REPORT
PROJECT: 135853-5.2.2

SITE SERVICING & STORMWATER MANAGEMENT DESIGN BRIEF
SOUTH KEYS MALL
SOUTH PHASE - PHASE 1
2200 BANK STREET
CITY OF OTTAWA

Prepared for SmartCentres Real Estate Investment Trust
by IBI Group

OCTOBER 28, 2021

Table of Contents

List of Appendices

1 INTRODUCTION

1.1 Scope

IBI Group has been retained by SmartCentres Real Estate Investment Trust (REIT) on behalf of the Joint Venture Applicant, Calloway REIT (South Keys) Inc. and Canadian Property Holdings (South Keys) Inc. to undertake the suite of civil engineering documents needed in support of a Site Plan Control application and a Zoning By-Law Amendment application for a proposed high rise residential development to be located at 2200 Bank Street, Ottawa. This report will contain the following documents: A Site Servicing Plan; a Grading and Drainage Plan; a Stormwater Management Plan; a Site Servicing Plan; a Water Hydraulic Assessment and an Erosion and Sedimentation Control Plan.

This report will present a detailed servicing scheme to support the development including sections on water supply, wastewater collection and disposal and management of stormwater. This brief will also demonstrate the adequacy of the municipal services needed to support the ultimate development of the site. This report has been prepared in accordance with the current Servicing Study Guidelines for development applications in the City of Ottawa.

1.2 Subject Property

The proposed development is located in the South Keys Shopping Centre. The site is bounded by Daze Street to the east, existing commercial, including a Walmart outlet, to the north, a transit station to the west and a parking lot to the south. The ultimate Master Plan will include up to eight high rise buildings to be constructed in four phases. The total property covers 3.34 ha and Phase 1 which covers an area of 1.80 ha also includes an area called Transit Plaza. It is the intention that in time, ownership of that area be transferred to the City of Ottawa. **Figure 1** shows the ultimate buildout Master Plan and **Figure 2** shows the Phase 1 plan.

The subject site is currently a commercial area supported with surface parking. The site is presently improved with three retail outlets, a Cineplex movie theatre and a Montana's Steak House restaurant.

Phase 1 will include the removal of the three retail outlets adjacent to the cinema and construction of two high rise towers, 21 storeys in height. Phase 1 will include about 446 units and abut 460m^2 of ground flow retail space. Parking will be accommodated in a 6 storey podium.

1.3 Existing Conditions

As noted earlier, the subject property consists of retail outlets, a cinema and a restaurant. All parking is accommodated on a surface lot. **Figure 3** shows the location of existing major infrastructure including watermains, sanitary and storm sewers. Access to the site is available from one of three locations from Daze Street.

Water is provided to the site from the existing 300 mm main on Daze Street. There are existing 150, 200 and 300 mm mains to the north side of the site that connects to the Daze mains.

The existing sanitary outlet for the site includes a 250 mm dia pipe that runs west to east along the Transit Plaza area which in turn discharges into a 375 mm dia sanitary sewer located north west of the property. Two existing sanitary sewers connect to this outlet sewer; a 150 mm dia pipe which services the restaurant and a 250 mm dia pipe provides service to the retail outlets and the movie theatre.

All storm sewers on the site drain towards a 1200 x 3000 concrete culvert which is located in the future Transit Plaza. That trunk sewer eventually discharges into the Sawmill Creek Stormwater Facility. Similar to the sanitary sewer system, two storm sewers service the existing developments; a 250 mm dia storm sewer collects runoff from the restaurant and surrounding parking lot and a series of storm sewers ranging in size from 375 mm dia to 525 mm dia service the balance of the stie. The latter storm sewer system also provides an outlet for a portion of an office building site located to the south of the subject site. The existing parking lot is fitted with a number of catchbasins which connect to the two local storm sewers.

1.4 Phasing

As noted above, the Owner proposes to re-develop the site in four phases. Phase 1 will include two-21 storey towers joined by a 6-storey podium. Phase 1 will also include two roadway connections to Daze Street, one on either side of the Montana Steakhouse restaurant. The one to the north, and adjacent to the Transit Plaza, will be a new connection to Daze Street including a right-in, right-out operation. The second, located to the south of the restaurant, will replace an existing driveway which presently provides a “3/4” movement entrance.
The Phase 1 development will also include provision of modified parking lots for the restaurant and movie theatre. Development of the new driveways will include removal of about 100 parking spaces but will leave sufficient parking for both the restaurant and theatres. Phase 1 is expected to be fully occupied by 2026 and full build out of the Master Plan in about 15 years after Phase 1.

1.5 Pre-Consultation

There was a pre-consultation meeting with the City of Ottawa on June 10, 2021 to discuss development of the subject property. A copy of the meeting notes is included in **Appendix A**. Among other things, some of the items discussed were as follows:

- Official Plan
- Zoning Information
- Infrastructure
- Planning
- Urban Design
- Parks
- Trees
- Environment
- Conservation Authority
- Transportation
- OC Transpo

1.6 Phasing

A geotechnical report “Proposed Multi-Storey Buildings, South Keys Redevelopment – Phase 1, 2210 Bank Street, Ottawa, Ontario” dated September 13, 2021, has been prepared by Paterson Group for Phase 1.

The objective of the investigation was to prepare a report to:

- Determine the subsoil and groundwater conditions at the site by means of test pits and boreholes and;
- To provide geotechnical recommendations pertaining to design of the proposed development including construction considerations.

The report recommendations were based on the findings and observations from several boreholes and test pits. Among other items, the report recommendations deal with:

- Site Grading
- Foundations Design, including Rock Anchors
- Pavement Structure
- Sewer and Watermain Construction
- Groundwater Control
- Grade Raises
- Design of Earthquakes
- Basement Wall
- Winter Construction
- Corrosion Potential and Sulphate

The report confirmed that the site consists mostly of brown silty sand over a layer of vey stiff to stiff silty clay up to 4.5 m deep. Underlying the silty clay deposit below approximate depths of 9 m to 12 m, interbedded layers of compact to dense sandy silt, silty sand and/or firm to stiff silty clay were encountered. Practical refusal of the DCPT's were encountered at depths ranging from 25.1 m to 29.4 m below the existing ground surface.

1.7 Watercourses and Setbacks

There are no watercourses on the subject property, so developments will not be subject to setback distances.

1.8 Existing Private Services

It is unlikely there are any private wells or septic systems on an adjacent to the subject property. The site and surrounding properties are likely serviced from the City's central water supply.

2 WATER SUPPLY

2.1 Existing Conditions

As stated in Section 1.3 there is an existing 300 mm watermain on Daze Street and there are 150, 200 and 300 mm watermains north of the site that connects to the 300 mm on Daze Street. A connection to the Daze Street watermain and a connection to the existing mains north of the site will provide a looped system.

2.2 Design Criteria

2.2.1 Water Demands

Water demands are based on Table 4.2 - Consumption Rates for Subdivisions of 501 to 3,000 persons of the Ottawa Design Guidelines – Water Distribution. Water demands have been calculated for the Phase 1 which consists of 446 apartment units, calculations are also provided for the ultimate buildout which contains three additional residential buildings. A watermain demand calculation sheet is included in **Appendix B** and the total water demands are summarized as follows:

	Phase 1	**Ultimate**
Average Day	2.60 l/s	9.98 l/s
Maximum Day	6.50 l/s	24.93 l/s
Peak Hour	14.31 l/s	54.86 l/s

2.2.2 System Pressure

The 2010 City of Ottawa Water Distribution Guidelines states that the preferred practice for design of a new distribution system is to have normal operating pressures range between 345 kPa (50 psi) and 552 kPa (80 psi) under maximum daily flow conditions. Other pressure criteria identified in the guidelines are as follows:

Minimum Pressure	Minimum system pressure under peak hour demand conditions shall not be less than 276 kPa (40 psi)
Fire Flow	During the period of maximum day demand, the system pressure shall not be less than 140 kPa (20 psi) during a fire flow event.
Maximum Pressure	Maximum pressure at any point in the distribution system shall not exceed 689 kPa (100 psi). In accordance with the Ontario Building/Plumbing Code, the maximum pressure should not exceed 552 kPa (80 psi). Pressure reduction controls may be required for buildings where it is not possible/feasible to maintain the system pressure below 552 kPa.

2.2.3 Fire Flow Rate

A fire flow rate for the Phase 1 building has been calculated with the Fire Underwriters Survey (FUS). A flow rate of 8,000 l/min (133 l/s) has been determined, it is expected that the future buildings will have a similar fire flow rate. A copy of the FUS calculation is included in **Appendix B**.

2.2.4 Boundary Conditions

The City of Ottawa has provided a hydraulic boundary condition at the proposed connection to the 300 mm main on Daze Street. The boundary condition is based on the water demand and fire flow rates provided and a separate boundary condition is provided for the ultimate buildout scenario. The minimum HGL and max day plus fire elevations for the ultimate scenario is used in the model as they represent the worst case, for the maximum HGL the Phase 1 value is used as it is higher than the ultimate. A copy of the boundary conditions is included in **Appendix B** and are summarized as follows:

BOUNDARY CONDITIONS		
SCENARIO	HGL (m) PHASE 1	ULTIMATE
Minimum HGL	118.1	117.2
Maximum HGL	126.0	125.2
Max Day + Fire Flow (133 l/s)	114.5	113.1

2.2.5 Hydraulic Model

A computer model for the phase 1 development has been developed using the InfoWater program. The model incorporates the boundary condition provided by the City and is run for basic day (maximum HGL), peak hour (minimum HGL) and max day plus fire which evaluates the fire flows. Water demands for Phase 1 has been applied to Node J16 in the model, Node J12 has Phase 2 and 3 water demands while Node J14 has the Phase 4 demands. A schematic of the water model is included in **Appendix B**.

2.3 Proposed Water Plan

The hydraulic water model was run for the ultimate development for minimum pressure and fire flows and for Phase 1 for maximum HGL. Results of the hydraulic model are included in **Appendix B** and summarized as follows:

SCENARIO	RESULTS
Basic Day Pressure (Max HGL) kPa	355.4-367.3
Peak Hour Pressure (Min HGL) kPa	261.8-275.0
Max Day & Fire (133 l/s) Residual Pressure kPa	146.1-186.9

Maximum Pressure	Under the Phase 1 and ultimate scenarios, the pressures are below 552 kPa (80 psi) therefore pressure reducing control is not required for this development.
Minimum Pressure	The minimum pressure at surface level is slightly below the requirement of 276 kPa (40 psi). At Node J16 which is the location of the water service to Phase 1, the pressure under the ultimate scenario is 266.7 kPa and is 275.4 kPa under the Phase 1 scenario.

	While these pressures do not reach the minimum requirement the building will be serviced by booster pumps due to the height so the pressure will be increased for the residences.
Fire Flow	The residual pressure for all nodes on site are all above the minimum of 140 kPa (20 psi) during the fire flow event in the ultimate scenario.

3 WASTEWATER DISPOSAL

3.1 Existing Conditions

The site is presently serviced with two sanitary sewers; a 150 mm dia pipe that services the Montana restaurant and a 250 mm dia sewer that services the three retail outlets and the Cineplex theatres. Neither of these sewers is over sized for upstream properties. Both the sewers outlet to a 250 mm sanitary sewer located in the Transit Plaza area which in turn outlets to a 375 mm dia sanitary sewer that runs northward in front of the Walmart building.

3.2 Design Criteria

The proposed sanitary sewers for the subject site will be based on the City of Ottawa design criteria. It should be noted that the sanitary sewer design for this study incorporates the latest City of Ottawa design parameters identified in Technical Bulletin ISTB-2018-01. Our analysis is threefold; flow calculation for existing conditions and flow calculations for the interim condition (Phase 1) and flow calculation for the ultimate Master Plan. The following criteria was used in our calculations.

- Minimum Velocity — 0.6 m/s
- Maximum Velocity — 3.0 m/s
- Manning Roughness Coefficient — 0.013
- Total # residential of units — 446 (Phase1)–1710 (Ultimate)
- Population Density — 1.9 ppu
- Residential Average Flow — 280 l/p/d
- Commercial/Institutional Average Flow — 28.000 l/gross Ha/d
- Residential Peaking Factor — Harmon Formula (max 4, min 2)
  K=0.8
- Commercial/Institutional Peaking Factor — 1.5 if ICI >20%
  1.0 if ICI in <20%
- Infiltration Allowance — 0.33 L/s/Ha
- Minimum Sewer Slopes - 200 mm diameter — 0.32%

A spreadsheet with the proposed Phase 1 and Master Plan (buildout) conditions and related drainage area plan are included in **Appendix C**.

Based on the Phase 1 analysis which assumes some of the site remains as commercial, there is plenty of spare capacity in the proposed sewer system. The existing 150 mm dia sewer which serves the restaurant has a spare capacity of 99% and the existing 250 mm dia pipe which will services the cinema and the Phase 1 towers will have a spare capacity of 91%. The 250 mm dia outlet sewer which collects wastewater from the total property, as well as the transit station, will have a spare capacity of about 74%. The flow from the transit station is considered negligible.

The second analysis for full buildout of the south Master Plan also indicates that the phase 1 and existing sewers will also have spare capacity. The Master Plan includes eight towers and

associated driveways. For this situation there will be only one 250 mm dia sanitary sewer for the site and all drainage areas will be residential with a total buildout of 1710 units and a total expected population of 3249.

The existing 250 mm dia sewer immediately north of building 1 will have a spare capacity of 73% and the downstream 250 mm dia sewer will have a spare capacity of 23%. Therefore, the existing downstream sanitary sewers have sufficient available capacity to provide an adequate outlet for both the Phase 1 development and full buildout of the south Master Plan.

3.3 Sanitary Sewer Design

The proposed sanitary plan for Phase 1 is show as Drawing C-001 which is located in **Appendix C**. The existing 150 mm dia sanitary sewer serving the Montana's Steakhouse restaurant is proposed to remain. The existing sanitary sewer system which services the retail outlets and cinema is proposed to be modified. The latter system includes two sewer sections with 250 mm dia sewers. For Phase 1 it is proposed to leave some of the existing pipes near the cinema as is and replace the centre section in front of Phase 1 with a new relocated 250 mm dia pipe between MH's 6A and 4A. MH 4A is proposed to be located at the existing downstream 250 mm dia pipe. A 150 mm dia service connection will serve the new Phase 1 development.

4 STORMWATER MANAGEMENT

4.1 Existing Conditions

Figure 3 shows the location of major municipal infrastructure, including storm sewers, in the vicinity of the subject property. The existing storm sewer outlet for the property is an existing 1200 x 3000 box culvert located in the Transit Plaza. That culvert eventually empties into the downstream Sawmill Creek Stormwater Management Facility. There are two smaller storm sewers which collect runoff from the property and route the flows to the box culvert.

The smaller of these is a 250 mm dia sewer which serves the Montana restaurant and a nearby portion of the surface parking lot. The second is a sewer system ranging in size from 375 mm dia to 525 mm dia which serves the balance of the site including the retail outlets and the cinema. The latter sewer is also oversized for some runoff from the neighbouring development to the south of the subject site.

4.2 Design Criteria

The following design criteria was used to assess the capacity of the existing storm sewer system using the Rational Method.

- Design Storm 1:2-year return
- Initial Time of Concentration 10 minutes
- Runoff Coefficients 0.46 to 0.90
- Pipe Velocities 0.80 m/s to 3.0 m/s

Most of the site is assumed to have a runoff coefficient of 0.90 including buildings and parking lots. Based on the proposed Phase 1 plan, which includes some landscaped areas, runoff coefficient of some sub-drainage areas were adjusted to account for the landscaping. A copy of the runoff coefficients calculations for drainage areas 1, 2, 6, 8 and 10 are included in **Appendix D**.

Based on this criteria, an assessment was completed for Phase 1. A relevant drainage area plan and spreadsheet are included in **Appendix D**. The analysis uses the Rational Method to assess the ability of the proposed Phase 1 minor storm sewer system to adequately drain the site. The analysis includes a review of the Phase 1 system assuming uncontrolled flows and controlled flows.

For the uncontrolled situation the 250 mm dia sewer which services the restaurant has a spare capacity of 75%, while the larger 525 mm dia storm sewer has a spare capacity of 1.7%. However, as part of the Phase 1 development, flows tributary to the existing 525 mm dia storm sewer are proposed to be controlled as per City of Ottawa direction. The stormwater analysis, completed in Section 4.6.3, indicates that the Phase 1 flows will be controlled to 160 l/s. The uncontrolled flows in the same area, all areas except drainage areas 11 to 15 and MOVIES, is about 212 l/s or about 52 l/s less than the uncontrolled flows. In the latter situation, the existing 525 mm dia storm sewer will have a spare capacity of about 12.8%.

No further analysis was completed for the full buildout of the south Master Plan. It is reasonable to assume that with additional landscaped area and outlet controls, the flows under that condition will be less than those calculated for Phase 1.

4.3 Proposed Minor System

The proposed minor storm plan for Phase 1 is indicated on Drawing C-100. The existing 250 mm dia storm sewer servicing the restaurant and adjacent parking area is proposed to remain as is.

A portion of the 375/525 storm sewer adjacent to the Phase 1 development is proposed to be replaced. New storm sewers are proposed for the new driveways which connect to Daze Street. A 300 mm dia storm pipe will provide service for the Phase 1 building.

4.4 Stormwater Management

The subject site will be limited to a release rate the 5 year flow generated from the site using a C=0.50 (per pre-consult notes). This will be achieved through a combination of new inlet control devices (ICD's) at inlet locations and surface storage. Flows generated that are in excess of the site`s allowable release rate will be stored on site in strategic surface storage areas or by the use of building rooftop and or cistern storage and gradually released into the minor system so as not to surcharge the downstream sewers. The maximum surface retention depth of the re-developed areas will be limited to 300mm during a 1:100-year event. Overland flow routes will be provided in the grading and parking area design to permit emergency overland flow from the site.

At certain locations within the site, the opportunity to store runoff is limited due to grading constraints and building geometry. There were existing uncontrolled flows within the Phase 1 site limits prior to the proposed development, these are drainage areas 20, 18, 21, and 3 as shown on drainage area plan C-500 located in **Appendix D**. As these were existing, the flows generated were not subtracted from the site's allowable release rate. A new uncontrolled area, drainage area 10 was created, and this was subtracted from the allowable release rate. This new uncontrolled area is 0.12 hectares in total. Based on a 1:100-year storm, the uncontrolled area generates 40.21 l/s runoff (refer to Section 4.5 for calculation).

In the absence of the existing stormwater management report, we have assumed a flow control of 4 L/s for the existing Montana's building. Prior to site plan approval the presence of flow control roof drains will be confirmed. Furthermore, stormwater management practices for the existing Montana's parking lot are unknown and as such, new inlet control devices have been specified for those catchbasins.

Refer to the SWM calculations in **Appendix D** for further details, which have been summarized below.

4.5 Inlet Controls

The allowable release rate for the 1.50 Ha Phase 1 portion of the site can be calculated as follows:

$\mathbf{Q_{allowable}}$ = **2.78** x **C** x $\mathbf{i_{100yr}}$ x **A** where:

C = 0.50

$\mathbf{I_{5yr}}$ = Intensity of 5-year storm event (mm/hr)

= $998.071 \times (T_c + 6.053)^{0.814}$ = 76.87 mm/hr; where T_c = 10.00 minutes

A = Area = 1.50 Ha

= **217.24 L/s**

As noted in Section 4.4, a new portion of the site (drainage area 10) will be left to discharge to Daze Street and the minor system at an uncontrolled rate.

Based on a 1:100 year event, the flow from the 0.12 Ha uncontrolled area can be determined as:

$\mathbf{Q_{uncontrolled}}$ = **2.78** x **C** x $\mathbf{i_{100yr}}$ x **A** where:

C = Average runoff coefficient of uncontrolled area = 0.675 (increased by 25%)

$\mathbf{i_{100yr}}$ = Intensity of 100-year storm event (mm/hr)

$= 1735.688 \times (T_c + 6.014)^{0.820} = 178.56$ mm/hr; where $T_c = 10$ minutes

A = Uncontrolled Area = 0.12 Ha

Therefore, the uncontrolled release rate can be determined as:

$Q_{uncontrolled} = \mathbf{2.78} \times \mathbf{C} \times i_{100yr} \times \mathbf{A}$

$= 2.78 \times 0..675 \times 178.56 \times 0.12$

$= 40.\mathbf{21\ L/s}$

The maximum allowable release rate from the remainder of the site can then be determined as:

$Q_{max\ allowable} = Q_{restricted} - Q_{uncontrolled}$

$= 217.24\ L/s - 40.21\ L/s$

$= 177.\mathbf{03\ L/s}$

Based on the flow allowance at the various inlet locations, a combination of various sizes of inlet control devices (ICDs) were chosen in the design. The design of the inlet control devices is unique to each drainage area and is determined based on a number of factors, including hydraulic head and allowable release rate. The inlet control devices were sized according to the manufacturer's design charts. The restrictions will cause the on-site catchbasins and manholes to surcharge, generating surface ponding in the parking areas and/or in-line storage in the sewers. Ponding locations and elevations are summarized on the Ponding Plan 135853-C-600, and included in **Appendix E**.

4.6 On-Site Detention

Any excess storm water up to the 100-year event is to be stored on-site in order to not surcharge the downstream municipal storm sewer system. Detention will be provided in parking and vehicle access areas, building rooftops and cistern(s), where feasible. As previously noted, the volume of storage is dependent on the characteristics of each individual drainage area and the ICD's were chosen accordingly.

4.6.1 Site Inlet Control

With the exception of a new unrestricted area discharging direct to Daze Street, all parking and landscape areas will be have restricted flow to the storm sewer system.

The following Table summarizes the on-site storage requirements during both the 1:5-year and 1:100-year events.

ICD AREA	TRIBUTARY AREA	AVAILABLE STORAGE (M^3)	100-YEAR STORM		5-YEAR STORM	
			RESTRICTED FLOW (L/S)	REQUIRED STORAGE (M^3)	RESTRICTED FLOW (L/S)	REQUIRED STORAGE (M^3)
9	0.14	7.24	35	20.28	35	4.42
8	0.14	0	37	13.87	37	1.36
2	0.15	22.78	15	8.87	15	1.29
1	0.08	31.98	15	4.82	.15	0.39
4	0.06	13.0	10	12.24	10	3.57
5	0.07	0.46	6	21.08	6	7.77
7	0.08	18.0	12	17.55	12	5.40
6	0.16	53.46	11	51.16	11	15.89
Unrestricted	0.12					
TOTAL	**0.88**	**146.92**	**141**	**149.86**	**141**	**40.09**

In all instances the required storage is met with surface ponds which retain the stormwater and discharge at the restricted flow rate to the sewer system. Refer to the ponding plan in **Appendix E** for storage information.

4.6.2 Roof Inlet Controls

The existing building on-site have, and will maintain, roof inlet controls that help to control the amount of stormwater being released into the system. A cistern and or rooftop storage has been proposed to capture building runoff for the Phase 1 towers and associated podium area. A summary table on the drawing that indicates the proposed release rates. The restricted flow rates for the existing Montana's has been assumed and will need to be confirmed prior to final approval. Flow control from the proposed Phase 1 towers shall be confirmed with the mechanical consultant.

ICD AREA	TRIBUTARY AREA	100-YEAR STORM		5-YEAR STORM	
		RESTRICTED FLOW (L/S)	REQUIRED STORAGE (M^3)	RESTRICTED FLOW (L/S)	REQUIRED STORAGE (M^3)
Ex Montana's	0.07	4	25.15	4	10.02
Phase 1 Tower	0.40	15	167.57	15	70.47
TOTAL	**0.47**	**19**	**192.72**	**19**	**80.49**

4.6.3 Overall Release Rate

As demonstrated above, the site uses existing and new inlet control devices to restrict the 100 year storm event to the criteria set out in the pre-consult notes. Restricted stormwater will be contained onsite by utilizing surface ponding and building storage. In the 100 year event, there will be no overflow off-site from restricted areas.

The sum of restrictions on the site, rooftops and cistern is (141 l/s + 19 l/s) 160.0 l/s, which is less than the allowable release of 177.03 l/s noted in section 4.5.

4.7 Water Quality

The subject site is tributary to the existing Sawmill Creek Stormwater Management Facility (SWMF) which currently provides quality control for the stormwater flows from the existing lands. The proposed development will change some land use from vehicle parking areas to landscaped lands and building footprint, as such sediment loading on the SWMF should be less. Confirmation with the RVCA confirming the above is ongoing.

5 EROSION AND SEDIMENTATION CONTROL PLAN

During construction, existing stream and storm water conveyance systems can be exposed to significant sediment loadings. A number of construction techniques designed to reduce unnecessary construction sediment loadings may be used such as;

- The installation of straw bales within existing drainage features surrounding the site;
- Bulkhead barriers will be installed in the outlet pipes;
- Sediment capture filter socks will remain on open surface structures such as manholes and catchbasins until these structures are commissioned and put into use;
- Installation of silt fence, where applicable, around the perimeter of the proposed work area.

During construction of the services, any trench dewatering using pumps will be fitted with a “filter sock.” Thus, any pumped groundwater will be filtered prior to release to the existing surface runoff. The contractor will inspect and maintain the filter sock as needed including sediment removal and disposal.

All catchbasins, and to a lesser degree manholes, convey surface water to sewers. Consequently, until the surrounding surface has been completed these structures will be protected with a sediment capture filter sock to prevent sediment from entering the minor storm sewer system. These will stay in place and be maintained during construction and build-out until it is appropriate to remove them.

During construction of any development both imported and native soils are stockpiled. Mitigative measures and proper management to prevent these materials entering the sewer systems is needed.

During construction of the deeper watermains and sewers, imported granular bedding materials are temporarily stockpiled on site. These materials are however quickly used up and generally before any catchbasins are installed.

The Erosion and Sedimentation Control Plan 135853-C-900 is included in **Appendix E**.

6 GRADING AND DRAINAGE PLAN

The proposed Grading and Drainage Plan is shown on drawing 1135853-C-200 which is included in **Appendix F**. The Plan provides details of how the development ties into adjacent properties including Daze Street and the Transit Plaza. The plan indicates that much of the existing parking lot will remain to service the cinema and restaurant. Some modest changes to the existing parking lot are proposed west of the restaurant to ensure positive drainage to two proposed parking lot catchbasins.

The plan is designed to route major flow towards Daze Street and safely away from the site. The new driveway has been designed where possible to maximize on-site parking in order to minimize site runoff.

7 APPROVALS AND PERMIT REQUIREMENTS

7.1 City of Ottawa

The City of Ottawa reviews all development documents including this report and working drawings. Upon completion, the City will approve the local watermains, under Permit No. 008-202, submit the sewer ECA application to the province and eventually issue a Commence Work Notification.

7.2 Existing Conditions

The Ministry of Environment, Conservation, and Parks (MECP) will approve the local sewers under Section 53 of the Ontario Water Resources Act and issue an Environmental Compliance Approval. The MECP may also have to issue a Permit To Take Water.

7.3 Conservation Authority

The Rideau Valley Conservation has been contacted to discuss quality treatment of surface runoff. IBI Group will follow up with the agency.

8 CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusions

This report and the accompanying working drawings clearly indicate that the proposed development meets the requirements of the stakeholder regulators, including the City of Ottawa, provincial MECP and RVCA. The proposed development is in general conformance with the City of Ottawa design guidelines.

Downstream sanitary sewers were designed with the proposed development area included. There is a reliable water supply available adjacent to the proposed development and the Owner will be required to detail stormwater on site to ensure the existing downstream storm sewers are not surcharged.

8.2 Recommendations

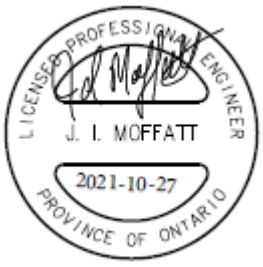
It is recommended that the regulators review this submission with an aim of providing the requisite approvals to permit the owners to proceed to the construction stage of the subject site.

In summary, this report demonstrates that Phase 2 of the proposed 2280 City Park Drive redevelopment and ultimate re-developments can be serviced by the adjacent existing municipal infrastructure. All municipal infrastructure designs have been done in conformance with current City of Ottawa guidelines.

Based on the information provided herein, the development can be serviced to meet City of Ottawa requirements.

Prepared by:

IBI GROUP

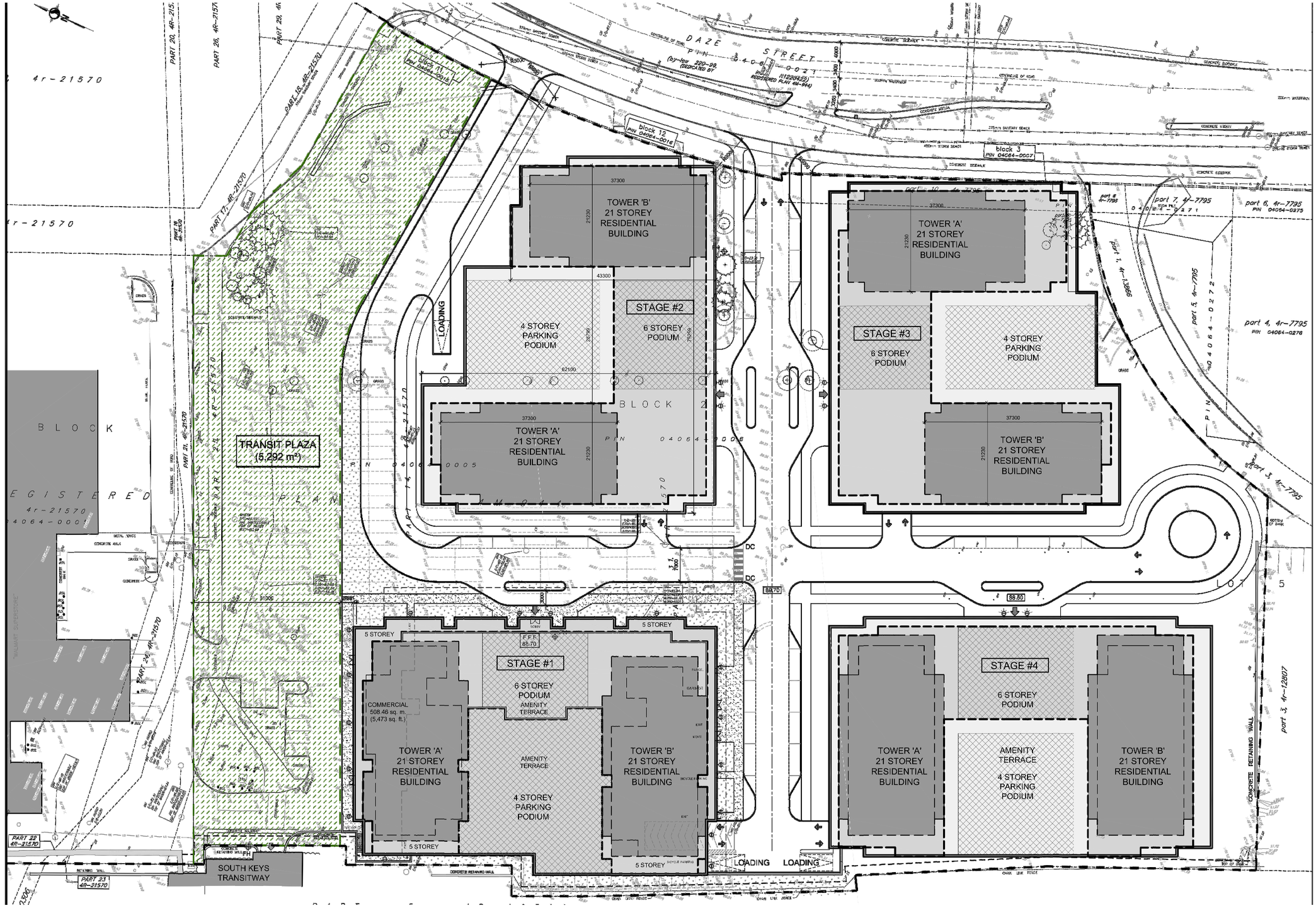


James I. Moffatt, P. Eng.

Associate

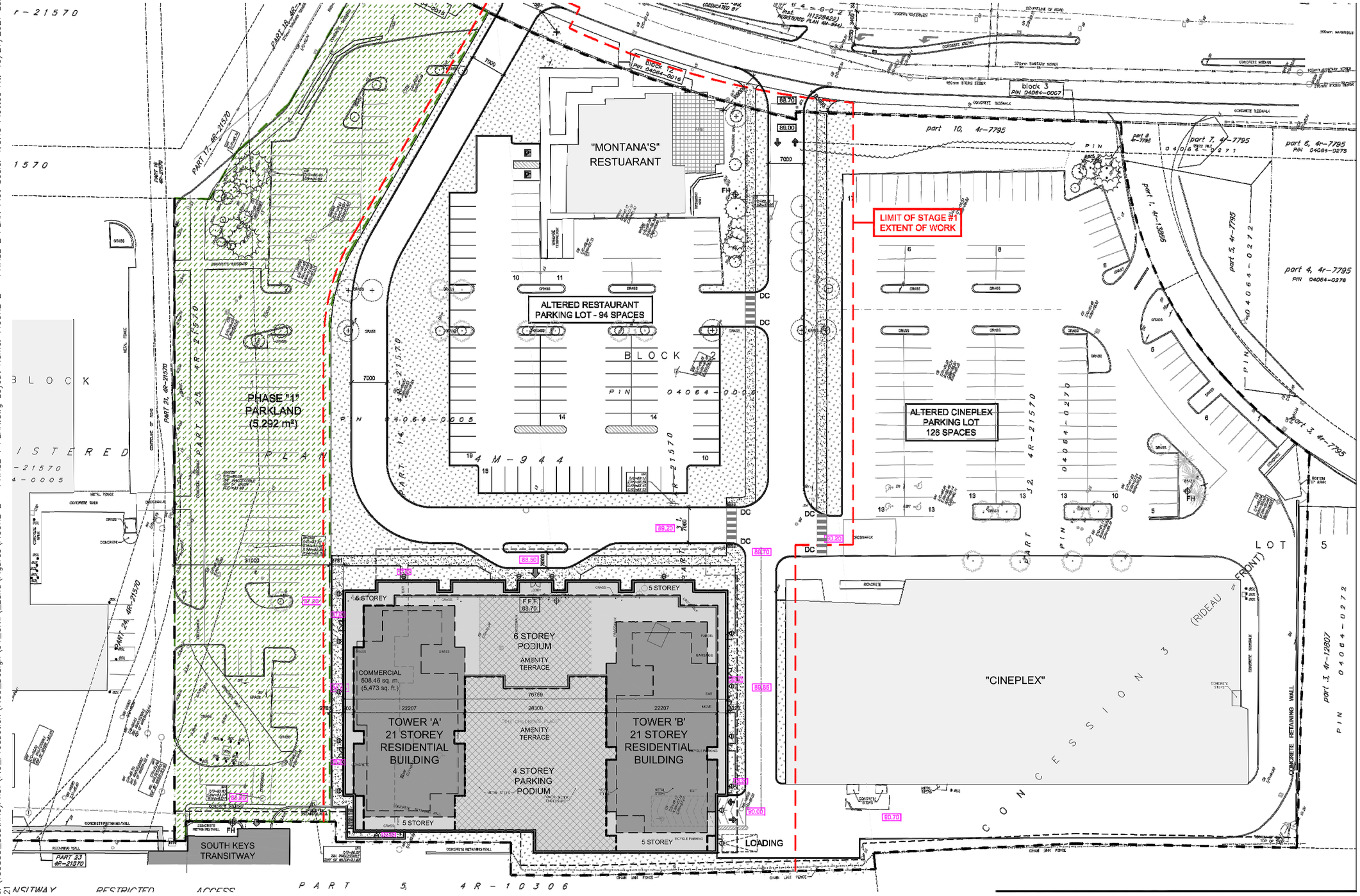
Lance Erion, P.Eng.

Associate



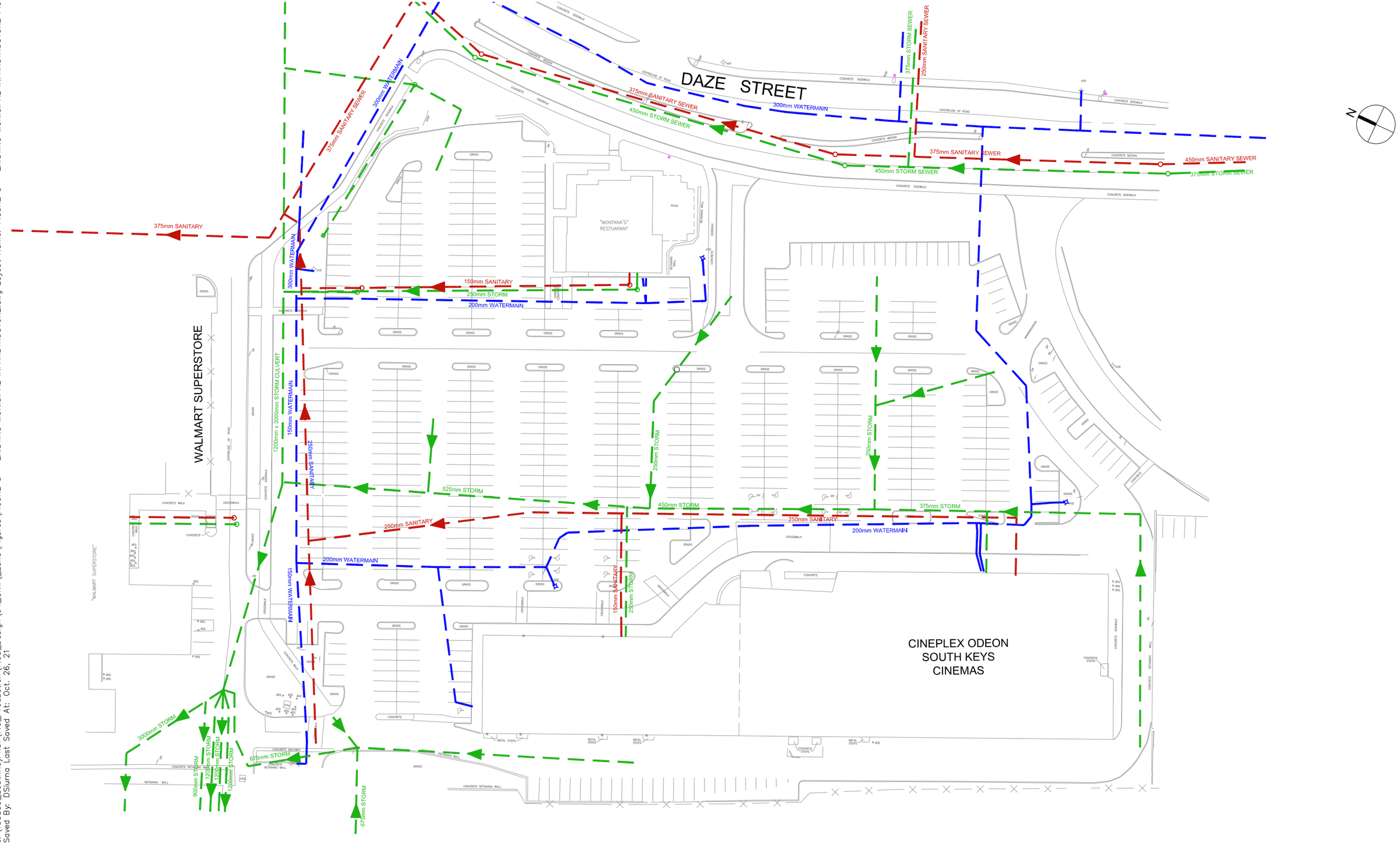
IBI	Scale: N.T.S.	Project Title: SOUTH KEYS MALL 2200 BANK STREET SOUTH PHASE - PHASE 1	Drawing Title: MASTER PLAN BUILD OUT
			Sheet No.: FIGURE 1

J:\135853_SouthKeyPhs1\7.0_Production\7.03_Design\04_Civil_Land\Figures\FIGURE 2 - PHASE 1 PLAN.dwg Layout Name: FIGURE 2 - PHASE 2 PLAN Plot Scale: 1:5.13 Plotted At: 10/27/2021 Last Saved B



Scale	Project Title	Drawing Title	Sheet No.
N.T.S.	SOUTH KEYS MALL 2200 BANK STREET SOUTH PHASE - PHASE 1	PHASE 1 PLAN	FIGURE 2

J:\135853_SouthKeyPhs1\7.0_Production\7.03_Design\04_Civil_Land\Figures\FIGURE 3 - EXISTING MUNICIPAL INFRASTRUCTURE.dwg Layout Name: FIGURE 3 - EXISTING MUNICIPAL INFRASTRUCTURE Plot Scale: 1
Saved By: DSiurna Last Saved At: Oct. 26, 21



IBI	Scale: N.T.S.	Project Title: SOUTH KEYS MALL 2200 BANK STREET SOUTH PHASE - PHASE 1	Drawing Title: EXISTING MUNICIPAL INFRASTRUCTURE	Sheet No.: FIGURE 3

APPENDIX A

- June 10, 2021 City of Ottawa Pre-Consultation Notes

2200 Bank Street

Meeting Summary Notes
June 10, 2021, Online Teams Meeting

Attendees:

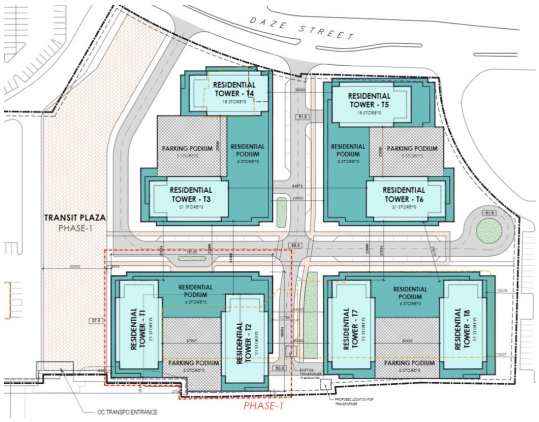
- Heather Jenkins, Smart Centres
- Mauro Pambianchi, Smart Centres
- Nancy Meloshe, Consultant
- Barrett Wagar, Consultant
- Rod Lahey, Architect
- Pat McMahon (Transportation Project Manager, City of Ottawa)
- Golam Sharif (Project Manager, City of Ottawa)
- Bruce Bramah, Engineering Intern, City of Ottawa
- Mark Young (Urban Designer, City of Ottawa)
- Phil Castro, Parks Planner, City of Ottawa
- Claire Lee, Urban Design Student
- Yvonne Mitchell, Planning Student
- Tracey Scaramozzino (File Lead, Planner, City of Ottawa)

Not in Attendance:

- Matthew Hayley, Environmental Planner
- Mark Richardson, Planning Forester
- Jamie Batchelor/Eric Lalonde (RVCA)

Issue of Discussion:

- Phase 1 of re-development of 2200 Bank Street, Former Children's Place/Retail Area – abutting movie theatre
- 1 mixed-use building with 6-storey podium, 2 21-storey towers (481 du), 5-storey above ground parking podium and 1 storey u/g (348 parking spaces), 629 m2 ground floor retail, indoor amenity area, Transit Plaza
- Applicant indicated that their understanding of the level of public transit, even at the O-train station, was not sufficient enough to reduce the parking rate.



Overall Concept

Shows animated street frontages

---

1. **Official Plan:**
    a. General Urban Area
    b. South Keys to Blossom Park Bank Street Secondary Plan and CDP

2. **Zoning Information**
    a. MC [2284] S349-h

3. **Infrastructure/Servicing (Golam Sharif, Bruce Bramah)**

Infrastructure

If existing services are to be reused, a CCTV scan is required to verify the absence of any service or structural defects. A stamped and signed memo prepared by a relevant professional is also required that addresses the condition of the service and provides any recommendations.

Please provide water boundary conditions and expected flow rates for both Sanitary and Storm including phase 1 or the complete site to ensure the sewer capacity is available.

Water

Existing public services:

- Daze Street. – 305mm PVC

Water redundancy would be required for this development based on the number of proposed units.

- Watermain Frontage Fees to be paid ($190.00 per metre) ☐ **Yes** ☒ **No**

Boundary conditions:
Civil consultant must request boundary conditions from the City's assigned Project Manager prior to first submission.

- Water boundary condition requests must include the location of the service(s) and the expected loads required by the proposed developments. Please provide all the following information:
    - Location of service(s)
    - Type of development and the amount of fire flow required (as per FUS, 1999).
    - Average daily demand: ___ l/s.
    - Maximum daily demand: ___l/s.
    - Maximum hourly daily demand: ___ l/s.
- Fire protection (Fire demand, Hydrant Locations)
- A water meter sizing questionnaire (water data card) will have to be completed prior to receiving a water permit (water card will be provided post approval)

Sanitary Sewer

Existing public services:

- Daze Street – 375mm PVC

Is a monitoring manhole required on private property? ☒ **Yes** ☐ **No**

- The designer should be aware there may be limited capacity in the downstream sanitary sewer system. The sanitary demand needs to be coordinated with the City Planning Dept. to determine if the existing sanitary sewer system has sufficient capacity to support the proposed rezoning. Provide sanitary demands to the City project manager for coordination.

Storm Sewer

Existing public services:

- Daze Street – 450mm PVC (Suggested connection)
- 3000mm STM Trunk north of property
- The Environmental Site Assessment (ESA) may provide recommendations where site contamination may be present. The recommendations from the ESA need to be coordinated with the servicing report to ensure compliance with the Sewer Use By-Law.

Stormwater Management

Quality Control:

- Rideau Valley Conservation Authority to provide quality control requirements for property. (Sawmill Creek)

Quantity Control:

- Allowable Runoff coefficient (C): C = the lesser of the existing pre-development conditions to a maximum of 0.5.
- Time of concentration (Tc): Tc = pre-development; maximum Tc = 10 min
- Allowable flowrate: Control the 100-year storm events to the 5-year storm event.

Ministry of Environment, Conservation and Parks (MECEP)

All development applications should be considered for an Environmental Compliance Approval, under MECP regulations.

a. The consultants determine if an approval for sewage works under Section 53 of OWRA is required and determines what type of application. The City's project manager may help confirm and coordinate with the MECP as required.
b. The project will be either transfer of review (standard), transfer of review (additional), direct submission, or exempt as per O. Reg. 525/98.
c. Pre-consultation is not required if applying for standard or additional works (Schedule A of the Agreement) under Transfer Review.
d. Pre-consultation with local District office of MECP is recommended for direct submission.
e. Consultant completes an MECP request form for a pre-consultation. Sends request to moeccottawasewage@ontario.ca
f. ECA applications are required to be submitted online through the MECP portal. A business account required to submit ECA application. For more information visit https://www.ontario.ca/page/environmental-compliance-approval

g. It is unclear if the proposed development will remain as one property. An ECA will be required where the stormwater management services more than one property parcel.

NOTE: Site Plan Approval, or Draft Approval, is required before any Ministry of the Environment and Climate Change (MOECC) application is sent.

General Service Design Comments

- The City of Ottawa requests that all new services be located within the existing service trench to minimize necessary road cuts.
- Monitoring manholes should be located within the property near the property line in an accessible location to City forces and free from obstruction (i.e. not a parking).
- Where service length is greater than 30 m between the building and the first maintenance hole / connection, a cleanout is required.
- The City of Ottawa Standard Detail Drawings should be referenced where possible for all work within the Public Right-of-Way.
- The upstream and downstream manhole top of grate and invert elevations are required for all new sewer connections.
- Services crossing the existing watermain or sewers need to clearly provide the obvert/invert elevations to demonstration minimum separation distances. A watermain crossing table may be provided.

Other

Are there are Capital Works Projects scheduled that will impact the application?

☐ **Yes** ☒ **No**

References and Resources

- As per section 53 of the Professional Engineers Act, O. Reg 941/40, R.S.O. 1990, all documents prepared by engineers must be signed and dated on the seal.
- All required plans are to be submitted on standard A1 size sheets (594mm x 841mm) sheets, utilizing a reasonable and appropriate metric scale as per City of Ottawa Servicing and Grading Plan Requirements: title blocks are to be placed on the right of the sheets and not along the bottom. Engineering plans may be combined, but the Site Plans must be provided separately. Plans shall include the survey monument used to confirm datum. Information shall be provided to enable a non-surveyor to locate the survey monument presented by the consultant.
- All required plans & reports are to be provided in *.pdf format (at application submission and for any, and all, re-submissions)
- Please find relevant City of Ottawa Links to Preparing Studies and Plans below: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans#standards-policies-and-guidelines
- To request City of Ottawa plan(s) or report information please contact the City of Ottawa Information Centre: InformationCentre@ottawa.ca<mailto:InformationCentre@ottawa.ca> (613) 580-2424 ext. 44455

- geoOttawa
  http://maps.ottawa.ca/geoOttawa/

4. Initial Planning Comments (Tracey Scaramozzino)

a. Rezoning is req'd for lifting of the holding provision, and to increase floorplate size
b. More comments will be provided once more detailed plans are submitted.
c. Concern over the abundance of vehicular parking that is being provided – especially when NO parking is required.
d. Sidewalks on the east-west road should be on both sides, as detailed in the Secondary Plan. The sidewalks are currently only shown on the south side.
e. Ensure ample plantings within the site and along perimeter and along the transit plaza – along with street furniture
f. Discuss proposal with local Councillor and Community Associations
g. Subject to the UDRP
h. Ensure metric dimensions are on the actual submission drawings.
i. Provide ped connection out from cul-de-sac out to private road into the medical bldg.
j. (This site has a drop-off space in front of the 6-storey podium, while none of the other buildings/phases have one because this site has been more detailed)
k. Show adequate/ample amenity space inside and outside.
l. As per Applicant's request on projections, please see S. 64 of the Zoning Bylaw which permits projections (with caveats) for "mechanical and service equipment penthouse, elevator or stairway penthouses – bylaw 2014-94)"
m. Will the transit plaza be conveyed to the City or stay under private ownership?

5. Urban Design Comments (Mark Young)

1. The subject site is located in a Design Priority Area. The applications will be subject to the review of the Urban Design Review Panel.
2. A Design Brief is required as part of your application submission. A terms of reference is included.
3. Thank you for providing concept plans for the entire redevelopment of the subject lands. This is very helpful in understanding how the first phase fits within the larger long-term vision.

Zoning By-law Amendment:

1. Additional information, study and justification are required to support an increase in the floorplate size above the currently required maximum of 750 sq. m. as indicated in the Secondary Plan and Zoning By-law.

Site Plan Application:

1. It is understood that the proposed internal streets will be private. They should be designed to look and feel like public streets and be accessible to the general public. Please provide additional cross-sections to provide a better sense of what is proposed within the private streets.
2. A private street adjacent to the Transit Plaza may be challenging, given a general desire to use this for drop off and pick up associated with the transit station.
3. Layout and access as they relate to this site and the transit station should be included as part of design brief materials.
4. Grade related units should be considered where feasible and designed to allow for the appropriate relationship between public and private realm.

6. Parks (Phil Castro)

a. Parkland dedication will be required as a condition of site plan control. The determination of the parkland area to be dedicated will be in accordance with the City's Parkland Dedication By-law and will be capped at 10 percent of the land area under consideration for residential apartment purposes. As discussed during the preapplication consultation meeting, the final parkland area to be dedicated will depend upon the future proposed uses and densities. How this is determined and addressed will require further discussion during the review of a formal submission.

7. Trees (Mark Richardson)

TCR requirements:

1. a Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City
    a. an approved TCR is a requirement of Site Plan approval.
2. As of January 1 2021, any removal of privately-owned trees 10cm or larger in diameter, or publicly (City) owned trees of any diameter requires a tree permit issued under the Tree Protection Bylaw (Bylaw 2020 – 340); the permit will be based on an approved TCR and made available at or near plan approval.
3. The Planning Forester from Planning and Growth Management as well as foresters from Forestry Services will review the submitted TCR
    a. If tree removal is required, both municipal and privately-owned trees will be addressed in a single permit issued through the Planning Forester
    b. Compensation may be required for city owned trees – if so, it will need to be paid prior to the release of the tree permit
4. the TCR must list all trees on site by species, diameter and health condition
5. please identify trees by ownership – private onsite, private on adjoining site, city owned, co-owned (trees on a property line)

6. the TCR must list all trees on adjacent sites if they have a critical root zone that extends onto the development site
7. If trees are to be removed, the TCR must clearly show where they are, and document the reason they cannot be retained
8. All retained trees must be shown and all retained trees within the area impacted by the development process must be protected as per City guidelines available at Tree Protection Specification or by searching Ottawa.ca
    a. the location of tree protection fencing must be shown on a plan
    b. show the critical root zone of the retained trees
    c. if excavation will occur within the critical root zone, please show the limits of excavation
9. the City encourages the retention of healthy trees; if possible, please seek opportunities for retention of trees that will contribute to the design/function of the site.
10. For more information on the process or help with tree retention options, contact Mark Richardson mark.richardson@ottawa.ca or on City of Ottawa

LP tree planting requirements:

For additional information on the following please contact tracy.smith@Ottawa.ca

Minimum Setbacks

- Maintain 1.5m from sidewalk or MUP/cycle track.
- Maintain 2.5m from curb
- Coniferous species require a minimum 4.5m setback from curb, sidewalk or MUP/cycle track/pathway.
- Maintain 7.5m between large growing trees, and 4m between small growing trees. Park or open space planting should consider 10m spacing.
- Adhere to Ottawa Hydro's planting guidelines (species and setbacks) when planting around overhead primary conductors.

Tree specifications

- Minimum stock size: 50mm tree caliper for deciduous, 200cm height for coniferous.
- Maximize the use of large deciduous species wherever possible to maximize future canopy coverage
- Tree planting on city property shall be in accordance with the City of Ottawa's Tree Planting Specification; and include watering and warranty as described in the specification (can be provided by Forestry Services).
- Plant native trees whenever possible
- No root barriers, dead-man anchor systems, or planters are permitted.
- No tree stakes unless necessary (and only 1 on the prevailing winds side of the tree)

Hard surface planting

- Curb style planter is highly recommended
- No grates are to be used and if guards are required, City of Ottawa standard (which can be provided) shall be used.
- Trees are to be planted at grade

Soil Volume

- Please ensure adequate soil volumes are met:

Tree Type/Size	Single Tree Soil Volume (m3)	Multiple Tree Soil Volume (m3/tree)
Ornamental	15	9
Columnar	15	9
Small	20	12
Medium	25	15
Large	30	18
Conifer	25	15

Sensitive Marine Clay

- Please follow the City's 2017 Tree Planting in Sensitive Marine Clay guidelines

8. Environment (Matthew Hayley)

1. Sawmill Creek runs along a portion of the eastern boundary of the larger site (visible on page 3 of the Concept Master Plan along Bank Street). That area currently zoned EP will need to continue be zoned EP and set aside. The redevelopment site does not share a boundary with Sawmill Creek, however any servicing and site alterations need to support the redevelopment adjacent to the watercourse will need to be mindful of the impact on the feature and the direction from the RVCA followed.

2. Bird Safe Design, Given the height of the proposal (mid to high rise) the proposal will need to review and incorporate bird safe design elements and as part of the site plan a review of elevation drawings will be needed to assess impact due to the proximity of green corridor to the west. Please review the Bird Safe Design Guidelines for details however in brief some items of concern are glass and related design traps such as corner glass and fly-through conditions, ventilation grates and open pipes, some types of landscaping, and light pollution.

3. Consider the impact this site has on the urban heat island effect and look for ways to reduce the heat generated through the provision of shade or other approaches (look to the high performance building standards for example).

9. Conservation Authority (Jamie Batchelor, RVCA)

Stormwater Management

Any new development will need to be in accordance with the Samwill Creek Subwatershed Study. This includes water quality treatment of 'enhanced' (80%TSS Removal). The opportunity for the inclusion of LID measures should be considered for the stormwater management plan.

10. Transportation (Pat McMahon)

- Ensure that a Transportation Impact Assessment (TIA) Screening form is included with the application. In this case, a TIA is required and should be started as soon as possible.
    - Start this process as soon as possible.
    - An update to the TRANS Trip Generation Manual has been completed (October 2020). This manual (and trip calculator) is to be utilized for this TIA and can be provided upon request.
    - Applicant advised that their application will not be deemed complete until the submission of the draft step 1-4, including the functional draft RMA package and/or monitoring report (if applicable). Collaboration and communication between development proponents and City staff are required at the end of every step of the TIA process.
- Noise Impact Studies required for the following:
    - Road (within 100m of light rail corridor)
    - Aircraft (within the Airport Vicinity Development Zone)
- Clear throat requirements for residential developments with greater than 200 units and accessing a collector road are 25m.
- As the proposed site is commercial and residential, AODA legislation applies to all areas accessible to the public (i.e. outdoor pathways, parking, etc.).
- On site plan:
    - Show all details of the roads abutting the site up to and including the opposite curb; include such items as pavement markings, accesses and/or sidewalks.
    - Turning templates will be required for all accesses showing the largest vehicle to access the site; required for internal movements and at all access (entering and exiting and going in both directions).
    - Show all curb radii measurements; ensure that all curb radii are reduced as much as possible
    - Show lane/aisle widths.
    - Sidewalk is to be continuous across accesses as per City Specification 7.1.
- Site is within 100m of future South Keys LRT Station – therefore TOD measures apply. As per the South Keys to Blossom Park CDP, a site-specific plan as well as a local Transportation Management Association is encouraged. To achieve

target mode shares within TOD zones, we highly recommend developments to provide as many TDM measures as possible. Given the need for sustainable travel modes, providing at least one bicycle space per unit is strongly encouraged. To reduce provided parking costs, car-sharing options would be equitable for the residents and could also save the development in costs for providing and maintaining the parking structure.

- As per the CDP, 30m ROW protection is encouraged along Daze. As the development progresses, be aware that the frontage along Daze may change, and the layout of the plaza as well as a result.
- The plaza forms part of the Hunt Club Neighbourhood Extension, consider working with the cycling group to consolidate efforts.
- Sidewalks are required on both sides of local streets, as per the CDP.

11. OC Transpo/O-train (Erica Springate will comment on future revisions)

a. There won't be any changes to the OC Transpo Bus station at South Keys. The only changes will be the pedestrian underpass between the Bus Station and O-train and the O-train platform itself (Tracey Scaramozzino, via Mark Antunes-Alves)
b. The former Trillium Line service operated at a 12-minute headway in all time periods. The timing will remain, once the Trillium Line expansion is complete.
c. The Confederation Line runs between a 3-5 mine headway. (Tracey via Matthew Wolstenholme)

12. Waste Collection

a. Please see City's Waste Management Guidelines for multi-unit residential: http://ottawa.ca/calendar/ottawa/citycouncil/pec/2012/11-13/Solid%20Waste%20Collection%20Guidelines%20-%20Doc%201.pdf

13. General Information

a. Ensure that all plans and studies are prepared as per City guidelines – as available online…
   https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans

APPENDIX B

- Watermain Demand Calculations
- Fire Flow Calculations
- Boundary Conditions
- Hydraulic Model Results

WATERMAIN DEMAND CALCULATION SHEET

IBI GROUP
333 PRESTON STREET
OTTAWA, ON
K1S 5N4

PROJECT : South Keys - Smart Centers
LOCATION : City of Ottawa

FILE: 135853.6.04
DATE PRINTED: 2021-10-21
DESIGN: 2021-09-09
PAGE : 1 OF 1

NODE	RESIDENTIAL				NON-RESIDENTIAL			AVERAGE DAILY DEMAND (l/s)			MAXIMUM DAILY DEMAND (l/s)			MAXIMUM HOURLY DEMAND (l/s)			FIRE DEMAND
	Single	Town	Apt	POP'N	INDTRL (ha.)	COMM. (ha.)	RETAIL (m^2)	Res.	Non-res.	Total	Res.	Non-res.	Total	Res.	Non-res.	Total	(l/min)
Phase 1																	
J16			446	803				2.60	0.00	**2.60**	6.50	0.00	**6.50**	14.31	0.00	**14.31**	**8,000**
Phase 2 & 3																	
J12			807	1,453				4.71	0.00	**4.71**	11.77	0.00	**11.77**	14.31	0.00	**14.31**	**8,000**
Phase 4																	
J14			457	823				2.67	0.00	**2.67**	6.66	0.00	**6.66**	14.66	0.00	**14.66**	**8,000**
Ultimate - Total			1264	3,078						**9.98**	18.43		**24.93**	28.97		**43.28**	

ASSUMPTIONS

RESIDENTIAL DENSITIES
Apartment (ave) 1.8 p / p / u

** Residential Daily Demand reduced to coincide with current waste water guidelines

AVG. DAILY DEMAND

Residential:**	280	l / cap / day
Industrial:		l / ha / day
Commercial:		l / ha / day
Retail:	2,500	l / 1000m^2 / day

MAX. DAILY DEMAND

Residential:	700	l / cap / day
Industrial:		l / ha / day
Commercial:		l / ha / day
Retail:	6,250	l / 1000m^2 / day

MAX. HOURLY DEMAND

Residential:	1,540	l / cap / day
Industrial:		l / ha / day
Commercial:		l / ha / day
Retail:	11,250	l / 1000m^2 / day

FIRE FLOW
From FUS Calculation 8,000 l / min

Fire Flow Requirement from Fire Underwriters Survey

South Keys - Phase 1

Floor	Area (m^2)	Two Largerst Floor	Floors Above at 50%
7	925	925	
8	925	925	
9	925		463
10	925		463
11	925		463
12	925		463
13	925		463
14	925		463
15	925		463
16	925		463
Total	9250		**5550**

(**Note**: For fire-resistive buildings, consider two largest adjoining floors plus 50% of each of any floors immediately above them up to eight.)

Total Floor Area 5,550 m^2

F = 220C√A

C	0.8	C =	1.5	wood frame
A	5,550 m^2		1.0	ordinary
			0.8	non-combustible
F	13,112 l/min		0.6	fire-resistive
use	13,000 l/min			

Occupancy Adjustment

		-25%	non-combustible
		-15%	limited combustible
Use	-15%	0%	combustible
		+15%	free burning
Adjustment	-1950 l/min	+25%	rapid burning
Fire flow	11,050 l/min		

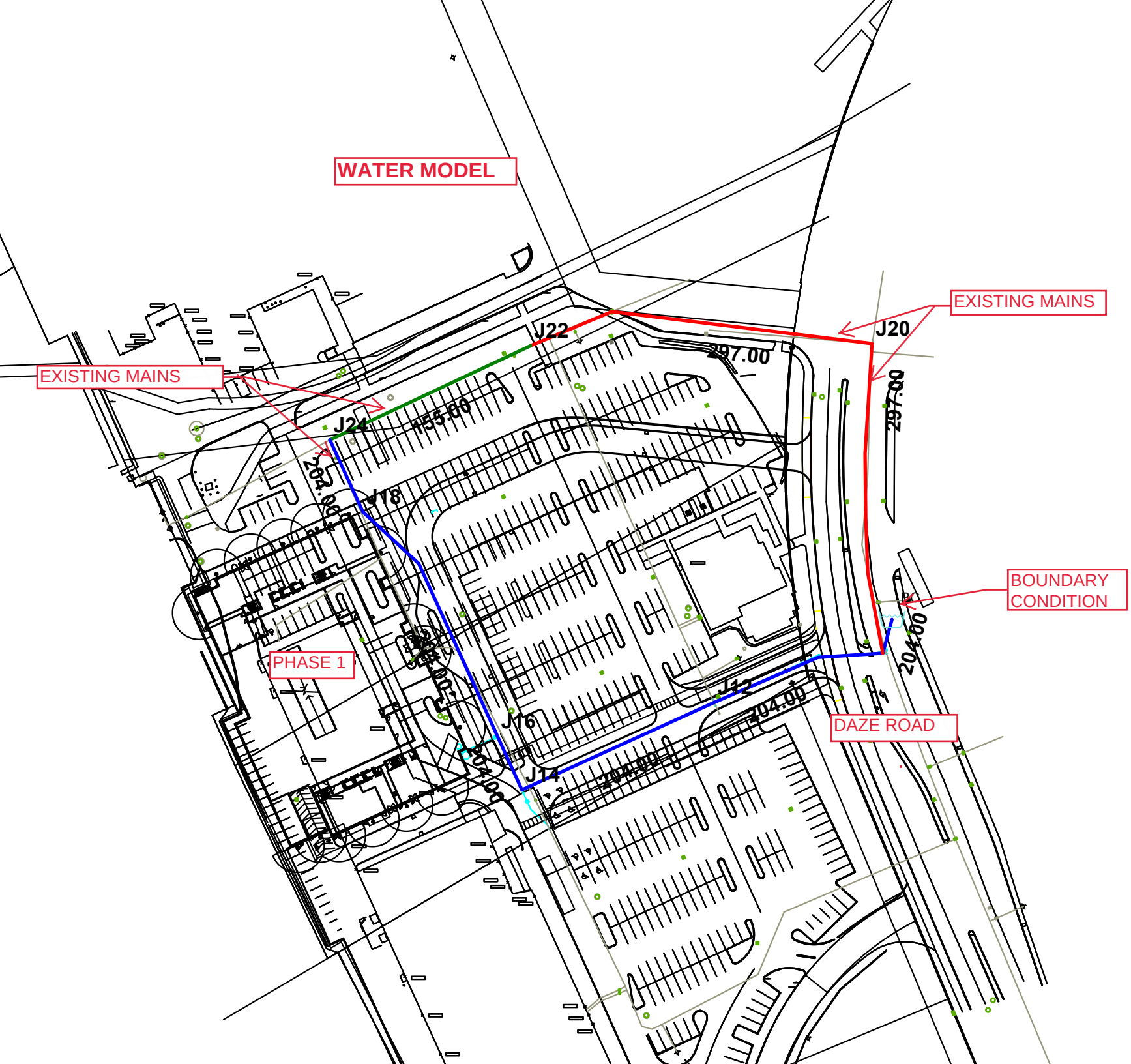
Sprinkler Adjustment

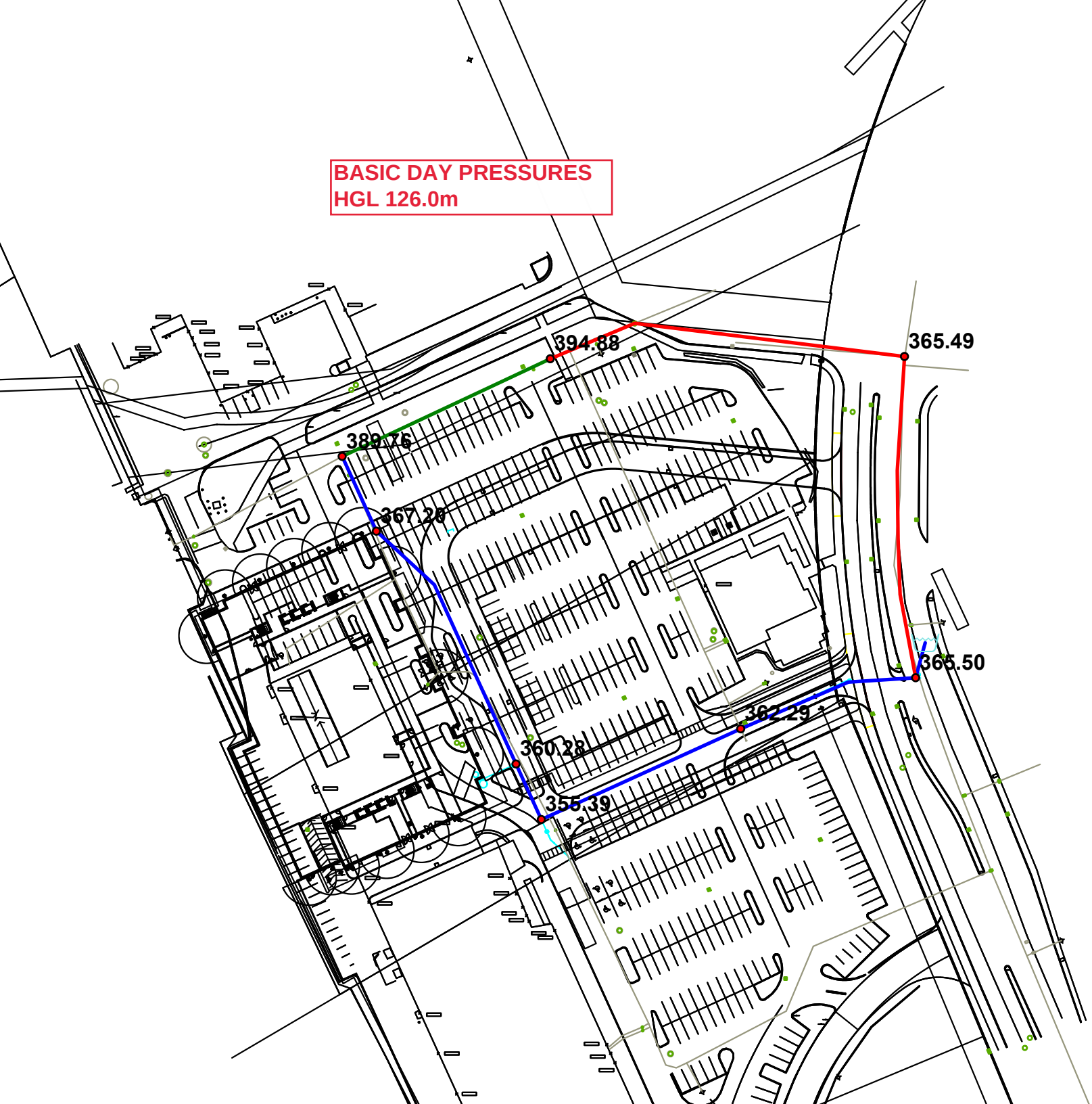
		-30%	system conforming to NFPA 13
		-50%	complete automatic system
Use	-30%		
Adjustment	-3315 l/min		

Exposure Adjustment

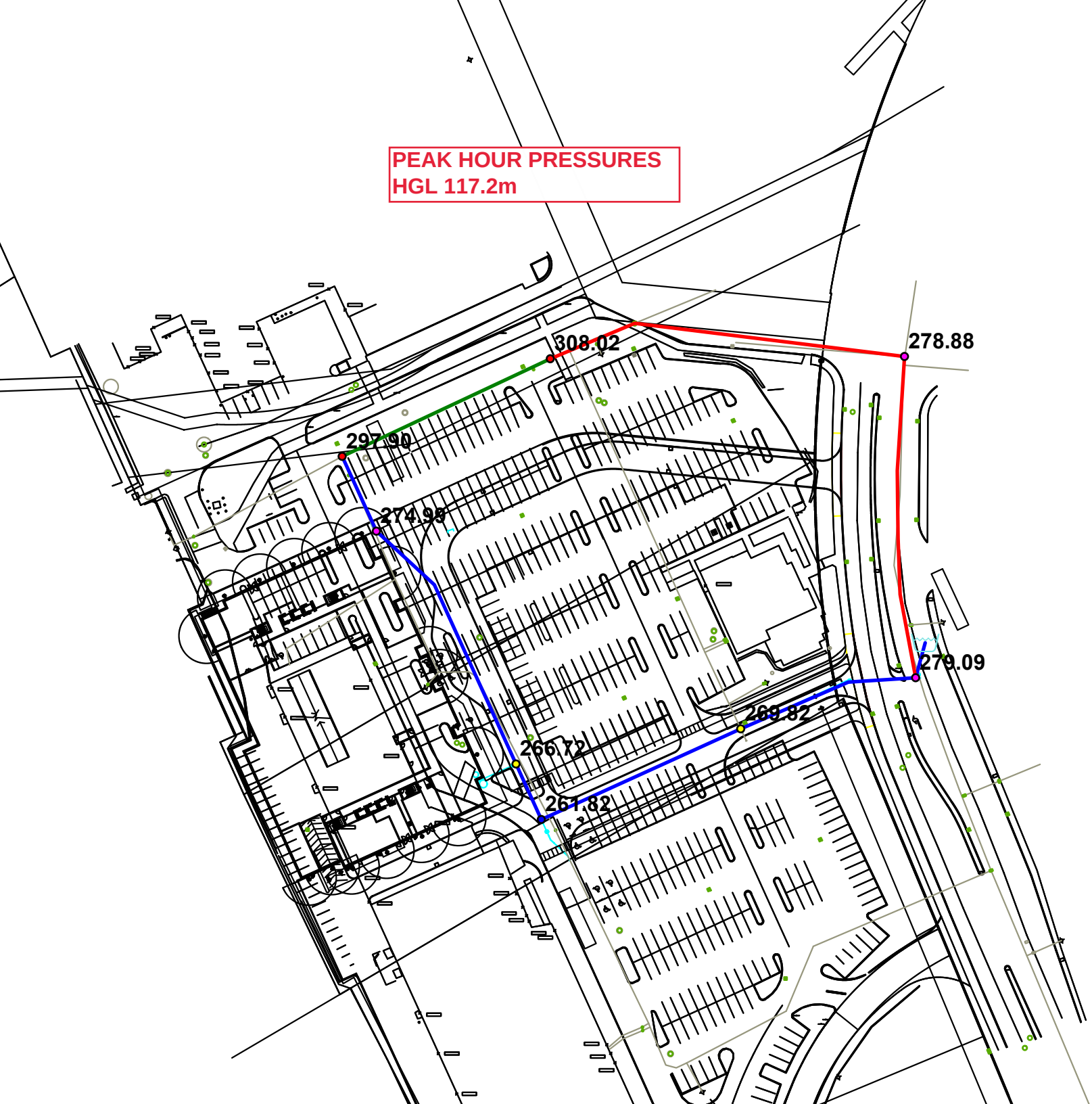
Building Face	Separation (m)	Adjacent Exposed Wall			Exposure Charge *
		Length	Stories	L*H Factor	
Total					0%
Adjustment				- l/min	
Total adjustments				(3,315) l/min	
Fire flow				7,735 l/min	
Use				**8,000 l/min**	
				133 l/s	

(**Note**: According to Page G-104 in **Tech bulletin ISTB-2018-02** Revisions to Ottawa Design Guidelines - Water Distribution, "If the exposing wall of the building being considered is taller than the exposed wall of the adjacent structure, no exposure charge applies".)


WATER MODEL
EXISTING MAINS
EXISTING MAINS
BOUNDARY CONDITION
PHASE 1
DAZE ROAD
J22
J20
J24
J18
J16
J14
J12
297.00
297.00
455.00
204.00
204.00
204.00
204.00

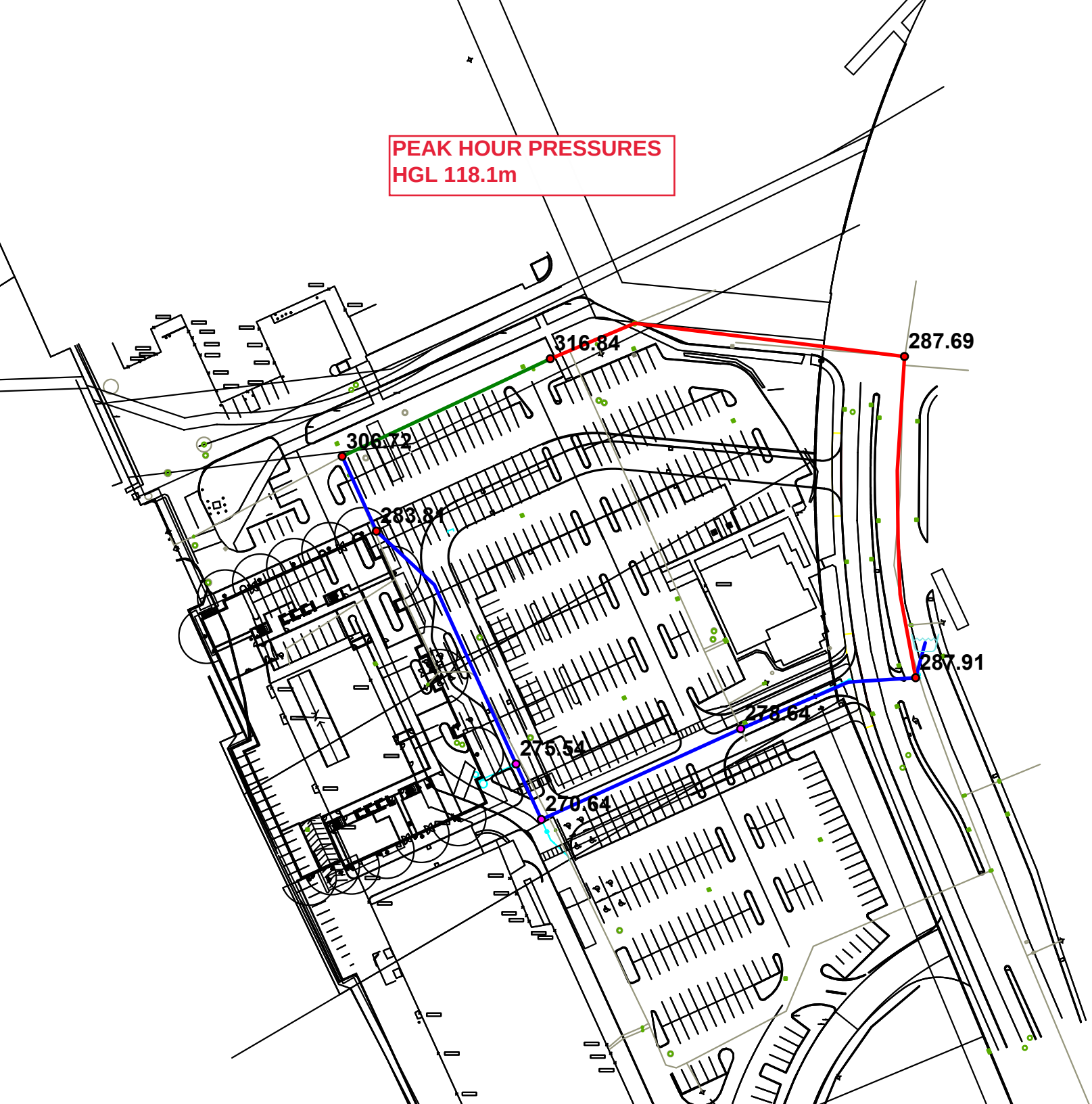

BASIC DAY PRESSURES
HGL 126.0m
394.88
365.49
389.76
367.20
365.50
362.29
360.28
355.39

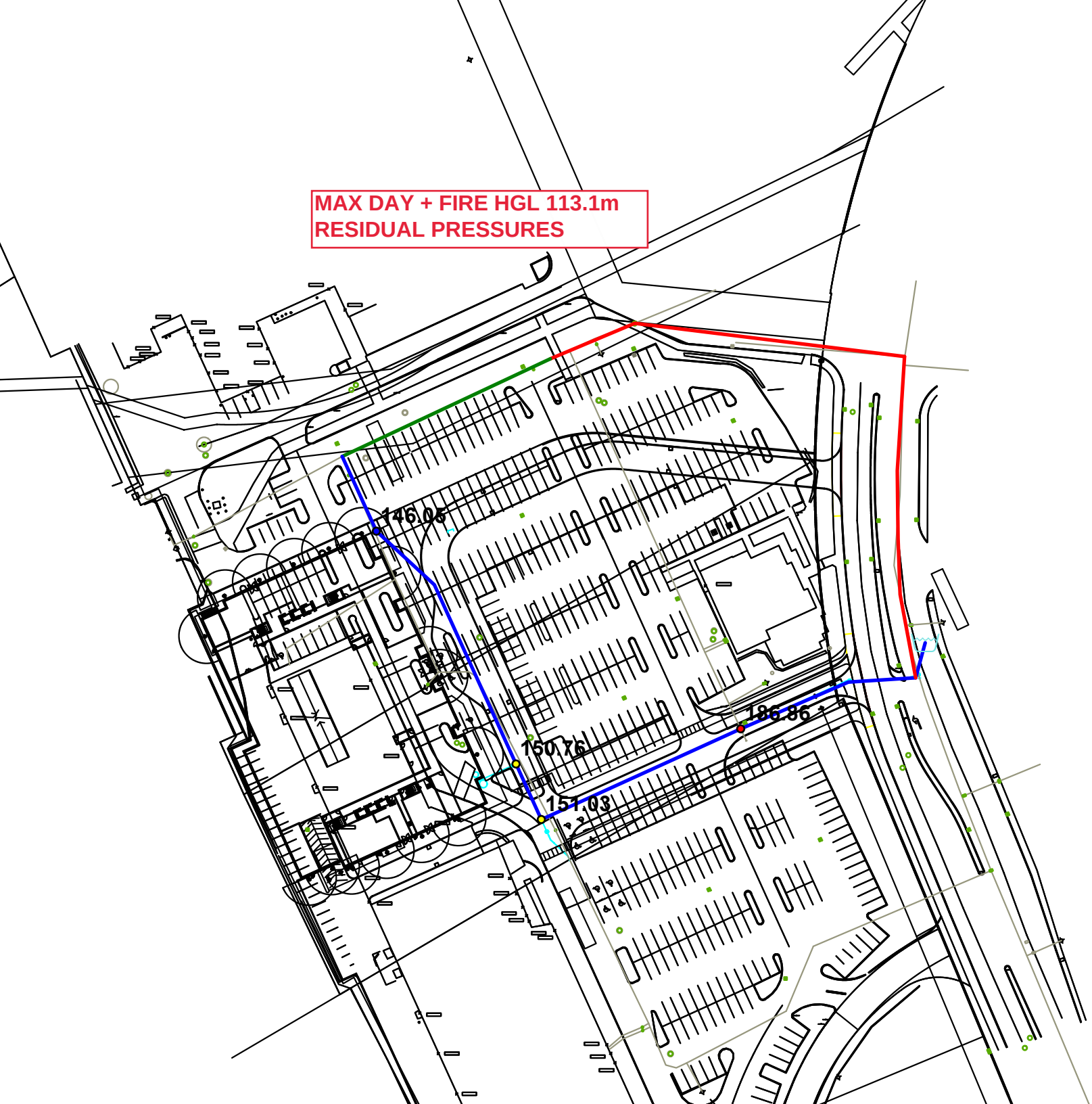
		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1	☐	J10	0.00	88.70	126.00	365.50
2	☐	J12	4.71	89.00	125.97	362.29
3	☐	J14	2.67	89.70	125.97	355.39
4	☐	J16	2.60	89.20	125.97	360.28
5	☐	J18	0.00	88.50	125.97	367.20
6	☐	J20	0.00	88.70	126.00	365.49
7	☐	J22	0.00	85.70	126.00	394.88
8	☐	J24	0.00	86.20	125.97	389.76


PEAK HOUR PRESSURES
HGL 117.2m
308.02
278.88
297.90
274.98
279.09
269.82
266.72
261.82

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1	☐	J10	0.00	88.70	117.18	279.09
2	☐	J12	25.89	89.00	116.53	269.82
3	☐	J14	14.66	89.70	116.42	261.82
4	☐	J16	14.31	89.20	116.42	266.72
5	☐	J18	0.00	88.50	116.56	274.99
6	☐	J20	0.00	88.70	117.16	278.88
7	☐	J22	0.00	85.70	117.13	308.02
8	☐	J24	0.00	86.20	116.60	297.90

		ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)	HL/1000 (m/k-m)	Status	Flow Reversal Count
1	☐	P11	J10	J12	60.00	204.00	110.00	40.55	1.24	0.65	10.77	Open	0
2	☐	P13	J12	J14	71.00	204.00	110.00	14.66	0.45	0.12	1.64	Open	0
3	☐	P15	J14	J16	20.00	204.00	110.00	0.00	0.00	0.00	0.00	Open	0
4	☐	P17	J16	J18	92.00	204.00	110.00	-14.31	0.44	0.14	1.56	Open	0
5	☐	P19	J10	BC	1.00	204.00	110.00	-54.86	1.68	0.02	18.85	Open	0
6	☐	P21	J20	J10	104.00	297.00	120.00	-14.31	0.21	0.02	0.21	Open	0
7	☐	P23	J20	J22	120.00	297.00	120.00	14.31	0.21	0.03	0.21	Open	0
8	☐	P25	J22	J24	75.00	155.00	100.00	14.31	0.76	0.53	7.11	Open	0
9	☐	P27	J24	J18	24.00	204.00	110.00	14.31	0.44	0.04	1.56	Open	0


PEAK HOUR PRESSURES
HGL 118.1m
316.84
287.69
306.72
283.81
287.91
278.64
275.54
270.64


MAX DAY + FIRE HGL 113.1m
RESIDUAL PRESSURES
146.05
150.76
151.03
186.86

		ID	Total Demand (L/s)	Available Flow at Hydrant (L/s)	Critical Node ID	Critical Node Pressure (kPa)	Critical Node Head (m)	Design Flow (L/s)	Design Pressure (kPa)	Design Fire Node Pressure (kPa)
1	☐	J12	145.10	213.27	J12	139.96	103.28	213.27	139.96	139.99
2	☐	J14	139.99	151.24	J14	139.96	103.98	151.24	139.96	139.96
3	☐	J16	139.83	150.07	J16	139.96	103.48	150.07	139.96	139.96
4	☐	J18	133.33	138.28	J18	139.96	102.78	138.28	139.96	139.96

APPENDIX C

- Sanitary Sewer Design Sheet – Phase 1 and Master Plan
- Drawing 135853 C-400 Sanitary Drainage Area Plan – Phase 1
- Drawing 135853 C-401 Sanitary Drainage Area Plan – Master Plan
- Drawing 135853 C-001 Site Servicing Plan

IBI GROUP
400-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

SANITARY SEWER DESIGN SHEET

2200 Bank Street South Keys
SmartCentres

LOCATION				RESIDENTIAL										ICI AREAS								INFILTRATION ALLOWANCE			FIXED FLOW (L/s)		TOTAL FLOW	PROPOSED SEWER DESIGN						
				AREA w/ Units	UNIT TYPES				AREA w/o Units	POPULATION		RES PEAK FACTOR	PEAK FLOW	AREA (Ha)						ICI PEAK FACTOR	PEAK FLOW	AREA (Ha)		FLOW				CAPACITY	LENGTH	DIA	SLOPE	VELOCITY	AVAILABLE CAPACITY	
STREET	AREA ID	FROM MH	TO MH	(Ha)	SF	SD	TH	APT	(Ha)	IND	CUM		(L/s)	INSTITUTIONAL IND	INSTITUTIONAL CUM	COMMERCIAL IND	COMMERCIAL CUM	INDUSTRIAL IND	INDUSTRIAL CUM		(L/s)	IND	CUM	(L/s)	IND	CUM	(L/s)	(L/s)	(m)	(mm)	(%)	(full) (m/s)	L/s	(%)
Phase 1 Conditions																																		
Montana's Restaurant	P1-2	ExMH 103A	ExMH 104A													0.34	0.34			1.50	0.17	0.34	0.34	0.11		0.00	0.28	27.88	66.18	150	3.08	1.529	27.61	99.00%
Phase 1 Building	P1-3	ExMH 100A	MH6A													1.18	1.18			1.50	0.57	1.18	1.18	0.39		0.00	0.96	65.36	58.95	250	1.11	1.290	64.40	98.53%
	P1-4	MH6A	MH5A													0.12	1.30			1.50	0.63	0.12	1.30	0.43		0.00	1.06	67.96	5.37	250	1.20	1.341	66.90	98.44%
	P1-1	MH5A	MH4A	1.23				446		847.4	847.4	3.28	9.00			0.00	1.30			1.50	0.63	1.23	2.53	0.83		0.00	10.46	67.96	70.50	250	1.20	1.341	57.50	84.60%
		MH4A	ExMH 102A							0.0	847.4	3.28	9.00			0.15	1.45			1.50	0.70	0.15	2.68	0.88		0.00	10.59	121.89	55.48	250	3.86	2.405	111.30	91.31%
Building Service lateral				0.39						847.4	847.4	3.28	9.00			0.00	0.00			1.00	0.00	0.39	3.07	1.01		0.00	10.01	34.22	15.00	200	1.00	1.055	24.21	70.74%
Total Flow	TP-1	ExMH 102A	ExMH 106A	0.54					0.0	847.4	3.28	9.00				0.00	1.45			1.50	0.70	0.54	3.22	1.06		0.00	10.76	42.08	50.70	250	0.46	0.830	31.31	74.42%
Master Plan (Full Buildout)																																		
		ExMH 100A	MH6A	1.35				861		1635.9	1635.9	3.12	16.55									1.35	1.35	0.45		0.00	16.99	65.36	58.95	250	1.11	1.290	48.37	74.00%
		MH6A	MH5A					0		0.0	1635.9	3.12	16.55		0.00		0.00		0.00	1.00	0.00	0.00	1.35	0.45		0.00	16.99	67.96	5.37	250	1.20	1.341	50.97	74.99%
		MH5A	MH4A	1.39				849		1613.1	3249.0	2.93	30.85		0.00		0.00		0.00	1.00	0.00	1.39	2.74	0.90		0.00	31.76	67.96	70.50	250	1.20	1.341	36.20	53.27%
		MH4A	ExMH 102A					0		0.0	3249.0	2.93	30.85		0.00		0.00			1.00	0.00	0.00	2.74	0.90		0.00	31.76	121.89	55.48	250	3.86	2.405	90.13	73.95%
Total Flow		ExMH 102A	ExMH 106A	0.54					0.53	0.0	3249.0	2.93	30.85			0.00	0.00			1.00	0.00	1.07	3.81	1.26		0.00	32.11	42.08	50.70	250	0.46	0.830	9.97	23.69%

Design Parameters:

Residential

SF	3.2	p/p/u
TH/SD	2.4	p/p/u
APT	1.9	p/p/u
Other	60	p/p/Ha

ICI Areas

INST	28,000	L/Ha/day	
COM	28,000	L/Ha/day	
IND	35,000	L/Ha/day	MOE Chart

Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 280 L/day 200 L/day
3. Infiltration allowance: 0.33 L/s/Ha
4. Residential Peaking Factor:
Harmon Formula = 1+(14/(4+(P/1000)^0.5))0.8
where K = 0.8 Correction Factor
5. Commercial and Institutional Peak Factors based on total area, 1.5 if greater than 20%, otherwise 1.0

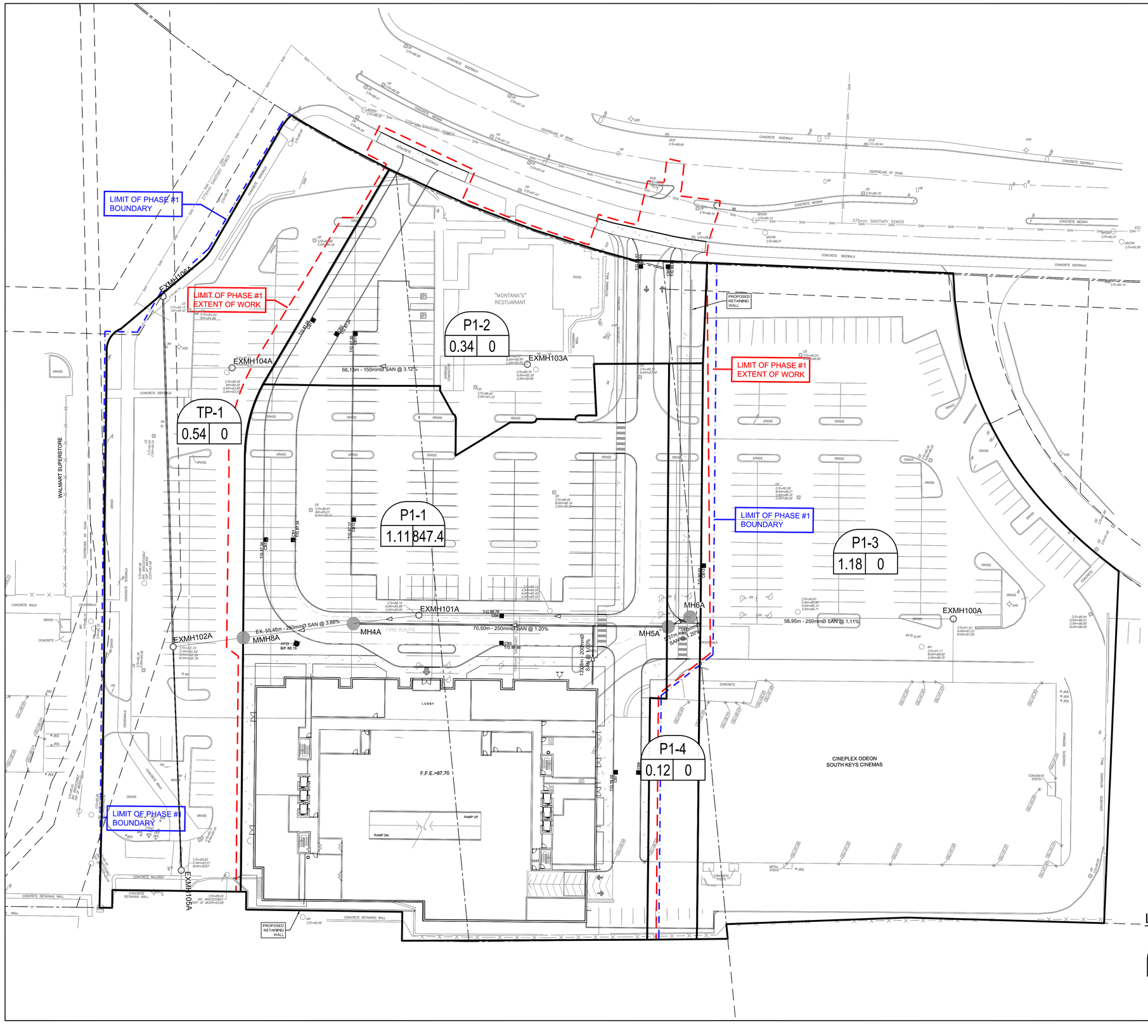
Designed: JM

Checked: JIM

Dwg. Reference: 135853 - 400 and 401

No.	Revision	Date
1.	SPA Submission No. 1 for City Review	2021-10-28
2.		

File Reference: 34731-5.7 **Date:** 2021-10-28 **Sheet No:** 1 of 1



Project North

LEGEND :

P1-1 (0.54 | 235.6)
- AREA NUMBER
- POPULATION (1.9 PERSONS PER UNIT)
- AREA IN HECTARES

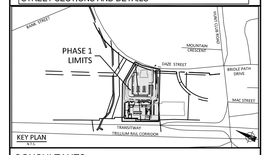
CLIENT

SMARTCENTRES® REAL ESTATE INVESTMENT TRUST

ISSUES

No.	DESCRIPTION	DATE
1	ISSUED FOR SPA	2021-10-28
2		
3		
4		

SEE 010, 011, 012 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS



CONSULTANTS

Project Coordinator

Architect:
RLA Architectue
Landscape:
Levstek consultants
Surveyor:
Stantec
Geotech:
Paterson Group
Transportation Engineer:
IBI Group
Urban Planner:
Stantec

1:400 0 4 12 20m

SEAL

LICENSED PROFESSIONAL ENGINEER
J. I. MOFFATT
2021/10/28
PROVINCE OF ONTARIO

IBI GROUP
400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

PROJECT
SOUTH KEYS MALL
2200 BANK STREET

SOUTH PHASE - PHASE 1

PROJECT NO: 135853	
DRAWN BY: **D.P.S.**	CHECKED BY: **J.B.**
PROJECT MGR: **J.I.M.**	APPROVED BY: **J.I.M.**

SHEET TITLE
SANITARY DRAINAGE AREA PLAN

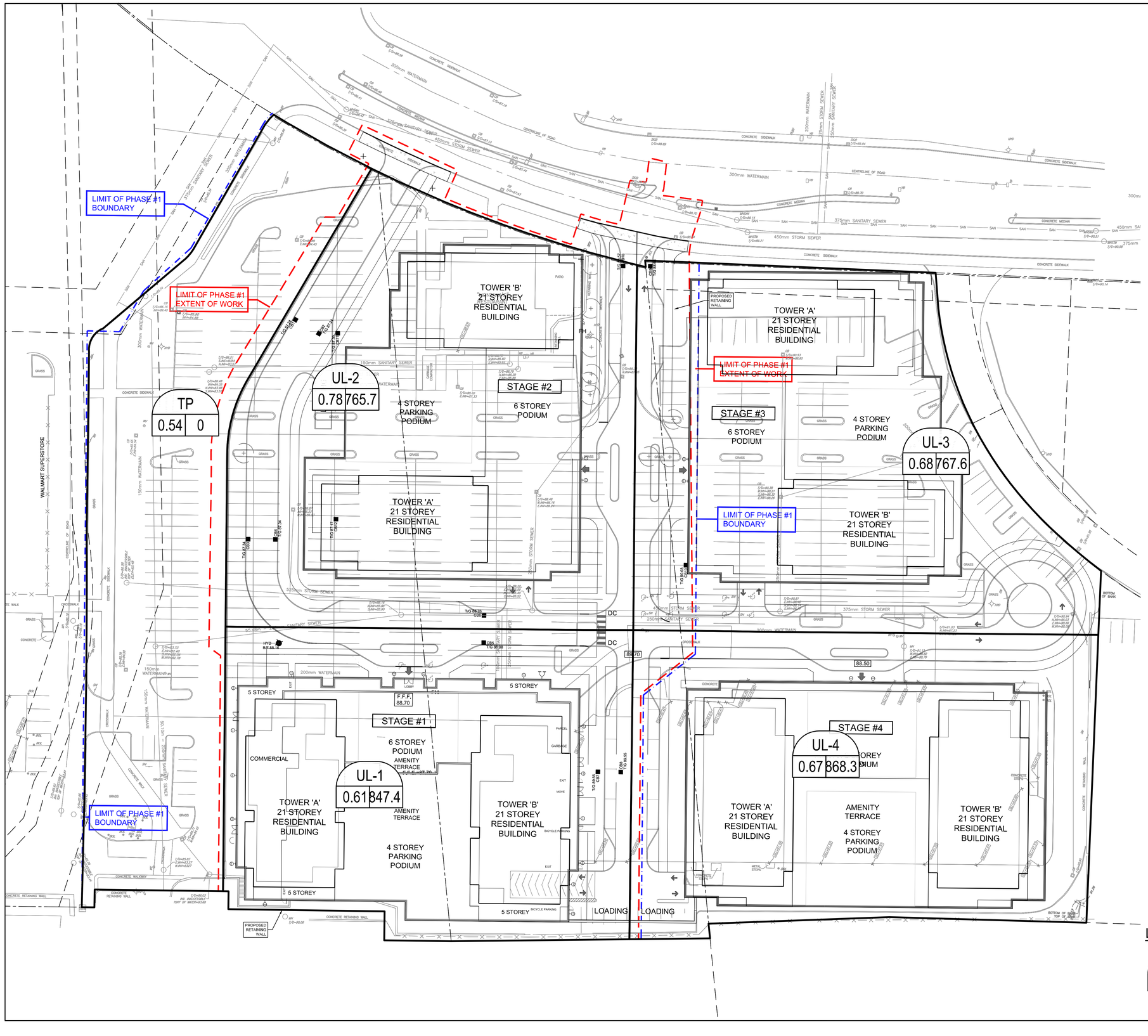
SHEET NUMBER	ISSUE
C-400	1

SCALE CHECK: 50mm

CITY FILE No. D07-XX-XX-XXXX

CITY PLAN No. xxxxx

File Location: J:\135853_SouthKeyPhs1\7.0_Production\7.03_Design\04_Civil\Sheets\C-400 SANITARY DRAINAGE AREA PLAN.dwg Last Saved: October 26, 2021, by DSiuma Plotted: Wednesday, October 27, 2021 9:43:51 AM by Don Siuma



Project North

LEGEND :

P1-1
0.54 | 235.6

- AREA NUMBER
- POPULATION (1.9 PERSONS PER UNIT)
- AREA IN HECTARES

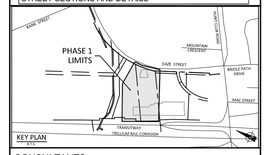
CLIENT

SMARTCENTRES®
REAL ESTATE INVESTMENT TRUST

ISSUES

No.	DESCRIPTION	DATE
1	ISSUED FOR SPA	2021-10-28
2		
3		
4		

SEE 010, 011, 012 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS



CONSULTANTS

Project Coordinator
IBI Group
Architect:
RLA Architectue
Landscape:
Levstek consultants
Surveyor:
Stantec
Geotech:
Paterson Group
Transportation Engineer:
IBI Group
Urban Planner:
Stantec

1:400 0 4 12 20m

SEAL

LICENSED PROFESSIONAL ENGINEER
J. I. MOFFATT
2021/10/28
PROVINCE OF ONTARIO

IBI GROUP
400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

PROJECT
SOUTH KEYS MALL
2200 BANK STREET
SOUTH PHASE - PHASE 1

PROJECT NO: 135853	
DRAWN BY: **D.P.S.**	CHECKED BY: **J.B.**
PROJECT MGR: **J.I.M.**	APPROVED BY: **J.I.M.**

SHEET TITLE
SANITARY DRAINAGE AREA PLAN MASTER PLAN

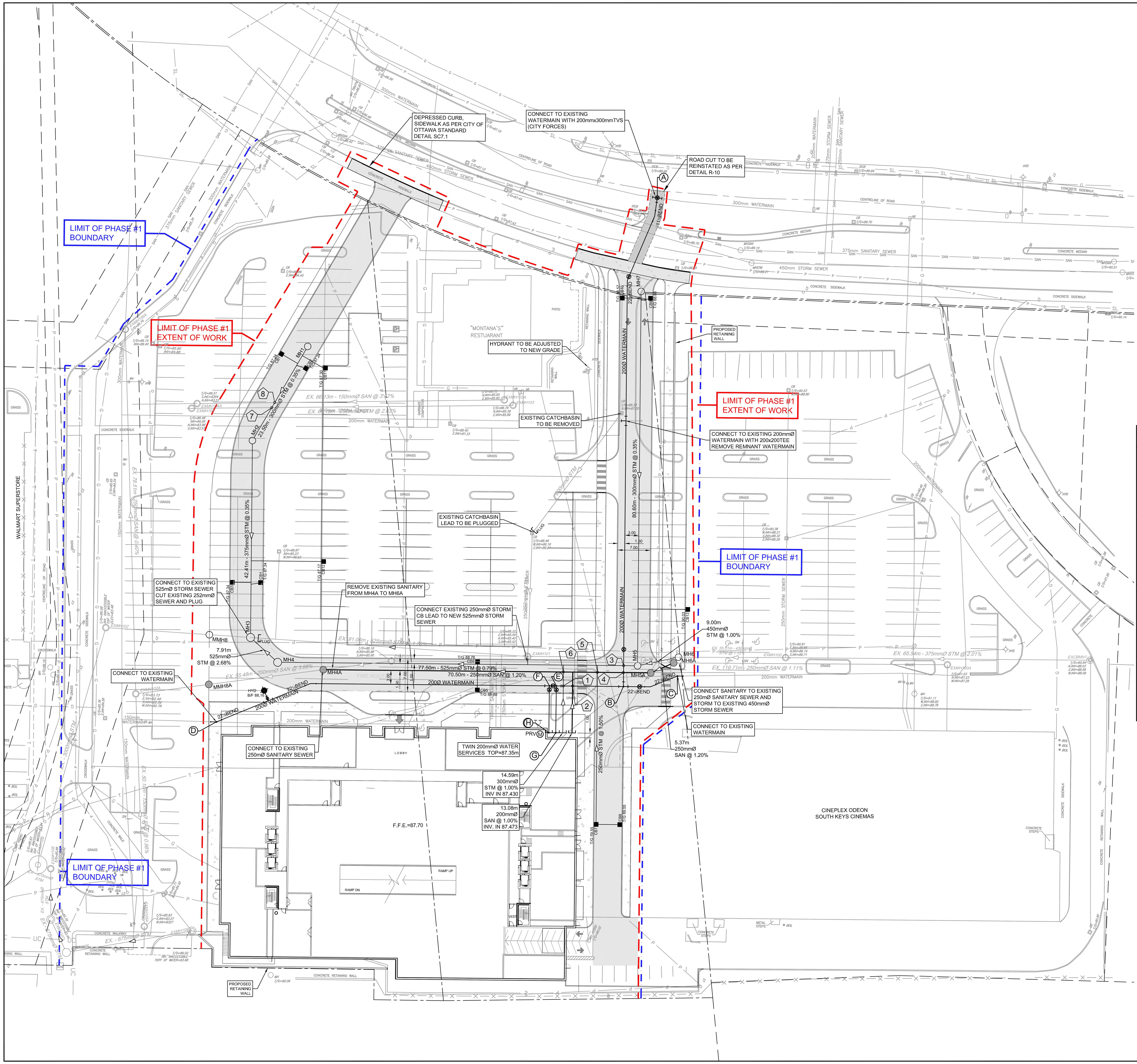
SHEET NUMBER	ISSUE
C-401	1

SCALE CHECK: 10cm

CITY FILE No. D07-XX-XX-XXXX

CITY PLAN No. xxxxx

File Location: J:\135853_SouthKeyPhs1\7.0_Production\7.03_Design\04_Civil\Sheets\C-401 SANITARY DRAINAGE PLAN MASTER PLAN.dwg Last Saved: October 26, 2021, by DSiuma Plotted: Wednesday, October 27, 2021 9:34:29 AM by Don Siuma



STM STRUCTURE TABLE

NAME	RIM ELEV.	INVERT IN	INVERT IN AS-BUILT	INVERT OUT	INVERT OUT AS-BUILT	DESCRIPTION
EXCBMH1	91.79			NW88.030		EXISTING CB MANHOLE
EXMH100	90.78	SE86.710		NW86.140		EXISTING MANHOLE
EXMH101	89.29	SE85.520 NE85.590		N85.400		EXISTING MANHOLE
EXMH102	86.09	S83.800		W84.590		EXISTING MANHOLE
MH1	87.38			W85.050		1200mmØ OPSD-701.010
MH2	87.62	E84.968		SW84.893		1200mmØ OPSD-701.010
MH3	87.76	NE84.744 S84.548		N84.349		1500mmØ OPSD-701.011
MH4	87.95	SE84.790		N84.760		1500mmØ OPSD-701.011
MH5	89.88	SE85.717 NE86.018		NW85.400		1200mmØ OPSD-701.010
MH6	90.36	SE85.882		NW85.807		1200mmØ OPSD-701.010
MH7	88.62			SW86.300		1200mmØ OPSD-701.010
MMH8	87.16	S84.193		N84.193		1200mmØ OPSD-701.010

SAN STRUCTURE TABLE

NAME	RIM ELEV.	INVERT IN	INVERT IN AS-BUILT	INVERT OUT	INVERT OUT AS-BUILT	DESCRIPTION
EXMH100A	91.03			NW87.230		1200mmØ OPSD-701.010
EXMH101A	88.48	SE85.900		NW85.880		1200mmØ OPSD-701.010
EXMH102A	86.32	SE83.728 SW82.780		NE82.480		1200mmØ OPSD-701.010
MH4A	88.23	SE85.505		NW85.309		1200mmØ OPSD-701.010
MH5A	90.05	SE86.381		NW86.351		1200mmØ OPSD-701.010
MH6A	90.35	SE86.575		NW86.445		1200mmØ OPSD-701.010
MMH8A	87.22	SE84.344		NW84.344		1200mmØ OPSD-701.010

WATERMAIN SCHEDULE

	Station	Description	Finished Grade	Top of Watermain	Watermain Cover	As Built Watermain
A	0+000.00	CONNECT TO EXISTING 300mmØ WITH 200TVS	88.67	±86.27	2.40	
	0+004.00	11.25 BEND	88.58	86.18	2.40	
	0+018.16	200V&VB	88.54	86.14	2.40	
	0+019.02	22.5 BEND	88.54	86.14	2.40	
	0+020.00	-	88.55	86.15	2.40	
	0+040.00	-	88.83	86.43	2.40	
	0+049.26	200mmØ TEE	88.97	86.57	2.40	
	0+060.00	-	89.13	86.73	2.40	
	0+080.00	-	89.36	86.96	2.40	
	0+098.46	200V&VB	89.64	87.24	2.40	
	0+100.00	-	89.67	87.27	2.40	
B	0+106.46	200mmø TEE	89.84	87.44	2.40	
C	0+000.00	CONNECT TO EXISTING 200mmØ WITH 22.5 BEND	90.30	±87.90	2.40	
	0+006.26	22.5 BEND	90.30	87.90	2.40	
	0+008.58	200V&VB	90.01	87.61	2.40	
B	0+012.06	200mmø TEE	89.84	87.44	2.40	
	0+020.00	-	89.54	87.14	2.40	
E	0+026.50	200mmø TEE FOR BUILDING SERVICE	89.35	86.95	2.40	
	0+027.25	200V&VB	89.33	86.93	2.40	
F	0+028.00	200mmø TEE FOR BUILDING SERVICE	89.31	86.91	2.40	
	0+040.00	-	88.99	86.59	2.40	
	0+060.00	-	88.55	86.15	2.40	
	0+079.47	22.5 BEND	88.13	85.73	2.40	
	0+080.00	-	88.11	85.71	2.40	
	0+089.24	150mmø HYDRANT TEE	87.80	85.40	2.40	
D	0+101.33	CONNECT TO EXISTING 200mmØ WITH 22.5 BEND	87.06	±84.66	2.40	
E	0+000.00	200mmø TEE FOR BUILDING SERVICE	89.35	86.95	2.40	
	0+000.83	200V&VB	89.36	86.96	2.40	
	0+005.00	-	89.62	87.22	2.40	
G	0+010.08	200mmØ CAP FOR BUILDING SERVICE	89.77	87.37	2.40	
F	0+000.00	200mmø TEE FOR BUILDING SERVICE	89.31	86.91	2.40	
	0+000.83	200V&VB	89.32	86.92	2.40	
	0+005.00	-	89.58	87.18	2.40	
H	0+010.08	200mmØ CAP FOR BUILDING SERVICE	89.73	87.33	2.40	

Pipe Interference Table

Crossing No.	PIPE 1	PIPE 2	Clearance
1	STM Bottom 87.320	WTR Top 87.016	0.304
2	SAN Bottom 87.366	WTR Top 87.065	0.301
3	WTR Bottom 87.107	STM Top 85.990	1.117
4	WTR Bottom 87.148	SAN Top 86.538	0.610
5	STM Bottom 88.001	SAN Top 86.471	1.530
6	STM Bottom 87.276	SAN Top 86.383	0.893
7	STM Bottom 84.988	STM Top 84.281	0.706
8	STM Bottom 84.992	SAN Top 84.214	0.778

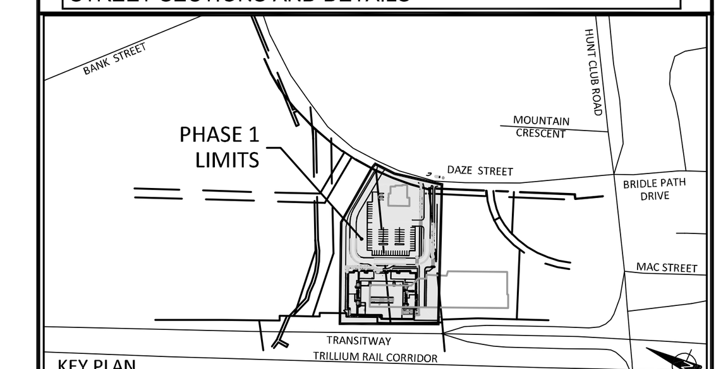
CLIENT

SMARTCENTRES® REAL ESTATE INVESTMENT TRUST

ISSUES

No.	DESCRIPTION	DATE
1	ISSUED FOR SPA	2021-10-28
2		
3		
4		

SEE 010, 011, 012 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS



KEY PLAN
N.T.S.

CONSULTANTS

Project Coordinator

Architect:
RLA Architectue
Landscape:
Levstek consultants
Surveyor:
Stantec
Geotech:
Paterson Group
Transportation Engineer:
IBI Group
Urban Planner:
Stantec

1:400 0 4 12 20m

SEAL

LICENSED PROFESSIONAL ENGINEER
J. I. MOFFATT
2021/10/28
PROVINCE OF ONTARIO

IBI GROUP
400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

PROJECT

SOUTH KEYS MALL
2200 BANK STREET

SOUTH PHASE - PHASE 1

PROJECT NO:
135853

DRAWN BY: **D.P.S.**
CHECKED BY: **J.B.**
PROJECT MGR: **J.I.M.**
APPROVED BY: **J.I.M.**

SHEET TITLE

SITE SERVICING PLAN

SHEET NUMBER: C-001
ISSUE: 1

CITY PLAN No. xxxxx

CITY FILE No. D07-XX-XX-XXXX

SCALE CHECK 1 in 10mm

File Location: J:\135853_SouthKeyPhs1\7.0_Production\7.03_Design\04_Civil\Sheets\C-001 SITE SERVICING PLAN.dwg Last Saved: October 27, 2021, by DSiurna Plotted: Wednesday, October 27, 2021 9:34:15 AM by Don Siurna

APPENDIX D

- Storm Sewer Design Sheet
- Drawing 135853 C-500 Storm Drainage Area Plan
- Runoff Coefficient Calculations
- Stormwater Management Calculations

IBI GROUP
400-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

STORM SEWER DESIGN SHEET

Storm Sewer Design Sheet Phase 1
2200 Bank Street
City of Ottawa
SmartCentres

LOCATION				AREA (Ha)										RATIONAL DESIGN FLOW												SEWER DATA								
STREET	AREA ID	FROM	TO	C= 0.00	C= 0.00	C= 0.00	C= 0.00	C= 0.00	C= 0.00	C= 0.46	C= 0.53	C= 0.54	C= 0.68	C= 0.78	C= 0.90	IND 2.78AC	CUM 2.78AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (2) (mm/hr)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	2yr PEAK FLOW (L/s)	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	FIXED FLOW (L/s)	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm) DIA	W	H	SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (2yr) (L/s)	(%)
Phase 1 Uncontrolled Flows																																					
Montana's Restaurant	4, MONTA	Ex MH 103	Ex MH 104											0.13	0.33	0.33	10.00	0.58	10.58	76.81	104.19	122.14	178.56	24.98					24.98	*100.61*	*69.19*	*250*			*2.63*	*1.986*	*75.63*	*75.17%*
Cinema and Outlets	1, 5	MH 1	MH2							0.08				0.07	0.28	0.28	10.00	0.48	10.48	76.81	104.19	122.14	178.56	21.31					21.31	59.68	23.50	300			0.35	0.818	38.37	64.30%
	2. 6	MH 2	MH 3								0.15			0.16	0.57	0.85	10.48	0.74	11.22	75.01	101.73	119.24	174.30	63.42					63.42	108.21	42.41	375			0.35	0.949	44.80	41.40%
	14, 15, MOVIES	ExCICB1	ExMH 100											0.99	2.48	2.48	11.00	0.48	11.48	73.17	99.19	116.25	169.91	181.23					*181.23*	*259.32*	*65.54*	*375*			*2.01*	*2.275*	*78.09*	*30.11%*
	11, 12, 13	ExMH 100	MH6											0.47	1.18	3.65	11.48	0.20	11.68	71.55	96.97	113.64	166.07	261.38					*261.38*	*314.77*	*23.00*	*450*			*1.12*	*1.917*	*53.40*	*16.96%*
		MH6	MH5											0.00	0.00	3.65	11.68	0.08	11.76	70.90	96.08	112.59	164.53	259.01					259.01	297.43	9.00	450			1.00	1.812	38.43	12.92%
																																			65.00			
	10, 16	MH7	MH5									0.12		0.10	0.43	0.43	10.00	1.64	11.64	76.81	104.19	122.14	178.56	33.05					33.05	59.68	80.60	300			0.35	0.818	26.63	44.62%
	7, 8, 9, BLD	MH5	MH4										0.14	0.62	1.82	5.90	11.76	0.61	12.38	70.64	95.72	112.16	163.90	416.71					416.71	470.56	77.55	525			1.10	2.106	53.84	11.44%
		MH4	MH3											0.00	0.00	5.90	12.38	0.06	12.44	68.74	93.12	109.10	159.40	405.53					405.53	470.56	7.91	525			1.10	2.106	65.03	13.82%
		MH3	ExTrunk											0.00	0.00	6.74	12.44	0.25	12.69	68.56	92.86	108.80	158.96	462.38					*462.38*	*470.56*	*31.50*	*525*			*1.10*	*2.106*	*8.18*	*1.74%*
Building Service lateral														0.39	0.98	0.98	10.00	0.18	10.18	76.81	104.19	122.14	178.56	74.94					74.94	100.88	14.59	300			1.00	1.383	25.94	25.71%
		The calculated runoff from the Phase 1 areas (All areas except areas 11 to 15 and MOVIES) is 212 l/s																																			
		The controlled flow from the Phase 1 area is 160l/s or 52 l/s less than the total uncontrolled flows.																																			
Phase 1 Controlled Flows		MH3	ExTrunk																										410.38	*470.56*	*31.50*	*525*			*1.10*	*2.106*	*60.18*	*12.79%*

Definitions:
Q = 2.78CiA, where:
Q = Peak Flow in Litres per Second (L/s)
A = Area in Hectares (Ha)
I = Rainfall intensity in millimeters per hour (mm/hr)
[i = 732.951 / (TC+6.199)^0.810] 2 YEAR
[i = 998.071 / (TC+6.053)^0.814] 5 YEAR
[i = 1174.184 / (TC+6.014)^0.816] 10 YEAR
[i = 1735.688 / (TC+6.014)^0.820] 100 YEAR

Notes:
1. Mannings coefficient (n) = 0.013
2. Initial T of C = 10 min

Designed: JM
Checked: JB
Dwg. Reference: 135853-500

No.	Revision	Date
1	Submission # 1 To City of Ottawa	2021-10-28
2		

File Reference: 135853.00
Date: 2021-10-28
Sheet No: 1 of 1

LIMIT OF PHASE #1 BOUNDARY

LIMIT OF PHASE #1 EXTENT OF WORK

LIMIT OF PHASE #1 EXTENT OF WORK

LIMIT OF PHASE #1 BOUNDARY

LIMIT OF PHASE #1 BOUNDARY

"MONTANA'S" RESTAURANT

CINEPLEX ODEON SOUTH KEYS CINEMAS

WALMART SUPERSTORE

PROPOSED RETAINING WALL

PROPOSED RETAINING WALL

F.F.E.=87.70

LEGEND :

P1-1 — AREA NUMBER
0.54 0.45 — RUNOFF COEFFICIENT
AREA IN HECTARES

CLIENT

SMARTCENTRES®
REAL ESTATE INVESTMENT TRUST

IBI Group Professional Services (Canada) Inc.
is a member of the IBI Group of companies

ISSUES

No.	DESCRIPTION	DATE
1	ISSUED FOR SPA	2021-10-28
2		
3		
4		

SEE 010, 011, 012 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS

KEY PLAN

CONSULTANTS

Project Coordinator

Architect:
RLA Architectue
Landscape:
Levstek consultants
Surveyor:
Stantec
Geotech:
Paterson Group
Transportation Engineer:
IBI Group
Urban Planner:
Stantec

SEAL

L'ICENSED PROFESSIONAL ENGINEER
J. I. MOFFATT
2021/10/28
PROVINCE OF ONTARIO

IBI GROUP
400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

PROJECT
SOUTH KEYS MALL
2200 BANK STREET

SOUTH PHASE - PHASE 1

PROJECT NO: 135853

DRAWN BY:	CHECKED BY:
D.P.S.	J.B.
PROJECT MGR:	APPROVED BY:
J.I.M.	J.I.M.

SHEET TITLE
STORM DRAINAGE AREA PLAN

SHEET NUMBER C-500 | ISSUE 1

SCALE CHECK

CITY FILE No. D07-XX-XX-XXXX

CITY PLAN No. xxxxx

File Location: J:\135853_SouthKey\Phase117.0_Production\7.03_Design\04_Civil\Sheets\C-500 STORM DRAINAGE AREA PLAN.dwg Last Saved: October 26, 2021 by DSuma Plotted: Wednesday, October 27, 2021 9:38:41 AM by Don Suma

$$Area\ 1\text{:}\ \frac{(315\ m^2\ \times 0.90) + (535m^2 \times 0.20)}{315\ m^2 + 535m^2} = 0.46$$

$$Area\ 2\text{:}\ \frac{(705\ m^2\ \times 0.90) + (807m^2 \times 0.20)}{705\ m^2 + 807m^2} = 0.53$$

$$Area\ 6\text{:}\ \frac{(1318\ m^2\ \times 0.90) + (300m^2 \times 0.20)}{1318\ m^2 + 300m^2} = 0.78$$

$$Area\ 8\text{:}\ \frac{(958\ m^2\ \times 0.90) + (435m^2 \times 0.20)}{958\ m^2 + 435m^2} = 0.68$$

$$Area\ 10\text{:}\ \frac{(590\ m^2\ \times 0.90) + (587m^2 \times 0.20)}{590\ m^2 + 587m^2} = 0.54$$

IBI GROUP
333 PRESTON STREET
OTTAWA, ON
K1S 5N4

PROJECT: South Keys - Ph1
DATE: 2021-10-24
FILE: 135853
REV #: 1
DESIGNED BY: JB
CHECKED BY: JIM

STORMWATER MANAGEMENT

Formulas and Descriptions

i_{2yr} = 1:2 year Intensity = 732.951 / $(T_c+6.199)^{0.810}$
i_{5yr} = 1:5 year Intensity = 998.071 / $(T_c+6.053)^{0.814}$
i_{100yr} = 1:100 year Intensity = 1735.688 / $(T_c+6.014)^{0.820}$
T_c = Time of Concentration (min)
C = Average Runoff Coefficient
A = Area (Ha)
Q = Flow = 2.78CiA (L/s)

Maximum Allowable Release Rate

Flow Allocation

C =	0.5	(Pre-Development)
T_c =	10	min
i_{2yr} =	104.19	mm/hr
A_{TOTAL} =	1.50	Ha
Q_{TOTAL} =	217.24	L/s

Uncontrolled Release ($Q_{uncontrolled}$ = 2.78*C*i_{100yr} *$A_{uncontrolled}$)

*Drainage area 10 is counted as uncontrolled and subtracted from the release rate

C =	0.675	
T_c =	10	min
i_{100yr} =	178.56	mm/hr
$A_{uncontrolled}$ =	0.120	Ha
$Q_{uncontrolled}$ =	40.21	L/s

Maximum Allowable Release Rate ($Q_{max\ allowable}$ = $Q_{restricted}$ - $Q_{uncontrolled}$)

$Q_{max\ allowable}$ = 177.03 L/s

MODIFIED RATIONAL METHOD (100-Year & 5-YearPonding)

Drainage Area 9 — Area (Ha) 0.140 — C = 0.99 — Restricted Flow Q_r (L/s)= 35.00

100-Year Ponding

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow Q_p=2.78xCi_{100yr}A (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)
7	211.67	81.56	35.00	46.56	19.55
9	188.25	72.54	35.00	37.54	20.27
10	178.56	68.80	35.00	33.80	**20.28**
11	169.91	65.47	35.00	30.47	20.11
13	155.11	59.76	35.00	24.76	19.32

Storage (m^3)

Overflow	Required	Surface	Cistern	Balance
0.00	20.28	7.24		13.04

Drainage Area 9 — Area (Ha) 0.140 — C = 0.90 — Restricted Flow Q_r (L/s)= 35.00

5-Year Ponding

T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow Q_p=2.78xCi_{5yr}A (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 5yr (m^3)
1	203.51	71.29	35.00	36.29	2.18
3	166.09	58.18	35.00	23.18	4.17
4	152.51	53.42	35.00	18.42	**4.42**
5	141.18	49.45	35.00	14.45	4.34
7	123.30	43.19	35.00	8.19	3.44

Storage (m^3)

Overflow	Required	Surface	Cistern	Balance
0.00	4.42	7.24	0.00	0.00

Drainage Area 9 — Area (Ha) 0.140 — C = 0.90 — Restricted Flow Q_r (L/s)= 35.00

2-Year Ponding

T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow Q_p=2.78xCi_{2yr}A (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
0	167.22	58.57	35.00	23.57	0.00
1	148.14	51.89	35.00	16.89	1.01
2	133.33	46.70	35.00	11.70	**1.40**
3	121.46	42.55	35.00	7.55	1.36
5	103.57	36.28	35.00	1.28	0.38

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	1.40	7.24	0	0.00

overflows to: 8

Drainage Area 8 — Area (Ha) 0.140 — C = 0.85 — Restricted Flow Q_r (L/s)= 37.00

100-Year Ponding

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow Q_p=2.78xCi_{100yr}A (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)
5	242.70	80.29	37.00	43.29	12.99
7	211.67	70.02	37.00	33.02	13.87
8	199.20	65.90	37.00	28.90	**13.87**
9	188.25	62.28	37.00	25.28	13.65
11	169.91	56.21	37.00	19.21	12.68

Storage (m^3)

Overflow	Required	Surface	Cistern	Balance
13.04	26.91	0.00	0.00	26.91

Drainage Area 8 — Area (Ha) 0.140 — C = 0.68 — Restricted Flow Q_r (L/s)= 37.00

5-Year Ponding

T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow Q_p=2.78xCi_{5yr}A (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 5yr (m^3)
-1	266.98	70.66	37.00	33.66	-2.02
1	203.51	53.86	37.00	16.86	1.01
2	182.69	48.35	37.00	11.35	**1.36**
3	166.09	43.96	37.00	6.96	1.25
5	141.18	37.36	37.00	0.36	0.11

Storage (m^3)

Overflow	Required	Surface	Cistern	Balance
13.04	14.40	0.00	0.00	14.40

Drainage Area 8 — Area (Ha) 0.140 — C = 0.68 — Restricted Flow Q_r (L/s)= 37.00

2-Year Ponding

T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow Q_p=2.78xCi_{2yr}A (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
-1	192.83	51.03	37.00	14.03	-0.84
0	167.22	44.26	37.00	7.26	0.00
1	148.14	39.21	37.00	2.21	**0.13**
2	133.33	35.29	37.00	-1.71	-0.21
4	111.72	29.57	37.00	-7.43	-1.78

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	0.13	0.00	0	0.13

overflows to: 2

Drainage Area 2 — Area (Ha) 0.150 — C = 0.40 — Restricted Flow Q_r (L/s)= 15.00 — 2

100-Year Ponding

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow Q_p=2.78xCi_{100yr}A (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)
7	211.67	35.31	15.00	20.31	8.53
9	188.25	31.40	15.00	16.40	8.86
10	178.56	29.78	15.00	14.78	**8.87**
11	169.91	28.34	15.00	13.34	8.80
13	155.11	25.87	15.00	10.87	8.48

Storage (m^3)

Overflow	Required	Surface	Cistern	Balance
26.91	35.78	22.78		13.00

Drainage Area 2 — Area (Ha) 0.150 — C = 0.32 — Restricted Flow Q_r (L/s)= 15.00

5-Year Ponding

T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow Q_p=2.78xCi_{5yr}A (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 5yr (m^3)
0	230.48	30.76	15.00	15.76	0.00
2	182.69	24.38	15.00	9.38	1.13
3	166.09	22.16	15.00	7.16	**1.29**
4	152.51	20.35	15.00	5.35	1.28
6	131.57	17.56	15.00	2.56	0.92

Storage (m^3)

Overflow	Required	Surface	Cistern	Balance
26.91	28.20	22.78	0.00	5.42

Drainage Area 2 — Area (Ha) 0.150 — C = 0.32 — Restricted Flow Q_r (L/s)= 15.00

2-Year Ponding

T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow Q_p=2.78xCi_{2yr}A (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
0	167.22	22.31	15.00	7.31	0.00
1	148.14	19.77	15.00	4.77	0.29
2	133.33	17.79	15.00	2.79	**0.33**
3	121.46	16.21	15.00	1.21	0.22
5	103.57	13.82	15.00	-1.18	-0.35

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	0.33	22.78	0	0.00

overflows to: 1

Drainage Area 1 — Area (Ha) 0.080 — C = 0.56 — Restricted Flow Q_r (L/s)= 15.00 — 2

100-Year Ponding

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow Q_p=2.78xCi_{100yr}A (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)
4	262.41	32.83	15.00	17.83	4.28
6	226.01	28.27	15.00	13.27	4.78
7	211.67	26.48	15.00	11.48	**4.82**
8	199.20	24.92	15.00	9.92	4.76
10	178.56	22.34	15.00	7.34	4.40

Storage (m^3)

Overflow	Required	Surface	Cistern	Balance
33.62	38.44	31.98		6.46

*balance of 6.46 m^3 would be accodated within CB structures, therefore, no water would leave site during 100 year storm

Drainage Area 1 — Area (Ha) 0.080 — C = 0.45 — Restricted Flow Q_r (L/s)= 15.00

5-Year Ponding

T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow Q_p=2.78xCi_{5yr}A (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 5yr (m^3)
-1	266.98	26.72	15.00	11.72	-0.70
1	203.51	20.37	15.00	5.37	0.32
2	182.69	18.28	15.00	3.28	**0.39**
3	166.09	16.62	15.00	1.62	0.29
5	141.18	14.13	15.00	-0.87	-0.26

Storage (m^3)

Overflow	Required	Surface	Cistern	Balance
33.62	34.02	31.98	0.00	2.04

Drainage Area 1 — Area (Ha) 0.080 — C = 0.45 — Restricted Flow Q_r (L/s)= 15.00

2-Year Ponding

T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow Q_p=2.78xCi_{2yr}A (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
-2	229.26	22.94	15.00	7.94	-0.95
-1	192.83	19.30	15.00	4.30	-0.26
0	167.22	16.74	15.00	1.74	**0.00**
1	148.14	14.83	15.00	-0.17	-0.01
3	121.46	12.16	15.00	-2.84	-0.51

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	0.00	31.98	0	0.00

overflows to: offsite

Drainage Area	Montana				
Area (Ha)	0.070				
C =	0.99	Restricted Flow Q_r (L/s)=	4.00		2

100-Year Ponding

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)
40	75.15	14.48	4.00	10.48	25.14
42	72.57	13.98	4.00	9.98	25.15
43	71.35	13.75	4.00	9.75	**25.15**
44	70.18	13.52	4.00	9.52	25.13
46	67.96	13.09	4.00	9.09	25.10

Storage (m^3)

Overflow	Required	Surface	Cistern	Balance
0.00	25.15	31.98		0.00

Drainage Area	Montana				
Area (Ha)	0.070				
C =	0.90	Restricted Flow Q_r (L/s)=	4.00		

5-Year Ponding

T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)
20	70.25	12.30	4.00	8.30	9.96
22	66.15	11.58	4.00	7.58	10.01
23	64.29	11.26	4.00	7.26	**10.02**
24	62.54	10.95	4.00	6.95	10.01
26	59.35	10.39	4.00	6.39	9.97

Storage (m^3)

Overflow	Required	Surface	Cistern	Balance
0.00	10.02	31.98	0.00	0.00

Drainage Area	Montana				
Area (Ha)	0.070				
C =	0.90	Restricted Flow Q_r (L/s)=	4.00		

2-Year Ponding

T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
15	61.77	10.82	4.00	6.82	6.14
16	59.50	10.42	4.00	6.42	6.16
17	57.42	10.06	4.00	6.06	**6.18**
18	55.49	9.72	4.00	5.72	6.18
20	52.03	9.11	4.00	5.11	6.14

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	6.18	31.98	0	0.00

Drainage Area	4				
Area (Ha)	0.060				
C =	0.99	Restricted Flow Q_r (L/s)=	10.00		2

100-Year Ponding

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)
12	162.13	26.77	10.00	16.77	12.08
14	148.72	24.56	10.00	14.56	12.23
15	142.89	23.60	10.00	13.60	**12.24**
16	137.55	22.71	10.00	12.71	12.21
18	128.08	21.15	10.00	11.15	12.04

Storage (m^3)

Overflow	Required	Surface	Cistern	Balance
0.00	12.24	13.00		0.00

Drainage Area	4				
Area (Ha)	0.060				
C =	0.90	Restricted Flow Q_r (L/s)=	10.00		

5-Year Ponding

T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)
5	141.18	21.19	10.00	11.19	3.36
7	123.30	18.51	10.00	8.51	3.57
8	116.11	17.43	10.00	7.43	**3.57**
9	109.79	16.48	10.00	6.48	3.50
11	99.19	14.89	10.00	4.89	3.23

Storage (m^3)

Overflow	Required	Surface	Cistern	Balance
0.00	3.57	13.00	0.00	0.00

Drainage Area	4				
Area (Ha)	0.060				
C =	0.90	Restricted Flow Q_r (L/s)=	10.00		

2-Year Ponding

T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
3	121.46	18.23	10.00	8.23	1.48
4	111.72	16.77	10.00	6.77	1.63
5	103.57	15.55	10.00	5.55	**1.66**
6	96.64	14.51	10.00	4.51	1.62
8	85.46	12.83	10.00	2.83	1.36

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	1.66	13.00	0	0.00

overflows to: 5

Drainage Area	5				
Area (Ha)	0.070				
C =	0.99	Restricted Flow Q_r (L/s)=	6.00		2

100-Year Ponding

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)
25	103.85	20.01	6.00	14.01	21.01
27	98.66	19.01	6.00	13.01	21.07
28	96.27	18.55	6.00	12.55	**21.08**
29	94.01	18.11	6.00	12.11	21.08
31	89.83	17.31	6.00	11.31	21.03

Storage (m^3)

Overflow	Required	Surface	Cistern	Balance
0.00	21.08	0.46		20.62

Drainage Area	5				
Area (Ha)	0.070				
C =	0.90	Restricted Flow Q_r (L/s)=	6.00		

5-Year Ponding

T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)
13	90.63	15.87	6.00	9.87	7.70
15	83.56	14.63	6.00	8.63	7.77
16	80.46	14.09	6.00	8.09	**7.77**
17	77.61	13.59	6.00	7.59	7.74
19	72.53	12.70	6.00	6.70	7.64

Storage (m^3)

Overflow	Required	Surface	Cistern	Balance
0.00	7.77	0.46	0.00	7.31

Drainage Area	5				
Area (Ha)	0.070				
C =	0.90	Restricted Flow Q_r (L/s)=	6.00		

2-Year Ponding

T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
9	80.87	14.16	6.00	8.16	4.41
10	76.81	13.45	6.00	7.45	4.47
11	73.17	12.81	6.00	6.81	**4.50**
12	69.89	12.24	6.00	6.24	4.49
14	64.23	11.25	6.00	5.25	4.41

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	4.50	0.46	0	4.04

overflows to: 1

Drainage Area	7				
Area (Ha)	0.080				
C =	0.99	Restricted Flow Q_r (L/s)=	12.00		2

100-Year Ponding

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)
14	148.72	32.75	12.00	20.75	17.43
16	137.55	30.29	12.00	18.29	17.55
17	132.63	29.20	12.00	17.20	**17.55**
18	128.08	28.20	12.00	16.20	17.50
20	119.95	26.41	12.00	14.41	17.29

Storage (m^3)

Overflow	Required	Surface	Cistern	Balance
0.00	17.55	18.00		0.00

Drainage Area	7				
Area (Ha)	0.080				
C =	0.90	Restricted Flow Q_r (L/s)=	12.00		

5-Year Ponding

T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)
5	141.18	28.26	12.00	16.26	4.88
7	123.30	24.68	12.00	12.68	5.33
8	116.11	23.24	12.00	11.24	**5.40**
9	109.79	21.98	12.00	9.98	5.39
11	99.19	19.85	12.00	7.85	5.18

Storage (m^3)

Overflow	Required	Surface	Cistern	Balance
0.00	5.40	18.00	0.00	0.00

Drainage Area	7				
Area (Ha)	0.080				
C =	0.90	Restricted Flow Q_r (L/s)=	12.00		

2-Year Ponding

T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
4	111.72	22.36	12.00	10.36	2.49
5	103.57	20.73	12.00	8.73	2.62
6	96.64	19.34	12.00	7.34	**2.64**
7	90.66	18.15	12.00	6.15	2.58
9	80.87	16.19	12.00	4.19	2.26

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	2.64	18.00	0	0.00

overflows to: 6

Drainage Area	6				
Area (Ha)	0.160				
C =	0.96	Restricted Flow Q_r (L/s)=	11.00		

100-Year Ponding

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)
31	89.83	38.46	11.00	27.46	51.07
33	86.03	36.83	11.00	25.83	51.15
34	84.27	36.08	11.00	25.08	**51.16**
35	82.58	35.35	11.00	24.35	51.14
37	79.42	34.00	11.00	23.00	51.06

Storage (m^3)

Overflow	Required	Surface	Cistern	Balance
0.00	51.16	53.46		0.00

Drainage Area	6				
Area (Ha)	0.160				
C =	0.77	Restricted Flow Q_r (L/s)=	11.00		

5-Year Ponding

T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)
14	86.93	29.77	11.00	18.77	15.77
16	80.46	27.56	11.00	16.56	15.89
17	77.61	26.58	11.00	15.58	**15.89**
18	74.97	25.68	11.00	14.68	15.85
20	70.25	24.06	11.00	13.06	15.67

Storage (m^3)

Overflow	Required	Surface	Cistern	Balance
0.00	15.89	53.46	0.00	0.00

Drainage Area	6				
Area (Ha)	0.160				
C =	0.77	Restricted Flow Q_r (L/s)=	11.00		

2-Year Ponding

T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
10	76.81	26.31	11.00	15.31	9.18
11	73.17	25.06	11.00	14.06	9.28
12	69.89	23.94	11.00	12.94	**9.32**
13	66.93	22.92	11.00	11.92	9.30
15	61.77	21.16	11.00	10.16	9.14

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	9.32	53.46	0	0.00

overflows to: 2

Drainage Area	PH1 Tower				
Area (Ha)	0.400				
C =	0.99	Restricted Flow Q_r (L/s)=	15.00		2

100-Year Ponding

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)
60	55.89	61.53	15.00	46.53	167.52
62	54.54	60.05	15.00	45.05	167.57
63	53.89	59.33	15.00	44.33	**167.57**
64	53.26	58.64	15.00	43.64	167.56
66	52.05	57.30	15.00	42.30	167.50

Storage (m^3)

Overflow	Required	Surface	Cistern	Balance
0.00	167.57		170.00	0.00

Drainage Area	PH1 Tower				
Area (Ha)	0.400				
C =	0.90	Restricted Flow Q_r (L/s)=	15.00		

5-Year Ponding

T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)
32	51.61	51.65	15.00	36.65	70.37
34	49.50	49.54	15.00	34.54	70.46
35	48.52	48.56	15.00	33.56	**70.47**
36	47.58	47.61	15.00	32.61	70.45
38	45.81	45.85	15.00	30.85	70.33

Storage (m^3)

Overflow	Required	Surface	Cistern	Balance
0.00	70.47	0.00	170.00	0.00

Drainage Area	PH1 Tower				
Area (Ha)	0.400				
C =	0.90	Restricted Flow Q_r (L/s)=	15.00		

2-Year Ponding

T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
24	46.37	46.41	15.00	31.41	45.23
25	45.17	45.20	15.00	30.20	45.30
26	44.03	44.06	15.00	29.06	**45.34**
27	42.95	42.98	15.00	27.98	45.33
29	40.96	41.00	15.00	26.00	45.23

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	45.34	0.00	170	0.00

APPENDIX E

- Drawing 135853 C-600 Ponding Plan

LIMIT OF PHASE #1 BOUNDARY

LIMIT OF PHASE #1 EXTENT OF WORK

POND ID	1
TOP OF GRATE (m)	87.24
STATIC ELEV (m)	87.54
STATIC DEPTH (m)	0.30
STATIC VOLUME (m³)	31.98

POND ID	2
TOP OF GRATE (m)	87.30
STATIC ELEV (m)	87.45
STATIC DEPTH (m)	0.15
STATIC VOLUME (m³)	0.46

POND ID	3
TOP OF GRATE (m)	87.34
STATIC ELEV (m)	87.60
STATIC DEPTH (m)	0.26
STATIC VOLUME (m³)	22.78

POND ID	4
TOP OF GRATE (m)	87.17
STATIC ELEV (m)	87.64
STATIC DEPTH (m)	0.47
STATIC VOLUME (m³)	53.46

POND ID	5
TOP OF GRATE (m)	89.55
STATIC ELEV (m)	89.70
STATIC DEPTH (m)	0.15
STATIC VOLUME (m³)	7.24

POND ID	6
TOP OF GRATE (m)	90.03
STATIC ELEV (m)	90.18
STATIC DEPTH (m)	0.15
STATIC VOLUME (m³)	1.61

"MONTANA'S" RESTUARANT

CINEPLEX ODEON SOUTH KEYS CINEMAS

"WALMART SUPERSTORE"

LOBBY

F.F.E.=87.70

RAMP UP

RAMP DN

TIE INTO EXISTING GRADE

TIE INTO EXISTING ASHPHALT WITH NEW CURB

TIE INTO EXISTING CONCRETE SIDEWALK (TYP)

TERRACE 3:1 AS NEEDED

PROPOSED RETAINING WALL

TERRACE 3:1 TO EXISTING GRADE

TERRACE 3:1 TO EXISTING GROUND

REMOVE ASPHALT AND REGRADE TO ACHIVE DRAINAGE TO NEW CB11

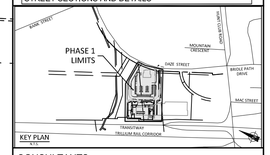
TIE INTO EXISTING ASHPHALT WITH NEW CURB

TIE INTO EXISTING ASHPHALT LIMIT OF CONSTRUCTION

SWALE

CONCRETE RETAINING WALL

SEE 010, 011, 012 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS



Project North

1:400 0 4 12 20m

CLIENT

SMARTCENTRES® REAL ESTATE INVESTMENT TRUST

ISSUES

No.	DESCRIPTION	DATE
1	ISSUED FOR SPA	2021-10-28
2		
3		
4		

CONSULTANTS

Project Coordinator

Architect:
RLA Architectue
Landscape:
Levstek consultants
Surveyor:
Stantec
Geotech:
Paterson Group
Transportation Engineer:
IBI Group
Urban Planner:
Stantec

SEAL

LICENSED PROFESSIONAL ENGINEER
J. I. MOFFATT
2021/10/28
PROVINCE OF ONTARIO

IBI GROUP
400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

PROJECT
SOUTH KEYS MALL
2200 BANK STREET

SOUTH PHASE - PHASE 1

PROJECT NO: 135853	
DRAWN BY: D.P.S.	CHECKED BY: J.B.
PROJECT MGR: J.I.M.	APPROVED BY: J.I.M.

SHEET TITLE
SITE PONDING PLAN

SHEET NUMBER	ISSUE
C-600	1

CITY FILE No. D07-XX-XX-XXXX

CITY PLAN No. xxxxx

File Location: J:\135853_SouthKeyPhs1\7.0_Production\7.03_Design\04_Civil\Sheets\C-600\SITE PONDING PLAN.dwg Last Saved: October 26, 2021 by DSiuma Plotted: Wednesday, October 27, 2021 9:35:24 AM by Don Siuma

APPENDIX F

- Drawing 135853 C-900 Erosion and Sedimentation Control Plan
- Drawing 135853 C-200 Grading and Drainage Plan

LIMIT OF PHASE #1 BOUNDARY

LIMIT OF PHASE #1 EXTENT OF WORK

DEPRESSED CURB, SIDEWALK AS PER CITY OF OTTAWA STANDARD DETAIL SC7.1

CONNECT TO EXISTING WATERMAIN WITH 200mmx300mmTVS (CITY FORCES)

ROAD CUT TO BE REINSTATED AS PER DETAIL R-10

"MONTANA'S" RESTUARANT

HYDRANT TO BE ADJUSTED TO NEW GRADE

PROPOSED RETAINING WALL

EXISTING CATCHBASIN TO BE REMOVED

CONNECT TO EXISTING 200mmØ WATERMAIN WITH 200x200TEE REMOVE REMINANT WATERMAIN

EXISTING CATCHBASIN LEAD TO BE PLUGGED

LIMIT OF PHASE #1 BOUNDARY

CONNECT TO EXISTING 525mØ STORM SEWER CUT EXISTING 250mmØ SEWER AND PLUG

REMOVE EXISTING SANITARY FROM MH4A TO MH8A

CONNECT EXISTING 250mmØ STORM CB LEAD TO NEW 525mmØ STORM SEWER

CONNECT TO EXISTING WATERMAIN

CONNECT SANITARY TO EXISTING 250mØ SANITARY SEWER AND STORM TO EXISTING 450mmØ STORM SEWER

CONNECT TO EXISTING WATERMAIN

CONNECT TO EXISTING 250mØ SANITARY SEWER

TWIN 200mmØ WATER SERVICES TOP=87.35m

LIMIT OF PHASE #1 BOUNDARY

PROPOSED RETAINING WALL

WALMART SUPERSTORE

CINEPLEX ODEON SOUTH KEYS CINEMAS

F.F.E.=87.70

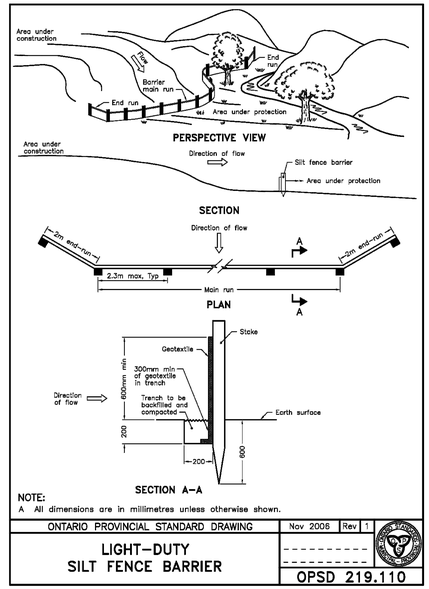
LEGEND :

- LIGHT DUTY SILT FENCE AS PER OPSD-219.110
- CUSTOM SILT FENCE (AS PER DETAIL)
- CB — SILT SACK PLACED UNDER EXISTING CB COVER OR MH COVER
- TEMPORARY MUD MAT 0.15m THICK 50mm CLEAR STONE ON NON WOVEN FILTER CLOTH (7.0 x 15.0)

NOTES:

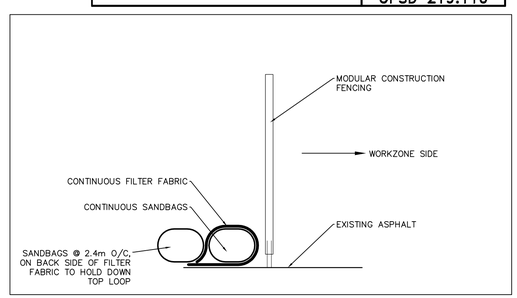
THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY,

1. SILT FENCE TO BE ERECTED PRIOR TO EARTH WORKS BEING COMMENCED. SILT FENCE TO BE MAINTAINED UNTIL VEGETATION IS ESTABLISHED OR UNTIL START OF SUBSEQUENT PHASE.
2. STRAW BALE SEDIMENT TRAPS TO BE CONSTRUCTED IN EXISTING ROAD SIDE DITCHES. TRAPS TO REMAIN AND BE MAINTAINED UNTIL VEGETATION IS ESTABLISHED.
3. SILT SACK TO BE PLACED AND MAINTAINED UNDER COVER OF ALL CATCHBASINS. GEOTEXTILE SILT SACK IN STREET CBs TO REMAIN UNTIL ALL CURBS ARE CONSTRUCTED. GEOTEXTILE FABRIC IN RYCBs TO REMAIN UNTIL VEGETATION IS ESTABLISHED. ALL CATCHBASINS TO BE REGULARLY INSPECTED AND CLEANED, AS NECESSARY, UNTIL SOD AND CURBS ARE CONSTRUCTED.
4. CONTRACTOR TO PROVIDE DETAILS ON LOCATION(S) AND DESIGN OF DEWATERING TRAP(S) PRIOR TO COMMENCING WORK. CONTRACTOR ALSO RESPONSIBLE FOR MAINTAINING TRAP(S) AND ADJUSTING SIZE(S) IF DEEMED REQUIRED BY THE ENGINEER DURING CONSTRUCTION.
5. CONTRACTOR TO PROTECT EXISTING CATCHBASINS WITH FILTER CLOTH UNDER THE COVERS TO TRAP SEDIMENTATION. REFER TO IDENTIFIED STRUCTURES.
6. WORKS NOTED ABOVE ARE TO BE INSTALLED, INSPECTED, MAINTAINED AND ULTIMATELY REMOVED BY SERVICING CONTRACTOR.
7. THIS IS A "LIVING DOCUMENT" AND MAY BE MODIFIED IN THE EVENT THE PROPOSED CONTROL MEASURES ARE INSUFFICIENT



NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2006	Rev	1
LIGHT–DUTY SILT FENCE BARRIER			OPSD 219.110



CUSTOM SILT FENCE DETAIL FOR SITE PERIMETER LOCATION AS REQUIRED

CLIENT

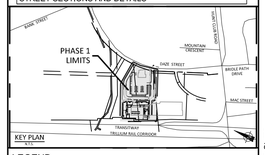
SMARTCENTRES® REAL ESTATE INVESTMENT TRUST

IBI Group Professional Services (Canada) Inc.
is a member of the IBI Group of companies

ISSUES

No.	DESCRIPTION	DATE
1	ISSUED FOR SPA	2021-10-28
2		
3		
4		

SEE 010, 011, 012 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS



LEGEND

Project Coordinator

Architect:
RLA Architectue
Landscape:
Levstek consultants
Surveyor:
Stantec
Geotech:
Paterson Group
Transportation Engineer:
IBI Group
Urban Planner:
Stantec

1:400 0 4 12 20m

SEAL

LICENSED PROFESSIONAL ENGINEER J. I. MOFFATT 2021-10-28 PROVINCE OF ONTARIO

IBI GROUP
Suite 400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 / 613 241 3300 fax 613 225 9868
ibigroup.com

PROJECT
SOUTH KEYS MALL
2200 BANK STREET

SOUTH PHASE - PHASE 1

PROJECT NO: 135853

DRAWN BY:	CHECKED BY:
D.P.S.	J.B.
PROJECT MGR:	APPROVED BY:
J.I.M.	J.I.M.

SHEET TITLE
EROSION AND SEDIMENTATION CONTROL PLAN

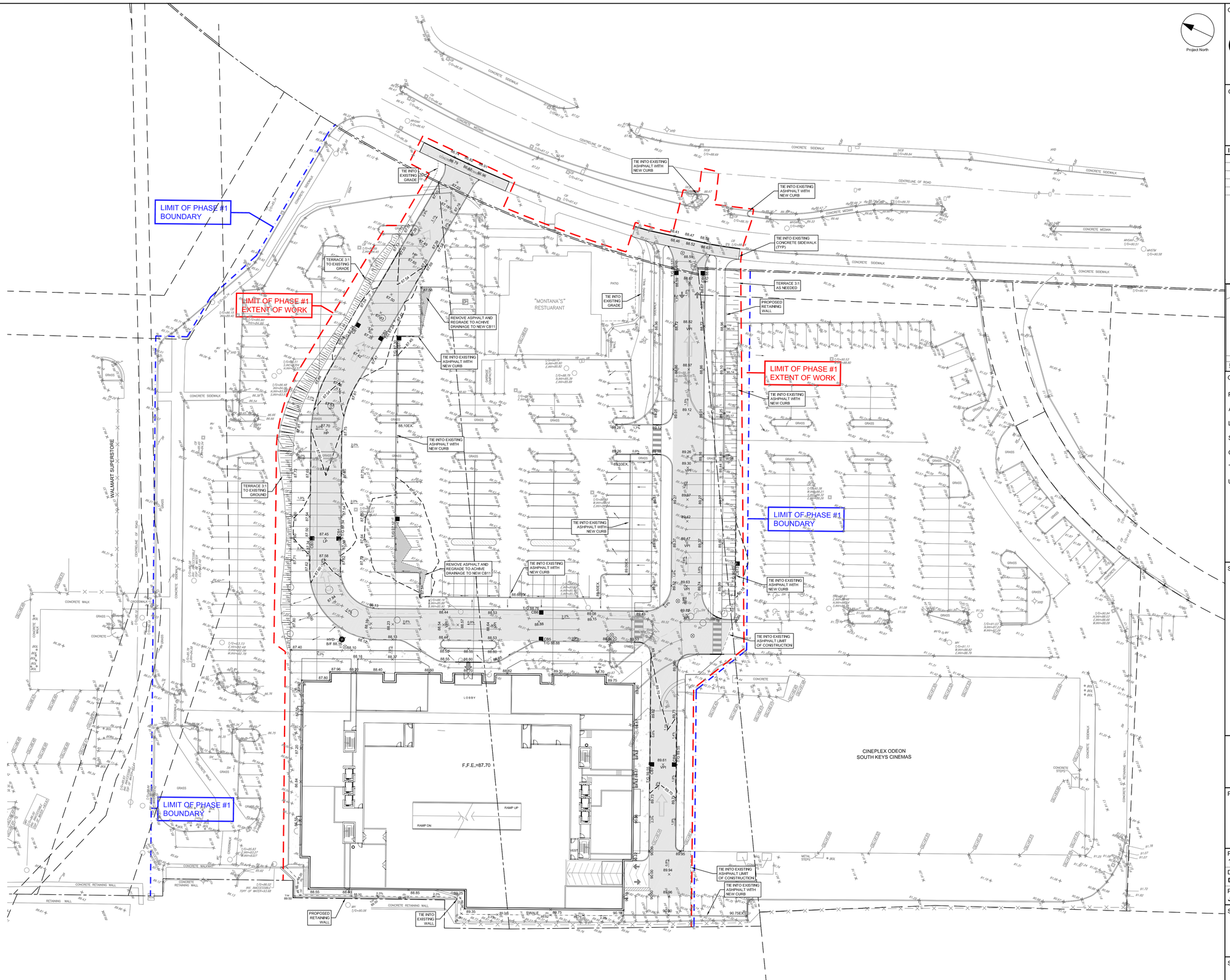
SHEET NUMBER	ISSUE
C-900	1

SCALE CHECK 1:400

CITY FILE No. D07-xx-xx-xxxx

CITY PLAN No. xxxxx

File Location: J:\135853_SouthKeysPhs1\7.0_Production\7.03_Design\04_Civil\Sheets\C-900 EROSION AND SEDIMENTATION CONTROL PLAN.dwg Last Saved: October 26, 2021 by DSiuma Plotted: Wednesday, October 27, 2021 9:35:33 AM by Don Siuma



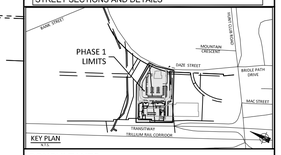
CLIENT

SMARTCENTRES®
REAL ESTATE INVESTMENT TRUST

ISSUES

No.	DESCRIPTION	DATE
1	ISSUED FOR SPA	2021-10-28
2		
3		
4		

SEE 010, 011, 012 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS



CONSULTANTS

Project Coordinator
IBI Group
Architect:
RLA Architectue
Landscape:
Levstek consultants
Surveyor:
Stantec
Geotech:
Paterson Group
Transportation Engineer:
IBI Group
Urban Planner:
Stantec

1:400 0 4 12 20m

SEAL

LICENSED PROFESSIONAL ENGINEER
J. I. MOFFATT
2021/10/28
PROVINCE OF ONTARIO

IBI GROUP
400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

PROJECT

SOUTH KEYS MALL
2200 BANK STREET

SOUTH PHASE -PHASE 1

PROJECT NO: 135853	
DRAWN BY: **D.P.S.**	CHECKED BY: **J.B.**
PROJECT MGR: **J.I.M.**	APPROVED BY: **J.I.M.**

SHEET TITLE

GRADING AND DRAINAGE PLAN

SHEET NUMBER	ISSUE
C-200	1

SCALE CHECK

CITY FILE No. D07-XX-XX-XXXX

CITY PLAN No. xxxxx

File Location: J:\135853_SouthKeysPhs1\7.0_Production\7.03_Design\04_Civil\Sheets\C-200 SITE GRADING PLAN.dwg Last Saved: October 27, 2021 by DSiuma Plotted: Wednesday, October 27, 2021 10:12:25 AM by Don Siuma