a 900mm pipe set at a slope of 0.32% and drains directly to the Pond 1 forebay. Due to the extent of the proposed parking structure this storm sewer will be relocated around the parking structure to the SWMF as shown on drawing 120202-GP2. A storm sewer design sheet and storm drainage area plans are included in **Appendix B**.

## 4.0 SANITARY SEWER SYSTEM

The proposed Apartment Building will be serviced by connecting to an existing 250mm sanitary service that currently services the existing parking garage and the recent expansion to the hotel. The existing 250mm sanitary sewer outlets to the main 250mm sanitary sewer to the west of the hotel which in turn outlets to the 750mm dia. March Trunk Sewer on the Marshes Golf Course lands. The March Trunk Sewer was designed to accommodate flow from the tributary drainage areas shown on the Sanitary Drainage Area Plan (98066-SAN) in **Appendix C.** 

As part of previous investigations, the capacity of the existing sanitary sewer system on Kanata Research Park Lands has been documented within the report Sanitary and Storm Trunk Sewer Design Brief Kanata Research Park Lands by Novatech dated November 12, 2014. Contained in the report are the tributary sanitary flows from the Brookstreet Hotel as well as the underground parking structure. A Sanitary Sewer Design Sheet and Drainage Area Plan from this report are contained in **Appendix C**, as well as flows from the recent expansion .

The City of Ottawa design criteria were used to calculate the theoretical sanitary flows for the proposed Apartment Building.

### Apartment Building

- Per capita flow 280 L/cap/day
- Peak Factor = 1 + 14/(4 + P<sup>1/2</sup>) x 0.80 = 3.10; Commercial Peak Factor 1.5
- 0.33 L/sec/ha extraneous flows
- Restaurant 30L/seat/day; Typical Floor Space/Seat: 1.25m<sup>2</sup>/seat
- Design Population: 361 m<sup>2</sup>/1.25m<sup>2</sup>/seat = 288 seats

**Table 3.1** identifies the theoretical sanitary flows from the Apartment Building.

Component	Floor Area (m <sup>2</sup> )	Floor Area per Seat	Design Population	Flow per Seat (L/seat/day)	Average Flow (L/s)	Peaking Factor	Peak Flow (L/s)			
Commercial	361	1.25m <sup>2</sup> /seat	288 seats	30	0.10	1.5	0.15			
Component	Units	Pop/Unit	Population	Per Capita Flow	Average Flow	Peak Factor	Peak Flow			
1 Bdr	162	1.4	227	280 L/day	0.74					
2 Bdr	93	2.1	195	280 L/day	0.56					
3 Bdr	1	3.1	3	280 L/day	0.11					
224         425         1.41         3.40         4										
Extraneous Flow = 0.53 ha x 0.33 L/sec/ha = 0.17 L/sec										
	Total Flow = 5.11 L									

 Table 3.1
 Theoretical Sanitary Flows based on the Design Population

In the Sanitary and Storm Trunk Sewer Design Brief Kanata Research Park Lands by Novatech dated November 12, 2014, the existing underground parking area tributary to the sanitary sewer system had no peak population flow and a peak design flow of 0.36 L/s that included extraneous flows. The recent expansion added a population flow of 0.45 L/s. The new apartment building will add a peak design flow of 5.11L/sec. From the 2014 report, the total peak design flow in the sanitary sewer downstream of the proposed hotel expansion connection was 13.91 L/s, and amended to include the recent expansion to 14.36 L/sec. With the increase in population flow from the proposed apartment building, the peak design flow is now 19.47 L/s (14.36 + 5.11). The capacity in the 250 mm diameter sewer to convey these flows to the City's trunk sewer is 44.74 L/sec. See Sanitary Sewer Design Sheet in **Appendix C**.

## 5.0 WATER SUPPLY

The proposed Apartment Building will be connected to the existing municipal water service within Terry Fox Drive. The existing 150 mm diameter watermain that services the Monmouth Building will be extended to the parking garage of the proposed apartment building. A second 150 mm diameter water service will be constructed from Terry Fox Drive to the parking structure. A valve will be placed on the Terry Fox main between the two watermain services.

The theoretical water demands for the proposed apartment building were calculated using City of Ottawa Design Criteria as follows:

Residential

- Average Day Demand = Design Population x 350 L/cap/day
- Maximum Day Demand = 2.5 x Average Day Demand
- Peak Hour Demand = 2.2 x Maximum Day Demand

Commercial (Restaurant)

- Average Day Demand =  $5 \text{ L/m}^2/\text{day}$
- Maximum Day Demand = 1.5 x Average Day Demand
- Peak Hour Demand = 1.8 x Maximum Day Demand

Site Component	Floor Area (m²)		Population (m2)		Average Flow (L/s)					
Commercial	361		5 L/m2/day		0.02					
Site Component         Units         Pop/Unit         Population         Per Capita Flow         Average Flow (L/s)										
Residential										
Based on the	Based on the above, water demands are summarized as follows:									
Average Day = 1.75 L/sec										
Maximum Day = (0.02 x 1.5) + (1.73 x 2.5) = <b>4.35 L/sec</b>										
Peak Hour =	<b>Peak Hour</b> = (0.02 x 1.5 x 1.8) + (1.73 x 2.5 x 2.2) = <b>9.57 L/sec</b>									

Fire Underwriters Survey (FUS) was used to provide water demands to the City to obtain the boundary conditions in the existing water mains on Terry Fox Drive. A fire demand of 6,000 L/min was calculated which is included in **Appendix D**.

## 6.0 EROSION AND SEDIMENT CONTROL

Temporary erosion and sediment control measures will be implemented during construction in accordance with the "Guidelines on Erosion and Sediment Control for Urban Construction Sites" (Government of Ontario, May 1987). These measures include:

- Placement of filter socks or bags under all catch basins and maintenance holes;
- Silt fences around the area under construction placed as per OPSS 577 and OPSD 219.110;
- Light duty straw bale check dam per OPSD 219.180;
- Application of topsoil and sod to disturbed areas

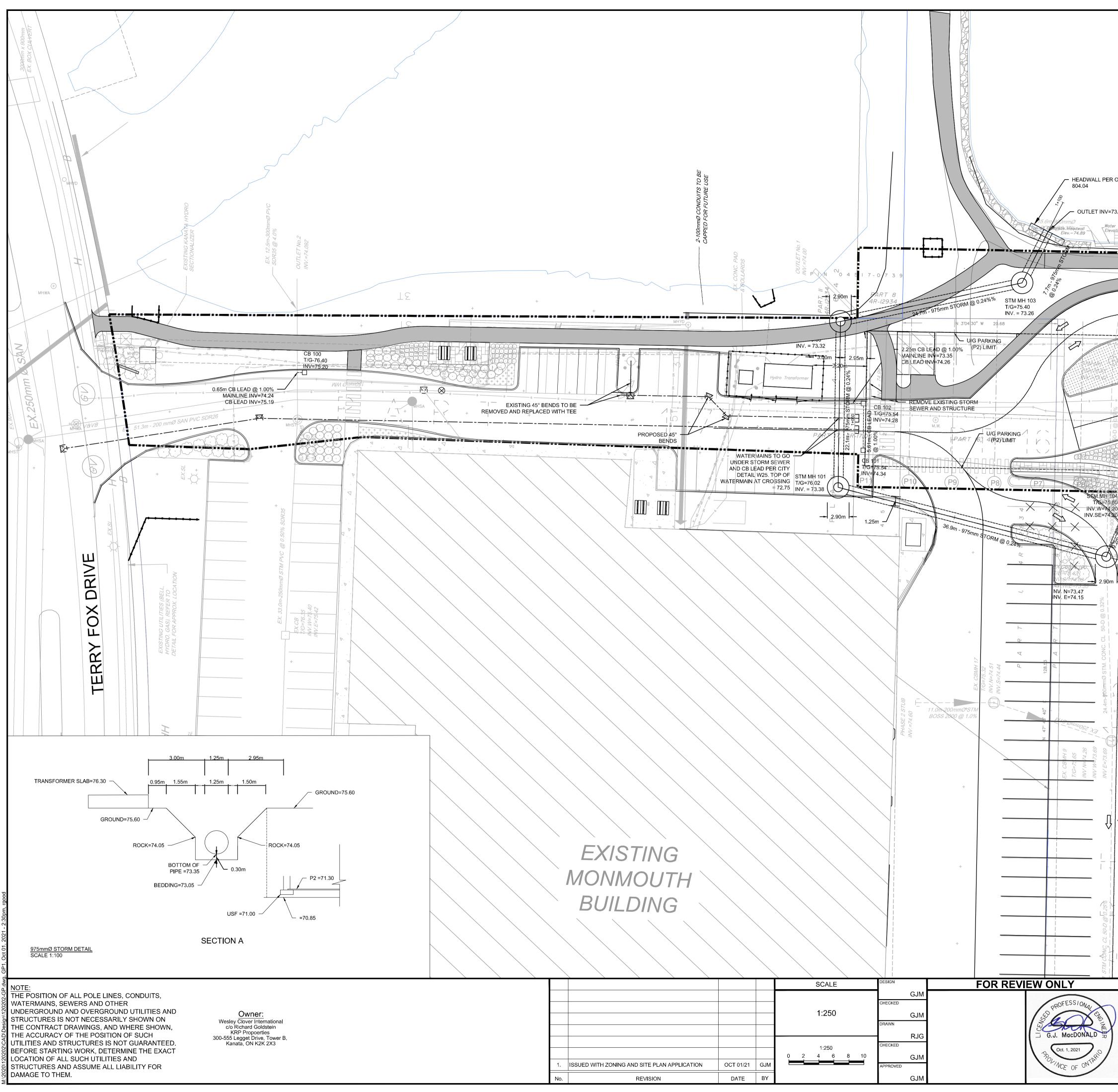
The proposed erosion and sediment control measures will be implemented prior to construction and will remain in place during construction until vegetation is established. There will be regular inspection and maintenance of the sediment control measures.

### NOVATECH

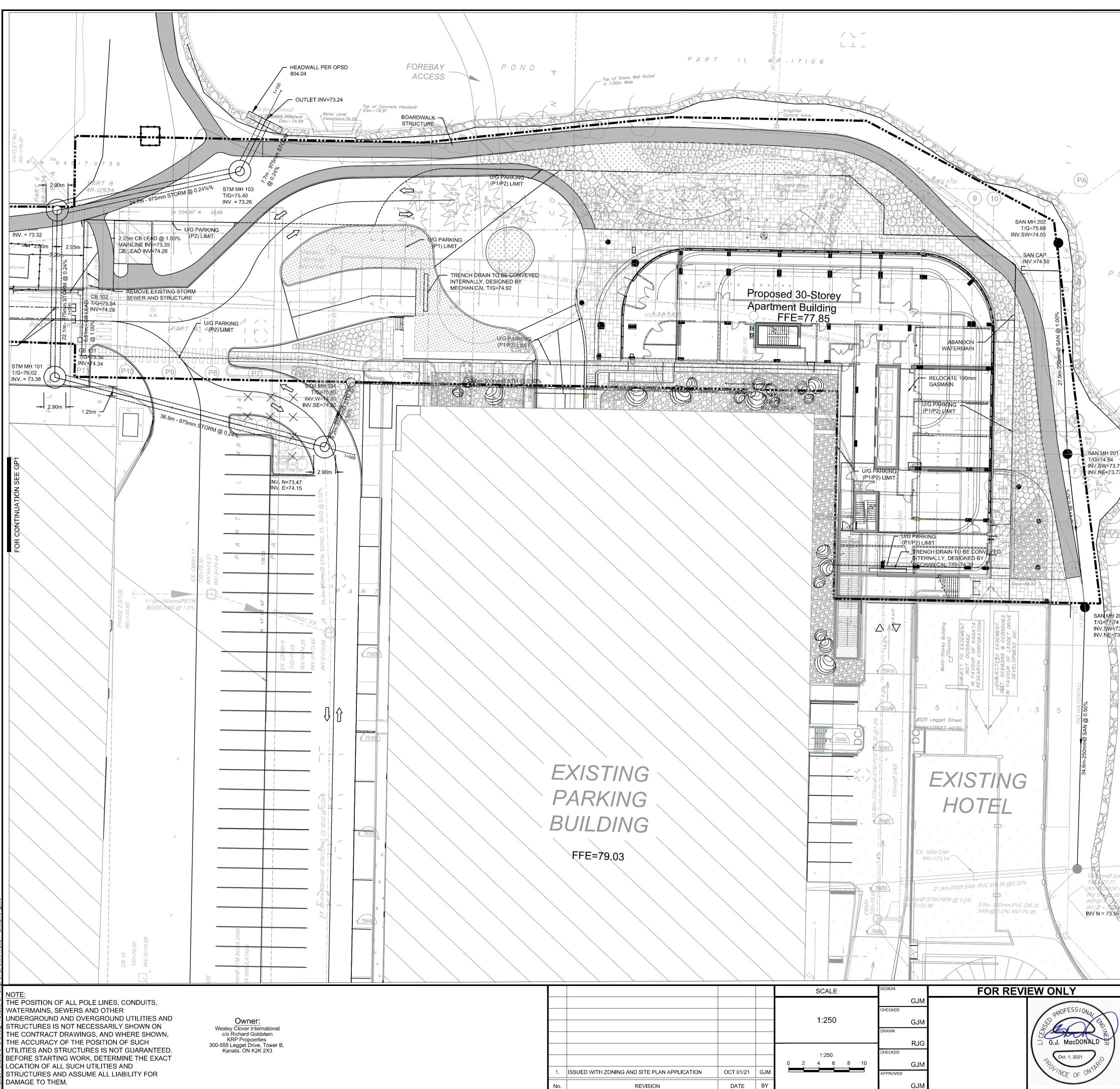


Greg MacDonald, P.Eng. Director Land Development and Public Sector Infrastructure

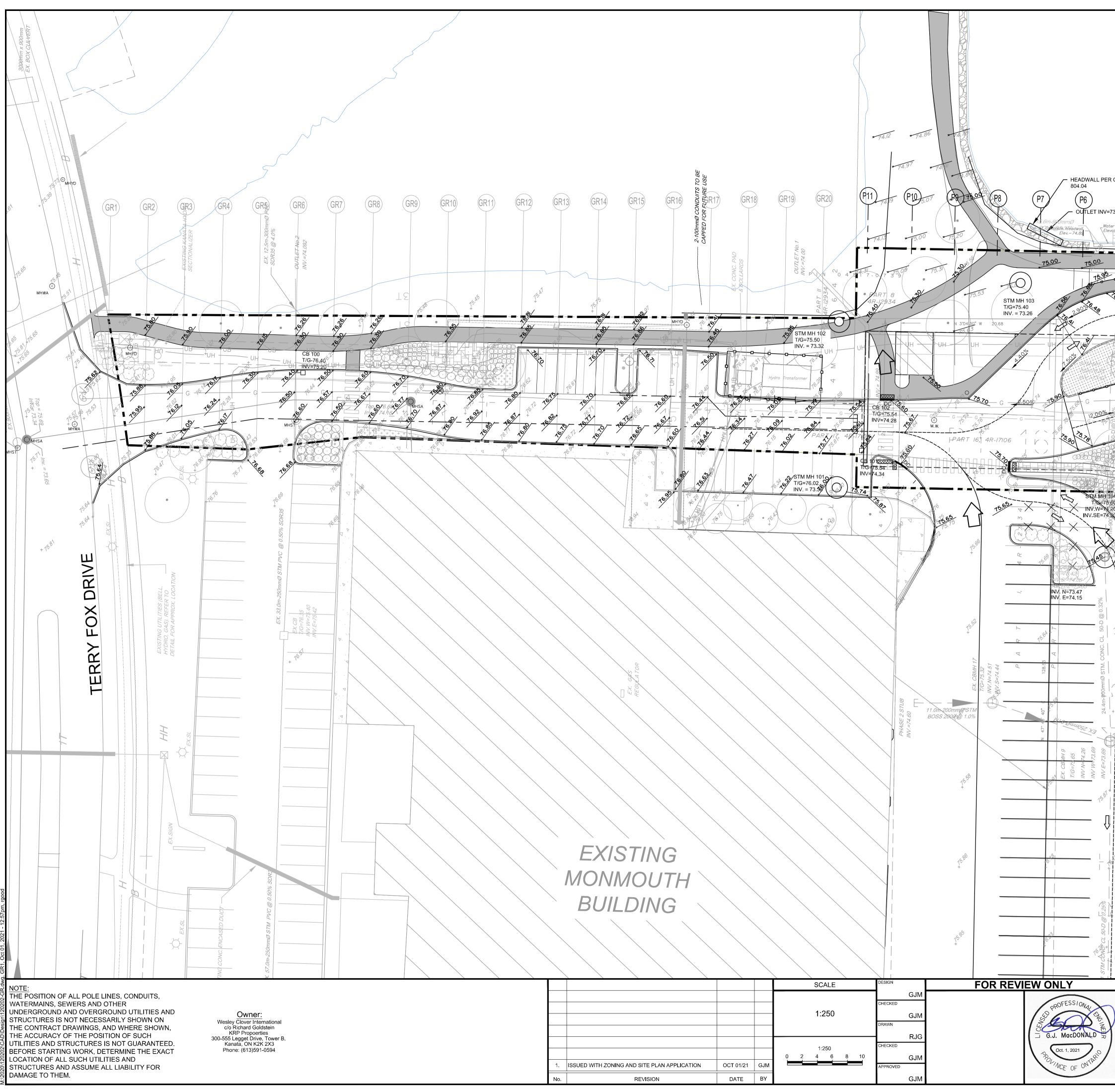
## APPENDIX A Servicing and Grading Drawings



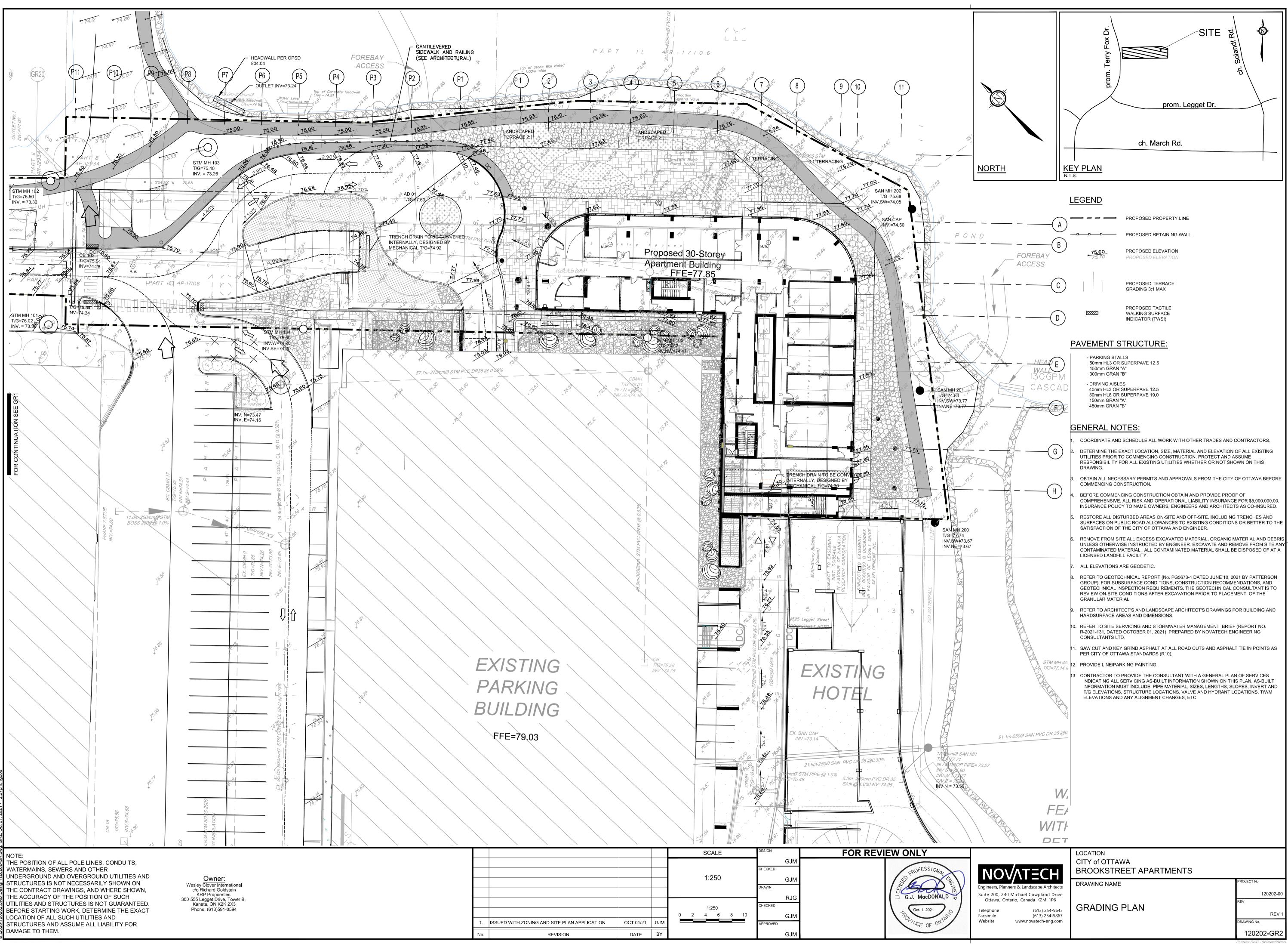
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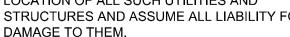


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ALLOWANCES TO EXISTING CONDITIONS OR BETTER TO THE SATISFACTON OF THE CITY OF OTTAWA AND EXISTING         9.       REVOR FROM STEL ACKESS ECXAVATION WITTEN A CONTAVINATED WATERIAL. ALL CONTAVINATED MATERIAL SHALLT DISPOSED OF AT ALLOKESSE LANDTLL FACULTY.         7.       ALL ELEVATIONS ARE GEODETIC.         8.       REFER TO GEOTECHNICAL REPORT IN POSOTO TATED JUNE 10, 2021 BY PATTERSON GROUP) FOR SUBJURACE CONSULTANT IS TO REVEW ON SITE CONDITIONS AFER EXCAVATION PRONT TO PLACEMENT S. THE GEOTECHNICAL CONSULTANT IS TO REVEW ON SITE CONDITIONS AFER EXCAVATION PRONT TO PLACEMENT OF THE GRANULAR MATERIA DIMENSIONS.         9.       REFER TO SECTEMENTICAL REPORT NO. POSOTO TAKE THE EXCAVATION PRONT TO PLACEMENT OF THE GRANULAR MATERIA DIMENSIONS.         9.       REFER TO SECTEMENTICAL REPORT NO. POSOTO TAKA ATER EXCAVATION PRONT TO PLACEMENT OF THE GRANULAR MATERIA DIMENSIONS.         10.       REFER TO SECTEMENT AND AND STORELATER MANAGEMENT BEREF (REPORT NO. R-2021-131 DATED OCTOBER 10, 2021) PREPARED BY MOVATECH ENGINEERING CONSULTANTS LTD.         11.       SW CULTAND REY GRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT THE IN POINTS AS PER CITY OF OTTAWA STANDARDS (NO.         12.       PROVIDE LINEPARRING PAINTING.         13.       SOTOM SINVENT ON THE BY AND ASPHALT TA ALL ROAD CUTS AND ASPHALT THE IN POINTS AS PER CITY OF OTTAWA STANDARDS (NO.         14.       SERVER NOTES:         15.       PROVIDE THE CONSULTANT WITH A DEVERTION WIST INCLUDE: PRE MATERIAL, SZES, LENGTHS, SLOPEN, SLOPEN, ALL ROAD CUTS AND ASPHALT THE INPOINT LOCATIONS, AND AND ALL SERVERTONS, STANDARDS (NO. THIS EXAMPLE <td>~</td> <td>LIABILITY INSURANCE FOR</td> <td>5,000,000.00. INSURANCE POLICY TO NAME OWNERS, ENGINEERS AND ARCHIT</td> <td></td>	~	LIABILITY INSURANCE FOR	5,000,000.00. INSURANCE POLICY TO NAME OWNERS, ENGINEERS AND ARCHIT	
BY ENGINEER, EXCAVATE AND REMOVE FROM SITE ANY CONTAMINATED MATERIAL, ALL CONTAMINATED MATERIAL, SALLE ON PROSED OF AT ALLEWERD CONTENCION.         BY ENGINEER, EXCAVATE AND REMOVE FROM SITE ANY CONTAMINATED MATERIAL, ALL CONTAMINATED MATERIAL SALLE ON PROSED OF AT ALLEWERD CONTENCE AND AND SALTER SALLE ON PROSED OF AT ALLEWERD CONTENCE AND AND SALTER SALLE ON PROSENCE AND AND SALTER SALLE ON PROSENCE AND AND SALTER SALLE CONTINUES, CONTENCION RECOURDERANCE, INSPECTION RECOURDERANCE, AND STOCKAST, AND LANDSCAPE ARCHITECT'S DRAWINGS FOR BUILLONG AND HARDSURFACE AREAS AND DIMENSIONS.         10. REFER TO STESSENCEND, AND STORMENTER MANAGEMENT BRIEF (REPORT NO. R-2021-13); DATED OCTOBER 01, 2021)         11. SAN OUT AND LEY GRIND ASPHALT TAT ALL ROAD CUTS AND ASPHALT TIE IN POINTS AS PER CITY OF OTTAWA STANDARDS (TO TO PROVIDE THE CONSULTANTS UTD. THE DESTINATION OF SERVICES INDICATING ALL SERVICING AS-BUILT INFORMATION MUST INCLUSE PRESIMPLICATING AND AND HARDSURFACE AREAS AND ONTRACTOR TO PROVIDE THE CONSULTANT WITH A GENERAL PLAN OF SERVICES INDICATING ALL SERVICING AS BUILT INFORMATION MUST INCLUSE PRESIMPLICATING AND AND ANY ALL SERVICING AS BUILT INFORMATION MUST INCLUSE PRESIMPLICATING AND ANY ALL SEARCH PLAN OF SERVICES INDICATING AND ANY ALL SEARCH PLAN OF SERVICES INDICATING AND ANY ALL SEARCH PLAN OF SERVICES INDICATING AND ANY ALL SEARCH PLAN ON SERVICES AND AND ANY ALL SEARCH PLAN ON SERVICES INDICATING AND AND ANY ALL SEARCH PLAN ON SERVICES INDICATING AND AND ANY ALL SEARCH PLAN ON SERVICES INTO AND AND ANY ALL SEARCH PLAN ON SERVICES INDICATING AND ANY ALL SEARCH PLAN ON SERVICES INTO AND AND ANY ALL SEARCH PLAN AN	X			
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PREPARED BY MOVATECH ENGINEERING CONSULTANTS LTD.  11. SAW CUT AND KEY GRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT THE IN POINTS AS PER CITY OF OTTAWA STANDARDS (10). 12. PROVIDE LINE/PARKING PAINTING. 13. CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GENERAL PLAN OF SERVICES INDICATING ALL SERVICING AS-BUILT INFORMATION HOW ON THIS PLAN. ASBUILT INFORMATION MUST INICLUDE: PIPE MATERIAL, SIZES, LENGTHS, SLOPES, INVERT AND TRO ELEVATIONS, STRUCTURE LOCATIONS, VALVE AND HYDRANT LOCATIONS, TWM ELEVATIONS AND ANY ALLOMENT CONVENTING. 15. SPECIFICATIONS 15. SPECIFICATIONS 15. SPECIFICATIONS 15. SPECIFICATIONS 16. CATCHARGEN, BEDDING (SANDULAR A) 17. COVER (GRANULAR A) 17. COVER A) 17. THE USE OF CLEAR CRUSHED 18. COVERE CORLECTION COVER WITH HOMMAN SLOPE OF 1.0%. 19. FLEXIBLE CONNECTION SARE REQUIRED FOR CONRECTION PRESTOR ALL NOT BE PERFORMED 19. FLEXIBLE CONNECTION SARE REQUIRED FOR CONRECTION PRESTOR AND A COVERNO FOR CONTROL OF CONTRACTOR THE STRUCTURE CONNECTION D THE STRUCTURE CONNECTION D THE STRUCTURE CONNECTION D THE PRESCHARE OF A CERTIFIED PROFESSIONAL 19. CONTRACTOR TO TESTIS SHALL DE P	B		D LANDSCAPE ARCHITECT'S DRAWINGS FOR BUILDING AND HARDSURFACE AR	EAS AND
(R10).     12. PROVIDE LINE/PARKING PAINTING.     13. CONTRACTOR TO PROVIDE THE CONSULT INFORMATION MUST INCLUDE: PHPE MATERIAL. SERVICING AS. BULT     INFORMATION SHOWN ON THIS PLAN. ASBULT INFORMATION MUST INCLUDE: PHPE MATERIAL. SIZES, LENGTHS, SLOPES,     INVERT AND TSE ELEVATIONS, STRUCTURE LOCATIONS, VALVE AND HYDRANT LOCATIONS, TWW ELEVATIONS AND ANY     ALLONAENT CHANGES, ETC.     SEWER NOTES:     1. SPECIFICATIONS: <u>SPEC. No.</u> <u>REFERENCE</u> SPEC. No. <u>SPEC. NO.</u> STORM SANITARY MAIRANCE (12000) 701.010 OPSD     STORM SENTH SANITARY MAIRANCE (12000) 701.010 OPSD     STORM SENTH SANITARY MAIRANCE SETURATION.     SOURCE (GRANULAR A) OR GRANULAR B TYPE I, UVIC 0R 33     CATCHASIN LEAD PVC 0R 33     CATCHASIN LEAD PVC 0R 35     INSULATE ALL PRES (SANISTM) THAT HAVE LESS THAN 1.5m COVER WITH 50mmX1200mm HI-40 INSULATION. PROVIDE '50mi     CLEARANCE BETWEEN PIPE AND INSULATION.     SERVICES ARE TO BE CONSTRUCTED TO 1.0m FROM FACE OF BUILDING AT A MINIMUM SLOPE OF 1.0%.     IPPE REDDING, COVER AND ARX/FILL ARE TO BE COMPACTED TO AT LEAST 59%; OT THE STANALAD PROCTOR MAXIMUM D     DENSITY. THE USE OF CLEAR CRUSHED STOME AS A BEDDING LAYER SHALL NOT BE PERFORMED.     FLEXIELE CONNECTIONS ARE REQUIRED FOR CONTRACTOR PREFORM FIELD TESTS FOR QUALITY CONTROL OF     SANITARY SEWEM MIN. THE FIELE CRUSHE TO A LEAST 59%; OT THE STANALADARE AND ARAYER KORA-SEAL. PSX: POSITI     SECURCE AND DEXAMPLE TO A CERTIFIED ON ALL SANITARY SERVECE TO CONTRUP FORONT	/			DBER 01, 2021)
13. CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GENERAL PLAN OF SERVICES INDICATING ALL SERVICING AS-BUILT INFORMATION SHOWN ON THIS PLAN. AS BUILT INFORMATION MUST INCLUDE: PIPE MATERIAL, SIZES, LENGTHS, SLOPES, INVERT AND TS GELEVATIONS, STRUCTURE LOCATIONS, VALVE AND HYDRANT LOCATIONS, TWM ELEVATIONS AND ANY ALIGNMENT CHANGES, ETC.         200 3.67 3.7 3.7 3.7 3.7 3.7 3.7 3.7 3.			SPHALT AT ALL ROAD CUTS AND ASPHALT TIE IN POINTS AS PER CITY OF OTTA	WA STANDARDS
INVERT AND TIG ELEVATIONS, STRUCTURE LOCATIONS, VALVE AND HYDRANT LOCATIONS, TWM ELEVATIONS AND ANY ALLOWNERSE, ETC.         SEEVER NOTES:         SPECIFICATIONS:	/			ICING AS-BUILT
200 3.67 3.67       1. SPECIFICATIONS: ITEM STORM (SANITARY MANHOLE (12000) 701,010 OPSD STORM (SANITARY MANHOLE (12002) OPSD STORM (SANITARY MIL FRAME & COVER 401,010 OPSD STORM (SANITARY MIL FRAME & COVER 401,010 OPSD STORM SEWER EVEN PVC DR 35 SANITARY SEWER PVC DR 35 SANITARY SEWER PVC DR 35 CATCHBASIN LEAD PVC DR 35 SANITARY SEWER SANITHAT HAVE LESS THAN 1.5m COVER WITH 50mmX1200mm HI-40 INSULATION. PROVIDE 150mm CLEARANCE BEC OSTERUES THE AND INSULATION.         3. SERVICES ARE TO BE CONSTRUCTED TO 1 0m FROM FACE OF BUILDING AT A MINIMUM SLOPE OF 1.0%.         4. PIPE BEDDING, COVER AND BACKFLL ARE TO BE COMPACTED TO AT LEAST 59% OF THE SANIDARD PROCTOR MAXIMUM D DENSITY. THE USE OF CLEAR CRUSHED STOME AS A BEDDING LAYER SHALL NOT BE PERMITTED.         5. FLEXIBLE CONNECTIONS ARE REQUIRE THAT THE SITE SERVICING CONTRACTOR PERFORM FIELD TESTS FOR QUALITY CONTROL OF SANITARY SEWER SLEAKAGE TESTING SHALL BE COMPLETED IN ACCORDANCE WITH OPSS 4100.716, 410.07.16.04 AND 407.07.24. DVE TESTING IS TO BE COMPLETED ON ALL SANITARY SERVICES TO CONFIRCTION TO THE SANITARY SEWER MINI THE FIELD TESTS SHALL BE COMPLETED IN ACCORDANCE WITH OPSS 4100.71.6, 410.07.16.04 AND 407.07.24. DVE TESTING IS TO BE COMPLETED ON ALL SANITARY SERVICES TO CONFRECTIONS 410.716.04 AND 407.07.24. DVE TESTING IS TO BE COMPLETED ON ALL SANITARY SERVICES TO CONFRECTIONS APPUR		INVERT AND T/G ELEVATION	IS, STRUCTURE LOCATIONS, VALVE AND HYDRANT LOCATIONS, T/WM ELEVATIO	
3.67 3.67       ITEM (CATCHGAISN) (600x800mm)       SPEC, No. 705,010       PEFERENCE OPSD         3.67       CATCHGAISN (600x800mm)       705,010       OPSD         3.67       STORM / SANITARY MANHOLE (12009)       701,010       OPSD         STORM / SANITARY MM FRAME & COVER       400,020       OPSD         STORM / SANITARY MM FRAME & COVER       400,020       OPSD         STORM / SANITARY SEWER       PVC DR 35         SANITARY SEWER       PVC DR 35         SANITARY SEWER       PVC DR 35         CATCHBASIN LEAD       PVC DR 35         SERVICES ARE TO BE CONSTRUCTED TO 1.0m FROM FACE OF BUILDING AT A MINIMUM SLOPE OF 1.0%.         SERVICES ARE TO BE CONSTRUCTED TO 1.0m FROM FACE OF BUILDING AT A MINIMUM SLOPE OF 1.0%.         SERVICES ARE TO BE CONSTRUCTED TO 1.0m FROM FACE OF BUILDING AT A MINIMUM SLOPE OF 1.0%.         PIPE BEDDING, COVER AND BACKFILL ARE TO BE COMPACTED TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM D DENSITY. THE USE OF CLEAR CRUSHED STONE AS A BEDDING LAYER SHALL NOT BE PERMITTED.         SERVICES ARE TO BE CONCRETE CRUSHED STONE AS A BEDDING CONTRACTOR PERFORM FIELD TESTS FOR QUALITY CONTROL OF SANITARY SEWER MAIN. THE FIELD TESTS SHALL BE COMPLETED IN ACCORDANCE WITH OPSS 410.07.16,40.40.07.07.24. DY ETSTING IST DE COMPLETED ON ALL SANITARY SEWER STOR CONFREM PROPER CONNECTION TO THE SANITARY SEWER MAIN. THE FIELD TESTS SHALL BE PERFORMED IN THE PRESENCE OF A CERTIFIED PROFESSIONAL ENVINCE         STORM MANHOLES AND CBMHS ARE TO HAVE 300mm SUMES UNL				
CB. FRAME & COVER       400.020       OPSD         STORM / SANITARY MH FRAME & COVER       401.010       OPSD         SEWER TRENCH - BEDDING (GRANULAR A)       OVER (GRANULAR A)       OVER (GRANULAR A)         WITH MAXIMUM PARTICLE SIZE=25mm)       STORM / SANULAR A)       EVED DR 35         SANITARY SEWER       PVC DR 35         CATCHBASIN LEAD       PVC DR 35         2.       INSULATE ALL IPPES (SANISTM) THAT HAVE LESS THAN 1.5m COVER WITH 50mmX1200mm HI-40 INSULATION. PROVIDE 150mm         3.       SERVICES ARE TO BE CONSTRUCTED TO 1.0m FROM FACE OF BUILDING AT A MINIMUM SLOPE OF 1.0%.         4.       PIPE BEDDING, COVER AND BACKFILL ARE TO BE COMPACTED TO AT LEAST 95%, OF THE STANDARD PROCTOR MAXIMUM D         DENSITY. THE USE OF CLEAR CRUSHED FOR CONNECTING PIPES TO MANHOLES (FOR EXAMPLE KOR-N-SEAL, PSX: POSITI SEAL AND DURASEAL). THE CONCRETE CRADLE FOR THE PIPE CAN BE ELIMINATED.         5.       FLEXIBLE CONDUCTIONS ARE REQUIRED FOR CONNECTING PIPES TO MANHOLES (FOR EXAMPLE KOR-N-SEAL, PSX: POSITI SEAL AND DURASEAL). THE CONCRETE CRADLE FED IN TACORDANCE WITH OPTER CONNECTION TO THE SANITARY SEVERS. LEAX ADD ETTES INSCIDENT MERIDIN THE PRESENCE OF A CERTIFIED CONTROL OF SANITARY SEVERS. LEAX ADD THEST SHALL BE COMPLETED IN ACCORDANCE WITH PROFER CONNECTION TO THE SANITARY SEVERS MAIL. THE STERES HALL BE CORFORMED IN THE PRESENCE OF A CERTIFIED PROFESSIONAL ENSINEER WHO SHALL SUBMIT A CERTIFIED COPY OF THE TEST RESULTS.         7.       STORM MANHOLES AND GBMHS ARE TO HAVE 300mm SUMPS UNLESS OTHERWISE INDICATED.         8.	73.67	ITEM CATCHBASIN (600x600mm	) 705.010 OPSD	
COVER (GRANULAR & OR GRÁNULAR & TYPE I, WITH MAXIMUM PARTICLE SUE=25mm) STORM SEWER AXIMITARY SEWER CATCHBASIN LEAD PVC DR 35 2. INSULATE ALL PIPES (SANSTM) THAT HAVE LESS THAN 1.5m COVER WITH 50mmX1200mm HI-40 INSULATION. PROVIDE 150ml CLEARANCE BETWEEN PIPE AND INSULATION. 3. SERVICES ARE TO BE CONSTRUCTED TO 1.0m FROM FACE OF BUILDING AT A MINIMUM SLOPE OF 1.0%. 4. PIPE BEDDING, COVER AND BACKFILL ARE TO BE COMPACTED TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM D DENSITY. THE USE OF CLEAR CRUSHED STONE AS A BEDDING LAYER SHALL NOT BE PERMITTED. 5. FLEXIBLE CONNECTIONS ARE REQUIRED FOR CONNECTING PIPES TO MANHOLES (FOR EXAMPLE KOR-N-SEAL, PSX: POSITI SEAL AND DURASEAL). THE CONCRETE CRADLE FOR THE PIPE CAN BE ELIMINATED. 6. THE OWNER SHALL REQUIRE THAT THE SITE SERVICING CONTRACTOR PERFORM FIELD TESTS FOR QUALITY CONTROL OF SANITARY SEWERS. LEAKAGE TESTING SHALL BE COMPLETED IN ACCORDANCE WITH OPSS 410.07.16, 410.07.160.4 AND 407.07.24. DVE TESTING IS TO BE COMPLETED ON ALL SANITARY SERVICES TO CONTRACTOR PERFORM FIELD TESTS FOR QUALITY CONTROL OF SANITARY SEWER MAIN. THE FIELD TEST SHALL BE COMPLETED IN ACCORDANCE WITH OPSS 410.07.16, 410.07.160.4 AND 407.07.24. DVE TESTING IS TO BE COMPLETED ON ALL SANITARY SERVICES TO CONTRACTOR PERFORMED THE PRESENCE OF A CERTIFIED PROFESSIONAL ENGINEER WHO SHALL SUBMIT A CERTIFIED COPY OF THE TEST RESULTS. 7. STORM MANHOLES AND CBMHS ARE TO HAVE 300mm SUMPS UNLESS OTHERWISE INDICATED. 8. CONTRACTOR TO TELEVISE (CCTV) ALL PROPOSED SEWERS, 200mmØ OR GREATER PRIOR TO BASE COURSE ASPHALT. UP COMPLETION OF CONTRACT. THE CONTRACTOR IS RESPONSIBLE TO FLUSH AND CLEAN ALL SEWERS & APPURTENANCES. WATERMAIN NOTES: 11. SPECIFICATIONS: 11. SPECIFICATIONS: 12. SUPPLY AND CONSTRUCT ALL WATERMAINS AND APPURTENANCES IN ACCORDANCE WITH THE CITY OF OTTAWA WATERMAIN PLOYED SEWER W22 CITY OF OTTAWA WATERMAIN SHALL BE MINIMUM 2.4m DEPTH BELOW GRADE UNLESS OTHERWISE INDICATED.		CB, FRAME & COVER STORM / SANITARY MH FI	400.020 OPSD RAME & COVER 401.010 OPSD	
CATCHBASIN LEAD       PVC DR 35         2.       INSULATE ALL PIPES (SAN/STM) THAT HAVE LESS THAN 1.5m COVER WITH 50mmX1200mm HI-40 INSULATION. PROVIDE 150mm CLEARANCE BETWEEN PIPE AND INSULATION.         3.       SERVICES ARE TO BE CONSTRUCTED TO 1.0m FROM FACE OF BUILDING AT A MINIMUM SLOPE OF 1.0%.         4.       PIPE BEDDING, COVER AND BACKFILL ARE TO BE COMPACTED TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM D DENSITY. THE USE OF CLEAR CRUSHED STONE AS A BEDDING LAYER SHALL NOT BE PERMITTED.         5.       FLEXIBLE CONNECTIONS ARE REQUIRED FOR CONNECTING PIPES TO MANHOLES (FOR EXAMPLE KOR-N-SEAL, PSX: POSITI SEAL AND DURASEAL). THE CONCRETE CRADLE FOR THE PIPE CAN BE ELIMINATED.         6.       THE OWNER SHALL REQUIRE THAT THE SITE SERVICING CONTRACTOR PERFORM FIELD TESTS FOR QUALITY CONTROL OF SANTTARY SEWERS. LEAKAGE TESTING SHALL BE COMPLETED IN ACCORDANCE WITH OPSS ATON 76, 4100.716, 411.700.7170.7170.7170.7170.7170.7170.71		COVER (GRA WITH MAXIM	NULAR A OR GRÁNULAR B TYPE I, JM PARTICLE SIZE=25mm)	
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<ul> <li>5. FLEXIBLE CONNECTIONS ARE REQUIRED FOR CONNECTING PIPES TO MANHOLES (FOR EXAMPLE KOR-N-SEAL, PSX: POSITI SEAL AND DURASEAL). THE CONCRETE CRADLE FOR THE PIPE CAN BE ELIMINATED.</li> <li>6. THE OWNER SHALL REQUIRE THAT THE SITE SERVICING CONTRACTOR PERFORM FIELD TESTS FOR QUALITY CONTROL OF SANITARY SEWERS. LEAKAGE TESTING SHALL BE COMPLETED IN ACCORDANCE WITH OPSS 410.07.16, 410.07.16, 44 ND 407.07.24. DYE TESTING IS TO BE COMPLETED ON ALL SANITARY SERVICES TO CONFIRM PROPER CONNECTION TO THE SANITARY SEWER MAIN. THE FIELD TESTS SHALL BE DEFORMED IN THE PRESENCE OF A CERTIFIED PROFESSIONAL ENGINEER WHO SHALL SUBMIT A CERTIFIED COPY OF THE TEST RESULTS.</li> <li>7. STORM MANHOLES AND CBMHS ARE TO HAVE 300mm SUMPS UNLESS OTHERWISE INDICATED.</li> <li>8. CONTRACTOR TO TELEVISE (CCTV) ALL PROPOSED SEWERS, 200mmØ OR GREATER PRIOR TO BASE COURSE ASPHALT. UP COMPLETION OF CONTRACT, THE CONTRACTOR IS RESPONSIBLE TO FLUSH AND CLEAN ALL SEWERS &amp; APPURTENANCES.</li> <li>WATERMAIN TRENCHING WIT? CITY OF OTTAWA THERMAL INSULATION IN SHALLOW TRENCHES W22 CITY OF OTTAWA WATERMAIN CROSSING BELOW SEWER W25 CITY OF OTTAWA WATERMAIN CROSSING BELOW SEWER W25 CITY OF OTTAWA WATERMAIN CROSSING BELOW SEWER W25 CITY OF OTTAWA AND SPECIFICATIONS. EXCAVATION, INSTALLATION, BACKFILL AND RESTORATION OF ALL WATERMAINS BY THE CONTRACT OR ONNE CONNECTIONS AND SHULTOFFS AT THE MAIN AND CHLORINATION OF THE WATER SYSTEM SHALL BE PERFORMED BY CITY OFFICIALS.</li> <li>8. WATERMAIN SHALL BE MINIMUM 2.4m DEPTH BELOW GRADE UNLESS OTHERWISE INDICATED.</li> </ul>		4. PIPE BEDDING, COVER AN	D BACKFILL ARE TO BE COMPACTED TO AT LEAST 95% OF THE STANDARD PRO	CTOR MAXIMUM DRY
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<ul> <li>AN MH</li> <li>AN ATERMAIN CROSSING BELOW SEWER</li> <li>WATERMAIN</li> <li>WATERMAIN</li> <li>AND CONSTRUCT ALL WATERMAINS AND APPURTENANCES IN ACCORDANCE WITH THE CITY OF OTTAWA STANDAR AND SPECIFICATIONS. EXCAVATION, INSTALLATION, BACKFILL AND RESTORATION OF ALL WATERMAINS BY THE CONTRACT CONNECTIONS AND SHUT-OFFS AT THE MAIN AND CHLORINATION OF THE WATER SYSTEM SHALL BE PERFORMED BY CITY OFFICIALS.</li> <li>WATERMAIN SHALL BE MINIMUM 2.4m DEPTH BELOW GRADE UNLESS OTHERWISE INDICATED.</li> </ul>		COMPLETION OF CONTRAC	CT, THE CONTRACTOR IS RESPONSIBLE TO FLUSH AND CLEAN ALL SEWERS & A	
<ul> <li>WATERMAIN TRENCHING W17 CITY OF OTTAWA THERMAL INSULATION IN SHALLOW TRENCHES W22 CITY OF OTTAWA WATERMAIN CROSSING BELOW SEWER W25 CITY OF OTTAWA WATERMAIN</li> <li>PIPE= 7</li> <li>SUPPLY AND CONSTRUCT ALL WATERMAINS AND APPURTENANCES IN ACCORDANCE WITH THE CITY OF OTTAWA STANDAR AND SPECIFICATIONS. EXCAVATION, INSTALLATION, BACKFILL AND RESTORATION OF ALL WATERMAINS BY THE CONTRACT CONNECTIONS AND SHUT-OFFS AT THE MAIN AND CHLORINATION OF THE WATER SYSTEM SHALL BE PERFORMED BY CITY OFFICIALS.</li> <li>WATERMAIN SHALL BE MINIMUM 2.4m DEPTH BELOW GRADE UNLESS OTHERWISE INDICATED.</li> </ul>			SPEC No. REFERENCE	
WATERMAIN       PVC DR 18         WATERMAIN       PVC DR 18         Supply and construct all watermains and appurtenances in accordance with the city of ottawa standar and specifications. Excavation, installation, backfill and restoration of all watermains by the contract connections and shut-offs at the main and chlorination of the water system shall be performed by city officials.         Watermain shall be minimum 2.4m depth below grade unless otherwise indicated.	AN MH	WATERMAIN TRENCHING THERMAL INSULATION IN	W17         CITY OF OTTAWA           SHALLOW TRENCHES         W22         CITY OF OTTAWA	
<ul> <li>CONNECTIONS AND SHUT-OFFS AT THE MAIN AND CHLORINATION OF THE WATER SYSTEM SHALL BE PERFORMED BY CITY OFFICIALS.</li> <li>3. WATERMAIN SHALL BE MINIMUM 2.4m DEPTH BELOW GRADE UNLESS OTHERWISE INDICATED.</li> </ul>	0	<ul><li>WATERMAIN</li><li>2. SUPPLY AND CONSTRUCT</li></ul>	PVC DR 18 ALL WATERMAINS AND APPURTENANCES IN ACCORDANCE WITH THE CITY OF C	
X.		CONNECTIONS AND SHUT-		
THE THE THE MINIMUM VEGITIVE DETITED VOTOIDE OF THE DATALE UNDONINGO	A	X		
<ol> <li>WATER SERVICE IS TO BE CONSTRUCTED TO WITHIN 1.0m OF FOUNDATION WALL AND CAPPED, UNLESS OTHERWISE INDICATED.</li> </ol>		5. WATER SERVICE IS TO BE		THERWISE
6. WATER DEMAND = TBD		6. WATER DEMAND = TBD		
			CITY of OTTAWA	
NOVATECH       BROOKSTREET APARTMENTS         Engineers & Landscape Architects       DRAWING NAME	)			PROJECT No.
Suite 200, 240 Michael Cowpland Drive       120202         Ottawa, Ontario, Canada K2M 1P6       REV		Suite 200, 240 Michael Cowpland Dri	ve	120202-00 REV
Telephone (613) 254-9643 Facsimile (613) 254-5867 Website www.novatech-eng.com GENERAL PLAN OF SEVRICES		Facsimile (613) 254-58	67	REV 1
120202-G				120202-GP2 PLANA1. DWG - 841 mmx594 mm

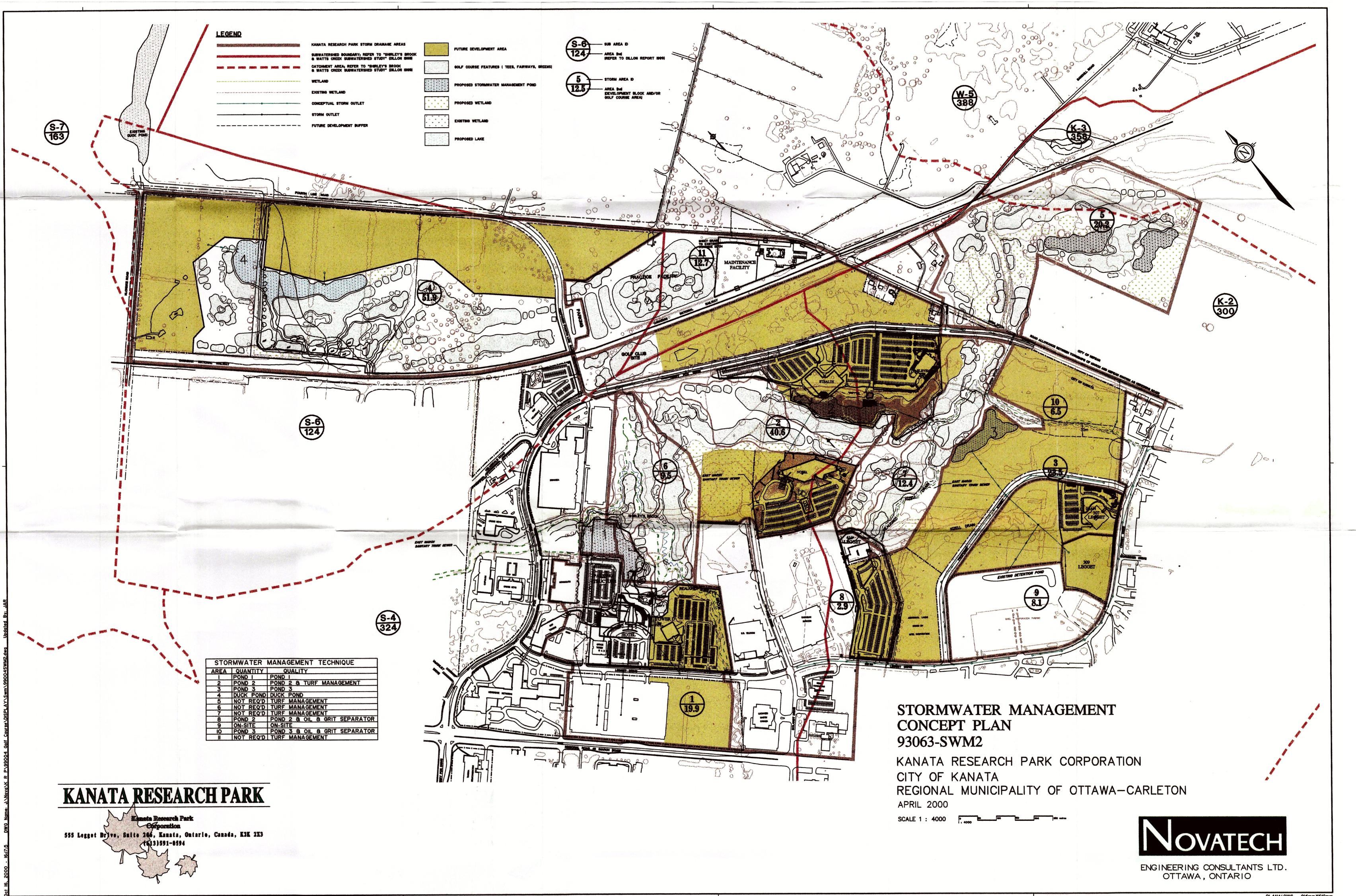


	TH	SITE PLAN	ch. Soler
73.24 Top Erevel Top Flexe 100 74.28 100 75.09 76.81		N.T.S. PROPOSED PROPERTY LINE PROPOSED RETAINING WALL PROPOSED RETAINING WALL PROPOSED TERRACE GRADING 3.1 MAX PROPOSED TACTILE WALKING SURFACE INDICATOR (TWSI) TERUCTURE: LLS SUPERPAVE 12.5 SUPERPAVE	ITIES WHETHER OR ENCING RISK AND ENGINEERS AND S ON PUBLIC ROAD TAWA AND ENGINEER. SS OTHERWISE ALL FOR SUBSURFACE MENTS. THE D PLACEMENT OF RFACE AREAS AND ATED OCTOBER 01, Y OF OTTAWA ALL SERVICING TERIAL, SIZES,
Engineer Suite 20		GRADING PLAN	PROJECT No. 120202-00 REV REV 1 DRAWING No. 120202-GR1





## APPENDIX B Storm Sewer Design Sheet and Drawing



**Calculation Summary** 

Project: 120202

#### **Brookstreet Apartment Building**

Additional Volume:

1600m<sup>2</sup> additional impervious area V = CAd  $V = (0.9) \times (1330m^2) \times (100mm \ rainfall)$  $V = 144 \ m^3$ 

Pond Impacts:

 $Volume Increase = \frac{Added Volume}{Existing Volume}$  $= \frac{144m^3}{5210m^3}$ = 0.027Depth Increase,  $d = \frac{Added Volume}{Surface Area}$  $d = \frac{144m^3}{15,000m^2}$ d = 9.6 mm

Project: Brookstreet Apartments Location: Ottawa, Ontario Client: KRP

Storm Sewer Design Sheet

DATE: Sept. 23, 2021 Rev: 1



LOCATION			FLOW				PROPOSED SEWER						1								
STREET	FROM	то	AREA ID	R= 0.25	R= 0.55	R= 0.75	R= 0.90	INDIV 2.78 AR	ACCUM 2.78 AR	TIME OF CONC.	RAINFALL INTENSITY I	PEAK FLOW Q (I/s)	NOMINAL SIZE (mm)	PIPE SIZE (mm)	PIPE SLOPE (%)	LENGTH (m)	CAPACITY (I/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW (min.)	EXCESS CAPACITY (I/s)	Q/Qfull
																					í
																					<b></b>
	CB1	CB2	Refer to 98066-STM			0.290		0.60	0.60	10.00	104.19	63.00	200	203	0.50	45.0	24.22	0.75	1.01	-38.78	2.60
	CB3	CB4				0.330		0.69	0.69	11.01	99.17	68.23	200	203	1.10	45.5	35.92	1.11	0.69	-32.31	1.90
	CB4	CB5				0.460		0.96	1.65	11.69	96.04	158.19	300	305	0.40	57.0	63.87	0.87	1.09	-94.32	2.48
	CB5	CBMH1				0.350		0.73	2.38	12.78	91.50	217.49	300	305	0.70	45.0	84.49	1.16	0.65	-133.00	2.57
	CBMH1	CBMH5				0.520		1.08	3.46	13.43	89.02	308.09	375	381	0.40	90.0	115.80	1.01	1.48	-192.29	2.66
	CBMH5	MH6				0.220		0.46	3.92	14.90	83.87	328.75	375	381	0.64	46.8	146.48	1.28	0.61	-182.28	2.24
	MH6	CBMH7				0.830		1.73	5.65	15.51	81.94	462.99	450	457	0.60	33.3	230.62	1.40	0.40	-232.37	2.01
	CBMH7	MH10				0.240		0.50	6.15	15.91	80.74	496.60	450	457	2.90	41.0	507.02	3.09	0.22	10.43	0.98
	MH10	CBMH8				0.460		0.96	7.11	16.13	80.08	569.36	450	457	2.90	24.0	507.02	3.09	0.13	-62.34	1.12
	CBMH8	CBMH9				0.860		1.79	8.90	16.26	79.70	709.58	900	914	0.25	65.0	945.25	1.44	0.75	235.67	0.75
	CBMH9	CBMH100	Refer to 120202-STM			0.990		2.06	10.97	17.01	77.58	850.78	900	914	0.32	24.4	1069.42	1.63	0.25	218.64	0.80
		STM MH 101				0.150		0.31	11.28	17.26	76.90	867.40	975	991	0.24	36.9	1146.51	1.49	0.41	279.11	0.76
	STM MH 101	STM MH102				0.000	0.110	0.28	11.56	17.68	75.80	875.93	975	991	0.24	22.1	1146.51	1.49	0.25	270.58	0.76
	STM MH 102	STM MH103				0.000		0.00	11.56	17.92	75.17	868.55	975	991	0.24	24.7	1146.51	1.49	0.28	277.96	0.76
	STM MH103	OUTLET				0.000		0.00	11.56	18.20	74.47	860.47	975	991	0.24	7.7	1146.51	1.49	0.09	286.04	0.75
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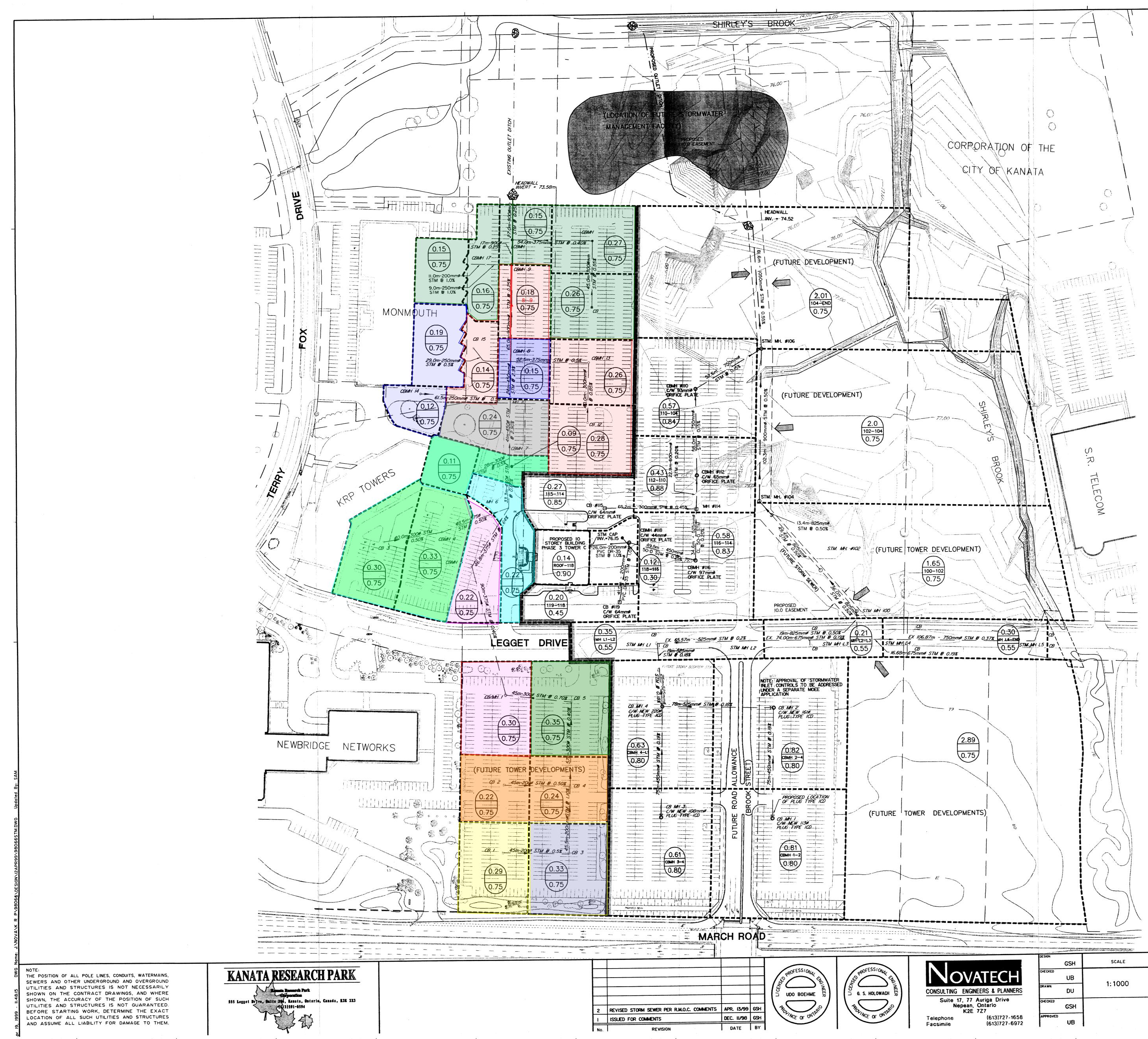
Definitions

Q = 2.78 AIR Q = Peak Flow, in Litres per second (L/s) A = Area in hectares (ha) I = Rainfall Intensity (mm/h)

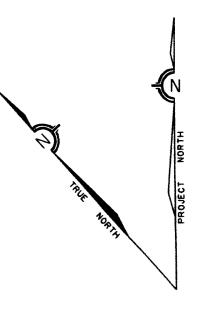
Notes:

1) Ottawa Rainfall-Intensity Curve 2) Min Velocity = 0.80 m/sec.

Reference Plans Drawing No. 98066-STM Rev. 2 Drawing No. 120202-STM Rev. 1



101124PB990980687M DWG Lavourt 5/10/2007 3:00:30 PM smatthews Xerx EQ I



# LEGEND

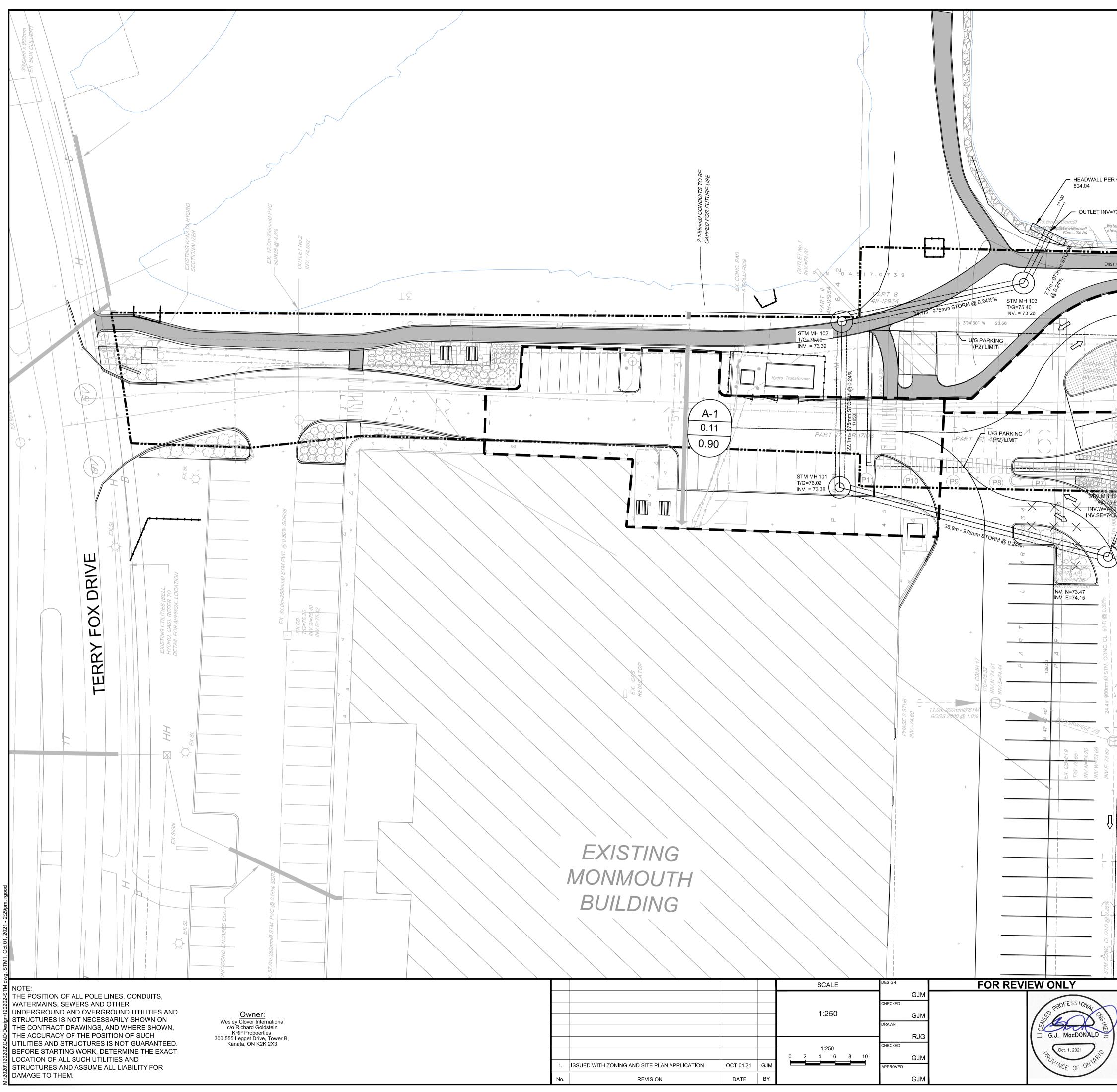
2.02	- DRAINAGE AREA (hectores)
100-102	-MANHOLE TO MANHOLE
0.6	RUN-OFF COEFFICIENT
	STORM DRAINAGE AREA
	STORM DRAINAGE AREA BOUNDARY
MH #100	EXISTING STORM SEWER AND MANHOLE
O CBMH #116	EXISTING CATCHBASIN MANHOLE
⊡ CB #II9	EXISTING CATCHBASIN
	DIRECTION OF FLOW
	MINOR STORM SYSTEM FLOW ROUTING (UNDEVELOPED AREAS)

# NOTE:

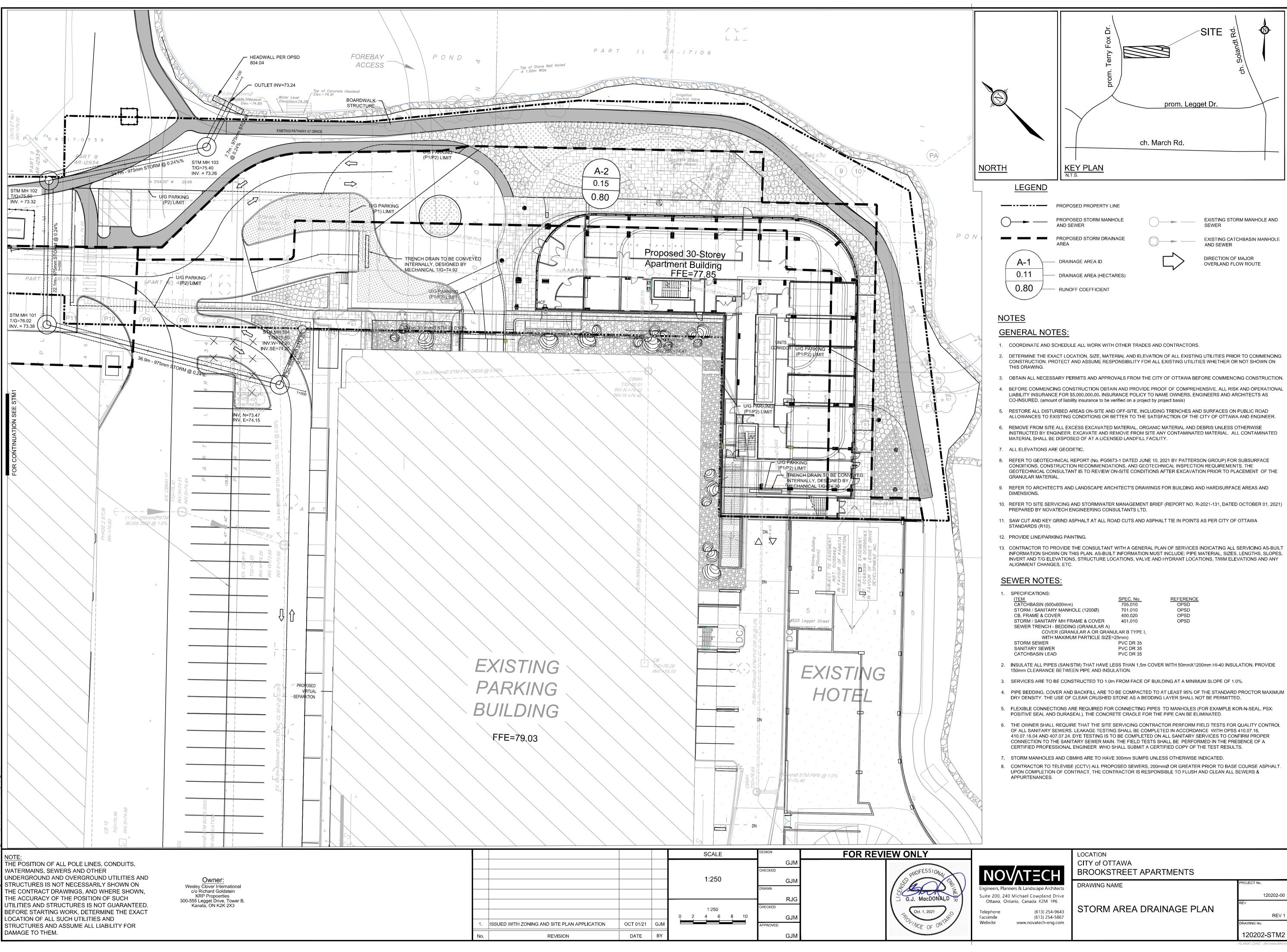
- I. RUNOFF COEFFICIENTS FOR TOWER 'C' PHASE 3 DEVELOPMENT ARE AS OUTLINED IN "KANATA RESEARCH PARK - TOWER 'C' STORMWATER MANAGEMENT REPORT" (NECL, Dec 1998)
- 2. APPROVAL OF STORMWATER INLET CONTROLS FOR THE EXISTING NEWBRIDGE PARKING LOT (PLUG TYPE ICD'S) TO BE ADDRESSED UNDER A SEPARATE MOEE APPLICATION.

	DESIGN		CITY OF KANATA	PROJECT No. 98066
	GSH	SCALE		30000
VATECH	снескер UB		KANATA RESEARCH PARK	
	DRAWN	1:1000	TOWER 'C' PROJECT	DATE
NGINEERS & PLANNERS	DU			SEPTEMBER 1998
77 Auriga Drive an, Ontario (2E 7Z7	CHECKED GSH		STORM DRAINAGE AREA PLAN	
(613)727-1658 (613)727-6972	APPROVED			98066-STM





		Q		SITE Providence SITE Providenc	ch. Solaliu-
	NOR	<u>гн</u>		KEY PLAN N.T.S.	
73.24 er Leve			LEGEND		
	IWAY AT GRADE	С		ND SEWER SEWER	RM MANHOLE AND CHBASIN MANHOLE
			0.11	DIRECTION OF OVERLAND FLO PRAINAGE AREA (HECTARES)	
		NC	DTES		
			ENERAL NOTE COORDINATE AND SCH DETERMINE THE EXAC CONSTRUCTION. PROT THIS DRAWING.	ES: HEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS. IT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRI FECT AND ASSUME RESPONSIBILITY FOR ALL EXISTING UTILITIES WHETHER O RY PERMITS AND APPROVALS FROM THE CITY OF OTTAWA BEFORE COMMENT	PR NOT SHOWN ON
		4. 5.	BEFORE COMMENCING LIABILITY INSURANCE CO-INSURED. (amount of RESTORE ALL DISTURI	G CONSTRUCTION OBTAIN AND PROVIDE PROOF OF COMPREHENSIVE, ALL RIS FOR \$5,000,000.00. INSURANCE POLICY TO NAME OWNERS, ENGINEERS AND A of liability insurance to be verified on a project by project basis) BED AREAS ON-SITE AND OFF-SITE, INCLUDING TRENCHES AND SURFACES OF STING CONDITIONS OR BETTER TO THE SATISFACTION OF THE CITY OF OTTAW	SK AND OPERATIONAL RCHITECTS AS N PUBLIC ROAD
04 60 20		6. 7.	INSTRUCTED BY ENGIN	LL EXCESS EXCAVATED MATERIAL, ORGANIC MATERIAL AND DEBRIS UNLESS NEER. EXCAVATE AND REMOVE FROM SITE ANY CONTAMINATED MATERIAL. A ISPOSED OF AT A LICENSED LANDFILL FACILITY. GEODETIC.	
	N SEE STMZ	8. 9.	CONDITIONS, CONSTR GEOTECHNICAL CONS GRANULAR MATERIAL. REFER TO ARCHITECT	ICAL REPORT (No. PG5673-1 DATED JUNE 10, 2021 BY PATTERSON GROUP) FO UCTION RECOMMENDATIONS, AND GEOTECHNICAL INSPECTION REQUIREMEN ULTANT IS TO REVIEW ON-SITE CONDITIONS AFTER EXCAVATION PRIOR TO P 'S AND LANDSCAPE ARCHITECT'S DRAWINGS FOR BUILDING AND HARDSURFA	NTS. THE LACEMENT OF THE
	CONTINUATIO	11.	PREPARED BY NOVATE SAW CUT AND KEY GR STANDARDS (R10).	CING AND STORMWATER MANAGEMENT BRIEF(REPORT NO. R-2021-131, DATEI ECH ENGINEERING CONSULTANTS LTD. IND ASPHALT AT ALL ROAD CUTS AND ASPHALT TIE IN POINTS AS PER CITY O	
+	FOR	13.	INFORMATION SHOWN	VIDE THE CONSULTANT WITH A GENERAL PLAN OF SERVICES INDICATING ALL ON THIS PLAN. AS-BUILT INFORMATION MUST INCLUDE: PIPE MATERIAL, SIZE ATIONS, STRUCTURE LOCATIONS, VALVE AND HYDRANT LOCATIONS, T/WM EL 5, ETC.	S, LENGTHS, SLOPES,
		1.	SPECIFICATIONS: ITEM	SPEC. No. REFERENCE	
↓ + −	A R		SEWER TRENCH - BI COVER WITH M/ STORM SEWER	MANHOLE (1200Ø) 701.010 OPSD R 400.020 OPSD MH FRAME & COVER 401.010 OPSD EDDING (GRANULAR A) (GRANULAR A OR GRANULAR B TYPE I, AXIMUM PARTICLE SIZE=25mm) PVC DR 35	
		2.		PVC DR 35 PVC DR 35 (SAN/STM) THAT HAVE LESS THAN 1.5m COVER WITH 50mmX1200mm HI-40 INSU ETWEEN PIPE AND INSULATION.	JLATION. PROVIDE
		3. 4.	PIPE BEDDING, COVE	CONSTRUCTED TO 1.0m FROM FACE OF BUILDING AT A MINIMUM SLOPE OF 1 R AND BACKFILL ARE TO BE COMPACTED TO AT LEAST 95% OF THE STANDAR SE OF CLEAR CRUSHED STONE AS A BEDDING LAYER SHALL NOT BE PERMITT	D PROCTOR MAXIMUM
Û		5. 6.	POSITIVE SEAL AND D	ONS ARE REQUIRED FOR CONNECTING PIPES TO MANHOLES (FOR EXAMPLE FOURASEAL). THE CONCRETE CRADLE FOR THE PIPE CAN BE ELIMINATED. EQUIRE THAT THE SITE SERVICING CONTRACTOR PERFORM FIELD TESTS FOR	R QUALITY CONTROL
		7.	410.07.16.04 AND 407.0 CONNECTION TO THE CERTIFIED PROFESSI	WERS. LEAKAGE TESTING SHALL BE COMPLETED IN ACCORDANCE WITH OPS 07.24. DYE TESTING IS TO BE COMPLETED ON ALL SANITARY SERVICES TO CO SANITARY SEWER MAIN. THE FIELD TESTS SHALL BE PERFORMED IN THE PR ONAL ENGINEER WHO SHALL SUBMIT A CERTIFIED COPY OF THE TEST RESU ND CBMHS ARE TO HAVE 300mm SUMPS UNLESS OTHERWISE INDICATED.	NFIRM PROPER ESENCE OF A
1	PROPOSED VRTUAL -	8.		EVISE (CCTV) ALL PROPOSED SEWERS, 200mmØ OR GREATER PRIOR TO BAS OF CONTRACT, THE CONTRACTOR IS RESPONSIBLE TO FLUSH AND CLEAN ALL	
	PARATION				
				LOCATION CITY of OTTAWA BROOKSTREET APARTMENTS	
	Engineers Suite 200	, Plan ), 24( a, On	ATECH ners & Landscape Architect Michael Cowpland Driv tario, Canada K2M 1P6 (613) 254-964 (613) 254-586 www.novatech-eng.cor	<sup>s</sup> e 3 7 7 BRAINAGE AREA PLAN	PROJECT No. 120202-00 REV REV 1 DRAWING No.
					120202-STM1 PLANA1.DWG - 841mmx594mm





## APPENDIX C Sanitary Sewer Design Sheet

#### SANITARY TRUNK SEWER **Sanitary Sewer Design Sheet Brookstreet Apartments**



CAPACITY

(L/s)

43.87

35.64

34.54

33.41

FULL FLOW

VELOCITY

(m/s)

0.87

0.70

0.68

0.66

PROPOSED SEWER

GRADE %

0.50

0.33

0.31

0.29

TYPE OF

PIPE

PVC

PVC

PVC

PVC

PEAK DESIGN FLOW

Q (d) (L/s)

2.61

2.61

3.67

3.67

LENGTH

(m)

25.4

55.1

60.3

68.0

PIPE SIZE

(mm)

250

250

250

250

DATE: Sept. 23, 2021

120202

GMAC

PROJECT

DESIGNED BY:

	LOCATION			INDIV	IDUAL	CUMUL	ATIVE	PEAK FLOWS			
	AREA	FROM MH	то мн	FLOW RATE (L/s)	Infiltration Area (ha)	FLOW RATE (L/s)	Infiltration Area (ha)	PEAK FACTOR M	PEAK FLOW Q (p) (L/s)	PEAK EXTRAN.FLOW Q(i) (L/s)	
	528 March Road Site	SAN MH 4	EX. SAN MH A	0.35	2.20	0.35	2.20	5.7	2.00	0.62	
	Legget Drive	EX. SAN MH A	EX. SAN MH B	0.00	0.00	0.35	2.20	5.7	2.00	0.62	
	Legget Drive (Newbridge)	EX. SAN MH	EX. SAN MH C	1.69	4.05	1.69	4.05	1.5	2.54	1.13	
	Legget Drive	EX. SAN MH C	EX. SAN MH B	0.00	0.00	1.69	4.05	1.5	2.54	1.13	
*	Legget Drive	EX. SAN MH B	SAN MH 3	0.00	0.00	2.04	6.25	1.5	3.06	1.75	
	KRP Site	SAN MH 3	SAN MH 2	0.00	0.00	2.04	6.25	1.5	3.06	1.75	
	KRP Site	SAN MH 2	SAN MH 1	0.00	0.00	2.04	6.25	1.5	3.06	1.75	
	KRP Site	SAN MH 1	EX. SAN MH D	0.00	0.00	2.04	6.25	1.5	3.06	1.75	

**	Legget Drive	EX. SAN MH B	SAN MH 3	0.00	0.00	2.04	6.25	1.5	3.06	1.75	4.81	26.7	250	PVC	0.25	31.02	0.61
*	KRP Site	SAN MH 3	SAN MH 2	0.00	0.00	2.04	6.25	1.5	3.06	1.75	4.81	50.4	250	PVC	0.50	43.87	0.87
*	KRP Site	SAN MH 2	SAN MH 1	0.00	0.00	2.04	6.25	1.5	3.06	1.75	4.81	44.0	250	PVC	0.50	43.87	0.87
*	KRP Site	SAN MH 1	EX. SAN MH D	0.00	0.00	2.04	6.25	1.5	3.06	1.75	4.81	9.1	250	PVC	1.00	62.04	1.22
	KRP Site (Tower C)	TOWER C	EX. SAN MH D	0.96	1.23	0.96	1.23	1.5	1.44	0.34	1.79	114.3	250	PVC	0.40	39.24	0.77
*	KRP Site	EX. SAN MH D	EX. SAN MH E	0.00	0.00	3.00	7.48	1.5	4.50	2.09	6.60	9.5	250	PVC	1.00	62.04	1.22
*	KRP Site	EX. SAN MH E	EX. SAN MH F	0.00	0.00	3.00	7.48	1.5	4.50	2.09	6.60	48.1	250	PVC	0.67	50.78	1.00
	KRP Site (Tower D)	TOWER D	EX. SAN MH F	0.96	3.37	0.96	3.37	1.5	1.44	0.94	2.39	34.0	200	PVC	1.30	39.01	1.20
*	KRP Site	EX. SAN MH F	EX. SAN MH G	0.00	0.00	3.96	10.85	1.5	5.95	3.04	8.98	61.9	250	PVC	0.35	36.70	0.72
†	KRP Site (Brookstreet Hotel)	HOTEL	EX. SAN MH G	2.21	4.49	2.21	4.49	1.5 - 4.0	7.07	1.26	8.33	22.0	200	PVC	0.90	32.46	1.00
*	KRP Site	EX. SAN MH G	EX. SAN MH H	0.00	0.00	6.17	15.34	1.5	9.26	4.30	13.56	21.0	250	PVC	0.38	38.24	0.75
	KRP Site (Parking Structure)	PRKG STRUCT	EX. SAN MH H	0.30	1.28	0.30	1.28	1.5	0.45	0.36	0.81	91.1	250	PVC	0.40	39.24	0.77
*	KRP Site	EX. SAN MH H	EX. SAN MH I	0.00	0.00	6.47	16.62	1.5	9.71	4.65	14.36	88.9	250	PVC	0.38	38.24	0.75
*	KRP Site	EX. SAN MH I	EX. 750 TRUNK	0.00	0.00	6.47	16.62	1.5	9.71	4.65	14.36	100.1	250	PVC	0.52	44.74	0.88
	Brookstreet Apartments	EX SAN MH1	EX 750 TRUNK						4.94	0.17	19.47	100.1	250	PVC	0.52	44.74	0.88

Notes: 1. Q(d) = Q(p) + Q(i), where

 $\begin{array}{l} Q(d) = \text{Design Flow (L/sec)} \\ Q(p) = \text{Population Flow (L/sec)} \\ Q(i) = \text{Extraneous Flow (L/sec)} \end{array}$ 

2. Q(i) = 0.28 L/sec/ha

Daily Sewage Flow from Office Towers = 75 L/person/day (Appendix 4-A, Ottawa Sewer Design Guidelines)

4. Commercial Peaking Factor = 1.5 (Figure 4.3 Ottawa Sewer Design Guidelines)

5. Refer to Sanitary Drainage Area Plan (114060-SAN, C200) for details of drainage areas

6. Refer to the 'Sanitary and Storm Sewer Design Brief' for a breakdown of Daily Sewage Flow components and applicable peaking factors from the Brookstreet Hotel

\* Denotes sewers applicable to this MOE ECA appplication. All other sewers shown on this design sheet are private sewers tributary to the sanitary trunk sewer under application for MOE approval and/or have MOE approval under an existing C of A.

An existing C of A covers the sanitary stub from SAN MH B north approx. 16.1m to the existing can. The 10.7m of proposed sever from the cap to SAN MH 3 is applicable to the new MOE ECA application.
 Total peak sanitary flow from hotel site = 8.33 L/s, including Extraneous Flows (Also refer to Note 6 above for further details)

#### SANITARY TRUNK SEWER Sanitary Sewer Design Sheet



PROJECT : DESIGNED BY: 114060

SM/FST

25-Sep-14

FST

CHECKED BY: DATE:

	LOCATION			INDIVIDUAL CUMULATIVE			PEAK FLOWS				PROPOSED SEWER						
	AREA	FROM MH	то мн	FLOW RATE (L/s)	Infiltration Area (ha)	FLOW RATE (L/s)	Infiltration Area (ha)	PEAK FACTOR M	PEAK FLOW Q (p) (L/s)	PEAK EXTRAN.FLOW Q(i) (L/s)	PEAK DESIGN FLOW Q (d) (L/s)	LENGTH (m)	PIPE SIZE (mm)	TYPE OF PIPE	GRADE %	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)
	528 March Road Site	SAN MH 4	EX. SAN MH A	0.35	2.20	0.35	2.20	5.7	2.00	0.62	2.61	25.4	250	PVC	0.50	43.87	0.87
	Legget Drive	EX. SAN MH A	EX. SAN MH B	0.00	0.00	0.35	2.20	5.7	2.00	0.62	2.61	55.1	250	PVC	0.33	35.64	0.70
	Legget Drive (Newbridge)	EX. SAN MH	EX. SAN MH C	1.69	4.05	1.69	4.05	1.5	2.54	1.13	3.67	60.3	250	PVC	0.31	34.54	0.68
	Legget Drive	EX. SAN MH C	EX. SAN MH B	0.00	0.00	1.69	4.05	1.5	2.54	1.13	3.67	68.0	250	PVC	0.29	33.41	0.66
**	Legget Drive	EX. SAN MH B	SAN MH 3	0.00	0.00	2.04	6.25	1.5	3.06	1.75	4.81	26.7	250	PVC	0.25	31.02	0.61
*	KRP Site	SAN MH 3	SAN MH 2	0.00	0.00	2.04	6.25	1.5	3.06	1.75	4.81	50.4	250	PVC	0.50	43.87	0.87
*	KRP Site	SAN MH 2	SAN MH 1	0.00	0.00	2.04	6.25	1.5	3.06	1.75	4.81	44.0	250	PVC	0.50	43.87	0.87
*	KRP Site	SAN MH 1	EX. SAN MH D	0.00	0.00	2.04	6.25	1.5	3.06	1.75	4.81	9.1	250	PVC	1.00	62.04	1.22
	KRP Site (Tower C)	TOWER C	EX. SAN MH D	0.96	1.23	0.96	1.23	1.5	1.44	0.34	1.79	114.3	250	PVC	0.40	39.24	0.77
*	KRP Site	EX. SAN MH D	EX. SAN MH E	0.00	0.00	3.00	7.48	1.5	4.50	2.09	6.60	9.5	250	PVC	1.00	62.04	1.22
*	KRP Site	EX. SAN MH E	EX. SAN MH F	0.00	0.00	3.00	7.48	1.5	4.50	2.09	6.60	48.1	250	PVC	0.67	50.78	1.00
	KRP Site (Tower D)	TOWER D	EX. SAN MH F	0.96	3.37	0.96	3.37	1.5	1.44	0.94	2.39	34.0	200	PVC	1.30	39.01	1.20
*	KRP Site	EX. SAN MH F	EX. SAN MH G	0.00	0.00	3.96	10.85	1.5	5.95	3.04	8.98	61.9	250	PVC	0.35	36.70	0.72
t	KRP Site (Brookstreet Hotel)	HOTEL	EX. SAN MH G	2.21	4.49	2.21	4.49	1.5 - 4.0	7.07	1.26	8.33	22.0	200	PVC	0.90	32.46	1.00
*	KRP Site	EX. SAN MH G	EX. SAN MH H	0.00	0.00	6.17	15.34	1.5	9.26	4.30	13.56	21.0	250	PVC	0.38	38.24	0.75
	KRP Site (Parking Structure)	PRKG STRUCT	EX. SAN MH H	0.00	1.28	0.00	1.28	1.5	0.00	0.36	0.36	91.1	250	PVC	0.40	39.24	0.77
*	KRP Site	EX. SAN MH H	EX. SAN MH I	0.00	0.00	6.17	16.62	1.5	9.26	4.65	13.91	88.9	250	PVC	0.38	38.24	0.75
*	KRP Site	-	EX. 750 TRUNK		0.00	6.17	16.62	1.5	9.26	4.65	13.91	100.1	250	PVC	0.52	44.74	0.88
				0.00	0.00	0.17	10.02	1.5	5.20	4.05	10.91	100.1	2.50	1.40	0.52	77./4	0.00

Notes: 1. Q(d) = Q(p) + Q(i), where

Q(d) = Design Flow (L/sec) Q(p) = Population Flow (L/sec) Q(i) = Extraneous Flow (L/sec)

2. Q(i) = 0.28 L/sec/ha

3. Daily Sewage Flow from Office Towers = 75 L/person/day (Appendix 4-A, Ottawa Sewer Design Guidelines)

4. Commercial Peaking Factor = 1.5 (Figure 4.3 Ottawa Sewer Design Guidelines)

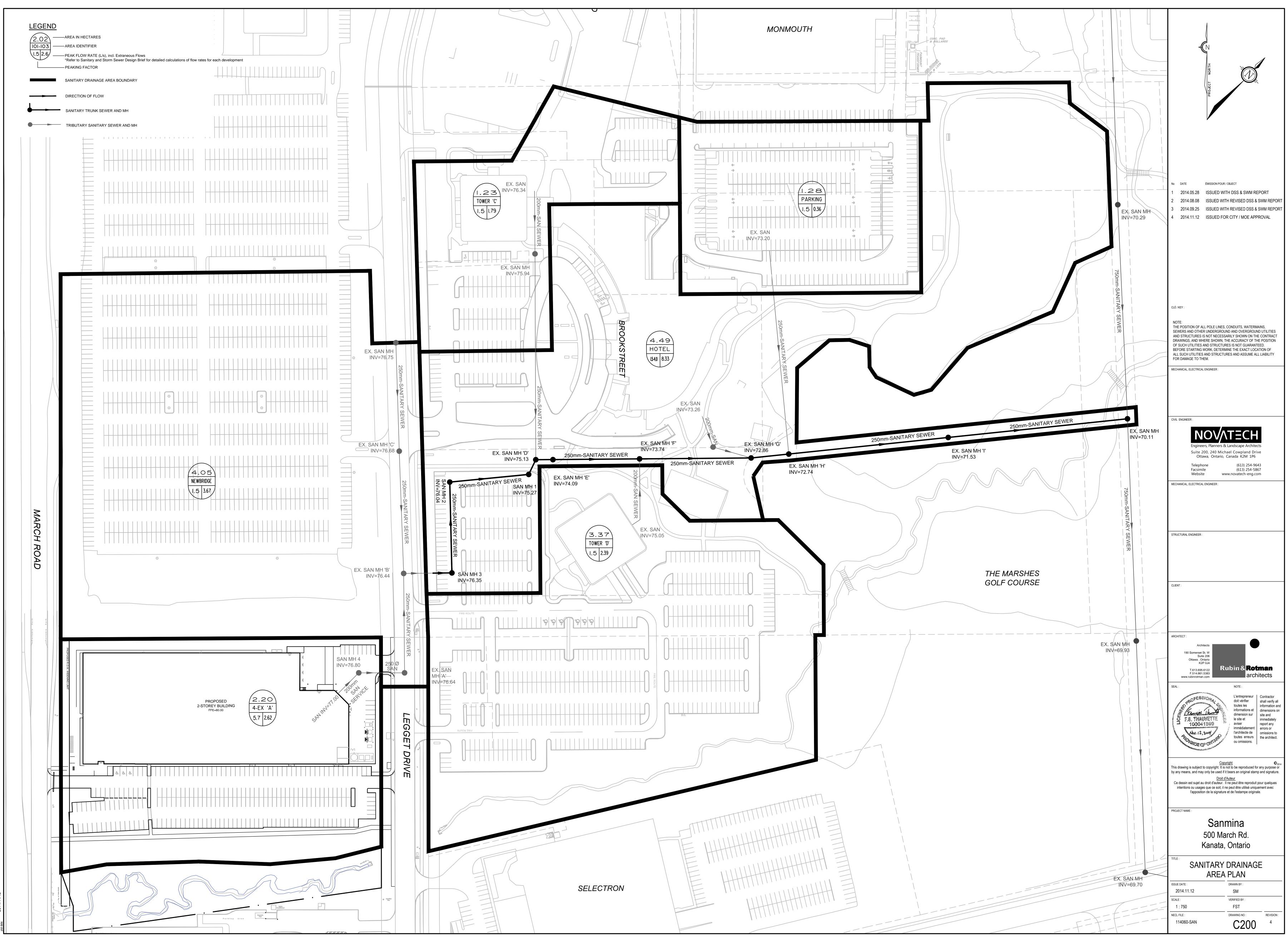
5. Refer to Sanitary Drainage Area Plan (114060-SAN, C200) for details of drainage areas

6. Refer to the 'Sanitary and Storm Sewer Design Brief' for a breakdown of Daily Sewage Flow components and applicable peaking factors from the Brookstreet Hotel

\* Denotes sewers applicable to this MOE ECA appplication. All other sewers shown on this design sheet are private sewers tributary to the sanitary trunk sewer under application for MOE approval and/or have MOE approval under an existing C of A.

\*\* An existing C of A covers the sanitary stub from SAN MH B north approx. 16.1m to the existing cap. The 10.7m of proposed sewer from the cap to SAN MH 3 is applicable to the new MOE ECA application.

+ Total peak sanitary flow from hotel site = 8.33 L/s, including Extraneous Flows (Also refer to Note 6 above for further details)



14060\CAD\DESIGN\114060-SAN 399/ 2014/11/12

## **APPENDIX D** Fire Demand per FUS

# **FUS - Fire Flow Calculations**

As per 1999 Fire Underwriter's Survey Guidelines

Novatech Project #: 120202 Project Name: Brookstreet Appartments Date: 9/15/2021 Input By: Jazmine Gauthier Reviewed By: Greg MacDonald



Engineers, Planners & Landscape Architects

Legend

Input by User No Information or Input Required

Building Description: 31 story building (incl. 4 story podium) Fire Resistive Construction

Step			Choose		Value Used	Total Fire Flow (L/min)
		Base Fire Flo	w			
	Construction Ma	Mult	iplier			
1	Coefficient related to type of construction	Wood frame Ordinary construction Non-combustible construction	inary construction construction 0.8		0.6	
	С	Modified Fire resistive construction (2 hrs) Fire resistive construction (> 3 hrs)	Yes	0.6 0.6		
	Floor Area					
2	A	Podium Level Footprint (m²)         Total Floors/Storeys (Podium)         Tower Footprint (m²)         Total Floors/Storeys (Tower)         Protected Openings (1 hr)	1536 4 887 27 Yes			
		Area of structure considered (m <sup>2</sup> )			2,304	
	F	Base fire flow without reductions F = 220 C (A) <sup>0.5</sup>	-			6,000
	<u></u>	Reductions or Surc	harges			
	Occupancy haza	Reduction	Surcharge			
3	(1)	Non-combustible Limited combustible	Yes	-25% -15%	-15%	E 400
		Combustible Free burning Rapid burning		0% 15% 25%	-13%	5,100
	Sprinkler Reduc	tion		Redu	ction	
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	
4		Standard Water Supply Fully Supervised System	Yes Yes	-10% -10%	-10% -10%	-2,550
			Cun	nulative Total	-50%	
	Exposure Surch	arge (cumulative %)			Surcharge	
5	(3)	North Side East Side South Side West Side	0 - 3 m > 45.1m 20.1 - 30 m 0 - 3 m	ulative Total	25% 0% 10% 25%	3,060
		60%				
		Results				
6	(4) + (0) + (0)	Total Required Fire Flow, rounded to nea	n	L/min	6,000	
6	(1) + (2) + (3)	(2,000 L/min < Fire Flow < 45,000 L/min)		or or	L/s USGPM	<b>100</b> 1,585
7	Storage Volume	Required Duration of Fire Flow (hours)			Hours	2
		Required Volume of Fire Flow (m <sup>3</sup> )			m <sup>3</sup>	720

	FUS - Fire Flow Calculations - User Guide - Fire Resistive									
	Novatech Project #: 120202 Project Name: Brookstreet Appartments Date: 9/15/2021 Input By: Jazmine Gauthier Reviewed By: Greg MacDonald	the notes below as a guide when completing the FUS Fire tions oubt, confirm construction material, firewalls, etc. with ner oubt, err on conservative side								
	Note: This form only applies for Fire Resistive									
	Enter a description of the building or unit being cons <b>Base Fire Flow</b> <b>Construction Material</b> Does not apply for this form Does not apply for this form	dered, i.e. use/most stringent condition/address           Summary           Construction Type         Fire Resistive Construct           Floor Area Considered         2,304 m²           Occupancy Reduction         -15%           Sprinkler Reduction         -50%           Exposure Surcharge         60%           Total Fire Flow         6,000 L/m								
1	Does not apply for this form Only Use if can be confirmed with client/architect (IS Only Use if can be confirmed with client/architect (IS	Date: Name:								
2	Floor Area       Signature:         If considered gross floor area, then enter 1 floor/storey. If Fire wall, then reduce footprint accordingly.       Un-Protected         In-Protected       8 = number of floors above first 2, up to max of 10 floors total         Protected       2 = number of additional immediately adjoining floors to be considered, up to 2         Do vertical openings have minimum 1 hour rating between floors? Confirm this with the architect.         For unprotected openings scenario only, can be mix of podium and tower									
	Reductions or Surcharges									
3	Occupancy hazard reduction or surcharge         Residential - with no garage         Residential - with garage         General Commercial - Generally, no reduction         Check usage with FUS         Check usage with FUS									
4	Sprinkler Reduction Only Use if can be confirmed with client/architect Only Use if can be confirmed with client/architect Only Use if can be confirmed with client/architect									
5	Exposure Surcharge (cumulative %) For Fire walls: FUS considers a Fire wall to have a minimum 2 hour rating per NBC.									
	Results									
6	NOTE: Refer to City Technical Bulletin ISDTB-2014-02 for additional considerations to cap this value at 10,000L/min									
	If IGPM is needed, divide USGPM by 1.20095									
7	For Rural areas, or where required									