Canada Lands Company
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Public Services and Procurement Canada
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Tunney's Pasture - Site Servicing and Public Road Redevelopment
Assessment of Adequacy of Public Services, Municipal Infrastructure

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1 INTRODUCTION

In 2021, Public Service and Procurement Canada (PSPC) partnered with CLC under a collaboration project to leverage the strengths of each organization to deliver the long-term vision of Tunney's Pasture that includes the site's transition from a federal employment centre into a mixed-use, sustainable, transit-oriented community. CLC is a self-financing federal Crown corporation specializing in real estate and development with a mandate to transform former Government of Canada properties and reintegrates them into local communities while ensuring their long-term goals. Since the launch of this collaboration project, CLC has been committed to working with the community to define amendments to the TPMP and proposed upgrades to the existing roadway and servicing infrastructure that support both federal priorities and future development.

Arcadis IBI Group was retained by Canada Lands Company (CLC) and Public Service and Procurement Canada (PSPC) to assist in the transformation of the Tunney's Pasture federal government campus (herein referred to as the 'Campus') to a mixed used development with publicly owned roads and a mixture of private and publicly owned buildings through the Draft Plan of Subdivision process. Copy of proposed Draft Plan is included in Appendix 1. This report supports the Draft Plan Application for the subject lands by demonstrating the conceptual servicing of municipal infrastructure including water supply, wastewater collection and disposal and storm sewers and stormwater management within the Proposed Right of Ways (ROW). The newly created Right of Ways (ROW) to be conveyed to the City of Ottawa will serve as a framework to facilitate the long-term redevelopment of individual property parcels within the Campus.

Tunney's Pasture presently exists as a single-use government workplace campus which was built primarily in the 1950s and 1960s in accordance with the 1950 Gréber Plan and is currently owned and operated by the federal government. The Campus is approximately 49 hectares in size and is located about four kilometres west of Parliament Hill in the City of Ottawa, Ontario. The site is bound by the Ottawa Riverfront to the north, as well as established communities, including Laroche Park to the east, Wellington West/Hintonburg to the south and Champlain Park to the west.

The Tunney's Pasture Master Plan (TPMP), approved in September 2014, was prepared to guide the development of the site into a sustainable, transit-oriented, mixed-use community and federal employment node over the next 25 years. The TPMP envisioned office and employment opportunities for approximately 22,000 to 25,000 employees and approximately 3,400 to 3,700 dwelling units.

The ensuing report, an assessment of existing services (water, sanitary sewers, storm sewers), was prepared to inform the Infrastructure Upgrade and Divestiture Strategy Report. For the purposes of this assessment, we are using the employee and residential population estimates from the Massing Model Statistics dated October 30, 2023. The Massing Model Statistics estimate that the campus redevelopment will provide for a total of 6,867 federal/retail employees, 3,200 students, and a residential population of 16,290 persons.

Planning and implementation advisory services have been procured by the Government of Canada to conduct the next phase of planning for the Campus. This 'next phase' focuses on roads and servicing, which includes an Investment Program Plan (IPP). One component of the IPP involves the preparation of an Infrastructure Upgrade and Divestiture Strategy Report. The report, among other issues, will include a road divestiture plan for the eventual transfer of roadways and infrastructure (above and below grade) to the City of Ottawa as municipal rights-of-way (ROWs). Divestiture is intended to provide opportunities for private sector development in the future. **Figure 1 in Appendix 1** illustrates the location of a compilation of underground infrastructure including but not limited to storm, sanitary sewers, watermains, heating and cooling lines/tunnels.

CLC and PSPC have retained Arcadis to assist in transforming the site from federal employment campus to a mix use Plan of Subdivision. Stage 1 of the program to transformer the campus is the creation of Municipal ROW and Blocks, the subsequent development of Blocks whether it is repurposing a building, demolishing and constructing new building will be completed under the City of Ottawa Site Plan Approval process. The purpose of this report is to support the application for Draft Plan of Subdivision Approval by demonstrating the existing municipal infrastructure surrounding the campus can support the proposed redevelopment.

2 BACKGROUND INFORMATION

Prior to commencing this study, an extensive review of background documents provided by PSPC/CLC was undertaken to develop an appreciation for existing studies that have already been conducted for the Campus. The following is a partial list of background information that was used in the creation of this report:

- City of Ottawa Utility Coordinating Committee (UCC) Central Registry Drawings
- City of Ottawa 1K Mapping
- City of Ottawa Water Distribution Design Guidelines – July 2010
- City of Ottawa Sewer Design Guidelines – October 2012
- Drawing No. TNP-054-C-01-22 Site Plan from PSPC showing watermain, storm sewer and sanitary sewer distribution of the Tunney's Pasture Campus
- Tunney's Pasture Redevelopment Assessment of Existing Services Study January 28, 2019 by Parsons
- Tunney's Pasture Master Plan (TPMP) and supporting Infrastructure Overview (July 2014)
- Tunney's Pasture Redevelopment Telecommunication and Technology Assessment and Planning Proposal prepared by the Attain Group dated February 1, 2019
- Various communications with Public Services and Procurement Canada (PSPC) and Canada Lands Company (CLC) personnel
- Sewer Feasibility Study Final (Revision 1) April 28, 2023, by Jp2g Consultants Inc.

Since there has been no significant alteration or additions to the mainline underground watermain, sanitary sewer or storm sewers within the limits of the proposed ROW since the previous reports, this report draws upon data/analysis previously commissioned by PSPC. While there has been no significant change to mainline municipal services, some buildings have been removed from the Tunney's Pasture Campus and a new Central Heating and Cooling Plant (ESAP) is being constructed including modifications to the distribution network for the heating and cooling system.

3 WATER NETWORK INFRASTRUCTURE

3.1 BACKGROUND

Campus connection to the City of Ottawa Water Distribution network illustrated in **Figure 2, in Appendix 2,** Existing Watermain Infrastructure. The figure notes water is supplied to the site from a 1,050mm diameter watermain on Scott Street. Sir Frederick Banting Driveway and Tunney's Pasture Driveway each contain a 406mm diameter watermain that connects to the Scott Street watermain, crosses the Transitway, and provides water into the Tunney's Pasture campus. These two 406mm watermains each have an isolation valve at the connection to the Scott Street watermain. Furthermore, there is an isolation valve on the Scott Street watermain between these two connection points. In the event of a failure on the Scott Street watermain sufficient isolation valves exist to ensure water supply to the campus from either of the two connections.

3.2 EXISTING WATER NETWORK INFRASTUCTURE

The on-site distribution network is comprised of a network of water mains that vary in diameter from 203mm to 406mm. The original watermains, many dated from the 1950's and 1960's, were all replaced by the Operating Authority under a multiphase life-cycle renewal program. Most mains were replaced in the 2000's the exceptions being the 406mm ductile iron watermain (built 1977) on Tunney's Pasture Driveway (north of the meter chamber) and Colombine Driveway (from Sir Frederick Banting Driveway to Tunney's Pasture Driveway). The renewal program also involved provision of a second service lateral to every building on site, separated by an isolation valve. Thus, in the event of a local watermain or service lateral failure, supply to each building can be maintained. **Figure 2 in Appendix 2** illustrates the location of existing watermains within and adjacent to the campus. In addition, the available Plan and Profile drawings for various watermains within the campus are included in **Appendix 2.**

3.3 ANTICIPATED WATER NETWORK SYSTEM WORKS

As per City of Ottawa Technical Bulletin ISTB-2021-03 in relation to the City of Ottawa Water Distribution Design Guidelines (Guidelines), the average demand per resident is 280 L/c/d. Upon redevelopment, there could be up to 16,290 residents on campus, yielding an average demand of 4.56 ML/d. Applying a maximum day factor of 2.5, per Guidelines, the maximum day demand from residents will be 11.40 ML/d. Applying a maximum hour factor of 2.2, the maximum hour demand from residents will be 25.08 ML/d.

Assuming office employees demand on average 75 L of water per day per employee, upon redevelopment the federal/retail employees on the campus will demand an average of 0.73 ML/d. Applying a maximum day factor of 1.5, per Table 4.2 of City of Ottawa Guidelines, the maximum day demand from employees will be 1.10 ML/d. Applying a maximum hour factor of 1.8 the maximum hour demand from employees will be 1.98 ML/d.

The total demand, from residents and federal/retail employees, on the entire redeveloped campus will be; 5.29 ML/d for average day, 12.50 ML/d for maximum day, and 27.06 ML/d for maximum hour.

One 406mm watermain, flowing at a nominal velocity of 1.5 m/s, would supply 16.29 ML/d or approximately 3 times the average day demand of the site.

While the existing distribution layout suits current conditions, to divest the site into municipal ROWs and multiple individual property parcels, some segments of existing watermain will need to be realigned to suit the proposed ROW cross section or removed if they traverse a proposed development parcel. In other instances, new watermain will be required where current of future buildings do not have fronting watermains to connect to. **Figure 2A in Appendix 2** illustrates which mains are anticipated to be retained along with the year the main was constructed, material type and depth of cover plus reference to which plan and profile drawing the watermain can be found on. These mains have been identified for potential retention as all but the Tunneys/Colombine mains are of recent construction, as such are PVC material, have proper depth of cover, sized to suite development requirement, and are located within proposed ROW at a reasonable location. As noted, these are mains for consideration they will be vetted at detail design before being accepted.

The existing City of Ottawa water distribution network has ample capacity to accommodate the redevelopment of the Campus. The adjacent municipal system is adequately sized to meet the water demands for the anticipated redeveloped conditions. The on- campus distribution network is generally adequate, but, as identified above, will require relocation and extension at various locations to suit the incorporation of municipal ROWs.

Watermain boundary conditions from the City of Ottawa based on the anticipated total demand are contained in **Appendix 2**. Based on the conceptual water model a conceptual layout of watermains is illustrated in **Figure 3 in Appendix 2**, the figure also notes which mains at this time are known to be removed/replaced to more closely align with proposed road network, and the mains that could be retained to function as block services.

The conceptual unit composition has changed slightly since requesting and receiving boundary conditions as shown on the Water Demand Calculation Sheet in **Appendix 2**, however the change has resulted in minor variances in each scenario. Updated boundary conditions will be requested at Detail Design stage. In addition to updating the Hydraulic model at detail design stage, a water age analysis will also be completed.

3.4 HYDRAULIC MODEL

The 2010 City of Ottawa Water Distribution Guidelines state 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 150 kPa (21 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.

A computer model for the proposal has been developed using the InfoWater program produced by Innovyze. The model incorporates the boundary conditions received from the City of Ottawa at the two connection points on Scott Street. Basic day (max HGL), Peak hour (min HGL) and Max Day plus Fire scenarios were run using the provided HGLs. To be conservative, a fire flow demand of 250.0 l/s has been added to all the nodes in the InfoWater model.

The hydraulic model has a 406mm diameter “backbone” watermain through the site as well as a series of 305mm diameter local watermain. All new watermains are looped resulting in no dead-end scenarios.

Results of the hydraulic model are included in **Appendix 2** and summarized as follows.

Table 3-3-1 Results of the Hydraulic Model

Scenario	Results
Basic Day (Max HGL) kPa	498.5 to 560.17
Peak Hour (Min HGL) kPa	425.09 to 484.23
Max Day + Fire Flow	(250.0 l/s)
Minimum Residual Pressure kPa	409.72

A comparison of the results and design criteria is summarized as follows:

Maximum Pressure	Under the basic day (Max HGL) scenario there are some nodes that exceed 552 kPa (80 psi) therefore pressure reducing control may be required. No nodes exceed the maximum of 689 kPa (100 psi).
Minimum Pressure	The minimum peak hour pressures at all nodes exceed the minimum requirement of 276 kPa (40 psi).
Fire Flow	All nodes had a fire flow demand of 250.0 l/s applied. Results of the analysis results show all nodes exceeding the minimum residual pressure of 150 kPa (21 psi) therefore the fire flow requirement has been achieved.

Additionally, two other scenarios were modelled where one of the primary connections to Scott Street was taken offline. There are valves on Scott Street between Connections 1 and 2, therefore either side can be isolated in case of a break. Assuming system pressure remains the same at the remaining connection, the hydraulic model for fire flow with each connection offline is summarized as follows:

Table 3-3-2 Fire Flow with One Connection Offline

Scenario	Results
Max Day + Fire Flow	(250.0 l/s)
Minimum Residual Pressure kPa with Connection 1 Down	365.09
Minimum Residual Pressure kPa with Connection 2 Down	356.30

Even with one primary connection offline, the results of the hydraulic model indicate that all nodes continue to exceed the minimum residual pressure of 150 kPa (21 psi). Conceptually, these results conform to City of Ottawa standards based on the model and boundary conditions available. Further in-depth modelling can be done at detailed design stage.

3.5 WATERMAIN SITE SERVICING ISSUES

Addressing site servicing issues for the subject development as it relates to existing watermain infrastructure and future watermain installation, involves taking into consideration several critical factors. The age of the existing watermain plays a key role in determining its durability and potential for reliable service. Evaluating the condition of the existing watermain is essential to gauge its structural integrity and anticipate any potential risks associated with its continued use, as deterioration over time can lead to leaks, pressure drops and disruptions to the water supply. Equally important is the location of the existing watermain, which could influence the feasibility of its integration into the new development's infrastructure. Moreover, the future installation of the watermains may be placed within a non-standard city right-of-way location, needing coordination to ensure compliance with local regulations. A thorough analysis of these constraints is crucial to developing an effective solution that ensures efficient water supply while addressing the challenges posed by the existing watermain's age, condition, location, and the future non-standard city's right-of-way locations. In advance of detail design stakeholders from the City met to discuss potential requirements for the acceptance of previously constructed watermains as municipal assets. Minutes of the meeting are included in **Appendix 2**, this represents a start point and it was agreed prior to the commencement of detail design stakeholders from the City and design team to finalize a proposed conveyance framework generally to consist of a gate system with 3 key gates to pass before acceptance. Initial discussion identified the gates as:

1. Document review: including pipe material, installation date, asbuilt drawings and QA/QC records.
2. Condition Assessment: stakeholders to develop a formal program for condition assessment.
3. Financial Consideration: stakeholders to establish financial compensation for accepted assets that are partially through their service life.

In addition other requirements to be addressed at detail design were reviewed by the stakeholders including but not limited to: Phasing of works, and timing of acceptance of works, transferred watermains have at least one connection to municipal system, transferred watermain meets current City of Ottawa standards, and if significant modifications are required to an existing watermain to meet City standards replacement option will be employed. develop a matrix which assist in to predetermining whether a main meets the threshold for remove/replace, requires secondary review by stakeholders or meets the requirements to remain in service.

In addition to main watermain lines there are appurtenances that will require adjustment, this includes but is not limited to items such as fire hydrants and building service vales. These items will be required to meet municipal standards such as location and type. The location of hydrants and valves may in certain locations be influenced by the ESAP infrastructure and nonstandard locations may be required.

As noted previously the redevelopment of the campus will occur over decades the actual rehabilitation of the road network and associated infrastructure will be completed in stages and depending on market conditions this may take upwards of Five years. However, with the recent announcement of the Federal Government Land Bank program which included releasing multiple buildings/lands within this campus for repurposing to residential housing to assist in meeting the current housing crisis the time frame may be accelerated.

4 SANITARY INFRASTRUCTURE

4.1 BACKGROUND

Campus connections to the City of Ottawa Sanitary Sewer System is illustrated in **Figure 4 in Appendix 3**, Existing Sanitary Infrastructure. The figure notes there are several connections from the site to the WNC. There is a 450mm diameter sewer at Tunney's Pasture Driveway, a 600mm diameter sewer east of Sir Frederick Banting Driveway, as well as connections to the 375mm diameter sanitary sewer on Parkdale Avenue, which discharges into WNC.

City staff have noted the limitations of the WNC, during extreme wet-weather events the deep WNC sewer operates under surcharged conditions. During dry weather the WNC has ample capacity to accommodate the areas it services. Recognizing the constraints along the WNC the City has identified diversion projects that reduce inflows to the collector during wet weather conditions, such that it will operate with a reduced risk of basement flooding in critical areas. At the time of this report staff at the City of Ottawa advised that no diversion work has yet been undertaken impacting the Tunney's Pasture area. However, the City did complete work to disconnect abandoned infrastructure from the Sanitary system in the NCC fields between Churchill and Island Park Drive. City Staff had determined these old pipes were a significant source of I/I during the 2019 flood event.

The City also has identified long term projects within the Cities 2025 Infrastructure Master Plan (IMP) the report acknowledges the limitation of existing trunk sanitary sewer systems and presents an Infrastructure Capacity Management program which is necessary to:

• Support intensification:

• Identify the most appropriate intensification-driven upgrades to local systems that will meet long-term needs;

• Ensure adequate capacity is available for individual development projects; and

• Manage risks to level of service due to intensification and climate change.

The original IMP identified several projects such as Prince of Wales (2039-2044 $5.3M), Crystal Beach Ph1 & 2 (2029-2044 $63.7M) and Woodroffe Collector (2029-2034 $59.9M) diversions that would remove flow from the WNC, the timelines and cost as noted above are long and significant. Given the pressures to rapidly bring online new housing, all stakeholders including the City recognized the need to expedite work programs to ensure the municipal infrastructure is properly operating to meet the demands from not just this site but from the numerous proposed infill projects. For example, the City has prioritized the Prince of Wales diversion project which is estimated to free up between 200-300 l/s for this area of the WNC by 2033, which would be more than sufficient to accommodate this redevelopment plus many more sites within the area. The proposed timing of City works has not been finalized, similarly the timing of any onsite occupancy of a new buildings is not currently known but estimated to be in the near future. Given several onsite office buildings have been demolished reducing increased flow from the site, release of occupancy can be addressed through the condition of Draft Approval/SPA.

4.2 EXISTING SANITARY INFRASTUCTURE

A Sewer Feasibility Study was completed by the owner in 2018 that included the existing sanitary sewer system. The study only assessed the structural condition of the sanitary sewers and did not include any kind of operational assessment. Of the sanitary sewers inspected the majority were noted as being in general good condition. The study included a map of the sanitary sewers that were assessed and provides a structural index rating as well as rehabilitation recommendations. The existing on-site sanitary sewer collection system was designed to service a private campus with numerous segments of existing sanitary sewers crossing potential development parcels and typically do not follow City standards. The majority of sewers will be removed and new sewers installed to City standards as part of the roadway reconstruction. **Figure 4A in Appendix 3** notes the potential sewers to be retained and transferred to the City of Ottawa. At detailed design phase of the project, an assessment of the location (as-builts), capacity (updated sewer design sheets) and condition (including CCTV) of any existing sanitary sewers proposed to be conveyed to the Municipality will be undertaken to confirm the acceptability of the sewer. Any sewer deemed acceptable will also be reviewed for potential financial compensation for the acceptance of an asset that is partially through their service life.

4.3 ANTICIPATED SANITARY WORKS

The proposed redevelopment of the site will occur over a long period, existing buildings retained for the short or long term will continue to require sanitary sewer. **Figure 5 in Appendix 3** Conceptual Sanitary Infrastructure illustrates how the site could be serviced. The conceptual system utilizes the two existing sanitary connections on Scott Street to the WNC and one sanitary connection on Parkdale Avenue which also discharges into the WNC. A conceptual sanitary sewer design sheet is also included in **Appendix 3** and illustrates the conceptual sewers as noted can provide the necessary capacity to service the proposed development of Tunney's Pasture.

Based on Appendix 4-A of the City of Ottawa Sewer Design Guidelines (Guidelines), office employees generate on average 75 L of wastewater per day per employee. Upon redevelopment the 6867 federal/retail employees within the development, will generate an average of 515,025 L/d. Applying a peaking factor of 1.5, per Figure 4.3 in Guidelines, the peak design flow from employees will be 772,537.5 L/d (8.94 L/s).

Based on Appendix 4-A of the City of Ottawa Sewer Design Guidelines (Guidelines), students generate on average 90 L of wastewater per day per student. Upon redevelopment the 3200 students within the development, will generate an average of 288,000 L/d. Applying a peaking factor of 1.5, per Figure 4.3 in Guidelines, the peak design flow from students will be 432,000 L/d (5.0 L/s).

Based on Appendix 4-A of the City of Ottawa Sewer Design Guidelines (Guidelines), retail space generates on average 5 L of wastewater per day square meter of retail floor space. Upon redevelopment the 14,925sm retail space within the development, will generate an average of 74,625 L/d. Applying a peaking factor of 1.5, per Figure 4.3 in Guidelines, the peak design flow from employees will be 111,937.5 L/d (1.29 L/s)

Based on Figure 4.3 in the Guidelines (revised in Technical Bulletin ISTB 2018-01), the average resident generates 280 L/d of wastewater. Upon redevelopment, the 16,395 residents within the development will generate an average of 4,590,600 L/d. Appling a peaking factor of 2.74, per Harmon formula, the peak design flow from residents will be 12,578,244 L/d (145.55 L/s)

Applying an allowance of 0.33 L/s/ha, per Guidelines, the peak extraneous flow from the 47.63 ha. Campus will be 15.72 L/s.

The summation of all flows (i.e. 8.94+5.0+1.29+145.55+15.72) results in a Total Peak Design Flow of 176.50 L/s from the entire redeveloped campus.

The existing campus under the design requirements at the time would have been allocated 50,000 l/ha/d for the commercial use, with a Peaking Factor of 1.5. At the time of design infiltration allowance of 0.28l/Ha/s was used for theoretical flow for new systems. PSPC (PWGS at the time) completed various studies of their sanitary system as they contemplated redevelopment of the site. A brief flow monitoring study along with CCTV inspections of the sewers yielded the conclusion dry weather infiltration was approximately 1 l/s/Ha which is greater then the 0.28 l/s/Ha but less then the City of Ottawa guideline 4.4.1.5 which ranges existing areas with potential foundation drain connections to between 2 to 5 l/s/Ha. Noting the flow monitoring study was limited in time, the resulting pre-redevelopment infiltration flow can be assumed to be 49X1=49l/s resulting in a pre-redevelopment theoretical peak flow of 42.534 + 49 = 91.53l/s. the redevelopment will in theory add approximately 84.97 l/s to the system. As noted previously the WNC is subject to surcharging during wet weather events; to minimize potential impact on downstream system the completion of the Prince of Wales diversion project would remove significantly more flow from the WNC then the redeveloped site would generate. In addition, given the majority of sewers within the campus will be replaced the level of infiltration from the campus will also be reduced further improving the wet weather flow issues with the WNC.

The conceptual sewer system follows the proposed Draft Plan ROW configuration to this end various sanitary sewers will be required to be removed and replaced to suit municipality approved cross sections (standard or custom). It is also anticipated that the existing sanitary sewer connections to the existing Municipal system will remain (already City asset). Monitoring Maintenance Holes (MH's) to be located on service connections from buildings or private sewer lines connecting to the municipal system will be required per City Standards.

4.4 SANITARY SITE SERVICING ISSUES

All the constraints flagged under the watermain site servicing issues section will apply to the sanitary sewer site servicing issues, including but not limited to timing of acceptance of rehabilitated sanitary system to accommodate staging of servicing works over several years. While the majority of sanitary sewers will be removed and replaced the age/condition of any proposed retained sanitary sewer infrastructure serves as a crucial determinant in gauging its operational longevity and potential vulnerabilities. It is anticipated a review of any proposed retained portions of the system, not currently under municipal ownership will be completed in conjunction with the City prior to detail design and direction received to remove/replace any sections the City is not prepared to accept. Additionally, the intention is to position the future sanitary sewer within the standard city right-of-way location however due to the nature of the development, and existing retaining infrastructure such as the ESAP system non-standard location will need to be used in specific areas. This may also include the location of monitoring MH's which are a standard item required by the City and they will be added to meet municipal standards however we anticipate numerous conflicts with the ESAP system and any nonstandard location of monitoring MH will require City approval. However, unlike the water distribution system where the municipal system has ample capacity to accommodate the redevelopment, the connecting sanitary outlet, West Nepean Collector experiences wet weather capacity issues. As noted previously the Prince of Wale diversion project would address the increased sanitary flow from the redeveloped campus, thereby negating any negative impact on the WNC wet weather capacity for this development area. Should the timing of the City works be significantly delayed, an alternative interim measures to minimize impact on wet weather flow could include the installation of onsite private sewage detention tanks which collects and holds onsite sewage during wet weather events and discharges the sewage into the municipal system after the wet weather event has passed. Alternatively, City staff have advised through a flow monitoring program additional capacity could be provided to the campus if the program demonstrated infiltration or cross connections contributed more than municipal allowances, and repairs were completed and monitoring confirmed the reduction of infiltration to the sewer system. Appendix 3 contains the City's term of reference for any such program to be considered acceptable.

5 STORMWATER INFRASTRUCTURE

5.1 BACKGROUND

Campus connections to the City of Ottawa Storm Sewer System are illustrated on **Figure 6 in Appendix 4** Existing Storm Infrastructure. The figure notes there are four outlet sewers that serve the campus, these are; a 525mm diameter sewer servicing the northwest quadrant discharging to an existing ditch which outlets to an existing 2,100mm diameter sewer extending from Carleton Avenue to the Ottawa River, an 1,800mm diameter sewer on Tunney's Pasture Driveway servicing the central core of the campus which outlets to the Ottawa River, a section of the eastern portion of the site is serviced by a 300mm diameter sewer which discharges into an existing 2,100mm diameter sewer on Parkdale Avenue that outlets to the Ottawa River, and 750mm diameter sewer servicing the south west quadrant outlets to a twin cell 3,800mm x 2,400mm box trunk-sewer located below the West Transitway. When the above noted West Transitway trunk was constructed in the 1980's any sewer that crossed the trunk alignment was truncated and diverted into the trunk. The 1800mm diameter storm sewer along Tunney's Drive no longer carries the contributing flows from the south and therefore has significant additional residual capacity.

5.2 EXISTING STORMWATER INFRASTRUCTURE

Of the four outlet sewers, the 1,800mm on Tunney's Pasture Driveway drains most of the site and as noted above because of the West Transitway trunk intercepts all drainage south of the campus it now only collects drainage from within the Tunney's Pasture campus. At an average slope of 0.3% is has a capacity of approximately 6,568 L/s.

The estimated peak runoff from the entire redeveloped campus (47.4 ha), using the modified rational method, is in the order of 4450 L/s (2-year return period. Therefore the 1,800mm storm sewer if necessary has adequate capacity to service the entire redeveloped campus if appropriate flow management techniques are incorporated into the design.

The existing local storm sewer collection system consists of approximately 3,200m of sewers, including service laterals, in diameters ranging from 250mm to 750mm. The original design of the existing storm sewer system did not include any specific flow control measures (i.e. inlet control devices, orifices). While there is not a history of concerns regarding surface ponding during rainfall events, The Infrastructure Overview indicated that most of the local sewers do not have sufficient capacity to meet current City of Ottawa design guidelines.

A Sewer Feasibility Study was completed by the owner in 2018 that included the existing storm sewer system. The study only assessed the structural condition of the storm sewers and did not include any kind of operational assessment. Of the storm sewers inspected the majority were noted as being in general good condition. The study included a map of the storm sewers that were assessed and provides a structural index rating as well as rehabilitation recommendations.

The existing on-site storm sewer collection system was designed to service a private campus with numerous segments of existing storm sewers crossing potential development parcels and typically do not follow City standards. To this end the majority of sewers will be removed and new sewers installed to City standards as part of the roadway reconstruction. **Figure 6A in Appendix 4** illustrates the anticipated storm sewers to be retained, and as noted above only the 1,800mm dia storm is anticipated to be retained (along with outlet connections currently City assets) . At detailed design phase of the project, an assessment of the location (as-built), capacity (updated sewer design sheet) and condition (CCTV) of any existing storm sewers proposed to be conveyed to the Municipality will be undertaken to confirm the acceptability of the sewer.

It should also be noted the existing storm sewers on site service the private site, there are no sewers external to the site that drain into/through the private site. Similarly overland flows from the adjacent lands generally do not drain onto/through the site. An Existing Topography and Conceptual Grading plan is included in **Appendix 4.** This plan illustrates the existing topography and existing overland flow routes, it also includes conceptual grades and resulting conceptual overland flow routes. Since the site will be redeveloped over decades and some building will remain in use for extended periods of time before being decommissioned most existing road elevations will be respected to allow continued use of these buildings. Hence the figure reveals in general the existing road grades will be followed and to this end the major overland flow routes will also be similar. In several areas(Goldenrod and Sorrel) the existing road elevations would result in exceedance of static 100yr ponding, in those areas new sewers will be sized to accommodate 100yr flow as needed.

5.3 ANTICIPATED STORMWATER WORKS

While the existing storm sewer collection system was installed in a manner which best suited the needs of the campus as it was developed, it is not suitable to divest the campus into municipal ROWs and multiple individual property parcels. Many segments of existing storm sewer will need to be realigned to suit the proposed ROW cross section or extended where none currently exist to service fronting buildings.

The storm sewer system for the redeveloped site can re-use the existing outlet locations and the existing 1,800mm sewer on Tunney’s Pasture Driveway. Most of the local storm sewers, however, will have to be replaced to meet current City of Ottawa and MECP design guidelines for conveyance capacity of the sewers. In addition the overall storm system must accommodate major storms with onsite quantity control measures and providing onsite quality control measures.

The proposed redevelopment of the site will occur over an extended period, existing buildings and roadways retained for the short or long term will continue to require storm sewer connections. **Figure 7 in Appendix 4** Conceptual Storm Infrastructure illustrates conceptually how the sewer mains could be redesigned to meet City and MECP requirements. Also in **Appendix 4** is a conceptual storm sewer design sheet demonstrating the system is able to service the site if the identified runoff coefficients are incorporated into the design.

As noted previously the campus system was originally designed without any onsite quality or quantity control, nor is there any end of pipe treatment for the site, as was traditionally done during the original timing of the development. Due to space restrictions and while vacant land exists between the development and the Ottawa River it is not proposed to construct an end of pipe treatment facility on NCC lands to service the proposed redevelopment of the site. Due to type of redevelopment which more resembles urban renewal then greenfield development it is proposed to incorporate onsite controls for the site. This will be in the form of onsite attenuation for quantity control and Oil and Grit Separators (OGS) for quality control. Based on the conceptual storm servicing there are 4 outlets from the site, outlet 1 (1.76Ha) is to the Northwestern Ave ditch, outlet #2 (2.35Ha) is to Parkdale Ave 2100mm dia storm sewer, outlet #3 (9.46Ha) is to Scott St twin 3.8X2.4m box sewers, and outlet # 4 (33.56Ha) is to the Tunney Ave 1800 storm sewer. The conceptual sizing of traditional standard OGS to accommodate those areas is included in **Appendix 4.** At detail design an evaluation of OGS system will be undertaken with stakeholders to select the most appropriate type/size/configuration and location and number of OGS to meet the developer and City requirements. Currently proposed OGS locations are outside the proposed ROW, OGS 1&2 will be privately owned and operated while 3&4 will be City asset.

Quantity control of stormwater runoff from the site is proposed to be achieved through the use of onsite controls, where each block of development within the site will provide quantity control through the use of either surface, roof top, underground storage, or combination of these measures. Once the campus is draft approved detail design will establish a master stormwater allocation for each development block, where each block will provide overcontrol of runoff to assist in reducing surface storage requirements within the ROW. When individual blocks are redeveloped, they will be subject to Site Plan Approval (SPA) and will be required to demonstrate the detail design submitted to support the SPA conforms to the master allocation. The allocation from the site will be based on equally assuming a post development restriction of C=0.5 (or as approved by the Municipality). A conceptual allocation was modelled below and identifies release rates and estimated on-site storage requirements.

Quality control of stormwater runoff from the site is proposed to be achieved through the use of Oil and Grit Separators (OGS), the OGS units will be sized and strategically placed within the ROW to provide 80% TSS removal for the area. In addition, streets will be designed using Low Impact Development (LID) features, the LID systems will provide pretreatment of stormwater runoff before being processed by the OGS's. LID's are further discussed in section 8 of this report. In summary Storm water will be addressed as follows: Quantity control is proposed to be achieved using any combination of private onsite controls including but not limited to roof top, underground, surface storage, in combination with public (ROW) surface storage. Quality control will be achieved through the use of OGS's, LID's will be at a minimum incorporated into the ROW as a pretreatment of runoff, however OGS's will be sized to accommodate runoff independent of any LID benefits.

5.4 STORMWATER SITE SERVICING ISSUES

Identifying the site servicing challenges for the planned redevelopment requires a thorough review of any proposed retained storm sewers that are not currently under municipal ownership. Building upon the considerations highlighted in the sanitary sewer section; the age, location, and condition of the existing storm sewer infrastructure become pivotal factors, shaping the effectiveness of the drainage network. A careful evaluation of any proposed retained portion of the existing storm sewer is to be undertaken at detail design to confirm Municipality acceptance of the sewer/infrastructure. Moreover, the exact existing and future positioning of the storm sewer lines impacts their integration into the new development's layout and drainage configuration, conflicts with the ESAP system will further complicate the storm sewer system location including the provision of monitoring MH to be installed for building or private sewer lines.

5.5 HYDRAULIC EVALUATION

A high level hydrologic and hydraulic model was developed using PCSWMM to assess the proposed dual drainage stormwater management concept and confirm that adjacent properties are not negatively impacted by the proposed development.

The dual drainage SWM model is presented in **Appendix 4 as Figure 8**.

No external minor or major flows enter the site under existing or proposed conditions. The 1800mm dia. storm sewer running tough the site was confirmed to have been disconnected from areas south of Scott St. as noted in **Section 5.2**. Major flow throughout the site under existing and proposed conditions is illustrated on the Existing Topography and Conceptual Grading Plan which is included in **Appendix 4**.

The major system has been modeled in accordance with the grading shown on the Conceptual Grading Plan. Low points capturing 100-year flows are proposed at locations to limit major flow leaving the site. Elsewhere roadways have been modeled with a 5-year level of service.

Development blocks have been modeled with release rates set to the 5-year peak runoff rate with an assumed runoff coefficient set to 0.5 with select block restricted beyond the 5-year peak runoff. Flows exceeding the release rates are to be stored and managed on-site.

5.5.1 Model Input Parameters

Model parameters used for subcatchments are described below and presented in **Appendix 4**. Selected parameters are consistent with the OSDG.

Area and Imperviousness – Catchment areas used in the modeling are shown in **Figure 8**, in **Appendix 4**. Impervious ratios used within the subdivision are consistent with the C values used in the rational storm design.

Infiltration – Infiltration parameters consistent with the OSDG have been used in the modeling. The following Horton infiltration values have been used: f_o = 76.2 mm/h, f_c = 13.2 mm/h, k = 0.00115 s^{-1}.

Subcatchment Width – Consistent with the OSDG, subcatchment widths for roads within the proposed development have been set to the gutter length and multiplied by two where flow from either side of the right-of-way flow to the street. For the development blocks the width has been set using the following equation:

$$w = 1.7\sqrt{Area}$$

Slope – A slope of 1% has been used for all subcatchments.

Initial Abstraction (Detention Storage) – Detention storage depths of 1.57 mm and 4.67 mm were used for impervious and pervious areas, respectively. These values are consistent with the OSDG.

Manning's roughness – Manning's roughness coefficients of 0.013 and 0.25 were used for impervious and pervious areas, respectively.

5.5.2 Modeling Results

Modeling results for development blocks including release rates and estimated storage required are indicated in *Table 5-1*. Release rates from most development blocks range from 126 to 129 l/s/ha and were set to the 5-year peak runoff from the development blocks with a runoff coefficient set to 0.5.

The 750mm storm pipe which outlets to the storm pipe beneath the LRT/Transitway at OF-7 will not be upsized and does not have the capacity to convey the 5-year peak runoff from the site. As such, runoff from development blocks 1A, 2A, and 3A have been restricted beyond this to 60 L/s/ha and block 3B has been restricted to 30 L/s/ha. Runoff from Block 32 has also been restricted beyond the 5-year peak runoff to 90 L/s/ha.

Note that storage volumes listed below are estimates. The actual required storage to meet the established release rates may differ from the estimates and are to be determined at the detailed design stage for the individual development blocks.

Modeling results at outlets are included in *Table 5-2*. Outlet locations are indicated in **Appendix 4 Figure 8**. Major flow leaving the site it limited to outlets OF-3, OF-4, OF-5, and OF-6. For outlets OF-3 and OF-6, low points are to be placed at these locations capturing 100-year flows with no major flow will leaving the site up to the 100-year event.

At outlets, OF-4 and OF-5, modeling results show 37 and 64 L/s respectively leaving the site as major flow. Low points capturing 100-year flow have been placed upstream of these outlets to limit major flow leaving the site as much as possible. Due to grading challenges, however, the low points cannot be placed at the downstream end of the roads and major flow has been limited to a 5-year level of service on continuous grades.

The 100-year minor system peak flow leaving the site through outlet OF-2 via the existing 1800mm dia. storm sewer and through OF-7 via the proposed 1200mm dia. storm sewer is 5698 L/s and 831 L/s respectively. Both outlets have adequate capacity with 6568 and 971 L/s capacity for OF-2 and OF-7 respectively as shown on the conceptual Storm Sewer Design sheet included in **Appendix 4**. Modeling results indicate both outlet pipes are not surcharged during the 100-year event.

Table 5-1 Development Block Modeling Results

Subcatchment ID	100-Year Peak Runoff (L/s)	Release Rate (L/s)	Unit Release Rate (L/s/ha)	100-Year Estimated Storage (m^3)
B1A	800	144	60	499
B2A	839	162	60	509
B3A	864	114	60	594
B3B	141	30	30	117
B5A	991	279	128	433
B7A	662	251	128	222
B8	478	126	130	233
B9A	818	229	128	360
B10A	278	90	131	115
B11A	1107	312	127	482
B13A	451	126	130	204
B14A	1080	304	127	471
B18A	87	37	136	31
B20A	195	88	131	57
B24A	708	198	128	313
B24C	203	57	132	98
B25A	293	82	131	136
B27A	493	138	130	221
B28A	842	236	128	370
B29A	1361	385	127	590
B30A	709	199	129	313
B32	607	212	90	231
B33	803	225	128	354

Table 5-2 Modeling Results at Outlets

Outlet	Description	100-Year Peak Flow (L/s)
OF-1	Northwest outlet draining Block 1	225
OF-2	Minor flow outlet for 1800mm dia. existing storm sewer draining North to the Ottawa River	5698
OF-3	Major flow outlet on Goldenrod Driveway north of the site	0
OF-4	Major flow outlet at Goldendrod Driveway and Scott St.	37
OF-5	Major flow outlet at Colombine Driveway and Parkdale Ave.	64
OF-6	Major flow outlet at Sir Frederick Banting Driveway and Scott St.	0
OF-7	Minor flow outlet via 1050mm dia. proposed storm sewer draining south to the 3800x2400mm twin box pipe under the Transitway	831
OF-8	Minor flow outlet draining Block 28 via the proposed 375mm dia. storm sewer to Parkdale Ave.	212

5.5.3 Summary of Model Files

PCSWMM Model files included in the submission are listed in *Table 5-3*.

Table 5-3 PCSWMM Model Files

Design Storm	PCSWMM File
2-year 3 hour Chicago	139833-Tunneys_3H2CHI_V02-POST.pcz
5-year 3 hour Chicago	139833-Tunneys_3H5CHI_V02-POST.pcz
	139833-Tunneys_3H5CHI-05C_V02-POST.pcz
100-year 3 hour Chicago	139833-Tunneys_3H100CHI_V02-POST.pcz
100-year 3 hour Chicago + 20% (Stress Test)	139833-Tunneys_3H120CHI_V02-POST.pcz
July 1979	139833-Tunneys_JUL1979_V02-POST.pcz
August 1988	139833-Tunneys_AUG1988_V02-POST.pcz
August 1996	139833-Tunneys_AUG1996_V02-POST.pcz

6 HIGH LEVEL UTILITIES

6.1 BACKGROUND

There are various underground utilities that serve the current Tunney's Pasture Campus and with the proposed adoption of a Municipal ROW network throughout the Campus the locations of each utility will need to be reviewed and if necessary, relocated to support the redevelopment of the Campus. The several conceptual Road Cross Sections have been prepared for the various proposed streets, **Figure 9** illustrates the location of cross sections while **Figures 10 and 11** illustrate the cross-sections all in **Appendix 5.** Both high level utilities and deep municipal services are noted on the figures, as noted in previous sections the location of infrastructure will vary due to existing conditions these illustrations provide a guidance based on current information of the likely configuration of the cross sections. At detail design in full consultation with stakeholders the location of high level and deep infrastructure will be reviewed/approved for each street and presented in a deviation report. This will finalize the utility's locations and will allow the various plant owners to complete their design. All high-level utility plants designs will be consolidated onto a Composite Utility Plan (CUP). The CUP will detail all the utilities to be located within the new Municipal ROW's and will require review and approval by the City of Ottawa.

6.2 ELECTRICAL SITE ISSUES

Hydro Ottawa and PSPC have entered into an agreement for the transfer of ownership and maintenance of the hydro infrastructure within the Tunney's Pasture Campus to Hydro Ottawa. Hydro Ottawa has advised the existing Hydro Ottawa distribution system in the vicinity of the Tunney's Pasture Campus has ample spare capacity to accommodate the redevelopment of the Campus.

6.2.1 Electrical Site Issues

With regards to the existing electrical site servicing for the Tunney's Pasture Site the following information from Hydro Ottawa. We have included assumptions and comments to allow for the electrical design to progress. In addition to the "ultimate" electrical site servicing, interim servicing will be required during various phases of works as existing infrastructure is removed/replaced/relocated. The installation of temporary overhead system (poles) will be reviewed in detail at detail design stage to ensure current tenants have stable electrical supply.

6.2.2 Capacity of the existing Hydro Ottawa Utility Service to the Site

Hydro Ottawa's Response:

The site is very large, and we have multiple circuits running through it. There is capacity right now, but this is ever changing based on the demand of the system.

Assumptions:

Capacity for utilities is based on a first-come-first serve basis, so although there Is currently upstream capacity; construction projects in the area that commence before utility service applications are made for the Tunney's Pasture site will get priority access to the available capacity. It is assumed that the demand load for the site will increase with inclusion of EV charging and the migration from natural gas fired to electric mechanical units.

6.2.3 Location and quantities of Hydro Ottawa feeders to existing buildings/infrastructure on the Tunney's Pasture Site

Hydro Ottawa's Response:

There are lots of feeders at the campus and this is changing constantly. this is not information we share but know that there are main feeders located on each road, street and driveway.

Assumptions:

Based on the current access to the site, and location of existing Hydro Ottawa overhead services we are making the following assumptions with regards to the locations of Primary and Secondary ductbanks

There are primary service ductbanks into the site running North-South along the following roads served from Scott Street

- Sir Frederick Banting Driveway
- Goldenrod Driveway
- Tunney Pasture Driveway

There is a primary service ductbank into the site running East-West along the following road served from Parkdale Avenue

- Columbine Driveway

Secondary branch ductbanks are tapped off primary service ductbanks and serve the interior of the site.

6.2.4 Current capacities of the existing Hydro Ottawa primary services into the existing buildings on the Tunney's Pasture site

This information to come from PSPC, Health Canada, Equans, etc.

Assumptions:

This information has been previously requested. In order for the design team to review existing building capacity, and provide comment on necessary service upgrades, we require existing building drawings and single line diagrams, in addition to monthly Hydro Ottawa billing to determine the existing age and service capacity for each building.

6.2.5 Age of existing Hydro Ottawa primary feeders and duct banks on the Tunney's Pasture site

There have been some major changes to the existing infrastructure in the last 5 years with lots of upgrades to our civil and electrical plant. There is also a lot of old infrastructure that is in good condition. Anything that is being identified as requiring an upgrade is taken seriously and a plan is put in place. Age of infrastructure ranges from 0-60 years.

Assumptions:

The existing infrastructure is in good condition and that it will be replaced as needed to serve the new development projects on site. Existing infrastructure will be assessed during construction of new roads/sidewalks and any required work will be coordinated with Hydro Ottawa at that time.

6.3 ESAP CENTRAL HEATING AND COOLING PLANT (CHCP)

When the original Tunney's Pasture Campus was developed the CHCP was located at the northeast corner of Sorrel Street and Du Chardon Street (50 Chardon, Building #13) and included an underground heating and cooling pipe network as shown on Drawing no. TNP_035_C_01_17 in **Appendix 5**. The existing heating and cooling pipes are located in concrete conduits. As part of the redevelopment of the Tunney's Pasture Campus a new CHCP is nearing completion at the southwest corner of Columbine Driveway and Goldenrod Driveway and includes a new underground heating and cooling pipe network which will be shallow buried system. The general layout of the new CHCP and underground pipe network is shown on Drawing no. TUd-000-C001 in **Appendix 5**. Any residual abandoned concrete conduits including heating and cooling pipes that are not removed as part of the ESAP project will be decommissioned and either filled in or removed as required under the Municipal infrastructure renewal. In addition to the ESAP infrastructure various telecom systems are located within sections of the existing ESAP concrete duct banks. Prior to decommissioning the existing ESAP tunnels the existing telecom will need to be relocated to an interim service pole line until such time as the ultimate utility duct system is completed. In previous sections it was noted the new ESAP infrastructure within the ROW will conflict with other infrastructure necessitating nonstandard installations which will impact approvals and construction costs.

6.4 NATURAL GAS

Natural gas to and within the Tunney's Pasture Campus is provided by Enbridge Gas, the gas network within the campus services a limited number of buildings. Once the new Municipal ROW network has been finalized and future building gas service loading is available, Enbridge will recommend where the natural gas network requires expansion or relocation.

6.5 TELECOMMUNICATIONS

Existing telecommunications on site will remain in the ownership of the respective service providers. If there are telecommunications services not currently provided in the Tunney's Pasture Campus, there will be an opportunity to add them during the re-development process. All existing telecommunications services will be relocated to the new Municipal ROW network for ease of maintenance. As noted earlier there will be a transition period where the infrastructure will be relocated to temporary pole system to assist in the reconstruction of municipal services in the ROW and/or the removal/disposal of concrete duct backs shared with abandoned ESAP infrastructure. All works related to telecommunications will be coordinated with SSC.

The Attain Group prepared a report titled Tunney's Pasture Redevelopment Telecommunication and Technology Assessment and Planning Proposal dated July 26, 2024. The report provided their site analysis of current and future campus telecommunications infrastructure also looked at both current and future technologies as the campus migrates from a government campus to a mixed-use community. A copy of the report is included in **Appendix 5.** Subsequent to that report Attain coordinated with the various utility providers and prepared schematics of existing plants and a pre-emptive conceptual design aimed at the installation of new telecom infrastructure to accommodate both interim conditions and final design. Copy of the plans are included in Appendix 5.

6.6 DECOMMISSIONED REACTOR

The decommissioned reactor is situated at 20 Goldenrod Street, a property currently under the ownership of PSPC, having previously been owned by Atomic Energy of Canada

Limited (AECL). As outlined in the Limited Radiological Survey at 20 Goldenrod Street – Basement Level compiled by DST, dated April, 2001, the location of the decommissioned slow poke reactor pool is confined within the southwestern part of the designated building. This area is characterized by an 8-meter by 6-meter void cut into the bedrock, to a depth of 11.5 meters beneath the overlying overburden grade. This void has been backfilled to meet the adjacent ground levels with a blend of crushed remnants from the former AECL building demolition and earth extracted from the immediate confines of the subject property. Additionally, on the northwestern corner of subject building, two decommissioned cells were once stationed. This area of the property has now been remediated including but not limited to filling with concrete.

7 GEOTECHNICAL CONSIDERATIONS

Paterson Group was retained by Arcadis to prepare a Geotechnical investigation for the subject lands. The Paterson report PG6348-1 dated June 2024 has been submitted under separate cover, among other things, the report provides recommendations for the following;

- Grading
- Backfilling
- Pavement structures,
- Excavation and Infrastructure Construction
- Groundwater Control
- Winer Construction

8 LOW IMPACT DEVELOPMENT

Aquafor Beech Ltd. was retained by Arcadis to prepare a Low Impact Development (LID) design memo for the proposed Right of Ways within the subject lands. The Aquafor Beech memo 67564 dated December 2025 is included in **Appendix 5**, among other things, the report provides recommendations for the implementation of LID features within the proposed ROW, which will be reviewed through detail design stage with City of Ottawa and implement as approved:

Permeable Pavements and Pavers – Collective terms for a variety of surface treatments including pervious concrete, porous asphalt, permeable interlocking pavers, rubberized granular surfaces, and plastic or concrete grid systems. These systems contain pore spaces that allow stormwater to pass through into a stone base for treatment or infiltration.

Dry Swale Filtration Facilities –Designed to mimic the tributaries of the Ottawa River using a limestone creek bed typology at the surface that will meander through medians and boulevards, widening at bump out locations. Stormwater will be directed to the creek bed from road, sidewalk and cycle track surfaces via curb cuts and will drain from the surface into a subsurface filtration trench below. The filtration trench is composed of a rectangular trench lined with geotextile fabric and filled with a sand media to encourage filtration and cooling of runoff while omitting organic matter or mulch to discourage plant establishment and reduce operation and maintenance needs. The creek bed at the surface will be composed of limestone aggregate and boulders ranging in size and shape to mimic natural tributary form and aesthetic. Where these facilities intersect with key amenity nodes, plazas and parks, the creek bed can be hardened to activate these spaces by keep runoff at the surface. This can be accomplished by grouting joints between the stones or installing an impermeable liner between the limestone creek bed and filtration gallery in specific locations. At the downstream end of these 'hardened' zones, runoff will again be permitted to drain into the galleries below where it will be filtered and cooled before being directed back to the storm sewer. The meandering form of the creek bed will create pockets for integration of street trees and plant material to allow for enhanced stormwater treatment, urban cooling and habitat integration.

Tree Pits - located to take advantage of available space in the boulevard to enhance stormwater capture and filtration and provide passive irrigation of street trees. They can be designed to take runoff from the sidewalk or street and are composed of engineered soils such as biomedia and an underdrain to direct overflow to the storm sewer..

Rain Pockets and Enhanced Micro-pools - small engineered grassy basins that incorporate engineered soil such as biomedia and an optional perforated underdrain pipe designed to mimic natural depressions in upland forests, meadows and prairies that capture, filter and slow runoff, provide topographic interest and support biodiversity. These basins may be planted with more elaborate landscaping, and allow for enhanced filtration and storage of runoff in comparison to enhanced grass swales.

Bioswale – vegetated open channels designed to convey, treat and attenuate stormwater runoff. Check dams and vegetation in the swale slows water to allow filtration of sediments, evapotranspiration, and infiltration into underlying soils to occur where site conditions allow. Additionally, a biomedia channel bed encourages filtration of runoff through this soil-based layer and into a perforated subdrain below for conveyance into the storm sewer system as treated runoff.

9 SEDIMENT AND EROSION CONTROL

9.1 General

During construction, existing stream and conveyance systems can be exposed to significant sediment loadings. Although construction is only a temporary situation, it is proposed to possibly introduce a number of mitigative construction techniques to reduce unnecessary construction sediment loadings. These may include:

- Groundwater in trench will be pumped into a filter mechanism prior to release to the environment
- Bulkhead barriers will be installed at the nearest downstream manhole in each sewer which connects to an existing downstream sewer
- Seepage barriers will be constructed in any temporary drainage ditches
- Filter cloths will remain on open surface structure such as manholes and catchbasins until these structures are commissioned and put into use

Silt fence on the site perimeter.

At detail design of each phase of the roadway renewal site specific Sediment and Erosion Control Plans will be prepared for each stage of works.

9.2 Trench Dewatering

Any trench dewatering using pumps will be discharged into a filter trap made up of geotextile filters and straw bales similar in design to the OPSD 219.240 Dewatering Trap. These will be constructed in a bowl shape with the fabric forming the bottom and the straw bales forming the sides. Any pumped groundwater will be filtered prior to release to the existing surface runoff. The contractor will inspect and maintain the filters as needed, including sediment removal and disposal and material replacement as needed. It should be noted that that the contractor will be responsible for the design and management of the trap(s).

9.3 Bulkhead Barriers

At the first new manhole constructed within the development that is immediately upstream of an existing sewer a temporary ½ diameter bulkhead will be constructed over the lower half of the outletting sewer. This bulkhead will trap any sediment carrying flows thus preventing any construction-related contamination of existing sewers. The bulkheads will be inspected and maintained including periodic sediment removal as needed and removed prior to top course asphalt being laid.

9.4 Seepage Barriers

In order to further reduce sediment loading to the downstream system, seepage barriers will be installed on any surface water courses at appropriate locations that may become evident during construction. These barriers will be Light Duty Straw Bale Barriers per OPSD 219.100 and Heavy-Duty Silt Fence Barriers per OPSD 219.130. They are typically made of layers of straw bales or geotextile fabric staked in place. All seepage barriers will be inspected and maintained as needed.

9.5 Surface Structure Filters

All catchbasins, and to a lesser degree manholes, convey surface water to sewers. However, until the surrounding surface has been completed these structures should be covered in some fashion to prevent sediment from entering the minor storm sewer system. Until the boulevards are sodded or until streets are asphalted and curbed, catchbasins and manholes will be constructed with geotextile filter bags, or a geotextile filter fabric located between the structure frame and cover respectively. These will stay in place and be maintained during construction and build until it is appropriate to remove same.

9.6 Stockpile Management

During construction of any redevelopment similar to that proposed by the Owner, both imported and native soils are stockpiled. Mitigative measures and proper management to prevent these materials entering the sewer systems is needed. Significant excess material will be generated from the subject lands and will need to be disposed of off-site in a manner consistent with all MECP regulations.

During construction of the deeper municipal services, water, sewers and service connections, imported granular bedding materials are temporarily stockpiled on site. These materials are however quickly used up and generally before any catchbasins are installed. Street catchbasins are installed at the time of roadway construction.

Contamination of the environment as a result of stockpiling of imported construction materials is generally not a concern provided the above noted seepage barriers are installed. These materials are quickly used and the mitigative measures stated previously, help to manage these concerns.

The roadway granular materials are not stockpiled on site. They are immediately placed in the roadway and have little opportunity of contamination. Lot grading sometimes generates stockpiles of native materials. However, this is only a temporary event since the materials are quickly moved off site. To assist in the control of transporting sediment off-site into municipal roads, mud mats will be employed at the construction entrances.

10 CONSTRUCTION MANAGEMENT PLAN

At detail design/construction stage a Construction Management Plan (CMP) will be prepared and approved by stakeholders which will include but not limited to: PSPC, CLC, Heath Canada, National Defence, SSC, City of Ottawa, Ottawa and Gatineau Transit operators, Hydro Ottawa, Utility providers, successful Contractor(s) plus others deemed appropriate to invite. The CMP will outline the specific scope of works to be completed with each contract. As multiple contracts are expected to be entered into to complete the works over multiple years. Each CMP will include the projected timelines with key milestone and deadlines, as the site will continue to have federal tenants each with specific requirements the project timeline including specific elements such as rock blasting or road closures will be reviewed and approved by the stakeholders. The contractor will be required to provide Resource Management Schedule to coincide with the contracted completion dates and milestone dates for the works, this will include the listing of any long term delivery of materials necessary for the project.

For each CMP the stakeholders and contractor will complete a risk management assessment noting potential risks and their impact and note the corresponding mitigation strategies to manage or reduce risks.

For each CMP the stakeholders and contractor will establish a Safety Plan to ensure workers and tenants are able to travers the site safely. This will also include an emergency plan and contacts in the event of an onsite issue.

For each CMP the stakeholders and contractor will also review potential environment impacts and mitigation measures, and review/implement sustainable construction practices for the works.

It should be noted while significant works will be completed for this project limited works will be completed with City of Ottawa ROW, **Figure 12** Conceptual Construction Staging in **Appendix 5** illustrates the campus and the currently identifies the area for the first phase of construction. The areas where works will potential impact City owned lands is noted. While limited works will be on City lands significant works within the private site will occur and will require coordination. It is also key to note OC Transpo no longer has public bus services through the private roads, however STO continues to use Tunney's Pasture Drive. The following further outlines the CMP proposed goals and requirements and the potential table of contents for the CMP

Contraction Management Plan: Tunney's Pasture Redevelopment
1. Introduction

- Purpose of the Plan: Outline strategies to manage and mitigate construction-related impacts during the redevelopment of Tunney's Pasture.
- Project Overview: Redevelopment of Tunney's Pasture into a mixed-use community with residential, commercial, and green spaces.
- Project Phasing: The project will be completed in multiple phases to minimize impact on traffic, transit, and surrounding infrastructure, each phase to be staged to further reduce impact.

2. Stakeholders

- Federal government (owner of Tunney's Pasture lands), and tenants.
- City of Ottawa
- Local residents and businesses
- Construction contractors
- Public transit authorities (OC Transpo, STO)

3. Key Objectives

- Ensure public safety and security during construction activities.
- Minimize disruptions to transportation, nearby residents, and businesses.
- Maintain environmental compliance and sustainability.
- Communicate effectively with stakeholders throughout the construction phase.

4. Construction Sequencing

- Sequence A: Focuses on initial infrastructure improvements and establishing access routes, with minimal interference to existing transit operations.
- Sequence B: Involves major construction work, with a detailed traffic and transit management plan to maintain flow and accessibility.
- Sequence C: Finalization of construction and landscaping, with efforts to restore and enhance transit routes, pedestrian pathways, bike lanes, and traffic patterns.

5. Construction Impact Assessment

To ensure a thorough assessment, the plan includes a review at each phase/stage to determine whether construction activities will impact the following:
Bus Routes:

- Assess whether temporary detours or route adjustments are needed for STO buses servicing the Tunney's Pasture area.
- Coordinate with OC Transpo and STO to ensure transit disruptions are minimized.

Sidewalks:

- Identify areas where sidewalks may be blocked or partially obstructed by construction work.
- Provide alternative pedestrian pathways with clear signage and safety measures.

Bike Lanes:

- Determine whether bike lanes will be blocked or temporarily inaccessible due to construction activities.
- Provide safe detour routes for cyclists with clear signage.

Traffic Lanes:

- Assess whether construction will require the temporary closure of traffic lanes.
- Implement lane closures only during off-peak hours, where feasible.
- Ensure proper traffic control measures, including barriers, lane markings, and flagging personnel.

6. Mitigation Strategies

Traffic and Transit Management

- Develop a phased traffic and transit management plan with OC Transpo and STO to address detours and disruptions:
- Coordinate bus route detours and transit stop relocations well in advance.
- Establish temporary transit hubs if necessary.
- Implement detours for pedestrians and cyclists around blocked sidewalks and bike lanes.
- Provide clear signage for road closures, alternative routes, and detours for all modes of transportation.
- Use temporary traffic signals and flagging personnel during lane closures to maintain flow and safety.

- Schedule deliveries and heavy equipment movement during off-peak hours to reduce congestion.

Noise and Vibration Control
- Limit noisy activities to designated hours (e.g., 7 AM to 7 PM) for each phase.
- Use noise barriers or blankets around equipment.
- Monitor vibration levels and conduct pre-construction surveys of nearby buildings.

Air Quality Management
- Use water spray or dust suppressants during excavation and demolition.
- Ensure all construction equipment meets emission standards.
- Cover trucks transporting loose materials.

Waste and Recycling
- Establish waste separation stations for recycling concrete, steel, and other materials.
- Partner with waste management services for regular disposal.
- Minimize material wastage through efficient design and planning.

Site Safety
- Erect fencing and barriers around the construction site.
- Provide clear signage for pedestrians and vehicles.
- Conduct regular safety training for workers.
- Ensure emergency response plans are in place.

7. Stakeholder Engagement
Public Communication:
- Host community information sessions prior to the start of each construction phase for directly impacted or deemed appropriate stakeholder.
- Provide regular updates through newsletters, websites, and social media.
- Establish a hotline or email for questions and complaints.

Coordination with City of Ottawa:
- Align construction activities with municipal guidelines and transit schedules.
- Provide advanced notice of any sidewalk, bike lane, or traffic lane closures.
- Consider City of Ottawa's active transportation policies and design guidelines for bridges and pathways.

8. Environmental Considerations
- Ensure compliance with provincial and federal environmental regulations.
- Protect green spaces and trees during construction.
- Implement erosion control measures to prevent impacts on nearby waterways.

9. Monitoring and Reporting
- Establish a monitoring system for traffic, noise, air quality, and vibrations.
- Conduct regular site inspections to ensure compliance with the management plan.
- Review and report on the impact of construction on bus routes, sidewalks, bike lanes, and traffic lanes at the start and end of each phase.
- Report progress and issues to stakeholders on a monthly basis.

10. Contingency Planning
- Develop contingency plans for unexpected events such as severe weather, equipment breakdowns, or public safety incidents.

- Ensure flexibility in project timelines to accommodate unforeseen delays.

In conclusion, by implementing the strategies outlined in an approved Contraction Management Plan, conducting regular reviews of impacts on bus routes, sidewalks, bike lanes, and traffic lanes. The redevelopment of Tunney's Pasture will proceed efficiently while minimizing disruption to the surrounding community. Continuous monitoring and stakeholder engagement will ensure the project aligns with its broader goals of creating a vibrant and sustainable mixed-use community.

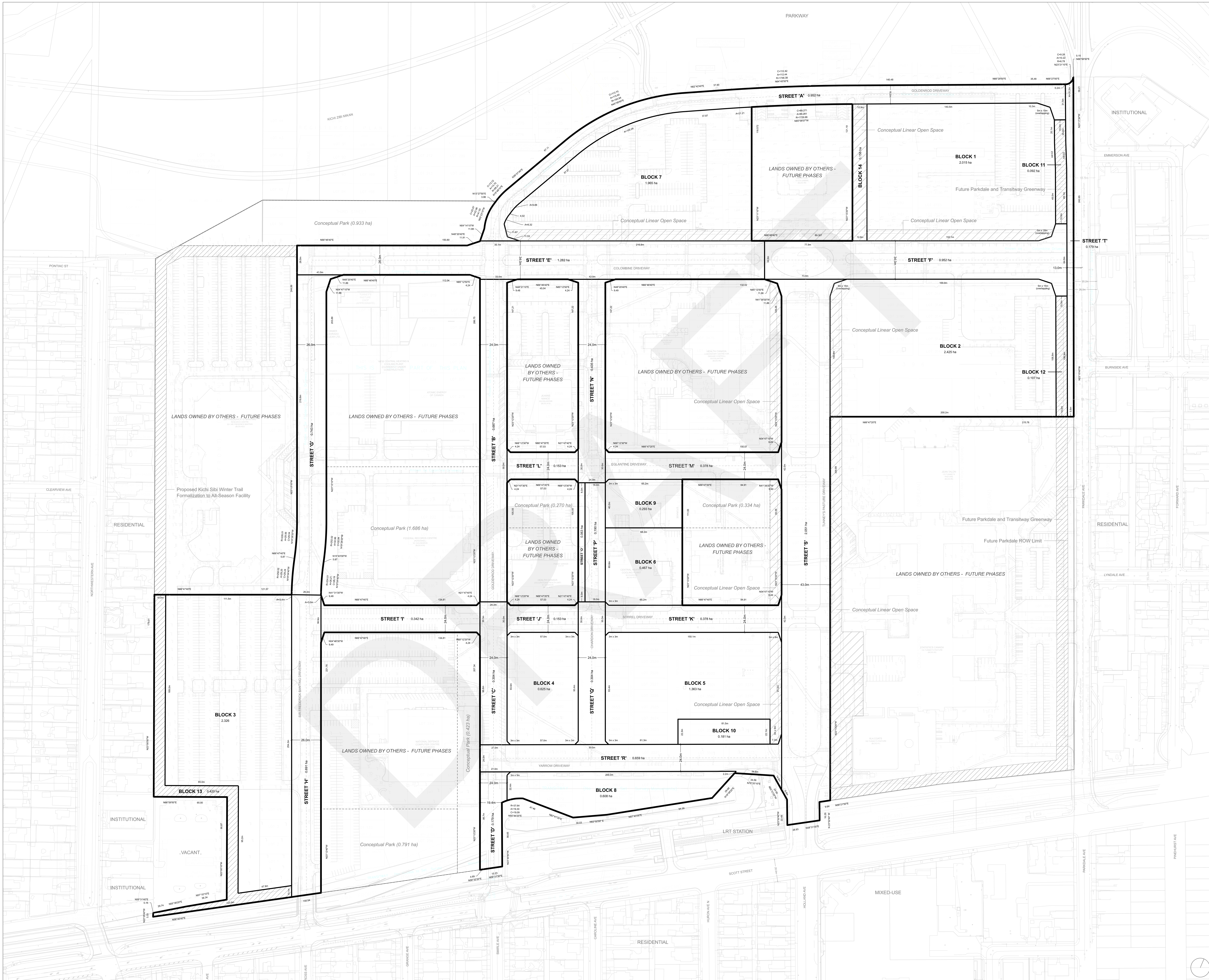
11 CONCLUSION

This report was prepared to support the application for Draft Plan Approval of the ROW for the subject lands. The report has illustrated that the proposed redevelopment of the Federal Campus can be serviced via existing municipal infrastructure. The water network will be adjusted within the development to provide necessary domestic and fire flow service for the retained and future blocks. The private sanitary sewer system will be generally removed and replace within the proposed ROWs to service the site. It is acknowledged there is limited capacity/surcharging within the WNC during wet weather events however noted offsite works proposed by the City of Ottawa can mitigate the impact of the redevelopment. Similarly, the storm sewer system will be generally removed and replaced within the ROWs to service the site. Stormwater runoff from the future/redevelopment blocks will be subject to quantity controls to ensure the proposed renewed storm sewer system within the ROW is able to accommodate the redevelopment. In addition to ROW LID's the installation of centralized OGS will assist in meeting quality control targets. The sanitary and storm sewer designs for this development will be completed in conformance with City of Ottawa and MECP standards.

Based on the information provided within this report, the existing municipal systems can support the proposed redevelopment of the site. Conditions of Draft Approval will dictate the specific detail design requirements to implement the urban renewal of the ROW's to support the future development/redevelopment of blocks. The created blocks within the plan of subdivision will be subject to SPA and required to meet the City of Ottawa and MECP requirements.

Demetrius Yannoulopoulos, P. Eng.
Principal – Practice Lead, Land Engineering
https://arcadiso365.sharepoint.com/sites/Projects2/139833/Internal Documents/6.0_Technical/6.04_Civil/03_Reports/Assessment of Adequacy/ APSR 3rd Submission/ CTR-Assessment of Adequacy-2026-03-16.docx\

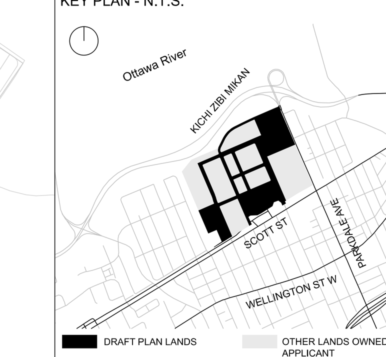
APPENDIX 1



PUBLIC ROAD REDEVELOPMENT

TUNNEY'S PASTURE
OTTAWA, ON

KEY PLAN - N.T.S.



INFORMATION REQUIRED

UNDER SECTION 51 (17) OF THE PLANNING ACT, R.S.O. 1990. c.P.13 AS AMENDED
(a) - AS SHOWN
(b) - AS SHOWN
(c) - AS SHOWN
(d) - AS LISTED
(e) - AS SHOWN
(f) - AS SHOWN
(g) - AS SHOWN
(h) - MUNICIPAL WATER
(i) - URBAN, NA
(j) - AS SHOWN
(k) - MUNICIPAL SANITARY AND STORM SEWERS
(l) - AS SHOWN

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

SIGNED ______________________

V ANDREW SHELP, O.L.S.
ANNIS, O'SULLIVAN, VOLLEBEKK LTD

DATE ____________

OWNER'S CERTIFICATE

I HEREBY CONSENT TO THE FILING OF THIS PLAN BY IBI GROUP, IN DRAFT FORM.

SIGNED ______________________
CANADA LANDS COMPANY

DATE ____________

LAND USE SCHEDULE

BLOCKS/ STREETS	DESCRIPTION	Est. # Units*	AREA (ha)
1	MIXED-USE	1,000	2.015
2	MIXED-USE	800	2.425
3	MIXED-USE	750	2.326
4	MIXED-USE	700	0.625
5	MIXED-USE	1,700	1.363
6	MIXED-USE	0	0.467
7	MIXED-USE	750	1.965
8	TRANSIT (TO BE CONVEYED TO CITY)		0.608
9	PARK		0.293
10	PARK		0.181
11	OPEN SPACE		0.092
12	OPEN SPACE		0.107
13	OPEN SPACE		0.420
14	OPEN SPACE		0.156
'A'	PUBLIC ROW (Goldenrod Driveway)		0.952
'B'	PUBLIC ROW (Goldenrod Driveway)		0.687
'C'	PUBLIC ROW (Goldenrod Driveway)		0.304
'D'	PUBLIC ROW (Goldenrod Driveway)		0.179
'E'	PUBLIC ROW (Colombine Driveway)		1.282
'F'	PUBLIC ROW (Colombine Driveway)		0.952
'G'	PUBLIC ROW (Sir Frederick Banting Driveway)		0.743
'H'	PUBLIC ROW (Sir Frederick Banting Driveway)		0.691
'I'	PUBLIC ROW (Sorrel Driveway)		0.342
'J'	PUBLIC ROW (Sorrel Driveway)		0.153
'K'	PUBLIC ROW (Sorrel Driveway)		0.378
'L'	PUBLIC ROW (Eglantine Driveway)		0.153
'M'	PUBLIC ROW (Eglantine Driveway)		0.378
'N'	PUBLIC ROW (Chardon Driveway)		0.435
'O'	PUBLIC ROW WIDENING (Chardon Driveway)		0.063
'P'	PUBLIC ROW (Chardon Driveway)		0.190
'Q'	PUBLIC ROW (Chardon Driveway)		0.304
'R'	PUBLIC ROW (Yarrow Driveway)		0.659
'S'	PUBLIC ROW (Tunney's Pasture Driveway)		2.051
'T'	PUBLIC ROW WIDENING (Parkdale Avenue)		0.179
	TOTAL:	5,700	24.120

*Unit total is estimated

DRAWING ISSUE RECORD

#	DATE	BY	DESCRIPTION
14	2025-12-15	SD	DRAFT
13	2025-12-12	SD	DRAFT
12	2025-07-02	SD	SUBMISSION
11	2025-05-21	SD	DRAFT
10	2024-12-03	SD	DRAFT
9	2024-09-13	SD	SUBMISSION
8	2024-07-30	SD	DRAFT
7	2024-07-24	SD	DRAFT
6	2024-07-16	SD	DRAFT
5	2024-07-16	SD	DRAFT
4	2024-06-28	SD	DRAFT
3	2024-04-05	SD	PAC SUBMISSION
2	2024-03-04	SD	DRAFT
1	2023-12-15	SD	DRAFT
0	2023-06-21	SD	DRAFT

APPROVALS

SIGNED ______________________

ANDREW MCCREIGHT, MANAGER,
DEVELOPMENT REVIEW CENTRAL

DATE ____________

ARCADIS

BENCHMARK

1. Elevations shown are geodetic and are referred to the CGVD2013 geodetic datum.
2. It is the responsibility of the user of this information to verify that the job benchmark has not been altered or disturbed and that it's relative elevation and description agrees with the information shown on this drawing.

SCALE 15 0 10 20 40
1:1000 (m)

PROJECT NO: 139833

DRAWN BY: SD

CHECKED BY:

PROJECT MGR: SA

APPROVED BY:

SHEET TITLE

DRAFT PLAN OF SUBDIVISION

SHEET NUMBER 1

ISSUE 1.13

Building Legend:

- Short-term Retention
- Short-term Retention Repurposed
- Mid-term Retention (10-15 Years)
- Long Term Retention (20+ Years)
- Permanent
- Health Canada Property Limits

Légende:

- Conservation à court terme
- Conservation à court terme Réaménagement
- Conservation à moyen terme (10-15 ans)
- Conservation à long terme (plus de 20 ans)
- Permanent

LEGEND

Water Valve, Valve Chamber, Fire Hydrant	
Sewer Manhole, Catch Basin Manhole	
Catch Basin / Drainage, Wing Wall, Head Wall	
Pole, Pole w/ light, Decorative, Lawn Light	UP H
Power Supply, Panel, Pedestal, Transformer, Tower, Regulator	P/S B PED GR
Amp, Hand Hole, Vault, Gas Valve	AMP
OC Transpo: Bus Shelter-No Power, Energized, Isolated	BUS BUS BUS
Streetscape: Planter Box, Grate Square, Eng. Soil	TGS
Traffic Connect Box / Disconnect Box, SL Disconnect	TCB TDB SDB
Red Light Hand Hole, Red Light Camera	THH
Scada: Handhold, Monitoring Panel	S M
Reducer	
Pipe, Duct, Conduit, Lateral	
Culvert	
Abandoned	
Capped	
Buried Cable	
Property Line	
Install Year	(2015)

TELECOM GLOSSARY

A.....Allstream	P.....Primus
AT.....Atria	P2P.....Canadian P2P Fibre
B.....Bell	R.....Rogers
BH.....Birch Hill	S.....Sprint
F.....Fibre Noir	SL.....Street Lighting
G.....Globility	T.....Traffic
GT.....Group Telecom	TO.....Telecom Ottawa
H.....Hydro Ottawa	TU.....Telus
H1.....Hydro One	V.....Videotron
L / L3.....Level 3	Z.....Zayo

GLOSSARY - OTHER

DD.....Dept. of Defence	PED.....Pedestal (owner unknown)
MH.....Manhole (owner unknown)	PW.....Public Works
O/OC.....OCTranspo	UP.....Utility Pole (owner unknown)
SCD.....Scada	

CAUTION/ATTENTION

Although utility locations are established using the best available informaiton, they cannot be guaranteed.
Property Lines were compiled from plans and documents recorded in the Land Registry System and are for indexing purposes only.

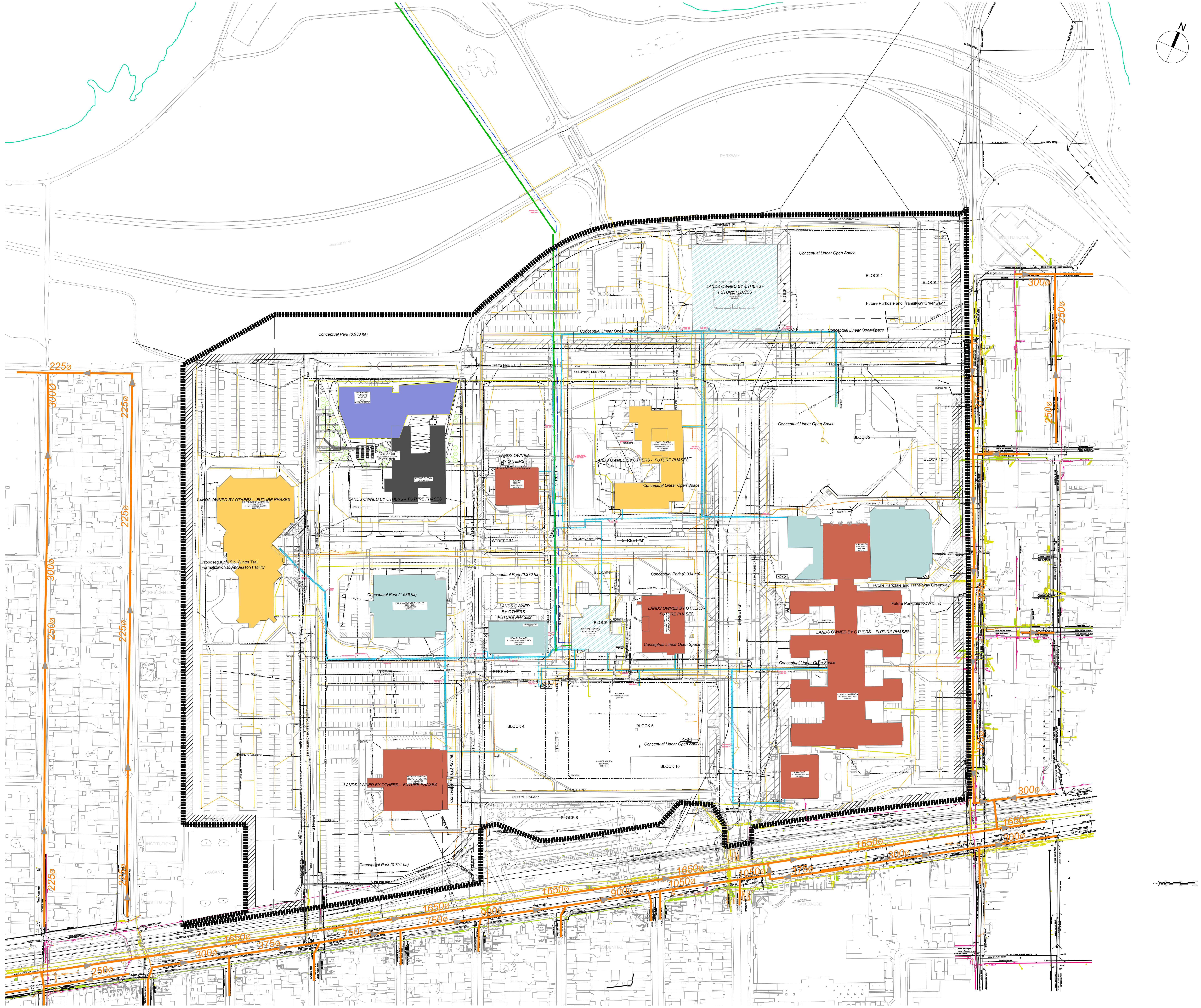
UTILITY COORDINATING COMMITTEE UCC Ottawa CCSP COMITÉ DE COORDINATION DES SERVICES PUBLICS

Bien que l'emplacement des services publics soient établis en utilisant la meilleure information disponible, ils ne peuvent pas être garantis.
Des lignes de propriété ont été compilées en utilisant des plans et des documents enregistrés dans le système de cadastre et sont pour l'indexation seulement.

PWGSC LEGEND

- U/G BELL TELEPHONE SERVICE
- A/G BELL TELEPHONE SERVICE
- U/G FIBER OPTICS
- U/G LOW VOLTAGE ELECTRICAL
- A/G LOW VOLTAGE ELECTRICAL
- U/G ELECTRICAL SERVICE ABN
- U/G HIGH VOLTAGE ELECTRICAL
- A/G HIGH VOLTAGE ELECTRICAL
- A/G SECURITY LINE
- SECURITY SERVICE LINE
- CHILLED WATER RETURN
- CHILLED WATER SUPPLY
- STEAM CONDUIT
- CONDENSATE
- STEAM CONDUIT ABANDONED
- WATERMAIN CONDUIT
- WATERMAIN ABANDONED
- IRRIGATION LINE
- STORM SEWER
- STORM ABANDONED
- SANITARY SEWER
- COMBINED SEWER
- SANITARY FORCED MAIN
- SANITARY ABANDONED
- GAS LINE
- GAS LINE ABANDONED
- TREE LINE/ EDGE OF BUSH
- TOP OF SLOPE
- BOTTOM OF SLOPE

VERTICAL CONTROL	BHP BELL–HYDRO POLE
HORIZONTAL CONTROL	HP HYDRO POLE
IB SQUARE IRON BAR	BP BELL POLE
RIB ROUND IRON BAR	GUY GUY ANCHOR
CC CUT CROSS	GP GUY POLE
NAIL SURVEY NAIL	BP BELL PEDESTAL
WS WOODEN STAKE	CP CABLE PEDESTAL
BENCH MARK	ELECTRICALPULL BOX
MH GENERAL MANHOLE	ELECTRICAL PLUG POST
SMH SANITARY MANHOLE	LIGHTNING ROD
DMH STORM MANHOLE	
ELECTRICAL MANHOLE	
FOMH FIBRE OPTIC MANHOLE	
BMH BELL MANHOLE	
B/FOMH BELL–FIBRE OPTIC MANHOLE	TCB TRAFFIC CONTROL BOX
TMH TRAFFIC MANHOLE	TL TRAFFIC LIGHT
MC METER CHAMBER	FC SECURITY CAMERA
H FIRE HYDRANT	LS LIGHT STANDARD
VC VALVE CHAMBER	LP LAMP POST
VB VALVE BOX	FL FLOOD LIGHT
CS WATER CURB STOP	D-LS DOUBLE LIGHT STANDARD
STANDPIPE	H/LP HYDRO–LAMP POST
IV IRRIGIATION VALVE BOX	GV/N NATURAL GAS VALVE
IS IRRIGATION SPRINKLER HEAD	GM/N NATURAL GAS METER
IV INTAKE VALVE	VENT/N NATURAL GAS VENT
CO/SA SANITARY SEWER CLEAN OUT	OFC OIL FILLER CAP
CO/SW STORM SEWER CLEAN OUT	
CB SQUARE CATCH BASIN	ROAD BOLLARD
CB DOUBLE CATCH BASIN	MP ENVIRONMENTAL MONITOR PIN
CB INLET CATCH BASIN	MW ENVIRONMENTAL MONITOR WELL
CB RECTANGULAR CATCH BASIN	TP GEOTECH TEST PIT
CB ROUND CATCH BASIN	BH GEOTECH BOREHOLE
DI DITCH INLET	SD SATELLITE DISH
DR DRAIN	SB SATELLITE BOX
FLAG POLE	M/GP METAL GATE POST
DECORATIVE POLE	W/GP WOODEN GATE POST
DECIDUOUS	SHRUB
CONIFEROUS	STUMP



Z:\Toronto\139833_TunneyPasture\7.0_Production\7.03_Design\04_Civil_Land\Figures\Servicing Report\139833ExistingUndergroundInfrastructure.dwg Layout Name: Figure 1 Existing Underground Infrastructure Last Saved By: dored5754 Last Saved At: Mar. 23, 26

ARCADIS

Project Title

Tunney's Pasture

Site Servicing and Public Road Redevelopment

Prepared for Canada Lands Company & Public Service and Procurement Canada

Drawing Title

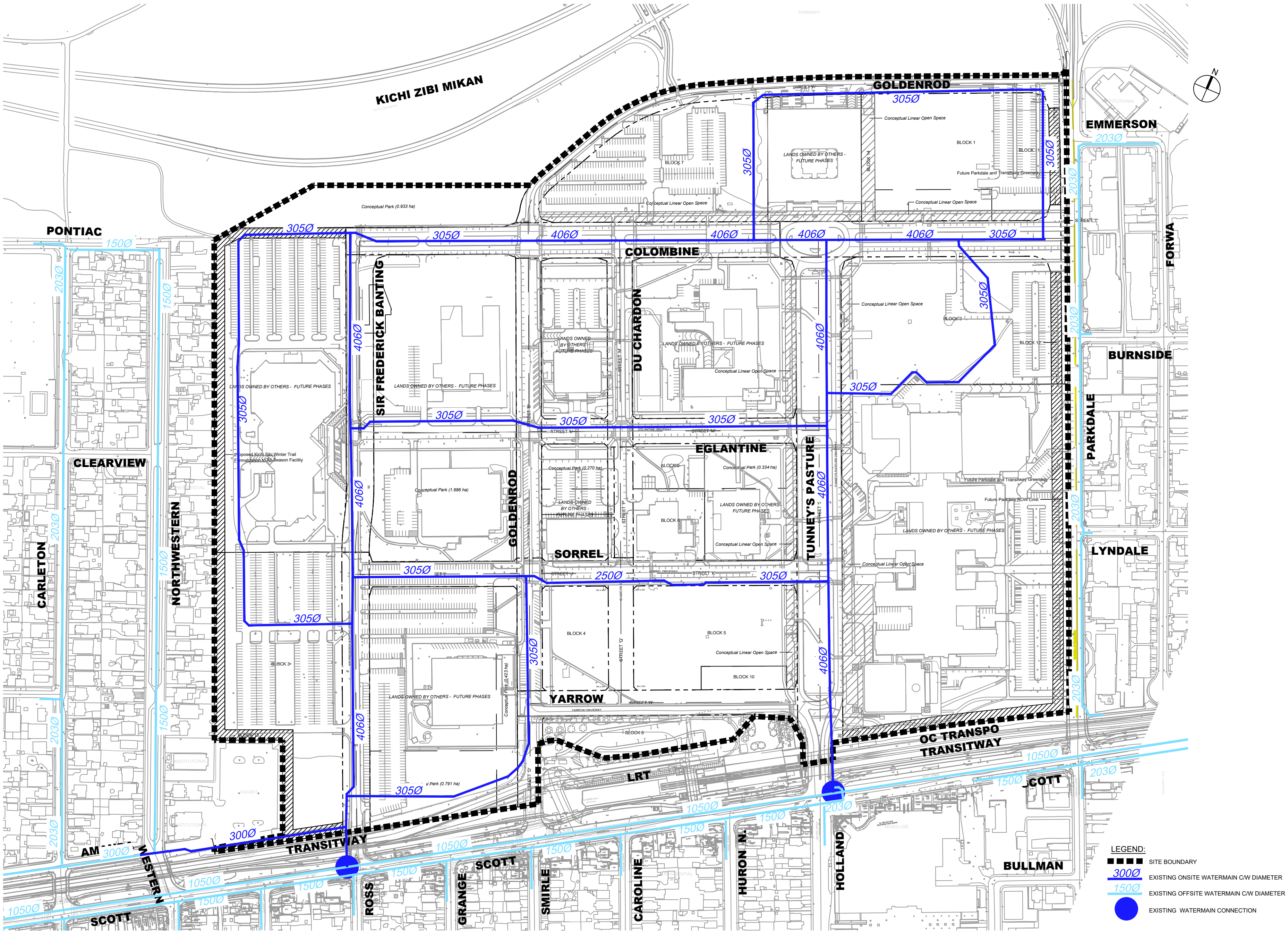
Existing Underground Infrastructure

Sheet No.

Figure 1

March 25. 2026

APPENDIX 2



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ARCADIS

Project Title

Tunney's Pasture

Site Servicing and Public Road Redevelopment

Prepared for Canada Lands Company & Public Service and Procurement Canada

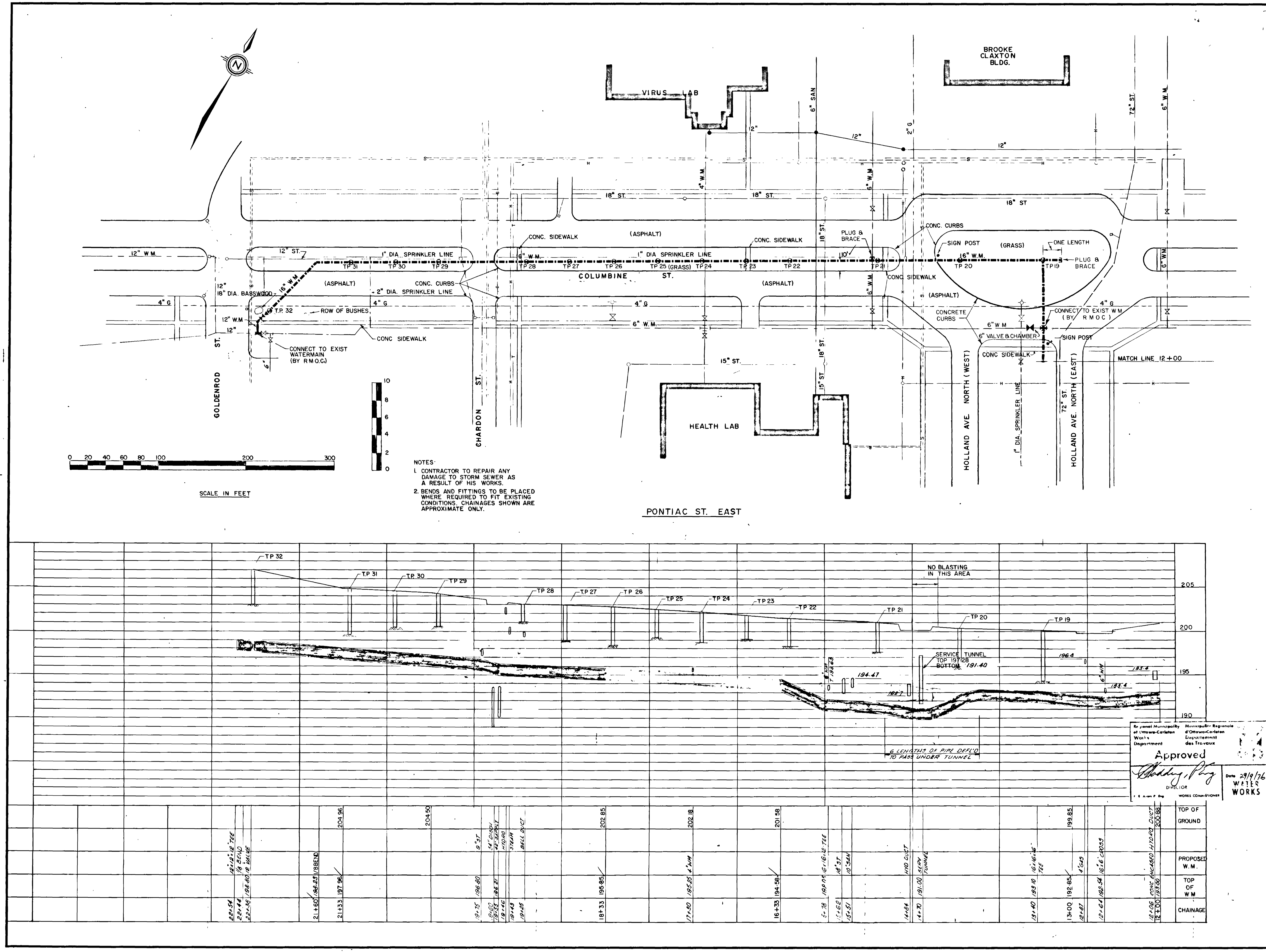
Drawing Title

Existing Watermain Infrastructure

Sheet No.

Figure 2

March 25, 2026



Columbine P&P 2

Public Works Canada / Travaux publics Canada

National Capital Operations Branch
Direction générale des opérations de la Capitale nationale

H.D. McFarland
Director General
Directeur général

W.N. Thomas
Manager
Design and Construction
Administrateur
Études et construction

AS BUILT
J. L. RICHARDS & ASSOCIATES LIMITED
MARCH 1977

J.L. RICHARDS & ASSOCIATES LIMITED

Z.I. RANA

project title / titre du projet
SERVICES DISTRIBUTION SYSTEM
TUNNEY'S PASTURE
OTTAWA ONTARIO

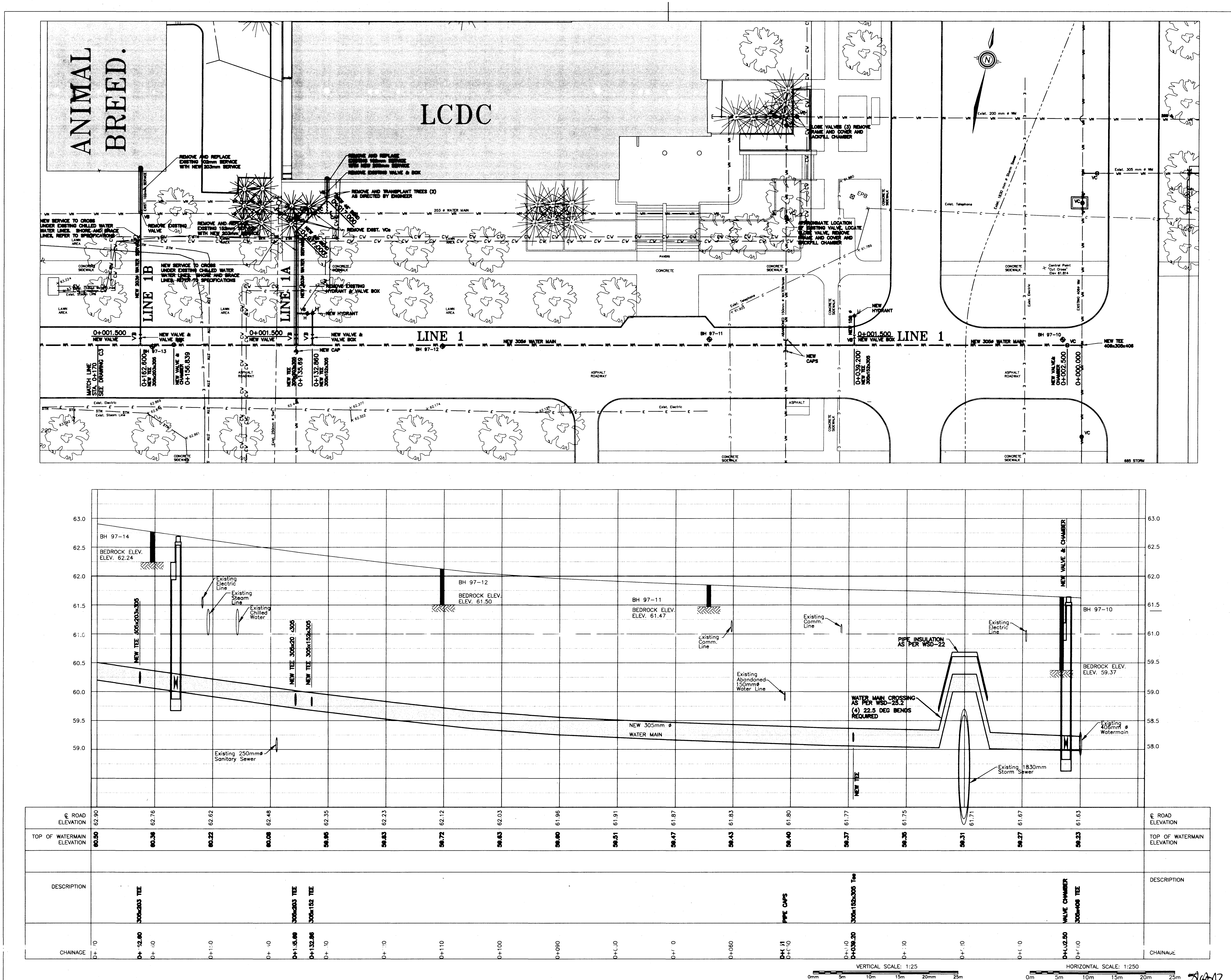
drawing title / titre du dessin
WATER MAIN EXTENSION
PLAN & PROFILE
PONTIAC ST. EAST

designed by	Z.I. RANA	JUNE 1976
drawn by	D.V. SALLY	JUNE 1976
reviewed by	J.R. ALLEN	JUNE 1976
approved by	A.E. FEE	JUNE 1976
Tender	A. SCOTHORN	

project number: 77970/03

drawing no.: 03 – C3 2594-2

DPW 708E



Public Works and Government Services Canada / Travaux publics et Services gouvernementaux Canada

National Centre of Expertise
Centre d'expertise national

National Center of Expertise
Architectural and Engineering Services
Real Property Services Branch

Centre d'expertise national
Services d'architecture et génie
Direction générale des services immobiliers

Subject: Water Main
Based upon your information provided, City of Ottawa Infrastructure Services Branch has no objections

Signature — Date 7 Jan 03

Contractor to verify all dimensions & conditions on site and immediately notify the engineer of all discrepancies

revisions		date
2.	100% Issued For Tender	Oct./02
1.	100% Issued For RPCD Review	Sept. 5/02

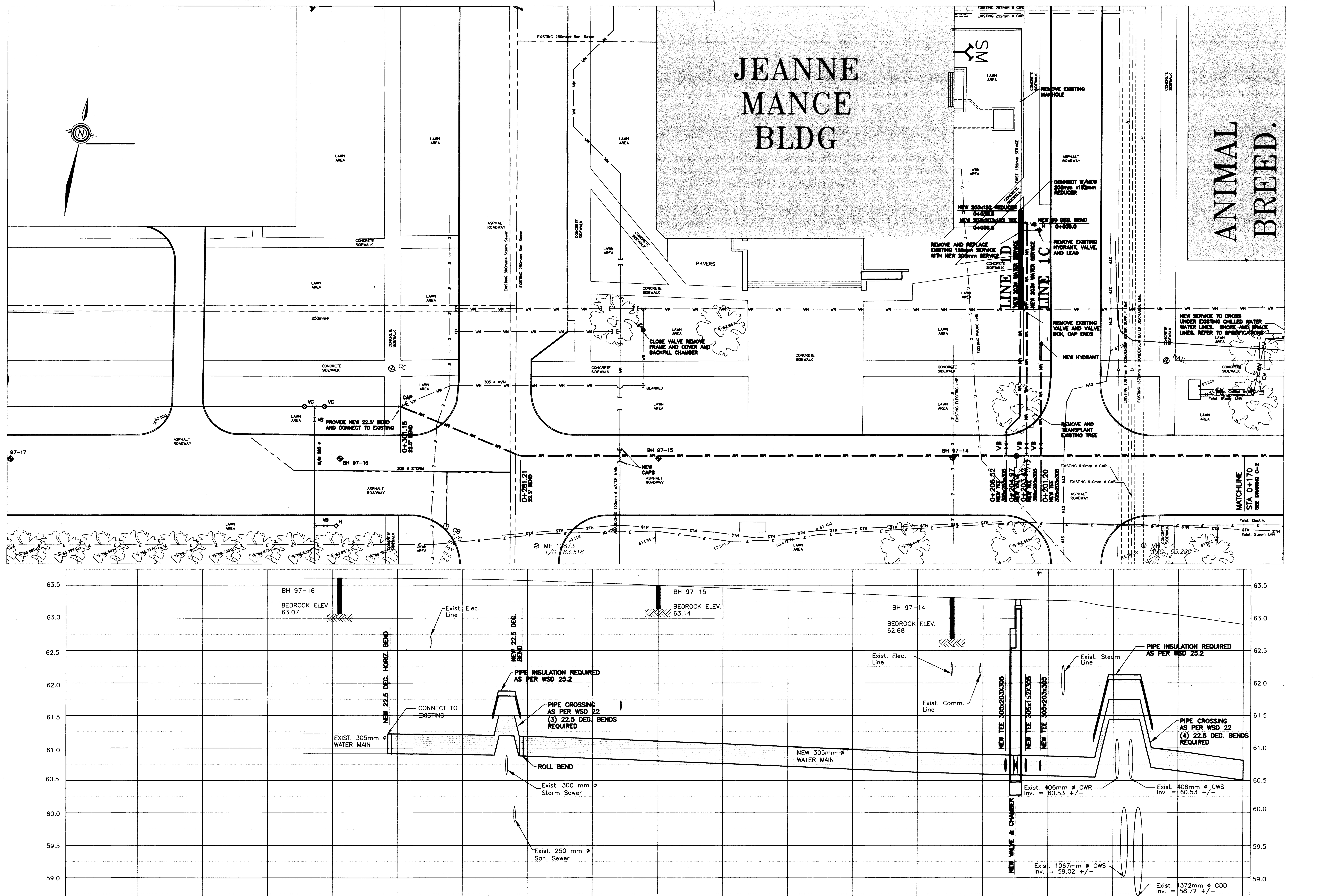
project / projet
TUNNEY'S PASTURE WATER MAIN UPGRADING PHASE V
OTTAWA — ONTARIO

drawing / dessin
PLAN & PROFILE DE L'EGLANTINE STA. 0+000 TO 0+170

designed	J.M.	conçu
date	AUGUST, 2002	
drawn	J.M. & M.B.	dessiné
date	AUGUST, 2002	
reviewed		examiné
date		
approved	J.M.	approuvé
date	AUGUST, 2002	
Tender	DERIC MOIR	Soumission
Project Manager		Administrateur de projets
project no.	418334	no. du projet
drawing no.	C-2	no. du dessin

PWGSC B1

9615



℄ ROAD ELEVATION		XX.XX	XX.XX	XX.XX	63.62	63.62	63.60	63.58	63.55	63.51	63.46	63.42	63.38	63.33	63.30				63.28	63.17	63.05	62.90
TOP OF WATERMAIN ELEVATION		XX.XX	XX.XX	XX.XX	61.22	61.22	61.20	61.18	61.15	61.11	61.06	61.02	60.98	60.93	60.90				60.88	61.43	60.85	60.50
SANITARY SEWER INVERT																						
DESCRIPTION						BEND CONNECT TO EXISTING		NEW BEND								305x203 TEE	305mm VALVE	305x203 TEE	305x203 TEE			
CHAINAGE	0+3[illegible]0	0+[illegible]0	0+3[illegible]0	0+[illegible]0	0+3[illegible]0	0+301.16 0+300	0+290	0+280.96 0+280	0+270	0+2[illegible]0	0+2[illegible]0	0+240	0+2[illegible]0	0+2[illegible]0	0+2[illegible]0	0+2[illegible]6.52	0+2[illegible]4.97	0+2[illegible]3.42	0+2[illegible]1.20 0+2[illegible]0	0+1[illegible]0	0+1[illegible]0	0+1[illegible]0

VERTICAL SCALE: 1:25
0mm 5m 10m 15m 20mm 25m

HORIZONTAL SCALE: 1:250
0m 5m 10m 15m 20m 25m

PWGSC B1

0 10 20mm 40 60 80 100 120 140 160 180 200mm

Public Works and Government Services Canada / Travaux publics et Services gouvernementaux Canada

National Centre of Expertise
Centre d'expertise national

National Center of Expertise
Architectural and Engineering Services
Real Property Services Branch

Centre d'expertise national
Services d'architecture et génie
Direction générale des services immobiliers

Eglantine P&P 2

Subject: [illegible]
Based upon your information provided. City of Ottawa Infrastructure Services Branch has no objections
Signature: [signature] Date: [illegible]

revisions		date
2.	100% Issued For Tender	Oct. /02
1.	100% Issued For RPCD Review	Sept. 5/02

A detail no. / no. du detail
B location drawing no. / sur dessin no.
C drawing no. / dessin no.

project / projet
TUNNEY'S PASTURE WATER MAIN UPGRADING PHASE V
OTTAWA ONTARIO

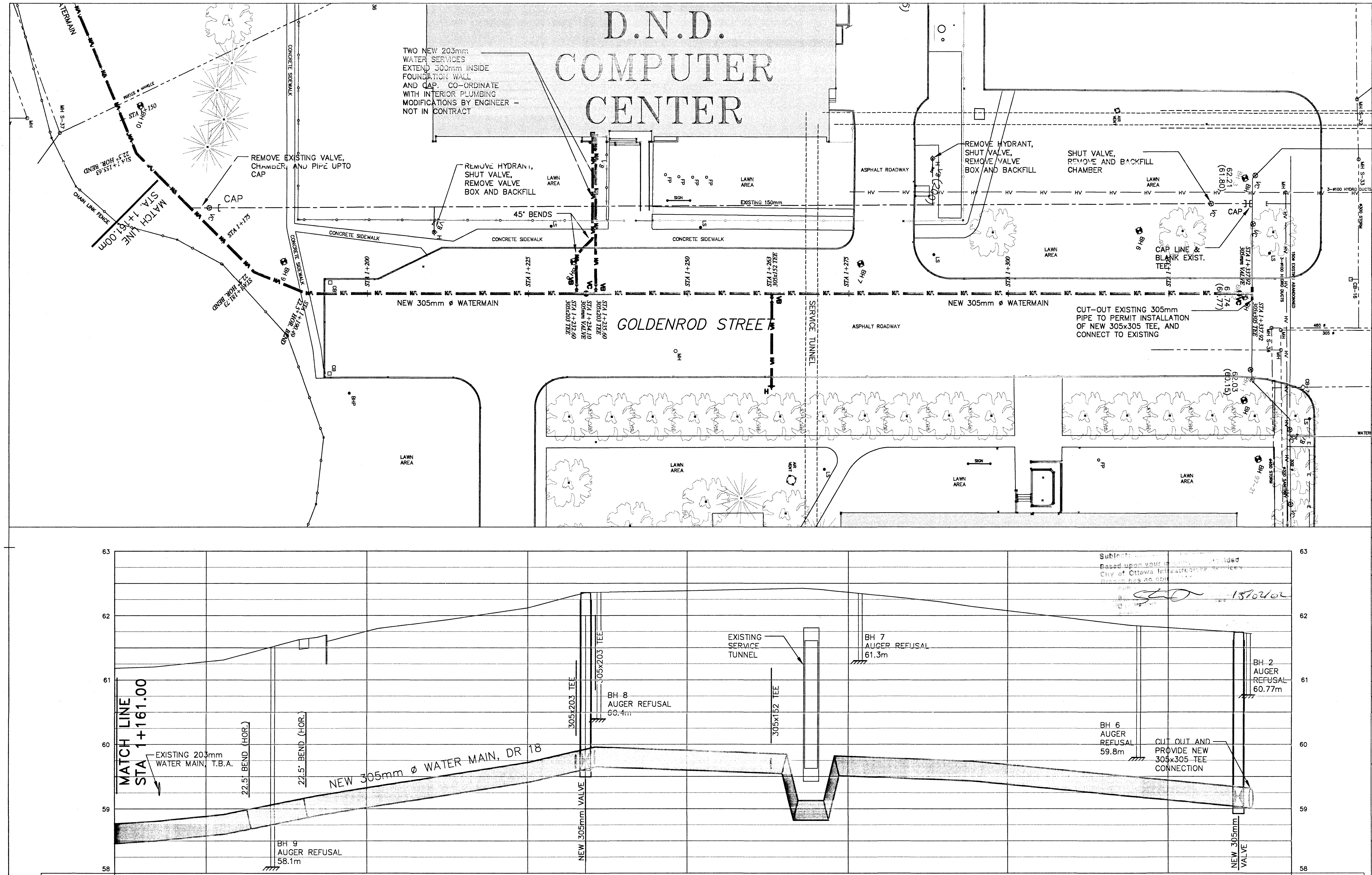
drawing / dessin
PLAN & PROFILE DE L'EGLANTINE STA. 0+170 TO 0+301.2

designed / conçu: J.M.
date: AUGUST, 2002
drawn / dessiné: J.M. & M.B.
date: AUGUST, 2002
reviewed / examine: G.L.D.
date: AUGUST, 2002
approved / approuvé: J.M.
date: AUGUST, 2002
Tender / Soumission: DERIC MOIR
Project Manager / Administrateur de projets
project no. / no. du projet: 446334
drawing no. / no. du desin: C-3

S6A7

9615

Goldenrod P&P 1



CHAINAGE	EXISTING GRADE ELEVATION	TOP OF WATERMAIN ELEVATION	DESCRIPTION
1+161.00	61.19	58.77	
1+175	61.29	58.89	
1+181.73			22.5° HOR. BEND
1+190.49			22.5° HOR. BEND
1+200	61.76	59.33	
1+225	62.12	59.72	
1+232.60	62.36	59.93	305x203 TEE
1+234.10			305mm VALVE
1+235.60			305x203 TEE
1+250	62.39	59.91	
1+263			305x152 TEE
1+265.09			22.5° VERT. BEND
1+266.83			22.5° VERT. BEND
1+271.55			22.5° VERT. BEND
1+273.22			22.5° VERT. BEND
1+275	62.36	59.82	
1+300	62.08	59.69	
1+325	61.81	59.45	
1+335.92			305mm VALVE
1+325	61.72	59.32	305x305 TEE

Public Works and Government Services Canada / Travaux publics et Services gouvernementaux Canada

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Architectural and Engineering Services
Real Property Services Branch

Centre d'expertise national
Services d'architecture et génie
Direction générale des services immobiliers

LEGEND

FP	Flag Pole
IB	Iron Bar
GP	Guy Pole
BHP	Bell-Hydro Pole
MH	Manhole
CB	Catch Basin
BH-110	Borehole
	Existing Hydro (Above)
	Existing Sanitary MH and Sewer
	Existing Storm MH and Sewer
	Existing Watermain
<	Direction of Flow
WM	Proposed Watermain and Diameter
VB	Valve & Valve Box
VC	Valve & Valve Chamber
CS	Curb Stop
H	Proposed Hydrant c/w Valve & Lead
	Proposed Valve Location

3.	Revised per City of Ottawa	Feb. 4/02
2.	100% Submission	Sept. 5/01
1.	66% Submission	March 31/01
revisions		date

project / projet

TUNNEY'S PASTURE WATERMAIN UPGRADING PHASE IV

OTTAWA ONTARIO

drawing / dessin

PLAN & PROFILE
STA. 1+161 TO 1+335.9

designed / conçu: J.M.
date: MARCH 2001
drawn / dessiné: J.M.
date: OCTOBER 2001
reviewed / examiné: P.R.S.
date: OCTOBER 2001
approved / approuvé: P.R.S.
date: MARCH 2001
Tender / Soumission: D. MOIR
Project Manager / Administrateur de projets

project no. / no. du projet: 433443

drawing no. / no. du dessin: C-3 of 5

9615

PLOT SCALE

PWGSC B1

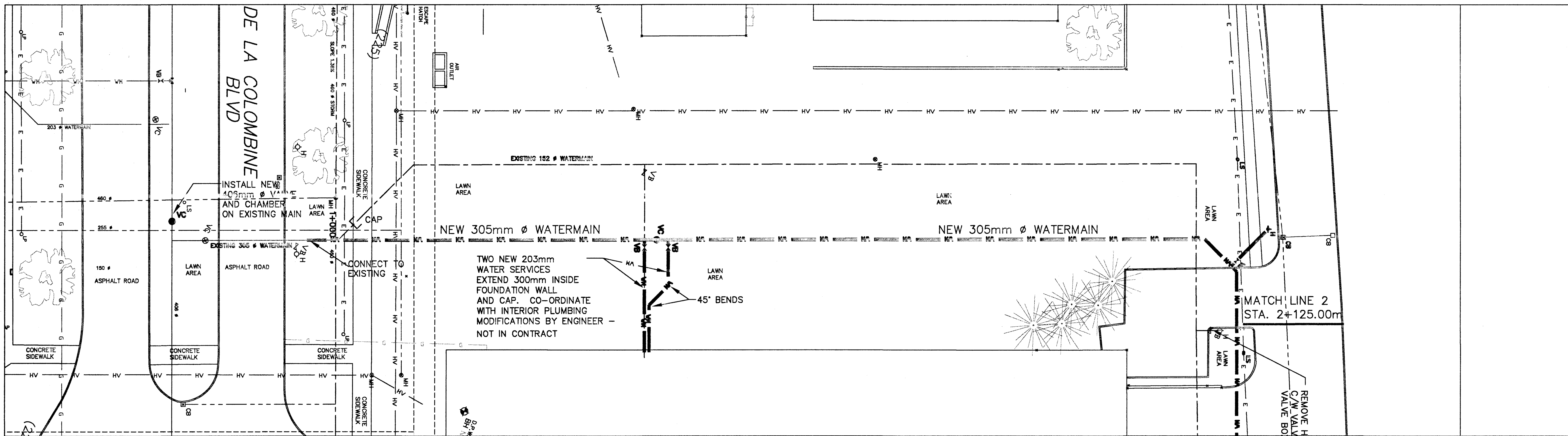
Goldenrod P&P 2

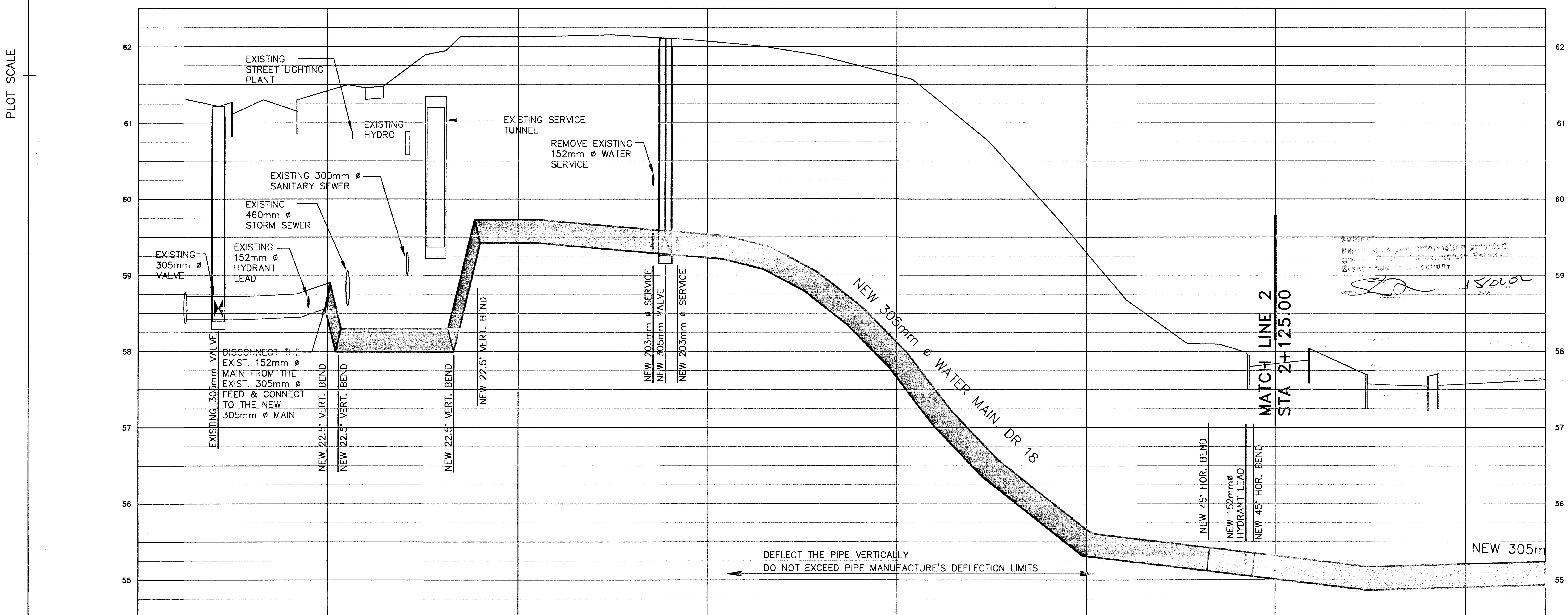
Public Works and Government Services Canada / Travaux publics et Services gouvernementaux Canada

National Centre of Expertise
Centre d'expertise national

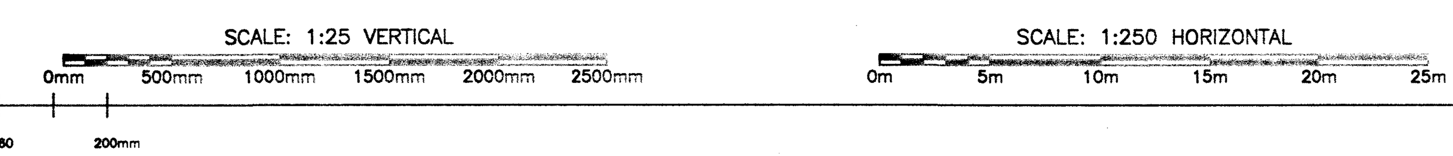
National Center of Expertise
Architectural and Engineering Services
Real Property Services Branch

Centre d'expertise national
Services d'architecture et génie
Direction générale des services immobiliers





EXISTING GRADE ELEVATION		61.42 61.46	61.95	62.13	62.13		62.07	61.62	59.21	58.10	57.81	57.84	57.58	EXISTING GRADE ELEVATION
TOP OF WATERMAIN ELEVATION		58.89 58.30	58.30	59.73	59.73		59.54	58.13	55.66	55.42	55.35	55.32	55.21	TOP OF WATERMAIN ELEVATION
DESCRIPTION		22.5° VERT. BEND 22.5° VERT. BEND	22.5° VERT. BEND	22.5° VERT. BEND		203mm SERVICE 305mm VALVE 203mm SERVICE				45° BEND HOR.	305x152mm TEE 45° BEND HOR.			DESCRIPTION
CHAINAGE	2-025	2+000 2+001.41	2+016.54	2+019.62	2+025	2+042.84 2+044.44 2+046.04	2+050	2+075	2+100	2+116.13	2+121.13 2+122.13	2+125	1+150	CHAINAGE



PWGSC B1

9615

LEGEND

FP	Flag Pole
IB	Iron Bar
GP	Guy Pole
BHP	Bell–Hydro Pole
MH	Manhole
CB	Catch Basin
BH-110	Borehole
	Existing Hydro (Above)
	Existing Sanitary MH and Sewer
	Existing Storm MH and Sewer
	Existing Watermain
<	Direction of Flow
WM	Proposed Watermain and Diameter
V&VB	Valve & Valve Box
V&VC	Valve & Valve Chamber
CS	Curb Stop
H	Proposed Hydrant c/w Valve & Lead
	Proposed Valve Location

3.	Revised per City of Ottawa	Feb. 4/02
2.	100% Submission	Sept. 5/01
1.	66% Submission	March 31/01
revisions		date

A detail no. / no. du detail
B location drawing no. / sur dessin no.
C drawing no. / dessin no.

project / projet

TUNNEY'S PASTURE WATERMAIN UPGRADING PHASE IV

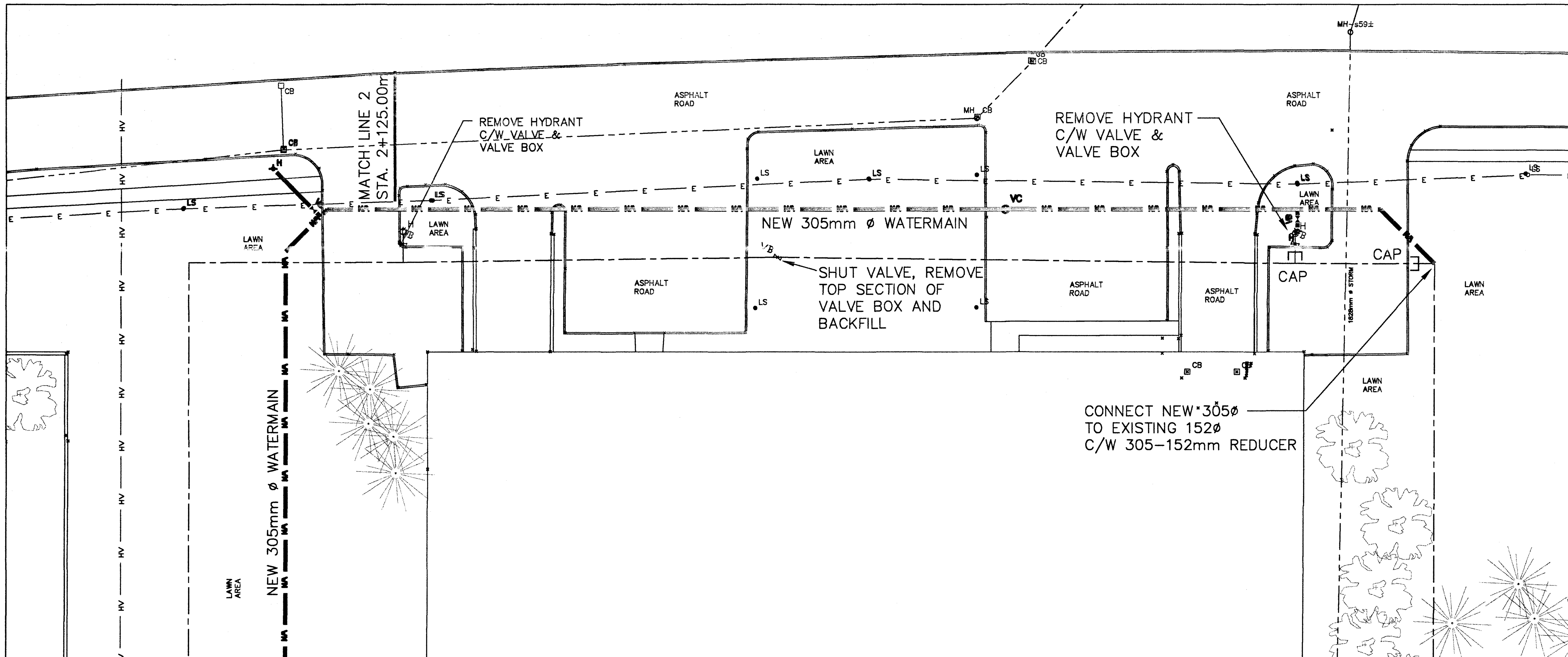
OTTAWA ONTARIO

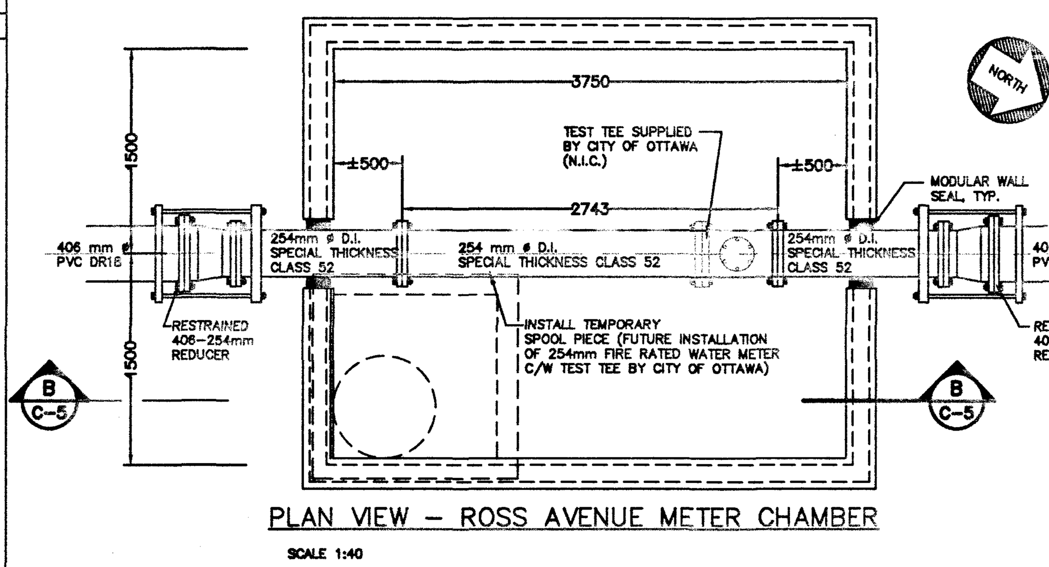
drawing / dessin

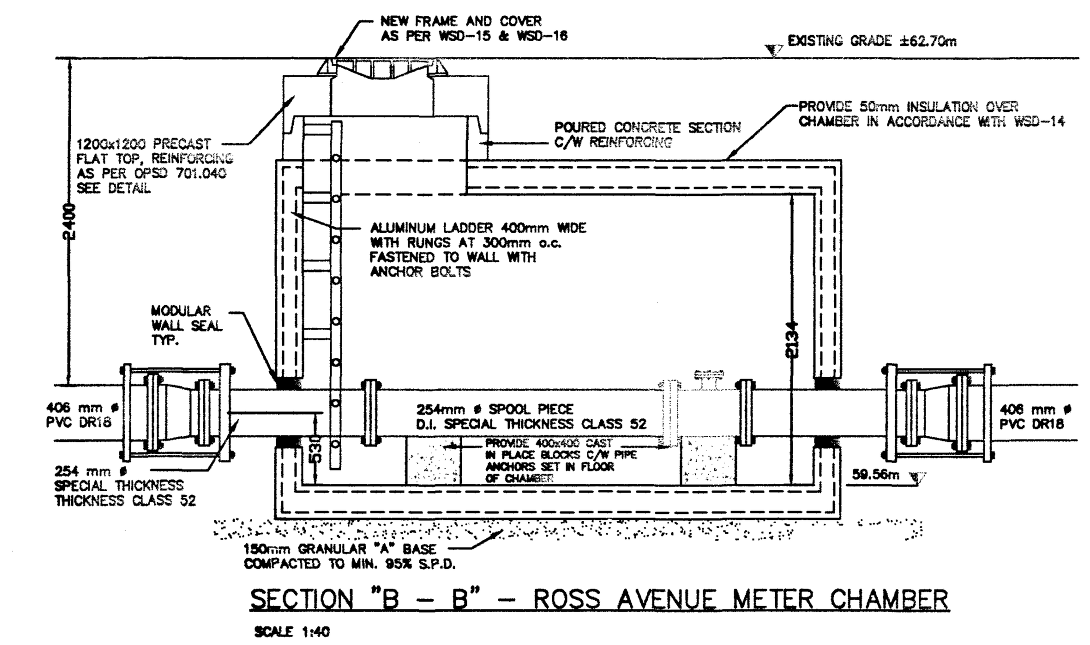
PLAN & PROFILE
STA. 2+000 TO 2+125

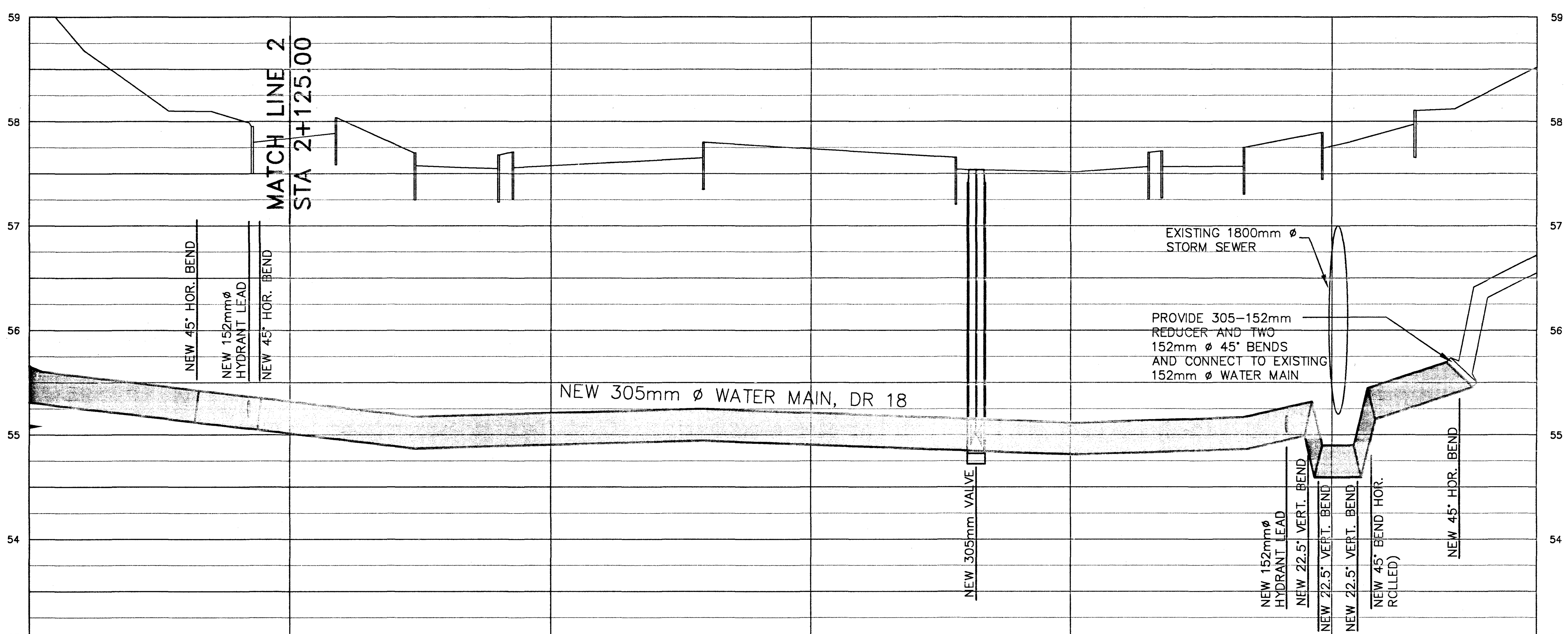
designed / conçu: J.M.
date: DECEMBER 2001
drawn / dessiné: J.M.
date: DECEMBER 2001
reviewed / examiné: P.R.S.
date: DECEMBER 2001
approved / approuvé: P.R.S.
date: DECEMBER 2001
Tender / Soumission: D. MOIR
Project Manager / Administrateur de projets
project no. / no. du projet: 433443
drawing no. / no. du dessin: C-4 of 5

Goldenrod P&P 3









CHAINAGE	EXISTING GRADE ELEVATION	TOP OF WATERMAIN ELEVATION	DESCRIPTION
2+116.13	58.10	55.42	
2+121.13 / 2+122.13	57.81	55.35	
2+125	57.84	55.32	
2+137.10	57.58	55.18	
2+150	57.58	55.21	
2+175	57.74	55.21	
2+190.99			305mm VALVE
2+200	57.52	55.12	
2+216.47	57.57	55.17	
2+220.65	57.87	55.32	305x152mm TEE
2+222.73	57.89	54.90	22.5° BEND VERT.
2+223.71			22.5° BEND VERT.
2+225	57.76	54.90	
2+227.51	57.82	54.90	22.5° BEND VERT.
2+228.84	57.86	55.45	45° BEND HOR.
2+237.33	58.15	55.70	45° BEND HOR.

SCALE: 1:25 VERTICAL

SCALE: 1:250 HORIZONTAL

PLOT SCALE

Subject: Based upon your information provided, City of Ottawa Infrastructure Services has no objections.

Signature 15/02/02 Date

9615

Public Works and Government Services Canada / Travaux publics et Services gouvernementaux Canada

National Centre of Expertise
Centre d'expertise national

National Center of Expertise
Architectural and Engineering Services
Real Property Services Branch

Centre d'expertise national
Services d'architecture et génie
Direction générale des services immobiliers

LEGEND

FP	Flag Pole
IB	Iron Bar
GP	Guy Pole
BHP	Bell–Hydro Pole
MH	Manhole
CB	Catch Basin
BH–110	Borehole
	Existing Hydro (Above)
	Existing Sanitary MH and Sewer
	Existing Storm MH and Sewer
	Existing Watermain
<	Direction of Flow
WM	Proposed Watermain and Diameter
W&VB	Valve & Valve Box
W&VC	Valve & Valve Chamber
CS	Curb Stop
H	Proposed Hydrant c/w Valve & Lead
	Proposed Valve Location

revisions		date
3.	Revised per City of Ottawa	Feb. 4/02
2.	100% Submission	Sept. 5/01
1.	66% Submission	March 31/01

A detail no. / no. du detail
B location drawing no. / sur dessin no.
C drawing no. / dessin no.

project / projet

TUNNEY'S PASTURE WATERMAIN UPGRADING PHASE IV

OTTAWA ONTARIO

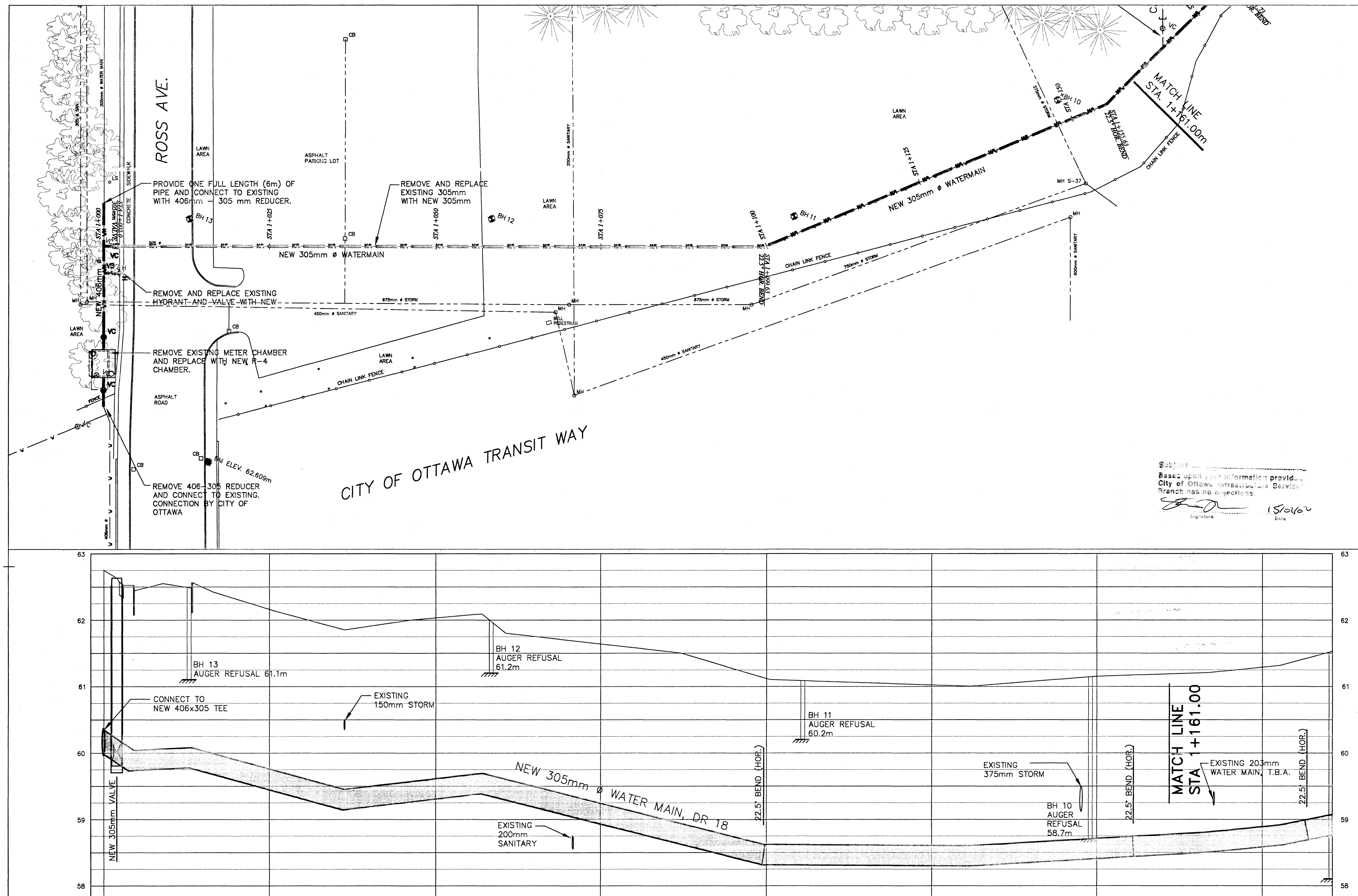
drawing / dessin

PLAN & PROFILE STA 2+125 TO 2+233.38 ROSS AVENUE METER CHAMBER DETAILS

designed	J.M.	conçu
date	DECEMBER 2001	
drawn	J.M.	dessiné
date	DECEMBER 2001	
reviewed	P.R.S.	examiné
date	DECEMBER 2001	
approved	P.R.S.	approuvé
date	DECEMBER 2001	
Tender	D. MOIR	Soumission
Project Manager		Administrateur de projets
project no.	433443	no. du projet
drawing no.	C-5 of 5	no. du dessin

PWGSC B1

SFB P&P 1



CHAINAGE	EXISTING GRADE ELEVATION	TOP OF WATERMAIN ELEVATION	DESCRIPTION
1+000	62.75	60.35	
1+002.00			305mm VALVE
	62.44	60.38	
	62.48	60.08	
1+025	62.16	59.76	
	61.85	59.45	
1+050	62.03	59.61	
	62.09	59.69	
1+075	61.64	59.24	
1+099.63			22.5 BEND HOR.
1+100	61.12	58.62	
1+125	61.02	58.60	
	61.00	58.60	
1+150	61.15	58.71	
1+155.63			22.5 BEND HOR.
1+161.00	61.19	58.77	
1+175	61.29	58.89	
	61.31	58.91	
1+181.73			22.5 BEND HOR.

SCALE: 1:25 VERTICAL

SCALE: 1:250 HORIZONTAL

9615

PWGSC B1

Public Works and Government Services Canada / Travaux publics et Services gouvernementaux Canada

National Centre of Expertise
Centre d'expertise national

National Center of Expertise
Architectural and Engineering Services
Real Property Services Branch

Centre d'expertise national
Services d'architecture et génie
Direction générale des services immobiliers

LEGEND

FP	Flag Pole
IB	Iron Bar
GP	Guy Pole
BHP	Bell-Hydro Pole
MH	Manhole
CB	Catch Basin
BH-110	Borehole
	Existing Hydro (Above)
	Existing Sanitary MH and Sewer
	Existing Storm MH and Sewer
	Existing Watermain
<	Direction of Flow
WM	Proposed Watermain and Diameter
VB	Valve & Valve Box
VC	Valve & Valve Chamber
CS	Curb Stop
H	Proposed Hydrant c/w Valve & Lead
	Proposed Valve Location

revisions		date
3.	Revised per City of Ottawa	Feb. 4/02
2.	100% Submission	Sept. 5/01
1.	66% Submission	March 31/01

A detail no. / no. du détail
B location drawing no. / sur dessin no.
C drawing no. / dessin no.

project / projet

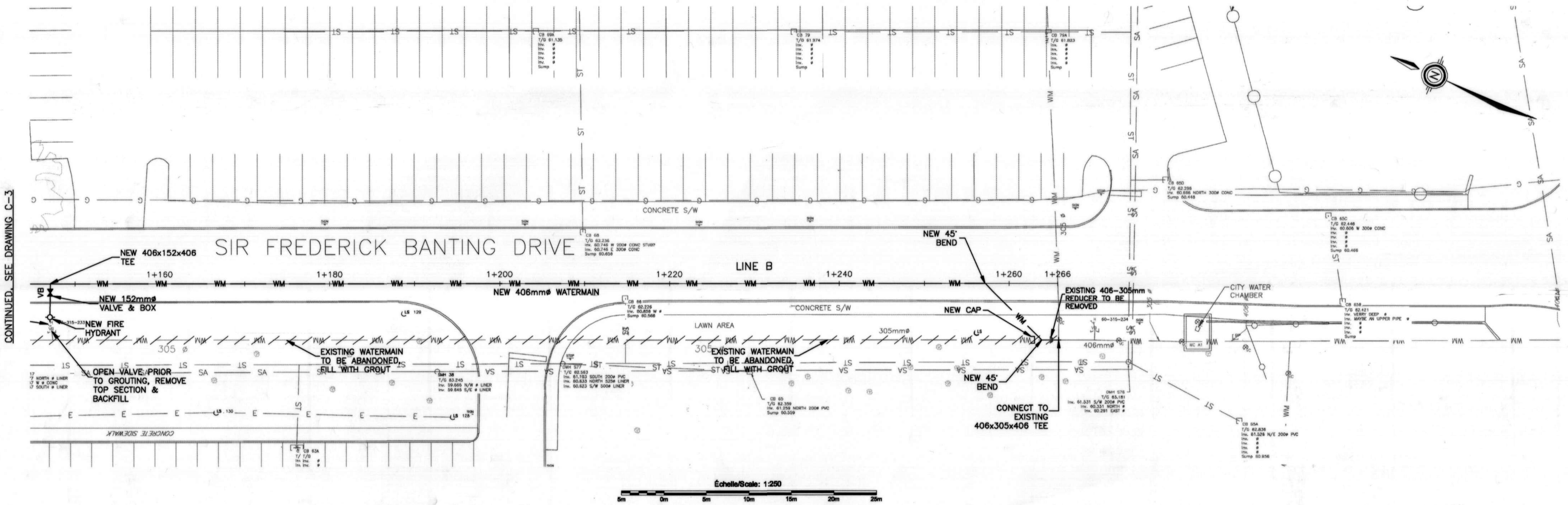
TUNNEY'S PASTURE
WATERMAIN UPGRADING
PHASE IV

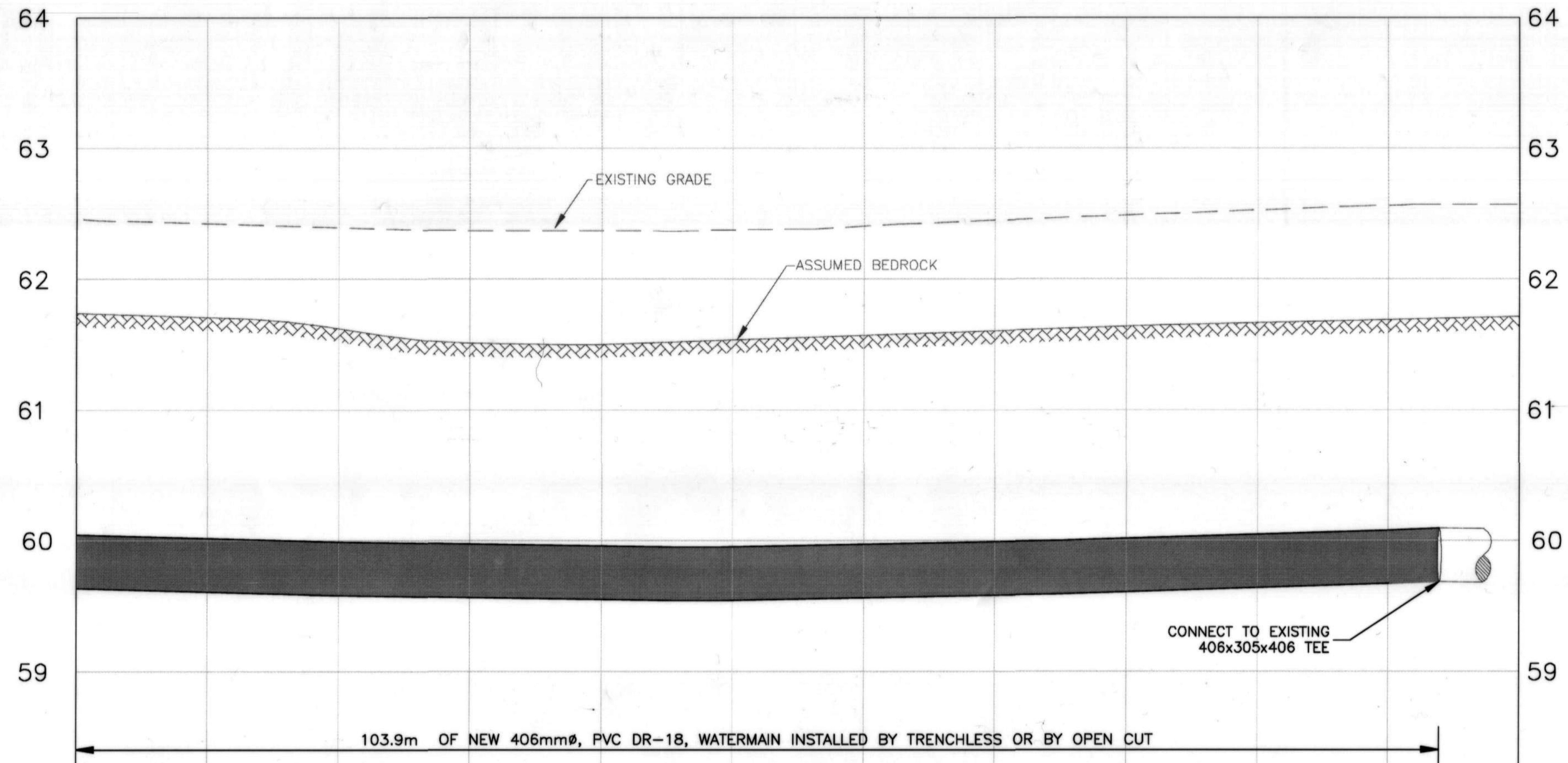
OTTAWA — ONTARIO

drawing / dessin

PLAN & PROFILE
STA. 1+000 TO 1+161

designed	J.M.	conçu
date	MARCH 2001	
drawn	J.M.	dessiné
date	OCTOBER 2001	
reviewed	P.R.S.	examiné
date	OCTOBER 2001	
approved	P.R.S.	approuvé
date	MARCH 2001	
Tender	D. MOIR	Soumission
Project Manager		Administrateur de projets
project no.	433443	no. du projet
drawing no.	C-2 of 5	no. du dessin





EXISTING GRADE ELEVATION	62.45	62.42	62.40	62.37	62.36	62.37	62.40	62.45	62.48	62.51	62.54		EXISTING GRADE ELEVATION
TOP OF WATERMAIN	60.04	60.01	59.99	59.97	59.96	59.95	59.97	59.99	60.03	60.06	60.08		TOP OF WATERMAIN
DESCRIPTION												CONNECTION TO EXISTING	DESCRIPTION
STATION	1+160	1+170	1+180	1+190	1+200	1+210	1+220	1+230	1+240	1+250	1+260	1+263.90	STATION

Canada

Public Works and Government Services Canada / Travaux publics et services gouvernementaux Canada

Real Property Branch / Direction générale des biens immobiliers

SFB P&P 2A

1	ISSUED FOR TENDER	25/11/11
revisions	description	date

A detail no. / no. du detail
B location drawing no. / sur dessin no.
C drawing no. / dessin no.

project / projet

TUNNEY'S PASTURE COMPLEX
NEW WATERMAIN
PHASE IX

OTTAWA, ONTARIO

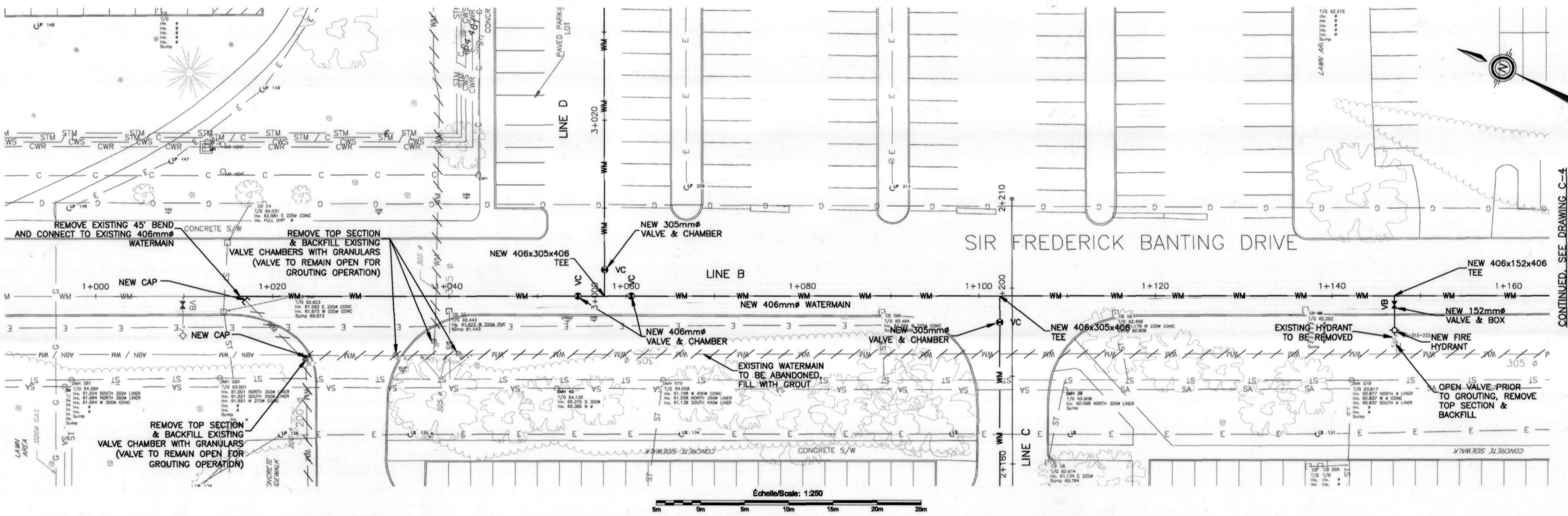
drawing / dessin

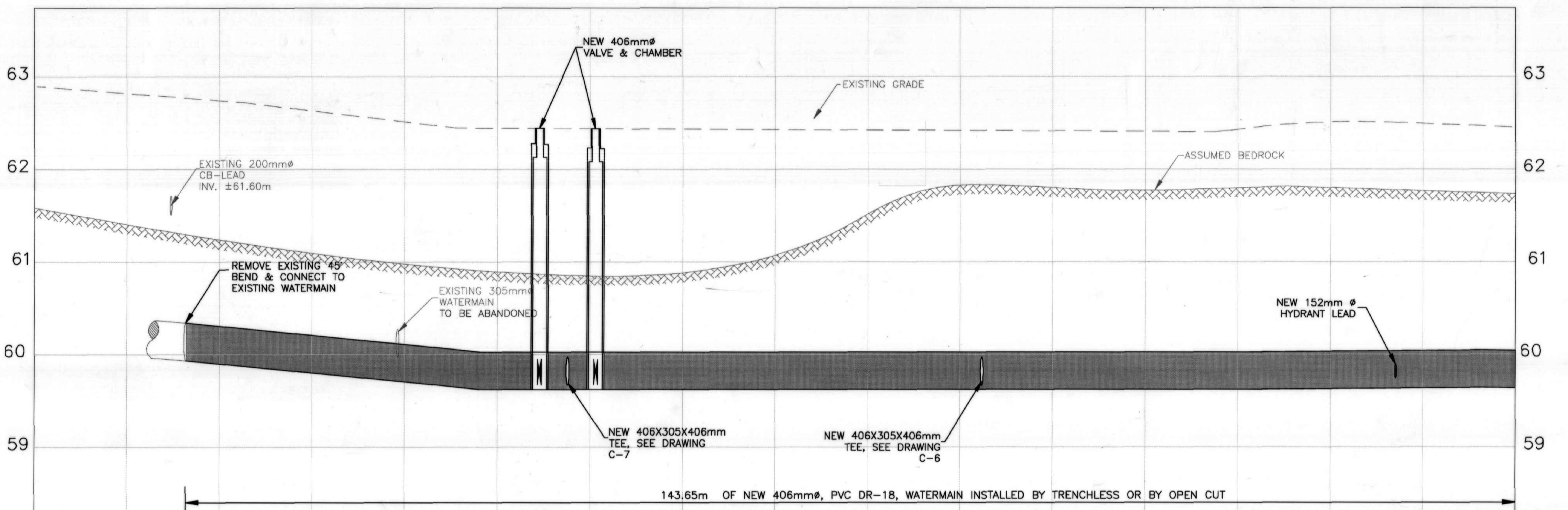
LINE B
PLAN & PROFILE
1+160 TO 1+270

Designed By / Conçu par: J. MAYDA
Date: 2011/09/15 (yyyy/mm/dd)
Drawn By / Dessiné par: G.FATTOUCHE
Date: 2011/09/15 (yyyy/mm/dd)
Reviewed By / Examiné par
Date (yyyy/mm/dd)
Approved By / Approuvé par
Date (yyyy/mm/dd)
Tender / Soumission
Project Manager / Administrateur de projets
Project no. / No. du projet: R.046357.002
Drawing no. / No. du dessin: C-4

PWGSC 51 (1000x707)

16034





EXISTING GRADE ELEVATION	62.82		62.69	62.68	62.61	62.44			62.45		62.42	62.42	62.42	62.42		62.43	62.42	62.43	62.52		62.50	62.45
TOP OF WATERMAIN			60.29	60.22	60.13	60.02			60.02		60.02	60.02	60.02	60.02		60.02	60.02	60.02	60.04		60.04	60.04
DESCRIPTION		CONNECTION TO EXISTING					NEW 406mmø VALVE & CHAMBER	NEW 406x305x406 TEE		NEW 406mmø VALVE & CHAMBER					NEW 406x305x406 TEE					NEW 152mmø HYDRANT LEAD & NEW 406x152x406 TEE		
STATION	1+010	1+016.35	1+020	1+030	1+040	1+050	1+054.56	1+057.57	1+060	1+060.58	1+070	1+080	1+090	1+100	1+102.37	1+110	1+120	1+130	1+140	1+147.04	1+150	1+160

PWGSC B1 (1000x707)

Canada

Public Works and Government Services Canada / Travaux publics et services gouvernementaux Canada

Real Property Branch / Direction générale des biens immobiliers

SFB P&P 2B

revisions	description	date
1	ISSUED FOR TENDER	25/11/11

A detail no. / no. du détail
B location drawing no. / sur dessin no.
C drawing no. / dessin no.

project / projet

TUNNEY'S PASTURE COMPLEX
NEW WATERMAIN
PHASE IX

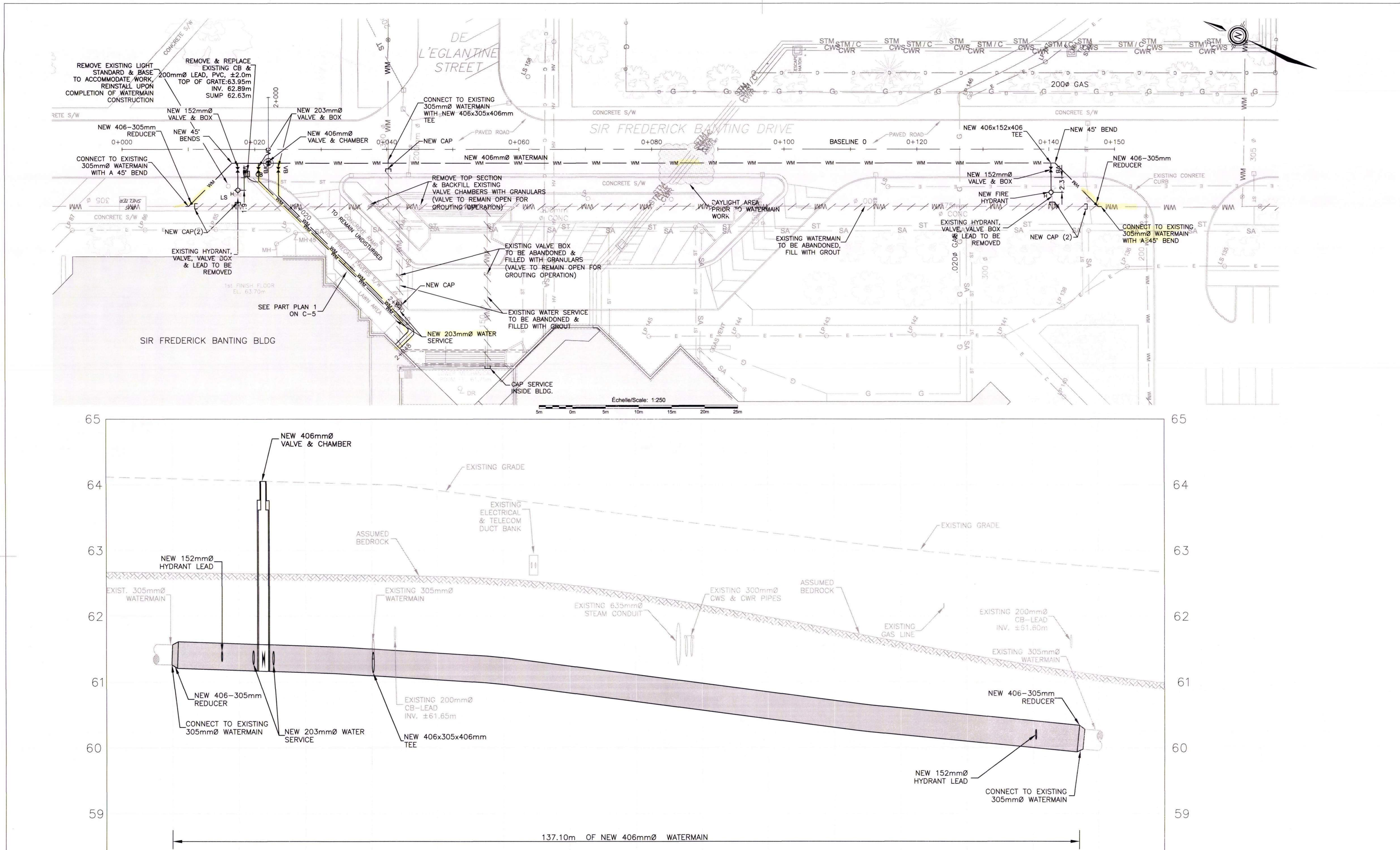
OTTAWA, ONTARIO

drawing / dessin

LINE B
PLAN & PROFILE
1+000 TO 1+160

Designed By / Conçu par: J. MAYDA
Date: 2011/09/15 (yyyy/mm/dd)
Drawn By / Dessiné par: G.FATTOUCHE
Date: 2011/09/15 (yyyy/mm/dd)
Reviewed By / Examiné par
Date (yyyy/mm/dd)
Approved By / Approuvé par
Date (yyyy/mm/dd)
Tender / Soumission
Project Manager / Administrateur de projets
Project no. / No. du projet: R.046357.002
Drawing no. / No. du dessin: C-3

16 034



	0+010	0+020	0+030	0+040	0+050	0+060	0+070	0+080	0+090	0+100	0+110	0+120	0+130	0+140	0+150
EXISTING GRADE ELEVATION	64.13	64.10	64.06	64.01	63.95	63.78	63.63	63.51	63.40	63.18	63.13	63.02	62.92	62.80	62.69
TOP OF WATERMAIN	61.62	61.63	61.55	61.52	61.44	61.37	61.23	61.11	60.98	60.78	60.72	60.61	60.51	60.41	60.36

STATION	DESCRIPTION
0+010	CONNECTION TO EXISTING 305mmØ WATERMAIN
0+010.70	NEW 406-305 REDUCER
0+017.45	NEW 152mmØ HYDRANT LEAD & NEW 406x152x406 TEE
0+020	
0+022.17	NEW 203mmØ WATER SERVICE & NEW 406x203x406 TEE
0+023.67	NEW 406mmØ VALVE & CHAMBER
0+025.17	NEW 203mmØ WATER SERVICE & NEW 406x203x406 TEE
0+030	
0+040	
0+040.22	NEW 406x305x406 TEE
0+050	
0+060	
0+070	
0+080	
0+090	
0+100	
0+110	
0+120	
0+130	
0+140	
0+140.13	NEW 152mmØ HYDRANT LEAD & NEW 406x152x406 TEE
0+147.25	NEW 406-305 REDUCER
0+147.95	CONNECTION TO EXISTING 305mmØ WATERMAIN
0+150	

PWGSC B1 (1000 x 707)

Canada

Public Works and Government Services Canada / Travaux publics et services gouvernementaux Canada
Real Property Branch / Direction générale des biens immobiliers

SFB P&P 3

revisions	description	date
1	ISSUED FOR TENDER	05/11/10

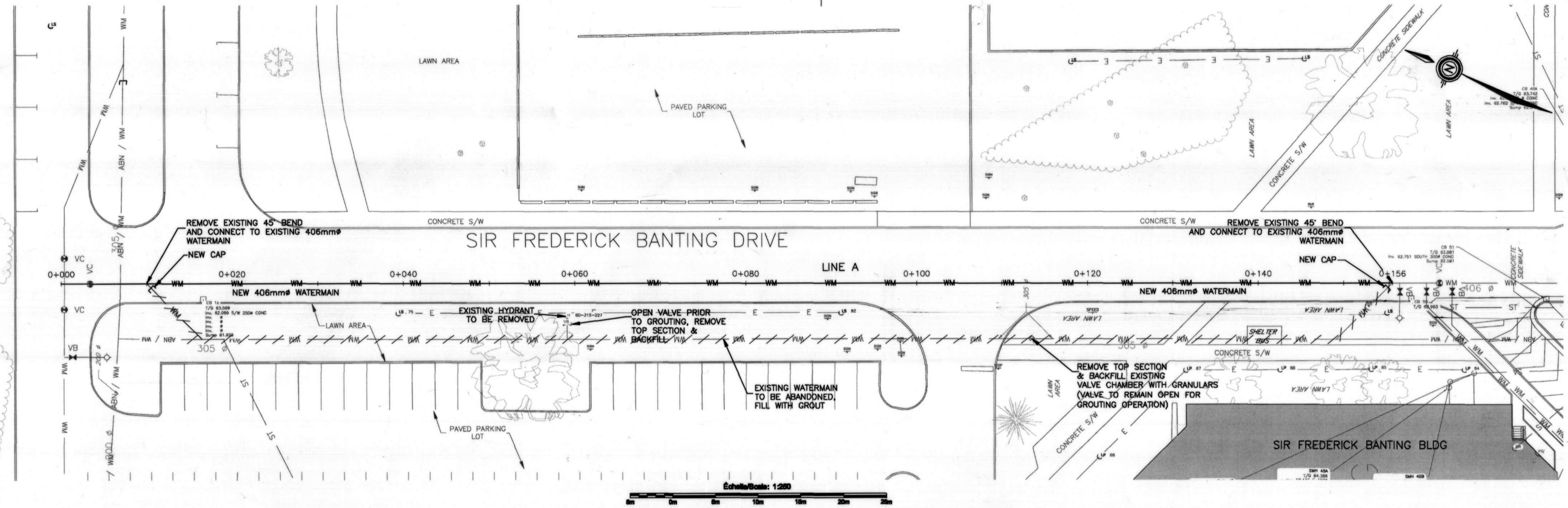
A detail no. / no. du detail
B location drawing no. / sur dessin no.
C drawing no. / dessin no.

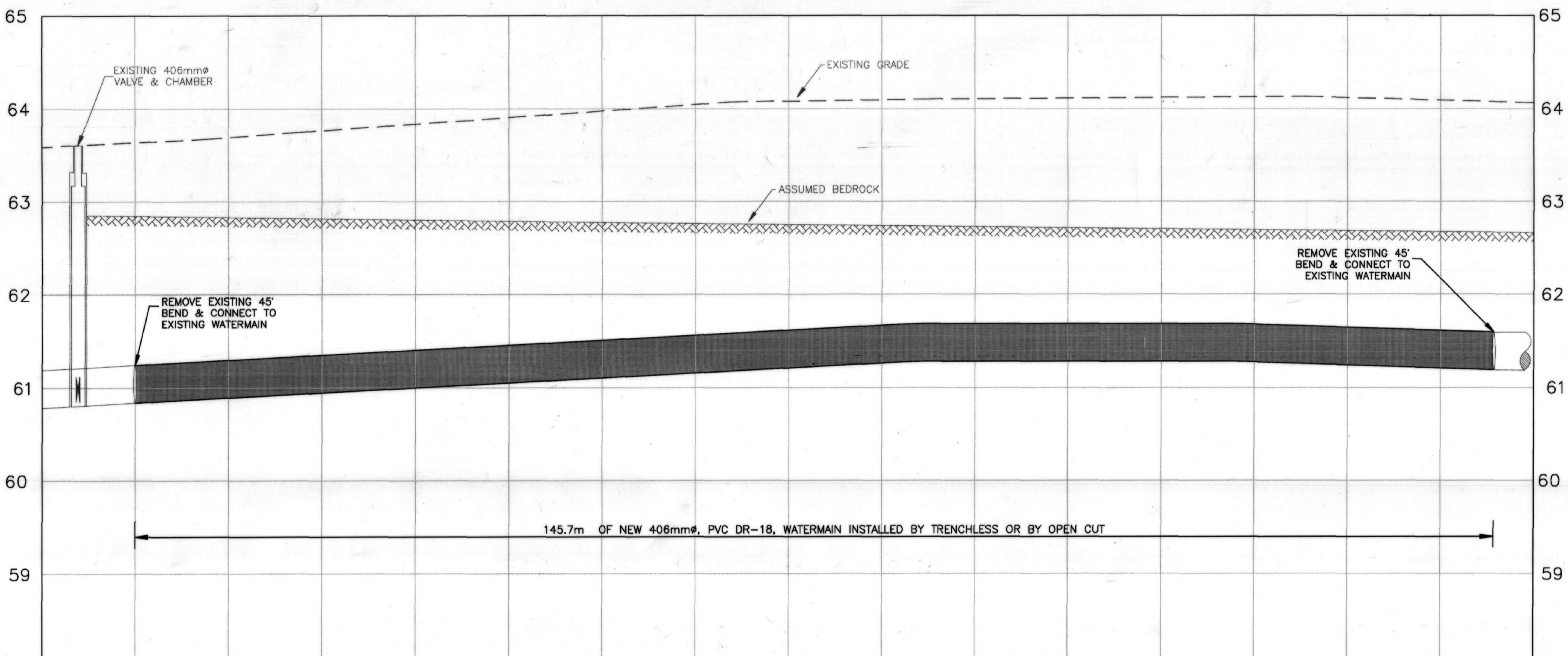
project / projet
TUNNEY'S PASTURE COMPLEX
NEW WATERMAIN
PHASE VIII
OTTAWA, ONTARIO

drawing / dessin
PLAN & PROFILE
0+000 TO 0+160

Designed By	J. MAYDA	Conçu par
Date	2010/11/03	(yyyy/mm/dd)
Drawn By	G.FATTOUCHE	Dessiné par
Date	2010/11/03	(yyyy/mm/dd)
Reviewed By		Examiné par
Date		(yyyy/mm/dd)
Approved By		Approuvé par
Date		(yyyy/mm/dd)
Tender	D.MOIR 2010/11/03	Soumission
Project Manager		Administrateur de projets
Project no.	R.007839.002	No. du projet
Drawing no.	C-2	No. du dessin

DRWG # 15721





STATION	EXISTING GRADE ELEVATION	TOP OF WATERMAIN	DESCRIPTION
0+010	63.65	61.25	CONNECTION TO EXISTING
0+020	63.70	61.30	
0+030	63.75	61.35	
0+040	63.81	61.40	
0+050	63.90	61.47	
0+060	63.97	61.52	
0+070	64.02	61.58	
0+080	64.08	61.63	
0+090	64.10	61.67	
0+100	64.11	61.68	
0+110	64.11	61.69	
0+120	64.12	61.69	
0+130	64.13	61.68	
0+140	64.12	61.65	
0+150	64.13	61.62	
0+155.70			CONNECTION TO EXISTING

Canada

Public Works and Government Services Canada / Travaux publics et services gouvernementaux Canada

Real Property Branch / Direction générale des biens immobiliers

SFB P&P 4

revisions	description	date
1	ISSUED FOR TENDER	25/11/11

project / projet

TUNNEY'S PASTURE COMPLEX
NEW WATERMAIN
PHASE IX

OTTAWA, ONTARIO

drawing / dessin

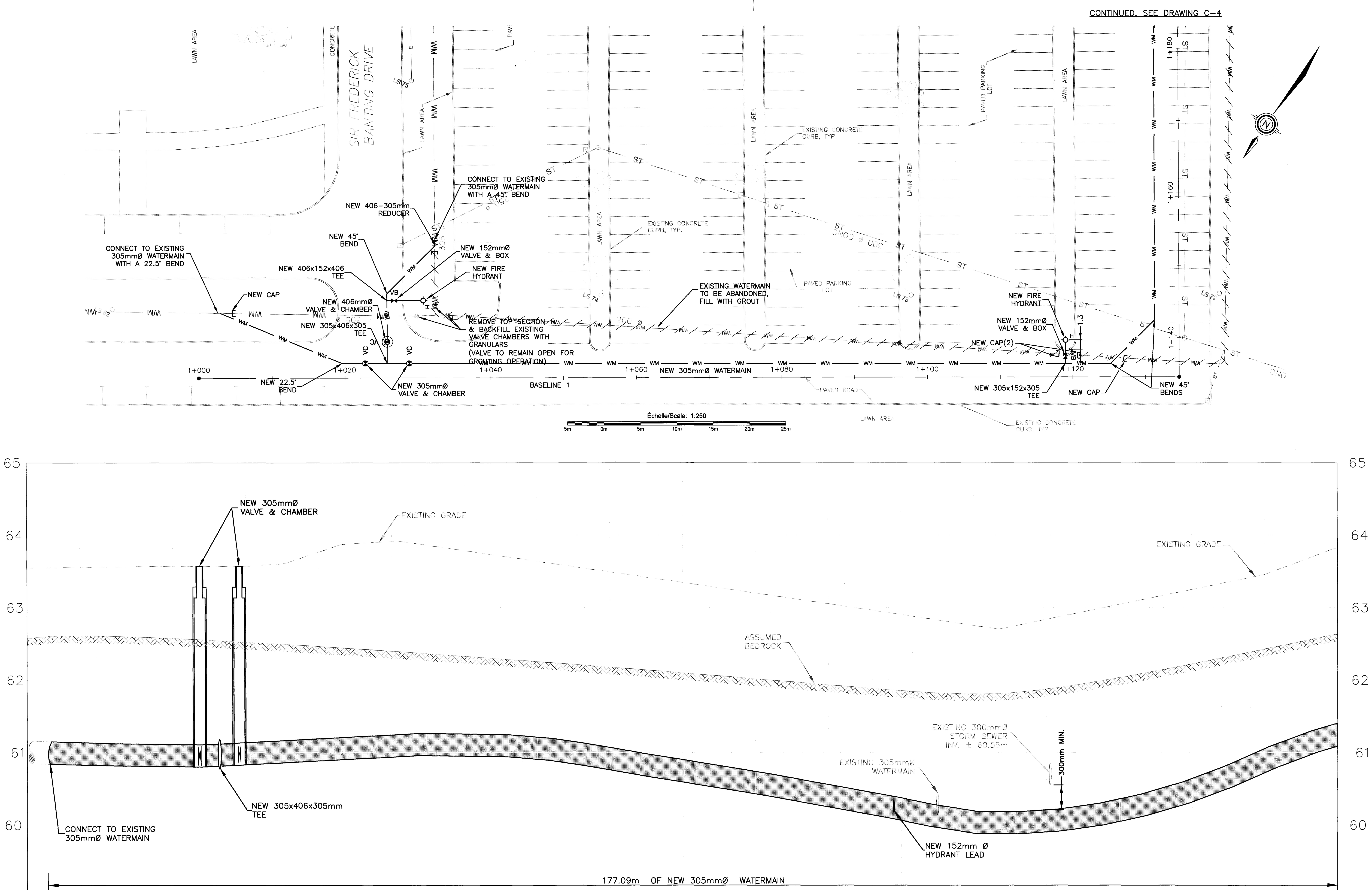
LINE A
PLAN & PROFILE
0+000 TO 0+160

Designed By / Conçu par: J. MAYDA
Date: 2011/09/16
Drawn By / Dessiné par: G.FATTOUCHE
Date: 2011/09/16
Reviewed By / Examiné par
Approved By / Approuvé par
Tender / Soumission
Project Manager / Administrateur de projets
Project no. / No. du projet: R.046357.002
Drawing no. / No. du dessin: C-2

16034

PWGSC 91 (1000x707)

CONTINUED, SEE DRAWING C-4



STATION	EXISTING GRADE ELEVATION	TOP OF WATERMAIN	DESCRIPTION
1+002.91			CONNECTION TO EXISTING 305mmØ WATERMAIN
1+010	63.54	61.13	
1+020	63.57	61.12	
1+023.70			NEW 305mmØ VALVE & CHAMBER
0+026.40			NEW 305x406x305 TEE
1+029.11			NEW 305mmØ VALVE & CHAMBER
1+030	63.61	61.14	
1+040	63.76	61.23	
1+050	63.92	61.24	
1+060	63.69	61.26	
1+070	63.64	61.22	
1+080	63.50	61.06	
1+090	63.33	60.89	
1+100	63.13	60.73	
1+110	63.06	60.56	
0+118.98			NEW 152mmØ HYDRANT LEAD & NEW 305x152x305 TEE
1+120	62.87	60.38	
1+130	62.63	60.23	
1+140	62.71	60.21	
1+150	62.93	60.41	
1+160	63.12	60.66	
1+170	63.46	61.06	
1+180	63.95	61.40	

Canada
Public Works and Government Services Canada — Travaux publics et services gouvernementaux Canada
Real Property Branch — Direction générale des biens immobiliers

SFB P&P 5

revisions	description	date
1	ISSUED FOR TENDER	05/11/10

A detail no. / no. du detail
B location drawing no. / sur dessin no.
C drawing no. / dessin no.

project / projet
TUNNEY'S PASTURE COMPLEX
NEW WATERMAIN
PHASE VIII

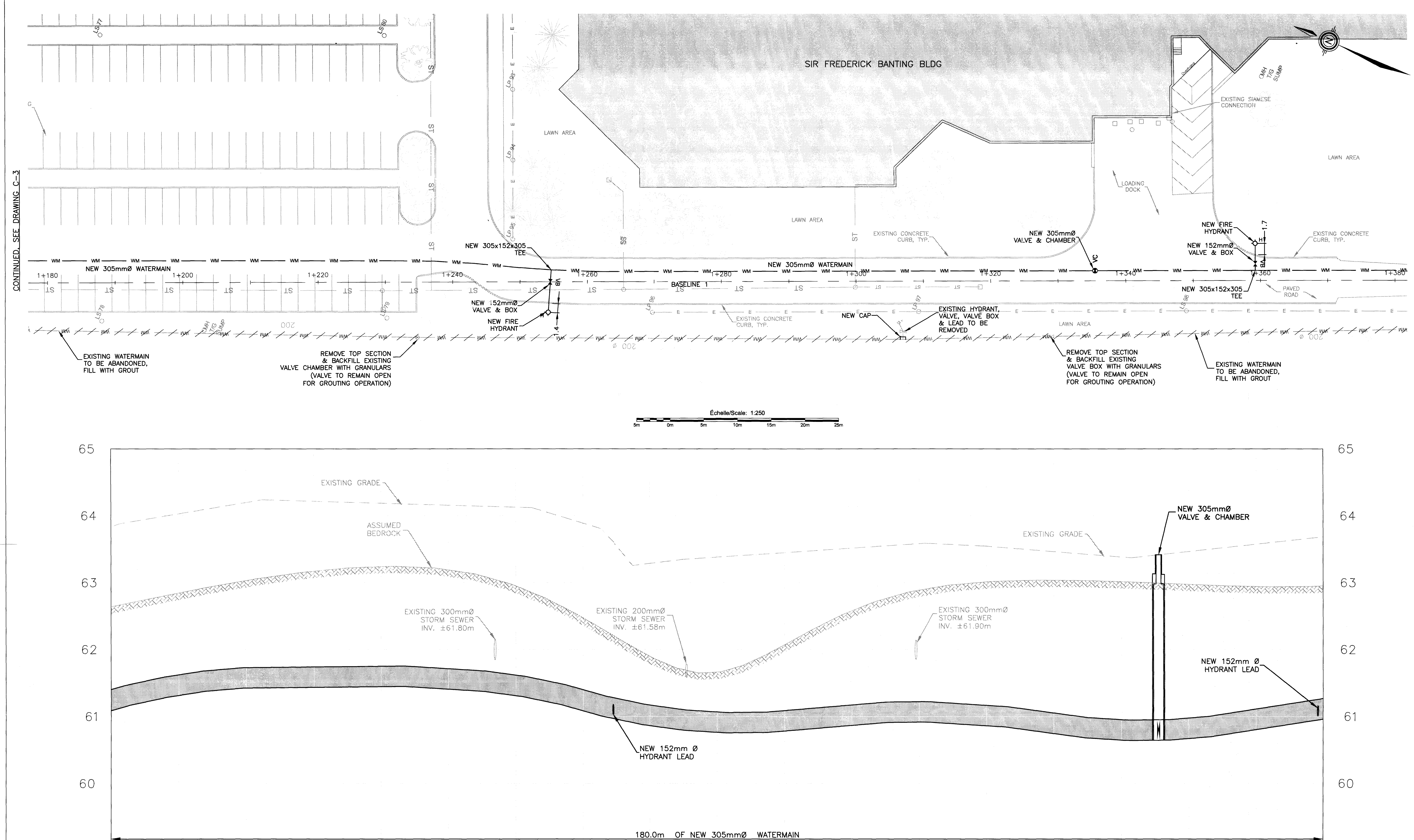
OTTAWA, ONTARIO

drawing / dessin
PLAN & PROFILE
1+000 TO 1+180

Designed By / Conçu par: J. MAYDA
Date: 2010/11/03 (yyyy/mm/dd)
Drawn By / Dessiné par: G.FATTOUCHE
Date: 2010/11/03 (yyyy/mm/dd)
Reviewed By / Examiné par
Date (yyyy/mm/dd)
Approved By / Approuvé par
Date (yyyy/mm/dd)
Tender / Soumission: D.MOIR 2010/11/03
Project Manager / Administrateur de projets
Project no. / No. du projet: R.007839.002
Drawing no. / No. du dessin: C-3

DRWG. #15721

PWGSC B1 (1000 x 707)



STATION	1+180	1+190	1+200	1+210	1+220	1+230	1+240	1+250	1+254.48	1+260	1+270	1+280	1+290	1+300	1+310	1+320	1+330	1+335.50	1+340	1+350	1+359.21	1+360
EXISTING GRADE ELEVATION	63.95	64.04	64.12	64.16	64.09	64.02	64.12	63.87		63.58	63.45	63.47	63.57	63.64	63.56	63.43	63.35		63.46	63.53		63.73
TOP OF WATERMAIN	61.40	61.62	61.72	61.74	61.75	61.71	61.62	61.40		61.17	61.05	61.07	61.17	61.21	61.16	61.03	60.95		60.98	61.10		61.13
DESCRIPTION									NEW 152mmØ HYDRANT LEAD & NEW 305x152x305 TEE									NEW 305mmØ VALVE & CHAMBER			NEW 152mmØ HYDRANT LEAD & NEW 305x152x305 TEE	

Canada

Public Works and Government Services Canada / Travaux publics et services gouvernementaux Canada
Real Property Branch / Direction générale des biens immobiliers

SFB P&P 6

revisions	description	date
1	ISSUED FOR TENDER	05/11/10

A detail no. / no. du detail
B location drawing no. / sur dessin no.
C drawing no. / dessin no.

project / projet
TUNNEY'S PASTURE COMPLEX
NEW WATERMAIN
PHASE VIII

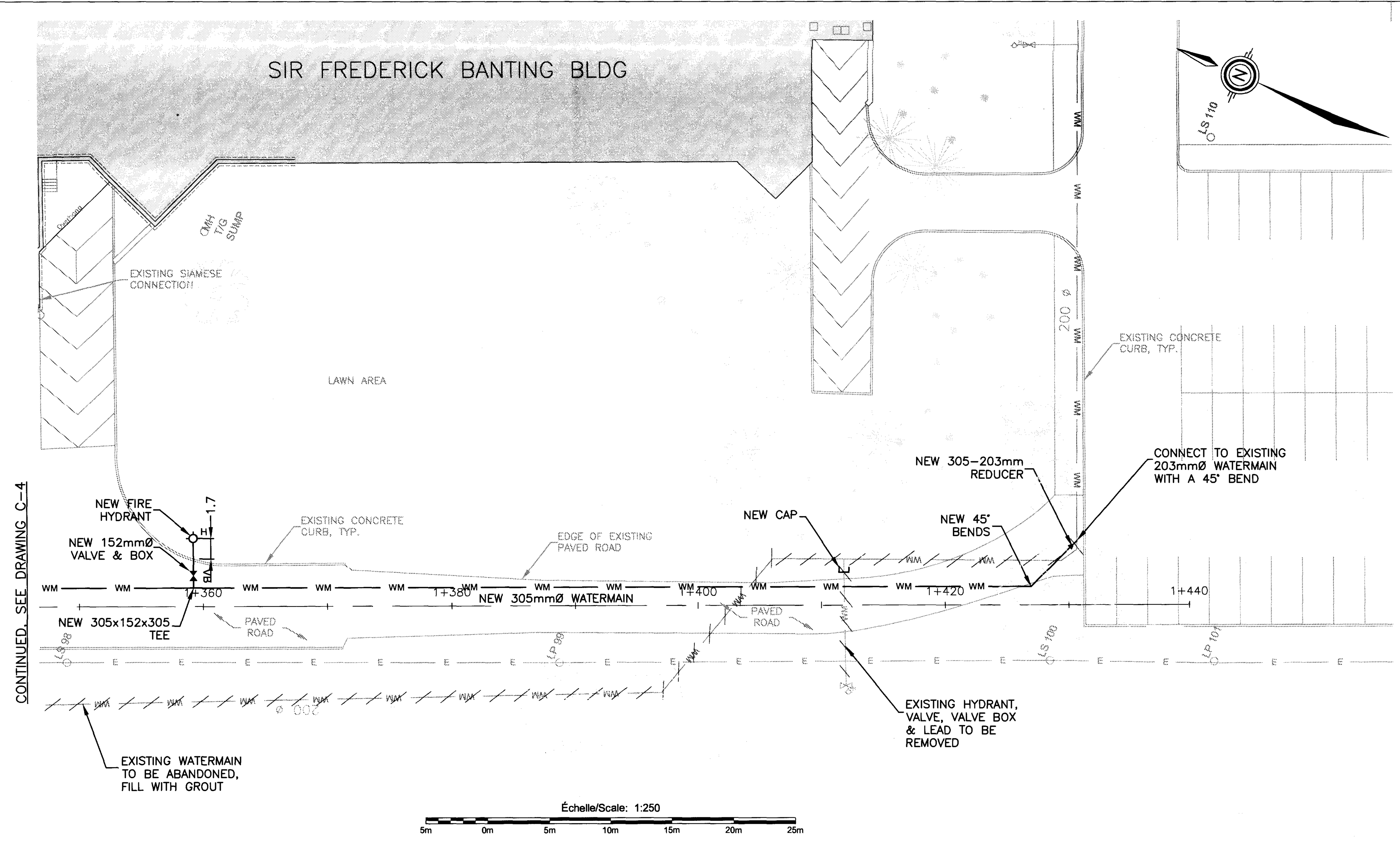
OTTAWA, ONTARIO

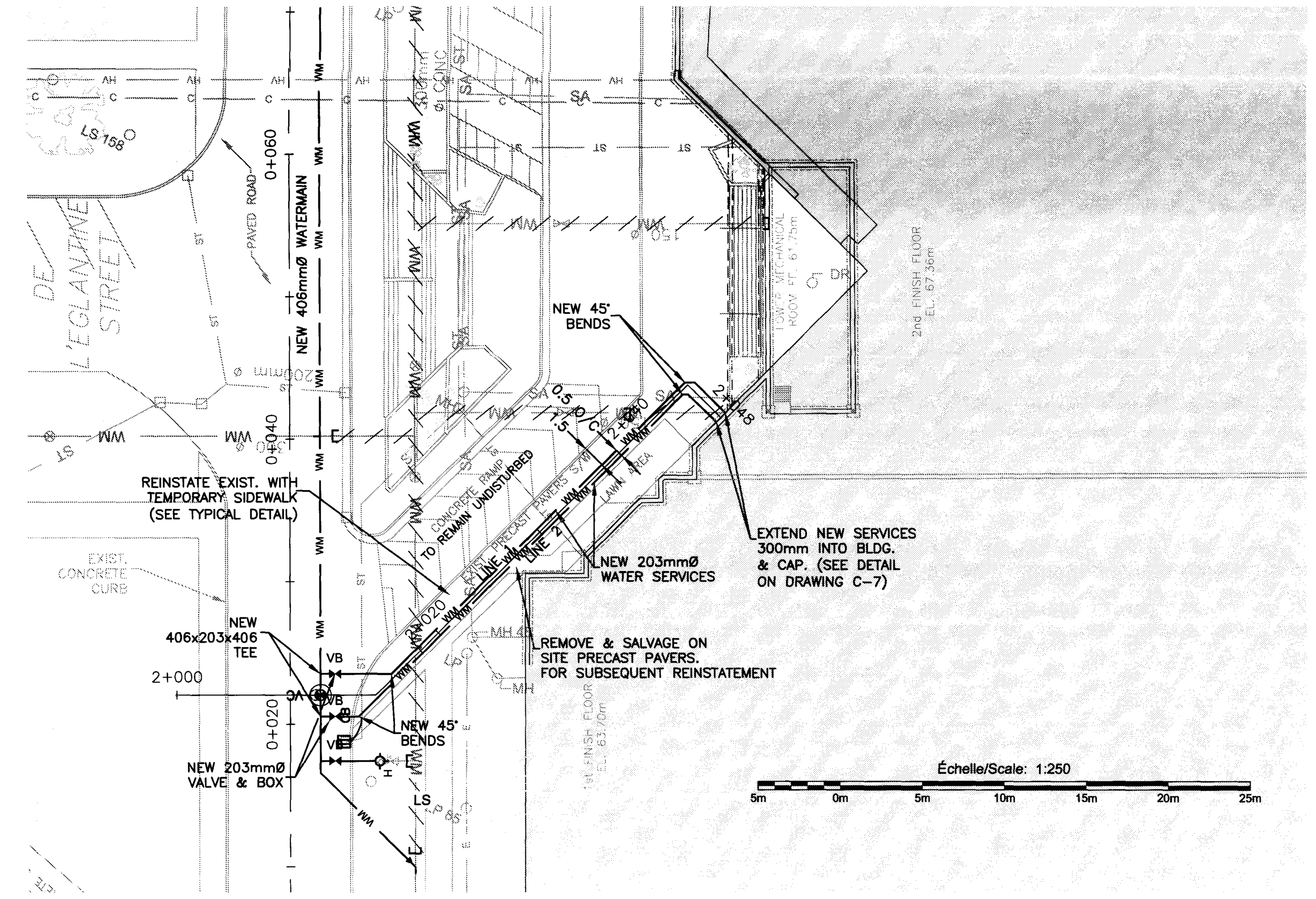
drawing / dessin
PLAN & PROFILE
1+180 TO 1+360

Designed By / Conçu par: J. MAYDA — Date: 2010/11/03 (yyyy/mm/dd)
Drawn By / Dessiné par: G.FATTOUCHE — Date: 2010/11/03 (yyyy/mm/dd)
Reviewed By / Examiné par — Date (yyyy/mm/dd)
Approved By / Approuvé par — Date (yyyy/mm/dd)
Tender / Soumission: D.MOIR 2010/11/03
Project Manager / Administrateur de projets
Project no. / No. du projet: R.007839.002
Drawing no. / No. du dessin: C-4

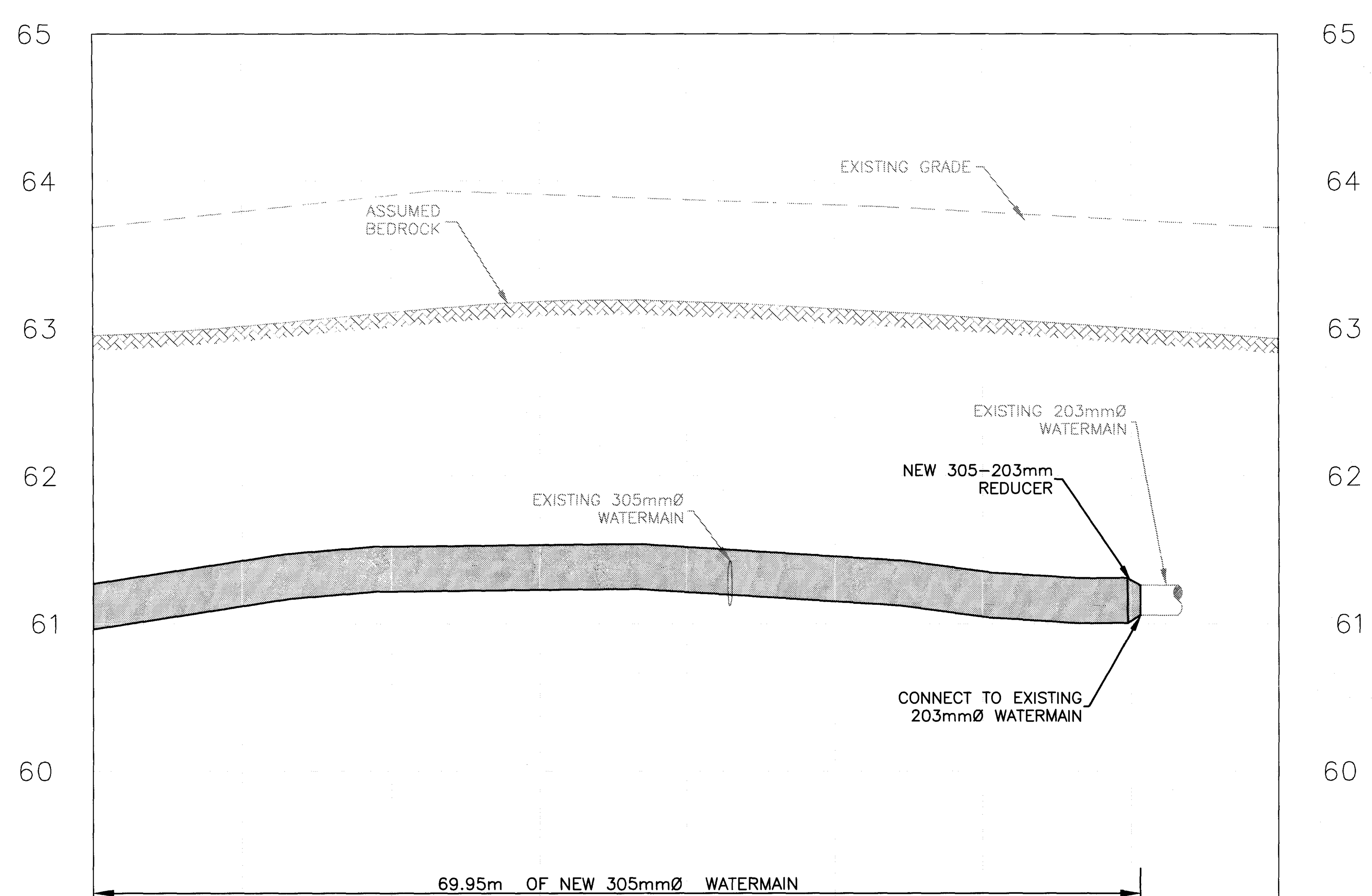
DRWG. # 1572

PWGSC B1 (1000 x 707)

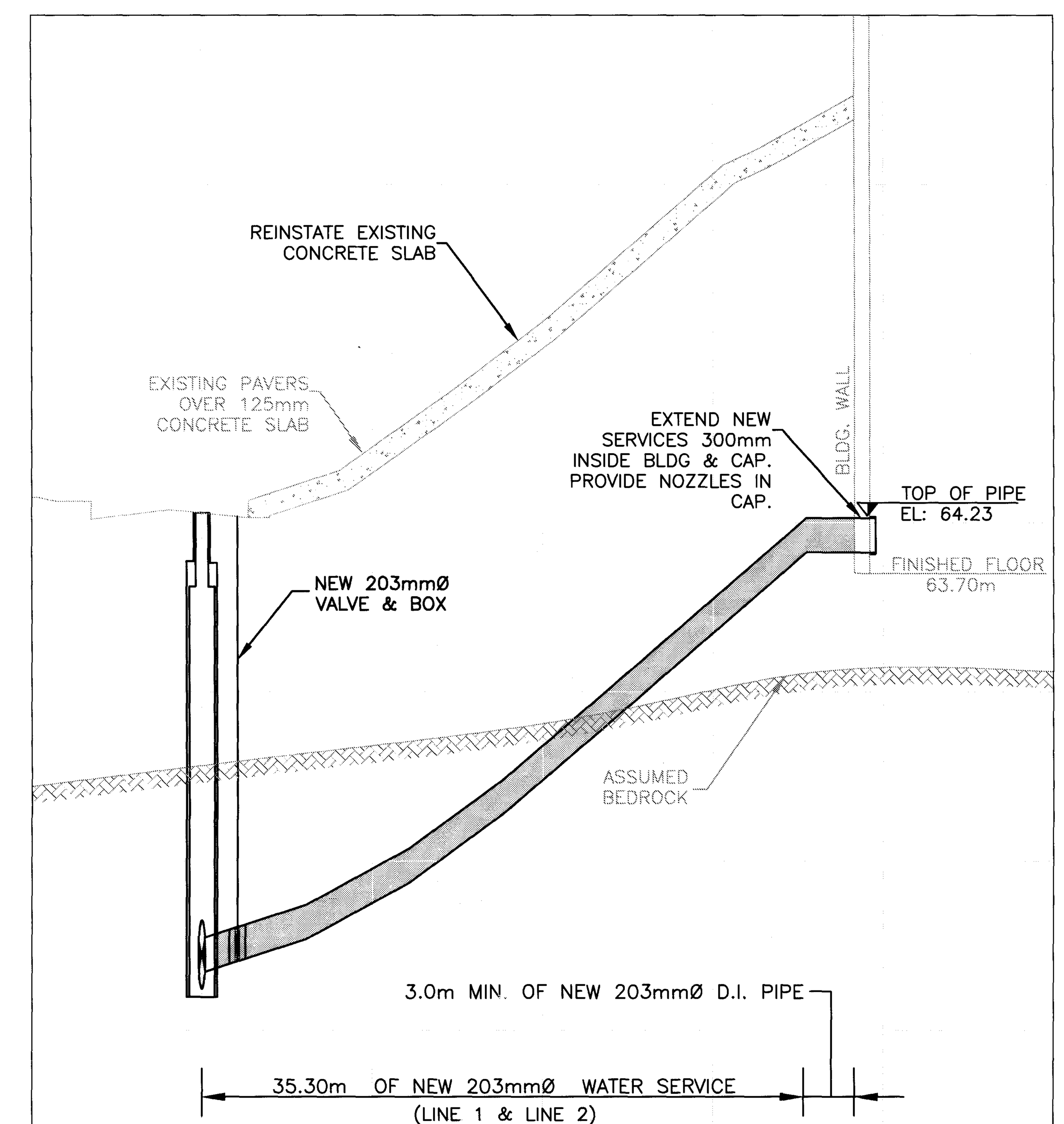




PART PLAN 1



EXISTING GRADE ELEVATION	63.73	63.79	63.91	63.93	63.92	63.86	63.77		63.71		EXISTING GRADE ELEVATION
TOP OF WATERMAIN	61.13	61.39	61.51	61.53	61.52	61.46	61.35		61.31		TOP OF WATERMAIN
DESCRIPTION	NEW 305x152x305 TEE							NEW 305–203mm REDUCER		CONNECTION TO EXISTING 203mmØ WATERMAIN	DESCRIPTION
STATION	1+360	1+370	1+380	1+390	1+400	1+410	1+420	1+429.95	1+430	1+430.65	STATION



EXISTING GRADE ELEVATION			64.45	65.10	66.06			EXISTING GRADE ELEVATION
TOP OF WATERMAIN			61.96	62.68	63.58	64.23		TOP OF WATERMAIN
DESCRIPTION		NEW 203mmØ VALVE & BOX				CONNECTION POINT AT EXISTING BLDG. WALL		DESCRIPTION
STATION	2+010	2+011.00	2+020	2+030	2+040	2+048.30	2+050	STATION

Canada

Public Works and Government Services Canada — Travaux publics et services gouvernementaux Canada
Real Property Branch — Direction générale des biens immobiliers

SFB P&P 7

revisions	description	date
1	ISSUED FOR TENDER	05/11/10

A detail no. / no. du détail
B location drawing no. / sur dessin no.
C drawing no. / dessin no.

project / projet
TUNNEY'S PASTURE COMPLEX
NEW WATERMAIN
PHASE VIII

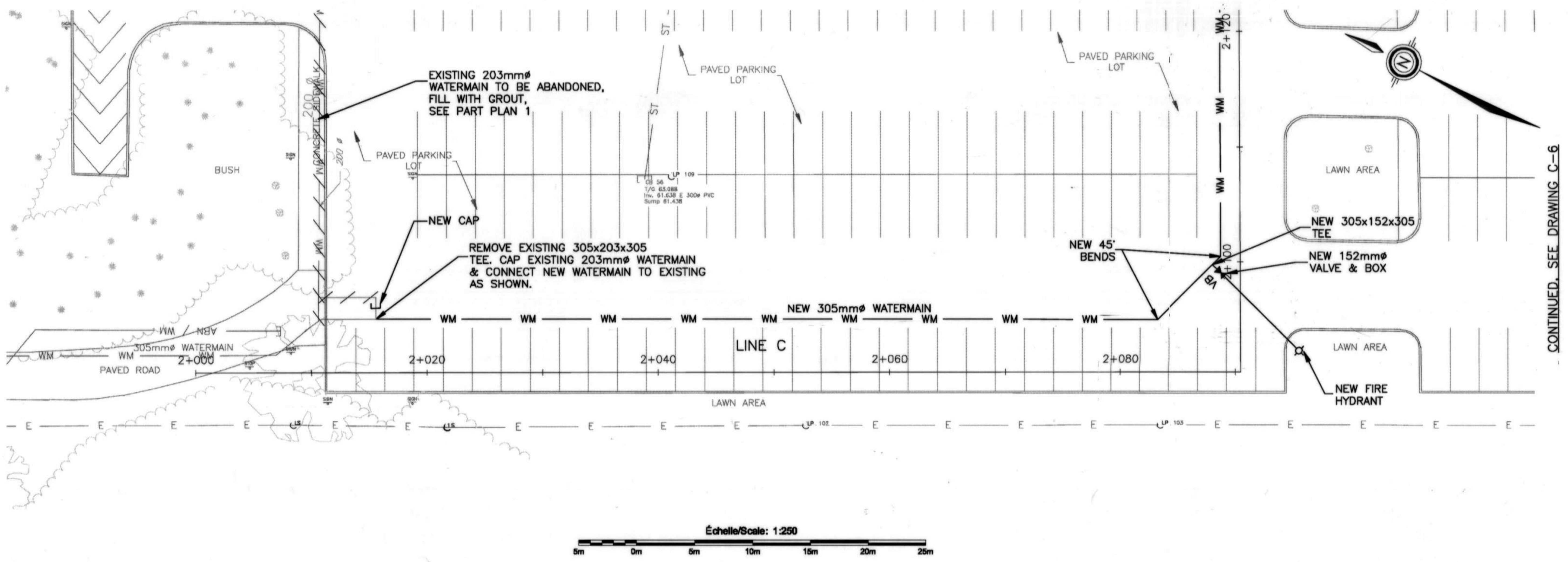
OTTAWA, ONTARIO

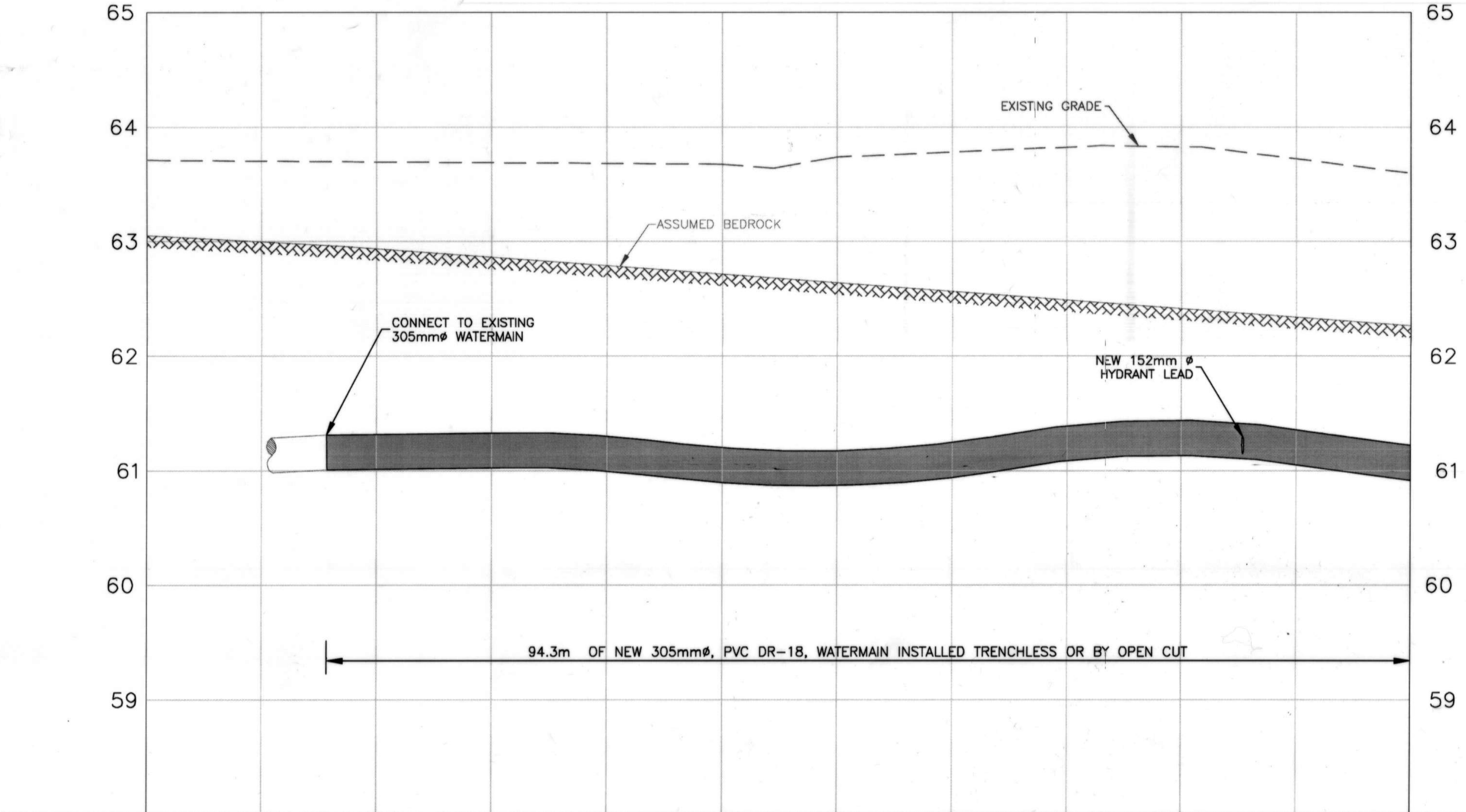
drawing / dessin
PLAN & PROFILE
1+360 TO 1+440
2+000 TO 2+060

Designed By	J. MAYDA	Conçu par
Date	2010/11/03	(yyyy/mm/dd)
Drawn By	G.FATTOUCHE	Dessiné par
Date	2010/11/03	(yyyy/mm/dd)
Reviewed By		Examiné par
Date		(yyyy/mm/dd)
Approved By		Approuvé par
Date		(yyyy/mm/dd)
Tender	D.MOIR 2010/11/03	Soumission
Project Manager		Administrateur de projets
Project no.	R.007839.002	No. du projet
Drawing no.	C-5	No. du dessin

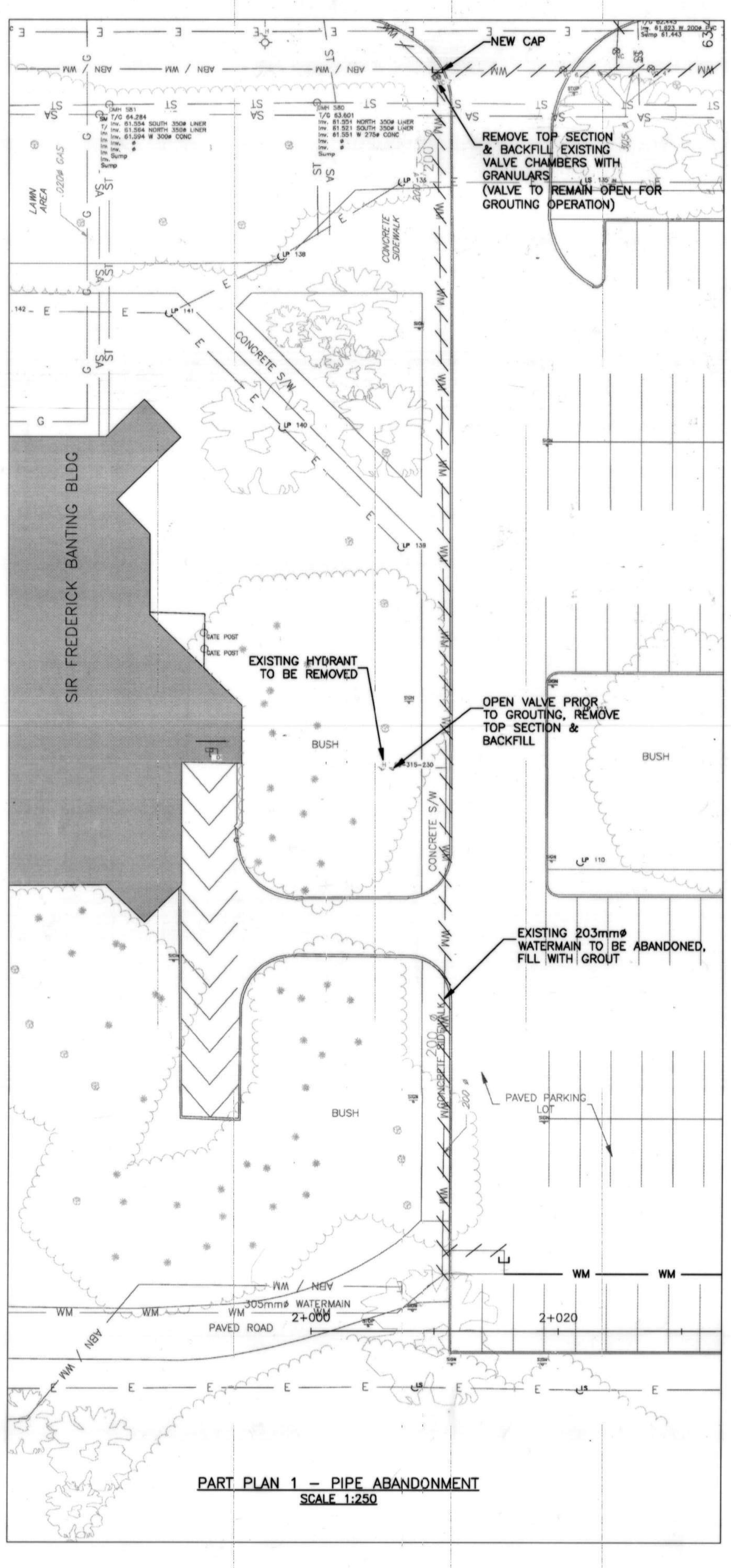
DRWG. # 15721

PWGSC B1 (1000 x 707)





EXISTING GRADE ELEVATION	63.67		63.72	63.73	63.72	63.71	63.72	63.76	63.81	63.81		63.71	63.59	EXISTING GRADE ELEVATION
TOP OF WATERMAIN			61.32	61.33	61.30	61.20	61.18	61.25	61.39	61.41		61.31	61.19	TOP OF WATERMAIN
DESCRIPTION		CONNECTION TO EXISTING									NEW 152mmø HYDRANT LEAD & NEW 305x152x305 TEE			DESCRIPTION
STATION	2+010	2+015.67	2+020	2+030	2+040	2+050	2+060	2+070	2+080	2+090	2+095.35	2+100	2+110	STATION



PART PLAN 1 – PIPE ABANDONMENT
SCALE 1:250

Canada

Public Works and Government Services Canada — Travaux publics et services gouvernementaux Canada
Real Property Branch — Direction générale des biens immobiliers

SFB P&P 8

revisions	description	date
1	ISSUED FOR TENDER	26/11/11

A detail no. / no. du détail
B location drawing no. / sur dessin no.
C drawing no. / dessin no.

project — projet
TUNNEY'S PASTURE COMPLEX
NEW WATERMAIN
PHASE IX

OTTAWA, ONTARIO

drawing — dessin
LINE C
PLAN & PROFILE
2+000 TO 2+110
PART PLAN 1

Designed By J. MAYDA — Conçu par
Date 2011/09/15 (yyyy/mm/dd)
Drawn By G.FATTOUCHE — Dessiné par
Date 2011/09/15 (yyyy/mm/dd)
Reviewed By — Examiné par
Date (yyyy/mm/dd)
Approved By — Approuvé par
Date (yyyy/mm/dd)
Tender — Soumission
Project Manager — Administrateur de projets
Project no. — No. du projet
R.046357.002
Drawing no. — No. du dessin
C-5

PWGSC B1 (1000x707)

16034

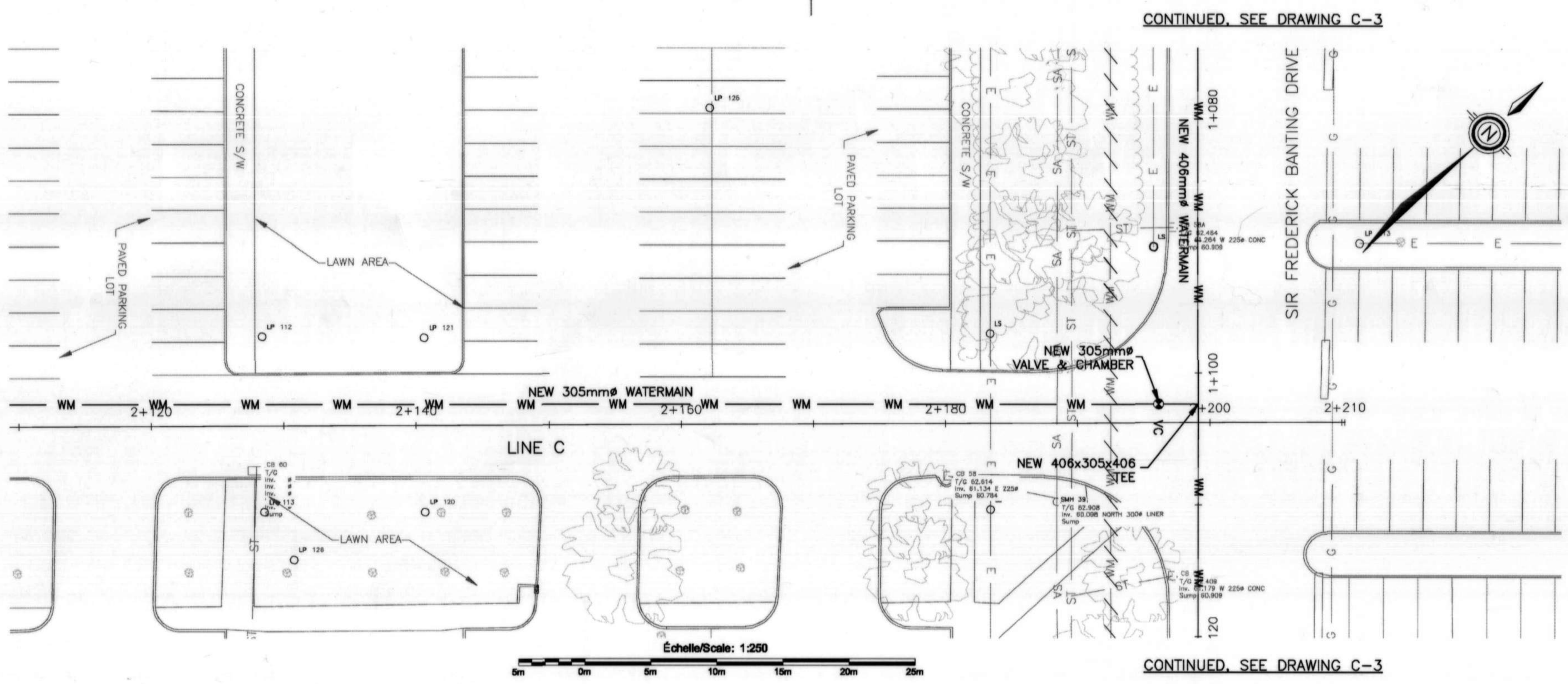
Canada

Public Works and Government Services Canada — Travaux publics et services gouvernementaux Canada

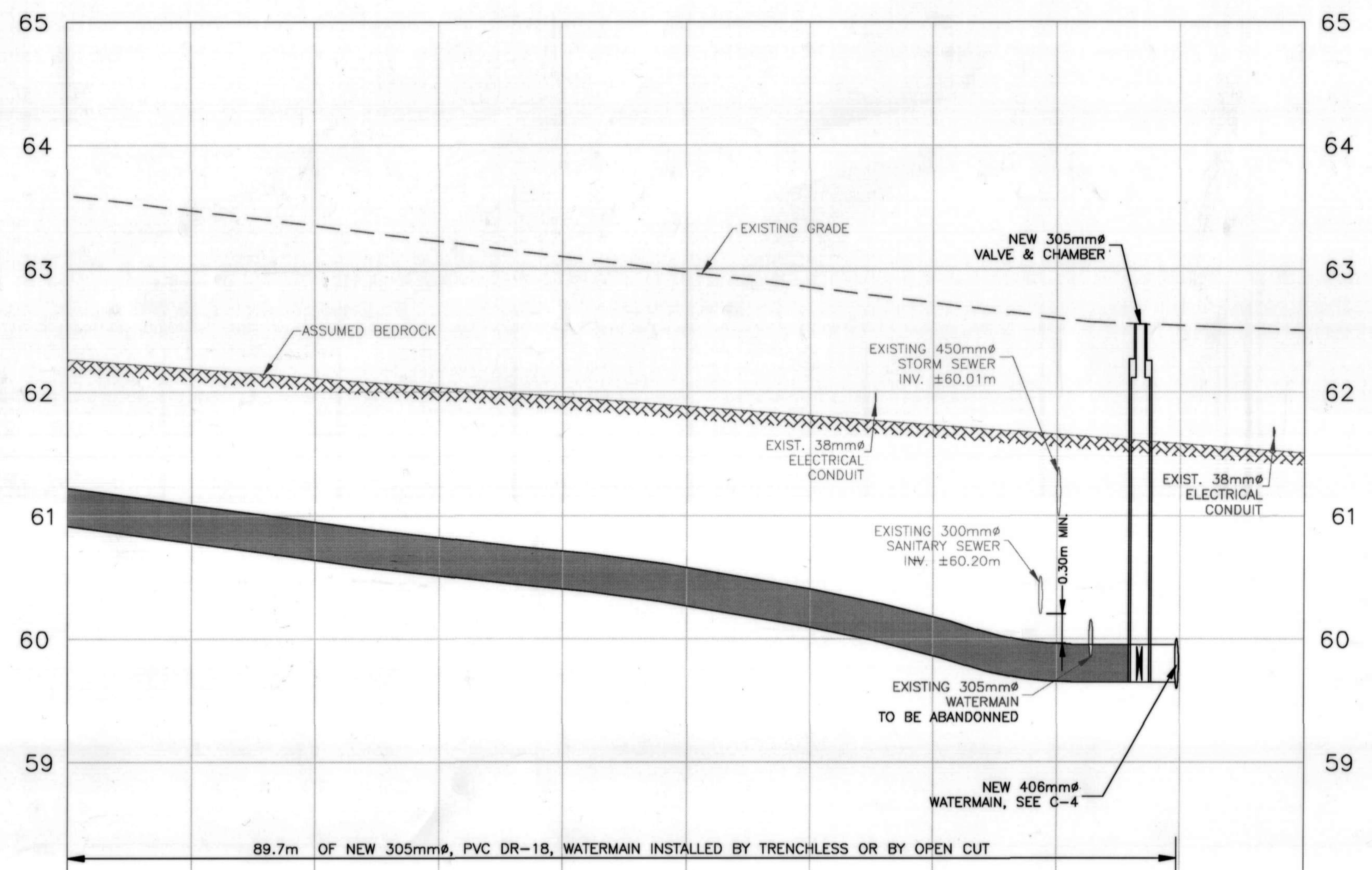
Real Property Branch — Direction générale des biens immobiliers

SFB P&P 9

CONTINUED, SEE DRAWING C-3



CONTINUED, SEE DRAWING C-3



EXISTING GRADE ELEVATION	63.59	63.48	63.34	63.26	63.13	63.00	62.85	62.68	62.58		62.53	EXISTING GRADE ELEVATION
TOP OF WATERMAIN	61.19	61.08	60.94	60.82	60.72	60.57	60.41	60.18	59.93			TOP OF WATERMAIN
DESCRIPTION										NEW 305mmø VALVE & CHAMBER		DESCRIPTION
STATION	2+110	2+120	2+130	2+140	2+150	2+160	2+170	2+180	2+190	2+196.74	2+200	STATION

revisions	description	date
1	ISSUED FOR TENDER	25/11/11

A detail no. / no. du detail
B location drawing no. / sur dessin no.
C drawing no. / dessin no.

project / projet

TUNNEY'S PASTURE COMPLEX
NEW WATERMAIN
PHASE IX

OTTAWA, ONTARIO

drawing / dessin

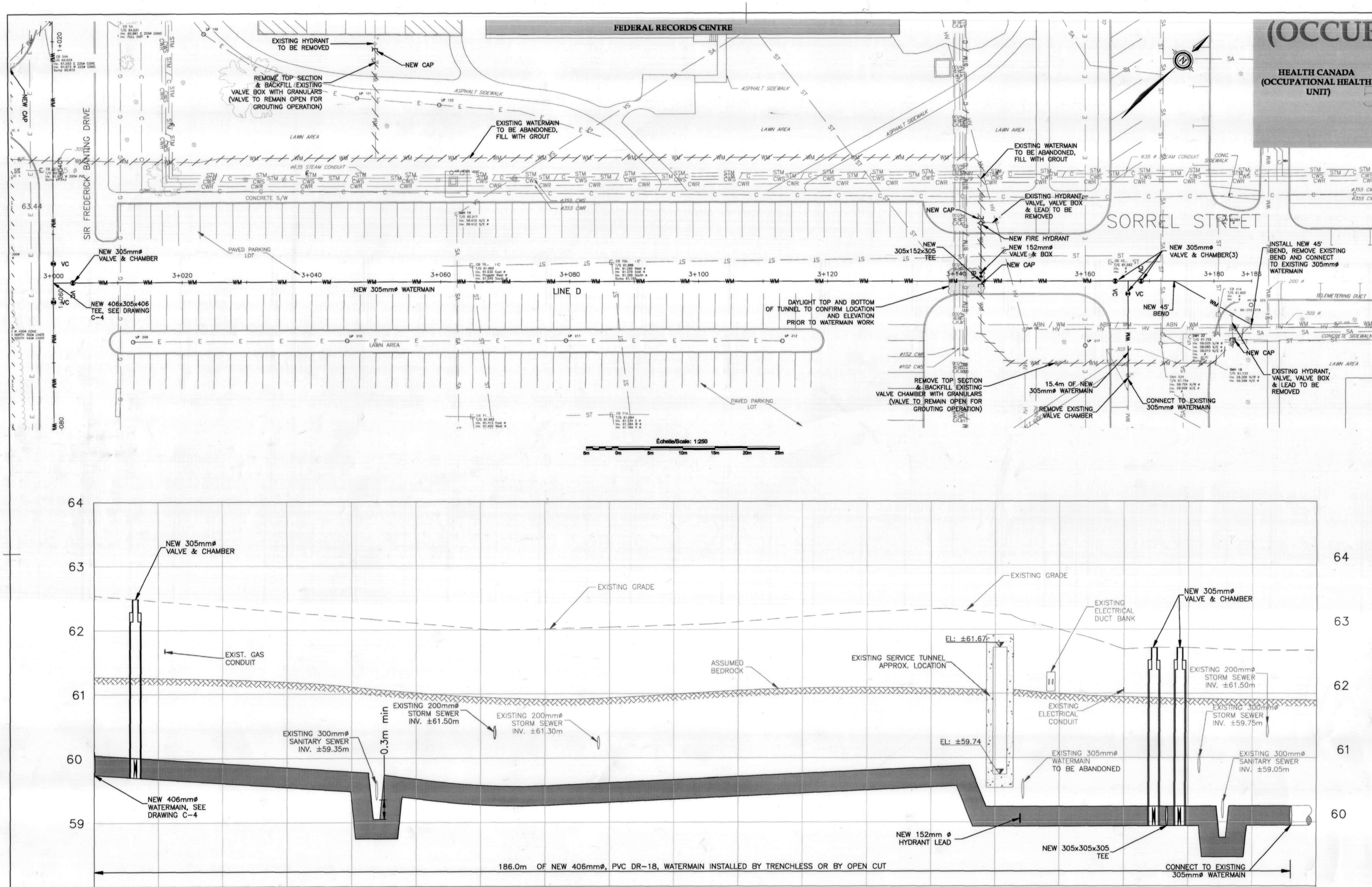
LINE C
PLAN & PROFILE
2+110 TO 2+210

Designed By / Conçu par: J. MAYDA
Date (yyyy/mm/dd): 2011/09/15
Drawn By / Dessiné par: G.FATTOUCHE
Date (yyyy/mm/dd): 2011/09/15
Reviewed By / Examiné par
Date (yyyy/mm/dd)
Approved By / Approuvé par
Date (yyyy/mm/dd)
Tender / Soumission
Project Manager / Administrateur de projets
Project no. / No. du projet: R.046357.002
Drawing no. / No. du dessin: C-6

16034

PWGSC 81 (1000x707)

Sorrel P&P 1



STATION	EXISTING GRADE ELEVATION	TOP OF WATERMAIN	DESCRIPTION
3+006.42			NEW 305mmø VALVE & CHAMBER
3+010	62.43	59.99	
3+020	62.36	59.92	
3+030	62.28	59.86	
3+040 / 3+041.27 / 3+042.00	62.19	59.79	NEW 45° BEND / NEW 45° BEND
3+045.76 / 3+046.42			NEW 45° BEND / NEW 45° BEND
3+050	62.11	59.68	
3+060	62.02	59.58	
3+070	62.02	59.57	
3+080	62.04	59.62	
3+090	62.07	59.66	
3+100	62.12	59.72	
3+110	62.20	59.76	
3+120	62.25	59.82	
3+130	62.31	59.86	
3+140	62.25	59.24	
3+143.90			NEW 152mmø HYDRANT LEAD & NEW 305x152x305 TEE
3+150	62.00	59.24	
3+160 / 3+164.70	61.70	59.24	NEW 305mmø VALVE & CHAMBER
3+166.67			NEW 305x305x305 TEE
3+168.70 / 3+170	61.70	59.25	NEW 305mmø VALVE & CHAMBER
3+173.02 / 3+173.51			NEW 45° BEND / NEW 45° BEND
3+177.27 / 3+177.78 / 3+180	61.67	59.25	NEW 45° BEND / NEW 45° BEND
3+186.00			CONNECTION TO EXISTING

Canada

Public Works and Government Services Canada — Travaux publics et services gouvernementaux Canada

Real Property Branch — Direction générale des biens immobiliers

revisions	description	date
1	ISSUED FOR TENDER	25/11/11

project / projet: TUNNEY'S PASTURE COMPLEX NEW WATERMAIN PHASE IX

OTTAWA, ONTARIO

drawing / dessin: LINE D PLAN & PROFILE 3+000 TO 3+160

Designed By / Conçu par: J. MAYDA — Date: 2011/09/15

Drawn By / Dessiné par: G.FATTOUCHE — Date: 2011/09/15

Reviewed By / Examiné par

Approved By / Approuvé par

Tender / Soumission

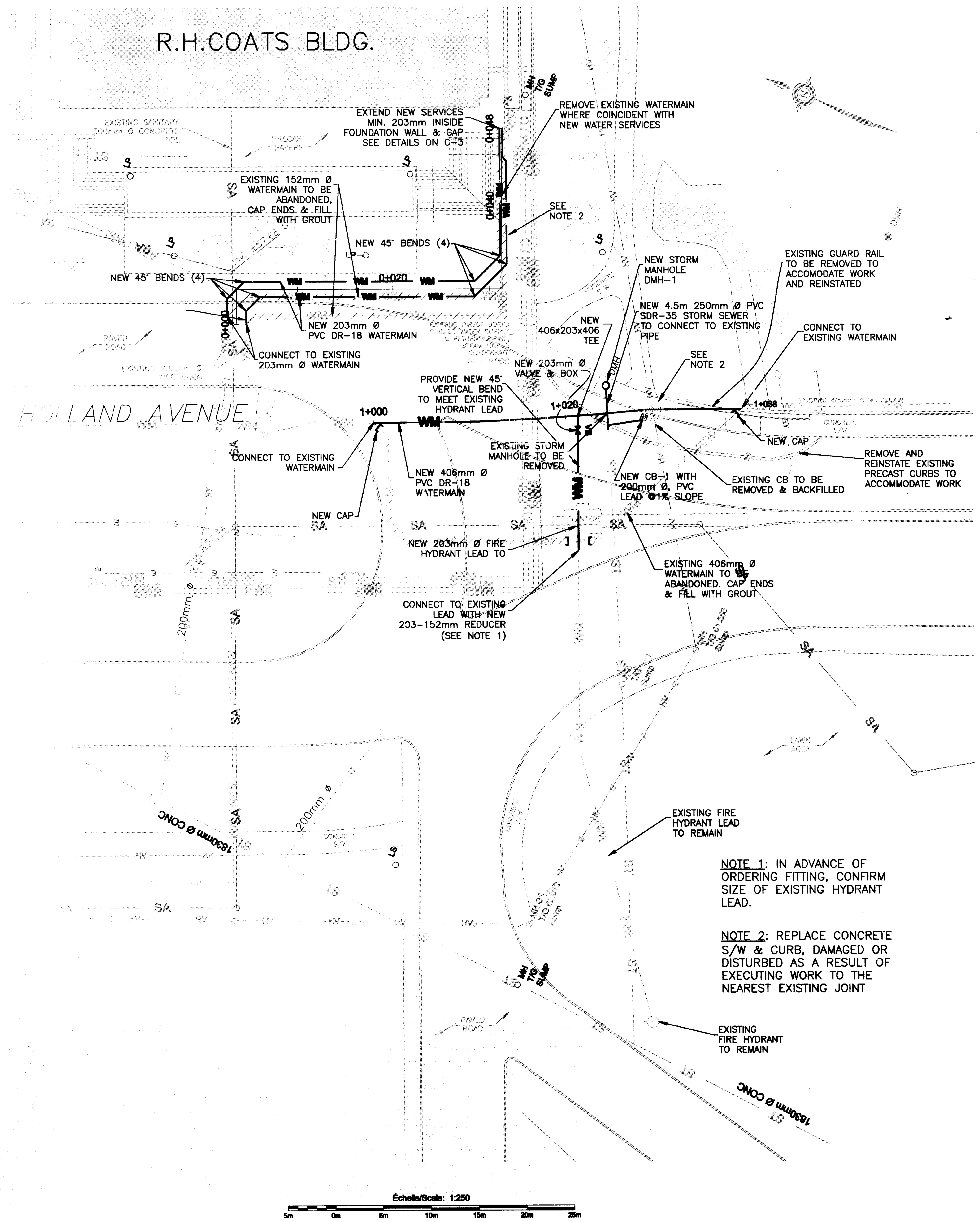
Project Manager / Administrateur de projets

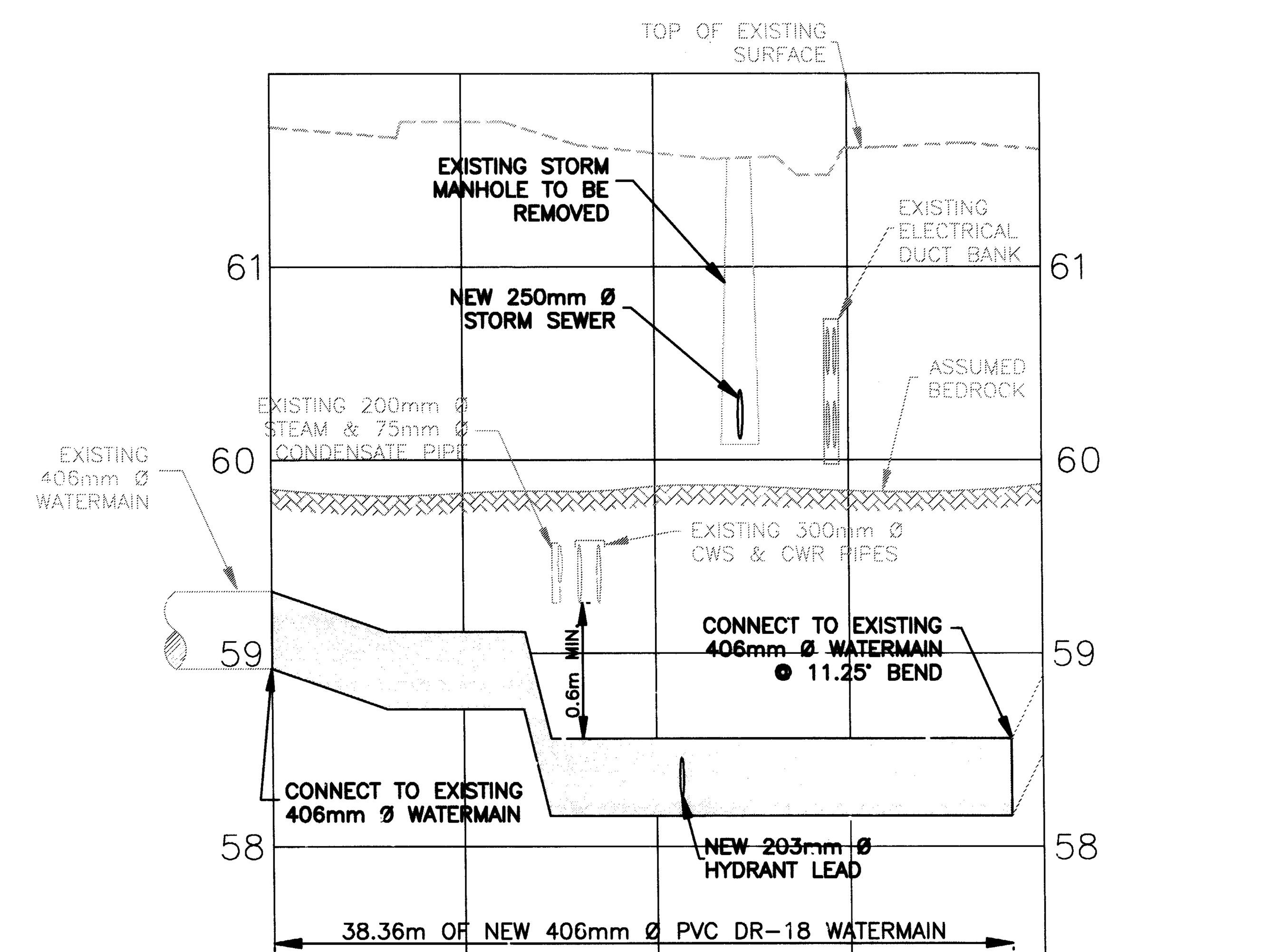
Project no. / No. du projet: R.046357.002

Drawing no. / No. du dessin: C-7

PWGSC B1 (1000x707)

16034





EXISTING GRADE ELEVATION	61.72	61.75		61.59	61.61	61.62	EXISTING GRADE ELEVATION
TOP OF WATERMAIN	59.32	59.11		58.56	58.56	58.56	TOP OF WATERMAIN
DESCRIPTION	CONNECT TO EXISTING WATERMAIN		NEW 22.5° BEND NEW 22.5° BEND	NEW 406x203x406 TEE (HYDRANT LEAD)		CONNECT TO EXISTING WATERMAIN	DESCRIPTION
STATION	1+000	1+010	1+013.20 1+014.47	1+020 1+021.30	1+030	1+038.36	STATION

HORIZONTAL SCALE 1:250
VERTICAL SCALE 1:25

Public Works and Government Services Canada / Travaux publics et services gouvernementaux Canada

Canada

Real Property Branch
Professional and Technical Services Sector

Direction générale des biens immobiliers
Secteur des services professionnels et techniques

TP P&P 0

LEGEND

LINETYPES

- EXIST. U/G ELECTRICAL SERVICE
- EXIST. GAS LINE
- EXIST. SANITARY SEWER
- EXIST. STORM SEWER
- EXIST. WATERMAIN CONDUIT
- EXIST. WATERMAIN TO BE REMOVED
- NEW WATERMAIN CONDUIT
- EXISTING CURB

SYMBOLS

- H EXIST. HYDRANT
- VB EXIST. VALVE-BOX
- CB EXIST. CATCH BASIN
- SMH EXIST. SANITARY MANHOLE
- DMH EXIST. STORM MANHOLE
- EXIST. VALVE CHAMBER
- LS EXIST. LIGHT STANDARD
- LP EXIST. LAMP POST
- EXIST. DECIDUOUS TREE
- EXIST. CONIFEROUS TREE
- EXIST. TREE STUMP
- DAYLIGHT AREAS PRIOR TO START OF WATERMAIN WORKS

revisions	description	date
3	REVISED FROM CITY COMMENTS	24/02/09
2	ISSUED FOR CITY	05/02/09
1	ISSUED FOR TENDER	20/10/08

A detail no. / no. du détail
B location drawing no. / sur dessin no.
C drawing no. / dessin no.

project / projet

Tunney's Pasture Complex Watermain Reconstruction Phase VII

OTTAWA, ONTARIO

drawing / dessin

Part plan - Holland avenue - Improvements to 406mm Ø site feed -Coats bldg. water service upgrade

designed	J.MAYDA	conçu
date	2008/10/01	(yyyy/mm/dd)
drawn	G.FATTOUCHE	dessiné
date	2008/10/01	(yyyy/mm/dd)
reviewed	J.MAYDA	examiné
date	2008/10/01	(yyyy/mm/dd)
approved	NAME	approuvé
date	YYYY/MM/DD	(yyyy/mm/dd)
Tender	D.MOIR	Soumission
Project Manager	2008/10/01	Administrateur de projets
project no.	R.007838.002	no. du projet
drawing no.	C-2	no. du dessin

Conforms to City of Ottawa Standards
Conforme aux standards de la Ville d'Ottawa
Re: 120 - Parkdale - Tunney's Pasture
By: [signature]
Date: Mar. 04/09
Ottawa

PWGSC B1 (1000x707)

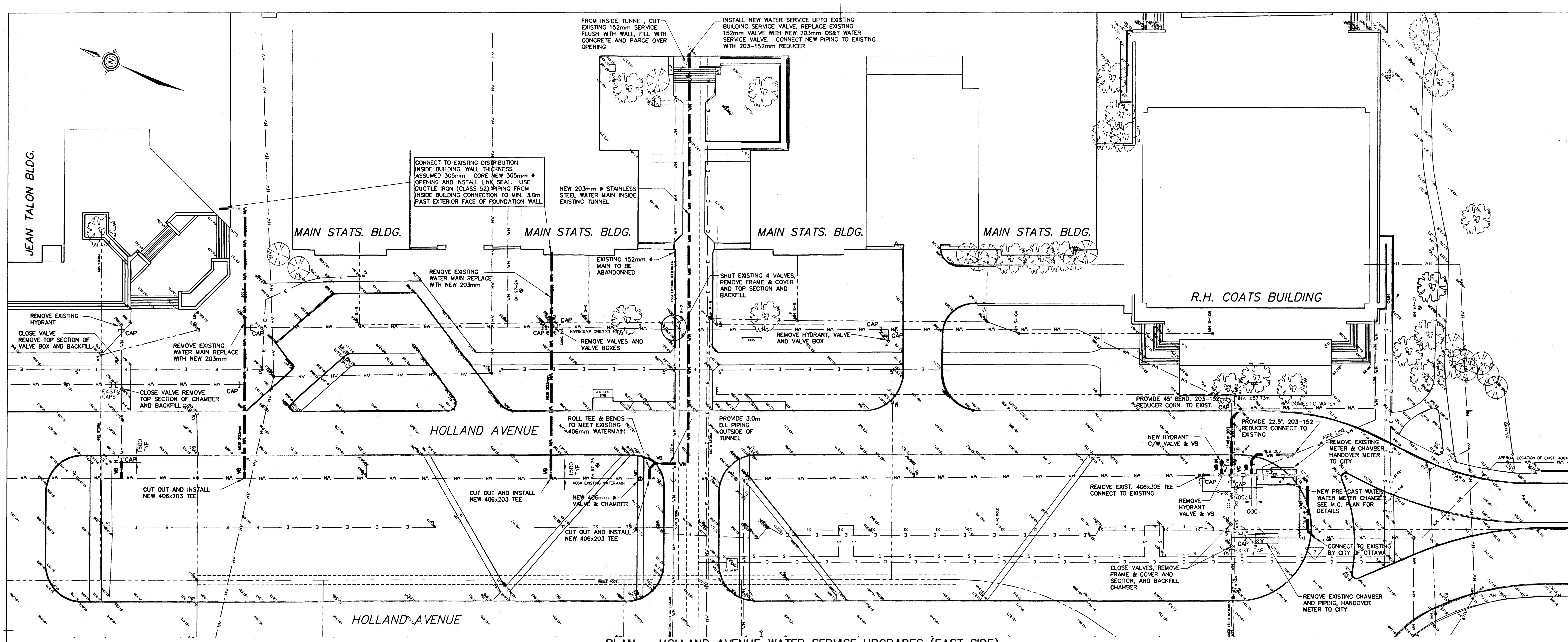
15073

Public Works and Government Services Canada
Travaux publics et Services gouvernementaux Canada

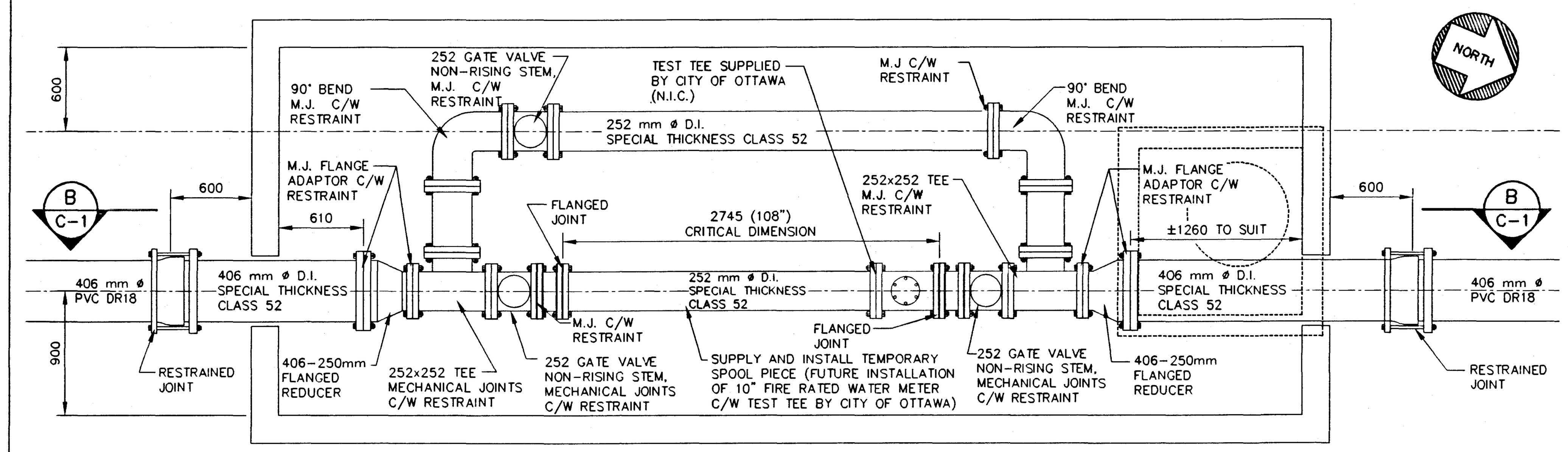
National Centre of Expertise
Architectural and Engineering Services
Real Property Services Branch

Centre d'expertise national
Services d'architecture et génie
Direction générale des services immobiliers

TP P&P 1

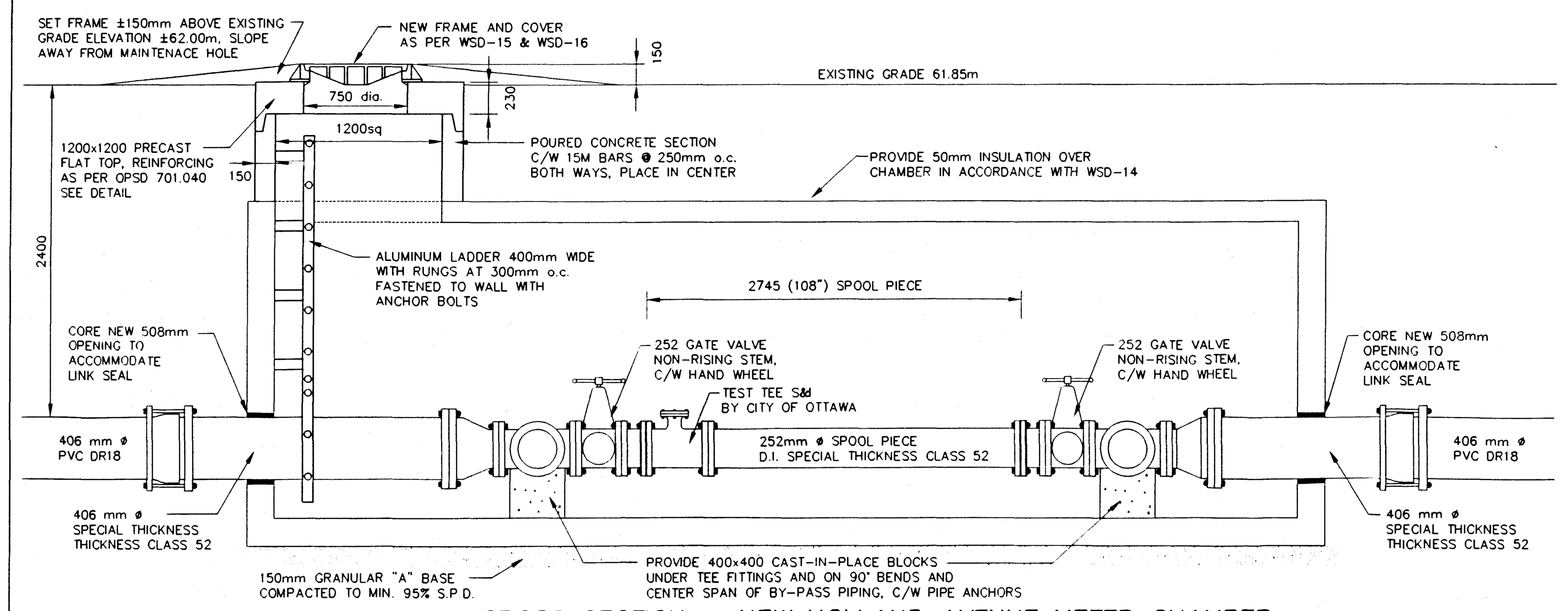


PLAN – HOLLAND AVENUE WATER SERVICE UPGRADES (EAST SIDE)



2 PLAN VIEW – NEW HOLLAND AVENUE METER CHAMBER

PLAN A C-1
SCALE 1:25

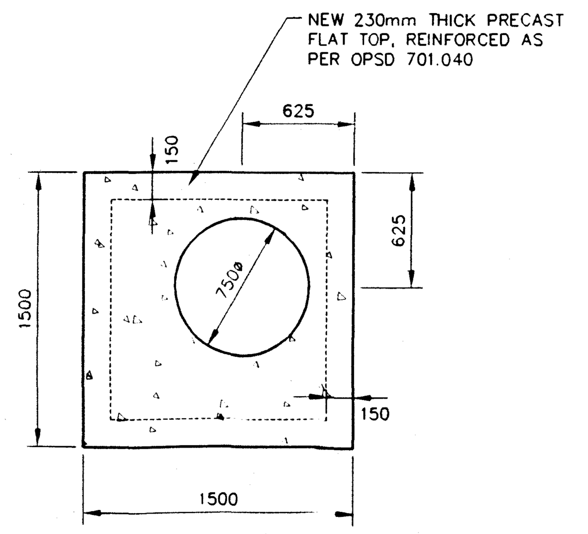


2 CROSS SECTION – NEW HOLLAND AVENUE METER CHAMBER

PLAN B C-1
SCALE 1:25

GENERAL NOTES

1. ALL MATERIALS AND CONSTRUCTION METHODS TO BE IN ACCORDANCE WITH O.P.S., CITY OF OTTAWA/R.M.O.C. STANDARD SPECIFICATIONS AND DRAWINGS. ALL WATER MAIN TO BE PROVIDED MINIMUM 2.4 m COVER.
2. CONTRACTOR TO BE RESPONSIBLE FOR OBTAINING ALL PERMITS REQUIRED AND BEAR THE COST OF THE SAME, INCLUDING WATER PERMIT AND ASSOCIATED COSTS.
3. CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE ALL NECESSARY BARRIERS AND LIGHTS TO DELINEATE THE SITE AND CONTROL ALL VEHICULAR AND PEDESTRIAN TRAFFIC AT ALL TIMES DURING THE EXECUTION OF THIS CONTRACT.
4. CONTRACTOR RESPONSIBLE TO OBTAIN LOCATES OF ALL BURIED UTILITIES FROM RESPECTIVE AGENCIES PRIOR TO COMMENCING EXCAVATION. IN THE EVENT BURIED PLANT IS IN THE VICINITY OF THE WORK AREA ADHERE TO RESPECTIVE UTILITY AGENCIES EXCAVATION PROCEDURES AND SHORING AND PROTECTION REQUIREMENTS.
5. AT LIMITS OF ALL NEW ASPHALT CROSSINGS, SAWCUT EXISTING ASPHALT PAVEMENT TO PROVIDE A CLEAN VERTICAL JOINT. IN THE EVENT THAT THIS EDGE IS DAMAGED DURING SUBSEQUENT WORK CLEAN UP THE EDGES BY RE-SAW CUTTING AND REMOVING DAMAGED ASPHALT.
6. EXCAVTION, BACKFILLING AND RELATED WATERMAIN WORK TO BE THE RESPONSIBILITY OF THE CONTRACTOR.
7. PROVIDE THERMAL INSULATION FOR WATERMAINS AT OPEN STRUCTURES IN ACCORDANCE WITH RMOC DRAWING WDS-23.
8. SURPLUS MATERIAL TO BE REMOVED FROM SITE AND DISPOSED OF LEGALLY.
9. FOR THE ENTIRE DURATION OF THE CONSTRUCTION PERIOD MAINTAIN A FILTER FABRIC AROUND ALL CATCH BASIN AND MANHOLE GRATES. ON A DAILY BASIS MONITOR THE CONDITION OF THE FILTERS AND REPLACE AS NECESSARY.
10. GRANULAR "A" IS TO BE PLACED TO A MINIMUM THICKNESS OF 300mm AROUND ALL STRUCTURES WITHIN PAVEMENT AREAS.
11. WATER TRENCH BEDDING MATERIAL SHALL CONSIST OF 150mm OF GRANULAR "A" COMPACTED TO A MINIMUM OF 95% STANDARD PROCTOR DENSITY. PIPE SURROUND MATERIAL SHALL CONSIST OF GRANULAR "A" HAND PLACED FROM THE PIPE SPRINGLINE TO 300mm ABOVE TOP OF PIPE. BACKFILL ABOVE PIPE BEDDING TO UNDERSIDE OF SURFACE TREATMENT TO CONSIST OF UNFROZEN EXCAVATED NATIVE MATERIAL OR SELECT SUBGRADE, COMPACTED TO A MINIMUM OF 95% STANDARD PROCTOR DENSITY.
12. ALL GRANULARS FOR ROADWAY REINSTATEMENT TO BE COMPACTED AS PER SPECIFICATIONS.
13. ALL NECESSARY CLEARING AND GRUBBING, INCLUDING SNOW REMOVAL OF WORK AREA TO BE COMPLETED BY CONTRACTOR.
14. CONTRACTOR IS RESPONSIBLE FOR ALL EXCAVATION, BACKFILLING, REINSTATEMENT OF ALL AREAS DISTURBED DURING CONSTRUCTION AND ALL ASSOCIATED WORKS TO THE SATISFACTION OF THE ENGINEER. DISTURBED LANDSCAPED AREAS TO BE REINSTATED WITH APPROVED TOPSOIL (135mm THICK) AND NURSERY SOD. DISTURBED ASPHALT SURFACES TO BE REINSTATED AS FOLLOWS:
MINIMUM 40mm HL3
50mm HL8
150mm GRANULAR "A"
400mm GRANULAR "B" TYPE II, ALL COMPACTED IN ACCORDANCE WITH SPECIFICATIONS.
15. MINIMUM WATERMAIN COVER TO BE 2.4m. NOTIFY ENGINEER SHOULD CONNECTIONS TO EXISTING MAINS RESULT IN LESS THAN REQUIRED EARTH COVER AND INSULATE AS PER RMOC STANDARDS.
16. FOR SOILS INFORMATION REFER TO REPORT PREPARED BY OMM/TROW CONSULTING ENGINEERS LIMITED, JOB No. MP13949A DATED AUGUST 2000, AND McROSTIE GENEST ST. LOUIS REPORT E-7538 (AVAILABLE FOR VIEWING UPON REQUEST).
17. PROVIDE CATHODIC PROTECTION IN ACCORDANCE WITH RMOC STANDARDS.
18. CONTRACTOR WILL CO-ORDINATE ALL WORK WITH ENGINEER AND ASSIST FULLY IN MINIMIZING DISRUPTION TO THE SITE.
19. DISCONNECTION OF EXISTING METERS TO BE UNDERTAKEN BY CITY OF OTTAWA. ASSIST CITY OF OTTAWA FORCES AS REQUIRED. CONTRACTOR RESPONSIBLE FOR REMOVAL, BACKFILLING, AND DISPOSAL OF EXISTING TWO METER CHAMBERS. INSTALLATION OF NEW METER CHAMBER TO BE SCHEDULED TO MINIMIZE DISRUPTION TO SITE AND SITE ACTIVITIES. PROVIDE FLAG MEN AT ALL TIMES DURING INSTALLATION OF NEW CHAMBER TO DIRECT VEHICLES AND PEDESTRIANS AWAY FROM DANGER ZONE.
20. EXISTING REMOTE READOUTS FOR EXISTING METER CHAMBERS ARE TO BE PRESERVED AND RELOCATED TO NEW CHAMBER.
21. CONNECTION OF NEW SERVICES TO EXISTING BUILDING DISTRIBUTION SYSTEM RESPONSIBILITY OF CONTRACTOR AND TO BE CO-ORDINATED WITH ENGINEER.
22. ALL MAIN SHUT DOWNS AND BUILDING SHUT DOWNS TO BE UNDERTAKEN DURING OFF HOURS. OFF HOURS ARE DEFINED AS ANYTIME ON WEEK-ENDS AND STATUTORY HOLIDAYS AND BETWEEN 6:00PM AND 6:00AM DURING WEEKDAYS.
23. ACCESS HATCH TO TUNNEL AT SORREL STREET AND HOLLAND AVENUE CAN BE USED TO BRING IN EQUIPMENT AND WATERMAIN PIPING FOR INSTALLATION INTO TUNNEL.
24. BUILDING SERVICES ARE TO CONSIST OF DUCTILE IRON PIPING, SPECIAL THICKNESS CLASS 52 FROM INSIDE CONNECTION TO BUILDING DISTRIBUTION, CONTINUOUS TO MINIMUM 3.0m BEYOND BUILDING FOUNDATION.
25. CITY OF OTTAWA WILL FLUSH AND DISINFECT WATERMAIN PRIOR TO PUTTING INTO SERVICE. CITY OF OTTAWA WILL SUPPLY AND BORE NOZZLES. CONTACTOR TO CO-ORDINATE AND ASSIST CITY. CITY OF OTTAWA WILL WITNESS HYDROSTATIC PRESSURE TESTS.



FLAT TOP – PLAN VIEW

DETAIL C C-1
SCALE 1:25

Conforms to Region of Ottawa-Carleton Water Standards
Conforme aux standards d'eau de la Région d'Ottawa-Carleton
Date 26 mch 2001

5607

1. NOTE THIS DRAWING SUPERCEDES TENDER DRAWINGS SP-101 AND SP-102. METER CHAMBER PLAN AND SECTION SHOWN ON THIS DRAWING SUPERCEDES THE CHAMBER LAYOUT DESIGN DETAILED ON TENDER DRAWING C-101 (NEW METERING CHAMBER – PLAN VIEW, SECTION "B-B", AND ACCESS COVER DETAIL).

2.	REVISED PER CITY OF OTTAWA REVIEW
1.	CHANGE ORDER No. 1 PROJECT No. 418195
revisions	date

project / projet: TUNNEY'S PASTURE COMPLEX WATER MAIN UPGRADES PHASE III

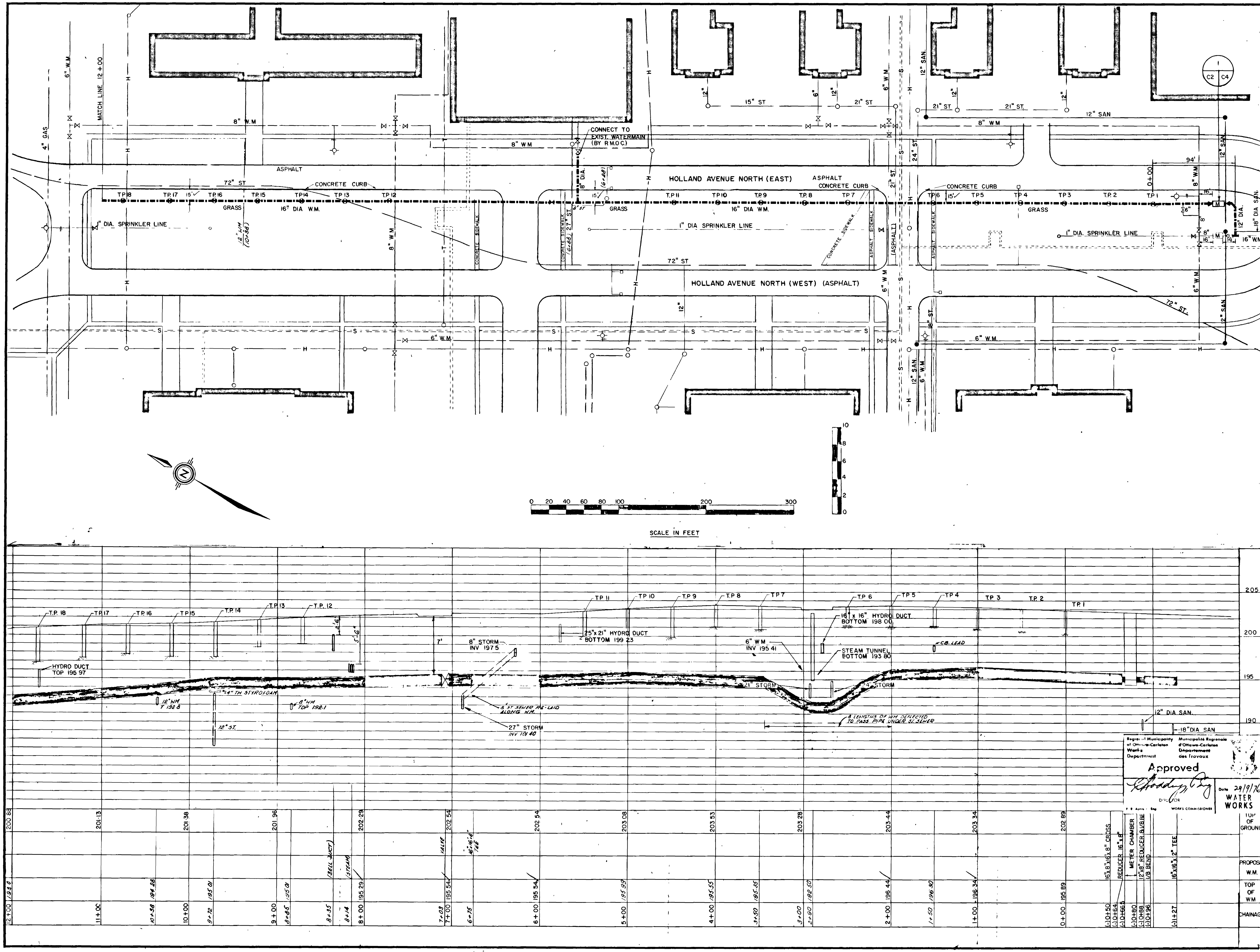
drawing / dessin: PLAN–HOLLAND AVE., PLAN & SECTION NEW METER CHAMBER GENERAL NOTES

designed	J.M./D.M	conçu
date	MARCH 14, 2001	
drawn	J.M.	dessiné
date		
reviewed		examine
date		
approved		approuvé
date		
Tender	DERIC MOIR	Soumission
Project Manager		Administrateur de projets
project no	418195	no du projet
drawing no	C-1 of 1	no. du desin

PLOT SCALE 1

PWGSC A0

9615



TP P&P 2

Public Works Canada / Travaux publics Canada

National Capital Operations Branch
Direction générale des opérations de la Capitale nationale

H D McFarland
Director General
Directeur général

W N Thomas
Manager
Design and Construction
Administrateur
Études et construction

J L RICHARDS & ASSOCIATES LIMITED
CONSULTING ENGINEERS AND PLANNERS
OTTAWA CANADA
JOB NO 75-3901

Z I RANA — Registered Professional Engineer, Province of Ontario

project title / titre du projet

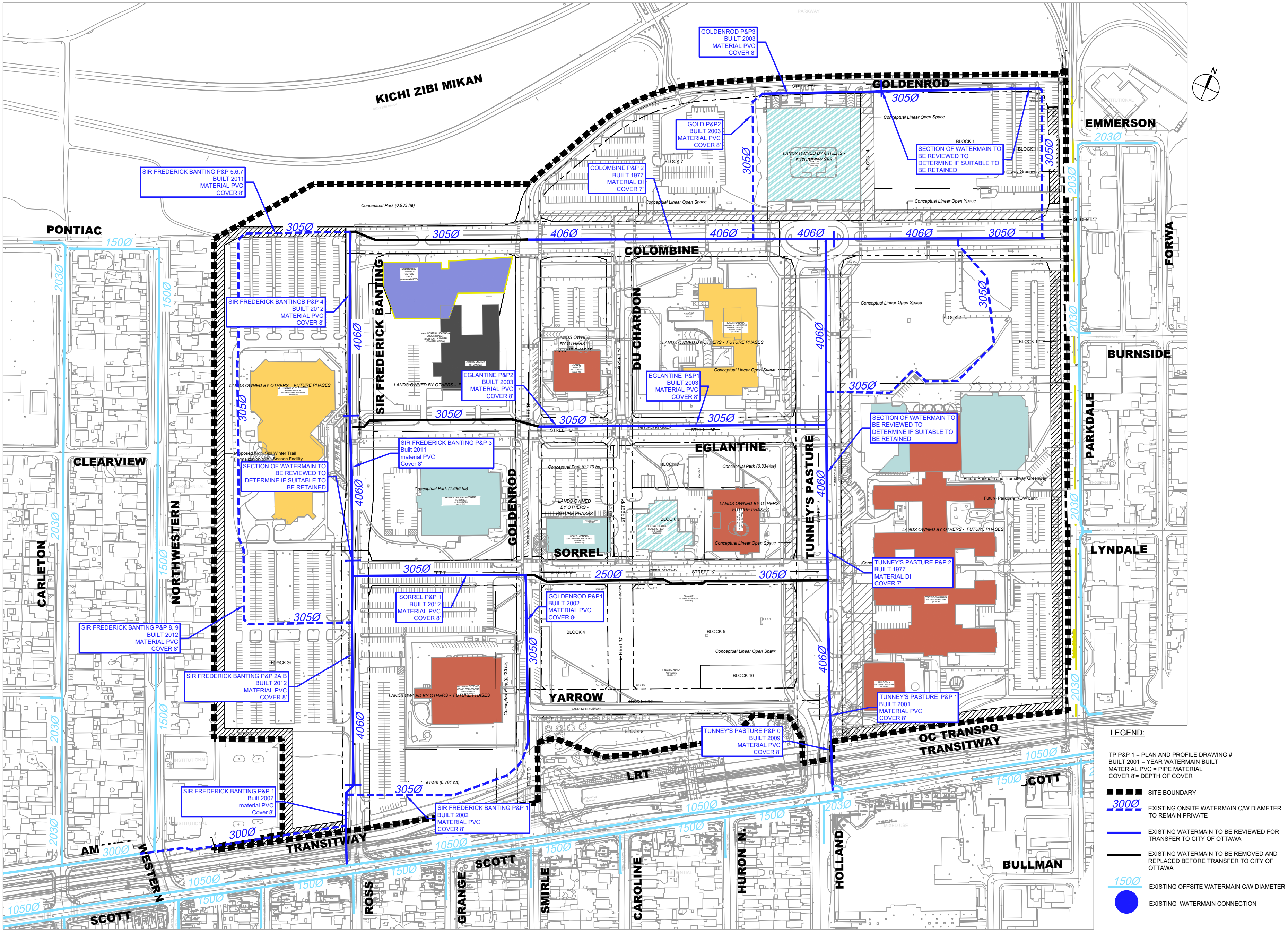
SERVICES DISTRIBUTION SYSTEM
TUNNEY'S PASTURE
OTTAWA ONTARIO

drawing title / titre du dessin

WATER MAIN EXTENSION
PLAN & PROFILE
HOLLAND AVE. NORTH

designed by / conçu par	Z.I RANA	date JUNE 1976
drawn by / dessiné par	D V SALLY	date JUNE 1976
reviewed by / examiné par	J R ALLEN	date JUNE 1976
approved by / approuvé par	A E. FEE	date JUNE 1976
Tender / Soumission — D P W Project Manager / Administrateur de projets M T P	A SCOTHORN	
project number / no du projet	77970/03	
drawing no. / dessin no	03-C2 2594-1	

Z:\Toronto\139833_TunneyPasture\7.0_Production\7.03_Design\04_Civil_Land\Figures\Site Servicing Issues Memo\139833ExistingWatermain-Fig2-2A.dwg Layout Name: Figure 2A Existing Watermain Infrastructure



Project Title

Tunney's Pasture

Site Servicing and Public Road Redevelopment

Prepared for Canada Lands Company & Public Service and Procurement Canada

ARCADIS

Drawing Title

Existing Watermain Infrastructure to be Retained

Sheet No.

Figure 2A

March 25, 2026

Labadie, Sam

From:	Whelan, Amy <amy.whelan@ottawa.ca>
Sent:	September 3, 2024 11:44 AM
To:	Labadie, Sam
Subject:	RE: Tunney's Pasture - Boundary Condition Request
Attachments:	Tunney's Pasture Redevelopment August 2024.pdf

Hi Sam,

****The following information may be passed on to the consultant, but do NOT forward this e-mail directly.****

The following are boundary conditions, HGL, for hydraulic analysis at Tunney's Pasture Redevelopment (zone 1W) assumed to be connected via two connections to the 406 mm watermain on Sir Frederick Banting Driveway AND the 406 mm watermain on Tunney's Pasture (see attached PDF for location).

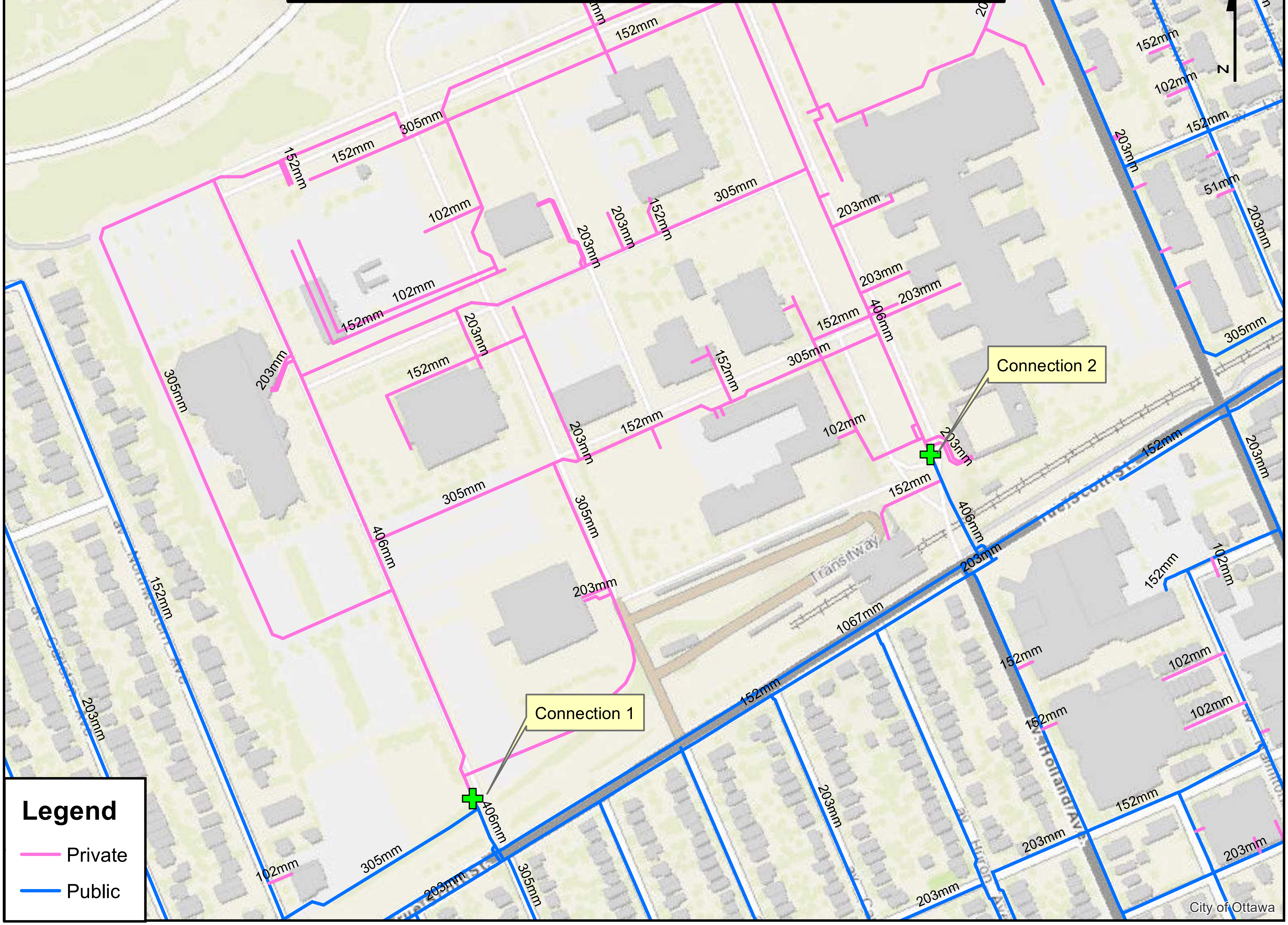
Connection	Min HGL (m)	Maximum HGL (m)	Max Day + FF (250 L/s)	Max Day + FF (166.67 L/s)
1. Sir Frederick Banting	107.8	114.7	109.1	109.5
2. Tunney's Pasture	107.6	114.7	108.3	109.0

These are for current conditions and are based on computer model simulation.

Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.

From: Whelan, Amy
Sent: September 03, 2024 10:07 AM
To: Labadie, Sam <samantha.labadie@arcadis.com>
Subject: RE: Tunney's Pasture - Boundary Condition Request

Boundary Conditions for Tunney's Pasture Redevelopment



WATERMAIN DEMAND CALCULATION SHEET

IBI GROUP
333 PRESTON STREET
OTTAWA, ONTARIO
K1S 5N4

PROJECT : **Tunney's Pasture**
CLIENT : **PSPC/CLC**

FILE: 139833-6.04.04
DATE PRINTED: 21-Oct-24
DESIGN: SEL

NODE	RESIDENTIAL				NON-RESIDENTIAL (ICI)			AVERAGE DAILY DEMAND (l/s)			MAXIMUM DAILY DEMAND (l/s)			MAXIMUM HOURLY DEMAND (l/s)			FIRE DEMAND (l/min)
	SINGLE FAMILY UNITS	TOWNHOUSE UNITS	APARTMENT UNITS	POPULATION	INDUST. (ha)	COMM. (m2)	INSTIT. (pp)	RESIDENTIAL	ICI	TOTAL	RESIDENTIAL	ICI	TOTAL	RESIDENTIAL	ICI	TOTAL	
Totals																	
Residential				16290.00				52.79		52.79	131.98		131.98	290.35		290.35	15,000
Institutional						16,175	9,262		8.51	8.51		12.76	12.76		22.97	22.97	15,000
										61.30			**144.74**			**313.33**	
Boundary Condition																	
Based on:																	
Residential				12960.00				42.00		42.00	105.00		105.00	231.00		231.00	15,000
Institutional							29,800		25.87	25.87		38.80	38.80		69.84	69.84	15,000
										67.87			**143.80**			**300.84**	

POPULATION DENSITY

Single Family 3.4 persons/unit
Townhouse 2.7 persons/unit
Avg Apartment 1.8 persons/unit

WATER DEMAND RATES

Residential 280 l/cap/day
Commercial Shopping Center 2,500 L/(1000m2)/day
Institutional 75 l/cap/day

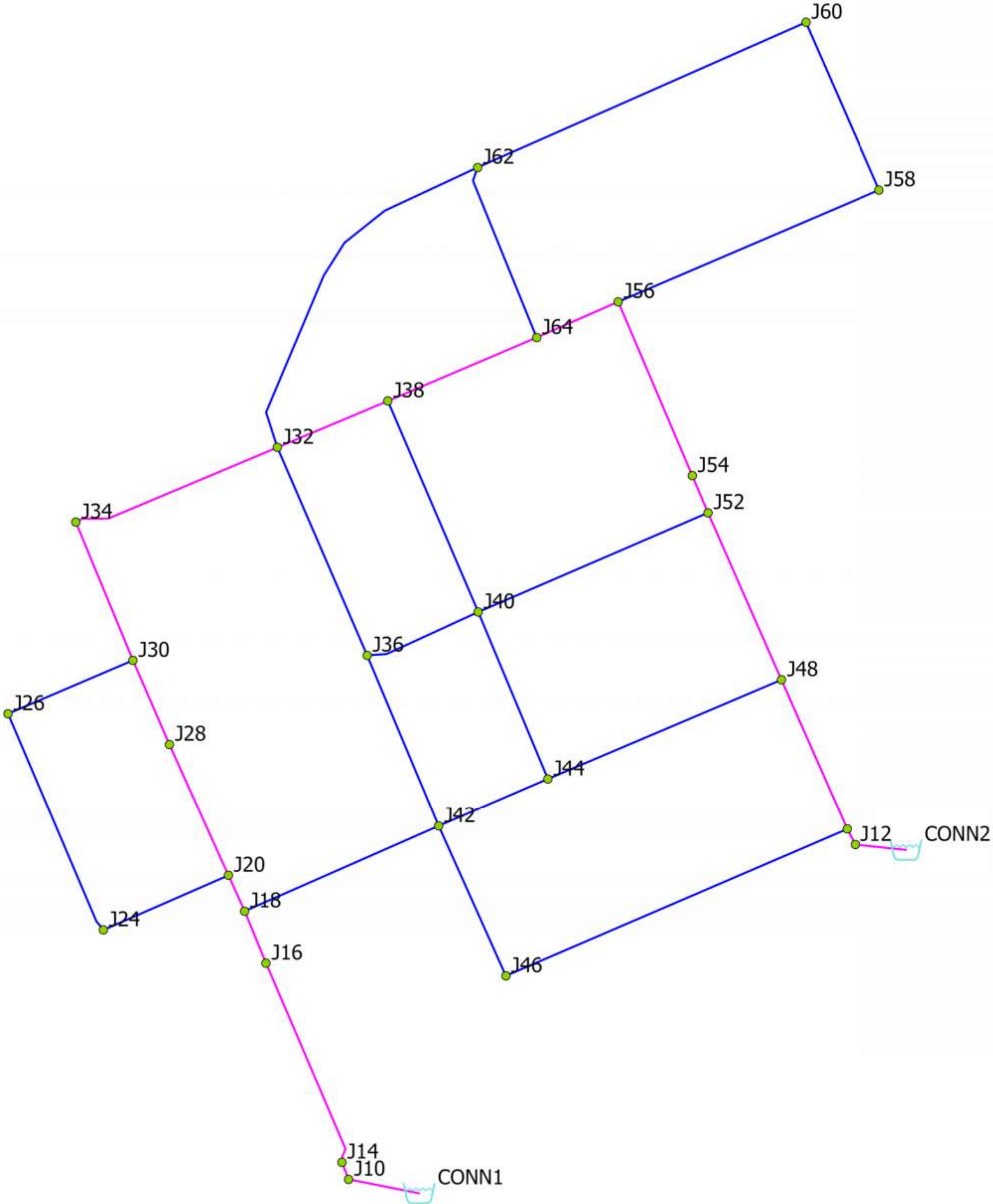
PEAKING FACTORS

Maximum Daily
Residential 2.5 x avg. day
Commercial 1.5 x avg. day
Maximum Hourly
Residential 2.2 x avg. day
Commercial 1.8 x avg. day

FIRE DEMANDS

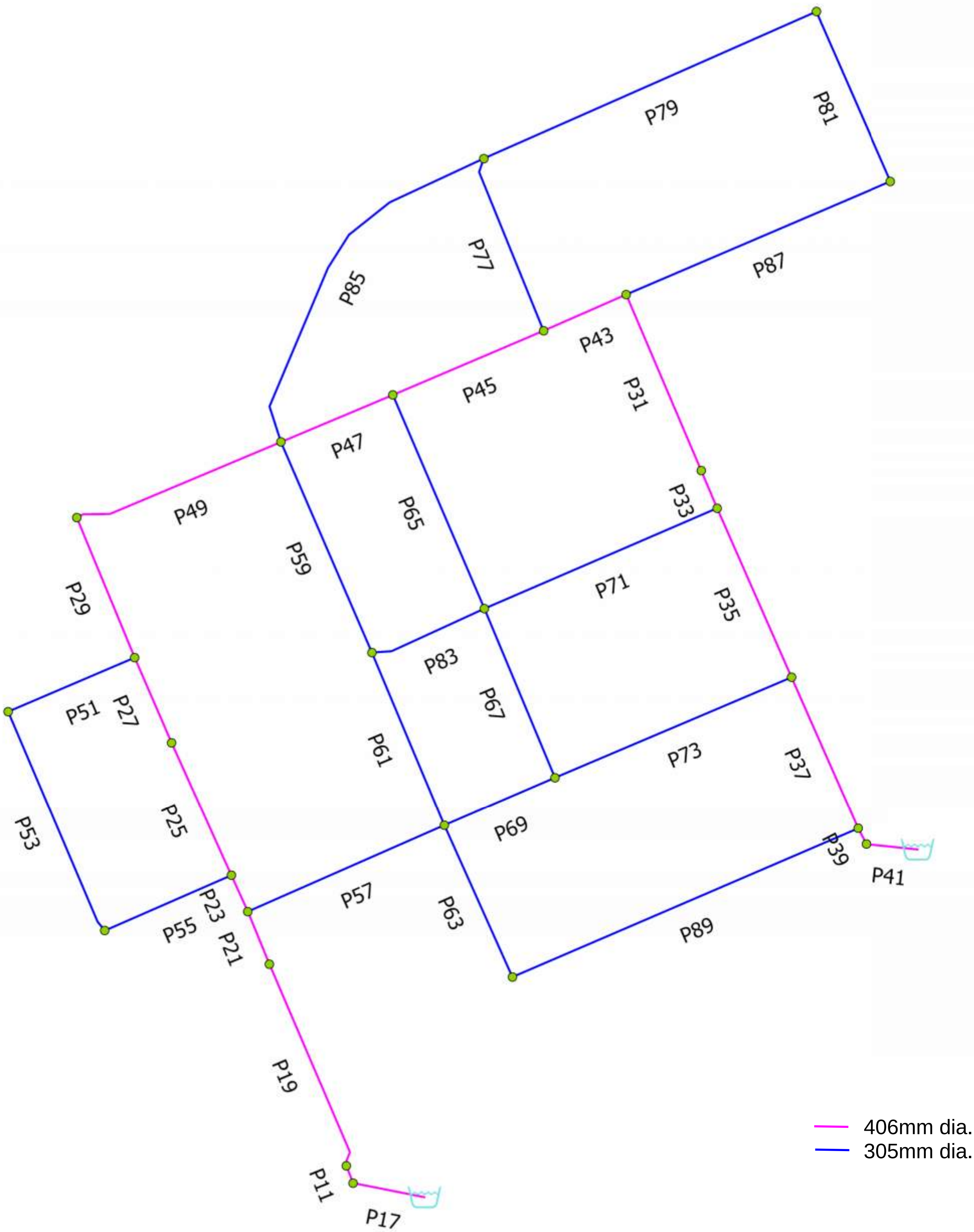
Single Family 10,000 l/min (166.7 l/s)
Semi Detached & Townhouse 10,000 l/min (166.7 l/s)
Medium Density 15,000 l/min (250 l/s)

Node IDs



J60
J62
J58
J56
J64
J38
J32
J54
J34
J52
J40
J36
J30
J48
J26
J28
J44
J42
J12
CONN2
J20
J18
J24
J16
J46
J14
J10
CONN1

Pipe IDs


P79
P81
P77
P87
P85
P43
P45
P31
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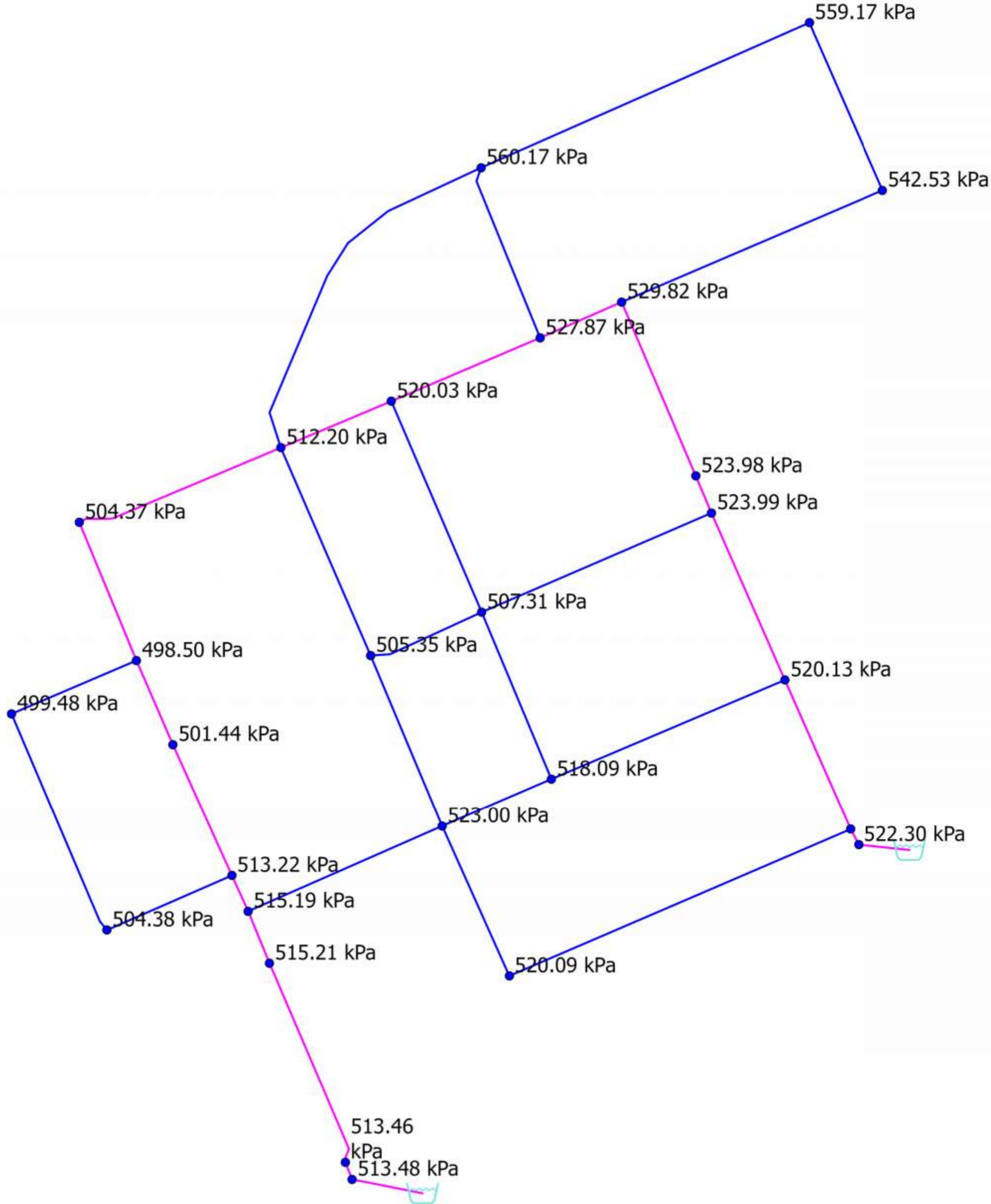
P61
P73
P37
P53
P25
P69
P39
P41
P57
P23
P55
P21
P63
P89
P19
P11
P17
406mm dia.
305mm dia.

Avg Day

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1	☐	J10	0.00	62.30	114.70	513.48
2	☐	J12	0.00	61.40	114.70	522.30
3	☐	J14	0.00	62.30	114.70	513.46
4	☐	J16	8.17	62.10	114.68	515.21
5	☐	J18	0.00	62.10	114.67	515.19
6	☐	J20	0.00	62.30	114.67	513.22
7	☐	J24	4.38	63.20	114.67	504.38
8	☐	J26	0.88	63.70	114.67	499.48
9	☐	J28	1.86	63.50	114.67	501.44
10	☐	J30	0.00	63.80	114.67	498.50
11	☐	J32	0.00	62.40	114.67	512.20
12	☐	J34	0.00	63.20	114.67	504.37
13	☐	J36	0.65	63.10	114.67	505.35
14	☐	J38	2.66	61.60	114.67	520.03
15	☐	J40	0.68	62.90	114.67	507.31
16	☐	J42	1.76	61.30	114.67	523.00
17	☐	J44	10.22	61.80	114.67	518.09
18	☐	J46	4.11	61.60	114.67	520.09
19	☐	J48	4.41	61.60	114.68	520.13
20	☐	J50	2.72	61.40	114.70	522.26
21	☐	J52	0.00	61.20	114.67	523.99
22	☐	J54	1.79	61.20	114.67	523.98
23	☐	J56	5.35	60.60	114.67	529.82
24	☐	J58	0.00	59.30	114.67	542.53
25	☐	J60	5.83	57.60	114.66	559.17
26	☐	J62	5.83	57.50	114.66	560.17
27	☐	J64	0.00	60.80	114.67	527.87

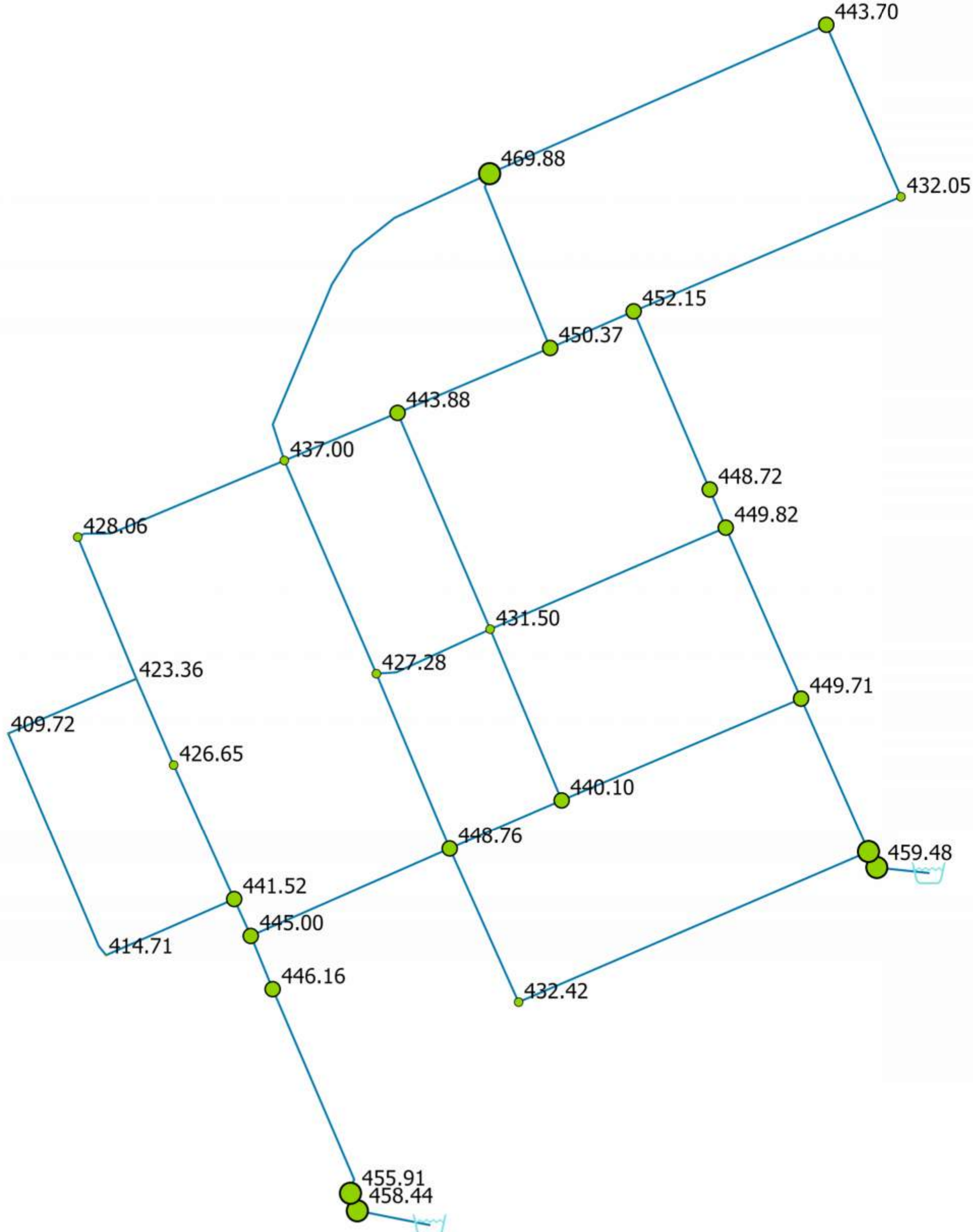
Avg Day


559.17 kPa
560.17 kPa
542.53 kPa
529.82 kPa
527.87 kPa
520.03 kPa
512.20 kPa
523.98 kPa
523.99 kPa
504.37 kPa
507.31 kPa
498.50 kPa
505.35 kPa
520.13 kPa
499.48 kPa
501.44 kPa
518.09 kPa
523.00 kPa
522.30 kPa
513.22 kPa
515.19 kPa
504.38 kPa
515.21 kPa
520.09 kPa
513.46
kPa
513.48 kPa

Max Day + Fireflow 15000 L/min

		ID	Static Demand (L/s)	Static Pressure (kPa)	Static Head (m)	Fire-Flow Demand (L/s)	Residual Pressure (kPa)	Hydrant Available Flow (L/s)	Hydrant Pressure at Available Flow (kPa)
1		J10	0.00	458.58	109.10	250.00	458.44	22,941.14	151.92
2		J12	0.00	459.58	108.30	250.00	459.48	20,676.75	151.55
3		J14	0.00	458.21	109.06	250.00	455.91	5,262.95	150.06
4		J16	20.42	455.85	108.62	250.00	446.16	1,992.49	149.97
5		J18	0.00	455.03	108.54	250.00	445.00	1,897.31	149.97
6		J20	0.00	452.84	108.51	250.00	441.52	1,744.34	149.97
7		J24	10.94	443.63	108.47	250.00	414.71	947.27	149.96
8		J26	2.19	438.55	108.45	250.00	409.72	923.00	149.96
9		J28	2.79	440.68	108.47	250.00	426.65	1,474.14	149.97
10		J30	0.00	437.51	108.45	250.00	423.36	1,458.62	149.97
11		J32	0.00	449.96	108.32	250.00	437.00	1,570.69	149.97
12		J34	0.00	442.87	108.39	250.00	428.06	1,412.41	149.97
13		J36	0.98	443.03	108.31	250.00	427.28	1,333.78	149.97
14		J38	6.61	457.63	108.30	250.00	443.88	1,541.94	149.97
15		J40	1.02	444.87	108.30	250.00	431.50	1,492.38	149.97
16		J42	4.40	460.74	108.32	250.00	448.76	1,635.33	149.97
17		J44	25.24	455.58	108.29	250.00	440.10	1,432.57	149.97
18		J46	10.25	457.62	108.30	250.00	432.42	1,021.50	149.96
19		J48	9.53	457.54	108.29	250.00	449.71	2,132.30	149.98
20		J50	4.08	459.57	108.30	250.00	458.16	5,330.68	150.07
21		J52	0.00	461.45	108.29	250.00	449.82	1,699.12	149.97
22		J54	4.44	461.43	108.29	250.00	448.72	1,615.23	149.97
23		J56	12.70	467.29	108.29	250.00	452.15	1,499.88	149.97
24		J58	0.00	479.89	108.27	250.00	432.05	746.01	149.96
25		J60	14.58	496.47	108.26	250.00	443.70	745.23	149.96
26		J62	14.58	497.57	108.28	250.00	469.88	1,092.00	149.96
27		J64	0.00	465.35	108.29	250.00	450.37	1,485.90	149.97

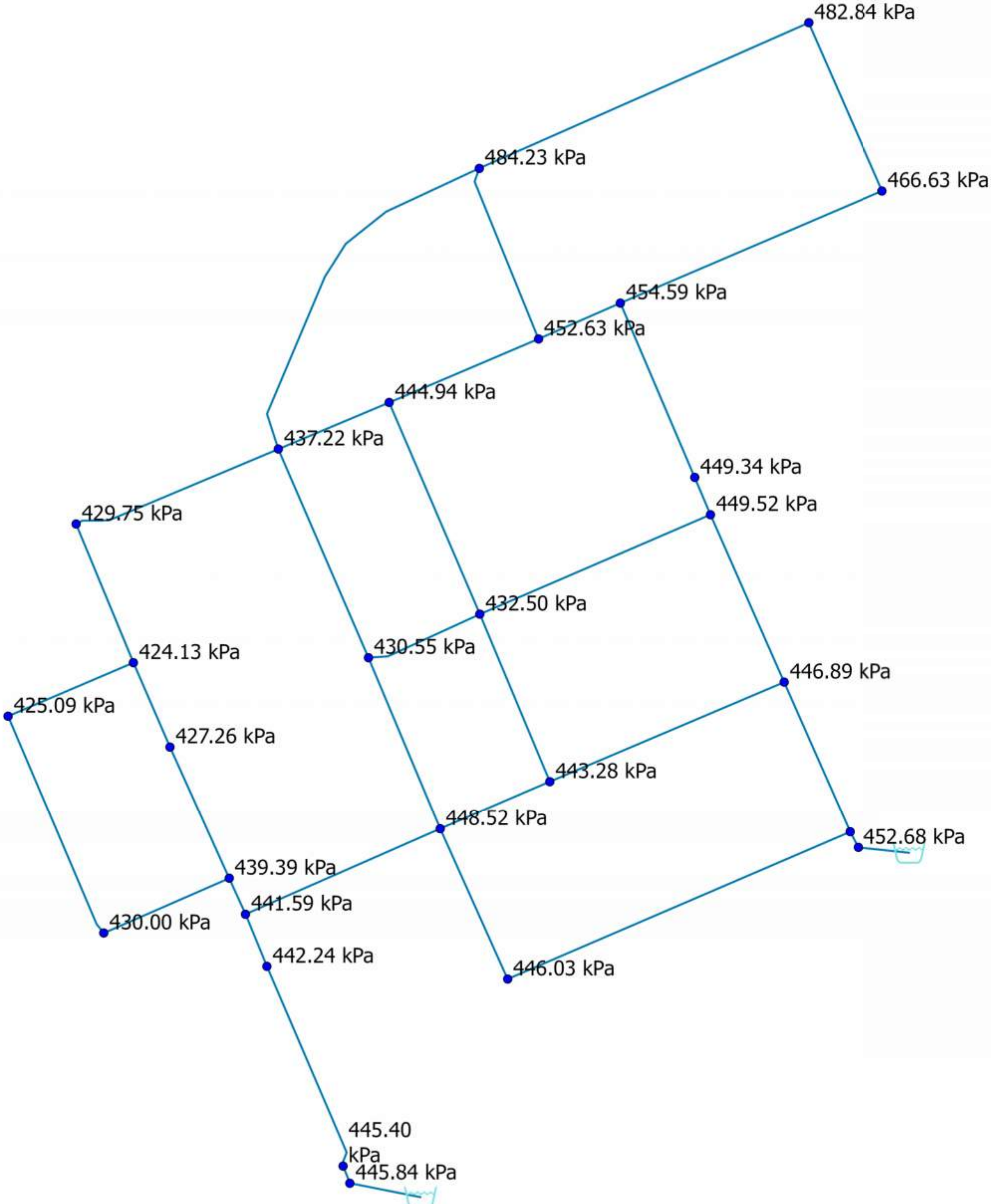
Residual Pressure



		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1		J10	0.00	62.30	107.80	445.84
2		J12	0.00	61.40	107.60	452.68
3		J14	0.00	62.30	107.75	445.40
4		J16	44.92	62.10	107.23	442.24
5		J18	0.00	62.10	107.16	441.59
6		J20	0.00	62.30	107.14	439.39
7		J24	24.06	63.20	107.08	430.00
8		J26	4.81	63.70	107.08	425.09
9		J28	5.03	63.50	107.10	427.26
10		J30	0.00	63.80	107.08	424.13
11		J32	0.00	62.40	107.02	437.22
12		J34	0.00	63.20	107.06	429.75
13		J36	1.76	63.10	107.04	430.55
14		J38	14.53	61.60	107.01	444.94
15		J40	1.84	62.90	107.04	432.50
16		J42	9.66	61.30	107.07	448.52
17		J44	55.35	61.80	107.04	443.28
18		J46	22.53	61.60	107.12	446.03
19		J48	20.08	61.60	107.20	446.89
20		J50	7.34	61.40	107.53	452.04
21		J52	0.00	61.20	107.07	449.52
22		J54	9.73	61.20	107.05	449.34
23		J56	27.52	60.60	106.99	454.59
24		J58	0.00	59.30	106.92	466.63
25		J60	32.08	57.60	106.87	482.84
26		J62	32.08	57.50	106.92	484.23
27		J64	0.00	60.80	106.99	452.63

		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	J14	J10	14.30	406.00	120.00	-138.49	1.07	0.04	3.12	Open	0
2	☐	P13	J10	CONN1	55.75	406.00	120.00	-14.19	0.11	0.00	0.05	Open	0
3	☐	P15	J10	J66	5.64	406.00	120.00	0.00	0.00	0.00	0.00	Open	0
4	☐	P17	J10	CONN1	1.00	406.00	120.00	-124.30	0.96	0.00	2.55	Open	0
5	☐	P19	J14	J16	167.52	406.00	120.00	138.49	1.07	0.52	3.12	Open	0
6	☐	P21	J16	J18	43.66	406.00	120.00	93.57	0.72	0.07	1.51	Open	0
7	☐	P23	J18	J20	30.49	406.00	120.00	67.51	0.52	0.03	0.82	Open	0
8	☐	P25	J20	J28	111.54	406.00	120.00	41.96	0.32	0.04	0.34	Open	0
9	☐	P27	J28	J30	71.07	406.00	120.00	36.93	0.29	0.02	0.27	Open	0
10	☐	P29	J30	J34	115.88	406.00	120.00	33.61	0.26	0.03	0.23	Open	0
11	☐	P31	J56	J54	146.54	406.00	120.00	-47.85	0.37	0.06	0.44	Open	0
12	☐	P33	J54	J52	31.19	406.00	120.00	-57.58	0.44	0.02	0.61	Open	0
13	☐	P35	J52	J48	141.44	406.00	120.00	-71.99	0.56	0.13	0.93	Open	0
14	☐	P37	J48	J50	126.61	406.00	120.00	-124.60	0.96	0.32	2.57	Open	0
15	☐	P39	J50	J12	13.63	406.00	120.00	-174.83	1.35	0.07	4.80	Open	0
16	☐	P41	J12	CONN2	1.00	406.00	120.00	-174.83	1.35	0.00	4.80	Open	0
17	☐	P43	J56	J64	69.09	406.00	120.00	1.09	0.01	0.00	0.00	Open	0
18	☐	P45	J64	J38	125.39	406.00	120.00	-23.88	0.18	0.02	0.12	Open	0
19	☐	P47	J38	J32	92.93	406.00	120.00	-24.66	0.19	0.01	0.13	Open	0
20	☐	P49	J34	J32	168.04	406.00	120.00	33.61	0.26	0.04	0.23	Open	0
21	☐	P51	J30	J26	105.32	305.00	120.00	3.32	0.05	0.00	0.01	Open	0
22	☐	P53	J26	J24	183.82	305.00	120.00	-1.49	0.02	0.00	0.00	Open	0
23	☐	P55	J24	J20	105.71	305.00	120.00	-25.55	0.35	0.06	0.55	Open	0
24	☐	P57	J18	J42	164.32	305.00	120.00	26.06	0.36	0.09	0.57	Open	0
25	☐	P59	J32	J36	175.49	305.00	120.00	-11.00	0.15	0.02	0.12	Open	0
26	☐	P61	J36	J42	143.54	305.00	120.00	-15.94	0.22	0.03	0.23	Open	0
27	☐	P63	J42	J46	127.45	305.00	120.00	-20.36	0.28	0.05	0.36	Open	0
28	☐	P65	J38	J40	177.92	305.00	120.00	-13.75	0.19	0.03	0.17	Open	0
29	☐	P67	J40	J44	140.29	305.00	120.00	2.00	0.03	0.00	0.00	Open	0
30	☐	P69	J44	J42	92.22	305.00	120.00	-20.82	0.28	0.03	0.38	Open	0
31	☐	P71	J40	J52	194.03	305.00	120.00	-14.42	0.20	0.04	0.19	Open	0
32	☐	P73	J44	J48	196.71	305.00	120.00	-32.53	0.45	0.17	0.86	Open	0
33	☐	P77	J64	J62	142.14	305.00	120.00	24.97	0.34	0.07	0.53	Open	0
34	☐	P79	J62	J60	278.28	305.00	120.00	12.84	0.18	0.04	0.15	Open	0
35	☐	P81	J60	J58	141.88	305.00	120.00	-19.24	0.26	0.05	0.32	Open	0
36	☐	P83	J36	J40	93.30	305.00	120.00	3.18	0.04	0.00	0.01	Open	0
37	☐	P85	J62	J32	293.08	305.00	120.00	-19.95	0.27	0.10	0.35	Open	0
38	☐	P87	J56	J58	220.23	305.00	120.00	19.24	0.26	0.07	0.32	Open	0
39	☐	P89	J46	J50	288.23	305.00	120.00	-42.89	0.59	0.41	1.43	Open	0

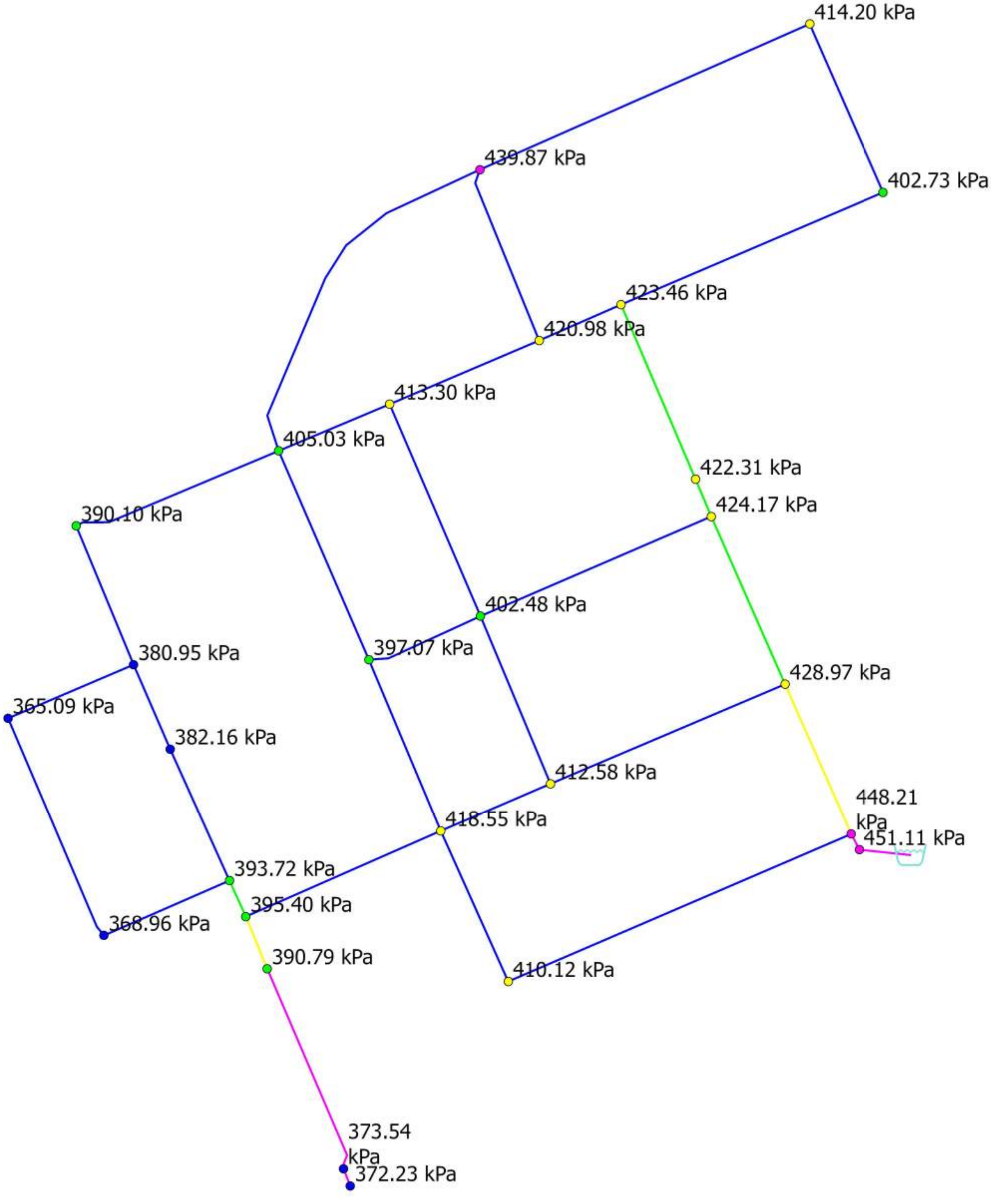
Peak Hour



482.84 kPa
484.23 kPa
466.63 kPa
454.59 kPa
452.63 kPa
444.94 kPa
437.22 kPa
449.34 kPa
449.52 kPa
429.75 kPa
432.50 kPa
424.13 kPa
430.55 kPa
446.89 kPa
425.09 kPa
427.26 kPa
443.28 kPa
448.52 kPa
452.68 kPa
439.39 kPa
441.59 kPa
430.00 kPa
442.24 kPa
446.03 kPa
445.40 kPa
445.84 kPa

Fireflow without Conn 1

		ID	Static Demand (L/s)	Static Pressure (kPa)	Static Head (m)	Fire-Flow Demand (L/s)	Residual Pressure (kPa)	Hydrant Available Flow (L/s)	Hydrant Pressure at Available Flow (kPa)
1	☐	J10	0.00	444.68	107.68	250.00	372.23	583.19	149.96
2	☐	J12	0.00	458.26	108.17	250.00	451.11	2,610.82	149.99
3	☐	J14	0.00	444.68	107.68	250.00	373.54	590.56	149.96
4	☐	J16	20.42	446.64	107.68	250.00	390.79	727.17	149.96
5	☐	J18	0.00	446.68	107.68	250.00	395.40	751.03	149.96
6	☐	J20	0.00	444.72	107.68	250.00	393.72	751.01	149.96
7	☐	J24	10.94	435.85	107.68	250.00	368.96	618.58	149.96
8	☐	J26	2.19	430.99	107.68	250.00	365.09	607.39	149.96
9	☐	J28	2.79	432.98	107.68	250.00	382.16	735.77	149.96
10	☐	J30	0.00	430.06	107.69	250.00	380.95	746.95	149.96
11	☐	J32	0.00	443.97	107.71	250.00	405.03	909.68	149.96
12	☐	J34	0.00	436.01	107.69	250.00	390.10	791.68	149.96
13	☐	J36	0.98	437.33	107.73	250.00	397.07	860.99	149.96
14	☐	J38	6.61	451.84	107.71	250.00	413.30	936.15	149.96
15	☐	J40	1.02	439.33	107.73	250.00	402.48	925.54	149.96
16	☐	J42	4.40	455.02	107.73	250.00	418.55	969.81	149.96
17	☐	J44	25.24	450.12	107.73	250.00	412.58	956.09	149.96
18	☐	J46	10.25	452.81	107.81	250.00	410.12	826.62	149.96
19	☐	J48	9.53	453.57	107.89	250.00	428.97	1,270.02	149.97
20	☐	J50	4.08	457.81	108.12	250.00	448.21	2,210.03	149.98
21	☐	J52	0.00	456.47	107.78	250.00	424.17	1,056.40	149.96
22	☐	J54	4.44	456.34	107.77	250.00	422.31	1,022.96	149.96
23	☐	J56	12.70	461.72	107.72	250.00	423.46	963.58	149.96
24	☐	J58	0.00	474.26	107.70	250.00	402.73	620.32	149.96
25	☐	J60	14.58	490.79	107.68	250.00	414.20	628.84	149.96
26	☐	J62	14.58	491.84	107.69	250.00	439.87	818.74	149.96
27	☐	J64	0.00	459.70	107.71	250.00	420.98	939.45	149.96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439.87 kPa
402.73 kPa
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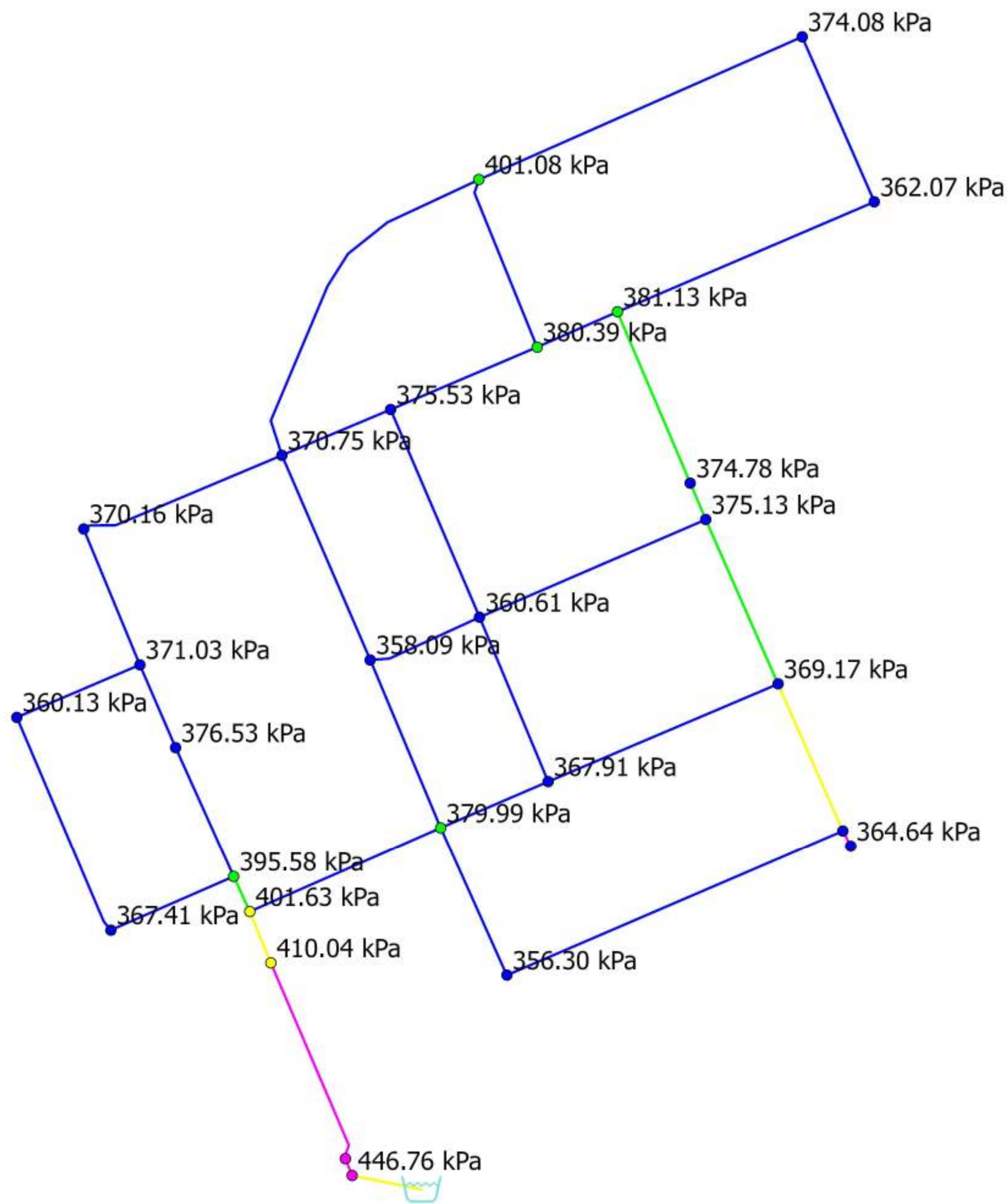
390.10 kPa
402.48 kPa
397.07 kPa
380.95 kPa
428.97 kPa
365.09 kPa
382.16 kPa
412.58 kPa
448.21 kPa
418.55 kPa
451.11 kPa
393.72 kPa
395.40 kPa
368.96 kPa
390.79 kPa
410.12 kPa
373.54 kPa
372.23 kPa

Fireflow without Conn 2

		ID	Static Demand (L/s)	Static Pressure (kPa)	Static Head (m)	Fire-Flow Demand (L/s)	Residual Pressure (kPa)	Hydrant Available Flow (L/s)	Hydrant Pressure at Available Flow (kPa)
1	☐	J10	0.00	456.76	108.91	250.00	446.76	2,151.16	149.98
2	☐	J12	0.00	455.05	107.84	250.00	364.64	548.39	149.96
3	☐	J14	0.00	456.28	108.86	250.00	443.72	1,884.51	149.97
4	☐	J16	20.42	452.68	108.30	250.00	410.04	928.14	149.96
5	☐	J18	0.00	451.59	108.18	250.00	401.63	819.21	149.96
6	☐	J20	0.00	449.33	108.15	250.00	395.58	777.96	149.96
7	☐	J24	10.94	440.02	108.10	250.00	367.41	614.71	149.96
8	☐	J26	2.19	434.86	108.08	250.00	360.13	588.81	149.96
9	☐	J28	2.79	437.03	108.10	250.00	376.53	703.92	149.96
10	☐	J30	0.00	433.77	108.07	250.00	371.03	680.53	149.96
11	☐	J32	0.00	445.70	107.88	250.00	370.75	620.73	149.96
12	☐	J34	0.00	438.92	107.99	250.00	370.16	646.61	149.96
13	☐	J36	0.98	438.72	107.87	250.00	358.09	576.83	149.96
14	☐	J38	6.61	453.29	107.86	250.00	375.53	620.64	149.96
15	☐	J40	1.02	440.51	107.85	250.00	360.61	585.42	149.96
16	☐	J42	4.40	456.44	107.88	250.00	379.99	628.75	149.96
17	☐	J44	25.24	451.18	107.84	250.00	367.91	605.87	149.96
18	☐	J46	10.25	453.20	107.85	250.00	356.30	528.27	149.96
19	☐	J48	9.53	453.08	107.84	250.00	369.17	589.26	149.96
20	☐	J50	4.08	455.05	107.84	250.00	365.88	558.48	149.96
21	☐	J52	0.00	457.01	107.84	250.00	375.13	595.82	149.96
22	☐	J54	4.44	457.00	107.84	250.00	374.78	598.39	149.96
23	☐	J56	12.70	462.88	107.84	250.00	381.13	617.25	149.96
24	☐	J58	0.00	475.50	107.82	250.00	362.07	485.31	149.96
25	☐	J60	14.58	492.09	107.82	250.00	374.08	502.76	149.96
26	☐	J62	14.58	493.21	107.83	250.00	401.08	598.93	149.96
27	☐	J64	0.00	460.97	107.84	250.00	380.39	608.38	149.96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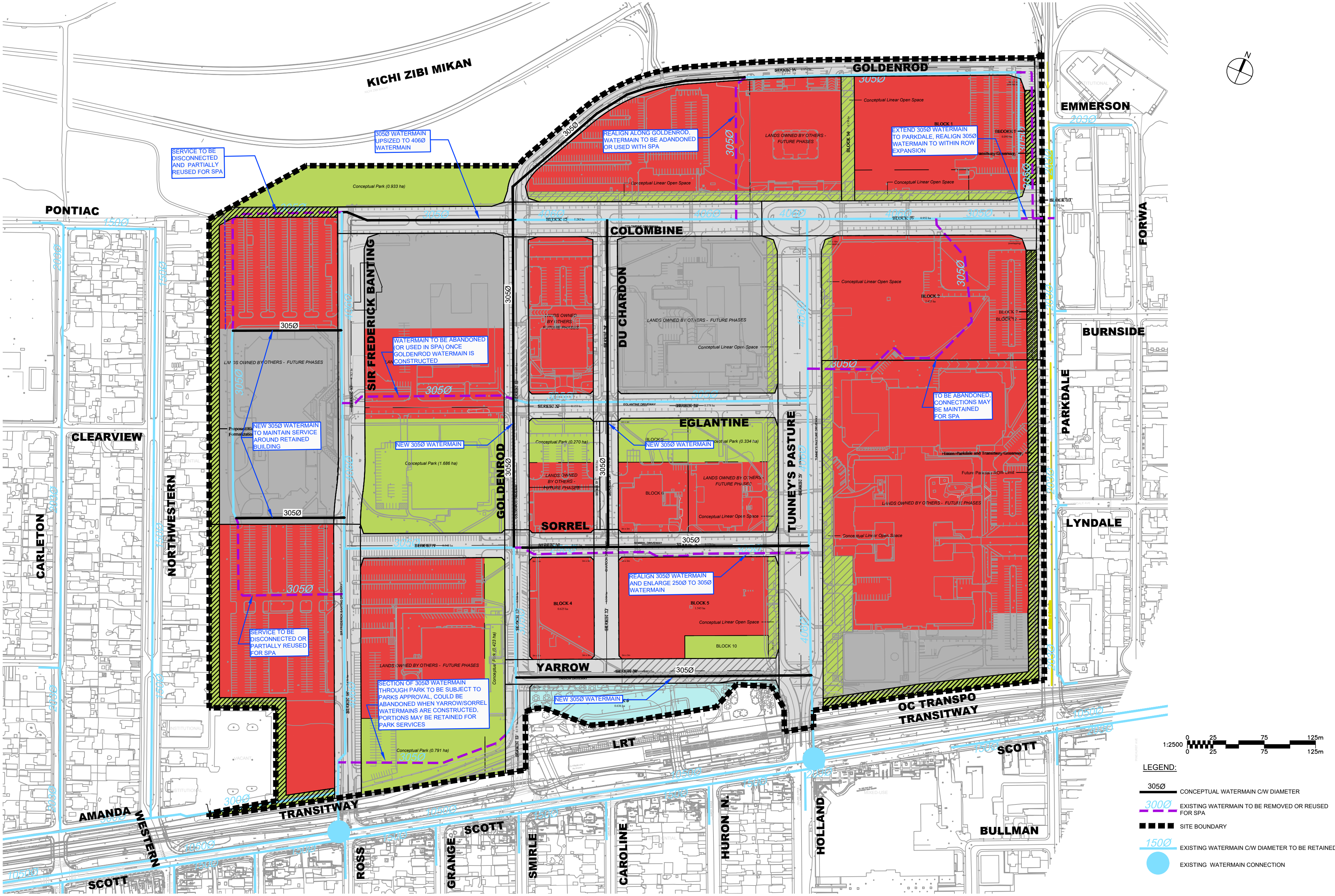

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ARCADIS

Project Title

Tunney's Pasture

Site Servicing and Public Road Redevelopment

Prepared for Canada Lands & Public Service and Procurement Canada

Drawing Title

Conceptual Watermain Infrastructure

Sheet No.

Figure 3

March 25, 2026

Tunney's Pasture Redevelopment – Existing Watermain Conveyance

Meeting Date: January 6, 2026
Time: 4:02 PM – 4:50 PM
Location: Virtual (Microsoft Teams)

Attendees

City of Ottawa

- **Amy Whelan** – Prj Mgr, Infrastructure Approvals
- **Andrea Feilders** – Senior Engineer, Infrastructure Renewal
- **Derek Phillips** – Prg Mgr, Infra Renewal-Water Systems (T)
- **John Wu** – Sr Engineer Infrastructure Applications
- **Brian Soehodho** – Prg Eng, Asset Reliability-FAC/NET System

Consultant / Proponent Team

- **Demetrius Yannoulopoulos** – Arcadis (on behalf of Canada Lands Company)

Others Referenced

- PSPC (Public Services and Procurement Canada)
- Health Canada
- Canada Lands Company (CLC)

Purpose of Meeting

To discuss the proposed approach for conveyance of existing private watermain infrastructure within the Tunney's Pasture redevelopment to the City of Ottawa, including:

- Which watermains may be retained, replaced, or remain private
- Required documentation and condition assessment
- Phasing and connection strategy
- Financial considerations associated with accepting existing assets

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Summary of Key Discussion Points

1. Overview of Existing Watermain Network and Redevelopment Strategy

- Approximately **4 km of existing watermain** exists across the Tunney's Pasture campus.
- Watermains fall into three categories:
  - **Proposed for retention and conveyance to the City** (within future municipal rights-of-way)
  - **To be removed and replaced** (due to location conflicts, sizing, looping requirements, or condition)
  - **To remain private** (servicing parcels retained under private ownership)
- Arcadis presented mapping identifying retained (red), replaced (black), and private watermains.

2. High-Level Conveyance Framework (Three-Step / "Gate" Approach)

The City outlined a high-level framework for potential acceptance of existing watermains:

Gate 1 – Documentation Review

- Confirmation of:
  - Pipe material
  - Installation year / age
  - As-built drawings
  - QA/QC and construction records
- If documentation cannot be provided, **default position is full replacement**.

Gate 2 – Condition Assessment

- Type of condition assessment to be determined based on material, age, and available records.
- City noted that there is **no formal program for condition assessment of small diameter watermains**, and approaches would need to be developed on a case-by-case basis.
- Potential tools discussed (acknowledged as limited):

- Review of removed pipe segments during replacement
- Selective sampling during early construction phases
- Leak detection and hydraulic testing (noting limitations as point-in-time indicators)

Gate 3 – Financial Consideration

- Financial compensation would be required where the City accepts assets that are partially through their service life.
- No clear City precedent was identified.
- Arcadis suggested a **pro-rated lifecycle approach** (e.g., remaining life relative to assumed 100-year design life).
- Questions remain regarding:
    - Appropriate valuation methodology
    - Where funds would be held and how they could be used (DC vs renewal limitations)

3. Phasing and Registration Strategy

- Redevelopment will proceed in **multiple phases over several years**.
- Acceptance of watermains would occur at **detailed design / phase registration**, not at draft plan approval.
- Key principles agreed upon:
    - Each phase must connect **public watermain to public watermain**
    - No permanent condition where City-owned watermains are fed solely by private infrastructure
    - Clear identification in each phase of what infrastructure is public vs private
- Arcadis confirmed an **"outside-in" phasing strategy** and will document this in the APSR.

4. Design Standards and Compatibility

- Retained infrastructure must meet **current City standards**, including:
    - Valve configuration and operation

- Hydrant spacing and location
- Isolation and operational requirements

- It was acknowledged that:
  - Existing hydrants and valves will largely require relocation or replacement
  - Historic installations often do not meet current **2.4 m cover** requirements
  - Depth of cover concerns will require further review by Drinking Water Services

5. Services, Connections, and Blanking

- City expressed concern regarding:
  - Number of historical connections, blankings, and future modifications
  - Impact on long-term integrity of retained watermains
- Additional hydrants and service modifications may push retained segments beyond acceptable thresholds.
- Redundancy requirements for buildings (second services) were noted.
- General consensus that:
  - Where significant modifications are required, **replacement is likely preferable**
  - Retention decisions should consider proximity to LID features and future surface works

6. Records and As-Built Information

- Arcadis has experienced difficulty obtaining as-built records from PSPC.
- City emphasized that **records are critical** to any decision to retain infrastructure.
- Action identified for both Arcadis and the City to search available archives.

Deliverables and Action Items

Arcadis / Canada Lands Company

1. **As-Built Documentation**

- Continue efforts with PSPC to obtain:
  - As-builts
  - Installation dates
  - Pipe material and QA/QC records

2. **Financial Consideration Proposal**
   - Research precedents from other municipalities and Arcadis projects
   - Develop a proposed methodology for lifecycle-based financial compensation
   - Submit summary to City for internal review
3. **APSR Updates**
   - Document:
     - Watermain conveyance framework (Gate 1–3 process)
     - Phasing strategy and public vs private infrastructure identification
     - Principles governing retention vs replacement
4. **Draft Acceptance / Evaluation Matrix**
   - Outline criteria for assessing existing watermains, including:
     - Documentation requirements
     - Condition considerations
     - Depth of cover
     - Number of connections/blankings
     - Extent of required modifications

City of Ottawa

1. **Internal Records Search**
   - Investigate whether historical as-built records for Tunney's Pasture watermains exist within City archives
2. **Internal Review and Feedback**

- Review Arcadis' proposed financial strategy and acceptance matrix once received
- Consult Drinking Water Services regarding depth of cover and mitigation considerations

3. **Follow-Up Meeting**
    - Schedule a follow-up discussion once:
        - Financial proposal is developed
        - Documentation availability is clarified

Next Steps

- Arcadis to circulate proposed financial and technical framework by email
- City to review internally and provide consolidated feedback
- Follow-up meeting to be scheduled as required

Prepared by: Amy Whelan

APPENDIX 3

Annex A
Terms of Reference

INTRODUCTION

The City of Ottawa requires the installation and maintenance of temporary flow monitors to characterize existing flow conditions within the City's sewer systems in ongoing areas of interest, for both spring and summer flow periods. Other types of monitoring would include: level/surcharge monitoring; dye testing and rainfall monitoring.

General Monitoring Requirements

The following requirements are applicable to all flow monitoring projects:

Site Inspections

The consultant will visit and assess each site to support project needs; this may include, as required, field verification; measurements; documentation of the existing topographical survey surface features, municipal infrastructure and utilities, condition assessment etc. In response to a standing offer request, the consultant shall identify the scope of proposed initial field investigation/site inspections/surveys and meetings with City staff for data collection.

Monitoring Devices and Data Quality Control

A minimum of twice-weekly site visits will be required until it is certain that the equipment is functioning properly. Weekly visits will be required afterwards along with regular pre-processing of the data. If telemetry equipment is used, site visits may be reduced to once every two weeks. Site visits will include well-documented manual depth measurements.

Flow monitoring, unless circumstances dictate otherwise, will be conducted with calibrated primary devices such as a flume or weir appropriate to the site. Where possible, a combination of a primary device and a depth-velocity meter is preferred over an installation with simply a depth-velocity meter or a depth meter with primary device.

Flow monitoring sites employing only a depth-velocity meter (or a non-standard weir or flume shape) will be calibrated using a dye-dilution test procedure over a sufficient range of depths to produce an accurate depth-discharge curve for the site. Where a calibrated primary device is being used in conjunction with a depth-velocity or a depth only meter, a dye-dilution test will not be required. Dye testing dates are to be coordinated with the City to prevent possible conflicts with dye testing efforts at the City's permanent monitoring locations.

It will be incumbent upon the consultant to provide immediate replacement of flow monitoring equipment if a malfunction is detected. Should excessive errors or lack of accurate data be found at a site because of equipment malfunction, the City and the area municipality will not consider it a valid site and refuse payment.

At this time, City approved devices include: ADS meters, Sigma meters, Surveyloger meters, FlowPro DV meters and Greyline meters. If any other meter is to be used, it must first be approved by the City.

Permanent Flow Monitoring Locations

The City will require that any permanent flow stations in the area be used to check the general validity of the temporary sites.

Annex A
Terms of Reference

Rainfall Information

Rainfall information will be collected by the City and will be made available to the consultant to plot with the total flow hydrographs for the final report. Rainfall information is available in both standard rain-gauge format, or in digital radar rainfall format. In some cases the Consultant will be required to install and maintain a rain gauge meeting City standards.

Duration of Monitoring

The monitoring period will be measured in months, and typically ranges from one to three months in duration, but could be up to 6 months. The City reserves the right to extend or reduce the duration of monitoring.

Sewer Access Requirements

Please see Flow Monitoring Safety and Procedures Plan below.

Participation by the City

The City will provide all available information related to the study area but will not participate directly in the work.

The City reserves the right to request the calibrated data from any site at any point during the monitoring program. The City may also, at its discretion, perform verification work on the equipment by conducting on-site calibration checks and request to inspect the sites with the Consultants.

Reports

A flow monitoring report shall be prepared at the completion of the data collection period. Four copies of each report shall be provided to the City, including a digital PDF copy of the report . Each report shall include, but not be limited to, the following:

For each monitoring site:

1. Site description for each site, including but not limited to:
   - Site Location Plan;
   - Equipment used and date of installation/removal;
   - Discussion of relevant and noteworthy site and installation details;
   - Relevant and noteworthy site observations during installation(s) and removal(s);
   - Details regarding equipment failure and replacement;
   - Photo of flow monitor installation; and
   - Sketch showing installation of monitoring equipment, weir or flume, with relevant dimensions;

2. Meteorological Data (rainfall, significant rain events, temperature and snowmelt, etc.)

3. Calibration:

   - Primary device equations and curves, along with details regarding source and/or determination of equations/curves; discussion on limitations of the equations/curves.

Annex A
Terms of Reference

- Dye-calibrated stage-discharge curves for any sites using depth-velocity meters. Comparison with a theoretical Manning's computation at sites where only depth-velocity meters are applied.

4. Data Correction and Commentary; includes discussion and details of any changes made to depth and velocity raw data to obtain final, calibrated values.

5. Analysis:
   - Methodology;
   - Site-by-site average daily dry weather flow;
   - Site-by-site extraneous flows and peak extraneous flow;

6. Site-by-site completeness of data, i.e. fraction of total monitoring period for which good data is available; and

7. Site-by-site list of continuous periods of good reliable data, and continuous periods of bad data or missing data along with explanatory notes.

8. Summary and Conclusions

9. Also to be included in the report are weekly hardcopy plots of flow monitoring data at each site including;
   - depth and velocity plots (plotted together),
   - depth and velocity scattergraphs,
   - total flow hydrographs, with rainfall given on an inverted axis.
   - Flow Separation Hydrographs

10. Compact Disk with raw and adjusted data in MS-Excel format that has:
    - Time System: The time system should always be Eastern Standard Time or local time
    - Column Descriptions: Each data column should have a description to indicate what it means.
    - Final Flow Column: There should be a final flow column that represents the best of all flows from the different measurement methods; if one method is always best, it should be identified as such, or if what is best varies from one period to another, there should be a special column that represents the best pick overall time
    - Ideally there should be a final column for depth and velocity as well.
    - Calculation formulas: leave formulas in the data sheet or at least provide documentation about how each column is calculated.
    - Meaningful site names: Where possible use street name, structure name, or function (like Hemlock Overflow) instead of site1, site2, etc., or ask us what they should be called.
    - The consultant should also provide easting and northing coordinates for each site. These can be requested from the City.

11. Documentation of field observations and manual measurements collected by the contractor during the flow monitoring period. The approach to determining the necessary offsets shall also be clearly documented.

Meetings

Up to three project meetings with City staff may be required. These canl occur at startup, after about 50% of the monitoring is completed, and following completion of the draft report(s). Draft reports are to be submitted within 4 weeks of the end of the monitoring period.

Annex A
Terms of Reference

Flow Monitoring Safety and Procedures Plan

Each contractor is responsible in preparing a **"Flow Monitoring Safety and Procedures Plan"** as indicated below:

- Prepare and submit for City approval a detailed **"Flow Monitoring Safety and Procedures Plan"**. This plan will include as a minimum:
  A. Introduction
  B. Organizational roles, responsibilities, experience and training for on-site and support staff
  C. Description of chain of command and accountability for health and safety activities
  D. Well-defined performance standards related to health and safety activities (i.e. safety meetings, inspections, etc.)
  E. Hazard recognition, assessment and control plan/procedures, which address primary environmental hazards, personal conduct and hygiene, as well as potential hazards. These might include, and not necessarily be limited to :
     (1) Performing work on or adjacent to roadways
     (2) Fire and Explosion
     (3) Falling debris
     (4) Confined Space Entry
     (5) Ladders or climbing (fall protection)
     (6) Energy sources (lockout/tagout)
     (7) Work around water
     (8) Biological
     (9) Stress and Fatigue
     (10) Noise
     (11) Thermal Extremes
     (12) Adverse Weather Conditions
     (13) Other hazards.

  F. Personal Protective Equipment Requirements, Selection, Maintenance and Continual Assessment;
     (1) Eye/face
     (2) Head
     (3) Foot
     (4) Hand
     (5) Hearing
     (6) Respiratory
     (7) Clothing/Body
     (8) Reflective Vest
     (9) Other
  G. An Emergency Preparedness and Response Plan, which addresses
     (10) First aid
     (11) Fire Protection
     (12) Critical Injury
     (13) Accident or Incident

The plan shall be readily available at the work site(s) prior to commencement of work. All works shall follow the procedures outlined within the plan. If asked, the consultant must make available for review documentation such as training records, respirator fit testing records, etc.

Annex A
Terms of Reference

- Obtain Safe Work Permits from City of Ottawa. This will require a meeting attended by all contractor staff that will perform fieldwork and City staff designated by the City's Project Manager. The purpose of the meeting will be for the Contractor to present, in detail, the Health and Safety Plan to all workers. This meeting will be followed by a field visit with City staff.
- Undertake site investigations as necessary to support project needs; this may include field verification and documentation of the existing topographical survey, surface features, municipal infrastructure and utilities, condition assessment etc. In response to this RFP, proponents shall identify the scope of proposed initial field investigation/site inspections/surveys and meetings with City staff for data collection.

Notes:

- Site investigations may be required at various stages of the project.
- Inspection of regulators, chambers and, if required, sewers will include confined space entry procedures.
- The Contractor shall ensure that all services are provided in a manner that complies with the Occupational Health and Safety Act, R.S.O. 1990, c.O.1, as amended, and the regulations made there under. The contractor will be responsible for supplying their own safety equipment where required and have the appropriate skills, experience and training for the work to be undertaken.
- The City reserves the right to suspend work should the Contractor not be able provide WSIB coverage or proof of WSIB coverage.

Annex A
Terms of Reference

Basis of Payment:
The Offerer offers to provide the services detailed herein under Annex A, and as further detailed in the Offerer's offer, to the acceptance of the stated Project and Contracting Authority in accordance with the following rates and shall remain FIRM for the proposed Standing Offer period:

Schedule A

Site Costs	**Unit Cost (per site)**				
	1 Site	2 Sites	3 Sites	4 Sites	5 or More Sites
Project management					
Meetings (up to 3)					
Reports					
Site Inspection					
Equipment Procurement					
Equipment Preparation (AV meter+ Weir or Flume)					
Installation					
Removal					
Miscellaneous Expenses					
Total					

Schedule B

Monthly Costs	**Monthly Cost (per site)**				
	1 site	2 sites	3 sites	4 sites	5 or More sites
On-Site Maintenance					
Data pre-processing and quality control					
AV Meter (**Type: ***)					
Primary Device – Weir**					
Safety Equipment					
Miscellaneous					
Total AV + Weir					

*** Must be approve AV Meter**

**** Cost of Flumes to be negotiated if required.**

For Supply Use Only:
Evaluation (For Comparison Purposes Only)
Total Cost for 5 Sites (A+B) $_______________

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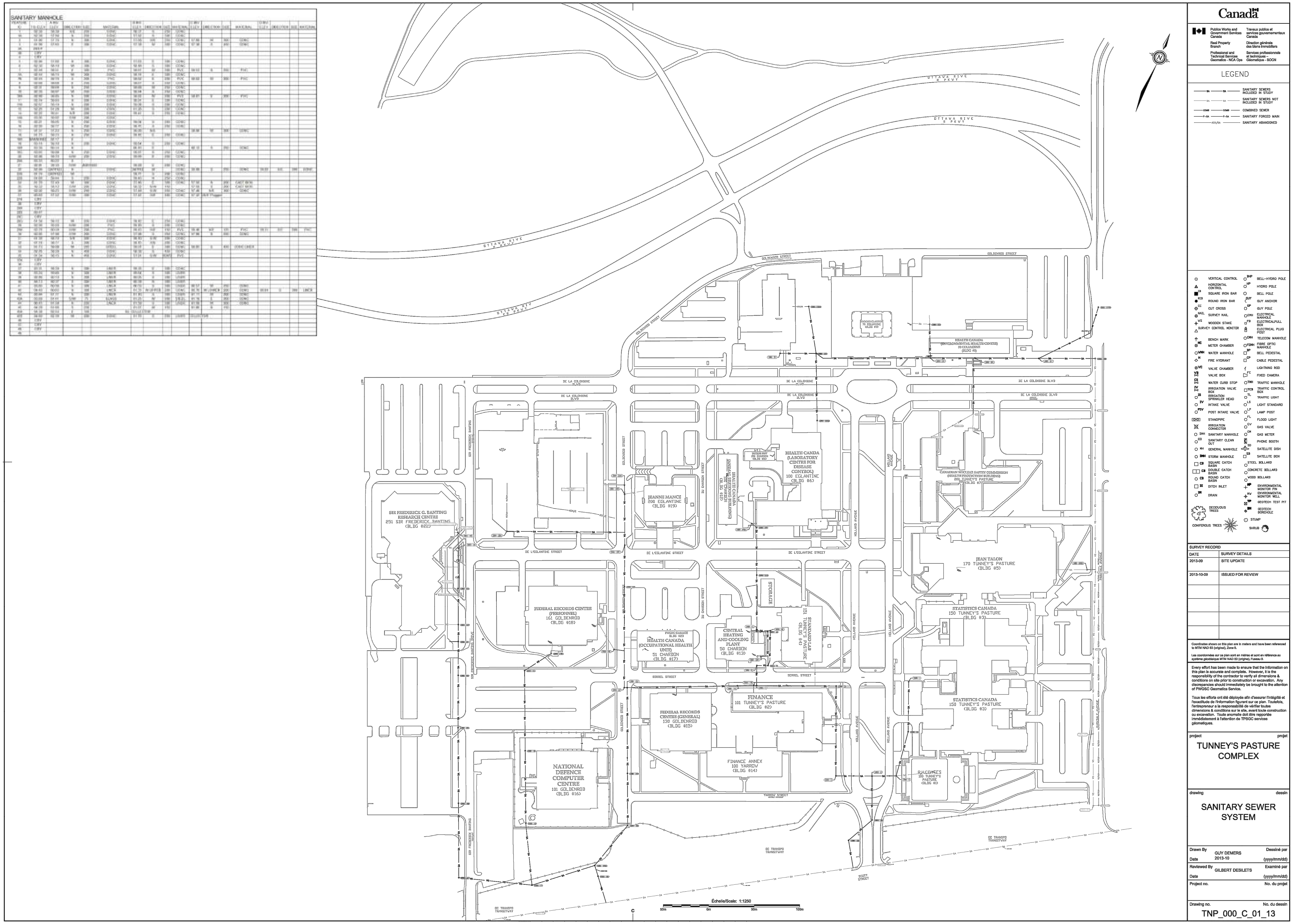


Project Title

Tunney's Pasture

Site Servicing and Public Road Redevelopment

Prepared for Canada Lands Company & Public Service and Procurement Canada

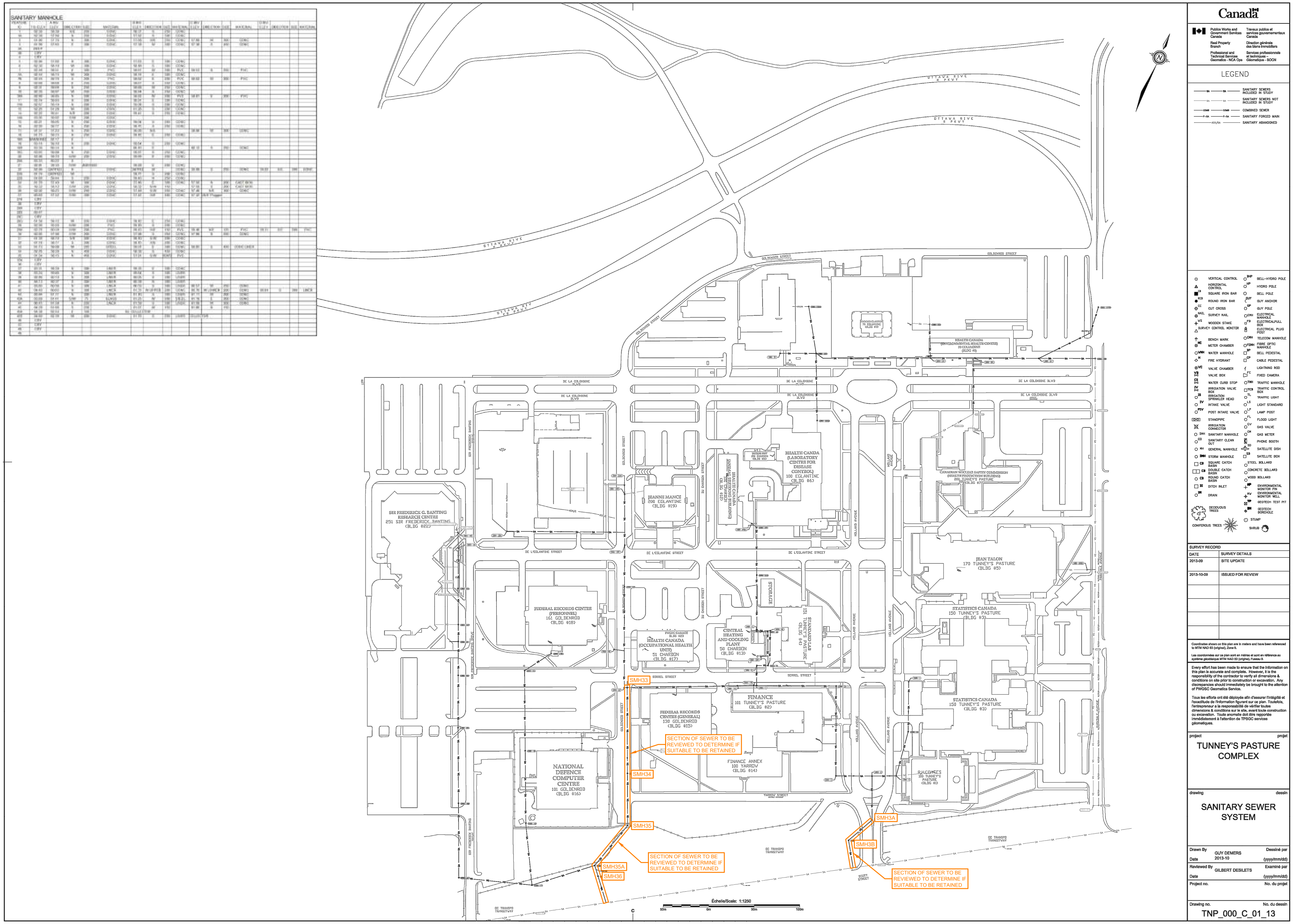
Drawing Title

Existing Sanitary Infrastructure

Sheet No.

Figure 4

March 25, 2026



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ARCADIS

Project Title

Tunney's Pasture

Site Servicing and Public Road Redevelopment

Prepared for Canada Lands Company & Public Service and Procurement Canada

Drawing Title

Existing Sanitary Infrastructure to be Retained

Sheet No.

Figure 4A

March 25, 2026

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Project Title

Tunney's Pasture

Site Servicing and Public Road Redevelopment

Prepared for Canada Lands Company & Public Service and Procurement Canada

Drawing Title

Conceptual Sanitary Infrastructure

Sheet No.

Figure 5

March 25,2026

ARCADIS

Arcadis Canada Inc.
500-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
arcadis.com

CONCEPTUAL SANITARY SEWER DESIGN SHEET

Tunney's Pasture
Ottawa
CLC

LOCATION: STREET	LOCATION: AREA ID	LOCATION: FROM MH	LOCATION: TO MH	RESIDENTIAL: AREA w/ Units (Ha)	UNIT TYPES: SF	UNIT TYPES: SD	UNIT TYPES: TH	UNIT TYPES: APT	AREA w/o Units (Ha)	POPULATION: IND	POPULATION: CUM	RES PEAK FACTOR	PEAK FLOW (L/s)	ICI AREAS: ICI AREA Ha	INSTITUTIONAL: IND	INSTITUTIONAL: CUM	EMPLOYMENT: IND	EMPLOYMENT: CUM	RETAIL: IND	RETAIL: CUM	ICI PEAK FACTOR	PEAK FLOW (L/s)	INFILTRATION ALLOWANCE: AREA (Ha) IND	AREA (Ha) CUM	FLOW (L/s)	FIXED FLOW (L/s): IND	FIXED FLOW (L/s): CUM	TOTAL FLOW (L/s)	PROPOSED SEWER DESIGN: CAPACITY (L/s)	LENGTH (m)	DIA (mm)	SLOPE (%)	VELOCITY (full) (m/s)	AVAILABLE CAPACITY: L/s	AVAILABLE CAPACITY: (%)
Colombine	5	5	6	4.59						2700.0	2700.0	3.48	30.46		0.00	0.00	0.00	0.00	0.00	0.00	1.50	0.00	4.59	4.59	1.51	0.00	0.0	31.97	48.38	182.00	300	0.23	0.663	16.41	33.92%
Parkdale		6	36988	1.27						1350.0	4050.0	3.33	43.69		0.00	0.00	0.00	0.00	0.00	0.00	1.50	0.00	1.27	5.86	1.93	0.00	0.0	45.62	96.79	30.30	375	0.28	0.849	51.17	52.87%
Parkdale		36988	36986	0.00						0.0	4050.0	3.33	43.69		0.00	0.00	0.00	0.00	0.00	0.00	1.50	0.00	0.00	5.86	1.93	0.00	0.0	45.62	100.18	177.00	375	0.30	0.879	54.56	54.46%
SF Banting	1	1	2	2.15						270.0	270.0	4.00	3.50			0.00		0.00	0.00	0.00	1.00	0.00	2.15	2.15	0.71	0.00	0.0	4.21	62.04	100.00	250	1.00	1.224	57.83	93.21%
SF Banting	2	2	3							0.0	270.0	4.00	3.50	5.96	750.00	750.00	2145.00	2145.00	0.00	0.00	1.50	3.96	5.96	8.11	2.68	0.00	0.0	10.14	55.26	190.00	300	0.30	0.757	45.11	81.65%
SF Banting	3	3	4	7.28						3870.0	4140.0	3.32	44.54		0.00	750.00	0.00	2145.00	0.00	0.00	1.50	3.96	7.28	15.39	5.08	0.00	0.0	53.59	100.18	240.00	375	0.30	0.879	46.60	46.51%
SF Banting		4	new17	0.00						0.0	4140.0	3.32	44.54		0.00	750.00	0.00	2145.00	0.00	0.00	1.50	3.96	0.00	15.39	5.08	0.00	0.0	53.59	100.18	67.00	375	0.30	0.879	46.60	46.51%
		new17	*new35A*	0.00						0.0	4140.0	3.32	44.54		0.00	750.00	0.00	2145.00	0.00	0.00	1.50	3.96	0.00	15.39	5.08	0.00	0.0	53.59	100.18	72.00	375	0.30	0.879	46.60	46.51%
Goldenrod	10A&B	10A	ex33	2.44						1350.0	1350.0	3.71	16.24	2.44	0.00	0.00	20.00	20.00	1640.00	1640.00	1.50	0.17	4.88	4.88	1.61	0.00	0.0	18.02	42.53	223.00	250	0.47	0.839	24.51	57.63%
Goldenrod	33	ex33	ex34	1.11						700.0	2050.0	3.58	23.77		0.00	0.00	0.00	20.00	930.00	2570.00	1.50	0.25	1.11	5.99	1.98	0.00	0.0	25.99	154.55	94.00	450	0.27	0.941	128.56	83.18%
Goldenrod		ex34	ex35							0.0	2050.0	3.58	23.77		0.00	0.00	0.00	20.00	0.00	2570.00	1.50	0.25	0.00	5.99	1.98	0.00	0.0	25.99	188.11	57.00	450	0.40	1.146	162.12	86.18%
Goldenrod		ex35	ex35A																																
Goldenrod		35A	exN8							0.0	6190.0	3.16	63.35		0.00	750.00	0.00	2165.00	0.00	2570.00	1.50	4.21	0.00	21.38	7.06	0.00	0.0	74.62	202.56	42.00	600	0.10	0.694	127.95	63.16%
Eglantine	9	9	11							0.0	0.0	4.00	0.00	1.16	0.00	0.00	395.00	395.00	0.00	0.00	1.50	0.51	1.16	1.16	0.38	0.00	0.0	0.90	50.44	180.00	300	0.25	0.691	49.54	98.22%
Colombine	8	8	7	4.72						1000.0	1000.0	3.80	12.31		0.00	0.00	390.00	390.00	0.00	0.00	1.50	0.51	4.72	4.72	1.56	0.00	0.0	14.38	62.04	120.00	250	1.00	1.224	47.66	76.82%
Tunney's Pasture		7	12							0.0	1000.0	3.80	12.31		0.00	0.00	0.00	390.00	0.00	0.00	1.50	0.51	0.00	4.72	1.56	0.00	0.0	14.38	50.44	62.00	300	0.25	0.691	36.06	71.49%
Tunney's Pasture		12	11	3.09						630.0	1630.0	3.65	19.30		750.00	750.00	785.00	1175.00	0.00	0.00	1.50	2.70	3.09	7.81	2.58	0.00	0.0	24.58	50.44	127.00	300	0.25	0.691	25.86	51.28%
Tunney's Pasture		11	13							0.0	1630.0	3.65	19.30		0.00	750.0	0.00	1570.0	0.00	0.0	1.50	3.22	0.00	8.97	2.96	0.00	0.0	25.47	50.44	93.13	300	0.25	0.691	24.97	49.50%
Sorrel	14	14	13	4.54						4525.0	4525.0	3.28	48.17		0.00	0.00	0.00	0.00	10955.00	10955.00	1.50	0.95	4.54	4.54	1.50	0.00	0.0	50.62	63.80	186.00	300	0.40	0.874	13.18	20.66%
Tunneys	13	13	ex3A	6.88						0.0	6155.0	3.16	63.04		1700.00	2450.0	3132.00	4702.0	1400.00	12355.0	1.50	11.02	6.88	20.39	6.73	0.00	0.0	80.79	162.91	160.00	450	0.30	0.992	82.12	50.41%
total site (future)										16395.00	16395.00	2.74	145.55			3200.00		6867.00		14925.00		15.24		47.63	15.72			176.50							

Design Parameters:

Residential			ICI Areas		
SF	3.4	p/p/u			
SD	2.7	p/p/u	INST	90	L/student/day
TH	2.7	p/p/u	EMP	75	L/emp/day
APT	1.8	p/p/u	RETAIL	5	L/sm/day MOE Chart
Other	115	p/p/Ha	ex com	50,000	l/ha/d

Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 280 L/day L/day
3. Infiltration allowance: 0.33 L/s/Ha 0.28 for existing
4. Residential Peaking Factor:
   Harmon Formula = 1+(14/(4+(P/1000)^0.5))
   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: WZ

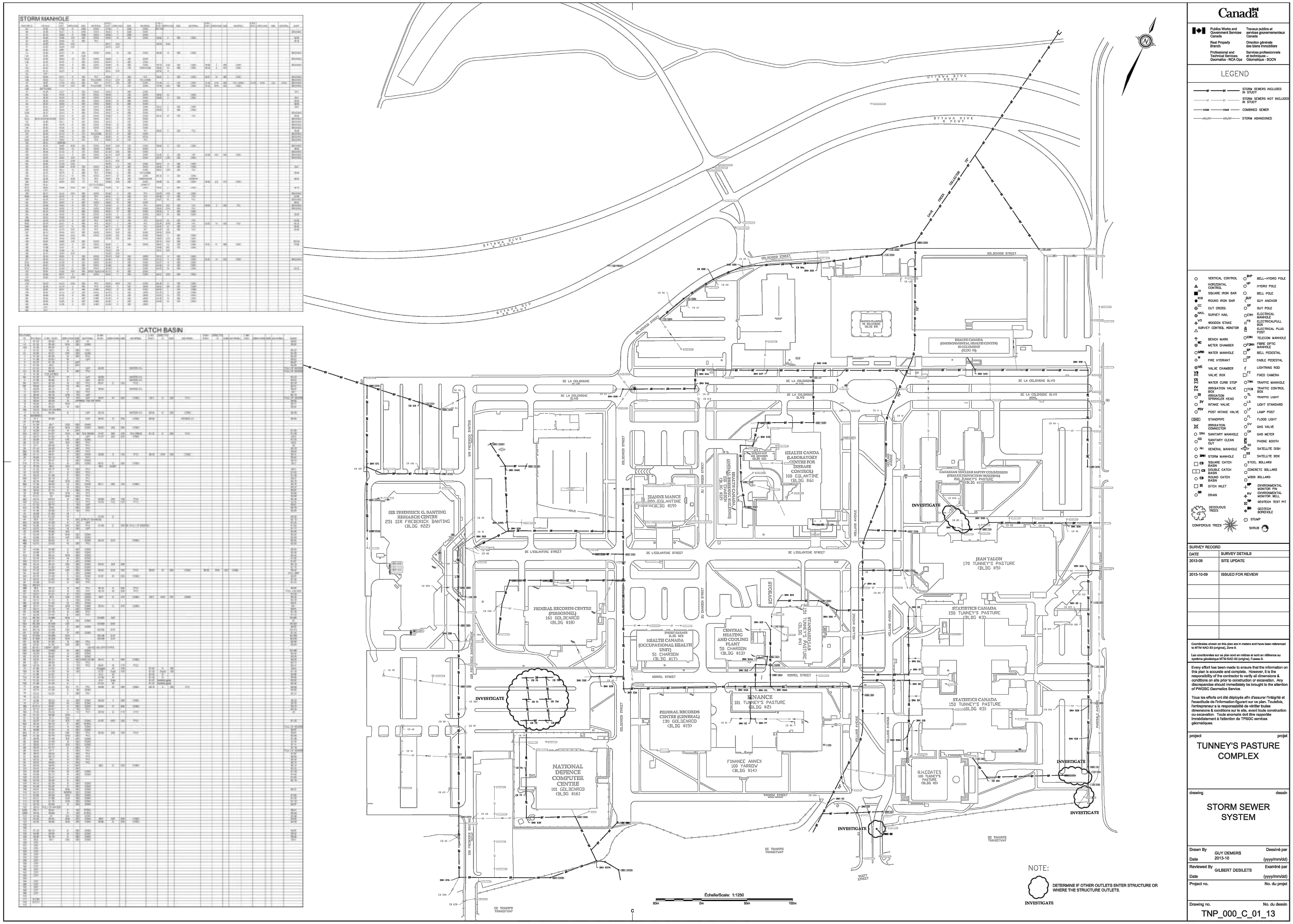
Checked: DGY

Dwg. Reference: 143385

No.	Revision	Date
1	APSR	2024-09-30
2	APSR #3	2026-03-25
3		
4		

File Reference:	Date:	Sheet No:
143385-6.04.04	2023-11-03	1 of 1

APPENDIX 4



Project Title

Tunney's Pasture

Site Servicing and Public Road Redevelopment

Prepared for Canada Lands Company & Public Service and Procurement Canada

ARCADIS

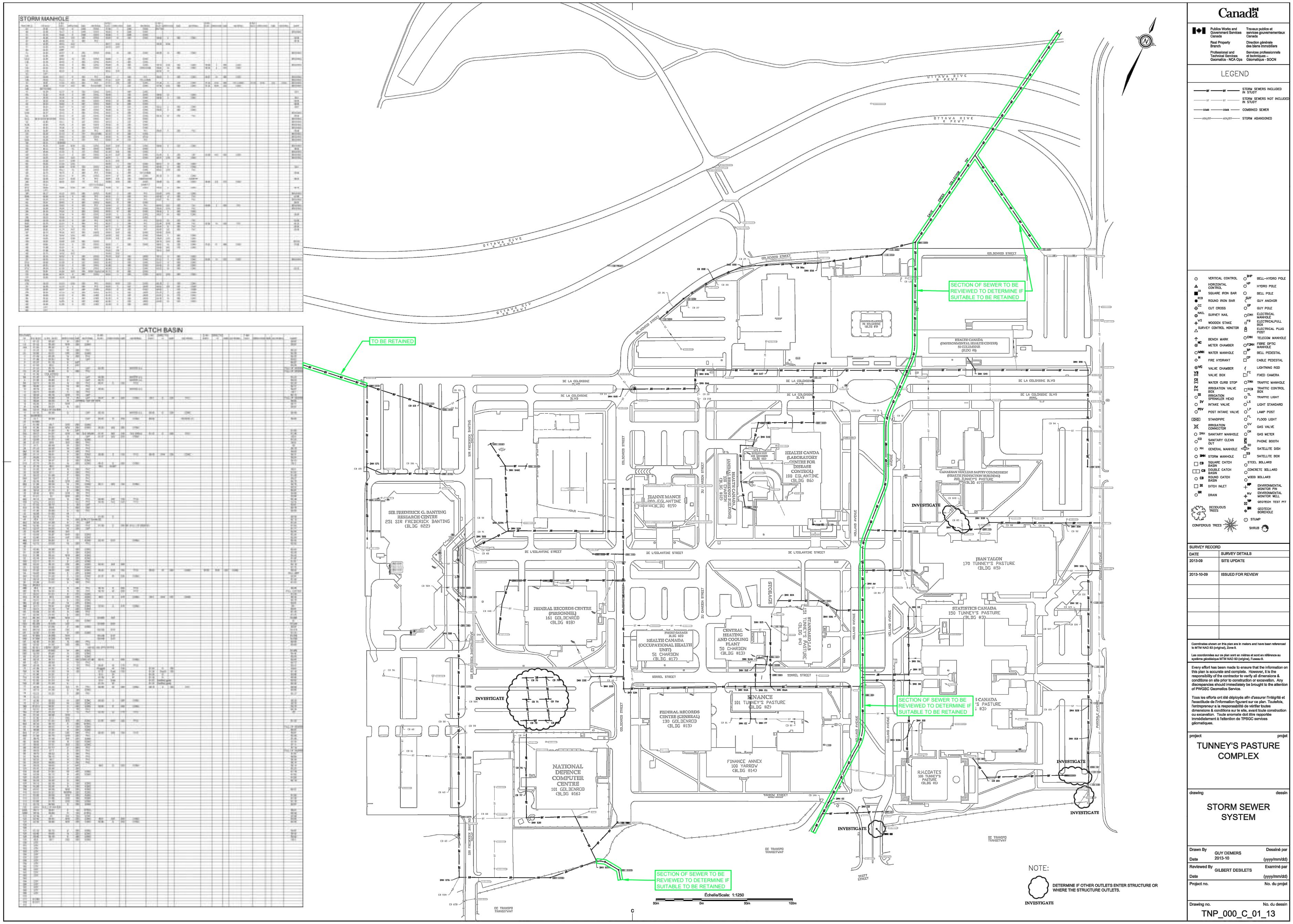
Drawing Title

Existing Storm Infrastructure

Sheet No.

Figure 6

March 25, 2026



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ARCADIS

Project Title	Drawing Title	Sheet No.
Tunney's Pasture Site Servicing and Public Road Redevelopment Prepared for Canada Lands Company & Public Service and Procurement Canada	Existing Storm Infrastructure to be Retained	Figure 6A March 25,2026

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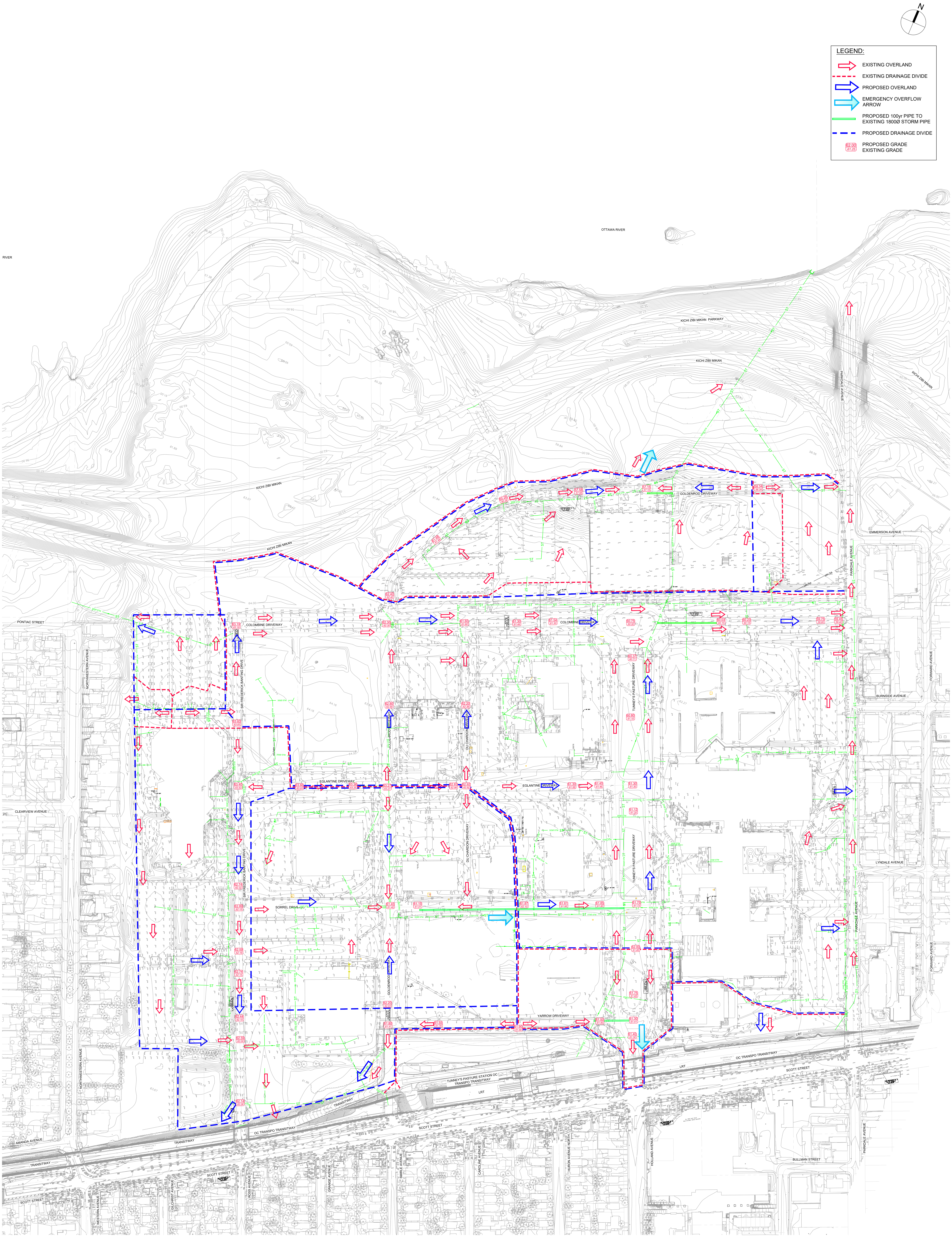


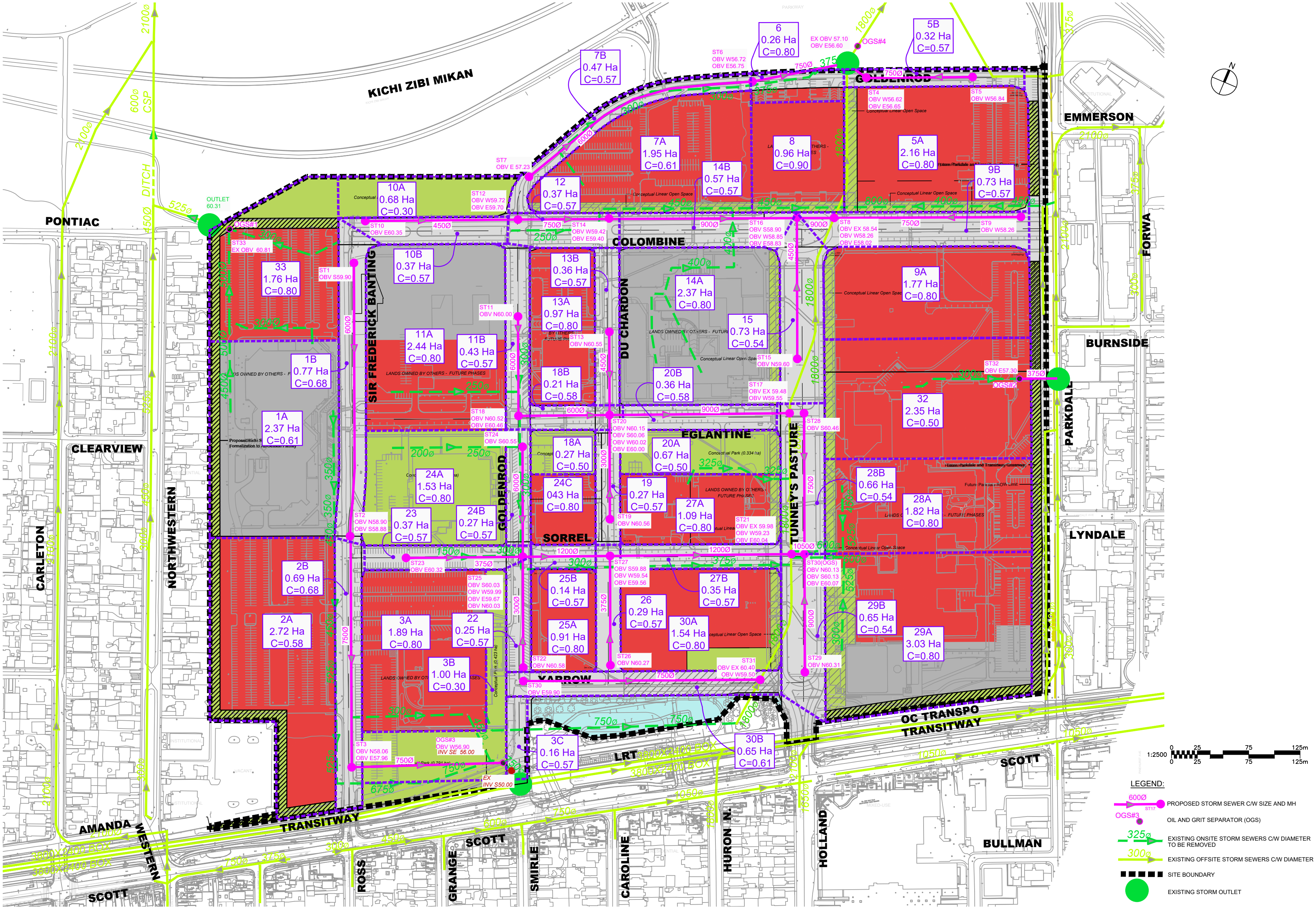
Project Title

Tunney's Pasture
Site Servicing and Public Road Redevelopment
Prepared for Canada Lands Company & Public Service and Procurement Canada

Drawing Title

Existing Topography
and Conceptual Grading

March 25, 2026



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Project Title

Tunney's Pasture

Site Servicing and Public Road Redevelopment

Prepared for Canada Lands & Public Service and Procurement Canada

Drawing Title

Conceptual Storm Infrastructure

Sheet No.

Figure 7

March 25, 2026

ARCADIS

ARCADIS IBI GROUP
500-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
ibigroup.com

STORM SEWER DESIGN SHEET
Tunney's Pasture
CLC
City of Ottawa

LOCATION				AREA (Ha)										RATIONAL DESIGN FLOW																SEWER DATA								
STREET	AREA ID	FROM	TO	C= 0.20	C= 0.30	C= 0.50	C= 0.54	C= 0.57	C= 0.58	C= 0.61	C= 0.68	C= 0.80	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 IND	FIXED FLOW CUM	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm) DIA	PIPE SIZE (mm) W	PIPE SIZE (mm) H	SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (2yr) (L/s)	AVAIL CAP (2yr) (%)
Colombine blk	33	33	ditch									1.76		3.91	3.91	15.00	0.44	15.44	61.77	83.56	97.85	142.89	241.77	327.06	383.02	559.32			241.77	634.50	75.80	525			2.00	2.839	392.72	61.90%
Parkdale	32	32	ex			2.35								3.27	3.27	15.00	0.29	15.29	61.77	83.56	97.85	142.89	201.76	272.94	319.63	466.76			201.76	258.68	40.00	375			2.00	2.269	56.91	22.00%
SF Banting	1A&B	1	2							2.37	0.77			5.47	5.47	15.00	3.47	18.47	61.77	83.56	97.85	142.89	338.16	457.45	535.71	782.30			338.16	378.96	270.00	600			0.35	1.298	40.81	10.77%
SF Banting	2A&B	2	3						2.72		0.69	1.89		9.89	15.37	18.47	2.48	20.94	54.64	73.81	86.39	126.08	839.68	1,134.31	1,327.67	1,937.63			839.68	687.10	224.00	750			0.35	1.507	-152.58	-22.21%
SF Banting	3A,B&C	3	ex		1.00			0.16						1.09	16.46	20.94	1.16	22.10	50.56	68.25	79.85	116.50	832.02	1,123.03	1,314.06	1,917.03			832.02	971.71	148.00	750			0.70	2.131	139.69	14.38%
Yarrow	30A&B	30	31							0.65		1.54		4.53	4.53	15.00	3.97	18.97	61.77	83.56	97.85	142.89	279.64	378.28	443.00	646.91			279.64	449.81	235.00	750			0.15	0.986	170.18	37.83%
Tunney's		31	21											0.00	4.53	18.97	0.87	19.84	53.75	72.59	84.96	123.99	243.33	328.65	384.65	561.32			243.33	6,568.16	130.00	1800			0.30	2.500	6324.83	96.30%
Goldenrod	22	22	25					0.25						0.40	0.40	10.00	1.88	11.88	76.81	104.19	122.14	178.56	30.43	41.28	48.39	70.74			30.43	71.33	110.00	300			0.50	0.978	40.91	57.35%
Sorrel	23	23	25					0.37						0.59	0.59	10.00	2.09	12.09	76.81	104.19	122.14	178.56	45.03	61.09	71.61	104.69			45.03	100.18	110.00	375			0.30	0.879	55.15	55.05%
Goldenrod	24A&B&C	24	25					0.27				1.96		4.79	4.79	15.00	1.13	16.13	61.77	83.56	97.85	142.89	295.67	399.98	468.41	684.02			295.67	452.94	105.00	600			0.50	1.552	157.27	34.72%
Sorrel	25A&B	25	27					0.14				0.91		2.25	8.02	16.13	1.17	17.30	59.23	80.08	93.77	136.90	474.71	641.86	751.54	1,097.25			1,097.25	1,408.95	85.00	1200			0.12	1.207	311.71	22.12%
Chardon	26	26	27					0.29						0.46	0.46	10.00	1.93	11.93	76.81	104.19	122.14	178.56	35.29	47.88	56.13	82.05			35.29	108.21	110.00	375			0.35	0.949	72.92	67.38%
	MH 25 to 27 designed for 100yr																																					
Sorrel	27A&B	27	21					0.35				1.09		2.98	11.45	17.30	1.97	19.27	56.82	76.79	89.90	131.22	650.78	879.51	1,029.60	1,502.92			1,502.92	1,725.61	175.00	1200			0.18	1.478	222.69	12.91%
	MH 27 to 21 designed for 100yr																																					
Tunney's	29A&B	29	30				0.65					3.03		7.71	7.71	15.00	1.80	16.80	61.77	83.56	97.85	142.89	476.50	644.60	754.88	1,102.36			476.50	731.45	120.00	900			0.15	1.114	254.94	34.85%
Tunney's	28A&B	28	30				0.66					1.82		5.04	5.04	15.00	1.70	16.70	61.77	83.56	97.85	142.89	311.21	421.00	493.02	719.97			311.21	580.71	130.00	750			0.25	1.273	269.49	46.41%
Tunney's		30	21											0.00	12.75	16.80	0.27	17.07	57.83	78.17	91.52	133.60	737.51	996.92	1,167.14	1,703.83			737.51	1,103.33	20.00	1050			0.15	1.234	365.82	33.16%
Tunney's		21	17											0.00	28.73	19.84	0.90	20.74	52.29	70.61	82.63	120.57	1,502.60	2,028.88	2,374.32	3,464.37			1,502.60	6,568.16	135.00	1800			0.30	2.500	5065.56	77.12%
Chardon	19	19	20					0.27						0.43	0.43	10.00	1.70	11.70	76.81	104.19	122.14	178.56	32.86	44.58	52.26	76.40			32.86	71.33	100.00	300			0.50	0.978	38.47	53.93%
Chardon	13A&B	13	20					0.36				0.97		2.73	2.73	15.00	1.04	16.04	61.77	83.56	97.85	142.89	168.49	227.92	266.91	389.78			168.49	210.32	80.00	450			0.50	1.281	41.83	19.89%
Goldenrod	11A&B	11	18					0.43				2.44		6.11	6.11	15.00	1.03	16.03	61.77	83.56	97.85	142.89	377.27	510.36	597.67	872.79			377.27	452.94	96.00	600			0.50	1.552	75.67	16.71%
Eglantine	18A&B	18	20			0.27			0.21					0.71	6.82	16.03	0.95	16.98	59.44	80.37	94.10	137.39	405.47	548.26	641.94	937.26			405.47	452.94	88.00	600			0.50	1.552	47.48	10.48%
Eglantine	20A&B	20	17			0.67			0.36					1.51	11.49	16.98	2.03	19.00	57.47	77.67	90.93	132.74	660.23	892.40	1,044.74	1,525.10			660.23	944.29	175.00	900			0.25	1.438	284.06	30.08%
Tunney's		17	8											0.00	40.22	20.74	1.33	22.07	50.87	68.67	80.36	117.23	2,046.32	2,762.23	3,232.18	4,715.43			2,046.32	6,568.16	200.00	1800			0.30	2.500	4521.84	68.84%
Colombine	10A&B	10	12		0.68			0.37						1.15	1.15	15.00	2.18	17.18	61.77	83.56	97.85	142.89	71.24	96.38	112.86	164.82			71.24	188.11	150.00	450			0.40	1.146	116.87	62.13%
Colombine	12	12	14					0.37						0.59	1.74	17.18	1.36	18.55	57.06	77.11	90.27	131.78	99.26	134.15	157.05	229.25			99.26	245.74	90.00	525			0.30	1.100	146.48	59.61%
Colombine	14A&B	14	16					0.57				2.37		6.17	7.91	18.55	2.15	20.70	54.49	73.61	86.16	125.74	431.26	582.56	681.87	995.12			431.26	636.13	180.00	750			0.30	1.395	204.87	32.21%
Tunney's	15	15	16				0.73							1.10	1.10	10.00	1.82	11.82	76.81	104.19	122.14	178.56	84.17	114.18	133.85	195.68			84.17	210.32	140.00	450			0.50	1.281	126.15	59.98%
Colombine		16	8											0.00	9.01	20.70	0.35	21.05	50.94	68.76	80.46	117.38	458.93	619.49	724.89	1,057.55			458.93	1,117.30	36.00	900			0.35	1.701	658.37	58.93%
Colombine	8A&B	9	8					0.73				1.77		5.09	5.09	15.00	3.40	18.40	61.77	83.56	97.85	142.89	314.60	425.58	498.38	727.79			314.60	402.33	180.00	750			0.12	0.882	87.73	21.81%
Block	8	8	ex										0.96	2.40	56.73	22.07	1.00	23.07	48.92	66.01	77.23	112.65	2,775.26	3,744.69	4,381.11	6,390.37			2,775.26	6,568.16	150.00	1800			0.30	2.500	3792.90	57.75%
Goldenrod	7A&B	7	6					0.47		1.95				4.05	4.05	15.00	4.08	19.08	61.77	83.56	97.85	142.89	250.26	338.54	396.45	578.95			250.26	286.47	240.00	600			0.20	0.982	36.21	12.64%
Goldenrod	6	6	ex									0.26		0.58	4.63	19.08	1.70	20.78	53.57	72.35	84.67	123.56	248.01	334.96	392.03	572.08			248.01	402.33	90.00	750			0.12	0.882	154.32	38.36%
	6 to ex sized for 100yr																																					
Goldenrod	5A&B	5	4					0.32				2.16		5.31	5.31	15.00	2.27	17.27	61.77	83.56	97.85	142.89	328.04	443.76	519.68	758.90			328.04	402.33	120.00	750			0.12	0.882	74.28	18.46%
Goldenrod		4	ex											0.00	5.31	17.27	0.42	17.68	56.89	76.88	90.00	131.38	302.13	408.32	478.00	697.75			302.13	402.33	22.00	750			0.12	0.882	100.20	24.90%
NCC		ex	ex											0.00	66.67	23.07	0.67	23.74	47.56	64.16	75.06	109.46	3,171.05	4,277.51	5,003.95	7,297.83			3,171.05	6,568.16	100.00	1800			0.30	2.500	3397.11	51.72%
site total				0.00	1.68	3.29	2.04	5.72	3.29	4.97	1.46	23.97	0.96																4,446.60									
													47.38																									

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
2.04

Designed: AB

Checked: DY

Dwg. Reference: 126884-500

No.	Revision	Date
1.	APSR	2024-10-16
2	APSR submission 2	2025-06-25
3	APSR submission 3	2026-03-31

File Reference:	Date:	Sheet No:
126884-6.04.04	2024-04-16	1 of 1

Stormceptor

Rinker MATERIALS A QUIKRETE COMPANY

Stormceptor EF Sizing Report

Imbrium® Systems

ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

06/17/2025

Province:	Ontario
City:	Ottawa
Nearest Rainfall Station:	OTTAWA CDA RCS
Climate Station Id:	6105978
Years of Rainfall Data:	20

Site Name:	Area 1

Drainage Area (ha):	1.76
Runoff Coefficient 'c':	0.80

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0
Required Water Quality Runoff Volume Capture (%):	90.0

Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	

Project Name:	Tunney's Pasture Redevelopment
Project Number:	-
Designer Name:	Brandon O'Leary
Designer Company:	Rinker Pipe
Designer Email:	brandon.oleary@RinkerPipe.com
Designer Phone:	905-630-0359
EOR Name:	Demetrius Yannoulopoulos
EOR Company:	ARCADIS Canada Inc.
EOR Email:	demetrius.yannoulopoulos@arcadis.com
EOR Phone:	613-447-0504

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	65
EFO5	73
EFO6	79
EFO8	87
EFO10	92
EFO12	94

Recommended Stormceptor EFO Model: EFO8

Estimated Net Annual Sediment (TSS) Load Reduction (%): 87

Water Quality Runoff Volume Capture (%): > 90

imbrium

THIRD-PARTY TESTING AND VERIFICATION

►**Stormceptor® EF and Stormceptor® EFO** are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

PERFORMANCE

►**Stormceptor® EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterways.

PARTICLE SIZE DISTRIBUTION (PSD)

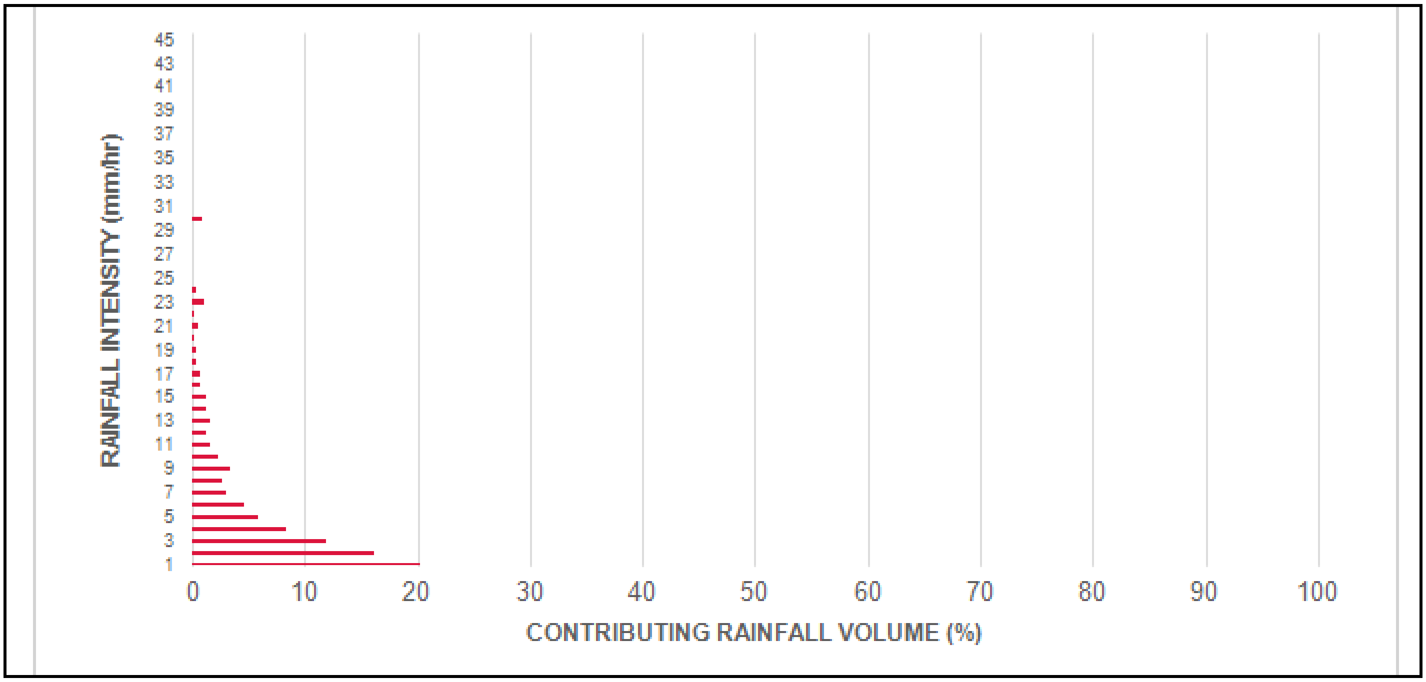
►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

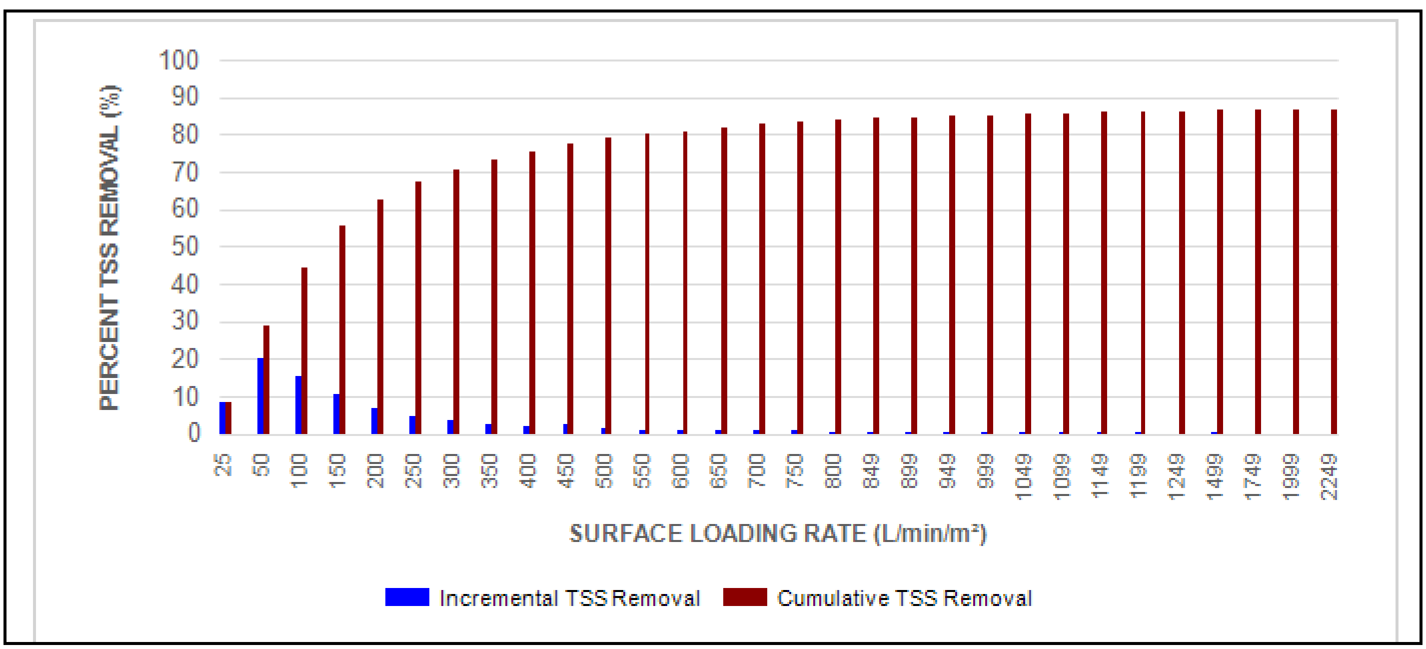
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.6	8.6	1.96	117.0	25.0	100	8.6	8.6
1.00	20.3	29.0	3.91	235.0	50.0	100	20.3	29.0
2.00	16.2	45.2	7.83	470.0	100.0	96	15.6	44.5
3.00	12.0	57.2	11.74	705.0	150.0	89	10.7	55.3
4.00	8.4	65.6	15.66	939.0	200.0	83	7.0	62.3
5.00	5.9	71.6	19.57	1174.0	250.0	81	4.8	67.1
6.00	4.6	76.2	23.49	1409.0	300.0	78	3.6	70.7
7.00	3.1	79.3	27.40	1644.0	350.0	76	2.3	73.0
8.00	2.7	82.0	31.31	1879.0	400.0	74	2.0	75.1
9.00	3.3	85.3	35.23	2114.0	450.0	72	2.4	77.4
10.00	2.3	87.6	39.14	2349.0	500.0	69	1.6	79.0
11.00	1.6	89.2	43.06	2583.0	550.0	67	1.0	80.1
12.00	1.3	90.5	46.97	2818.0	600.0	65	0.9	80.9
13.00	1.7	92.2	50.89	3053.0	650.0	64	1.1	82.0
14.00	1.2	93.5	54.80	3288.0	700.0	64	0.8	82.8
15.00	1.2	94.6	58.71	3523.0	750.0	63	0.7	83.6
16.00	0.7	95.3	62.63	3758.0	800.0	63	0.4	84.0
17.00	0.7	96.1	66.54	3993.0	849.0	63	0.5	84.5
18.00	0.4	96.5	70.46	4227.0	899.0	62	0.2	84.7
19.00	0.4	96.9	74.37	4462.0	949.0	62	0.3	85.0
20.00	0.2	97.1	78.28	4697.0	999.0	62	0.1	85.1
21.00	0.5	97.5	82.20	4932.0	1049.0	60	0.3	85.4
22.00	0.2	97.8	86.11	5167.0	1099.0	59	0.1	85.5
23.00	1.0	98.8	90.03	5402.0	1149.0	58	0.6	86.1
24.00	0.3	99.1	93.94	5637.0	1199.0	57	0.2	86.3
25.00	0.0	99.1	97.86	5871.0	1249.0	56	0.0	86.3
30.00	0.9	100.0	117.43	7046.0	1499.0	49	0.5	86.7
35.00	0.0	100.0	137.00	8220.0	1749.0	42	0.0	86.7
40.00	0.0	100.0	156.57	9394.0	1999.0	37	0.0	86.7
45.00	0.0	100.0	176.14	10568.0	2249.0	33	0.0	86.7
Estimated Net Annual Sediment (TSS) Load Reduction =								**87 %**

Climate Station ID: 6105978 *Years of Rainfall Data*: 20

RAINFALL DATA FROM OTTAWA CDA RCS RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL
FOR THE RECOMMENDED STORMCEPTOR® MODEL



Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF5 / EFO5	1.5	5	90	762	30	762	30	710	25
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

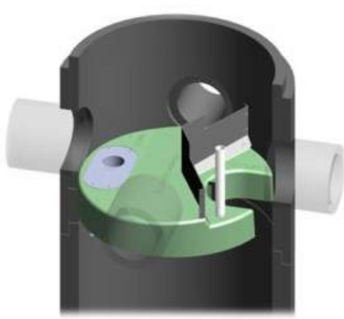
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

DESIGN FLEXIBILITY

►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

OIL CAPTURE AND RETENTION

►While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.



INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.

0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.

45° - 90° : The inlet pipe is 2 inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft^3)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF5 / EFO5	1.5	5	1.62	5.3	420	111	305	10	2124	75	2612	5758
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity
** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft^3)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade	Maintenance Contractor & Site Owner

STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD PERFORMANCE SPECIFICATION FOR “OIL GRIT SEPARATOR” (OGS) STORMWATER QUALITY TREAMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program’s **Procedure for Laboratory Testing of Oil-Grit Separators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	5 ft (1524 mm) Diameter OGS Units:	1.95 m^3 sediment / 420 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil

12 ft (3657 mm) Diameter OGS Units: 31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m^2 to 1400 L/min/m^2, and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/m^2 and 1400 L/min/m^2 shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/m^2 shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m^2. No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m^2.

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m^2 shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m^2, and shall be calculated using a simple proportioning formula, with 1400 L/min/m^2 in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/m^2.

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m^2 to 2600 L/min/m^2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

Stormceptor® EF Sizing Report

Imbrium® Systems
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

06/17/2025

Province:	Ontario
City:	Ottawa
Nearest Rainfall Station:	OTTAWA CDA RCS
Climate Station Id:	6105978
Years of Rainfall Data:	20
Site Name:	Area 2 to 4 and 9 (Split 2)
Drainage Area (ha):	4.73
Runoff Coefficient 'c':	0.80
Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0
Required Water Quality Runoff Volume Capture (%):	90.0
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	

Project Name:	Tunney's Pasture Redevelopment
Project Number:	-
Designer Name:	Brandon O'Leary
Designer Company:	Rinker Pipe
Designer Email:	brandon.oleary@RinkerPipe.com
Designer Phone:	905-630-0359
EOR Name:	Demetrius Yannoulopoulos
EOR Company:	ARCADIS Canada Inc.
EOR Email:	demetrius.yannoulopoulos@arcadis.com
EOR Phone:	613-447-0504

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	45
EFO5	54
EFO6	61
EFO8	73
EFO10	80
EFO12	85

Recommended Stormceptor EFO Model: EFO10

Estimated Net Annual Sediment (TSS) Load Reduction (%): 80

Water Quality Runoff Volume Capture (%): > 90

THIRD-PARTY TESTING AND VERIFICATION

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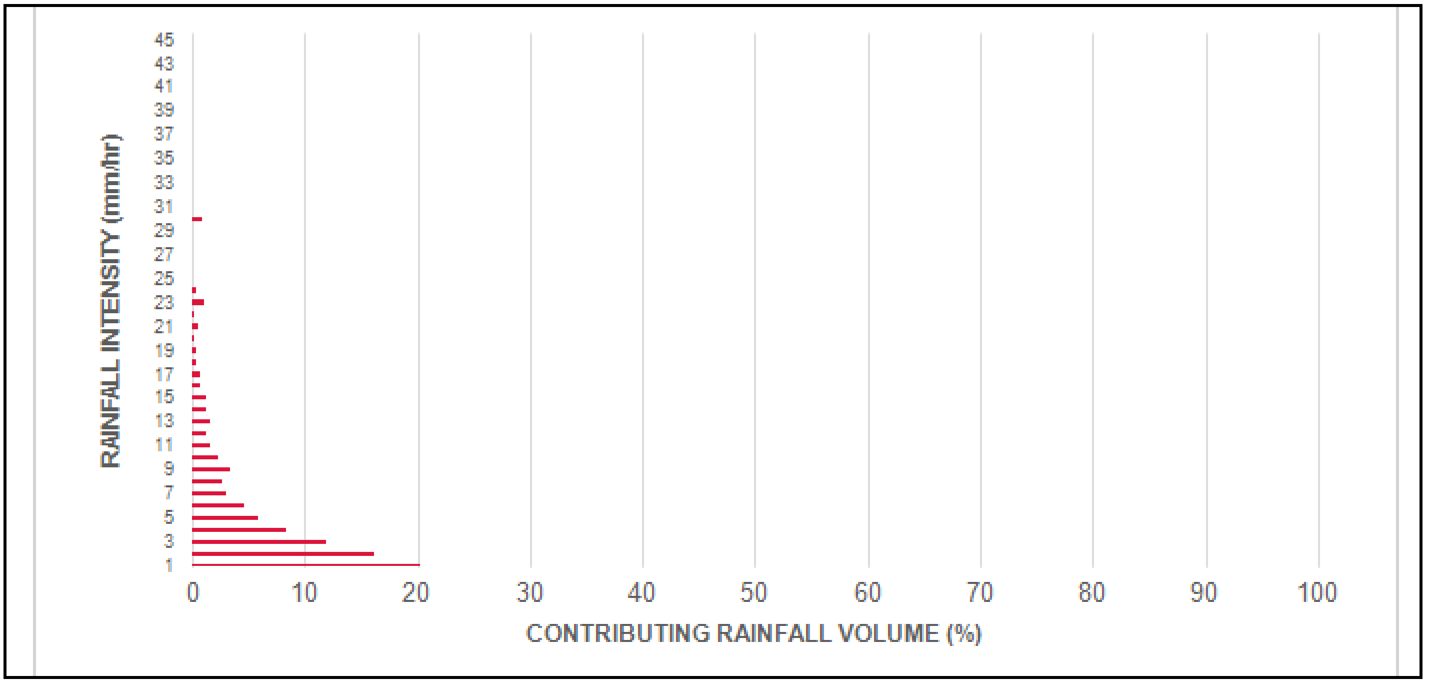
Particle Size (μm)	Percent Less Than	Particle Size Fraction (μm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

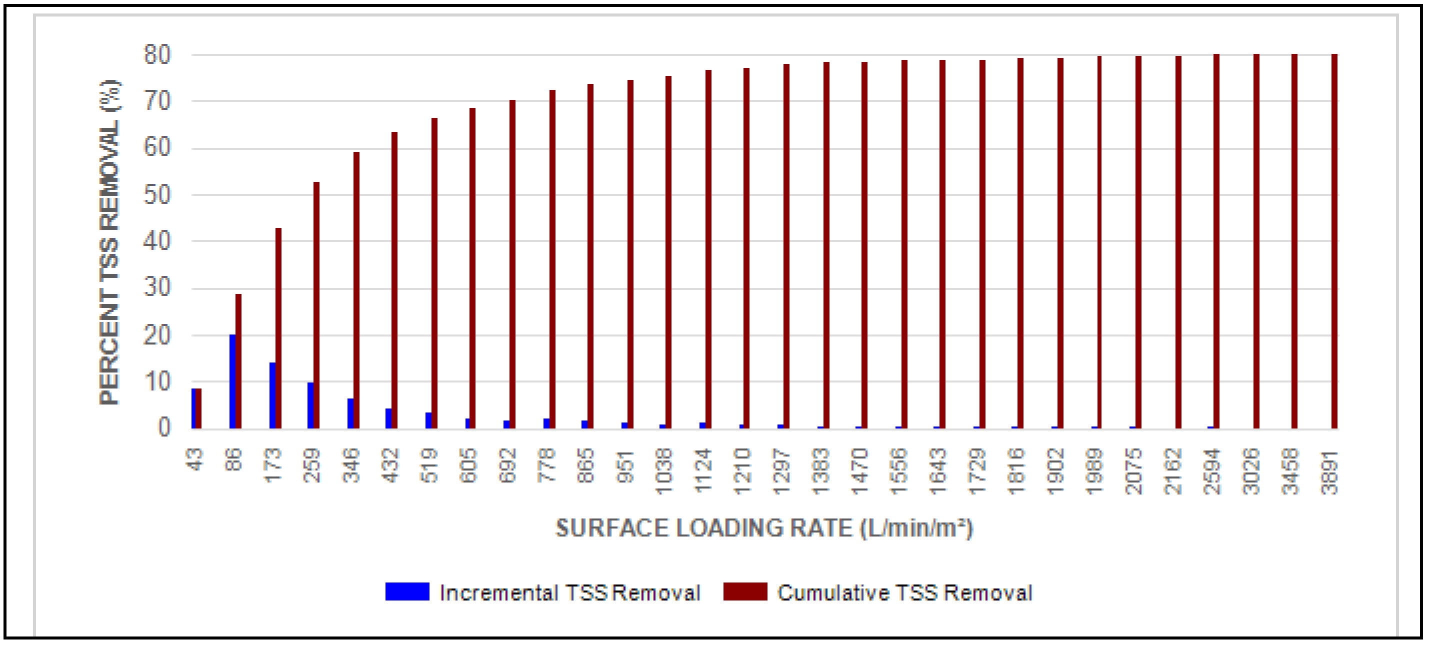
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.6	8.6	5.26	316.0	43.0	100	8.6	8.6
1.00	20.3	29.0	10.52	631.0	86.0	98	20.0	28.6
2.00	16.2	45.2	21.04	1262.0	173.0	87	14.1	42.7
3.00	12.0	57.2	31.56	1894.0	259.0	80	9.6	52.4
4.00	8.4	65.6	42.08	2525.0	346.0	77	6.5	58.9
5.00	5.9	71.6	52.60	3156.0	432.0	72	4.3	63.2
6.00	4.6	76.2	63.12	3787.0	519.0	69	3.2	66.3
7.00	3.1	79.3	73.64	4418.0	605.0	65	2.0	68.3
8.00	2.7	82.0	84.16	5049.0	692.0	64	1.8	70.1
9.00	3.3	85.3	94.68	5681.0	778.0	63	2.1	72.2
10.00	2.3	87.6	105.20	6312.0	865.0	63	1.4	73.6
11.00	1.6	89.2	115.71	6943.0	951.0	62	1.0	74.6
12.00	1.3	90.5	126.23	7574.0	1038.0	61	0.8	75.4
13.00	1.7	92.2	136.75	8205.0	1124.0	59	1.0	76.4
14.00	1.2	93.5	147.27	8836.0	1210.0	57	0.7	77.1
15.00	1.2	94.6	157.79	9468.0	1297.0	55	0.6	77.7
16.00	0.7	95.3	168.31	10099.0	1383.0	53	0.4	78.1
17.00	0.7	96.1	178.83	10730.0	1470.0	50	0.4	78.5
18.00	0.4	96.5	189.35	11361.0	1556.0	47	0.2	78.7
19.00	0.4	96.9	199.87	11992.0	1643.0	45	0.2	78.8
20.00	0.2	97.1	210.39	12623.0	1729.0	42	0.1	78.9
21.00	0.5	97.5	220.91	13255.0	1816.0	40	0.2	79.1
22.00	0.2	97.8	231.43	13886.0	1902.0	39	0.1	79.2
23.00	1.0	98.8	241.95	14517.0	1989.0	37	0.4	79.6
24.00	0.3	99.1	252.47	15148.0	2075.0	35	0.1	79.7
25.00	0.0	99.1	262.99	15779.0	2162.0	34	0.0	79.7
30.00	0.9	100.0	315.59	18935.0	2594.0	28	0.3	79.9
35.00	0.0	100.0	368.18	22091.0	3026.0	24	0.0	79.9
40.00	0.0	100.0	420.78	25247.0	3458.0	22	0.0	79.9
45.00	0.0	100.0	473.38	28403.0	3891.0	19	0.0	79.9
							Estimated Net Annual Sediment (TSS) Load Reduction =	**80 %**

Climate Station ID: 6105978 *Years of Rainfall Data*: 20

RAINFALL DATA FROM OTTAWA CDA RCS RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Stormceptor® EF Sizing Report

Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF5 / EFO5	1.5	5	90	762	30	762	30	710	25
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

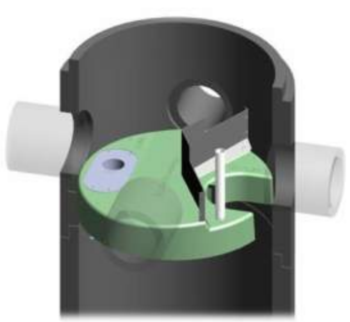
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

DESIGN FLEXIBILITY

►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

OIL CAPTURE AND RETENTION

►While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.



INLET-TO-OUTLET DROP

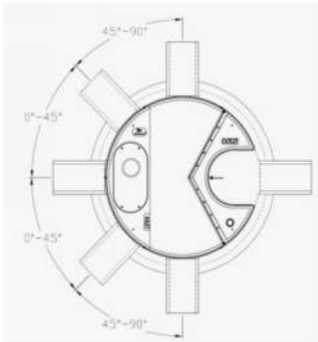
Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.

0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.

45° - 90° : The inlet pipe is 2 inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.



Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft³)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF5 / EFO5	1.5	5	1.62	5.3	420	111	305	10	2124	75	2612	5758
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity
** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft³)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade	Maintenance Contractor & Site Owner

STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD PERFORMANCE SPECIFICATION FOR "OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREAMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit Separators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	5 ft (1524 mm) Diameter OGS Units:	1.95 m^3 sediment / 420 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil

12 ft (3657 mm) Diameter OGS Units: 31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m^2 to 1400 L/min/m^2, and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/m^2 and 1400 L/min/m^2 shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/m^2 shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m^2. No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m^2.

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m^2 shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m^2, and shall be calculated using a simple proportioning formula, with 1400 L/min/m^2 in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/m^2.

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m^2 to 2600 L/min/m^2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

Stormceptor®

Rinker MATERIALS® A QUIKRETE® COMPANY

Stormceptor® EF Sizing Report

Imbrium® Systems
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

06/17/2025

Province:	Ontario
City:	Ottawa
Nearest Rainfall Station:	OTTAWA CDA RCS
Climate Station Id:	6105978
Years of Rainfall Data:	20
Site Name:	Area 5 to 27 (Split 5)
Drainage Area (ha):	6.72
Runoff Coefficient 'c':	0.80
Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0
Required Water Quality Runoff Volume Capture (%):	90.0
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	

Project Name:	Tunney's Pasture Redevelopment
Project Number:	-
Designer Name:	Brandon O'Leary
Designer Company:	Rinker Pipe
Designer Email:	brandon.oleary@RinkerPipe.com
Designer Phone:	905-630-0359
EOR Name:	Demetrius Yannoulopoulos
EOR Company:	ARCADIS Canada Inc.
EOR Email:	demetrius.yannoulopoulos@arcadis.com
EOR Phone:	613-447-0504

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	38
EFO5	47
EFO6	54
EFO8	66
EFO10	74
EFO12	80

Recommended Stormceptor EFO Model: EFO12

Estimated Net Annual Sediment (TSS) Load Reduction (%): 80

Water Quality Runoff Volume Capture (%): > 90

imbrium

THIRD-PARTY TESTING AND VERIFICATION

►**Stormceptor® EF and Stormceptor® EFO** are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

PERFORMANCE

►**Stormceptor® EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterways.

PARTICLE SIZE DISTRIBUTION (PSD)

►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

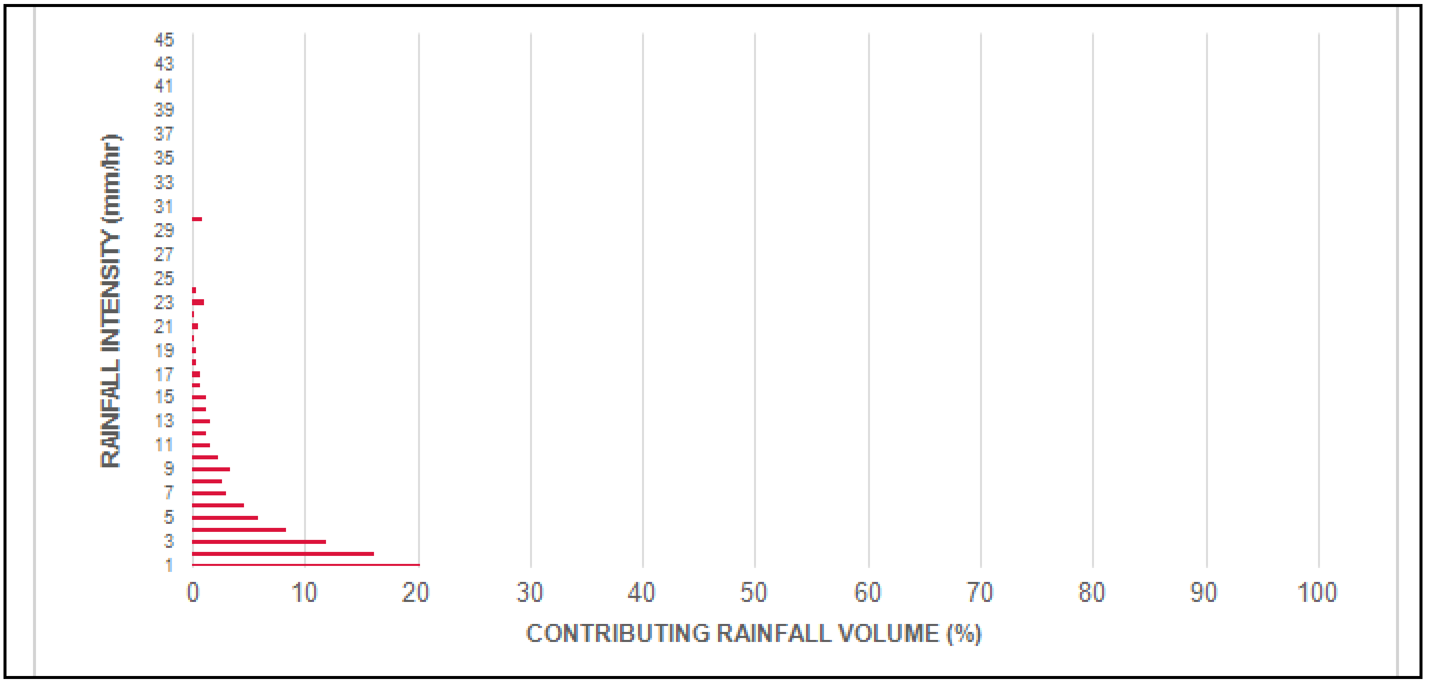
Particle Size (μm)	Percent Less Than	Particle Size Fraction (μm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

Stormceptor® EF Sizing Report

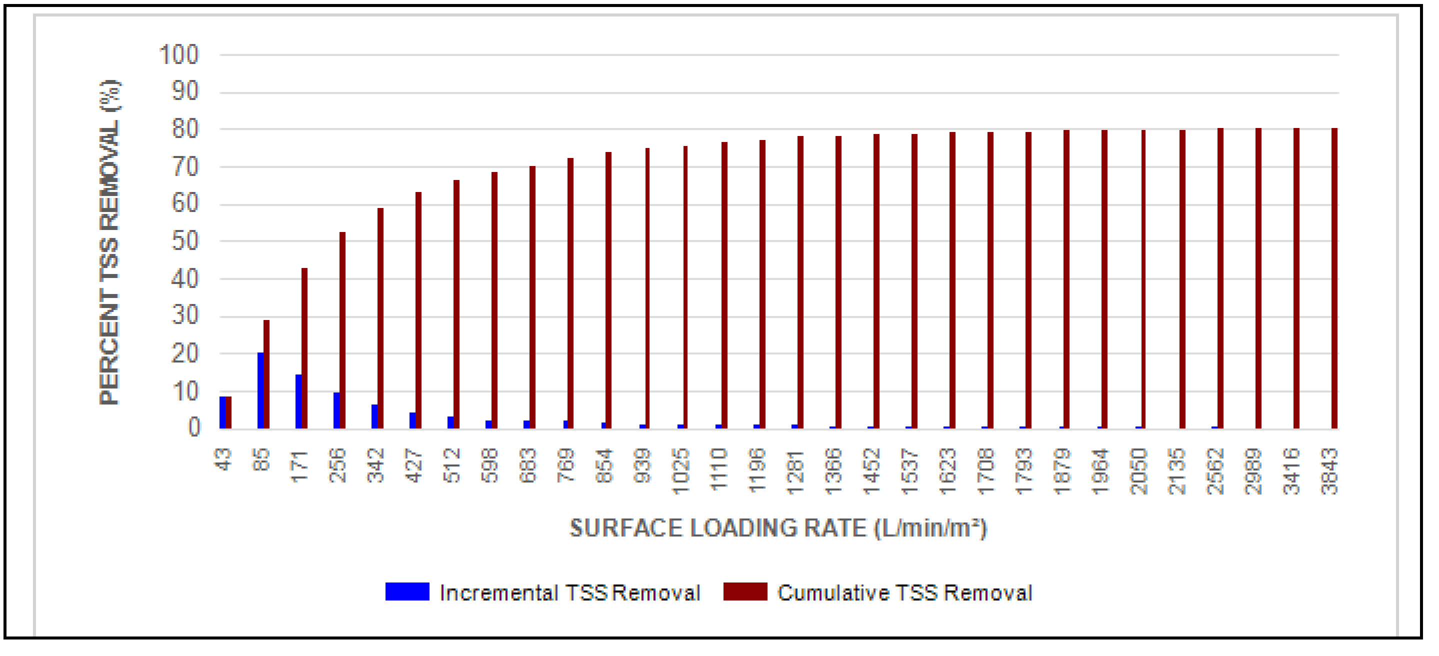
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.6	8.6	7.47	448.0	43.0	100	8.6	8.6
1.00	20.3	29.0	14.95	897.0	85.0	98	20.0	28.6
2.00	16.2	45.2	29.89	1793.0	171.0	87	14.1	42.7
3.00	12.0	57.2	44.84	2690.0	256.0	81	9.7	52.4
4.00	8.4	65.6	59.78	3587.0	342.0	77	6.5	58.9
5.00	5.9	71.6	74.73	4484.0	427.0	73	4.3	63.2
6.00	4.6	76.2	89.67	5380.0	512.0	69	3.2	66.4
7.00	3.1	79.3	104.62	6277.0	598.0	65	2.0	68.4
8.00	2.7	82.0	119.56	7174.0	683.0	64	1.8	70.2
9.00	3.3	85.3	134.51	8070.0	769.0	63	2.1	72.3
10.00	2.3	87.6	149.45	8967.0	854.0	63	1.4	73.7
11.00	1.6	89.2	164.40	9864.0	939.0	62	1.0	74.7
12.00	1.3	90.5	179.34	10761.0	1025.0	61	0.8	75.5
13.00	1.7	92.2	194.29	11657.0	1110.0	59	1.0	76.5
14.00	1.2	93.5	209.23	12554.0	1196.0	57	0.7	77.2
15.00	1.2	94.6	224.18	13451.0	1281.0	55	0.6	77.9
16.00	0.7	95.3	239.12	14347.0	1366.0	53	0.4	78.2
17.00	0.7	96.1	254.07	15244.0	1452.0	51	0.4	78.6
18.00	0.4	96.5	269.02	16141.0	1537.0	48	0.2	78.8
19.00	0.4	96.9	283.96	17038.0	1623.0	45	0.2	79.0
20.00	0.2	97.1	298.91	17934.0	1708.0	43	0.1	79.1
21.00	0.5	97.5	313.85	18831.0	1793.0	41	0.2	79.3
22.00	0.2	97.8	328.80	19728.0	1879.0	39	0.1	79.4
23.00	1.0	98.8	343.74	20624.0	1964.0	37	0.4	79.7
24.00	0.3	99.1	358.69	21521.0	2050.0	36	0.1	79.8
25.00	0.0	99.1	373.63	22418.0	2135.0	34	0.0	79.8
30.00	0.9	100.0	448.36	26902.0	2562.0	29	0.3	80.1
35.00	0.0	100.0	523.08	31385.0	2989.0	25	0.0	80.1
40.00	0.0	100.0	597.81	35869.0	3416.0	22	0.0	80.1
45.00	0.0	100.0	672.54	40352.0	3843.0	19	0.0	80.1
Estimated Net Annual Sediment (TSS) Load Reduction =								80 %

Climate Station ID: 6105978 *Years of Rainfall Data*: 20

RAINFALL DATA FROM OTTAWA CDA RCS RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL
FOR THE RECOMMENDED STORMCEPTOR® MODEL



Stormceptor® EF Sizing Report

Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF5 / EFO5	1.5	5	90	762	30	762	30	710	25
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

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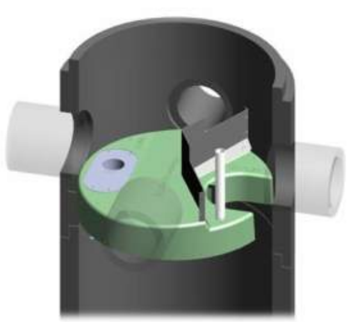
DESIGN FLEXIBILITY

► **Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

OIL CAPTURE AND RETENTION

► While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.



INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.

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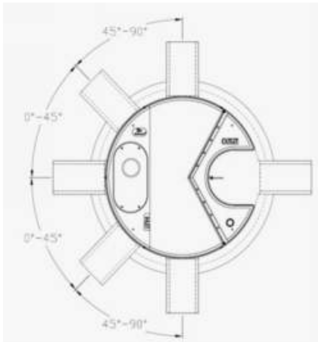
45° - 90° : The inlet pipe is 2 inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.

Stormceptor® EF Sizing Report



Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft^3)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF5 / EFO5	1.5	5	1.62	5.3	420	111	305	10	2124	75	2612	5758
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity
** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft^3)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade	Maintenance Contractor & Site Owner

STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD PERFORMANCE SPECIFICATION FOR "OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREAMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit Separators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	5 ft (1524 mm) Diameter OGS Units:	1.95 m^3 sediment / 420 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil

12 ft (3657 mm) Diameter OGS Units: 31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m^2 to 1400 L/min/m^2, and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/m^2 and 1400 L/min/m^2 shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/m^2 shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m^2. No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m^2.

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m^2 shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m^2, and shall be calculated using a simple proportioning formula, with 1400 L/min/m^2 in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/m^2.

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m^2 to 2600 L/min/m^2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

Stormceptor®

Rinker MATERIALS® A QUIKRETE® COMPANY

Stormceptor® EF Sizing Report

Imbrium® Systems
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

06/17/2025

Province:	Ontario
City:	Ottawa
Nearest Rainfall Station:	OTTAWA CDA RCS
Climate Station Id:	6105978
Years of Rainfall Data:	20

Site Name:	Area 28

Drainage Area (ha):	2.35
Runoff Coefficient 'c':	0.80

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0
Required Water Quality Runoff Volume Capture (%):	90.0

Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	

Project Name:	Tunney’s Pasture Redevelopment
Project Number:	-
Designer Name:	Brandon O'Leary
Designer Company:	Rinker Pipe
Designer Email:	brandon.oleary@RinkerPipe.com
Designer Phone:	905-630-0359
EOR Name:	Demetrius Yannoulopoulos
EOR Company:	ARCADIS Canada Inc.
EOR Email:	demetrius.yannoulopoulos@arcadis.com
EOR Phone:	613-447-0504

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	60
EFO5	68
EFO6	75
EFO8	83
EFO10	89
EFO12	92

Recommended Stormceptor EFO Model: EFO8

Estimated Net Annual Sediment (TSS) Load Reduction (%): 83

Water Quality Runoff Volume Capture (%): > 90

imbrium

THIRD-PARTY TESTING AND VERIFICATION

►**Stormceptor® EF and Stormceptor® EFO** are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

PERFORMANCE

►**Stormceptor® EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterways.

PARTICLE SIZE DISTRIBUTION (PSD)

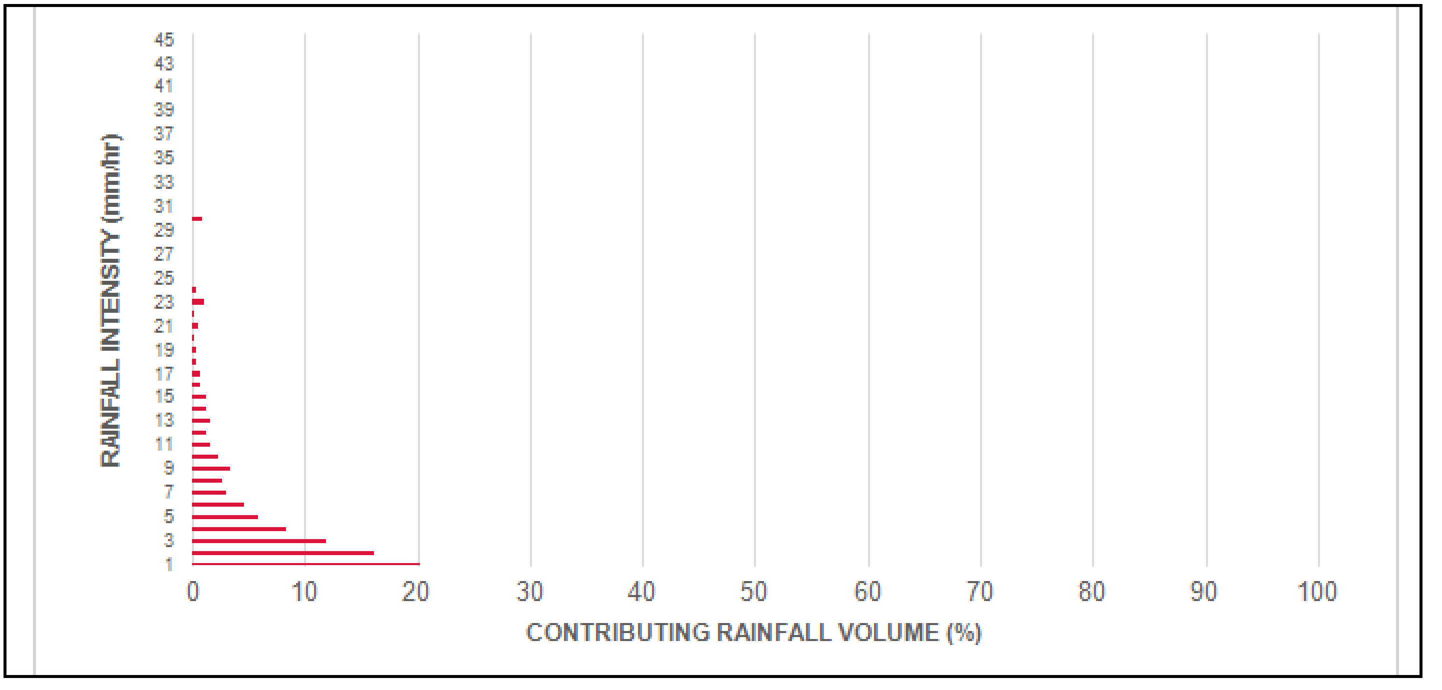
►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

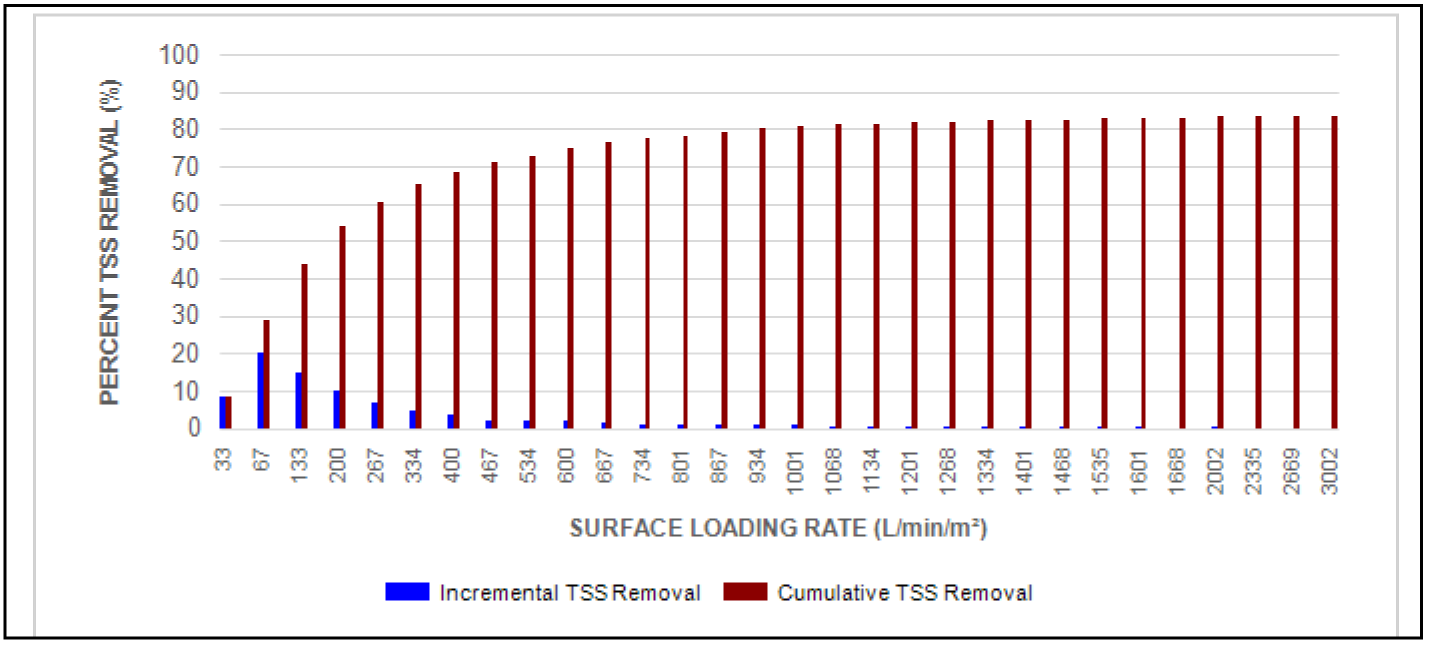
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.6	8.6	2.61	157.0	33.0	100	8.6	8.6
1.00	20.3	29.0	5.23	314.0	67.0	100	20.3	29.0
2.00	16.2	45.2	10.45	627.0	133.0	92	14.9	43.9
3.00	12.0	57.2	15.68	941.0	200.0	83	10.0	53.9
4.00	8.4	65.6	20.91	1254.0	267.0	80	6.8	60.6
5.00	5.9	71.6	26.13	1568.0	334.0	77	4.6	65.2
6.00	4.6	76.2	31.36	1882.0	400.0	74	3.4	68.6
7.00	3.1	79.3	36.58	2195.0	467.0	71	2.2	70.8
8.00	2.7	82.0	41.81	2509.0	534.0	68	1.9	72.7
9.00	3.3	85.3	47.04	2822.0	600.0	65	2.2	74.8
10.00	2.3	87.6	52.26	3136.0	667.0	64	1.5	76.3
11.00	1.6	89.2	57.49	3449.0	734.0	64	1.0	77.3
12.00	1.3	90.5	62.72	3763.0	801.0	63	0.8	78.1
13.00	1.7	92.2	67.94	4077.0	867.0	63	1.1	79.2
14.00	1.2	93.5	73.17	4390.0	934.0	62	0.8	80.0
15.00	1.2	94.6	78.40	4704.0	1001.0	62	0.7	80.7
16.00	0.7	95.3	83.62	5017.0	1068.0	60	0.4	81.1
17.00	0.7	96.1	88.85	5331.0	1134.0	59	0.4	81.5
18.00	0.4	96.5	94.08	5645.0	1201.0	57	0.2	81.8
19.00	0.4	96.9	99.30	5958.0	1268.0	56	0.2	82.0
20.00	0.2	97.1	104.53	6272.0	1334.0	54	0.1	82.1
21.00	0.5	97.5	109.75	6585.0	1401.0	52	0.2	82.3
22.00	0.2	97.8	114.98	6899.0	1468.0	50	0.1	82.5
23.00	1.0	98.8	120.21	7212.0	1535.0	48	0.5	83.0
24.00	0.3	99.1	125.43	7526.0	1601.0	46	0.1	83.1
25.00	0.0	99.1	130.66	7840.0	1668.0	44	0.0	83.1
30.00	0.9	100.0	156.79	9408.0	2002.0	37	0.3	83.4
35.00	0.0	100.0	182.92	10975.0	2335.0	31	0.0	83.4
40.00	0.0	100.0	209.06	12543.0	2669.0	28	0.0	83.4
45.00	0.0	100.0	235.19	14111.0	3002.0	24	0.0	83.4
Estimated Net Annual Sediment (TSS) Load Reduction =								**83 %**

Climate Station ID: 6105978 *Years of Rainfall Data*: 20

RAINFALL DATA FROM OTTAWA CDA RCS RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Stormceptor® EF Sizing Report

Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF5 / EFO5	1.5	5	90	762	30	762	30	710	25
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

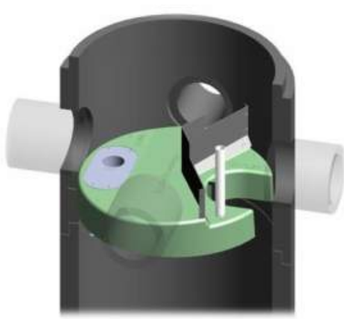
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

DESIGN FLEXIBILITY

►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

OIL CAPTURE AND RETENTION

►While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.



INLET-TO-OUTLET DROP

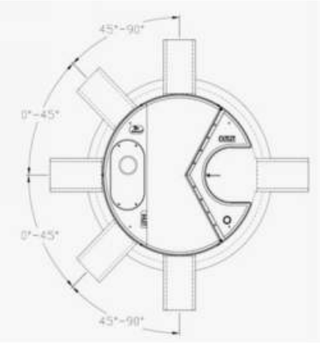
Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.

0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.

45° - 90° : The inlet pipe is 2 inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.



Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft^3)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF5 / EFO5	1.5	5	1.62	5.3	420	111	305	10	2124	75	2612	5758
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity
** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft^3)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade	Maintenance Contractor & Site Owner

STANDARD STORMCEPTOR EF/EFO DRAWINGS

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STANDARD STORMCEPTOR EF/EFO SPECIFICATION

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STANDARD PERFORMANCE SPECIFICATION FOR "OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREAMENT DEVICE

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1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

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	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
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12 ft (3657 mm) Diameter OGS Units: 31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

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3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m^2 to 1400 L/min/m^2, and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/m^2 and 1400 L/min/m^2 shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/m^2 shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m^2. No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m^2.

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m^2 shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m^2, and shall be calculated using a simple proportioning formula, with 1400 L/min/m^2 in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/m^2.

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

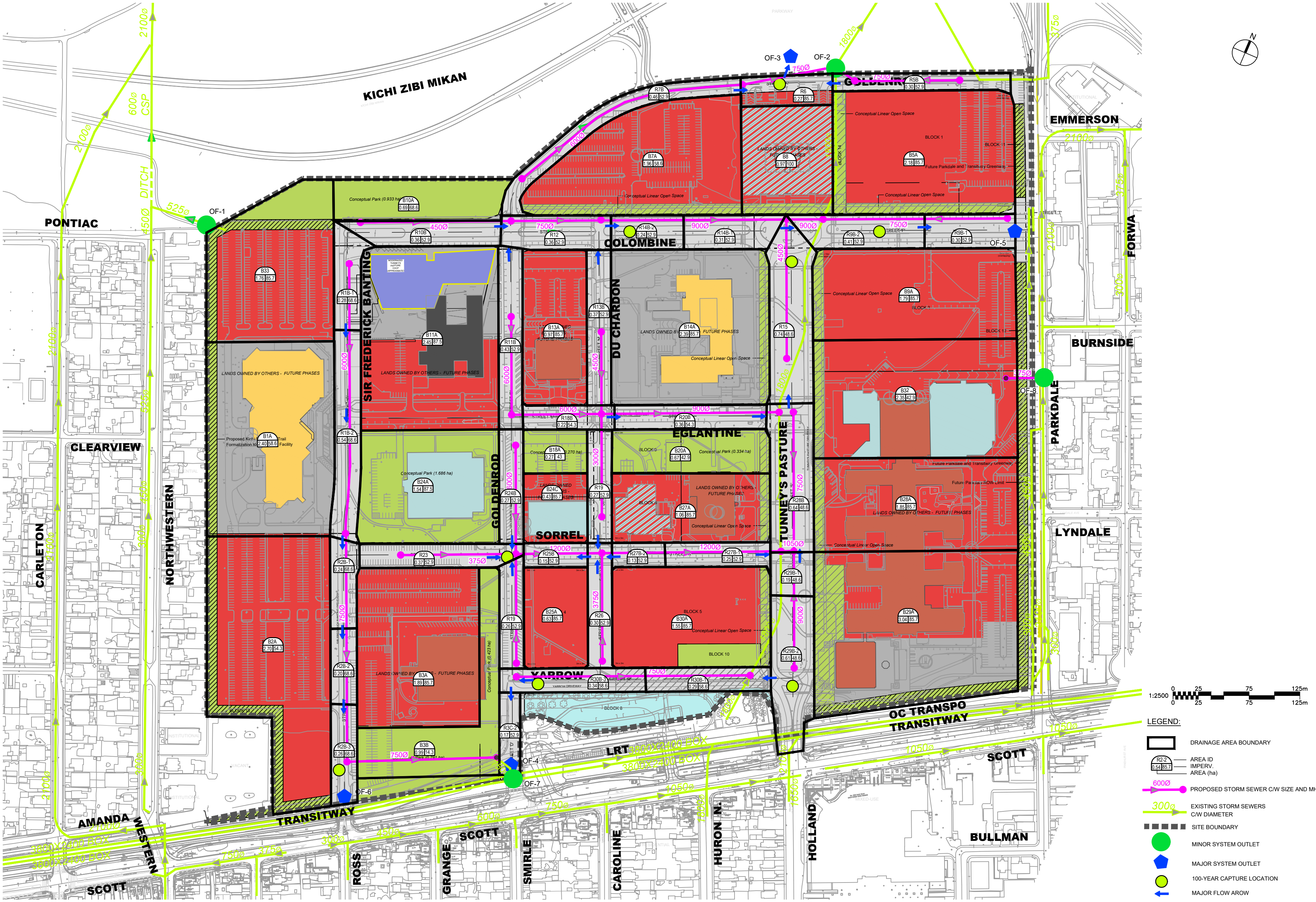
The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m^2 to 2600 L/min/m^2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.



ARCADIS

Project Title

Tunney's Pasture

Site Servicing and Public Road Redevelopment

Prepared for Canada Lands & Public Service and Procurement Canada

Drawing Title

Dual Drainage SWM Model Plan

Sheet No.

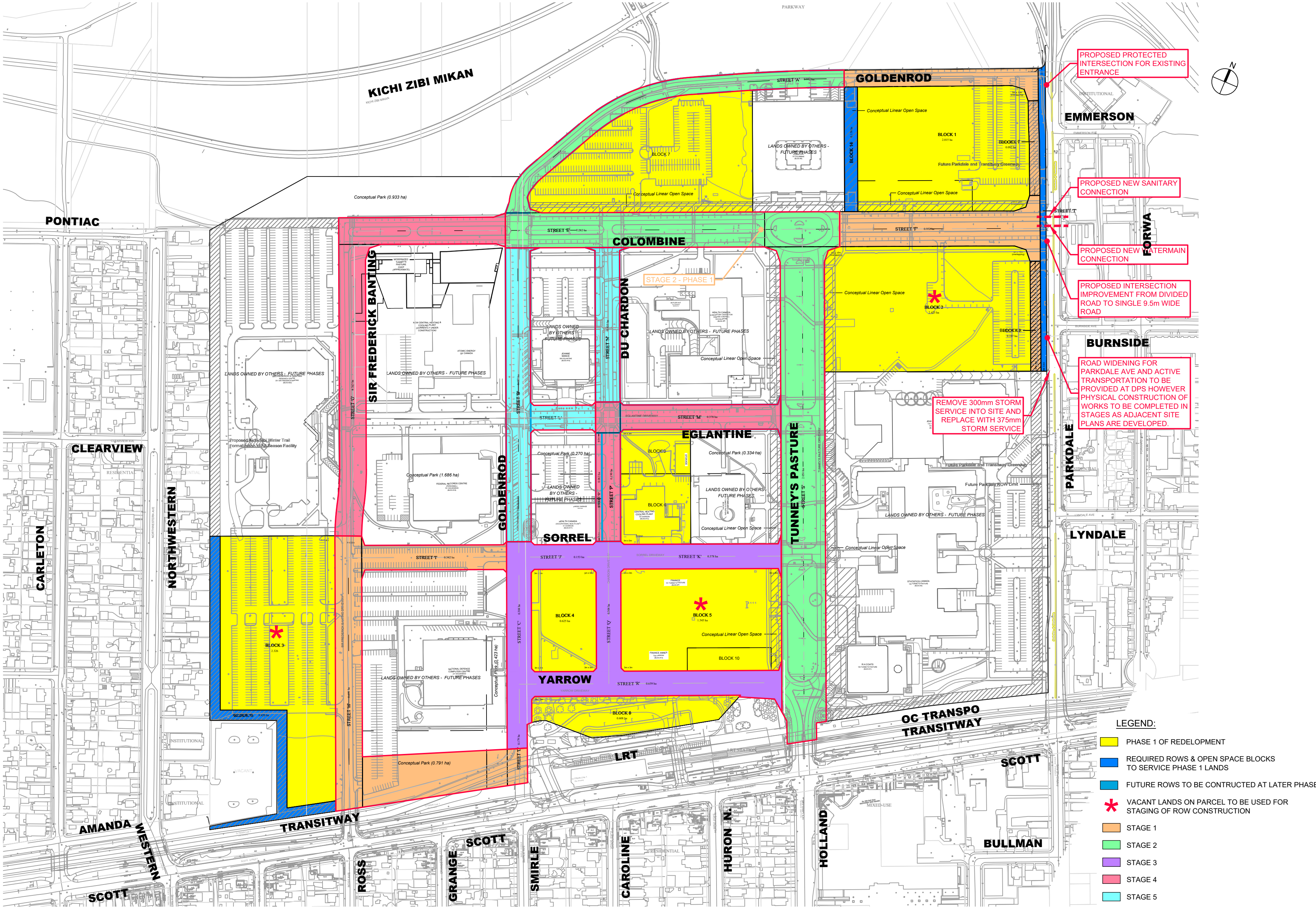
Figure 8

MARCH 31, 2026

Post-Development Model Subcatchment Input Parameters

Subcatchment	Tag	Area (ha)	Subcatchment Width (m)	Flow Length (m)	Slope (%)	Imperv. (%)	N Imperv	N Perv	Dstore Imperv (mm)	Dstore Perv (mm)	Zero Imperv (%)	Subarea Routing	Percent Routed	Infiltration Method	Max. Infil. Rate (mm/hr)	Min. Infil. Rate (mm/hr)	Decay Constant (1/hr)	Drying Time (days)
B1A	Block	2.40	263	91.28	1.00	58.57	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
B2A	Block	2.70	279	96.76	1.00	54.29	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
B3A	Block	1.89	234	80.94	1.00	85.71	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
B3B	Block	0.99	169	58.70	1.00	14.29	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
B5A	Block	2.18	251	87.02	1.00	85.71	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
B7A	Block	1.96	238	82.45	1.00	58.57	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
B8	Block	0.97	167	57.93	1.00	100	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
B9A	Block	1.79	228	78.57	1.00	85.71	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
B10A	Block	0.69	141	48.89	1.00	68.57	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
B11A	Block	2.45	266	92.08	1.00	85.71	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
B13A	Block	0.97	168	57.80	1.00	85.71	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
B14A	Block	2.39	263	90.75	1.00	85.71	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
B18A	Block	0.27	89	30.60	1.00	42.86	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
B20A	Block	0.67	140	48.13	1.00	42.86	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
B24A	Block	1.54	211	73.12	1.00	85.71	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
B24C	Block	0.43	112	38.50	1.00	85.71	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
B25A	Block	0.63	135	46.38	1.00	85.71	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
B27A	Block	1.06	175	60.81	1.00	85.71	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
B28A	Block	1.85	231	79.85	1.00	85.71	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
B29A	Block	3.04	296	102.55	1.00	85.71	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
B30A	Block	1.55	211	73.26	1.00	85.71	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
B32	Block	2.35	260	90.22	1.00	42.86	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
B33	Block	1.76	225	78.13	1.00	85.71	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
R1B-1	ROW	0.28	214	13.00	1.00	68.57	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
R1B-2	ROW	0.54	416	13.00	1.00	68.57	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
R2B-1	ROW	0.24	182	13.00	1.00	68.57	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
R2B-2	ROW	0.20	162	12.00	1.00	68.57	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
R2B-3	ROW	0.26	213	12.00	1.00	68.57	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
R3C-2	ROW	0.17	160	10.33	1.00	52.86	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
R5B	ROW	0.30	377	8.00	1.00	52.86	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
R6	ROW	0.27	88	30.55	1.00	85.71	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
R7B	ROW	0.46	579	8.00	1.00	52.86	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
R9B-1	ROW	0.30	176	17.00	1.00	52.86	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
R9B-2	ROW	0.41	243	17.00	1.00	52.86	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
R10B	ROW	0.36	300	12.00	1.00	52.86	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
R11B	ROW	0.43	354	12.00	1.00	52.86	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
R12	ROW	0.36	213	17.00	1.00	52.86	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
R13B	ROW	0.37	305	12.00	1.00	52.86	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
R14B-1	ROW	0.31	182	17.00	1.00	52.86	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
R14B-2	ROW	0.24	143	17.00	1.00	52.86	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
R15	ROW	0.74	344	21.50	1.00	48.57	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
R18B	ROW	0.22	180	12.00	1.00	54.29	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
R19	ROW	0.27	225	12.02	1.00	52.86	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
R20B	ROW	0.36	300	12.00	1.00	54.29	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
R22	ROW	0.26	215	12.00	1.00	52.86	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
R23	ROW	0.37	305	12.00	1.00	52.86	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
R24B	ROW	0.27	226	12.02	1.00	52.86	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
R25B	ROW	0.15	126	12.00	1.00	52.86	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
R26	ROW	0.30	247	12.00	1.00	52.86	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
R27B-1	ROW	0.25	209	12.00	1.00	52.86	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
R27B-2	ROW	0.13	105	12.00	1.00	52.86	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
R28B	ROW	0.64	298	21.50	1.00	48.57	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
R29B-1	ROW	0.19	86	21.50	1.00	48.57	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
R29B-2	ROW	0.61	214	28.38	1.00	48.57	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
R30B-1	ROW	0.29	240	12.10	1.00	58.57	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7
R30B-3	ROW	0.34	280	12.17	1.00	58.57	0.013	0.25	1.57	4.67	0	OUTLET	100	MODIFIED_HORTON	76.2	13.2	4.14	7

APPENDIX 5



Z:\Toronto\139833_TunneyPasture\7.0_Production\7.03_Design\04_Civil_Land\Figures\Servicing Report\139833ConstructionStaging.dwg Layout Name: Figure 9 Conceptual Construction Staging

ARCADIS

Project Title

Tunney's Pasture

Site Servicing and Public Road Redevelopment

Prepared for Canada Lands & Public Service and Procurement Canada

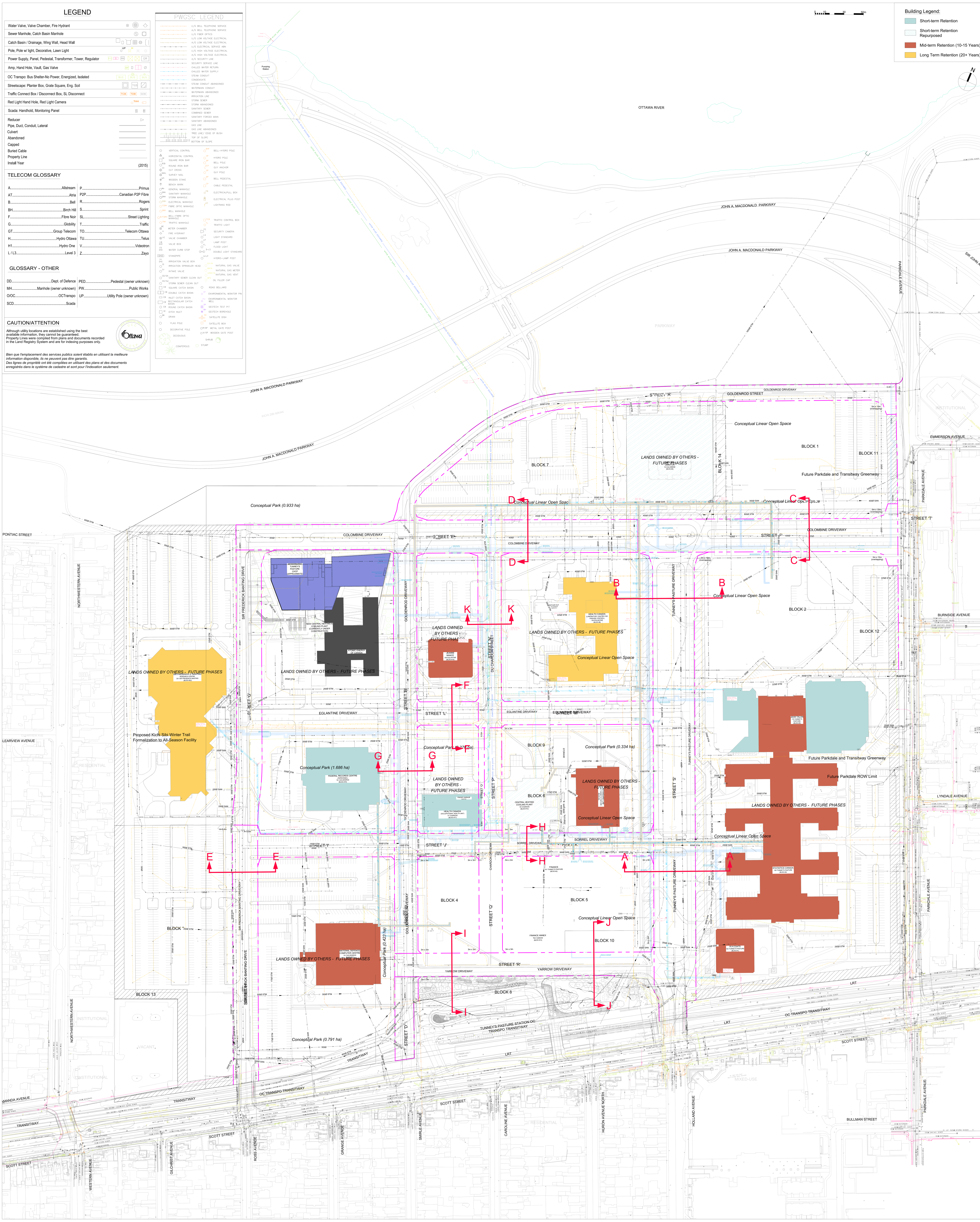
Drawing Title

Conceptual Construction Staging

Sheet No.

Figure 9

March 25, 2026



ARCADIS

Project Title

Tunney's Pasture

Site Servicing and Public Road Redevelopment

Prepared for Canada Lands Company & Public Service and Procurement Canada

Drawing Title

Conceptual Road Cross Section Base

Sheet No.

Figure 10

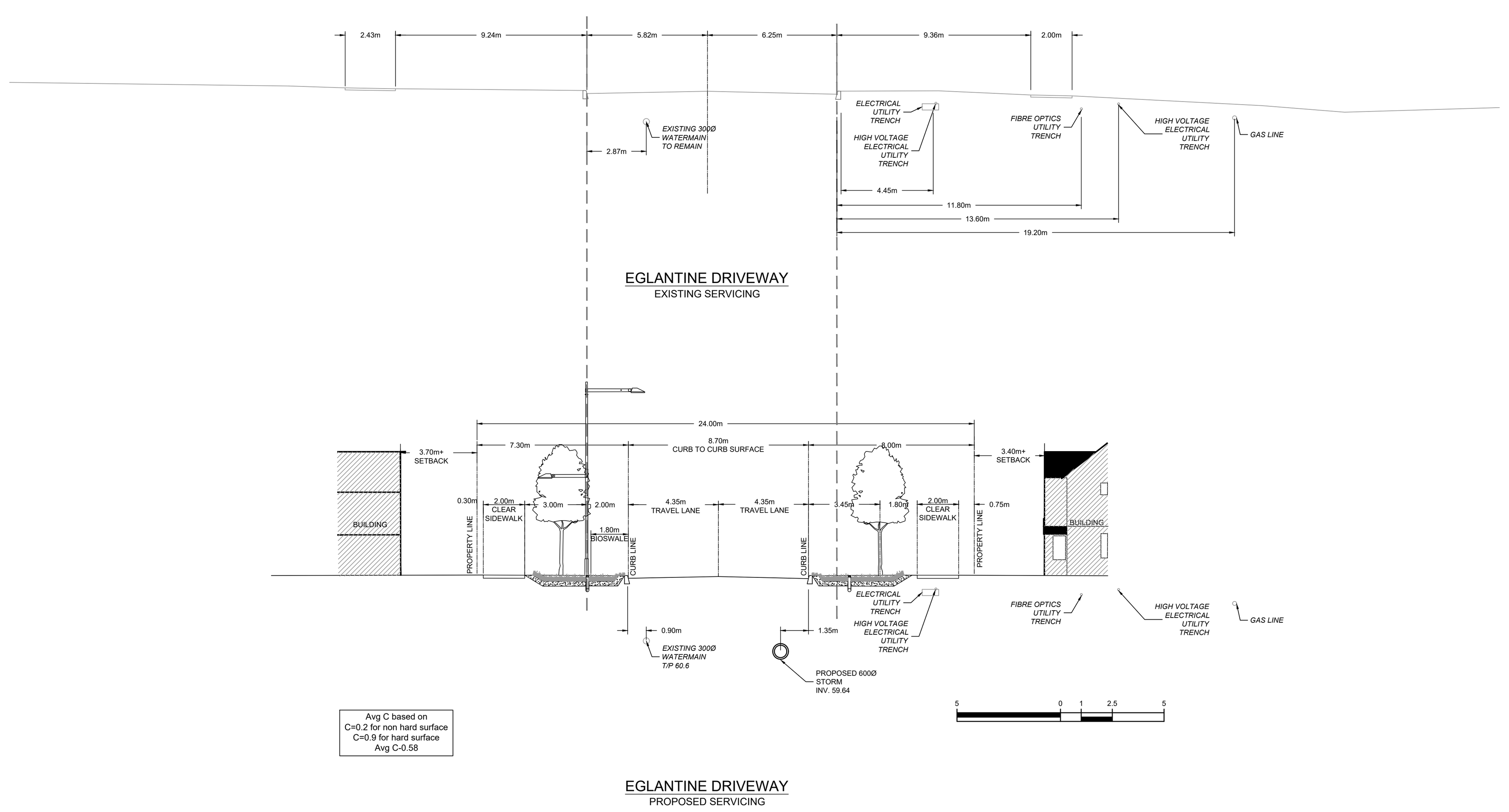
March 25, 2026

ARCADIS

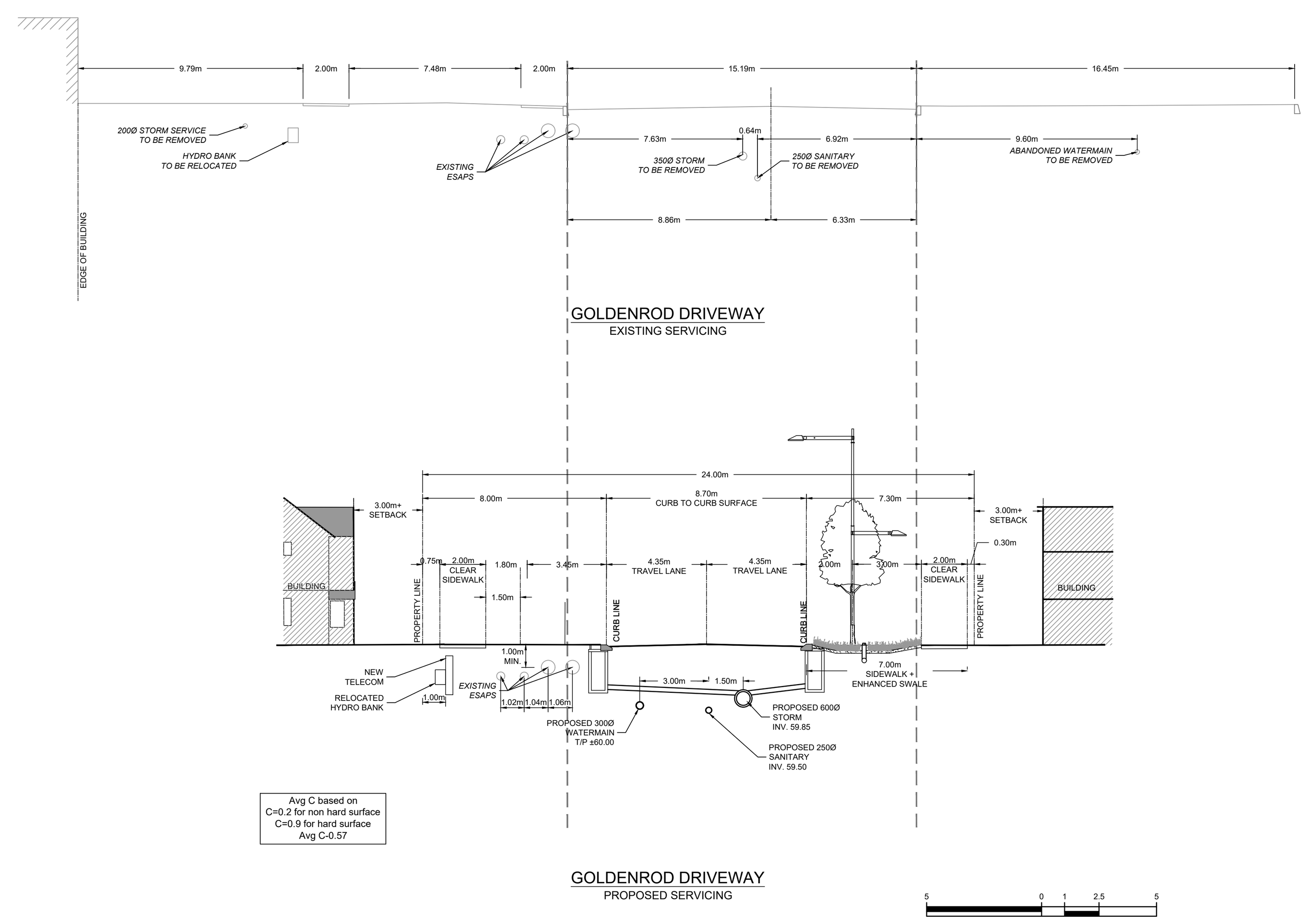
Project Title
Tunney's Pasture
Site Servicing and Public Road Redevelopment
Prepared for Canada Lands Company & Public Service and Procurement Canada

Drawing Title
Road Cross Sections

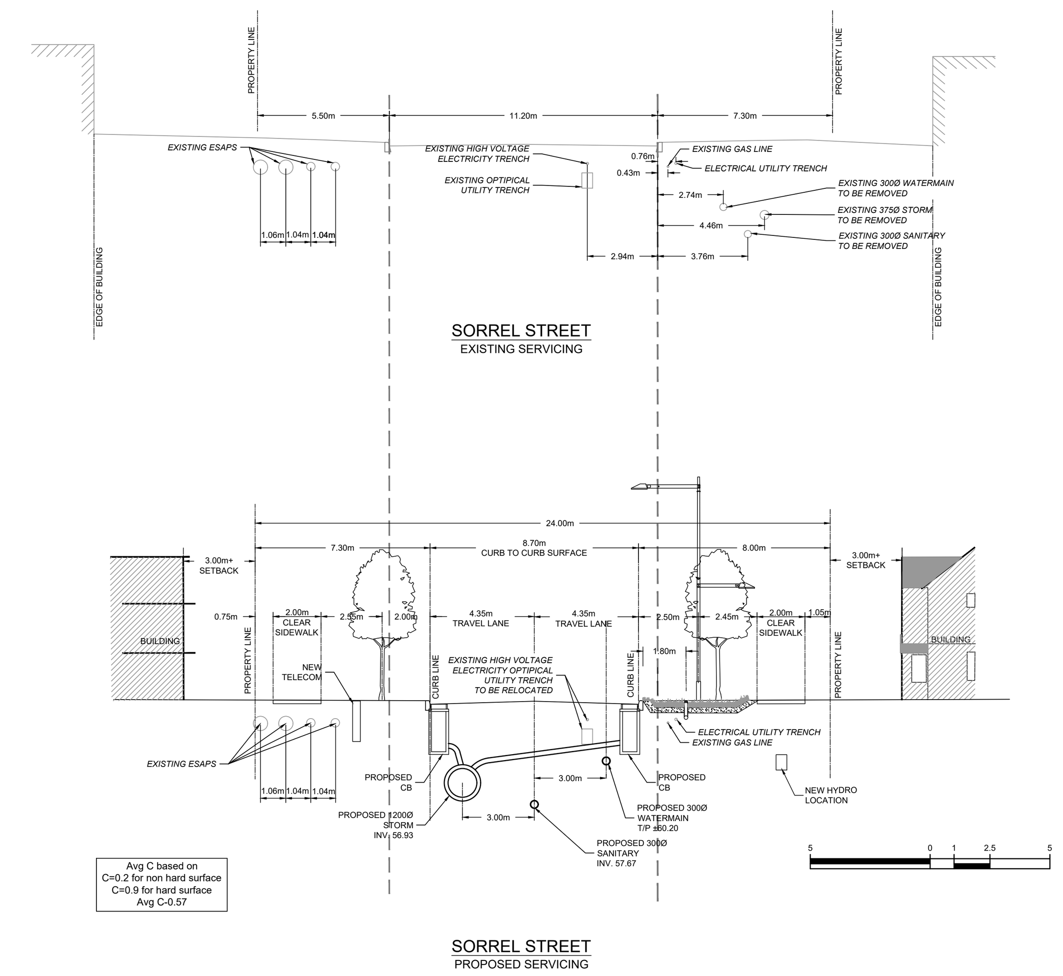
Sheet No.
Figure 11
March 25, 2026



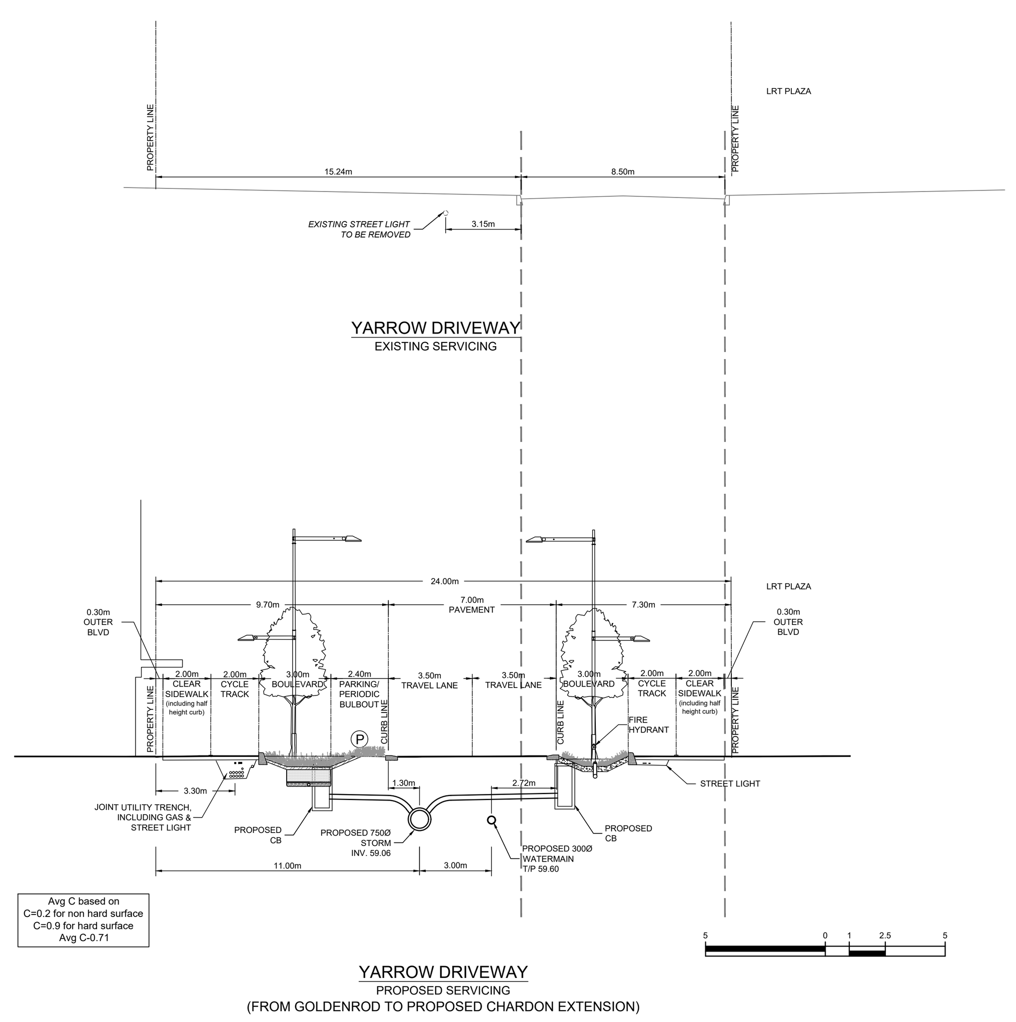
SECTION F-F



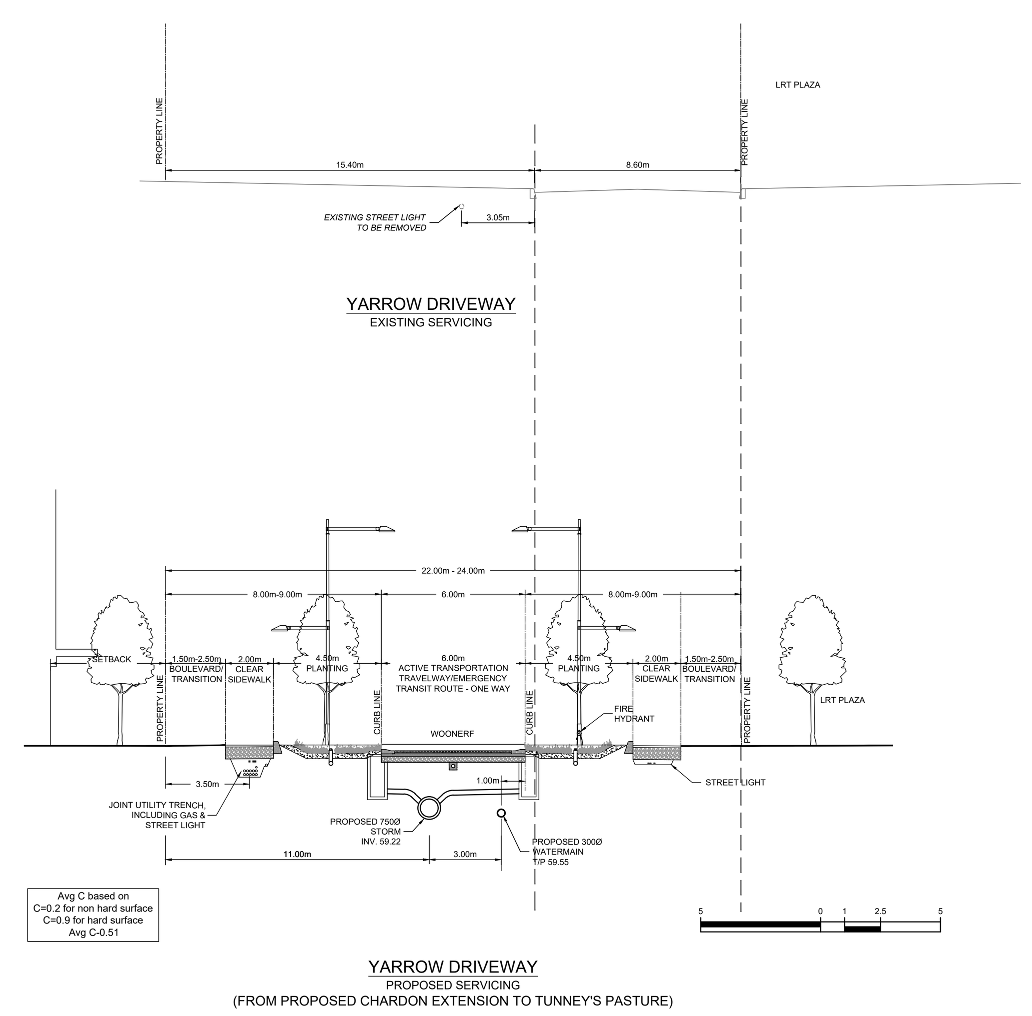
SECTION G-G



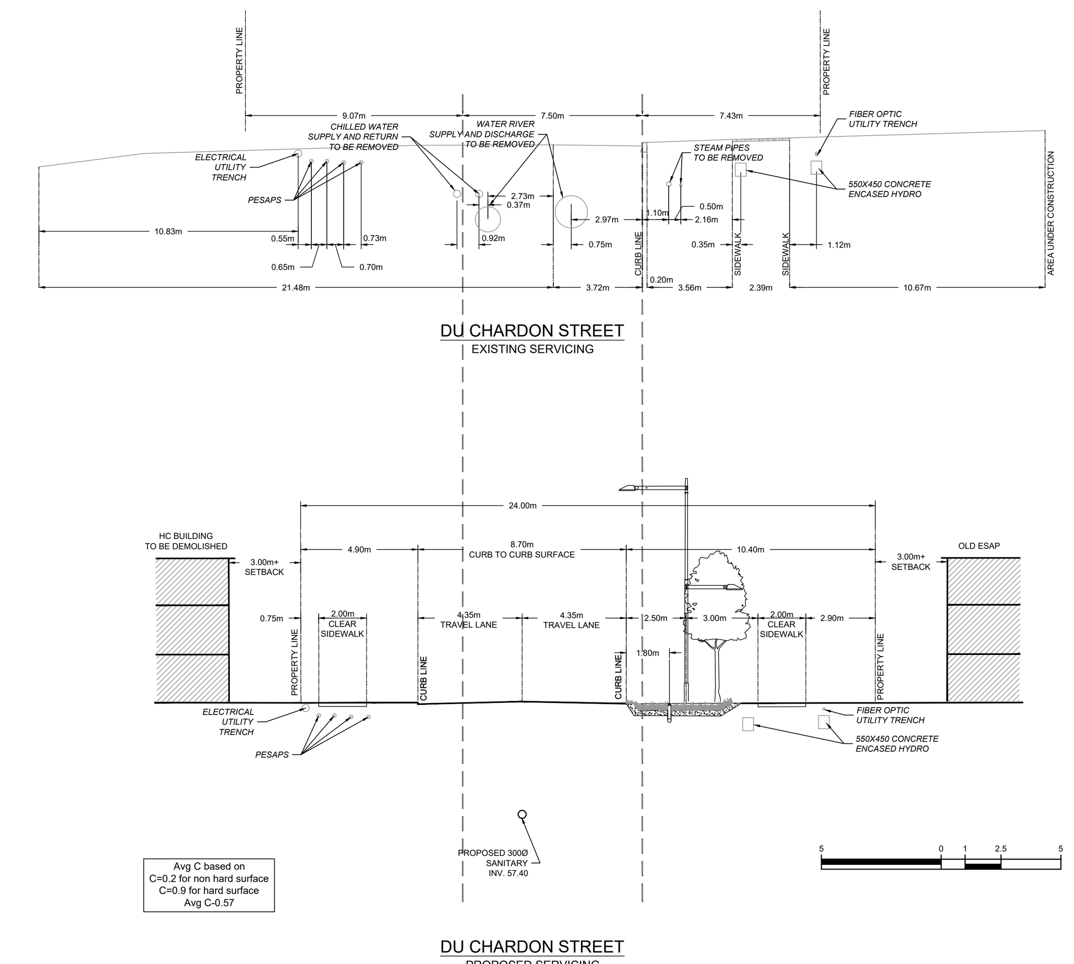
SECTION H-H



SECTION I-I



SECTION J-J



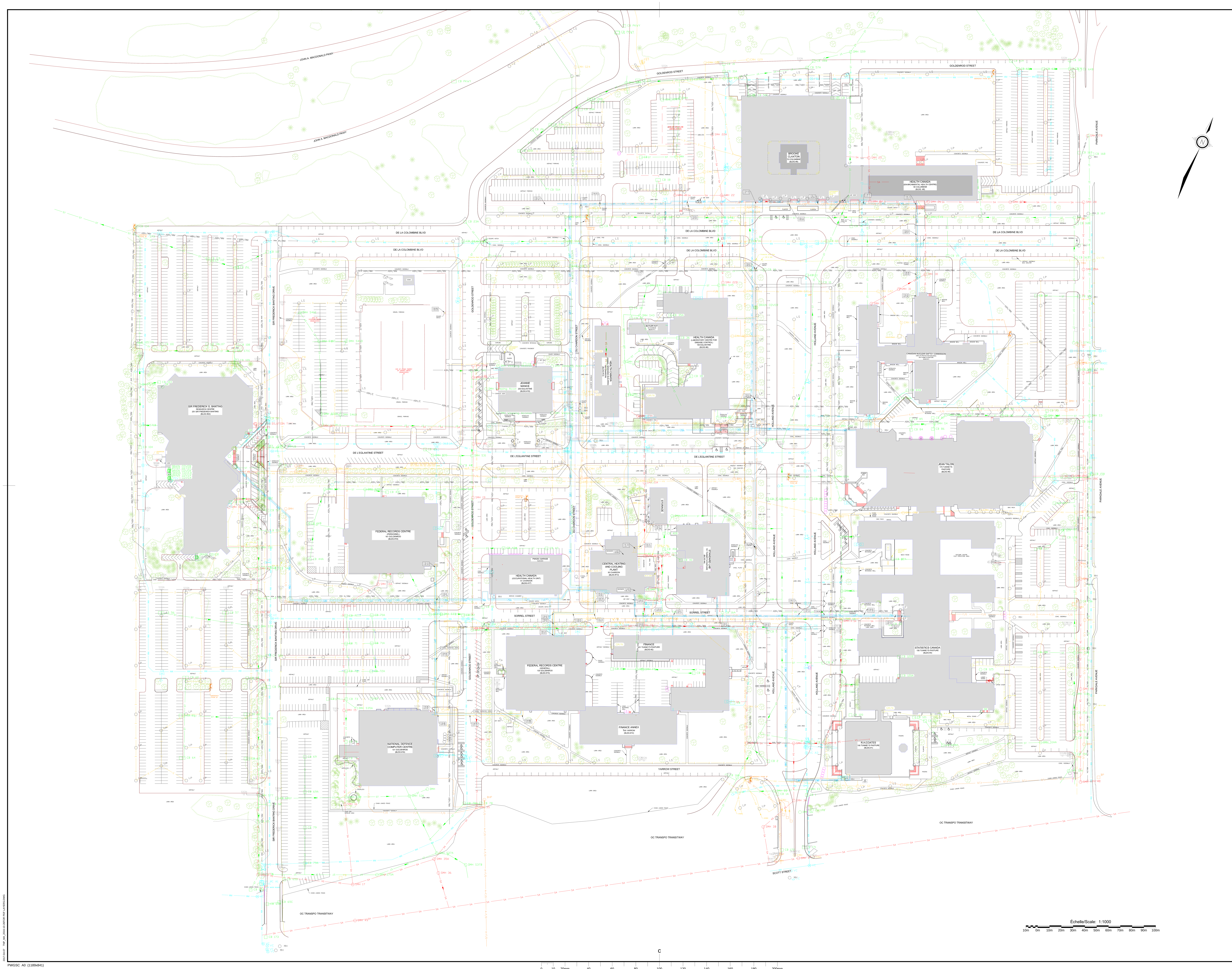
SECTION K-K

ARCADIS

Project Title
Tunney's Pasture
Site Servicing and Public Road Redevelopment
Prepared for Canada Lands Company & Public Service and Procurement Canada

Drawing Title
Road Cross Sections

Sheet No.
Figure 12
March 25, 2026



Canada

Publics Works and Government Services Canada | Travaux publics et services gouvernementaux Canada

Real Property Branch | Direction générale des biens immobiliers

Professional and Technical Services Geomatics - NCA Ops | Services professionnels et techniques – Géomatique - SOCN

LEGEND

B — B	U/G BELL TELEPHONE SERVICE
A–B	A/G BELL TELEPHONE SERVICE
F/O	U/G FIBER OPTICS
E — E	U/G LOW VOLTAGE ELECTRICAL
A–LV	A/G LOW VOLTAGE ELECTRICAL
ABN/E	U/G ELECTRICAL SERVICE ABN
HV	U/G HIGH VOLTAGE ELECTRICAL
A–HV	A/G HIGH VOLTAGE ELECTRICAL
A–S	A/G SECURITY LINE
SEC	SECURITY SERVICE LINE
CWR	CHILLED WATER RETURN
CWS	CHILLED WATER SUPPLY
STM	STEAM CONDUIT
STM/C	CONDENSATE
ABN/STM	STEAM CONDUIT ABANDONED
WM	WATERMAIN CONDUIT
ABN/WM	WATERMAIN ABANDONED
IR	IRRIGATION LINE
ST	STORM SEWER
ABN/ST	STORM ABANDONED
SA	SANITARY SEWER
COMB	COMBINED SEWER
F–SA	SANITARY FORCED MAIN
ABN/SA	SANITARY ABANDONED
G — G	GAS LINE
ABN/G	GAS LINE ABANDONED
	TREE LINE/ EDGE OF BUSH
	TOP OF SLOPE
	BOTTOM OF SLOPE

	VERTICAL CONTROL	BHP	BELL–HYDRO POLE
	HORIZONTAL CONTROL	HP	HYDRO POLE
IB	SQUARE IRON BAR	BP	BELL POLE
RIB	ROUND IRON BAR	GUY	GUY ANCHOR
CC	CUT CROSS	GP	GUY POLE
NAIL	SURVEY NAIL	BP	BELL PEDESTAL
WS	WOODEN STAKE	CP	CABLE PEDESTAL
	BENCH MARK	PB	ELECTRICALPULL BOX
MH	GENERAL MANHOLE		ELECTRICAL PLUG POST
SMH	SANITARY MANHOLE	LR	LIGHTNING ROD
DMH	STORM MANHOLE		
EMH	ELECTRICAL MANHOLE		
FOMH	FIBRE OPTIC MANHOLE		
BMH	BELL MANHOLE		
B/FOMH	BELL–FIBRE OPTIC MANHOLE	TCB	TRAFFIC CONTROL BOX
TMH	TRAFFIC MANHOLE	TL	TRAFFIC LIGHT
MC	METER CHAMBER	FC	SECURITY CAMERA
H	FIRE HYDRANT	LS	LIGHT STANDARD
VC	VALVE CHAMBER	LP	LAMP POST
VB	VALVE BOX	FL	FLOOD LIGHT
CS	WATER CURB STOP	D–LS	DOUBLE LIGHT STANDARD
	STANDPIPE	H/LP	HYDRO–LAMP POST
IV	IRRIGIATION VALVE BOX	GV/N	NATURAL GAS VALVE
IS	IRRIGATION SPRINKLER HEAD	GM/N	NATURAL GAS METER
IV	INTAKE VALVE	VENT/N	NATURAL GAS VENT
CO/SA	SANITARY SEWER CLEAN OUT	OFC	OIL FILLER CAP
CO/SW	STORM SEWER CLEAN OUT		ROAD BOLLARD
CB	SQUARE CATCH BASIN	MP	ENVIRONMENTAL MONITOR PIN
CB	DOUBLE CATCH BASIN	MW	ENVIRONMENTAL MONITOR WELL
CB	INLET CATCH BASIN	TP	GEOTECH TEST PIT
CB	RECTANGULAR CATCH BASIN	BH	GEOTECH BOREHOLE
CB	ROUND CATCH BASIN	SD	SATELLITE DISH
DI	DITCH INLET	SB	SATELLITE BOX
DR	DRAIN	M/GP	METAL GATE POST
	FLAG POLE	W/GP	WOODEN GATE POST
	DECORATIVE POLE		SHRUB
	DECIDUOUS		STUMP
	CONIFEROUS		

SURVEY RECORD

DATE	SURVEY DETAILS

Coordinates shown on this plan are in meters and have been referenced to MTM NAD 83 (original), Zone 9.
Canadian Geodetic Vertical Datum of 1928 (CGVD28)

Les coordonnées sur ce plan sont en mètres et sont en référence au système géodésique MTM NAD 83 (origine), Fuseau 9.
Système canadien de référence altimétrique de 1928 (CGVD28)

Please Note:

The utility information shown on this drawing has been collected using various sources and/or quality of information. It represents the best available data, but its accuracy or completeness cannot be guaranteed. This is only a single source of information, Contractors should contact the property owner and other PWGSC sources prior to digging. It is the responsibility of all subsequent users of this drawing to verify all pertinent information to the degree necessary to support subsequent designs, construction works, or other site interventions. Any discrepancies must immediately be brought to the attention of the PWGSC Geomatics Services.
Geomatics.Geomatique@pwgsc-tpsgc.gc.ca

Veuillez noter :

Les informations des servitudes figurant sur ce plan ont été recueillies à l'aide de diverse source et/ou de qualité d'information. Elle représente nos meilleures données disponibles, mais l'exactitude ou l'intégralité ne peut être garantie. Elle ne s'agit que d'une seule source d'information, les entrepreneurs doivent communiquer avec le gestionnaire des biens de propriété de TPSGC et autres sources avant de creuser. Cela demeure la responsabilité de tous utilisateurs de ce plan de vérifier tous l'information pertinente pour le degré nécessaire en vue d'appuyer leurs travaux de conception, de construction ou à d'autres interventions. Tout écart doit immédiatement être porté à l'attention des services géomatique de TPSGC.
Geomatics.Geomatique@pwgsc-tpsgc.gc.ca

project | projet

Tunney's Pasture Complex

Ottawa ON

drawing | dessin

Services Plan

Drawn By	J. De Curtis	Dessiné par
Date	2017-04-07	(yyyy/mm/dd)
Reviewed By		Examiné par
Date		(yyyy/mm/dd)
Project no.		No. du projet
Drawing no.	TNP_035_C_01_17	No. du dessin

PWGSC A0 (1189x841)

0 10 20mm 40 60 80 100 120 140 160 180 200mm

SHEET INDEX				
Sheet Number	Sheet Title	Revision Number	Revision Description	Revision Date
TUd-000-C001	DRAWING LIST AND KEY PLAN	4	ISSUED FOR FINAL DETAILED DESIGN REPORT (100%)	2021.05.28
TUd-000-C100	DISTRIBUTION PLAN & PROFILE 0+000 to 0+120	5	ISSUED FOR FINAL DETAILED DESIGN REPORT (100%)	2021.05.28
TUd-000-C101	DISTRIBUTION PLAN & PROFILE 1+000 to 1+230	5	ISSUED FOR FINAL DETAILED DESIGN REPORT (100%)	2021.05.28
TUd-000-C102	DISTRIBUTION PLAN & PROFILE 1+230 to 1+460	4	ISSUED FOR FINAL DETAILED DESIGN REPORT (100%)	2021.05.28
TUd-000-C103	DISTRIBUTION PLAN & PROFILE 1+460 to 1+695	4	ISSUED FOR FINAL DETAILED DESIGN REPORT (100%)	2021.05.28
TUd-000-C104	DISTRIBUTION PLAN & PROFILE 2+000 to 2+215	4	ISSUED FOR FINAL DETAILED DESIGN REPORT (100%)	2021.05.28
TUd-000-C105	DISTRIBUTION PLAN & PROFILE 2+215 to 2+405	6	ISSUED FOR FINAL DETAILED DESIGN REPORT (100%)	2021.05.28
TUd-000-C106	DISTRIBUTION PLAN & PROFILE 3+000 to 3+210	4	ISSUED FOR FINAL DETAILED DESIGN REPORT (100%)	2021.05.28
TUd-000-C107	DISTRIBUTION PLAN & PROFILE 3+210 to 3+288	4	ISSUED FOR FINAL DETAILED DESIGN REPORT (100%)	2021.05.28
TUd-000-C108	DISTRIBUTION PLAN & PROFILE 4+000 to 4+215	4	ISSUED FOR FINAL DETAILED DESIGN REPORT (100%)	2021.05.28
TUd-000-C109	DISTRIBUTION PLAN & PROFILE 4+215 to 4+310	4	ISSUED FOR FINAL DETAILED DESIGN REPORT (100%)	2021.05.28
TUd-000-C110	DISTRIBUTION PLAN & PROFILE 5+000 to 5+060	4	ISSUED FOR FINAL DETAILED DESIGN REPORT (100%)	2021.05.28
TUd-000-C111	DISTRIBUTION PLAN & PROFILE 8+000 to 8+040, 9+000 to 9+090	4	ISSUED FOR FINAL DETAILED DESIGN REPORT (100%)	2021.05.28
TUd-000-C112	DISTRIBUTION PLAN & PROFILE 10+000 to 10+116	4	ISSUED FOR FINAL DETAILED DESIGN REPORT (100%)	2021.05.28
TUd-000-C113	DISTRIBUTION PLAN & PROFILE 20+000 to 20+160	4	ISSUED FOR FINAL DETAILED DESIGN REPORT (100%)	2021.05.28
TUd-000-C114	DISTRIBUTION PLAN & PROFILE 12+000 to 12+025, 15+000 to 15+025	4	ISSUED FOR FINAL DETAILED DESIGN REPORT (100%)	2021.05.28
TUd-000-C115	DISTRIBUTION PLAN & PROFILE 16+000 to 16+030, 17+000 to 17+030	4	ISSUED FOR FINAL DETAILED DESIGN REPORT (100%)	2021.05.28
TUd-000-C116	DISTRIBUTION PLAN & PROFILE 18+000 to 18+210	4	ISSUED FOR FINAL DETAILED DESIGN REPORT (100%)	2021.05.28
TUd-000-C117	DISTRIBUTION PLAN & PROFILE 19+000 to 19+145	4	ISSUED FOR FINAL DETAILED DESIGN REPORT (100%)	2021.05.28
TUd-000-C118	DISTRIBUTION PLAN & PROFILE 21+000 to 21+027, 22+000 to 22+020	5	ISSUED FOR FINAL DETAILED DESIGN REPORT (100%)	2021.05.28
TUd-000-C200	REMOVAL PLAN	2	ISSUED FOR FINAL DETAILED DESIGN REPORT (100%)	2021.05.28
TUd-000-C201	REMOVAL PLAN	2	ISSUED FOR FINAL DETAILED DESIGN REPORT (100%)	2021.05.28
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TUd-000-C204	NEW UTILITIES	2	ISSUED FOR FINAL DETAILED DESIGN REPORT (100%)	2021.05.28
TUd-000-C300	REINSTATEMENT PLAN	2	ISSUED FOR FINAL DETAILED DESIGN REPORT (100%)	2021.05.28
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TUd-000-C303	REINSTATEMENT PLAN	2	ISSUED FOR FINAL DETAILED DESIGN REPORT (100%)	2021.05.28
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TUd-000-C808	BEND SCHEDULE 4+000 to 4+215	3	ISSUED FOR FINAL DETAILED DESIGN REPORT (100%)	2021.05.28
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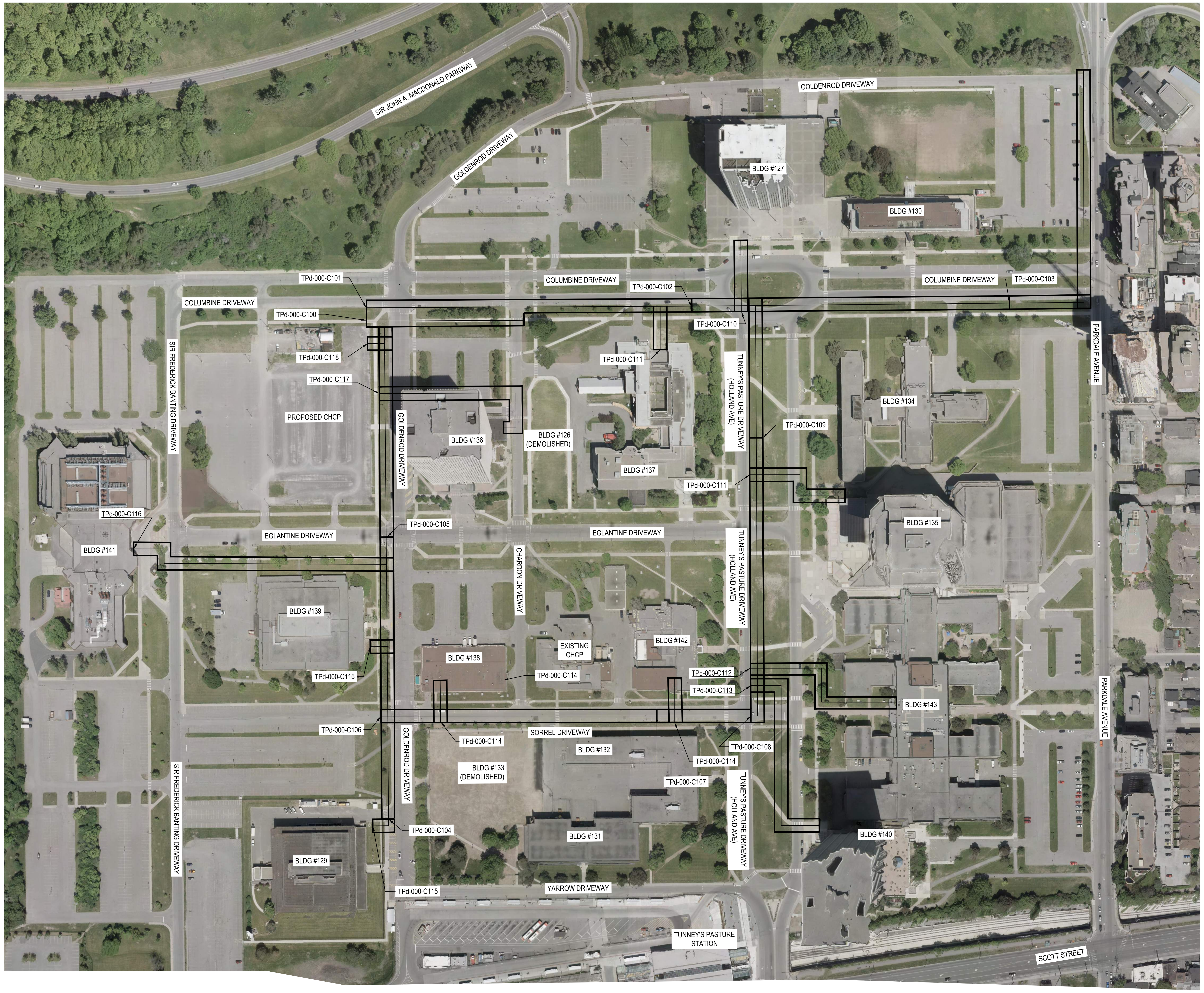
TUd-000-C903	DISTRIBUTION DETAILS	1	ISSUED FOR FINAL DETAILED DESIGN REPORT (100%)	2021.05.28
TUd-000-C904	DISTRIBUTION DETAILS	1	ISSUED FOR FINAL DETAILED DESIGN REPORT (100%)	2021.05.28



SYMBOL LEGEND							
EXISTING STREET LIGHTING		NEW STREET LIGHTING		EXISTING MANHOLE		NEW MANHOLE	
EXISTING VALVE BOX		NEW VALVE BOX		EXISTING CATCHBASIN MANHOLE		NEW CATCHBASIN MANHOLE	
EXISTING SIGNAGE	S	NEW SIGNAGE	S	EXISTING CAP		NEW CAP	
EXISTING CATCHBASIN		NEW CATCHBASIN		EXISTING GAS METER	GM	EXISTING SPRINKLER VALVE	
EXISTING HYDRANT		NEW HYDRANT		EXISTING PEDESTAL BOX	PB	EXISTING FLAGPOLE	FP

Public Works and Government Services Canada
Travaux publics et services gouvernementaux Canada

Real Property Branch
Services des Bien Immobiliers

Rev.	Description	Date
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3	DIRECT BURIED DISTRIBUTION EXPEDITED SUBMISSION 100%/IFC	2021.04.06
2	ISSUED FOR DETAILED DESIGN REPORT (99%)	2020.12.11
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Project / Projet

ENERGY SERVICES ACQUISITION PROGRAM MODERNIZATION PROJECT

drawing / dessin

MODERNIZED TUNNEY'S PASTURE CHCP
DRAWING LIST AND KEY PLAN

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Date

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Tunney's Pasture Redevelopment - *Telecommunications and Technology Assessment and Planning Report*

Prepared For:

ARCADIS Design & Consultancy for natural and built assets

Prepared By:

attain

Report Date:
July 26th, 2024

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Executive Summary

The Tunney's Pasture Redevelopment project aims to modernize and enhance the telecommunication and technology infrastructure to support future development and operations. This report provides an updated assessment and planning strategy, building on the foundations laid in our original 2019 report.

Key observations and recommendations include:

1. **Infrastructure Status**:
    - Since 2019, the cable plant infrastructure at Tunney's Pasture has seen minimal changes. There have been a few new installations; however, these have followed existing routes.
2. **Carrier Coordination**:
    - Carriers have been informed of the development transition plan. Importantly, they will require a one-year notice to plan and implement necessary changes. Effective coordination during the next phase, which includes detailed design and financial planning, is essential.
3. **Strategic Planning**:
    - A RACI (Responsible, Accountable, Consulted, Informed) matrix needs to be created to outline key steps, milestones, and potential risks. This will ensure clear roles and responsibilities throughout the project phases.
4. **Development Strategy**:
    - The overarching strategy is to establish new temporary overland conveyances for all telecommunications infrastructure, including poles and ducts. Each building will have new, independent cable entrances, minimizing interdependencies and ensuring that development can progress without disrupting adjacent buildings or services.
    - Carriers will be notified of changes on a phase-by-phase basis, allowing them to plan for long-term infrastructure in Tunney's Pasture similarly to any other commercial or residential street in Ottawa.
5. **Infrastructure Enhancements**:

    We recommend installing a series of new lateral ducts between each building and an underground handhole. This setup will facilitate both temporary feeds and long-term connections to the permanent telecom system, which will be developed as the project progresses. Tenant Preparation and Coordination:

    - Detailed tenant preparation and discussions, along with coordination and communication, will ensure a smooth cutover of temporary and permanent services. This includes a detailed planning phase by building to address specific needs and timelines. This phase requires a detailed review of each buildings' Main Telecom Room and building backbone(s) to assess suitability for long-term accommodation of services.

- There are other "low-voltage" services that need to be considered during the development process; specifically, security and surveillance systems, public lighting, traffic control systems, emergency call

By implementing these recommendations, we aim to create a robust and flexible telecommunications framework that supports the redevelopment of Tunney's Pasture, ensuring seamless service delivery and future-proof infrastructure.

Background

This report updates our 2019 assessment, addressing the evolving technological landscape and its implications for the development of Tunney's Pasture in Ottawa. Given the critical role of technology in commercial and residential developments, our focus has been on ensuring that the latest telecommunication advancements are integrated from the development stage.

The Tunney's Pasture Complex in Ottawa, Ontario, Canada, is home to many Federal Civil Servants primarily employed by Health Canada, Statistics Canada, and the Department of National Defense. There are 14 buildings managed by Public Services and Procurement Canada located on the campus.

The contiguous property includes both an older (located in building 13) and a new central heating and cooling plant operation (CHCP) that is comprised of several underground pathways and tunnels interconnecting buildings.

To distribute services to the individual client departments, Telecom Service Providers (TSPs), such as Bell Canada, Rogers Communications, broadcasters like Rogers, CBC, CTV, and others, including the client departments themselves, have utilized this system of underground tunnels and manholes to accommodate the fibre optic and copper cables required to interconnect carriers' networks to the individual departments. Additionally, these pathways connect various buildings and functional departments to each other.

The proliferation of network cables installed by both carriers, tenants, and broadcasters, without associated and appropriate support infrastructure, pathways, and management planning, has created a situation that prevents further installation of cables in existing pathways. The current voice system for all buildings, primarily a copper distribution with a few exceptions of fiber feed RLMs, is at maximum capacity for several buildings. The Centrex technology currently in use is at the end of its life with extremely limited replacement parts available.

As development proceeds, a new ESOP Plant is being installed. Collaboration with the development team (Arcadis, Canada Lands, PSPC) and IT teams (Bell, TELUS, Rogers, Zayo) is essential. We would like to extend recognition to SSC Salina Aubrey and Stephen Pilon for their contributions to this effort.

Scope

- **Phase 1: Telecommunications Site Condition Report**
    - Update the TBCR for each building to understand existing connections and inter-dependencies between buildings.
    - Survey each building and entrance to validate 2019 report findings.
    - Emphasize modern, redundant entries for each building, allowing for both multiple profile tenants.
    - Provide recommendations about potential upgrades or enhancements based on recent technological advancements.

- **Phase 2: Coordinated Technology Development & Transition Plan**
    - Review and update the interconnectivity plans with a focus on modularity and adaptability to future technological changes.
    - Ensure that the duct bank infrastructure plan is aligned with the latest environmental and construction standards.
    - Collaborate with SSC, City of Ottawa planning, and carriers to develop a comprehensive, forward-looking transition plan.
    - Update wireless coverage options to include the latest in cellular and Wi-Fi technology, considering 5G and futureproofing for upcoming standards.
    - Provide updated Class "A" cost estimates, reflecting current market prices and technological costs.
    - Explore new revenue streams from IT and telecommunications service providers, considering recent market shifts and regulatory changes.

Methodology

To capture the necessary data and determine the effects of the proposed development on the existing infrastructure, the Attain Group employed a comprehensive approach, including:

Carrier Meetings:

- Held meetings with wireline carriers Bell Canada, Rogers, TELUS, and Zayo to determine their existing cable plant routes into and around the campus.
- Gathered carriers' requests regarding their requirements for a new campus-wide underground cable plant infrastructure and proposed routing of new redundant entrance points into the campus.
- Discussed feeding temporary new entrances to each building during development and construction.

Stakeholder Meetings:

- Conducted multiple meetings with various Government of Canada stakeholders from the Department of National Defense (DND), Public Services and Procurement Canada (PSPC), Statistics Canada (Stats Can), Health Canada (HC), Innovation, Science and Economic Development Canada – Measurement Canada (ISED-M), Shared Services Canada (SSC) (Voice, Data, WAN, LAN, and Project-related staff), Canada Lands (CLC), Indigenous Services Canada/Crown-Indigenous Relations and Northern Affairs Canada (ISC-CIRNAC).
- These meetings were instrumental in understanding the diverse needs and concerns of all parties involved.

Data Review:

- Reviewed carrier plans and client-supplied information to ensure a comprehensive understanding of existing conditions and requirements.
- Reviewed the updated carrier report commissioned by BGIS in 2021 to incorporate the latest developments and insights.

With all the information gathered, the Attain Group analyzed the redevelopment requirements and developed a project transition plan. This plan encompasses the phasing, carrier requests, and future technology deployment of the future Tunney's Pasture community, ensuring a robust and future-proof telecommunication infrastructure.

Way Forward

Early into the updating of the 2019 report, it became apparent that a novel approach was needed to align with the goals of the Tunney's Pasture Redevelopment project. Due to the aggressive Phase 1 construction schedule which involves deep roadwork and associated utilities replacement (such as water, sewer, hydro and communications ducts) it became obvious that such work would directly impact existing utilities tunnels, duct banks and therefore communications services to most buildings in the Pasture.

With that understanding, a way forward was needed by all stakeholders to:

1) De-risk and prevent outages of communications services to all clients within the Pasture.
2) Provide a strategy for PSPC, SSC and their clients, and Arcadis to attempt to align with the construction schedule.

Approach

With all parties in agreement with the way forward, and approach or strategy was developed. While still high-level, all parties agree with the principles and steps which our outlined below:

1) Working with the major communications carriers (Bell, Zayo, Rogers, Telus), provide temporary services to all buildings to mirror current capacity.
2) Temporary services (fibre cables) would be fed from Parkdale Ave and Scott St.
3) Method of conveying the cables will have to be coordinated with all carriers, PSPC, Arcadis, and SSC (to ensure confidence of service level agreements).
4) Options for conveyance could include:
    a. New utility poles for street crossing to avoid construction traffic and equipment.
    b. Overland options such as utility poles, HDPE ducts with concrete protection or other proposed method.
    c. Tie-in to existing building entrance ducts, or construction of new entrance ducts to all affected buildings.

Risk Mitigation Strategy

Once new temporary services are installed and configured by the carriers to mirror those currently in service, the following steps would take place:

1) Cut-over existing services to new "temporary" services using new overland routes to avoid roadway construction.
2) Maintain current services until all building cutovers have been completed or both the carriers and major clients (i.e. SSC, BGIS) and tenants (Health Canada, Stats Canada, DND etc.) are satisfied that the new services are operationally stable.

3) Out-order (remove or abandon) all current copper and fibre cables utilizing the underground tunnels and duct structures.
4) New roadway construction can then proceed with the knowledge that all communications services to buildings are on temporary services not affected by construction.

Coordinated Technology Development and Transition Plan Overview

Overview

The plan aims to modernize and transition the telecommunication and technology infrastructure at Tunney's Pasture to meet current and future needs. It involves updating the existing copper and fiber cable systems and transitioning from a centralized campus to a decentralized city streetscape with robust, redundant connectivity.

Key Objectives

1. Ensure Continuity: Prevent outages of communication services during construction.
2. Align with Construction: Synchronize technology updates with the Phase 1 construction schedule.
3. Modernize Infrastructure: Upgrade to smart city technologies, focusing on IoT, AI, and smart grids.
4. Future-proof Connectivity: Prepare for emerging technologies.

Phase 1: Coordinated Technology Development & Transition Plan

1. Temporary Services Installation
    - Work with major carriers (Bell, Zayo, Rogers, TELUS) to install temporary services that mirror current capacity.
    - Utilize Parkdale Ave and Scott St for temporary fiber cable feeds.
    - Coordinate with carriers, PSPC, Arcadis, and SSC to ensure service level agreements are maintained.
    - Options for conveyance include new utility poles, HDPE ducts with concrete protection, and new entrance ducts.

2. Risk Mitigation and Cutover Process
    - Cutover existing services to new temporary services using new overland routes.
    - Maintain current services until all building cutovers are complete and new services are stable.
    - Decommission (out-order) current underground copper and fiber cables.
    - Proceed with new roadway construction once all communications services are on temporary setup.

3. Permanent Infrastructure Development
    - Develop a robust permanent infrastructure with enhanced capacity and resilience.
    - Implement smart city technologies focusing on IoT, AI, and smart grids.
    - Update wireless coverage to include 5G and future-proof standards.

- Ensure the duct bank infrastructure plan aligns with environmental and construction standards.

4. Tenant Preparation and Coordination

    - Conduct detailed discussions with tenants to prepare for the transition.
    - Provide clear communication on cutover schedules and temporary service setups.
    - Implement a detailed planning phase for each building.
    - Offer ongoing support and updates to tenants throughout the transition process.

5. Cost Estimates and Revenue Streams

    - Provide updated Class "A" cost estimates reflecting current market prices and technological costs.

Conclusion

The coordinated technology development and transition plan for Tunney's Pasture offers a strategic and comprehensive approach to modernizing the telecommunication and IT infrastructure. It ensures continuity, aligns with construction schedules, incorporates the latest technologies, and prepares for future advancements, supporting a smooth transition and futureproofing the campus.

Transition Plan – Next Steps

1. Working with Major Communications Carriers

Current State**:**
- Existing communications services are routed through underground tunnels and duct structures, which will be impacted by Phase 1 construction.

Temporary Solution**:**
- Engage with major carriers (Bell, Zayo, Rogers, Telus) to install temporary services that mirror the current capacity as development phases are confirmed.
- Temporary services (fiber cables) will be fed from Parkdale Ave and Scott St.
- Identify funding sources.

Permanent Solution**:**
- Once construction is completed, transition to a permanent infrastructure setup with enhanced capacity and resilience.

Steps**:**
1. Coordinate with carriers to design temporary service routes.
2. Install temporary fiber cables.
3. Test and validate temporary services to ensure they meet current capacity requirements.
4. Maintain a detailed record of temporary installations for future reference.

2. Conveyance Method Coordination

Current State**:**
- Existing conveyance methods are primarily underground, which will be disrupted by construction.

Temporary Solution**:**
- Explore and implement alternative conveyance methods, such as new utility poles, HDPE ducts with concrete protection, or new entrance ducts to affected buildings.

Permanent Solution**:**
- Develop a robust and resilient permanent conveyance infrastructure that avoids disruption from future construction activities.

Steps**:**
1. Evaluate and select the best temporary conveyance method in coordination with carriers, PSPC, Arcadis, and SSC.
2. Install the chosen temporary conveyance method.

3. Ensure all stakeholders are confident in the service level agreements for the temporary setup.
4. Plan for a transition to permanent conveyance methods post-construction.

3. Risk Mitigation Strategy

Current State**:**
- Existing services are at risk of outages due to construction activities.

Temporary Solution**:**
- Install and configure new temporary services to prevent outages and ensure continuity.

Permanent Solution**:**
- Transition to a stable and permanent service infrastructure post-construction.

Steps**:**
1. Cut-over existing services to new temporary services using new overland routes.
2. Maintain current services until all building cutovers are complete and the new services are operationally stable.
3. Decommission (out-order) all current underground copper and fiber cables.
4. Proceed with new roadway construction, knowing that communications services are safeguarded on temporary setups.

4. Detailed Tenant Preparation and Coordination

Current State**:**
- Tenants rely on existing infrastructure, which will be disrupted by construction.

Temporary Solution**:**
- Prepare tenants for the transition by providing detailed information and timelines.

Permanent Solution**:**
- Ensure tenants are smoothly transitioned to permanent services with minimal disruption.

Steps**:**
1. Conduct detailed discussions with tenants to prepare them for the transition.
2. Coordinate communication to ensure tenants are aware of cutover schedules and temporary service setups.
3. Implement a detailed planning phase by building to address specific needs and timelines.
4. Provide ongoing support and updates to tenants throughout the transition process.

Other Low Voltage Networks - Considerations

There are a range of other systems that might also be run underground (or through overhead lines) and encompass a range of utilities and services. Here are the primary low voltage networks commonly found that should also be considered during development:

1. **Low-Voltage Electric Power Distribution Networks**:
   - Low voltage (typically 120/240V) distribution lines provide electricity to residential, commercial, and public buildings.
2. **Emergency Call Stations**:
   - Fibre optic, copper or cellular based connected systems.
   - The system that allows for emergency call and assistance to pedestrians and occupants of Tunney's Pasture.
3. **Public Lighting Systems**:
   - Street lighting systems operating at low voltage levels to illuminate roadways, sidewalks, and public spaces.
4. **Traffic Control Systems**:
   - Low voltage wiring for traffic lights, pedestrian signals, and related control systems.
5. **Security and Surveillance Systems**:
   - Networks for CCTV cameras and other security monitoring equipment.
6. **Public Wi-Fi Networks**:
   - Infrastructure for public Wi-Fi hotspots installed by municipalities or private providers.
7. **Environmental Monitoring Systems**:
   - Sensors and data collection networks for monitoring air quality, weather conditions, and other environmental parameters.
8. **Smart City Infrastructure**:
   - IoT (Internet of Things) devices and sensors for smart lighting, smart parking, and other smart city applications.
9. **Electric Vehicle Charging Stations**:
   - Infrastructure to support the charging of electric vehicles, including both public and private charging points.

Comprehensive planning and stakeholder engagement are key to seamlessly incorporating these critical low voltage networks into the redevelopment project, ensuring both current functionality and future adaptability.

Recommended Infrastructure Enhancements

To ensure robust and resilient telecommunication services throughout the redevelopment of Tunney's Pasture, we are recommending the installation of a handhole with two lateral 100 mm ducts to each building. This infrastructure enhancement will be implemented in two strategic locations per building, providing redundant access points that are crucial for maintaining service continuity during both the temporary and permanent phases of the project.

The handholes, equipped with dual 100 mm ducts, will serve as pivotal connection points for both temporary carrier provisioning and long-term connectivity solutions. By establishing these redundant access points, we can mitigate the risk of service interruptions caused by construction activities or unforeseen incidents. This approach not only ensures a seamless transition from existing services to temporary setups but also lays the groundwork for a stable and future-proof permanent telecommunications infrastructure.

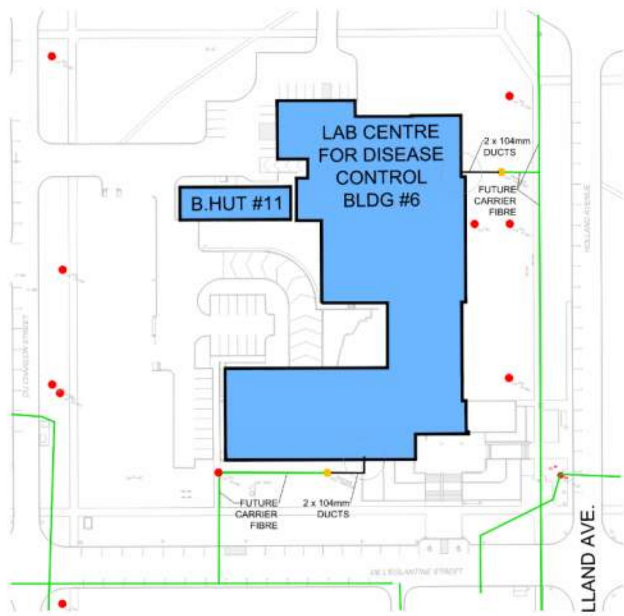

Figure 1: Recommendation for New Handhole and Lateral Ducts

In the temporary phase, these handholes will facilitate the rapid deployment of carrier services, allowing for flexible and efficient re-routing of connections as construction progresses. The dual duct system provides ample capacity for multiple carriers, ensuring that all telecommunication needs are met without compromising on performance or reliability. Once the permanent infrastructure is ready, these same handholes and ducts will be utilized to establish enduring connections, streamlining the cutover process and reducing downtime.

Moreover, the installation of handholes with redundant lateral ducts aligns with our overall strategy of decentralizing the telecommunication infrastructure at Tunney's Pasture. By providing multiple entry points to each building, we enhance the resilience of the network, making it less susceptible to single points of failure. This forward-thinking design not only addresses current requirements but also anticipates future demands, ensuring that the redeveloped Tunney's Pasture is equipped with a state-of-the-art telecommunication infrastructure.

In summary, the recommended installation of handholes with dual 100 mm lateral ducts in two locations per building is a critical component of our redevelopment strategy. This approach guarantees that both temporary and permanent telecommunication services are robust, flexible, and capable of supporting the evolving needs of Tunney's Pasture.

Please see full handhole detail in Appendix B (Figure 21).

Current Conditions

Carrier Findings

Bell Canada

Bell Canada is the incumbent local exchange carrier (ILEC) for telephone, internet, and network services. Based out of Montreal, QC, Bell Canada is a national service provider.

Voice Services (EEWD):

- Bell Canada indicated that the current Enhanced Exchange Wide Dial (EEWD) Centrex telephone system is at end of life due to the scarcity of active equipment for the system. This situation makes it impossible to add nodes via fibre to key buildings, thereby eliminating dependence on the existing copper multi-pair cables.
- Currently, there is a main telephone switch (DMS) located in the main building and some remote nodes (RLM) at Brooke Claxton and Jean Mance which are believed to be at or near capacity. Without a direct technology upgrade, fresh solutions for voice services will need to be explored.
- Additionally, there are 3 DMS switches in 101 Goldenrod providing various voice services to DND.
- A fire necessitated the reinstallation of copper services, with the existing copper cables utilizing the same route as shown on drawing xxx.

Entry Points:

- Bell Canada services the Tunney's Pasture campus with fibre optics and copper from street pathways.
    1. The first two entry points are both off Parkdale Avenue (near Lyndale Avenue) and north of the Main Stats building. Bell Canada cabling enters the campus through the existing utility hole system to Building 7 (Main Stats building); from this location, fibre is distributed using the existing steam tunnel and utility hole/duct system.
    2. The second campus entry is near the southwest corner of Northwestern and Premier Avenues. This entrance feeds the National Defense Data Centre (Building 16) through underground ducting.

Routing:

- Bell Canada currently uses both the old CHCP steam tunnels and the government-owned utility hole/duct and aerial pole-line infrastructure systems for distribution pathways around the campus.

- Highlights of Bell Canada distribution include:
  - Relocation of Bell Canada fibre from Building 15 via a new aerial run, avoiding the use of the building as a pathway to facilitate its demolition.
  - Building 13 (Central Heating Plant) serves as a pathway for all east-to-west cabling.
  - Splice locations in Building 3 (Main Building) are used for distribution to the rest of the campus.
  - Splice location in Building 16 (National Defense Data Centre) used for campus-wide distribution.
  - Several other splice locations are strategically placed in the CHCP steam tunnels.
  - New copper installed in the same existing route due to fire.

Other Discussion:

- Bell Canada agrees with our approach to provide temporary feeds to all buildings via new infrastructure and noted that their installation and planning would be triggered by an order from a tenant or SSC.
- Bell Canada needs to understand the financial model of this development. It is currently considered private property, and as such, the GoC is responsible for providing the main pathways (poles, ducts, tunnels) to allow for the installation of Bell Cabling. It is recommended to hold a follow-up meeting with Bell to discuss financial responsibilities regarding temporary infrastructure to ensure development timelines are not affected.

Bell Canada currently has cable deployment in the following buildings:

Building	**Fibre Optic**	**Copper**
R. H. Coats Building (1)	Yes	Yes
Main Building (3)	Yes	Yes
Standards Building (4)	Yes	Yes
Jean Talon Building (5)	Yes	Yes
Laboratory Centre for Disease Control (6)	Yes	Yes
Brooke Claxton Building (9)	Yes	Yes
Butler Hut (11)	Yes	Yes
National Defence Data Centre (16)	Yes	Yes
Occupational Health Unit Building (17)	Yes	Yes
Personnel Records Centre (18)	Yes	Yes
Jeanne Mance Building (19	Yes	Yes
Sir Frederick G Banting Research Centre (22)	Yes	Yes

Table 1: Bell Canada Cable Deployment at Tunney's Pasture

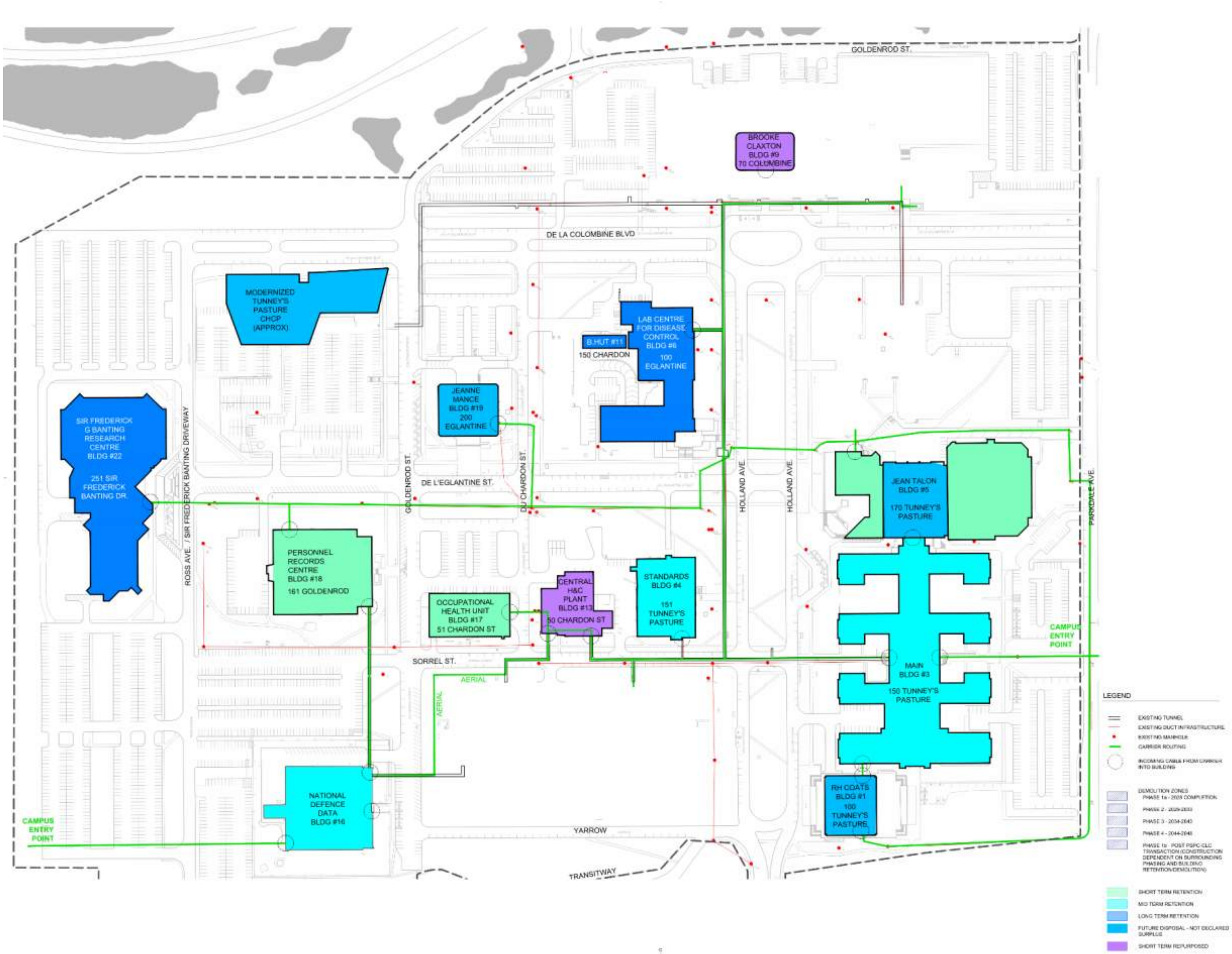

Figure 2: Existing Bell Fibre Routing at Tunney's Pasture

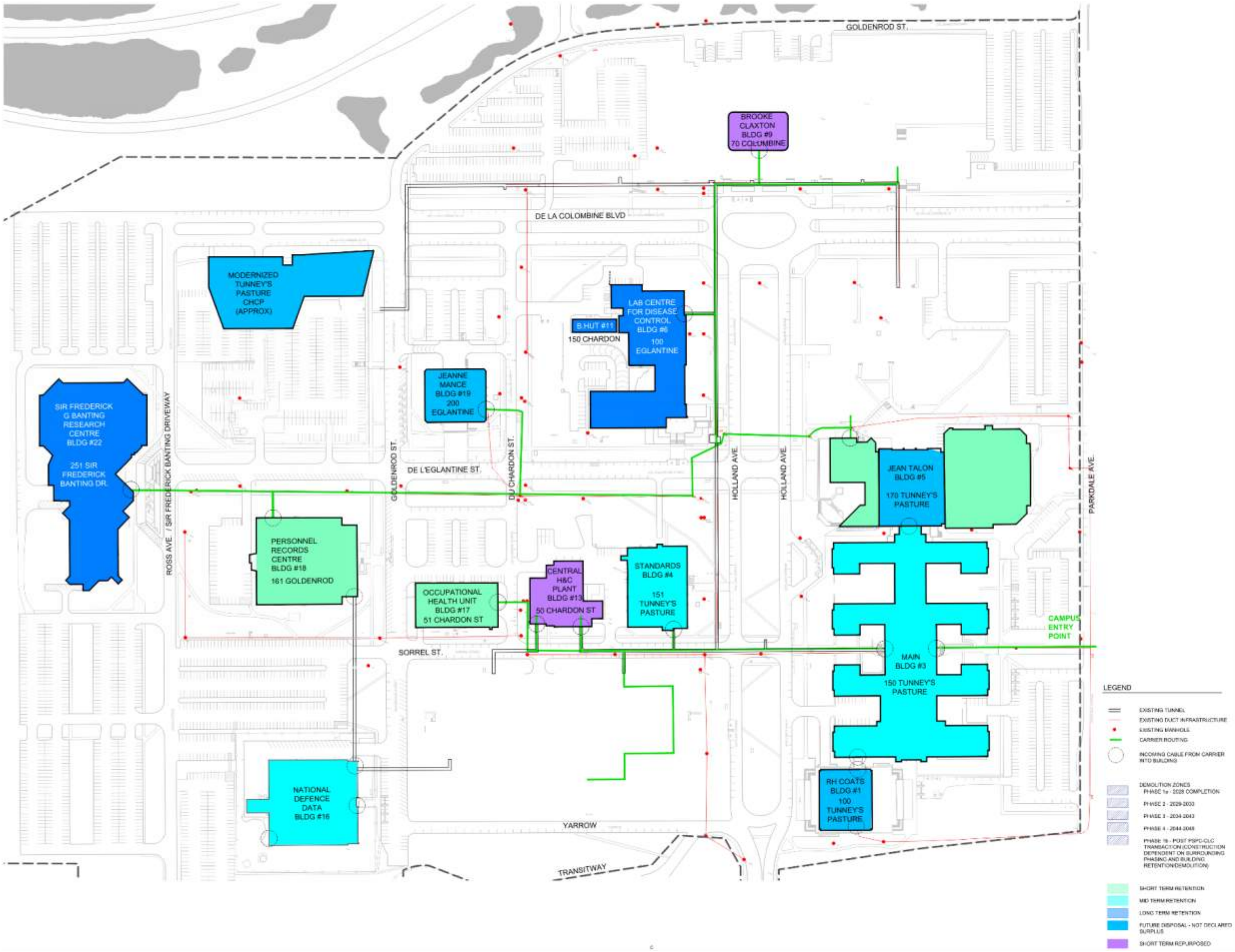

Figure 3: Existing Bell Copper Routing at Tunney's Pasture

Rogers

Rogers Communications Inc. is a Canadian communications and media company operating in wireless communications, cable television, telephone, and internet connectivity, with a significant fiber optic network presence in Canada. Rogers has a strong presence on Tunney's Pasture campus.

Entry Points:

Rogers Communications services the Tunney's Pasture campus with fiber optics from four distinct pathways:

1. The first campus entry is off Parkdale Avenue (near Lyndale Avenue). Rogers Communications fiber enters the campus through the existing utility hole system to Building 7 (Main Stats building); from this location, fiber is distributed using the existing steam tunnel and utility hole/duct system.

2. The second campus entry is also off Parkdale Avenue (near Burnside Avenue). Rogers Communications fiber enters the campus through the existing utility hole system; from this location, fiber is distributed using the existing steam tunnel and utility hole/duct system.

3. The third entrance is located off Scott Street. The fiber for the campus enters aerially across the transit cut at the end of Goldenrod Driveway. At this point, the fiber enters Building 16 (National Defense Data Centre) underground via an existing duct system. The Rogers Communications fiber is distributed using the existing steam tunnel and utility hole/duct system from a splice point in Building 16.

4. The fourth entrance is located off Scott Street. The Rogers Communications fiber for the campus enters at the end of Tunney's Pasture Driveway through the existing utility hole system; from this location, fiber is distributed using the existing steam tunnel and utility hole/duct system.

Routing:

Rogers Communications currently uses both the CHCP steam tunnels and the government-owned utility hole/duct system and pole line infrastructure for distribution pathways around the campus. Key highlights of Rogers Communications distribution include:

- Rogers's fiber has been relocated from Building 15 via a new aerial run that avoids using the building as a pathway to facilitate its demolition.
- Building 13 (Central Heating Plant) currently acts as a pathway for all east-to-west cabling.
- Rogers currently has splice locations in Building 3 (Main Building) that are used for distribution to the rest of the campus.

- Building 18 (Personnel Records) currently acts as a pathway for north-to-south cabling from Building 16 (National Defense Data Centre) to the utility hole system on Eglantine Driveway.
- Building 16 (National Defense Data Centre) has a splice location that is used for distribution to the rest of the campus.
- Several other splice locations are located at strategic points in the CHCP steam tunnels.
- There is a new aerial run from Scott Street to 101 Goldenrod.
- Rogers' new installations follow a Passive Optical Network approach (like Bell Fibe). All new installations will be done with fiber optic, eliminating distance restrictions for installed services.
- Rogers is agreeable to sharing pathways with other major carriers for both short and long-term purposes.

Other Discussion:

- Rogers agrees with our approach to provide temporary feeds to all buildings via new infrastructure, noting that their installation and planning would be triggered by an order from a tenant or SSC. They also noted that it is less expensive to provide services via new aerial infrastructure.

- Rogers needs to understand the financial model of this development. As the property is currently considered private, the GoC is responsible for providing the main pathways (poles, ducts, tunnels) to allow for the installation of Rogers Cabling. It is recommended to hold a follow-up meeting with Rogers to discuss financial responsibilities regarding temporary infrastructure to ensure development timelines are not affected.

Rogers Communications currently has cable deployment in the following buildings:

Building	**Fibre Optic**
R. H. Coats Building (1)	Yes
Main Building (3)	Yes
Standards Building (4)	Yes
Jean Talon Building (5)	Yes
Laboratory Centre for Disease Control (6)	Yes
Brooke Claxton Building (9)	Yes
Butler Hut (11)	Yes
National Defence Data Centre (16)	Yes
Occupational Health Unit Building (17)	Yes
Personnel Records Centre (18)	Yes
Jeanne Mance Building (19)	Yes
Sir Frederick G Banting Research Centre (22)	Yes

Table 2: Rogers Communications Cable Deployment at Tunney's Pasture

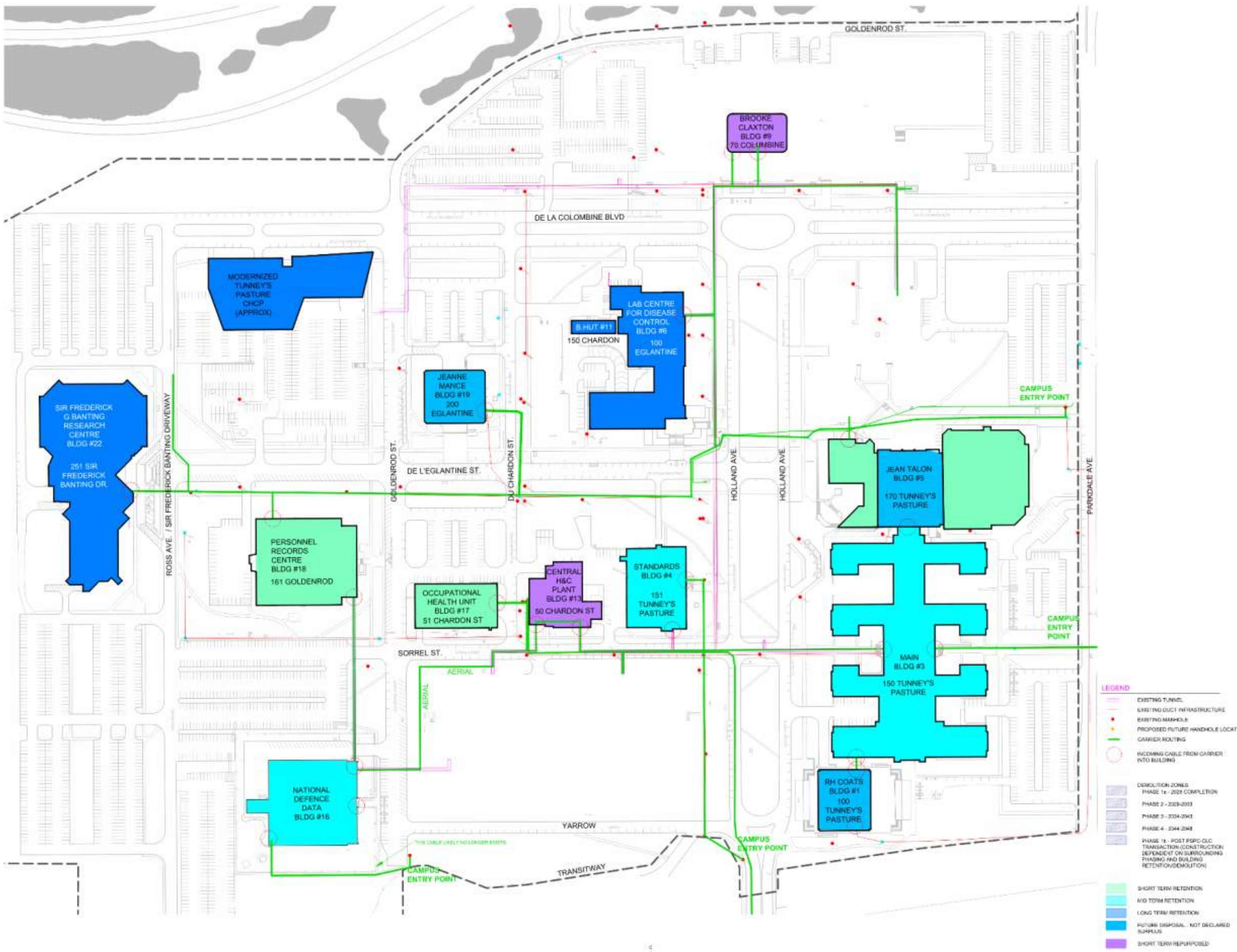

Figure 4: Existing Rogers Fibre Routing at Tunney's Pasture

Figure 5: Existing Rogers COAX Routing at Tunney's Pasture

Zayo (Formerly Allstream AT&T)

Zayo is a leading global provider of bandwidth infrastructure services, formerly known as Allstream AT&T. Zayo operates an extensive fiber optic network across Canada, providing high-capacity bandwidth and connectivity solutions.

Entry Points:

Zayo services the Tunney's Pasture campus with fiber optics through multiple entry points:

1. The first campus entry is off Parkdale Avenue (near Lyndale Avenue). Zayo fiber enters the campus through the existing utility hole system to Building 7 (Main Stats building); from this location, fiber is distributed using the existing steam tunnel and utility hole/duct system.
2. The second entry point is located off Scott Street. The fiber for the campus enters aerially across the transit cut at the end of Goldenrod Driveway. At this point, the fiber enters Building 16 (National Defense Data Centre) underground via an existing duct system. Zayo fiber is then distributed using the existing steam tunnel and utility hole/duct system from a splice point in Building 16.
3. Additional entry points are facilitated through various utility hole systems strategically located around the campus, providing robust connectivity and redundancy.

Routing:

Zayo utilizes both the CHCP steam tunnels and the government-owned utility hole/duct system and pole line infrastructure for distribution pathways around the campus. Key highlights of Zayo's distribution include:

- Relocation of fiber from Building 15 via a new aerial run to avoid using the building as a pathway, making way for its demolition.
- Building 13 (Central Heating Plant) serves as a pathway for all east-to-west cabling.
- Splice locations in Building 3 (Main Building) are used for distribution to the rest of the campus.
- Building 18 (Personnel Records) acts as a pathway for north-to-south cabling from Building 16 (National Defense Data Centre) to the utility hole system on Eglantine Driveway.
- Building 16 (National Defense Data Centre) has a splice location that supports distribution to the entire campus.
- Several other splice locations are strategically placed in the CHCP steam tunnels.
- New aerial runs and installations follow a modernized approach, ensuring future-proof infrastructure.

Other Discussion:

- Zayo supports our approach to provide temporary feeds to all buildings via new infrastructure, noting that their installation and planning would be triggered by an order from a tenant or SSC.
- Zayo needs to understand the financial model of this development. As the property is currently considered private, the GoC is responsible for providing the main pathways (poles, ducts, tunnels) to allow for the installation of Zayo cabling. It is recommended to hold a follow-up meeting with Zayo to discuss financial responsibilities for temporary infrastructure to ensure development timelines are not affected.

Zayo group currently has cable deployment in the following buildings:

Building	Fibre Optic
R. H. Coats Building (1)	Yes
Main Building (3)	Yes
Jean Talon Building (5)	Yes
Brooke Claxton Building (9)	Yes
Central Heating and Cooling Plant (13)	Yes
National Defence Data Centre (16)	Yes
Personnel Records Centre (18)	Yes
Jeanne Mance Building (19)	Yes

Table 3: Zayo Group Cable Deployment at Tunney's Pasture

PLEASE PROCEED TO FOLLOWING PAGE FOR ILLUSTRATION

Figure 6: Existing Zayo Fibre Routing at Tunney's Pasture

TELUS

Several meetings were held with TELUS who has confirmed that there facilities are installed on other carriers fibre optic facilities – specifically at 101 Golden Road using Rogers Fibre (and possibly Birch Hill Dark Fibre).

Phased Approach

The buildings within Tunney's Pasture campus have been categorized into various retention periods to facilitate a structured redevelopment plan. These categories are as follows:

- Short Term Retention (1-5 years): Buildings identified for short-term retention will be maintained and operational for the next 1-5 years. During this period, necessary infrastructure upgrades and temporary solutions will be implemented to ensure seamless connectivity and functionality.
- Mid Term Retention (5-10 years): Buildings in this category will remain operational for the next 5-10 years. These buildings will undergo phased infrastructure enhancements, including the installation of new fiber optics and the establishment of independent cable entrances to minimize interdependencies.
- Long Term Retention (20+ years): Buildings slated for long-term retention will be integral parts of the campus for the next 20+ years. Comprehensive infrastructure upgrades will be undertaken to future-proof these buildings, ensuring they meet the technological demands of the coming decades.
- Future Disposal – Not Declared Surplus: These buildings will remain on the campus but may potentially be transferred to another owner. Infrastructure planning for these buildings will include provisions for easy transfer of ownership, ensuring that new owners can seamlessly integrate their own telecommunication systems.
- Short Term Retention – Repurposed: Buildings in this category will be maintained for short-term use but will be repurposed. Infrastructure adjustments will be made to accommodate their new functions while ensuring minimal disruption to existing services.

The diagram on the following page prepared by Arcadis, visually represents the categorization and phased approach for each building within the campus. By categorizing the buildings into these retention periods, we can implement a phased approach that ensures continuous operation and connectivity across the campus. This structured plan allows for systematic upgrades and infrastructure enhancements tailored to the specific needs and timelines of each building category.

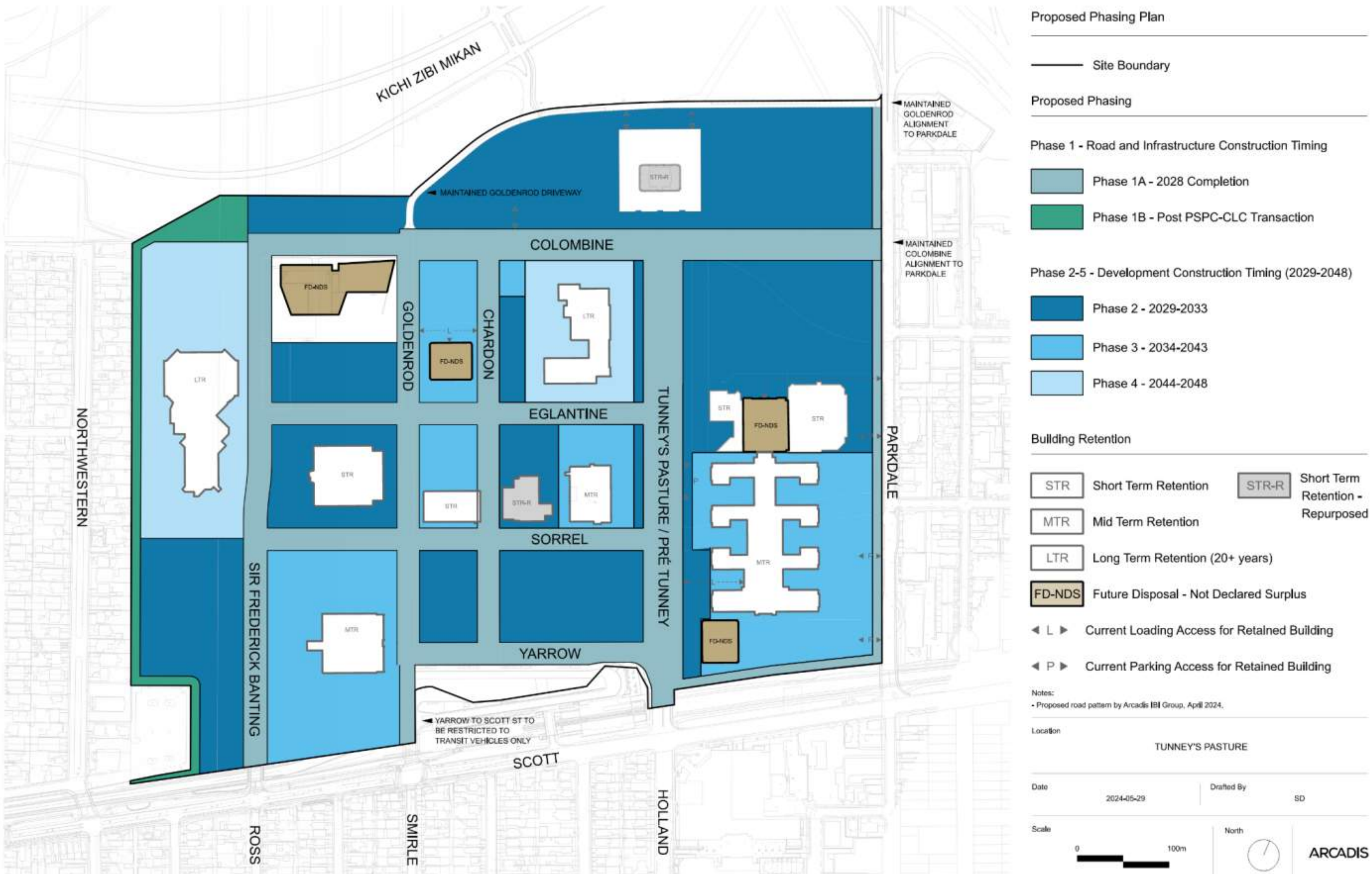

Figure 7: Proposed Phasing Plan For Tunney's Pasture Campus (All Phases, Drawing 1)

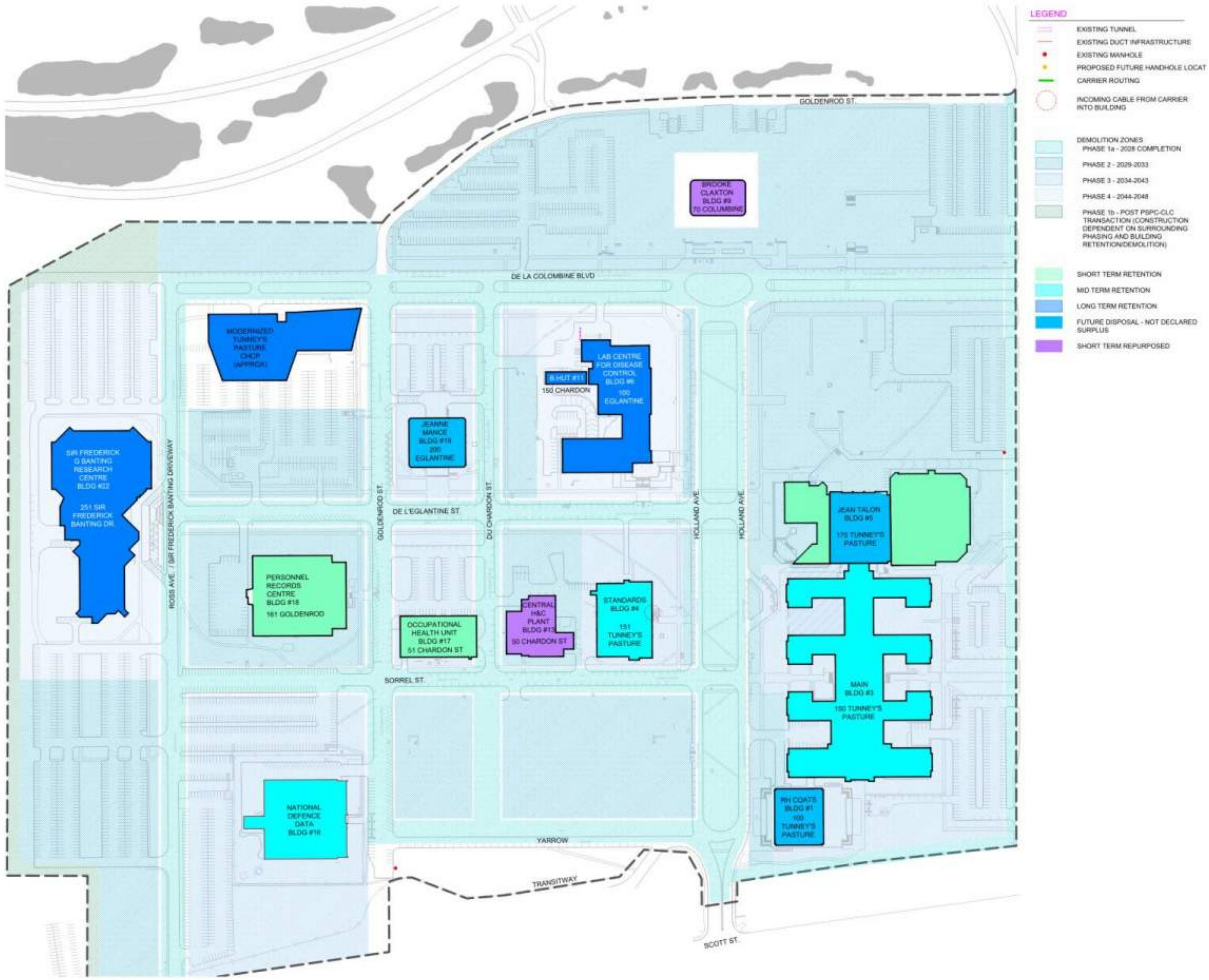

Figure 8: Proposed Phasing Plan For Tunney's Pasture Campus (All Phases, Drawing 2)

Figure 9: Phase 1a Illustration

Figure 10: Phase 1b Illustration

Figure 11: Phase 2 Illustration

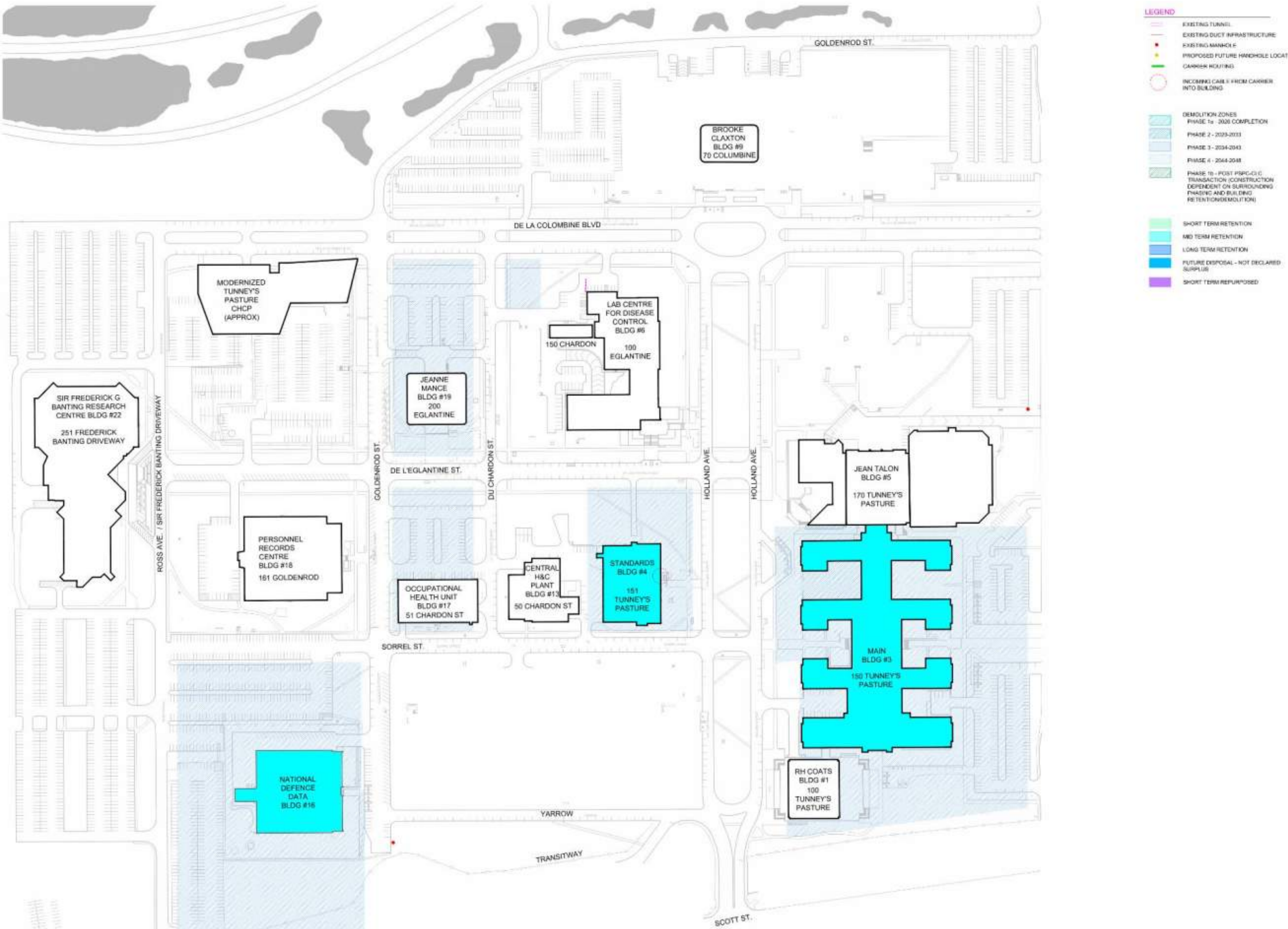

Figure 12: Phase 3 Illustration

Figure 13: Phase 4 Illustration

Figure 14: Remaining Structures w/ New Roadways Following Completion of Project

Short Term Retention - Repurpose

The following buildings are slated for demolition between year zero and five of the development plan. There is an additional building labelled Short-Term Retention – Repurpose. For the sake of this report, they are both included here as well. The buildings labelled Short Term Retention, are Occupational Health Unit (17) and Personnel Records Centre (18). The other two short term retention – repurpose are the Brooke Claxton Building (9) and the (old) Central Heating and Cooling Plant (13).

The Brooke Claxton Building (Building 9)
Address: 70 Columbine

The Brooke Claxton Building (Building 9) is a 19-storey (67M) office tower built in 1965. Located at 70 Columbine Driveway, the building has a net rentable area of 21,056 m2.

The Brooke Claxton Building

Building 9 currently has one entrance into the building; it is as follows:

- One from the steam tunnel system on the south side directly into the building. This is a significant issue as the only feed into the building is via steam tunnels that will be impacted by development. Suggestion is to install new temporary services directly from Parkdale from a minimum of two (2) carriers.

Communications cabling is feed to the building by a combination of utility hole/duct systems and existing steam tunnels.

The in addition to the steam tunnels, outside plant ducts and maintenance holes, the following buildings are considered important to maintaining of telecommunications services to the Brooke Claxton Building; elimination of any of these buildings will negatively affect the Brooke Claxton Building in terms of telecommunications services.

- Building 3 (the main building) is an essential building for the distribution of communication services to the Jean Mance Building as it serves as the main communications hub for both copper and fiber optic systems.
- Building 13 (Central Heating and Cooling Plant (CHCP)) serves as a distribution pathway for cables going from an east-west direction of the campus and may serve as a pathway for redundant fiber optic connections from the west.
- Building 16 (National Defense Data Centre) serves as an entry point for several carriers and is part of the redundant link to the Main building (3) for some carriers.

It is also one of the main pathways from the west end of the campus that distributes to other buildings.

- Building custodial transfer to Health Canada
- 2 x OGD in building
- Dual GCBB WAN supplied by Carriers
- Possible BGIS and Commissionaires

The Central Heating & Cooling Plant (CHCP) (Building 13)
Address: 50 Chardon

The Central Heating and Cooling Plant (CHCP) (Building 13) is a low-rise steam plant. Built in 1952, the building is located at 50 Chardon Driveway

1. This building has three entry points. They are as follows:
2. From the south going west thru the CHCP Steam tunnels.
3. From the south going east thru the CHCP Steam tunnels.
4. From west to the Government owned utility hole system

The CHCP Building

The elimination of this building would have a potentially negative effect on the following buildings since it is a major pathway east-west:

- R. H. Coats Building (1)
- Finance Building (2)
- Main Building (3)
- Standards Building (4)
- Jean Talon Building (5)
- Laboratory Centre for Disease Control (6)
- Environmental Health Building (8)
- Brooke Claxton Building (9)
- Butler Hut (11)
- Finance Annex (14)
- National Defense Data Centre (16)
- Occupational Health Unit Building (17)
- Personnel Records Centre (18)
- Jeanne Mance Building (19)
- Sir Frederick G Banting Research Centre (22)

Occupational Health Unit (Building 17)
Address: 51 Chardon

Built in 1956, the Occupational Health Unit (Building 17) is a low-rise building located at 51 Chardon Driveway.

This building has the following entry point:

1. Ducts enter the east of building from a utility hole duct system located on Chardon Driveway

This building does not appear to have any building interconnections that would be affected if eliminated.

Occupational Health Unit

Personnel Records Centre (Building 18)
Address: 161 Goldenrod

Built in 1965, the Personnel Records Centre (Building 18) is a low-rise building located at 161 Goldenrod Driveway.

This building has the following entry points:

1. From the south using the CHCP Steam tunnels.
2. From the north ducting to the Eglantine utility hole system.

The Personnel Records Centre

The elimination of this building would have a potentially negative effect on the following buildings:

- R. H. Coats Building (1)
- Finance Building (2)
- Main Building (3)
- Standards Building (4)
- Jean Talon Building (5)
- Laboratory Centre Disease Control (6)
- Environmental Health Building (8)
- Brooke Claxton Building (9)
- Butler Hut (11)
- Central Heating and Cooling Plant (13)
- Finance Annex (14)
- National Defense Data Center (16)
- Occupational Health Unit Building (17)
- Jeanne Mance Building (19)
- Sir Frederick G Banting Research Centre (22)

Mid Term Retention

These buildings are slated to be removed during the 10-to-15-year phase of the development. The buildings in this phase are the Main Stats Building (3), Standards Building (4), and the National Defence Building (16).

Main Stats Building (Building 3)
Address: 150 Tunney's Pasture Driveway

Main Stats Building

The building was completed in 1952 and is a four-storey federal government office building located in the Tunney's Pasture area of Ottawa. It is connected on the north side by the Jean Talon Building and on the south side by the R. H. Coats Building has the following entry point:

- Building 3 (the main building) is an essential building for the distribution of communication services to the RH Coats, to Jean Talon and is integrally interconnected both physically and from a telecommunications perspective. With all carriers using it for distribution, it serves as the main communications hub for both copper and fiber optic systems to all buildings within Tunney's Pasture.
- Has a main Bell Hub (DMS) with a connection to Place du Portage IV (PdP IV)
- Centre location for copper switching to entire campus
- Dual GCBB WAN connectivity
- Centrex of over 450 lines
- SSC has a new lab in Main Stats
- Call Centre
- Former data centre, some power generation capability for future
- BGIS and Commissionaires connectivity present
- Has a DAS (Distributed Antenna System for Cellular coverage)
- House Stats, Health, SSC and PSPC on various floors
- Census considerations 2025-2027

Standards Building (Building 4)
151 Tunney's Pasture Driveway


The Standards Building

Built in 1954, the Standards Building (4) is a low-rise office building located at 151 Tunney's Pasture Driveway.

This building has the following entry point:

1. From the south using the CHCP Steam tunnels

This building does not appear to have any building interconnections that would be affected if eliminated.

National Defence Data Centre (Building 16)
Address: 101 Goldenrod Driveway


National Defence DC

National Defence Data Centre (Building 16) is located at 101 Goldenrod Driveway. This building is an MSEC zone building (no copper/Fibre only).

This building has four entry points. They are as follows:

1. From the north using the CHCP Steam tunnels,
2. From the east using the CHCP Steam tunnels,
3. South from underground ducts from aerial campus entry off Scott Avenue
4. West from Bell Canada campus entry ducts from Northwestern Avenue

The elimination of this building would have a potentially negative effect on the following buildings:

- R. H. Coats Building (1)
- Finance Building (2)
- Main Building (3)
- Standards Building (4)
- Jean Talon Building (5)
- Laboratory Centre Disease Control (6)
- Environmental Health Building (8)
- Brooke Claxton Building (9)
- Butler Hut (11)
- Central Heating and Cooling Plant (13)
- Finance Annex (14)
- Occupational Health Unit Building (17)
- Personnel Records Centre (18)
- Jeanne Mance Building (19)
- Sir Frederick G Banting Research Centre (22)

Long Term Retention

These buildings are slated to be removed during the 20-to-25-year phase of the development. The building in this phase includes the Lab Centre for Disease Control (6), The Bulter Hut (11) and the Frederick Banting Building (22).

Laboratory Centre for Disease Control (Building 6)
Address: 100 Eglantine Drive

LCDC Building

The Laboratory Centre for Disease Control (LCDC) Building is a low-rise laboratory located at 100 Eglantine Driveway.

Entry Point:

1. From the south using the CHCP steam tunnels.

The elimination of this building would have a potentially negative effect on the following buildings:

- The Butler Hut (11)
- LCDC has an OGD presence and Dual GCBB WAN, all supplied by carrier fibre.
- Both Bell and Rogers have fibre in this building.
- Bell has copper in this building.

Butler Hut (Building 11)
Address: 150 Chardon Drive

LCDC Building

The Butler Hut is a low-rise building located at 150 Chardon Driveway. Built in 1955, it is physically connected to the Laboratory Centre for Disease Control (Building 6).

Entry Point:

1. From the east through the directly attached Laboratory Centre for Disease Control (Building 6).

This building does not appear to have any building interconnections that would be affected if eliminated.

Sir Frederick Banting Research Centre (Building 22)
Address: 251 Sir Frederick Banting Drive

Sir Frederick Banting Building

Built in 1978, the Sir Frederick Banting Research Centre is a low-rise research building located at 251 Sir Frederick Banting Driveway.

Entry Point:

1. Ducts enter the east of the building from a utility hole duct system located on Eglantine Driveway.

This building does not appear to have any building interconnections that would be affected if eliminated.

Additional Information:

- Alternative site for Brooke Claxton.
- Dual GCBB WAN and Rogers fibre for on-site labs.
- CANARIE connectivity at building demarcation point.

Future Disposal – Not Declared Surplus

R.H. Coats Building (Building 1)
Address: 100 Tunney's Pasture Drive

R.H Coats Building

The R.H. Coats Building is a multi-story commercial office building located at 100 Tunney's Pasture Driveway. Completed in 1976, it stands at 26 stories (99 meters) tall, making it the tallest tower in Tunney's Pasture, with 40,829 square meters of rentable floor space.

As the R.H. Coats Building is physically connected to the Main Stats Building, most cabling services are provided internally between the buildings. However, there are exceptions where cables are installed from the Main Stats Building through a utility hole system to the east side of the R.H. Coats Building. This pathway from the government-owned utility hole duct system enters the south side of the building.

In addition to the steam tunnels, outside plant ducts and utility holes, the following buildings are essential to maintaining telecommunications services to the R.H. Coats Building. The elimination of any of these buildings would negatively affect telecommunications services:

- Building 3 (Main Building): An essential building for distributing communication services to the R.H. Coats Building. It is integrally interconnected both physically and from a telecommunications perspective. Serving as the main communications hub, it supports both copper and fiber optic systems used by all carriers.
- Building 13 (Central Heating Plant): Serves as a distribution pathway for cables coming from the west of the campus and may provide a redundant fiber optic connection pathway.
- Building 16 (National Defense Data Centre): Acts as an entry point for several carriers and is part of the redundant link to the Main Building (3).

Additional Information:

- Approximately 200 Centrex telephone lines are still in service from the RLM in the Main Stats Building.
- Both BGIS and Commissionaires have services in this building.

- A helpdesk to support Census 2026 will open in early summer 2024 (this can be temporarily relocated with 2-3 weeks' notice).
- The helpdesk is not a physical location but is spread throughout Stats Can buildings, including R.H. Coats, Main, and Jean Talon.
- The building is currently undergoing densification (2,500 people).
- Key blackout dates start in August 2025 and extend through December 2027 due to the Census.
- The peak period for the Census is from April 2026 to August 2026.
- The building has a full WiFi system and Distributed Antenna System (DAS) in place.
- Some backup generator power is available on-site.
- Bell Copper/Zayo POP is in the basement wall closet in the BGIS Ops room, SW Corner.

The Jean Talon Building (Building 5)
Address: 170 Tunney's Pasture Drive

Jean Talon Building

The Jean Talon Building is a 13-story (44 meters) commercial office building constructed in 1979. Located at 170 Tunney's Pasture Driveway, it is directly attached to the Main Building (Building 3). The building has a total of 60,906 square meters of floor space in both its high-rise and low-rise sections.

As the Jean Talon Building is physically connected to the Main Stats Building, most cabling services are provided internally between the buildings. However, there are some exceptions where cables are installed from the Main Stats Building through a utility hole system to the east side of the Jean Talon Building. This pathway from the government-owned utility hole duct system enters the north side of the building.

In addition to the steam tunnels, outside plant ducts, and utility holes, the following buildings are essential to maintaining telecommunications services to the Jean Talon Building. The elimination of any of these buildings would negatively affect telecommunications services:

- **Building 3 (Main Building)**: An essential building for distributing communication services to the Jean Talon Building. It is integrally interconnected both physically and from a telecommunications perspective. Serving as the main communications hub, it supports both copper and fiber optic systems used by all carriers.

- **Building 13 (Central Heating Plant)**: Serves as a distribution pathway for cables coming from the west of the campus and may provide a redundant fiber optic connection pathway.
- **Building 16 (National Defense Data Centre)**: Acts as an entry point for several carriers and is part of the redundant link to the Main Building (3).

Additional Information:

- The building is currently undergoing full renovation.
- The building is undergoing densification (2,500 people).
- Key blackout dates start in August 2025 and extend through December 2027 due to the Census.
- The peak period for the Census is from April 2026 to August 2026.
- The building has a full WiFi system and Distributed Antenna System (DAS) in place.
- Some backup generator power is available on-site.
- Bell Copper/Rogers & Zayo POP located in B-1E-7 Basement NW.

Jeanne Mance Building (Building 19)
Address: 200 Eglantine Drive

Built in 1969, the Jeanne Mance Building is a multi-story commercial office tower located at 200 Eglantine Driveway. The building stands 21 stories high (77 meters) and has a rentable floor space of 32,755 square meters.

Building 19 currently has two entrances:

- From the Eglantine utility hole/duct system directly into the east side of the building.
- From the same Eglantine utility hole/duct system that travels up Chardon Ave and then into the east side of Building 19.

Jeanne Mance Building

Communications cabling is fed to the building by a combination of utility hole/duct systems and existing steam tunnels.

In addition to the steam tunnels, outside plant ducts, and utility holes, the following buildings are essential to maintaining telecommunications services to the Jeanne Mance Building. The elimination of any of these buildings may negatively affect telecommunications services:

- **Building 3 (Main Building)**: An essential building for distributing communication services to the Jeanne Mance Building. It serves as the main communications hub for both copper and fiber optic systems.
- **Building 13 (Central Heating and Cooling Plant (CHCP))**: Serves as a distribution pathway for cables running east-west across the campus and may provide a redundant fiber optic connection pathway.
- **Building 16 (National Defense Data Centre)**: Acts as an entry point for several carriers and is part of the redundant link to the Main Building (3) for some carriers. It is also one of the main pathways from the west end of the campus that distributes to other buildings.
- **Building 18 (Personnel Records Building)**: Serves as a pathway from Building 16 (National Defense Data Centre) to the Eglantine utility hole/duct systems, which appears to serve the Jeanne Mance Building, at least as a redundancy route.

Additional Information:

- Dual GCNet WAN by carriers.
- Currently houses both Health Canada and Indigenous Services of Canada (ISC).
- This building will be more difficult than others to provide temporary service based upon its location in the centre of the campus.

In Building Networks

Further Investigation and Inventory Requirements

As we advance into the next stages of the Tunney's Pasture Redevelopment project, it is essential to emphasize the necessity of further investigation within each building. While this report provides a comprehensive overview of the current telecommunications infrastructure, a more detailed examination will be required once the development phasing is solidified. This step is crucial to ensure that all potential disruptions are anticipated and managed effectively.

Prior to disconnecting any circuits, it is imperative to conduct a thorough inventory of intra-building networks. This inventory will help identify any in-building systems that may have been added since the last assessment. These systems might include security networks, internal communication systems, or specialized equipment networks that are not captured in the current report. Understanding the full scope of these networks is vital to prevent any unintended service interruptions during the transition phase.

Moreover, as development phases are detailed and finalized, targeted investigations within each building will provide valuable insights into the specific needs and dependencies of the existing infrastructure. This approach ensures that we can tailor our transition plans to address unique building requirements, thereby minimizing risk and maintaining service continuity. Comprehensive documentation of these findings will further support our strategy, ensuring all stakeholders are well-informed and prepared for the changes ahead.

During the Attain Groups consultation and analysis, it was determined that new Main Telecommunications Rooms (MTR's) and Entrance Facility (EF) /Carrier Room should be established in all the key buildings as well as all new commercial buildings. These rooms would have established minimum sizes and requirements.

Provisions for future in building wireless in the form of distributed antenna systems (DAS), rooftop pathways and 5G cell services must also be taken into consideration.

All key buildings, as part of the first phase of the redevelopment, should have new MTR's and EFs constructed to allow for proper termination points regarding the new infrastructure design.

Main Telecommunications' Room (MTR)

The Main Telecommunications Room (MTR) serves as the building focal point for telecommunications related services. Voice, data, ISS, and CATV will emanate from this room vertically to all required Telecom Rooms within the building.

The MTR would be ideally located within 25 meters of building riser system with a minimum area of 10 m2. It would be located a dry area not subject to flooding and as close as practicable to the building entrance point and next to the electrical service room to reduce the length of bonding conductor to the electrical grounding system.

There should be no false ceiling in MTR (open to slab) and extend all walls from floor to slab and entrance doors open outwards to maximize space.

There must be provision for electrical panel within the MTR reserved only for services within the room. This panel to be serviced by an uninterruptible source with circuits dedicated solely to telecommunications requirements within the MTR. The MTR should have a Telecommunications Grounding Bus bar (TGB) connected to main telecom building ground (TMGB).

The MTR must have a dedicated HVAC system operating 24 hours per day, 7 days per week and ensure the maintenance of a positive air pressure with a minimum of one air change per hour in all telecommunications spaces.

No services (including water pipes) are to pass through telecommunications spaces apart from those relevant to the functioning of the space.

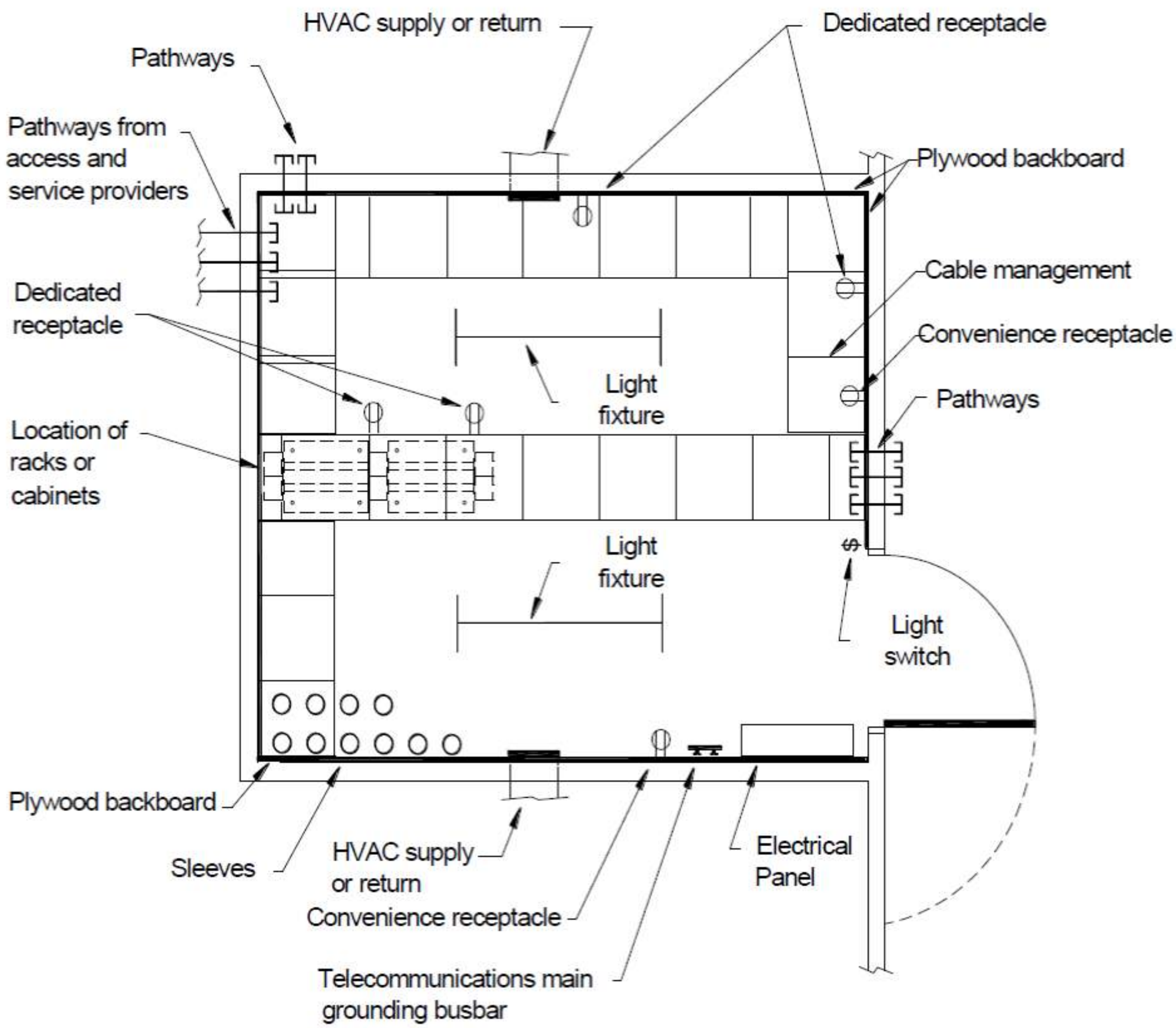

Figure 15: Typical MTR Diagram

Entrance Facility ([redacted]rier Room)

The Entrance [redacted]cility (EF) is the telecommunications space where all cabling from outside the building will terminate. Cables may be from a telecommunications carrier such as Bell, Telus, or Rogers. Its main function is as a transition point from outside cable to indoor rated cable and as a point of demarcation for telecommunications carriers.

The EF would be ideally located within 25 meters of building riser system with a minimum area of 10 m2. It would be located a dry area not subject to flooding and as close as practicable to the building entrance point and next to the electrical service room to reduce the length of bonding conductor to the electrical grounding system.

There should be no false ceiling in EF (open to slab) and extend all walls from floor to slab and entrance doors open outwards to maximize space.

The EF should have dedicated outlets on uninterruptible supply as well as a Telecommunications Grounding Bus bar (TGB) connected to main building ground.

Pathways should be established with either tray or conduits between EF and the Main Telecommunications Room (MTR).

The entrance facility must have a dedicated HVAC system operating 24 hours per day, 7 days per week (via dedicated chilled water from ESAP supply) and ensure the maintenance of a positive air pressure with a minimum of one air change per hour in all telecommunications spaces. In addition, equipment must be connected to the emergency generator.

No services (including water pipes) to pass through telecommunications spaces apart from those relevant to the functioning of the space.

Fire protection systems and generator systems to be considered as part of the next phase design.

Roof Top Infrastructure

Wireless carriers typically require a roof-mounted antenna to provide services. Coordination for the antenna mounting requirements with known wireless service providers is essential to assess each carrier's needs.

As rooftop antenna may have a visual impact on the architecture of the building depending on the size and placement, it is important to coordinate all wireless infrastructures (antenna, enclosures, dishes, etc.) with the carriers with rooftop agreements before the installation begins.

Providing a Trade Size 53 conduit (EMT or rigid conduit) linking the building penetration to a telecommunications room located on the top floor allows for a dedicated pathway for cables of the wireless provider to be run through this conduit, through spare backbone pathways, through the Distribution Room and to the Entrance Room where their equipment would reside.

Consideration should be given for the placement of a rooftop walkway to service wireless rooftop infrastructure if required as well as for the placement of specialized standoffs, mounts, or other structures for the support of wireless rooftop infrastructure including power and cables if required.

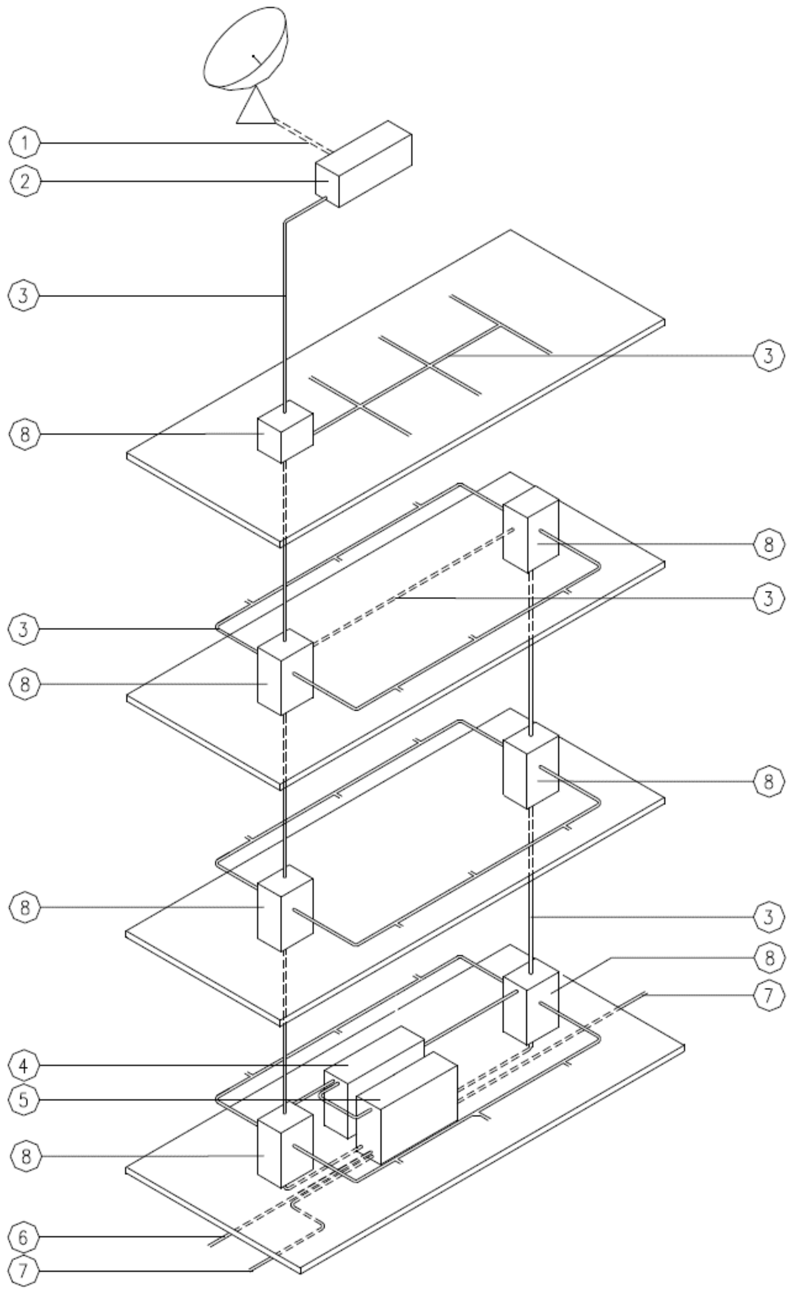

Figure 16: Typical Multi-tenant Building common spaces and pathways.

1. Wireless Service Entry
2. Entrance Facility
3. Common Building Pathways
4. Access provider space
5. Entrance Facility
6. Service Entrance Pathway
7. Diversity of Entrance Routes
8. Main Telecommunications Room

Voice Services

Technology and future operations procedure has made the use of the EEWD and other Centrex hard wired based telephony obsolete.

Future of government operations is an activity-based workspace (ABW) with no assigned desk. ABW allows the employees the freedom to decide for themselves: how to work, where to work, which tools to use and with whom to collaborate to get the work done. Employees will be mobile with the ability to work in any office space or remotely from home. Mobile wireless phones and Voice over IP (VOIP) telephony is the key to this transition due to the transferable nature of voice services.

It is highly recommended the Government agencies, located in the permanent buildings on Jean Mance and Brooke Claxton, as well as the midterm buildings of Standards Building (4), Laboratory Centre for Disease Control (6), Central Heating and Cooling Plant (13) and Sir Frederick Banting Research Centre (22), look to migrate to Voice over IP (VOIP) within the first couple years of the redevelopment. Alternatively, these government agencies could migrate to cellular, while the transition to VOIP plan is developed.

Permanent buildings Jean Talon, and RH Coats along with the Main Stats Building could look at a later migration date, due to the main switch residing in Main building and the direct connection to the other buildings.

If it is not feasible to migrate to the current technologies, there is capacity for new copper cabling in the proposed duct design. This approach would not be recommended due to costs and almost certain early abandonment.

Design Considerations

Glossary of Telecommunications Terms

Alternate Service Provider - Any telecommunications service provider other than the Incumbent Local Exchange Carrier (e.g., Bell Canada, Telus) such as MTS Allstream, also known as competitive local exchange carriers (CLECs).

Analog - Transmission method that uses electrical or physical analogies to produce a continuous signal.

Backboard A panel (e.g. wood or metal) used in mounting connecting hardware and equipment (typically 19mm (3/4") plywood).

Backbone A facility (e.g. pathway, cable, or conductors) between any of the following spaces: telecommunications rooms, common telecommunications rooms, floor-serving terminals, entrance facilities, equipment rooms, and common equipment rooms.

Bonding The permanent joining of metallic parts to form an electrically conductive path that will ensure electrical continuity and the capacity to conduct safely any current likely to be imposed.

Cable tray A support mechanism used to route and support telecommunications and other cables. Typically equipped with sides that allow cables to be placed within the sides over the tray's entire length.

Centrex - A coordinated phone service that can be leased from the local telephone company and which requires no special on-site equipment; it often includes enhanced services such as 4-digit extension dialling, call waiting, three-way calling, and off-site transfer.

Collocation - The process in which telecommunications service providers locate equipment in the same space. Collocation allows service providers to easily interconnect equipment and/or networks.

Competitive Local Exchange Carrier (CLEC) - See Alternate Service Provider above.

Easement - A right of use over the property of another.

End-User Switch - A device controlling a tenant's telecommunications system.

ILEC – Incumbent Local Exchange Carrier – the former monopolistic carriers (i.e. Bell Canada, TELUS, Rogers, Zayo, etc.).

Electronic Industries Alliance (EIA) An alliance organized along specific electronic product and market lines, and, as a standards association, develops and publishes industry guidelines.

Entrance Facility (EF) An entrance to a building for both public and private network service cables (including wireless) including the entrance point at the building wall and continuing to the entrance room or space. (TIA))

Fibre (U.K. & Canada) or **Fiber** (U.S.) Thin filament of glass or plastic that conducts a light signal.

Infrastructure A collection of telecommunications components, excluding equipment, that together provides the basic support for the distribution of all information within a building or campus.

Institute of Electrical and Electronics Engineers, Inc. (IEEE) An international organization whose purpose is to advance global prosperity by promoting the engineering process of creating, developing, integrating, sharing, and applying knowledge about electrical and information technologies by the definition and application of standards.

Interbuilding (campus) backbone A backbone network providing communications between more than one building.

Intrabuilding Backbone A backbone network providing communications within a building.

Key System - Multi-line telephone that allows the user to view and select any line serving the premises.

Local Area Network (LAN) - A limited-distance network connecting individual computer terminals, typically within a single building.

Main Telecommunications Room (MTR) The location of the cross-connect point of incoming cables from the telecommunications external network and the premises cable system. (TIA)

Utility Hole (UH) A vault located in the ground or earth as part of an underground duct system and used to facilitate placing, termination and maintenance of cables as well as the placing of associated equipment, in which it is expected that a person will enter to perform work.

Pathway - A sequence of connections that provides the connectivity between devices on a network or between networks on an Internetwork. 2. The vertical and horizontal route of the telecommunications cable. 3. A facility for the placement of telecommunications cable.

Personal Communications Service (PCS) - Digital wireless telecommunications service that operates over transmission spectrum auctioned by the FCC in 1996. Similar in application to cellular services.
Plain Old Telephone Service (POTS) - Standard analog telephone lines using a twisted pair of copper wires.

Point-of-Presence (POP) - A point where calls, data, or other electronic signals are transferred from one type of network to another.

Private Branch Exchange (PBX) - A system that allows for switching and routing of multiple lines without specific user knowledge or intervention.

Riser - A vertical or horizontal space used for utility distribution within the building.

Service Provider - Any company providing telecommunications services, including local, long distance, cellular, paging, video, data, and the Internet.

Shared PBX Services - A central switch that is established for use by multiple tenants; service is typically provided to tenants on a station-by-station basis.

Singlemode Optical Fibre Optical fibre with a small diameter, featuring a core of 8-9 micron (micrometers) and a cladding diameter of 125 micron; light is restricted to a single path, or mode, in singlemode fibre.

Strand 2. A single unit of optical fibre within a cable (e.g. a 12-strand fibre cable has twelve individual optical fibres within the cable sheath).

Switching - Interconnection of transmission equipment to provide individual communications services.

Telecommunications Any transmission, emission, and reception of signs, signals, writings, images, and sounds, that is, information of any nature by cable, radio, optical, or other electromagnetic systems.

Telecommunications Bonding Backbone (TBB) A conductor that interconnects telecommunications bonding backbones.

Telecom License Agreement - A privilege to do some act or a series of acts without possessing any estate or interest. It is usually revocable at the will of the licensor and is not assignable.

Wide Area Network (WAN) - An integrated data network linking individual computer stations or local networks over common carrier facilities.

Acronyms

ABW	Activity Based Workspace
AP	Access Point
BAS	Building Automation System
BBC	Backbone Bonding Conductor
BICSI	Building Industry Consulting Service International
CATV	Cable Television
CCTV	Closed-Circuit Television
CEC	Canadian Electrical Code
CHCP	Central Heating and Cooling Plant
COAX	Coaxial Cable
DAS	Distributed Antenna System
EF	Entrance Facility
EIA	Electronic Industries Alliance
EEWD	Enhanced Exchange Wide Area Dialing
EMT	Electrical Metallic Tubing
EP	Entrance Point
EF	Entrance Facility
ER	Equipment Room
EIA	Electronic Industries Alliance
EMT	Electrical Metallic Tubing
HVAC	Heating, Ventilation, and Air Conditioning
IEEE	Institute of Electrical and Electronics Engineers, Inc.
ILEC	Incumbent Local Exchange Carrier
IP	Internet Protocol
IT	Information Technology
IoT	Internet of Things

MTR	Main Telecommunications Room
MH	Utility hole
MM	Multimode (Fibre)
OSP	Outside Plant
PM	Project Manager
PoE	Power over Ethernet
PVC	Polyvinyl Chloride
RCDD	Registered Communications Distribution Designer
RLM	Remote Line Module
SSC	Shared Services Canada
SM	Singlemode (Fibre)
TBB	Telecommunications Bonding Backbone
TBC	Telecommunications Bonding Conductor
TIA	Telecommunications Industry Association
TMGB	Telecommunications Main Grounding Busbar
TSP	Telecommunications Service Provider
VoIP	Voice over Internet Protocol
WiFi	Wireless Fidelity

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Appendix B: Supplementary Drawings

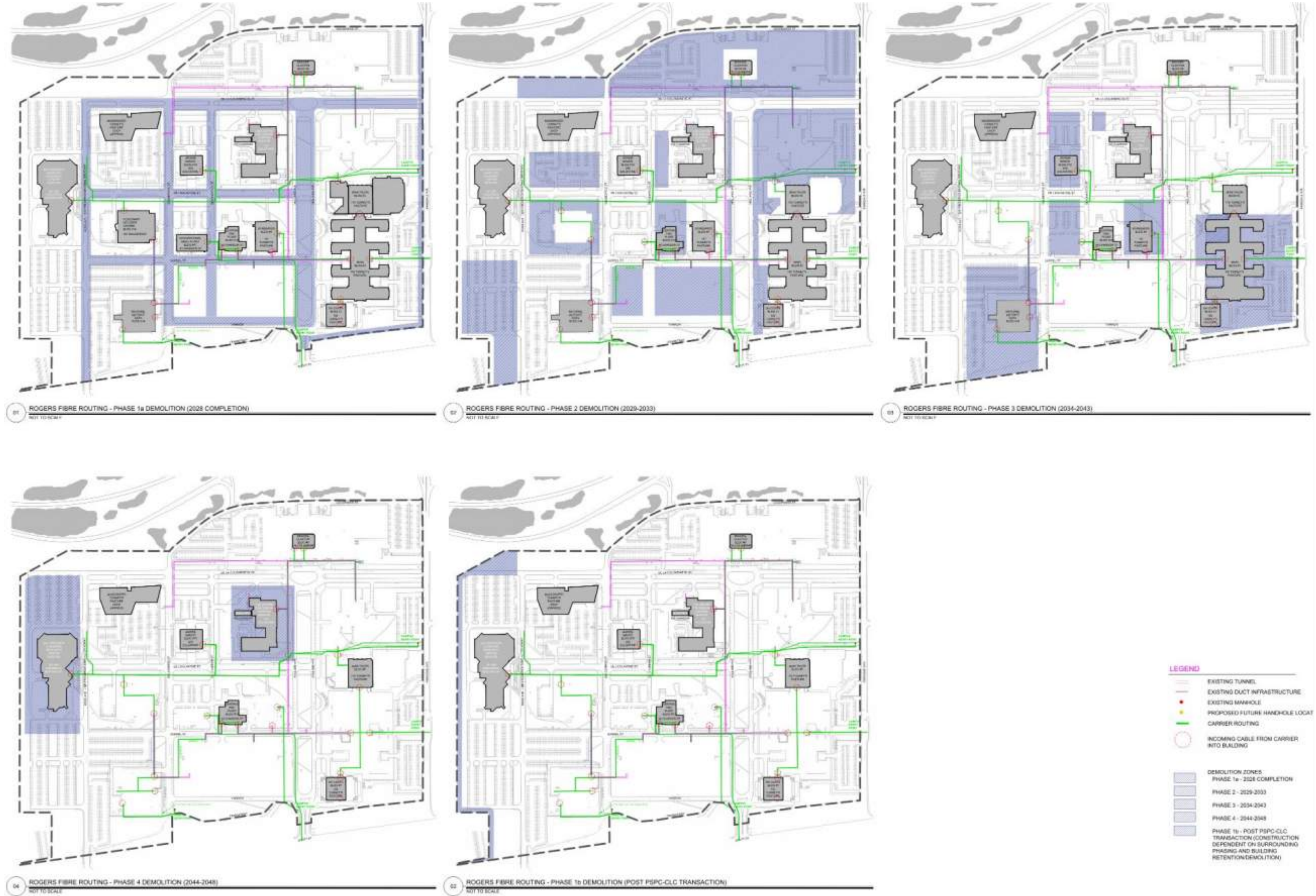

Figure 17: Rogers Fibre Routing Demolition (By Phases)

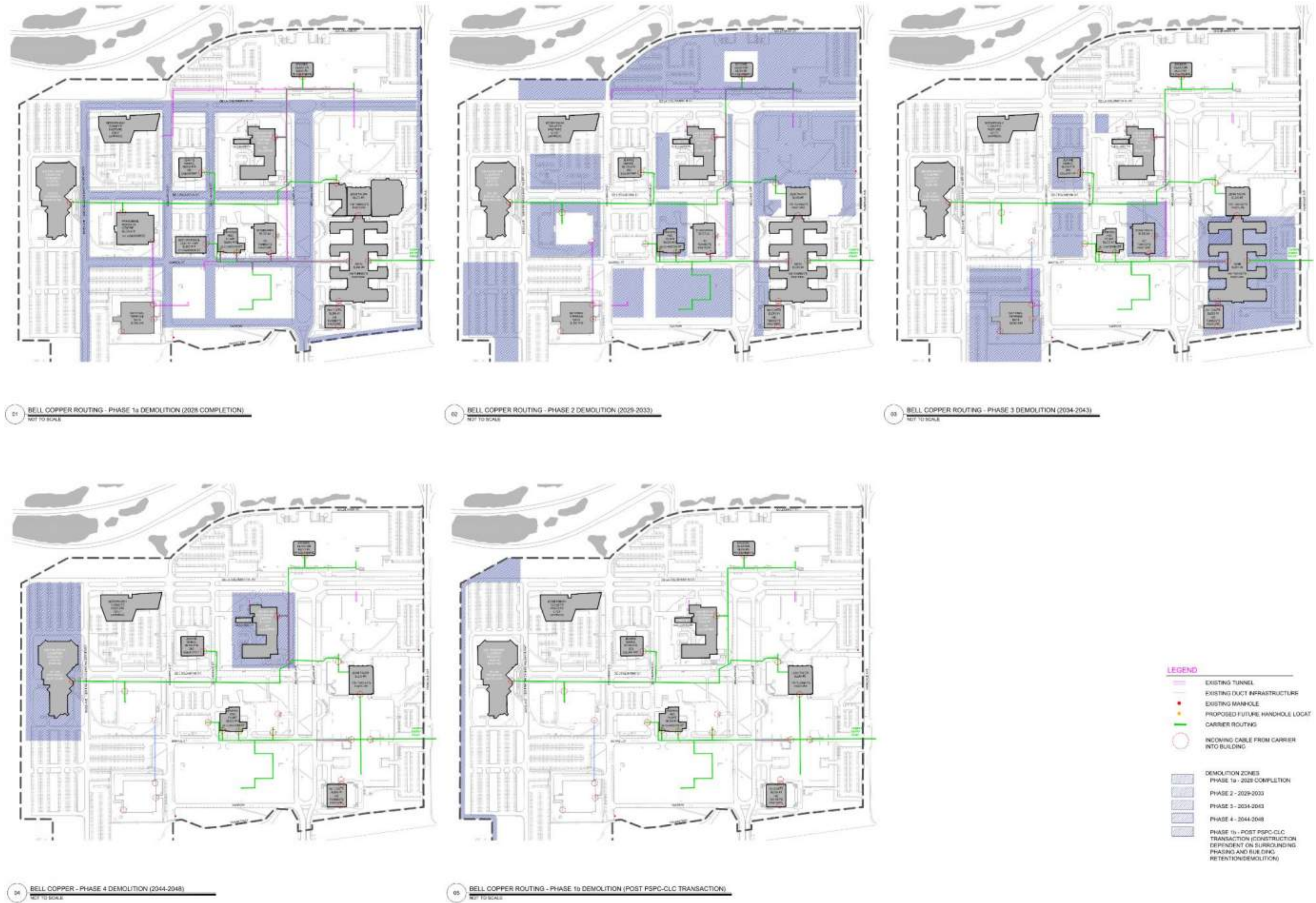

Figure 18: Bell Copper Routing Demolition (By Phases)

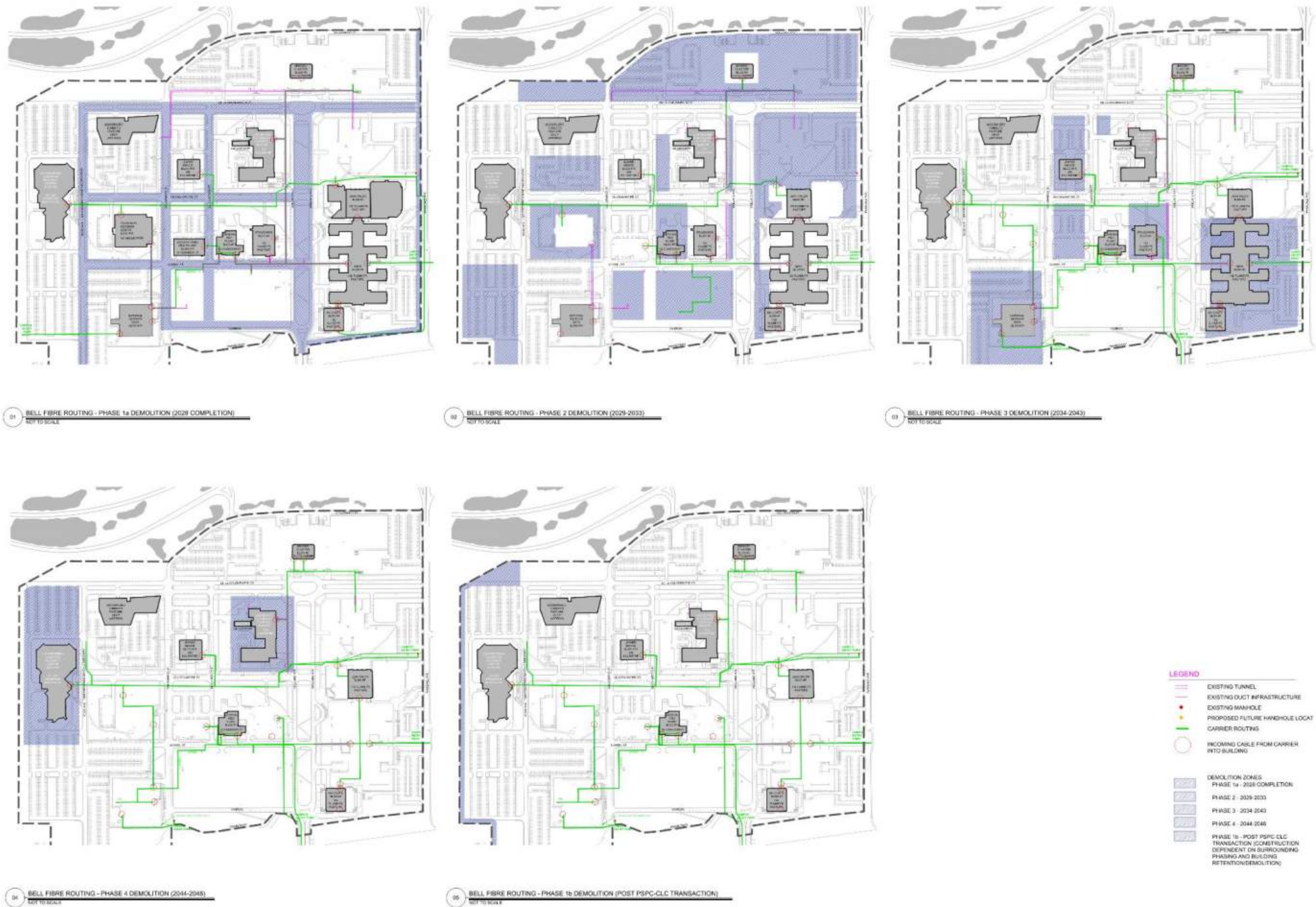

Figure 19: Bell Fibre Routing Demolition (By Phases)

Figure 20: Zayo Fibre Routing Demolition (By Phases)

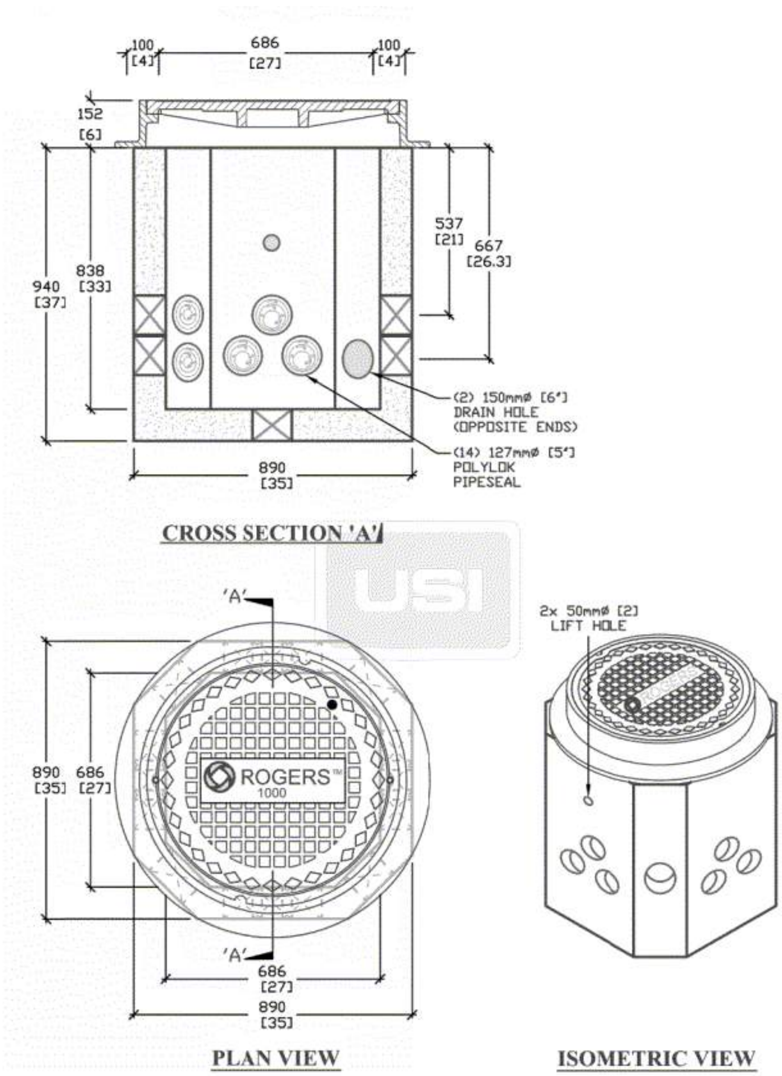

Figure 21: Proposed Handhole Detail

END REPORT

Tunney's Pasture Redevelopment Phase II - *Telecommunications and Technology Assessment and Planning Report*

Prepared For:

ARCADIS Design & Consultancy for natural and built assets

Prepared By:

attain

Report Date:
December 17th, 2025

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Section 1 - Executive Summary

This Phase II report provides a clear plan to modernize, right-size, and sequence telecommunications infrastructure at Tunney's Pasture so services remain online during demolition, roadworks, and new construction. It consolidates findings from the 2019 baseline and the December 2024 update, adds 2025 site observations, and translates them into actionable steps for carriers, SSC/PSPC/CLC, Hydro Ottawa, and tenant departments. Key outcomes of this phase include coordinated cutover planning, defined carrier entry points, early backbone build for permanent connectivity, clear stakeholder communication templates, and risk-based prioritization for critical tenants (Health Canada, DND, Statistics Canada).

This report includes updated annotated drawings, stakeholder matrices, photos of site conditions, provisional cutover phasing plans, and a series of templates and appendices to facilitate implementation.

1.1 Phase II Objectives:

- Align telecommunications infrastructure with modified roadways, building footprints, and campus-servicing utility corridors.
- Provide detailed cutover planning to ensure continuity of service during demolition, roadwork, and civil utility realignment.
- Continuing stakeholder coordination with SSC, PSPC, CLC, Arcadis, Bell, Rogers, Telus, Zayo, and Hydro Ottawa.
- Support the enablement of future smart building and operational technology (OT) services.
- Ensuring tenants — particularly Government of Canada departments — are supported through proactive communication and departmental readiness for telecommunications transitions.

1.2 Key Recommendations:

- Establish a coordinated telecommunications cutover plan aligned with the latest construction and roadway phasing.
- Finalize carrier design submissions and entry points per the new utility corridor.
- Initiate pre-construction notices and tenant coordination activities using Appendix F communication templates included within.
- Monitor and mitigate risks outlined within Section 13 of this report. Please refer to Section 9 for risk by building and appendices.
- Maintain a regular working cadence with SSC, tenants, CLC, PSPC, Telecom Carriers and Hydro Ottawa to ensure readiness for each milestone.

1.3 Next Steps:

- Engage stakeholders and design teams involved in the implementation of Phase II. This includes civil works, Hydro Ottawa, telecommunications carriers, Attain, PSPC, CLC, and other relevant stakeholders.
- Engage tenants of impacted buildings via SSC. Utilize the tenant communications plans included within Appendix F.
- Coordinate design and cutover implementation with Hydro Ottawa, as well as telecommunications carriers to ensure minimal risk and interference.

- Finalize entry paths and MTR/MDF requirements by Dec 2025 with telecommunications carriers.
- Confirm cutover timelines with tenants by Q1 2026.
- Begin permit applications for telecommunications work by Q2 2026.

Section 2 - Background & Context

The original **2019 Telecommunications and Technology Assessment Report** outlined a foundational vision for delivering modernized, resilient, and carrier-neutral telecommunications infrastructure across the Tunney's Pasture campus, in anticipation of long-term real estate transformation.

This was updated in **December 2024**, following new developments in:

- Energy Services Acquisition Program (ESAP) (District Heating & Cooling) Plant planning & design.
- A revised phasing and civil road alignment plan.
- Stakeholder feedback from carriers, SSC, and Hydro Ottawa.
- Additional fieldwork and coordination meetings conducted by The Attain Group.

The 2024 update included a revised understanding of campus risks, limitations in existing entrance facilities, and planning assumptions for smart building readiness and tenant migration. It also introduced specific recommendations regarding pathway capacity, carrier entry options, and demarcation points for future phases.

The 2025 Final Report builds directly upon that foundation, reflecting:

- New field photos and inspections at the Heating & Cooling Plant, DND, Personal Records Buildings, Brooke Claxton, and Occupational Health areas.
- A provisional telecommunications corridor plan and pathway cutover recommendations, organized by building and construction sequence.
- A continued emphasis on tenancy continuity, leveraging templates and checklists for building readiness, SSC coordination, and telecommunications contractor engagement.

Collaboration with Arcadis, CLC, PSPC, and other redevelopment stakeholders has continued to ensure that telecommunications infrastructure maintains pace with evolving civil and vertical design inputs. The report reflects a phased implementation strategy, including temporary pathways, permanent alignments, and a methodical transition plan to minimize disruption to tenant operations.

Section 3 - Stakeholder Engagement

Successful telecommunications and technology infrastructure planning at Tunney's Pasture has required ongoing collaboration between government departments, carriers, utilities, and development stakeholders.

Throughout Phase II, The Attain Group, on behalf of Public Services and Procurement Canada (PSPC) and Shared Services Canada (SSC), has coordinated with a broad network of stakeholders.

This section captures key touchpoints, coordination status, and next steps across each stakeholder group.

3.1 Stakeholder Register

Please refer to Appendix I included within this report, which outlines the full stakeholder register including names, contacts, and responsibilities.

3.2 Summary of Engagements

3.2.1 Telecommunications Carriers

Each carrier (Bell, Rogers, Telus, Zayo) was provided with updated routing drawings, building-by-building matrices, and provisional drawings. They were asked to:

- Review and provide feedback on revised telecommunications pathways.
- Confirm preferred entry points and servicing routes.
- Participate in coordination meetings for cutover planning.

Current Status: Review provisional design with each carrier, begin planning for new services. Appendix F provides a formal communications template.

3.2.2 Hydro Ottawa

Hydro Ottawa has been working on a duct upgrade/replacement project since 2017. We had an opportunity to connect with Hydro to coordinate our efforts. As utility roadwork and duct bank realignment are tied directly to the telecommunications corridor, Hydro Ottawa was briefed on the telecommunications and IT redevelopment project and Tunney's Pasture. Coordination with hydro is critical in the successful installation of new underground duct infrastructure. Hydro Ottawa and was engaged for:

- Coordination of new road alignment in relation with telecommunications.
- Technical documents and campus site plan sharing.
- Shared underground duct pathways and trenching discussions.
- Site access timelines.

Current Status: Joint corridor plans are currently under proposed as part of this work; Hydro Ottawa phasing inputs directly impact telecommunications duct and pathway engineering strategy. Attain's proposed pre-emptive underground duct pathway design (Appendix D) takes into consideration Hydro lines. Site plans and documentation have been submitted to Arcadis Civil Planning for future civil action.

3.2.3 Tenants / Government Departments

Government of Canada departments situated within Tunney's Pasture campus were contacted via SSC, PSPC. and internal channels. Departments that will be impacted in Phase II include:

- **Health Canada** – Brooke Claxton & Occupational Health buildings.
- **Statistics Canada** – RH Coats, data processing centers and support buildings.
- **Environment & Climate Change Canada (ECCC)** – Environmental monitoring labs and offices.
- **Department of National Defense / Personal Records** – Occupying aging buildings impacted by civil works.

Current Status: When appropriate, connect with IT & telecommunications coordination leads in each department. Appendix F provides a template of communication for tenant engagement.

3.2.4 Development Stakeholders

Ongoing meetings with Arcadis, CLC, and PSPC have resulted in updated infrastructure drawings, phasing overlays, and corridor conflict reviews. Attain continues to function as liaison between these teams and telecommunications carriers.

Current Status: Coordination is currently ongoing. Key dependencies flagged in the risk summary (Section 9).

3.3 Touchpoints & Action Item Matrix

Stakeholder	***Engagement Date(s)***	***Key Topic(s)***	***Status***	***Next Steps***
Bell, Rogers, Telus, Zayo	Spring – Fall 2024	Design input on existing and future telecommunications corridors.	Awaiting revised submissions.	Confirm entry points and cutover plans.
Hydro Ottawa	July – September 2024	Current and future road alignment, shared corridor coordination.	Alignment finalized, construction phasing underway.	Confirm duct bank layout and access timelines. Ensure coordination with telecommunications.
SSC (Salina Aubrey, Stephen Pilon)	Ongoing	Tenant readiness, telecommunications continuity.	Active and ongoing coordination.	Finalize tenant contacts and service cutover schedule. Notify tenants, ass appropriate.
Arcadis / CLC / PSPC	Bi-weekly	Document updates, conflict resolution.	Continuous.	Align new documents with carrier and Hydro Ottawa inputs.
Health Canada, StatsCan, ECCC	Initial Notice Circulated	Facility access, system continuity.	Awaiting departmental telecommunications & IT leads.	Initiate building-specific briefings in anticipation of Phase II.
Attain Group	Continuous	Technical leadership, stakeholder integration and engagement.	Lead consultant.	Continue to manage stakeholder communications and reporting.

Section 4 - Site Visits & Infrastructure Assessment

In support of the Phase II telecommunications and technology planning effort, a series of targeted site visits were conducted by The Attain Group and representatives from Shared Services Canada (SSC), BGIS, and PSPC. These visits were critical to assessing the condition and suitability of existing telecommunications infrastructure, entrance facilities, tunnels, basement corridors, and other infrastructure elements that are key to the redevelopment strategy.

4.1 Site Visit Summary

Date	Location(s) Visited	Participants	Notes
June – September 2025	Heating & Cooling Plant	Attain, SSC	Observed aging telecommunications cabling infrastructure with limited conduit and pathways access; future cutover required to accommodate new roadway realignment.
June – September 2025	DND / Personal Records Buildings	Attain, SSC	Entrance facilities are in congested utility zones. Critical Risk: Identified risk of service disruption during demolition unless cutovers are completed in advance.
June – September 2025	Brooke Claxton / Standards / Occupational Health Buildings	Attain, SSC, Health Canada Facilities	Critical Health Canada services identified; detailed cutover planning and smart-building readiness assessment conducted.
Fall 2025	Exterior Campus Corridor & Road Alignments	Attain, Arcadis, Hydro Ottawa (review only)	Reviewed existing and proposed road alignments, confirming potential clashes with existing carrier plant. Alignment drawings annotated. Hydro Ottawa coordination in civil planning ongoing.

4.2 Infrastructure Observations

4.2.1 Heating & Cooling Plant

- Future use of this building needs to be confirmed to plan, to inform urgency and upgrades to telecommunications infrastructure.
- Aging cabling is present throughout the building, legacy copper and coax cabling in place.
- Conduit and pathway access constrained; existing infrastructure may be abandoned upon cutover.
- Civil and telecommunications cutover required in early phases of redevelopment project to accommodate road changes.

4.2.2 DND / Personal Records Buildings

- Existing entrance facilities are concentrated/crowded, and thereby vulnerable to upcoming demolition and/or redevelopment of the building.
- Critical: Requires proactive relocation of carrier and government circuits due to the nature of services conducted at the mentioned facilities.
- SSC to confirm and verify services routed throughout this facility.

4.2.3 Brooke Claxton / Standards / Occupational Health Buildings

- Houses Health Canada critical infrastructure such as labs, occupational health.
- Phase II pathway routing and early smart-building coordination required.
- Requires phased cutover from existing fiber entrances to the new duct infrastructure pathways.

4.2.4 Tunnels and Basement Corridors

- Several telecommunications cable routes utilize shared basement corridors or the legacy tunnel system between buildings.
- All telecommunications carriers (Rogers, Bell, Zayo) utilize the tunnel system throughout the campus to service various buildings.
- Several areas within the tunnel system show signs of water ingress and age-related deterioration.
- Coordination with Facilities and Environmental teams is required if the intention is to remediate for future or re-use the existing tunnel system.

4.2.5 Emergency Phone Lines

- Cellular based telephone lines are present throughout the Tunney's pasture campus. These phones were installed in 2009 and 2010 with Attain's contribution.
- There are a total of eight (8) emergency phone lines scattered throughout the campus.
- Although phones are cellular based, power to the systems was routed to the emergency phone locations via routing to the closest lighting pole in 50mm (2") PVC conduits.
- Emergency phone line removal and/or repurposing in the context of Phase II should be taken into consideration, ensuring that these phone line remain functional during the transition period.
- Please refer to Appendix J for an illustration of locations throughout the campus.

4.3 Entrance Facility Assessment

Building	***Existing Carrier Entry***	***Condition***	***Actions Required***
Heating & Cooling Plant	Yes – Legacy Pathways	Moderate	New entrance pathway design and civil integration.
DND / Personal Records	Yes – Mixed Pathways	Poor	Critical: Prioritized for service relocation and early phase cutover to ensure no service disruption.
Brooke Claxton / Standards / Occupational Health	Yes – Fiber Entrances	Fair	Confirm redundant paths, smart building support required. Relocate cabling to new duct infrastructure.
Tunnel Network	Yes – Legacy Shared Access	Varies	As the tunnel system has been deteriorating due to age, a risk assessment for reuse vs. decommissioning is required.

4.4 Access & Security Constraints

- Access to certain buildings, basements, telecommunications rooms, and entrance facility rooms was delayed due to security clearance requirements and/or tenant approvals.
- SSC and PSPC assisted with internal coordination and coordination with tenants to facilitate site walk-throughs as required.
- Health Canada requires a 48–72 hours advance notice and health/safety protocols for lab-adjacent spaces.

4.5 Supporting Documentation & Photos

Appendix B, D, and H of this report include:

- Annotated site photos of each major building (Appendix H).
- Corridor and tunnel condition imagery (Appendix H).
- Marked-up PDF drawings indicating current vs. proposed telecommunications routing (current carrier pathways vs. new underground duct infrastructure plan)(Appendices B and D).

Section 5 - Carrier & Hydro Coordination

The successful redevelopment of telecommunications infrastructure at Tunney's Pasture hinges on proactive coordination with all major telecommunications carriers present at the Tunney's Pasture campus, as well as Hydro Ottawa. Carrier infrastructure intersects with civil road realignments, building demolition schedules, and new tenant IT requirements. This section summarizes the engagement, status, and next steps for each stakeholder.

5.1 Coordination with Telecommunications Carriers

5.1.1 Bell Canada

- **Existing Presence**: Multiple points of presence (POPs) across the campus, including legacy copper and fibre entrances at various buildings.
- **Engagement**: Participated in multiple design discussions, including new duct infrastructure requirements for servicing; awaiting final requirements and routing confirmation.
- **Status**: Reviewed initial pathway concepts in 2025; requested updates based on revised civil and duct bank phasing plans.
- **Action Required**: Submit design for feedback to Bell Canada.

5.2.2 Rogers Communications

- **Existing Presence**: Active fiber connections to multiple Government of Canada (GOC) tenants.
- **Engagement**: Requested to confirm entry point conflicts near Heating & Cooling Plant. In addition, new duct infrastructure requirements for servicing the campus were also requested.
- **Status**: Participated in preliminary meetings. Rogers to confirm new cutover timelines aligned with road realignment.
- **Action Required**: Submit pre-emptive design for feedback from Rogers Communications.

5.1.3 Telus Communications

- **Existing Presence**: Although Telus presence is limited, cabling is present at the Tunney's Pasture LRT station, as well as 131 Parkdale Avenue. Note that Telus services are primarily being carried by all other carriers.
- **Engagement**: Telus provided pathway redline feedback in 2024; requested duct bank trench sharing opportunities. In August 2025, Telus provided documentation confirming their presence.
- **Status**: Share preliminary duct infrastructure design for feedback.
- **Action Required**: Coordinate with Telus once design for the new underground duct system has been completed.

5.1.4 Zayo Group

- **Existing Presence**: Known dark fiber presence; routing will potentially be impacted by Brooke Claxton sidewalk relocation.
- **Engagement**: Coordination ongoing via SSC and Attain; response required to confirm pathway adjustments for transition to the new duct infrastructure system.
- **Status**: Pending internal routing review. In addition, Zayo to provide requirements in anticipation of transition to new duct system.
- **Action Required**: Coordinate with Zayo once design for the new underground duct system has been completed.

5.2 Hydro Ottawa Integration

Hydro Ottawa plays a critical role in both power and corridor alignment integration. The new underground telecommunications duct bank plan must remain coordinated with power services to prevent clashes and ensure civil trench efficiency. An overall hydro site plan of the entire Tunney's Pasture campus was requested by Attain and provided by Hydro Ottawa. Attain's proposed pre-emptive underground duct design (Appendix D) ensures minimal crossovers between hydro and telecommunications.

5.2.1 Key Coordination Topics:

- **Road Realignment Impact**: Hydro's underground infrastructure shifts near the Personnel Records Building and Brooke Claxton impact telecommunications corridor options.
- **Joint Trench Opportunity**: Discussions ongoing on shared civil trenching where feasible.
- **Ongoing Infrastructure Updates**: Hydro Ottawa advised that there have been several transformations and updates to their duct infrastructure system in the past few years. Such changes have been made keeping Phase II in mind.
- **Hydro Ottawa Input (September 2025)**:
    - Raised concerns regarding duct spacing and clearances. New works for Hydro have been addressing these issues.
    - Flagged specific conflict near Heating & Cooling Plant with civil routing. Arcadis and Hydro will be coordinating to address this item.

5.2.2 Action Items:

- Review all cross-section details in revised Arcadis civil plans, once available.

- Confirm vertical and horizontal separation between Hydro and telecommunications ducts. Note that details have been included within the drawings package, which illustrates the required clearances and avoidances with Hydro pathways.
- Align build windows to avoid rework or trench duplication.

5.3 Joint Issues & Opportunities

Issue	***Stakeholders***	***Risk Level***	***Notes***
Delay in carrier design feedback.	Bell, Rogers, Telus, Zayo	High	Could delay permit submission and trenching commencement.
Shared duct bank congestion.	Hydro Ottawa, Bell, Telus	Medium	Vertical separation plans required to evaluate density of cabling in duct banks.
Entry clashes in each building.	All Carriers, Hydro	High	Requires entrance duct coordination and updated trench layout.
Temporary vs Permanent cutover overlap.	SSC, Tenants, All Carriers	Medium	A clear and concise phasing plan required to plan cutover plan.

Section 6 - Staging & Phasing

The staging and phasing strategy for Tunney's Pasture Redevelopment Phase II has evolved significantly from the original 2019 plan and its 2024 update. This section outlines the integration of current real estate phasing plans with a proposed telecommunications infrastructure strategy that ensures service continuity, scalability, and coordinated deployment of both temporary and permanent systems.

6.1 Overview of Phasing Plan

The **Arcadis Draft Proposed Phasing Plan (August 2026)** subdivides redevelopment into the following components:

- **Phase 1A (2028 Completion):** Road and infrastructure enabling works including Columbine, Goldenrod, and Sir Frederick Banting roads.
- **Phase 1B (Post PSPC - CLC Transaction):** Expansion area west of Northwestern Avenue, contingent on federal property transaction.
- **Phase 2 (2029 – 2033):** First wave of vertical development along the Goldenrod - Chardon corridor and the eastern edge of Tunney's Pasture Drive.
- **Phase 3 (2034 – 2044):** Mid-site densification and replacement of retained buildings along Sorrel Driveway and Yarrow Driveway.
- **Phase 4 (2044 +):** Final redevelopment activities focused on the northern quadrant along Kichi Zibi Mikan.

The diagram below (Figure 6.1) illustrates the full phasing overlay and alignment of new and retained buildings:

Figure 6.1: Proposed Building Phasing Plan – Phase 2 (Red), Phase 3 (Purple), Phase 4 (Green) (Attain Drawing Page #2)

6.2 Telecommunications Infrastructure Strategy

To align with this long-term redevelopment, Attain proposes a new telecommunications infrastructure system to be constructed in tandem with each site phase. Rather than duplicating temporary systems for each building, this forward-looking strategy enables permanent backbone elements to be constructed in a modular and extendable manner.

6.2.1 Key Infrastructure Concepts:

- New campus-wide fiber and pathway corridors will be routed alongside new road alignments (Goldenrod, Chardon, Sorrel, Tunney's Pasture Driveway).
- Permanent entrance facilities will be installed for each block and/or building group as construction progresses.
- Cutovers from legacy pathways will occur building-by-building, as described in Section 7.3.
- Carrier participation and clear assignment of entrance vaults, handholes, and pathways are critical to avoid future disruption.

The graphic below (Figure 5.2) is taken from Attain's drawing set and represents the proposed long-term telecommunications backbone to support this staged development (pre-emptive):

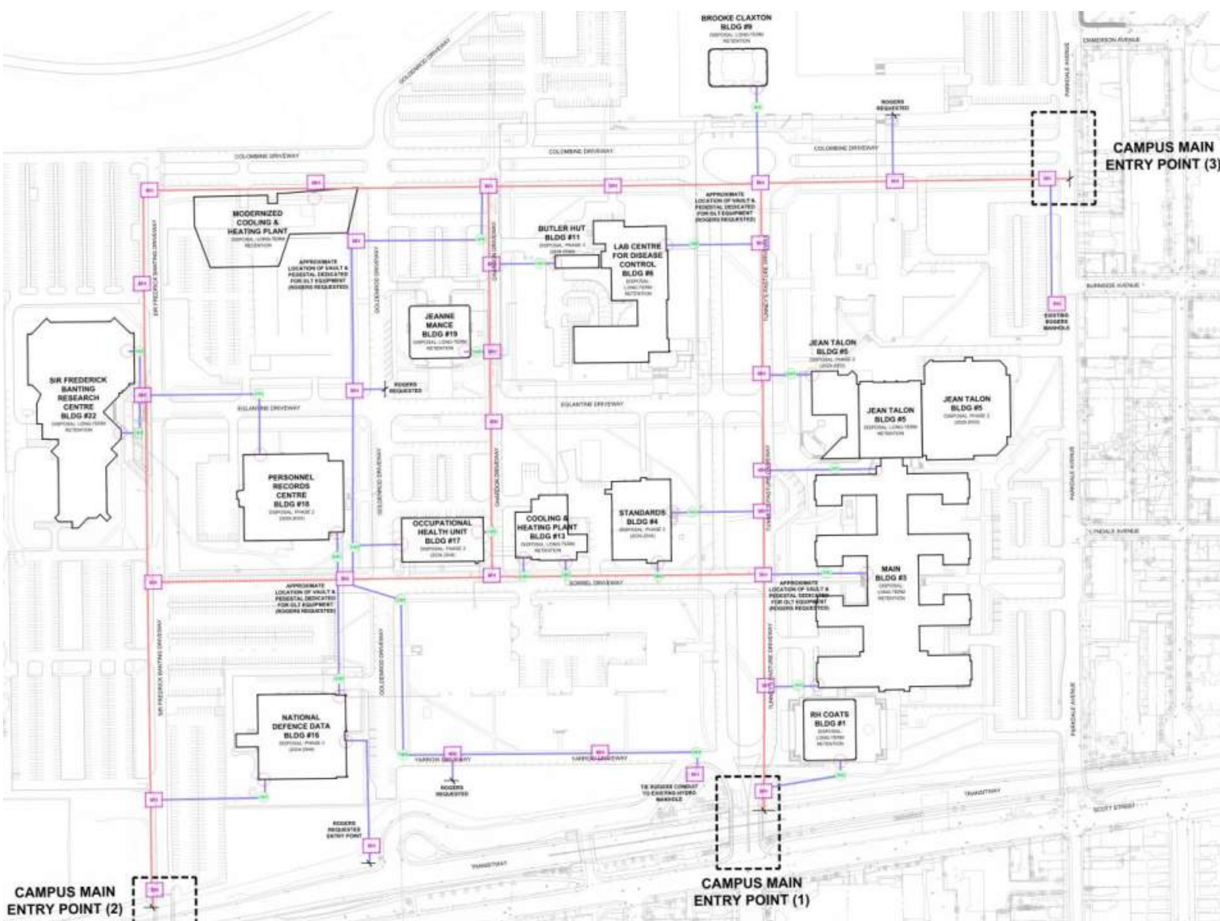

***Figure 6.2**: Underground Duct Infrastructure Plan (Pre-emptive) (Attain Drawings Page #4)*

6.3 Integration with Tenant Occupancy and Government Requirements

As buildings are decommissioned or redeveloped, tenants such as Health Canada, Statistics Canada, DND, SSC, and Environment Canada will require uninterrupted telecommunications access. In order to address this item:

- Temporary cutovers will be provided only in circumstances where timing or access constraints preclude permanent installation.
- Tenant-specific staging matrices indicate the window for relocation or infrastructure servicing.
- Health Canada laboratory requirements and SSC critical systems will receive priority sequencing in infrastructure readiness.

6.4 Carrier Readiness and Staging Coordination

The plan relies on timely engagement with all participating carriers: Bell, Rogers, Telus, and Zayo. Each will be assigned conduit pathways and vaults within the master plan, and must coordinate with:

- The civil engineering team to ensure telecommunications pathway requirements are met.
- Hydro Ottawa to coordinate hydro and telecommunications pathways and ensure minimal interference with one another.
- The overall project schedule ensuring timely completion of tasks.
- Permitting timelines.
- Required pre-construction surveys and as-builts.

6.5 Recommendations

To support this evolving and long-term staging approach:

- Begin design and construction of new telecommunications corridors during Phases 1 – 4 roadworks program (as outlined within section 6.1, and Attain's drawings package page #3), prioritizing main road alignments (Goldenrod, Chardon, Sorrel, Yarrow, Columbine).
- Issue building-specific cutover schedules to tenants and carriers no less than 90 days in advance. Some Government of Canada departments on campus, such as DND, should receive prior notice in the case a comprehensive cutover plan is in place.
- Utilize Appendix F templates to initiate coordination communications with tenants and carriers, including responsibilities, timelines, and field contacts.
- Include dedicated allowance for temporary systems where permanent deployment is not feasible due to sequence, permits, and/or funding.

Section 7 - Detailed Cutover Planning & Implementation

7.1 Purpose and Objectives

The purpose of the following section is to define the approach for transitioning telecommunications services (ISP, carrier, and internal network) from legacy pathways (underground tunnel system) to the newly proposed infrastructure at Tunney's Pasture in alignment with the staged redevelopment.

7.1.1 Key objectives:

- Ensure zero service disruption for all Government of Canada tenants, specifically DND.
- Coordinate with all carriers including Bell, Rogers, Telus, Zayo, and SSC to finalize entry and exit paths for each building.
- Establish cutover timing to match roadworks and construction windows as per Arcadis's 2026 staging, which is outlined in section 6.1.
- Maintain flexibility for lab-based tenants (such as Health Canada) requiring parallel systems during testing and commissioning.

7.2 Planning Assumptions

- Each building will have a building-specific cutover notice (template in Appendix F).
- Carrier entry cabling work must be complete prior to cutover and include validation tests. This sequencing will ensure little to no downtime for tenants.
- SSC must validate Government of Canada IT services within 48 hours post-cutover.

7.3 Cutover Approach Per Phase

7.3.1 Phase 1A (Road Enabling Works, 2026 – 2028)

- **Scope:** Telecommunications backbone pathways installation along specific areas of Columbine, Sorrel, Yarrow, Goldenrod, and Sir Fredrick Banting. Please refer to Attain's drawings package (page #3) for the proposed road infrastructure redevelopment phasing plan, which outlines specific areas on each street that have been phased out.
- **Focus:** Construction of permanent maintenance holes (manholes), handholes, underground concrete encased conduit duct banks, and vaults. Carrier access points provisioned.

7.3.2 Phase 2 (2029 – 2033)

- **Buildings Included:**
    - Jean Talon (East and West wings) Building.
    - Personnel Records Building.
- **Actions:**
    - Finalize new proximity vaults and entrance locations. See Attain drawings page #4 for a pre-emptive illustration of the proposed underground duct infrastructure for Phase II.

- Coordinate and engage with SSC for any Government related networking circuits.
- Install underground ducts infrastructure servicing each building, coordinate building entrance locations.
- Validate fiber acceptance with tenants and install interim switch panels, as required.

7.3.3 Phase 3 (2034 – 2044)

- **Buildings Included:**
  - Department of National Defense, DND Building.
  - Occupational Health Unit Building.
  - Standards Building.
  - Butler Hut Building.

- **Actions:**
  - Implement core cutovers during tenant relocation, specifically on Goldenrod Driveway and Sorrel Driveway.
  - Use vertical riser designs and legacy riser decommissioning strategy for aged cabling.
  - Critical: SSC and tenant engagement required at least 90 days prior to switchover.

7.3.4 Phase 4 (Long-Term Retention, 2044 +)

- **Buildings:**
  - Sir Fredrick Banting Research Centre Building.
  - Brooke Claxton Building.
  - Jeanne Mance Building.
  - Lab Centre for Disease Control Building.
  - Heating & Cooling Plant.
  - Jean Talon (central wing) Building.
  - Main Building.
  - Modernized Cooling & Heating Plant.
  - RH Coats Building.
  - Northern edge block (Kichi Zibi Mikan side), potential tower replacement sites.

- **Actions:**
  - Infrastructure should already be in place (from Phase 1A, Road Enabling Works). Ensure port availability and smart-building readiness.
  - Carriers to use "plug-in" connection to main lateral duct. Coordinate temporary-to-permanent transitions with Health Canada to preserve lab connectivity throughout.

7.4 Roles and Responsibilities

Role	*Responsibility*
Attain	Overall coordination, building-specific cutover plans, stakeholder communications.
SSC	Coordination with client departments, circuit specific information, and coordination with Attain / Carriers.
Carriers (Bell, Rogers, Telus, Zayo)	Physical splicing, port reassignments, MOPs, and field tech readiness.
Health Canada / StatsCan / Other Tenants	Provide system dependency input, participate in acceptance testing.
Arcadis / Civil Team	Provide readiness of vaults, underground duct planning, building entry locations, and road access.

7.5 Suggested Cutover Tracker

See below a suggested example of a cutover tracker:

Phase	Building	Cutover Type	Planned Date	Vault ID	Carrier Coordination Complete	SSC Test Date	Tenant Confirmed	Notes
3	Department of National Defense, DND	Temporary → Permanent	October 2029	MH - T - 14	✓ Bell, Rogers	November 2nd, 2029	Pending – SSC	Notify tenant 90 days prior to cutover.
4	Brooke Claxton	New Permanent	November 2029	MH - T - 17	✓ Bell, Telus	November 10th, 2029	Confirmed	Lab switchover staged.

7.6 Contingency and Commissioning

- A dual-run period (approximately 2 to 5 days) is required where both, old and new, pathways are active. This process will ensure that there is no networking service disruption or downtime for tenants.
- Attain or another provider should supervise field commissioning with carrier technical leads, civil works, and tenant representatives.
- Cutovers should occur during low-impact windows and timelines (such as evenings and weekends), unless otherwise specifically requested.

Section 8 - Technology & Network Design

8.1 Pathway Strategy

- Dual-path fibre incoming from multiple different campus entry locations into redundant MTRs.
- Entry point coordination for each building with hydro, civil, and relevant stakeholder.
- Installation of new risers and the use of existing risers, where feasible.

8.2 Smart Building Enablement

- Conduits and trays planned for building automation systems (BAS), wireless networking and connectivity (Wi-Fi), security cabling (access control system, intrusion system, CCTV).
- Ensure to accommodate for other smart building features in underground duct infrastructure design and planning.
- Each MTR and IDF should be evaluated for readiness to support OT (Operational Technology) devices including:
    - IoT Sensors, Lighting Controls, HVAC/BAS Controllers.
    - Access Control Panels, Surveillance Cameras, Wireless APs.

- Clear separation between IT and OT networks should be enforced within rooms, using segmented cabling pathways, color-coded patching schemes, and appropriate network segmentation strategies (for example, VLANs and firewalls).
- Risk assessments should be conducted for each building (see Section 9), and modernization of rooms prioritized based on:
    - Building interconnectivity and network reliance.
    - Tenant criticality (Health Canada, DND, SSC).
    - Planned redevelopment phase timing.

8.3 Tenant Interface Planning

- Meetings with tenants and communications plan to be initiated in Q1 2026, once a more finalized design has been established.

8.4 Technology Room Upgrades & IT Modernization

As the redevelopment of Tunney's Pasture proceeds in coordinated phases, and as new telecommunications infrastructure is installed to support temporary and permanent services, each impacted building may require upgrades to its Main Telecommunications Room (MTR) and associated Intermediate Distribution Frames (IDFs) to meet current and future standards for smart building integration, cyber security, and occupant connectivity needs.

8.4.1 MTR & IDF Upgrades

- Many of the existing MTRs were designed decades ago and may not be compliant with current TIA/EIA and Shared Services Canada (SSC) standards.
- Building construction activities (core drilling, conduit routing, slab trenching) related to telecommunications cutovers provide a natural opportunity to modernize these spaces concurrently.
- Upgrades may include:
    - Fire-rated cable trays and sleeves.
    - Upgraded grounding and bonding infrastructure.
    - Secure and climate-controlled room environments.
    - Redundant power feeds (UPS-backed) to maintain uptime during outages.
    - Standardized telecommunications rack layout (42RU, cable management, patch panels).
    - Expansion or reconfiguration to accommodate new security, BAS, or Wi-Fi systems.

8.4.2 Smart Building & OT/IT Convergence Readiness

- All telecommunications upgrades must include the following items:
    - Updated as-built drawings.
    - Consistent cable labeling schema (matching ESAP campus standards).
    - Fiber certification and copper testing reports.
    - Documentation of equipment serial numbers, rack elevations, and network configurations.

- MTR and IDF upgrade plans must be reviewed with the following stakeholders:

- The tenant's IT representatives and team.
- SSC representatives.
- Real Property and Facilities Management.
- Telecommunications Carriers (Bell, Rogers, Telus, Zayo).

Early coordination during the design phase (starting Q1 2026) is critical to minimize service disruptions, manage temporary cutovers effectively, and ensure that permanent telecommunications systems are future-proof and compliant with Government of Canada standards.

Section 9 – Risk Assessment by Building

Building	Phase	Interconnectivity	Uptime Criticality	Key Risks
Original Heating & Cooling Plant	Phase 4	Connected via utility tunnel system to multiple buildings.	🔴 High (Supports all mechanical services).	Aging telecommunications racks, cables not labelled, physical congestion, and shared pathway dependencies.
Department of National Defense (DND)	Phase 3	Connected to adjacent buildings via tunnel system.	🔴 High (DND critical infrastructure).	High-count legacy cabling with shared civil infrastructure, lack of labelling, and undocumented fiber pathways.
Personnel Records Building	Phase 2	Connected to adjacent buildings via tunnel system.	🔴 High (PRB critical infrastructure).	High-count legacy cabling with shared civil infrastructure, lack of labelling, undocumented fiber pathways.
Standards, Occupational Health Unit	Phase 3	All interconnected via utility tunnel system. Dense cabling from Sorrel Dr.	🔴 High (Health Canada tenants present).	Congested telecommunications closets, overlapping services, undocumented inter-building connections, and difficult access.
Brooke Claxton	Phase 4	Interconnected via utility tunnel system.	🔴 High (Includes Health Canada and SSC tenants).	Congested telecommunications closets, overlapping services, undocumented inter-building connections via closed off tunnel system, and difficult access.
Jeanne Mance	Phase 4	Connected via tunnel system.	🟠 Medium – High (Health Canada presence).	Aging copper infrastructure, complexity in cutover planning.
Main Building, R.H. Coats, Jean Talon (Main Statistics Canada Complex)	Phase 2 & 4	Fully interconnected; central node in the fiber network.	🔴 High (National Statistics operations).	High concentration of fiber cabling, shared civil structures, vulnerable during cutovers, requires tight coordination.
Sir Frederick Banting Building	Phase 4	Interconnectivity via Eglantine Driveway on east side from Bell and Rogers.	🔴 High (Health Canada presence).	Health Canada is present. Congested and aging cabling. Tenants should be notified in a timely manner if disposal plan is revised to include building.
Modernized Heating and Cooling Plant	Phase 4	Independently interconnected with all buildings with a buried system.	🟢 Low	Interconnected with each building via buried pathways, completely independent from the tunnel system. Ensure lines are safe during construction.
Butler Hut	Phase 3	Interconnectivity via LCDC building, which is fed from Tunney's Pasture Dr.	🟢 Low	No major risks noted.
Labs Centre for Disease Control	Phase 4	Interconnected via carrier pathways on Tunney's Pasture & CHCP tunnels.	🟠 Medium – High (Health Canada presence).	No major risks noted, although removal will impact Butler Hut. Bell and Rogers presence.
Holland Cross	Off-site	No interconnectivity.	🟢 Low (Remote node).	Standalone site, less vulnerable but still important for completeness of fiber network.

Notes:

- Interconnectivity: Increases complexity during service cutovers and adds risk to neighboring buildings if not carefully planned.
- Uptime Criticality: Based on tenant function (for example, Health Canada, SSC, DND) and whether services must remain operational during transitions and cutover periods.
- Key Risks: Draw upon findings in site photos, legacy cabling reports, and shared tunnel observations from both the 2019 and 2024 reviews.

Section 10 – Annotated Drawings, Maps & Details

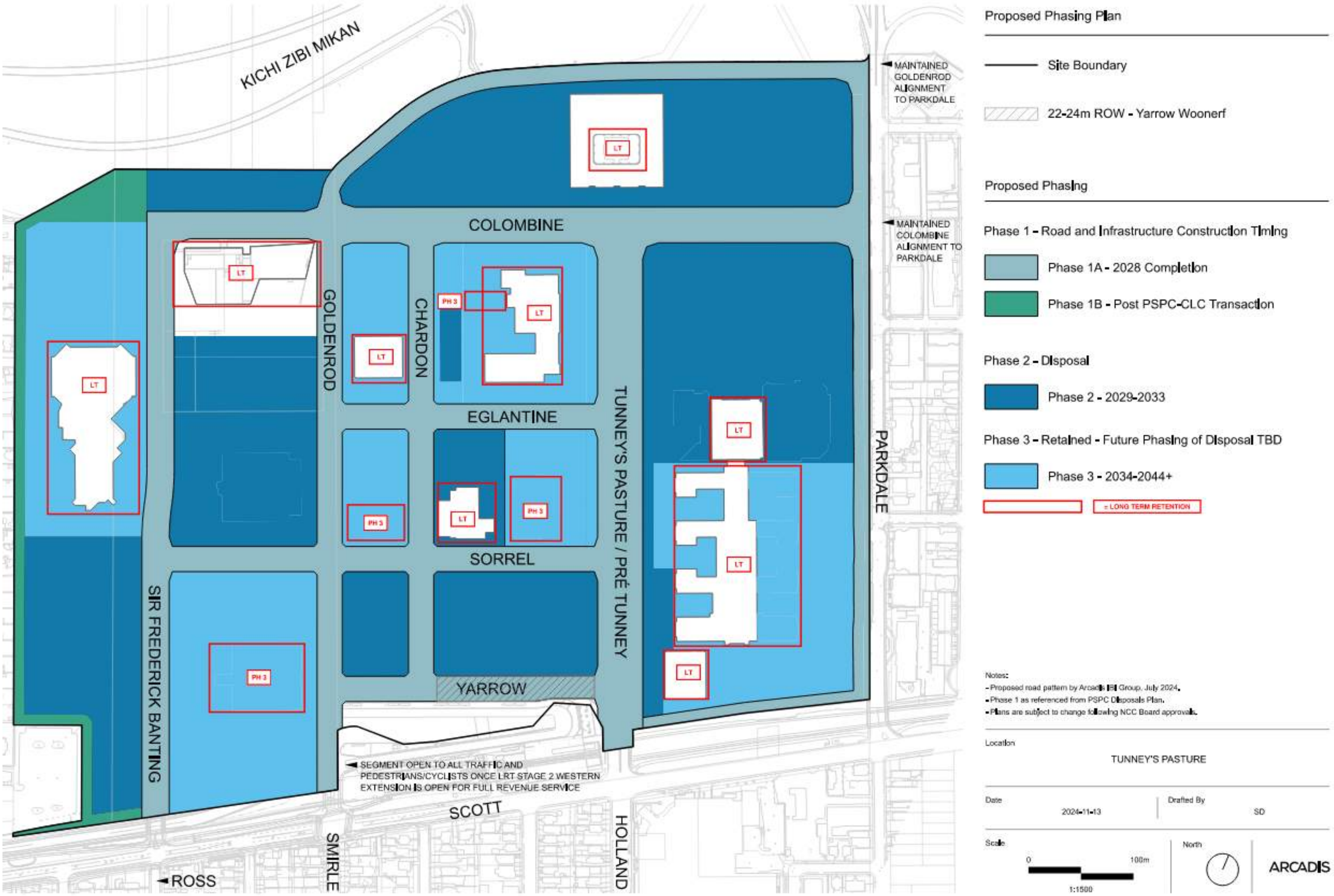

Figure 10.1: Proposed Phasing Plan via Arcadis (2024-11-13)

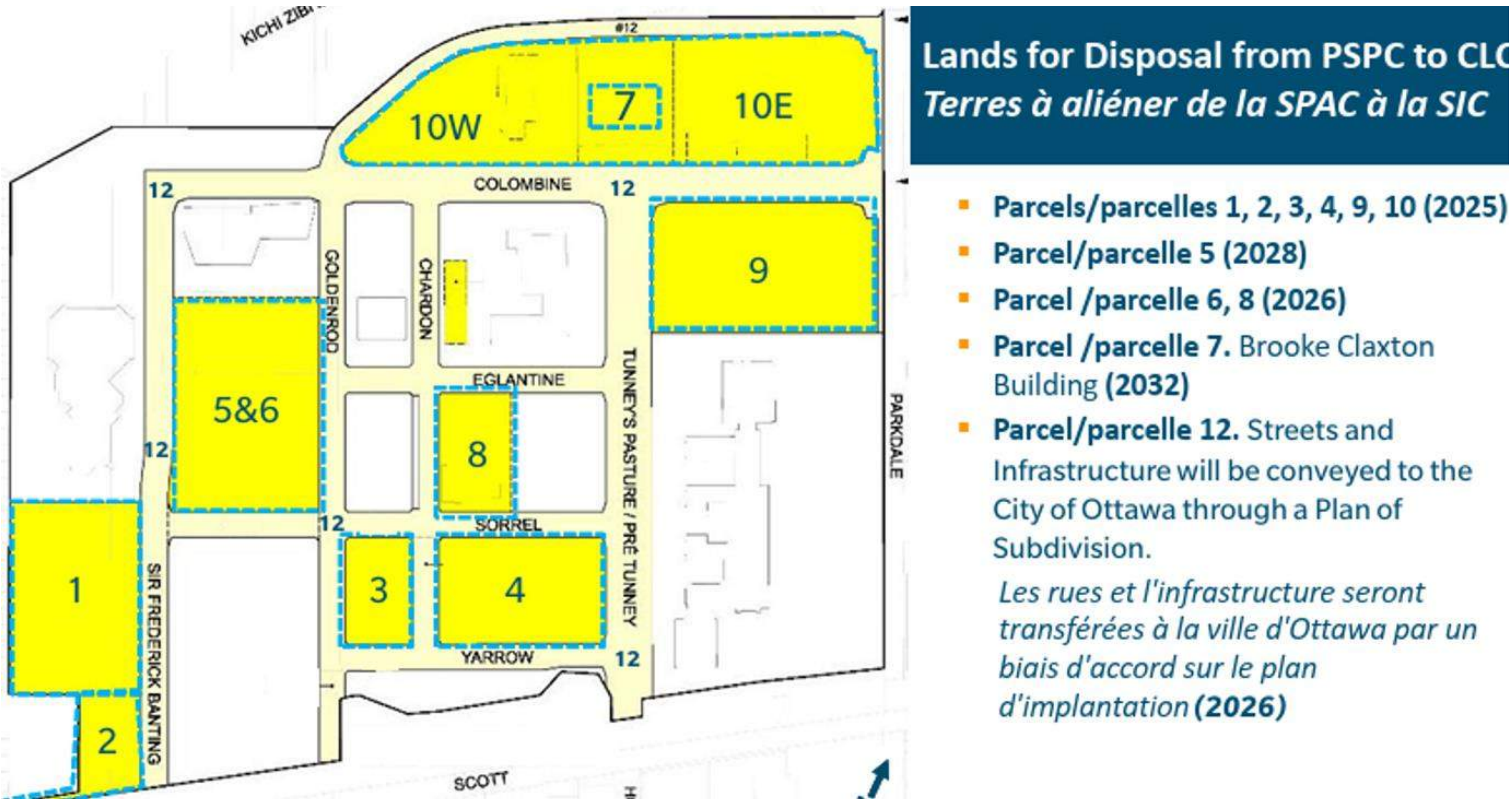

***Figure 10.2**: Lands Separated By Parcels & Disposal To CLC*

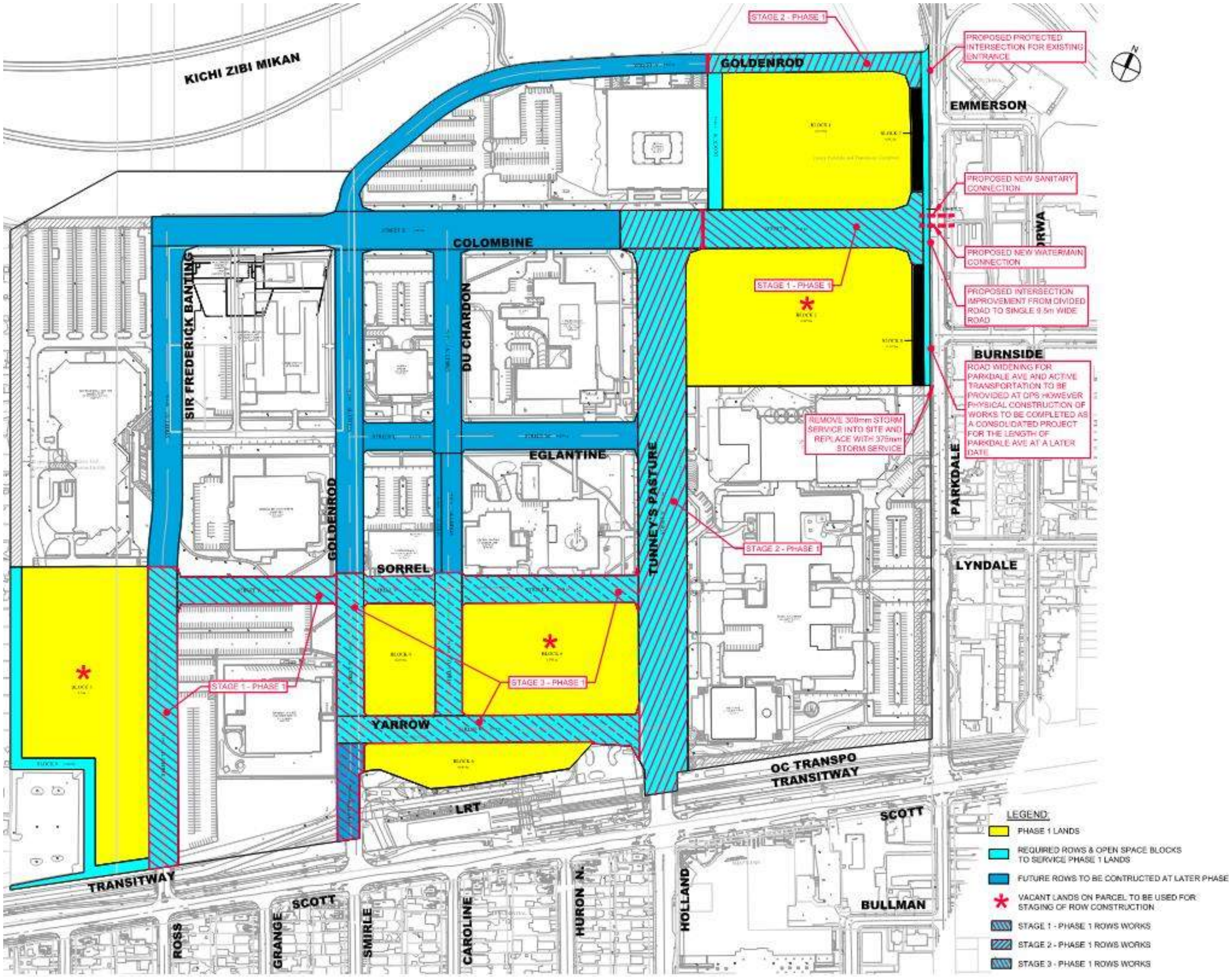

***Figure 10.3**: Road Infrastructure Redevelopment Plan via Arcadis (2025-08-27)*

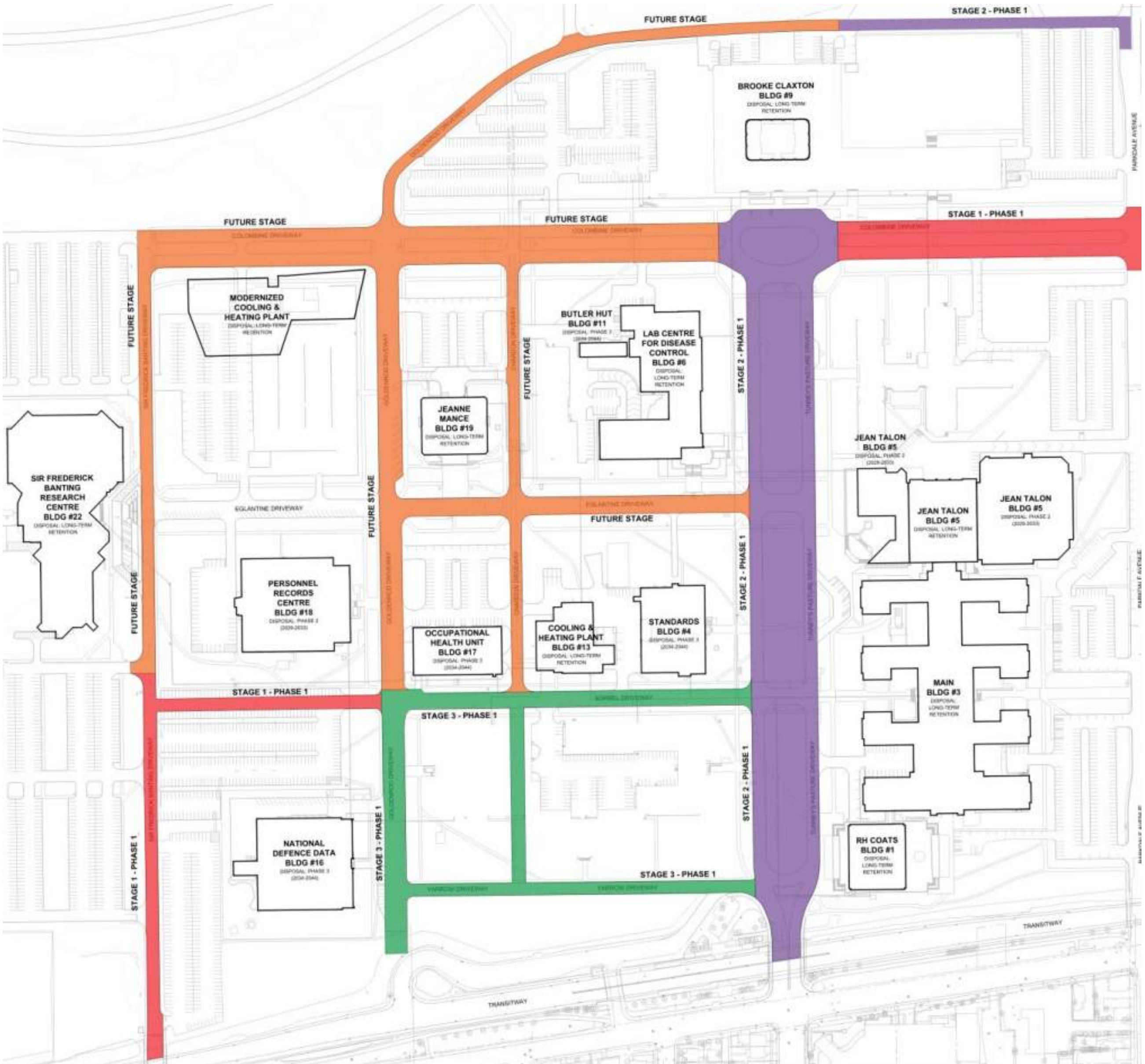

Figure 10.4: Road Infrastructure Redevelopment Plan via Attain (Attain Drawing Page #3)

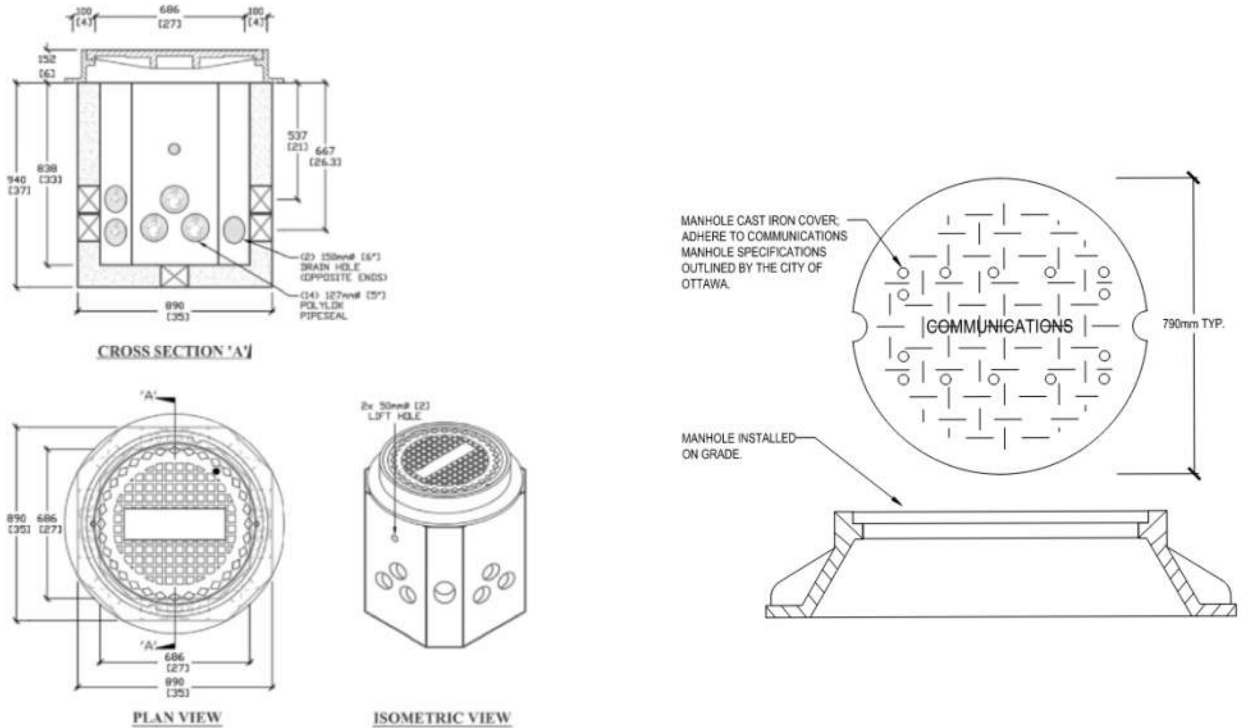

***Figure 10.5**: Typical Manhole & Handhole Detail (Attain Drawing Page #9)*

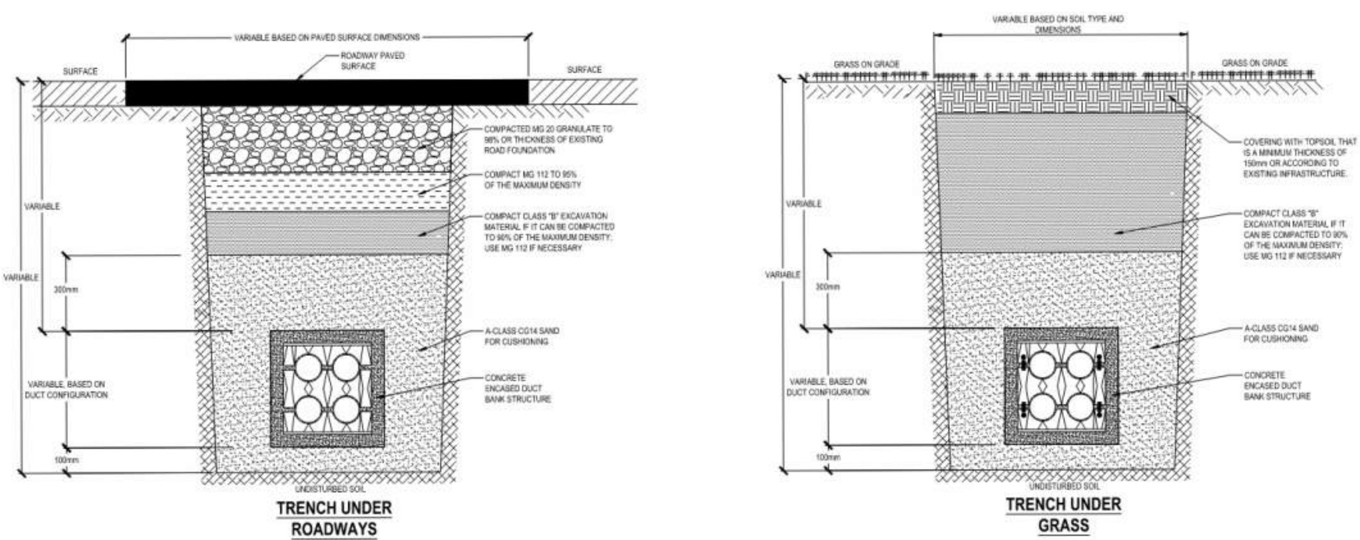

***Figure 10.6**: Trenching For Underground Concrete-Encased Pathways Typical (Attain Drawing Page #9)*

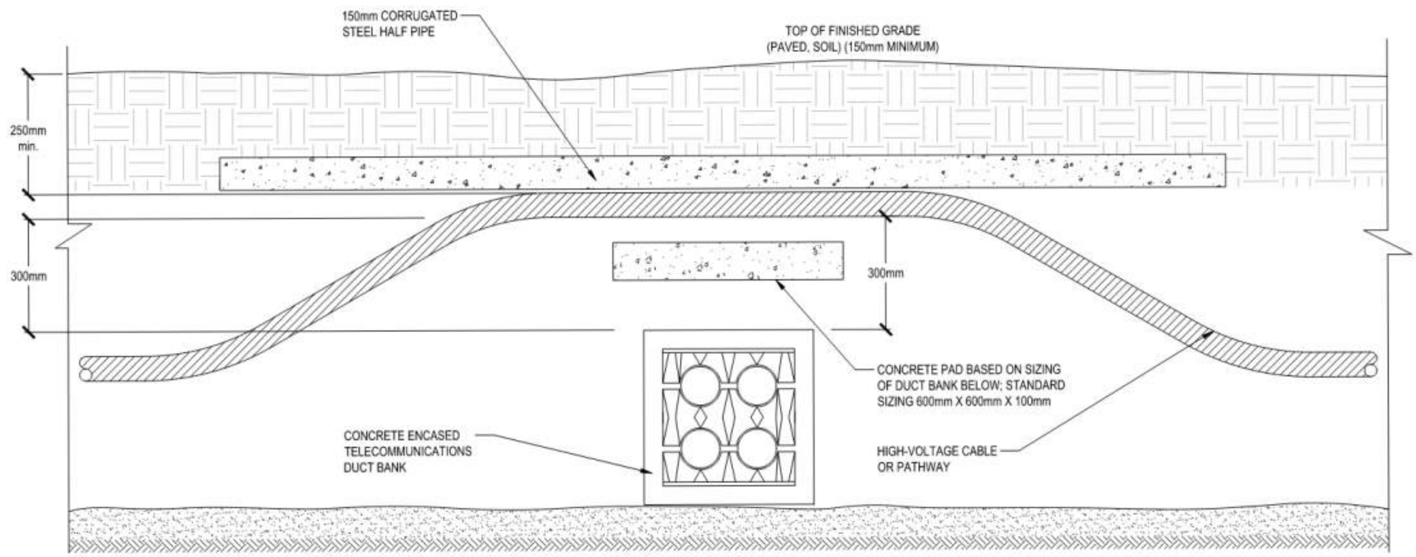

Figure 10.7: High-Voltage (Hydro Ottawa) Crossover Routing Typical (Attain Drawing Page #9)

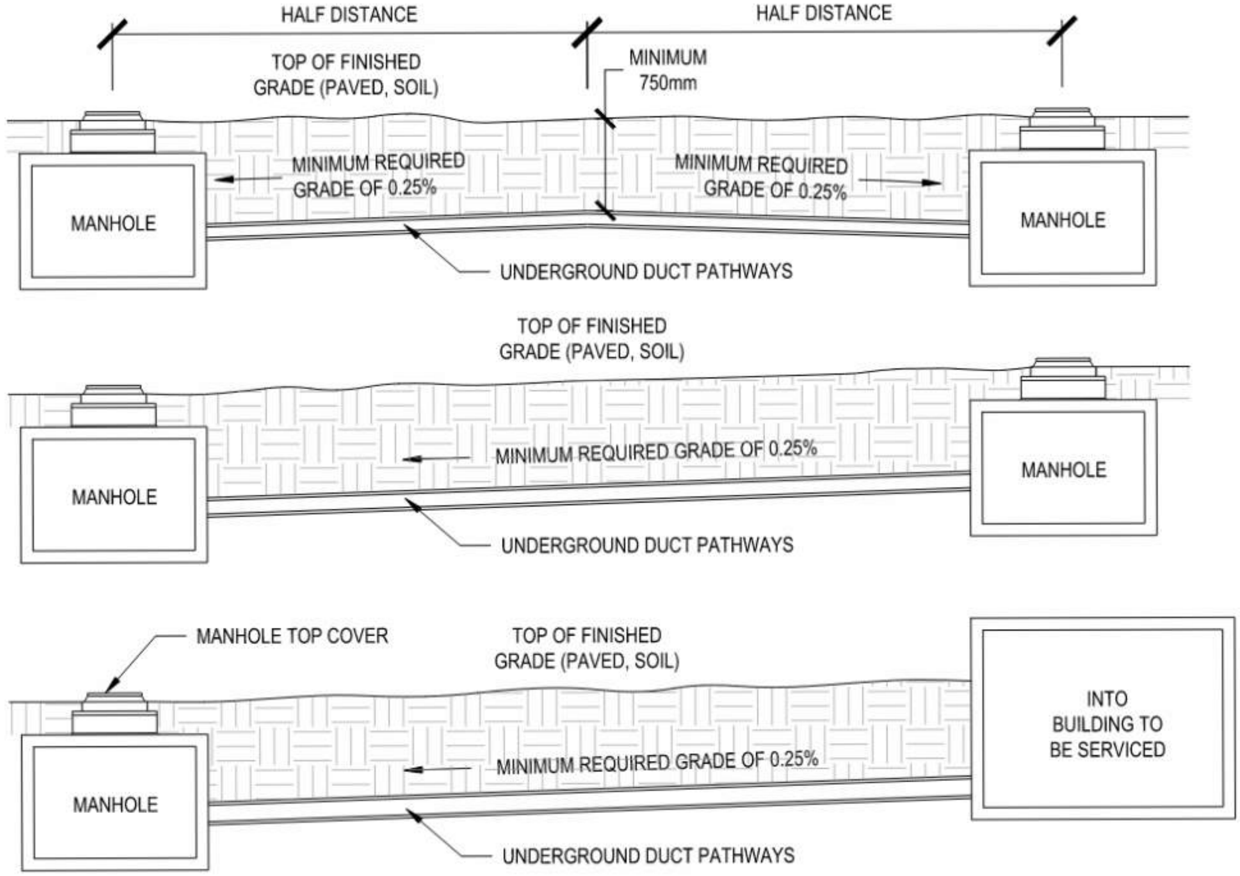

Figure 10.8: Underground Duct Pathway Routing Typical (Attain Drawing Page #9)

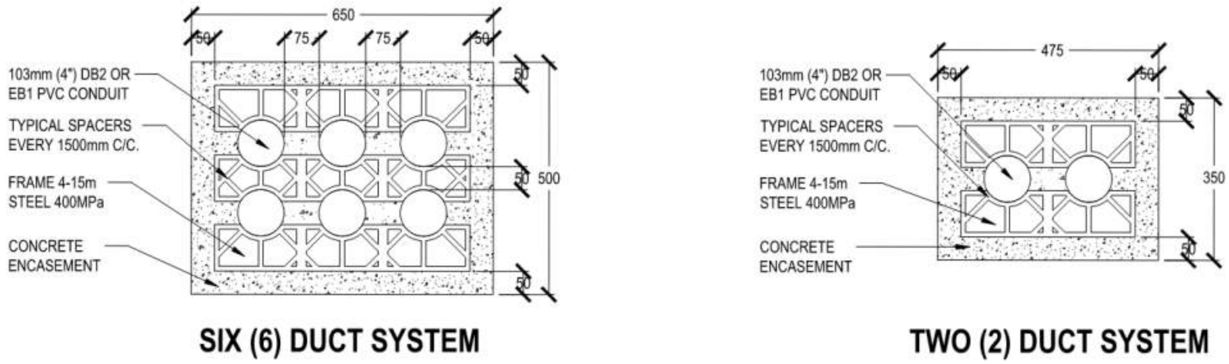

Figure 10.9: *Typical Two (2) & Six (6) Concrete Encased Duct System Detail (Attain Drawing Page #9)*

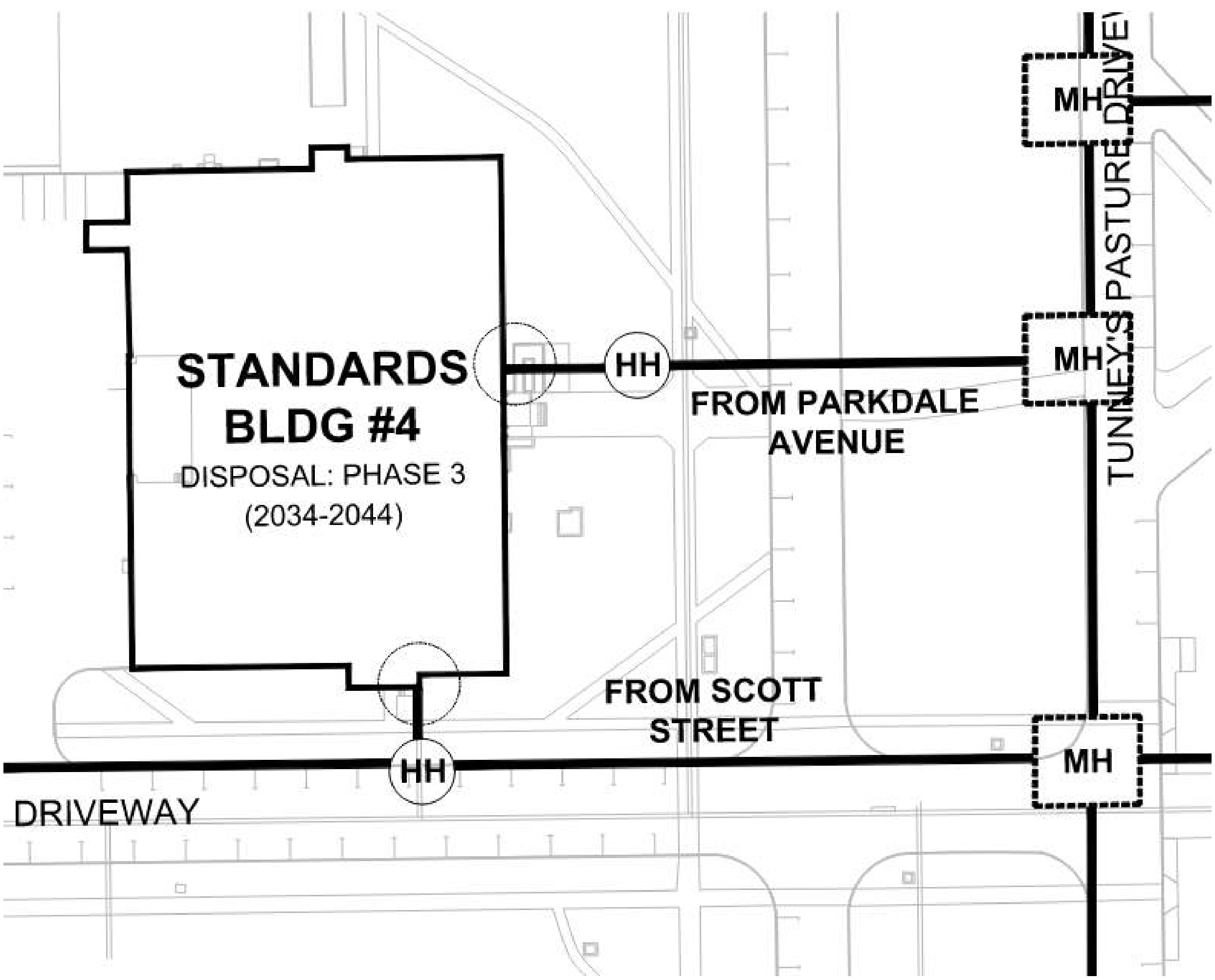

Figure 10.10: *Typical Example of Redundant Duct Entry Locations (Attain Drawing Page #9)*

Section 11 - Cost Estimate Summary

See below a preliminary cost estimate summary, which is based on the September 2024 fee estimate:

Category	***Estimated Cost (CAD) - Low***	***Estimated Cost (CAD) - High***
Telecommunications Civil Infrastructure	$ 2,989,031	$ 3.457,625
Telecommunications Carriers Costs	$ 1,350,936	$ 2,055,000
Labour & Project Management	$ 867,993	$ 1,102,525
Contingency	$ 1,301,990	$ 1,653,787
TOTAL	**$ 6,509,950 CAD**	**$ 8,268,937 CAD**

Section 12 - Communications Strategy

12.1 Tenant Communications Template

Tenant communications templates will play a critical role in ensuring tenants are aware of ongoing construction works that may impact the services they provide. The below noted items shall be included within the communications plans for tenants. See Appendix F.

- Provide a construction window notification prior to construction.
- Ensure tenant contact points are involved and aware during telecommunications cutovers.
- Provide service interruption planning notices, as required.

12.2 Carrier Coordination Templates

- Provide entry confirmation letters.
- Site readiness schedules to ensure no delays and installation commences ASAP.

Section 13 - Recommendations & The Way Forward

13.1 Key Risks

The following risks have been identified and should be closely monitored as the Tunney's Pasture redevelopment project advances into the design and implementation phases. These risks are categorized by operational, technical, construction, and coordination concerns.

13.1.1 Construction and Environmental Risks

- Inclement weather will influence trenching and excavation activities, particularly during winter months. This can also impact critical milestones and overall construction schedules.
- Existing site conditions including aging duct banks, undocumented civil infrastructure, and the presence of asbestos-containing materials (ACMs) in legacy telecommunications spaces.

13.1.2 Carrier and Coordination Risks

- Delays in telecommunications carrier responses due to the complex legacy cabling environments and the need to confirm routes and fibre strands to retained vs. disposable buildings.
- Conflicting timelines between telecommunications providers and government stakeholders (such as SSC PSPC), which can create misalignment in cutover planning and civil trenching work.
- Concurrent projects on campus, including mechanical upgrades, security modernizations, and site decontamination that may compete for pathway access and scheduling.
- Issues with tunnel compromises or collapse must be addressed during construction.

13.1.3 Building Readiness and Infrastructure Risks

- Aging or inadequate main telecommunications rooms (MTRs) may not be suitable for new fibre and smart building enablement without renovations to electrical, cooling, grounding, and spatial layout upgrades.
- Lack of secure pathways or risers within existing buildings to support modern redundant fibre connections and OT/smart building cabling.

13.1.4 Service Continuity and Uptime Risks

- Buildings such as Brooke Claxton, Jean Talon, and Health Canada's Records Centre require high availability of telecommunications services due to mission-critical government operations. Any service disruption during cutover may have operational consequences.
- Tunneled interconnectivity between buildings (such as DND/PRB complex and Brooke Claxton) introduces risk of single points of failure in older fibre routes shared across multiple tenants or government departments.

13.1.5 Design and Stakeholder Risks

- Incomplete tenant information or change in occupancy may result in scope changes or delays in design progression and finalization.
- Failure to integrate all smart building needs (such as the OT network, security, IoT) early in design could lead to costly change orders or duplicated trenching and pathway work.
- Overlapping construction phases may require carefully staged cutovers to ensure that existing services are not interrupted prematurely.

13.1.6 Operational Risk Mitigation Recommendations

- Conduct early audits of MTRs in each building and develop a renovation scope where necessary.
- Perform civil pathway investigations and test pits in advance of construction to confirm duct availability, assess rock, and contamination presence.
- Schedule early carrier coordination and initiate "as-is" drawing reconciliation across all carriers (Bell, Rogers, Telus, Zayo).
- Develop a detailed cutover schedule per building, aligned to the staging and phasing diagrams, which includes fallback strategies in the event of delays.

13.2 Next Steps

The following key next steps are recommended to maintain project momentum, manage dependencies, and prepare for a successful implementation of telecommunications infrastructure under Phase II:

13.2.1 Stakeholder Engagement

- Continue with a coordinated engagement strategy involving all key implementation stakeholders, including:
    - Civil and utility partners (Hydro Ottawa, civil contractors, etc.).
    - Telecommunications carriers (Bell, Rogers, Telus, Zayo, possibly Hiboo Networks).
    - Government stakeholders (PSPC, SSC, Real Property Services).
    - Technology design leads (Attain, smart building consultants, security integrators).
- Host kick-off coordination meetings by Q4 2025 to align timelines, design responsibilities, and permit strategies.

13.2.2 Tenant Communication & Coordination

- Engage tenants of impacted and retained buildings through SSC in alignment with the Tenant Communication Plan (see Appendix F).
- Confirm operational criticality and service continuity expectations for high-importance tenants (particularly Health Canada, DND, Jean Talon).
- Identify potential interim service needs or phased cutover strategies where full cutover is not feasible due to site readiness or tenant constraints.

13.2.3 Carrier Coordination and Design Finalization

- Work with the telecommunications carriers to:
    - Confirm entry points, maintenance hole routes, and underground duct sharing requirements. Carriers have been made aware of the current project and are working internally to provide their ducts infrastructure requirements.
    - Finalize MTR and MDF design specifications for each building by December 2025.
    - Validate backbone fibre counts, termination locations, and service redundancy and diversity pathways.

13.2.4 Cutover Planning

- Develop a detailed cutover plan by building, identifying:
  - Scope of civil trenching and restoration per building.
  - Internal cabling and riser modifications.
  - Room readiness upgrades (power, cooling, security).
  - Expected outage durations, fallback plans, and carrier service commissioning timelines.
- Confirm cutover timelines with tenants and SSC by Q1 2026 to allow for operational planning and change management.

13.2.5 Permits and Regulatory Approvals

- Begin preparation of telecommunications trenching and installation permits by Q2 2025, including submissions to:
  - Hydro Ottawa for underground works and utility coordination.
  - City of Ottawa for right-of-way work, if applicable.
  - Federal Real Property (PSPC) and SSC network compliance and change requests.

13.2.6 MTR Modernization and Smart Building Considerations

- Review existing MTR conditions per building and assess modernization requirements (such as power upgrades, cooling, grounding, cable trays, physical security).
- Integrate smart building infrastructure requirements into the telecommunications design, including:
  - OT network drop locations for building systems.
  - IoT device cabling pathways.
  - Security system integrations (CCTV, access control, intrusion detection).

13.3 Stakeholder and Circuit Requirements Documentation

Extensive coordination has taken place across government stakeholders and telecommunications carriers to document and validate telecommunications circuit requirements for Phase II of the Tunney's Pasture redevelopment project. The primary stakeholders include Shared Services Canada (SSC), Public Services and Procurement Canada (PSPC), Canada Lands Company (CLC), Health Canada (HC), Environment and Climate Change Canada (ECCC), and Statistics Canada. Engagements have also occurred with Bell, Rogers, Telus, and Zayo, along with civil consultants and the Hydro Ottawa team.

13.3.1 Government Stakeholder Requirements

- SSC & Attain led multiple planning meetings with tenant departments to determine ongoing circuit requirements for both, base-building and tenant program needs.
- Circuit retention and migration decisions were made based on whether buildings were categorized as retained, to be demolished, or to be re-tenanted.
- Stakeholders emphasized uninterrupted services during migration, particularly for mission-critical operations (Health Canada labs, StatsCan data centers, DND operations, etc.).

- Tenants impacted by cutovers need to be engaged via SSC-led communications following the templates provided in Appendix F.

13.3.2 Telecommunications Carrier Coordination

- Bell, Rogers, Telus, and Zayo were each consulted in a series of meetings to identify:
    - The current number of active and inactive circuits.
    - Backbone fiber routes, handoff points, and splice enclosure locations.
    - Existing and proposed maintenance hole and duct infrastructure.
- Each carrier provided as-built documentation or committed to doing so by Fall 2025.
- Specific temporary routing strategies (where demolition activities precede permanent construction) have been coordinated to ensure continuity.
- Carriers are expected to finalize MTR/MDF requirements and support cutover timelines by Q1 2026, ahead of tenant relocations.

13.3.3 Documentation Status

- As of October 2025, preliminary documentation has been assembled covering:
    - Circuit inventory by building.
    - Carrier entry paths and splice points.
    - Room readiness audits for each MTR and IDF.
- Finalized stakeholder signoffs and detailed cutover plans are targeted for Q1–Q2 of 2026, prior to building transitions.

Appendices

Appendix A.1 – 2019 Telecommunications & Technology Assessment Report Summary

Date Issued: July 2019
Prepared By: The Attain Group Inc.
Commissioned By: Public Services and Procurement Canada (PSPC)

Purpose & Context:
The 2019 report provided a baseline assessment of the telecommunications, security, and technology infrastructure across the Tunney's Pasture campus. It was developed in anticipation of large-scale redevelopment and the need for future-ready, integrated infrastructure.

Key Components:

- Inventory of all existing telecommunications entrance facilities and inter-building connectivity.
- Review of pathways, conduits, maintenance holes, and central telecommunications vaults.
- Condition assessments of telecommunications equipment rooms, MTRs, the legacy tunnel system, and redundant pathways for various buildings.
- Analysis of service provider infrastructure: Bell, Rogers, Telus, Zayo.
- Identification of gaps, constraints, and bottlenecks in capacity or accessibility.

Key Recommendations:

- Consolidation of telecom entrance facilities per building.
- New shared telecommunications corridor aligned with phased redevelopment.
- Transition plan for temporary services during demolition and new construction.
- Stakeholder coordination framework with SSC, carriers, and utility partners.

Outcome:
The report became the foundation for telecommunications planning at the Tunney's Pasture campus and shaped early coordination efforts among PSPC, SSC, carriers, and the master planning team.

Appendix A.2 – 2024 Telecommunications & Technology Assessment Update

Date Issued: December 2024
Prepared By: The Attain Group Inc.
Commissioned By: Canada Lands Company, PSPC, and Arcadis (Planning Team)

Purpose & Context:
This update was requested to reflect progress since the 2019 report and adjust plans considering confirmed phasing, updated Health Canada lab requirements, Hydro Ottawa involvement, and the revised redevelopment timeline.

Key Updates:

- Confirmation of new stakeholder roles. This includes Arcadis as the master planner, Salina Aubrey representing SSC and coordination efforts with Government of Canada departments on the Tunney's Pasture campus, and Health Canada's infrastructure leads.
- Adjusted corridor recommendations based on roadway infrastructure shifts and Hydro Ottawa transformer locations.
- Infrastructure risk mitigation identified around demolition zones and limited carrier space.
- Initial proposal for duct-bank standardization, separation of operational technology (OT) and carrier conduits, and zone-based telecommunications deployment.

Stakeholder Engagement Highlights:

- Renewed coordination and engagement efforts with Bell, Rogers, Telus, Zayo.
- Hydro Ottawa's input is integrated into shared trenching strategies.
- SSC provided preliminary circuit migration strategies for Government of Canada tenants on campus.
- Meetings with CLC, PSPC, and Arcadis to align telecommunications planning with vertical development and mobility corridors.

Outcome:
The 2024 update formed the basis for the Phase II execution strategy and confirmed the need for staged, building-by-building coordination supported by early infrastructure deployment in line with roadwork and construction activity.

Appendix B – Carrier Drawings and Plans (Bell, Rogers, Zayo)

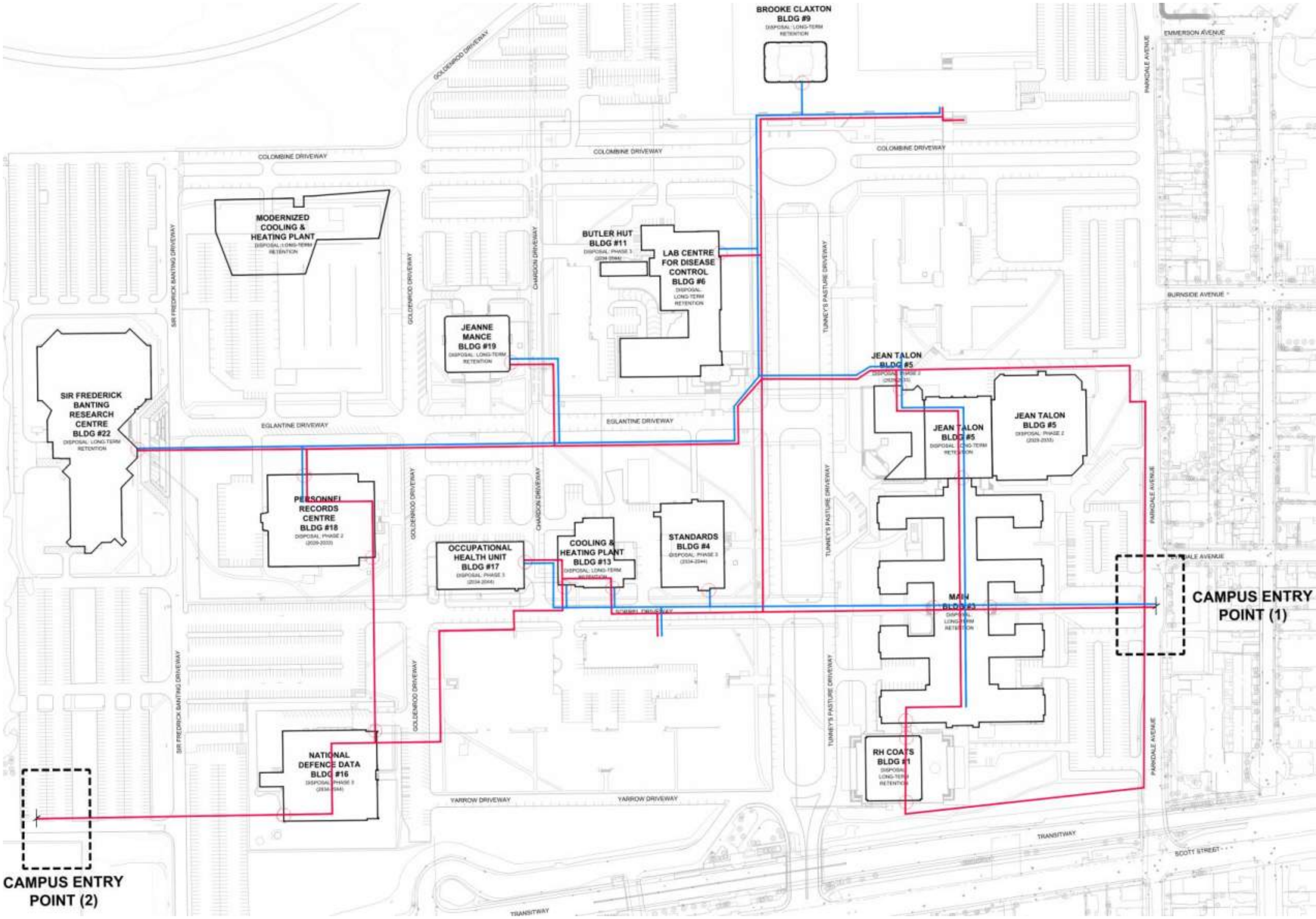

Figure B.1: Carrier Drawings – Bell Canada (Red Fibre, Blue Copper) (Attain Drawing Page #4)

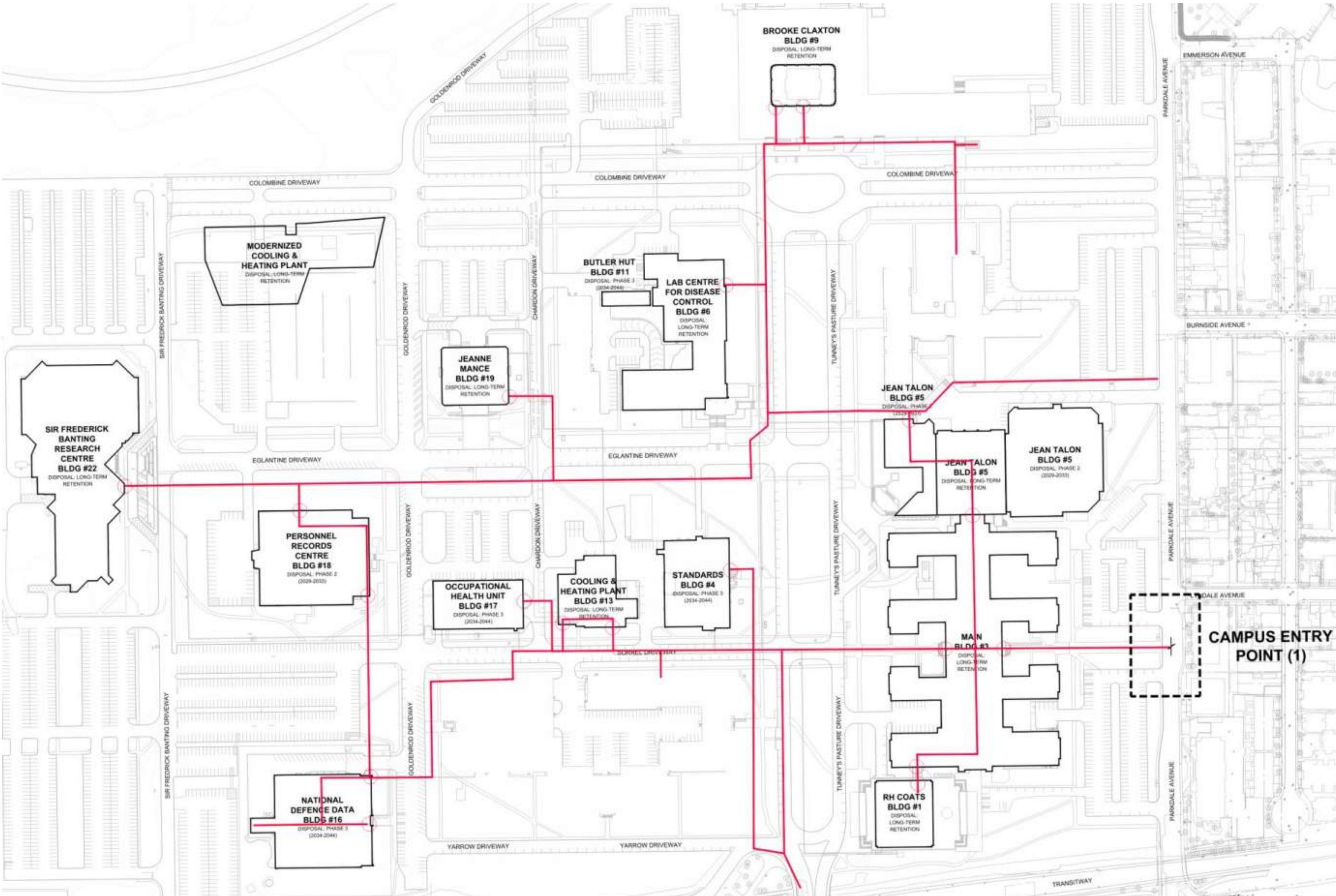

Figure B.2: *Carrier Drawings – Rogers Communications (Red Fibre) (Attain Drawing Page #5)*

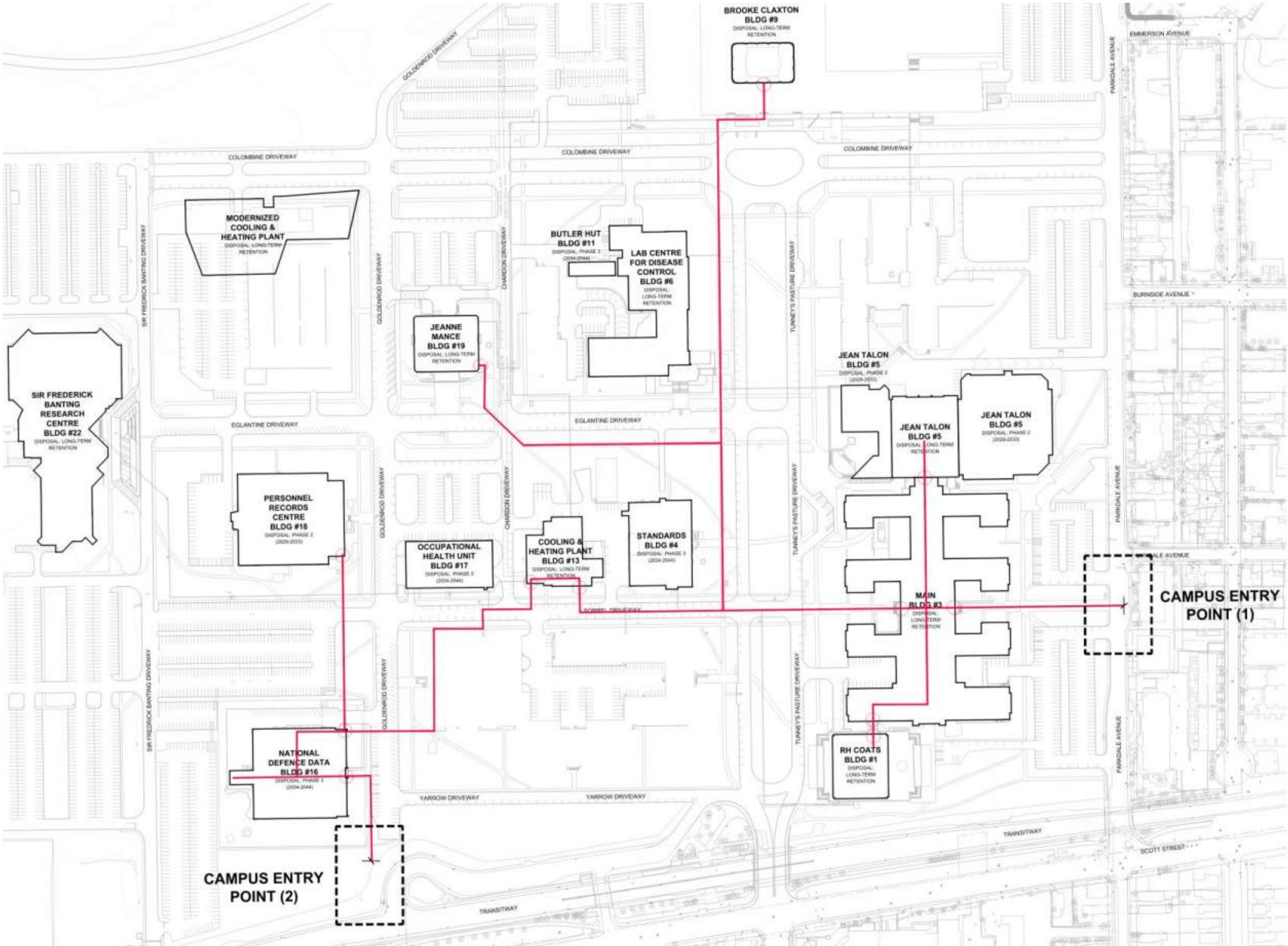

Figure B.3: Carrier Drawings – Zayo Group (Red Fibre) (Attain Drawing Page #6)

Appendix C – Hydro Ottawa Current Duct Infrastructure Site Plan (2025-09-25)

Figure C.1: *Hydro Ottawa Current Duct Infrastructure Site Plan (Purple Manholes, Orange Duct Pathways) (2025-09-25) (Attain Drawing Page #8)*

Appendix D – Attain's Proposed Underground Duct Infrastructure Plan (Pre-Emptive)

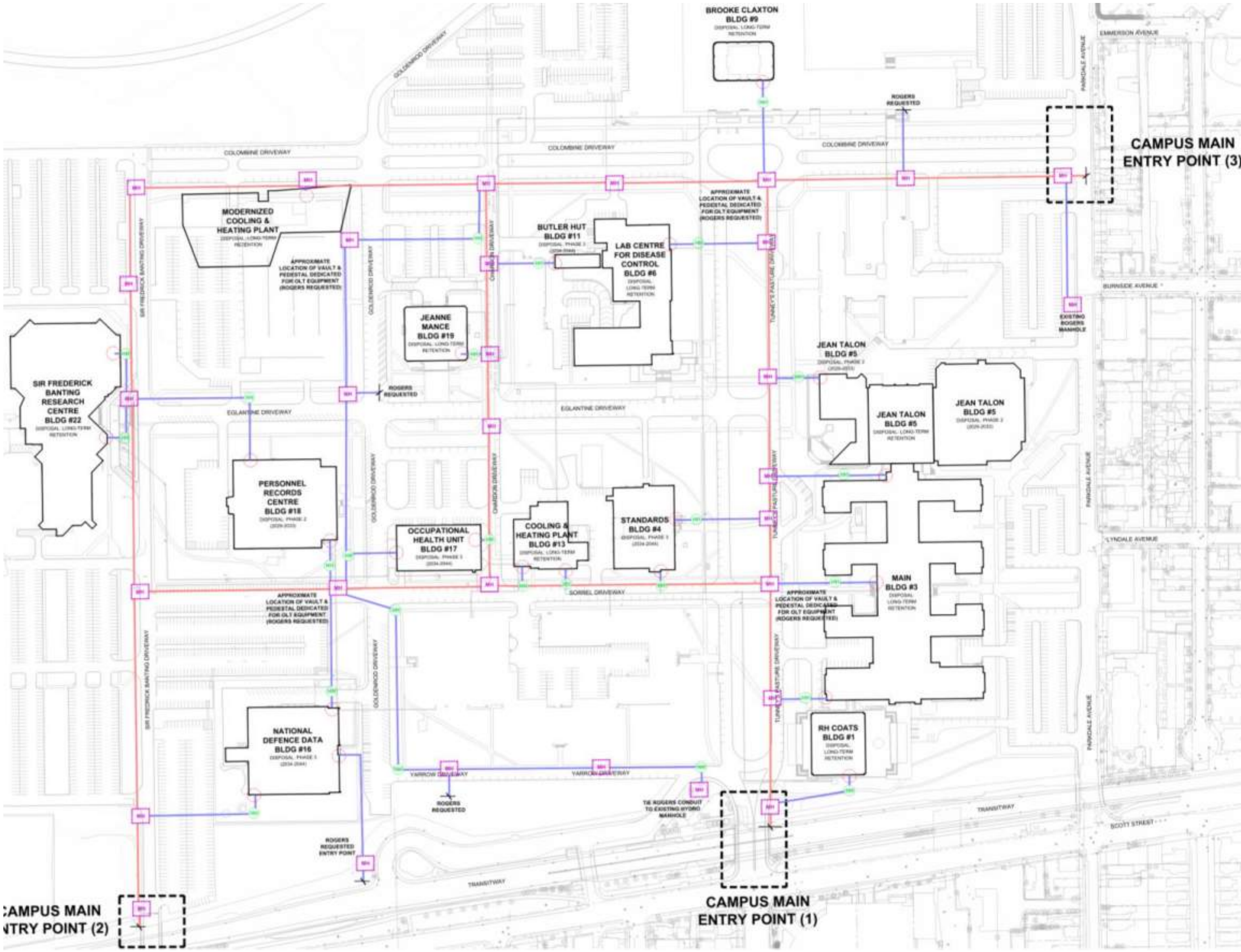

Figure D.1: Attain's Proposed Underground Duct Infrastructure Plan (Pre-Emptive) (Attain Drawing Page #4)

Appendix E – Stakeholder Communications Matrix

Stakeholder Name	Organization	Role	Engagement Summary	Next Steps / Actions
Salina Aubrey	Shared Services Canada (SSC)	Telecommunications Coordination	Attended working sessions; validated Government requirements.	Continue SSC oversight for Government of Canada (GOC) tenants on site.
Stephen Pilon	Shared Services Canada (SSC)	Technical Oversight	Provided technical input into network requirements and validation.	Participate in cutover planning and provide feedback during infrastructure design phase.
Derrick Hanson	Attain Group	Project Consultant	Led coordination meetings and prepared technical assessment.	Continue client and carrier liaison.
Arcadis Team	PSPC/CLC	Master Planner	Shared updated staging and road alignment diagrams.	Provide phasing updates, as required. Plan telecommunications duct system, in relation with civil.
Stephane Konstantina	Bell Canada	Carrier	Reviewed OSP/ISP plans, entry points for each building.	Provide duct infrastructure design input and timing.
Martin Proulx	Rogers Communications	Carrier	Reviewed entry coordination and redundancy	Provide duct infrastructure design input. Confirm permitting and cutover windows.
Jovica Stojanovski	Telus	Carrier	Reviewed routing options and shared drawings.	Provide duct infrastructure design input. Validate site access windows.
John Steele	Zayo Group	Carrier	Discussed alternate routing, provided current presence on campus.	Confirm engagement timeline and path readiness. Provide duct infrastructure design input.
Brent Blaseg	Utility	Coordination	Reviewed shared duct and infrastructure plan	Coordinate joint-use trenching
Robert Godbout	PSPC RPS Engineering	Government of Canada	Reviewed routing options and shared drawings.	Coordinate documents access with project team, as required.

Appendix F.1 – Communications Templates (Government of Canada Tenants, English)

Subject: Upcoming Telecommunications Infrastructure Work – Tunney's Pasture Phase II

To: Departmental Facility Managers and IT Representatives
CC: PSPC Project Leads, SSC Coordination, Attain Group Inc.

Dear Colleagues,
As part of the Phase II Redevelopment of Tunney's Pasture Campus, we are undertaking critical upgrades and realignments of the telecommunications infrastructure. These upgrades are necessary to enable future smart building capabilities, ensure continuity of service, and align with the development phasing of new roadways and buildings.

What to Expect

Site Work & Service Windows:
Work will begin in *[Month/Year]* in proximity around your building(s) – including [Building Name(s)], with construction and telecommunications transition activity scheduled to occur during designated windows.

Telecom Cutover:
Cutover from existing to new temporary or permanent pathways will be planned well in advance. You will receive a detailed **Building-Specific Cutover Notice** with timing, impacts, and contacts.

Service Continuity:
We are coordinating closely with SSC and carriers (Bell, Rogers, Telus, Zayo) to ensure uninterrupted service. Please ensure that your IT teams are prepared to test and validate services post-cutover.

Your Support is Needed:
- Identify a departmental point of contact for telecommunications and IT coordination.
- Confirm any critical business systems requiring special consideration.
- Review and acknowledge receipt of the **Cutover Schedule,** when distributed.

Contacts for Questions:

Contact Name	***Role***	***Email***	***Phone***
Salina Aubrey	SSC Telecommunications Coordination	salina.aubrey@ssc-spc.gc.ca	(613) 433-0926
Derrick Hanson	Consultant, The Attain Group	derrick.hanson@theattaingroup.com	(613) 864-9424

Thank you for your collaboration as we modernize and future-proof the Tunney's Pasture Campus.

Sincerely,
Project Coordination Team
Tunney's Pasture Phase II – Telecommunications & Technology Infrastructure

Appendix F.2 – Communications Templates (Government of Canada Tenants, French)

Sujet: Travaux à venir sur l'infrastructure des télécommunications – Tunney's Pasture, Phase II

À: Gestionnaires des installations ministérielles et représentants TI
CC: Chefs de projet de SPAC, Coordination de SPC, Groupe Attain Inc.

Chers collègues,
Dans le cadre de la Phase II du réaménagement du campus de Tunney's Pasture, nous entreprenons des mises à niveau et des réajustements essentiels de l'infrastructure de télécommunications. Ces travaux sont nécessaires afin de permettre les futures fonctionnalités des immeubles intelligents, d'assurer la continuité des services et de s'harmoniser avec le phasage de développement des nouvelles routes et des bâtiments.

Ce à quoi vous pouvez vous attendre

Travaux sur le site et fenêtres d'intervention:
Les travaux débuteront en [mois/année] dans et autour de votre(vos) bâtiment(s) y compris [Nom du bâtiment] - et les activités de construction et de transition des services télécom seront planifiées selon des périodes précises.

Basculement (télécommunications):
Le transfert des services existants vers les nouvelles voies temporaires ou permanentes sera planifié à l'avance.

Continuité du service:
Nous travaillons en étroite collaboration avec SPC et fournisseurs (Bell, Rogers, Telus, Zayo) afin d'assurer la continuité des services. Veuillez-vous assurer que vos équipes TI sont prêtes à tester et valider les services après basculement.

Votre collaboration est requise:
- Désigner un point de contact ministériel pour la coordination télécommunications et TI.
- Confirmer tout système critique nécessitant une attention particulière.
- Examiner et accuser réception de l'horaire de basculement lors de sa diffusion.

Contacts pour toute question:

Contact Name	*Rôle*	*E-mail*	*Téléphone*
Salina Aubrey	Coordination SPC Télécommunications	salina.aubrey@ssc-spc.gc.ca	(613) 433-0926
Derrick Hanson	Consultant, Groupe Attain	derrick.hanson@theattaingroup.com	(613) 864-9424

Nous vous remercions de votre collaboration dans la modernisation et la mise à niveau du campus de Tunney's Pasture.

Cordialement,
Équipe de coordination du projet
Phase II – Tunney's Pasture – Télécommunications et Technologies

Appendix F.3 – Communications Templates (Telecommunications Carriers, English)

Subject: Upcoming Telecommunications Infrastructure Work – Tunney's Pasture Phase II

To: Network Infrastructure and Field Operations Teams
Organizations: Bell, Rogers, Telus, Zayo
CC: SSC, PSPC, Attain Group Inc.

Dear Partners,
As part of the ongoing redevelopment at Tunney's Pasture, we are entering the next phase of construction and require your support in transitioning existing telecommunications services to new infrastructure in line with the updated phasing and road alignment plan.

Actions Required:

Review of Infrastructure Plans:
Please review the updated drawings and proposed pathway alignments submitted via our shared coordination portal. Your design input is required by *[Date]*.

Service Cutover Planning:
We anticipate requiring support for cutovers and transitioning at the sites mentioned below.

- Heating & Cooling Plant.
- Department of National Defense (DND) / Personnel Records Buildings.
- Brooke Claxton / Standards / Occupational Health Buildings.

Permitting and Field Work Readiness:
Carriers are asked to confirm internal permitting needs and scheduling of any required pre-construction site visits and/or coordination.

Coordination Meetings:
Joint working sessions will be scheduled with SSC and project stakeholders to finalize conduit and pathway allocations, entry coordination, and cutover dates.

Please Confirm:

- Assigned a point of contact for the Tunney's Pasture Phase II project.
- Provide timelines for design response, construction readiness, and permit submission.
- Engage in and address any issues requiring attention from the development or government team.

We appreciate your cooperation in delivering seamless service continuity during this complex, multi-phase project.

Sincerely,
Project Coordination Team
Tunney's Pasture Phase II – Telecommunications & Technology Infrastructure

Appendix F.4 – Communications Templates (Telecommunications Carriers, French)

Sujet: Travaux à venir sur l'infrastructure des télécommunications – Tunney's Pasture, Phase II

À: Équipes d'infrastructure réseau et d'exploitation terrain
Organisations: Bell, Rogers, Telus, Zayo
CC: SPC, SPAC, Groupe Attain Inc.

Chers partenaires,
Dans le cadre du réaménagement continuer de Tunney's Pasture, nous amorçons une nouvelle phase de construction et sollicitons votre collaboration pour la transition des services télécommunications existants vers les nouvelles infrastructures, conformément au phasing et à l'alignement mis à jour des routes.

Actions requises:

Revue des plans d'infrastructure:
Veuillez examiner les plans et alignements proposés transmis via notre portail de coordination. Vos com mentaires techniques sont attendus pour le [date].

Planification des basculements:
Un appui sera nécessaire pour les sites suivants.

- Usine de chauffage et de refroidissement
- Bâtiments MDN / Dossiers personnels
- Édifices Brooke Claxton / Normes / Santé au travail

Permis et préparation des travaux:
Nous demandons aux fournisseurs de confirmer leurs besoins en permis internes et leurs disponibilité s pour lesvisites de site préliminaire.

Réunions de coordination:
Des rencontres conjointes seront planifiées avec SPC et les principales parties prenantes afin de fin aliser les allocations de conduits, les coordonnées d'entrée et les dates de basculement.

Veuillez confirmer:

- Votre personne-ressource désignée pour la Phase II.
- Les délais pour les retours de conception, la préparation des travaux et les demandes de permis.
- Tout enjeu nécessitant l'appui de l'équipe du projet ou des partenaires gouvernementaux.

Nous vous remercions de votre coopération et de votre engagement à assurer la continuité des services pendant ce projet complexe et multi phase.

Cordialement,
Équipe de coordination du projet
Phase II – Tunney's Pasture – Télécommunications et Technologies

Appendix G – Cost Estimate Tables

Cost Estimate Table – September 2024 Submission

Please find below an updated construction cost estimate for the underground duct bank infrastructure and fibre installation at Tunney's Pasture for Phase II. This version accounts for 25% rock encounter rate during excavation, 60% of remaining duct trench to be concrete encased, 25% contingency, and updated fibre optic installation and cutover to each building by three major telecom carriers (Bell, Rogers, and Zayo). This estimate is based on 96-144 strand armored backbone cabling and 24-strand lateral connections to each building.

Component	***Low Estimate ($)***	***High Estimate ($)***
Rock Trenching (25%)	$1,153,125	$1,441,406
Concrete Encased Duct (60% of remaining)	$1,245,375	$1,314,562
Granular Backfill Duct (25% of remaining)	$259,452	$288,281
Soft Earth Duct (15% of remaining)	$121,078	$138,375
Handholes (20 units)	$75,000	$125,000
Utility Holes (6 units)	$135,000	$150,000
TOTAL ESTIMATE	**$2,989,031**	**$3,457,625**

Table G.1: *Estimated Duct Infrastructure Costs (Includes 25% Contingency)*

Carrier	***Low Estimate ($)***	***High Estimate ($)***
Bell	$450,312	$685,000
Rogers	$450,312	$685,000
Zayo	$450,312	$685,000
TOTAL ESTIMATE	**$1,350,936**	**$2,055,000**

Table G.2: *Estimated Carrier Fibre Installation & Cutover Costs (Includes 25% Contingency)*

The total estimated cost, which also includes all above components with a 25% contingency is:

Low Estimate → $4,339,967
High Estimate → $5,512,625

These figures are intended for early-stage planning and budgeting purposes only, and are subject to refinement as design advances, site conditions are confirmed, and coordination with carriers and civil teams progresses.

Appendix H – Photos & On-Site Observations

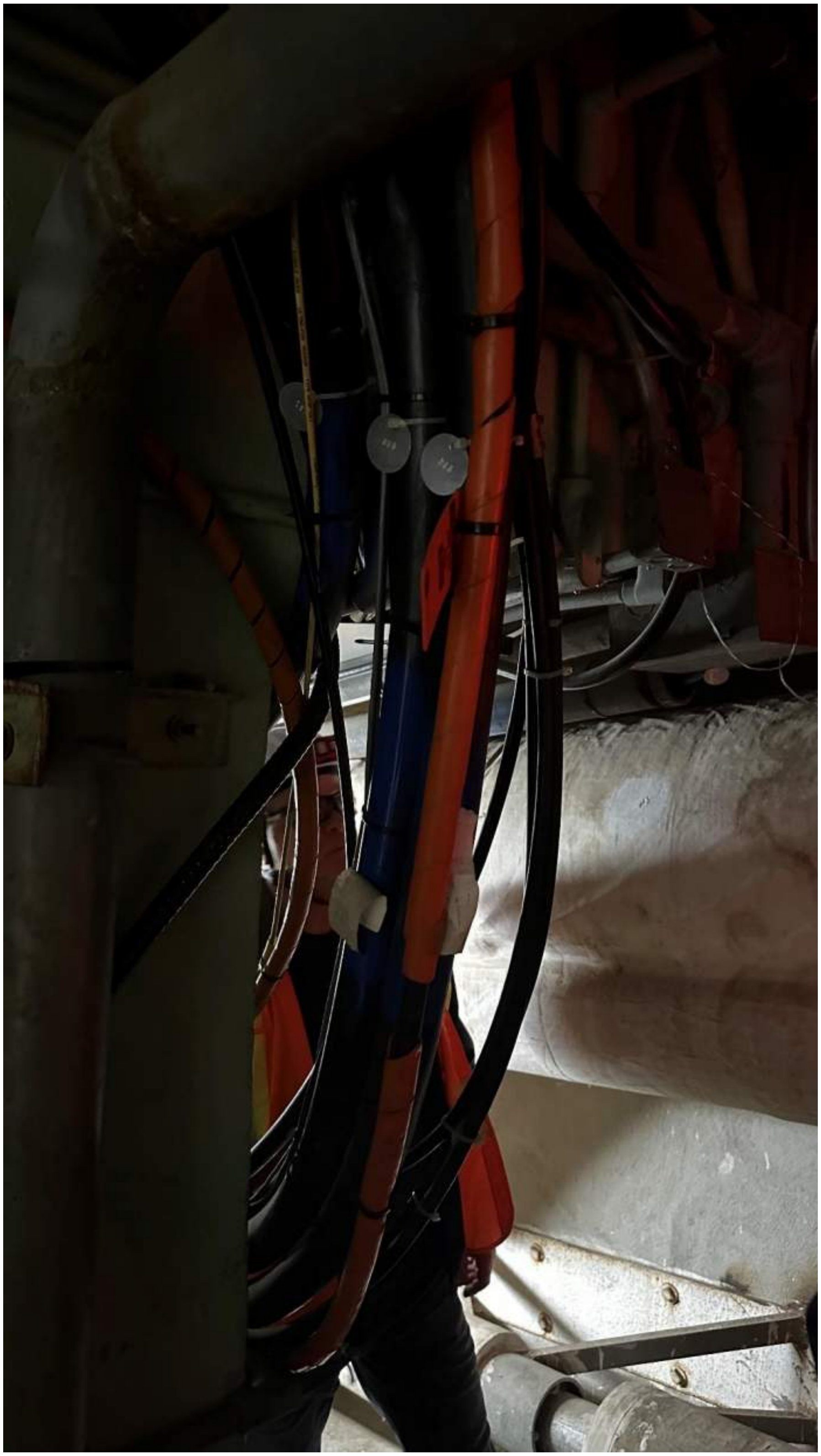

Image H.1: *Heating & Cooling Plant - Congested Cabling (Tunnel)*

Image H.2: *Heating & Cooling Plant - Congested Cabling (Ground Floor)*

Image H.3: *Heating & Cooling Plant – Duct Entry, West Side Interior*

Image H.4: *Heating & Cooling Plant – Duct Entry, West Side Exterior*

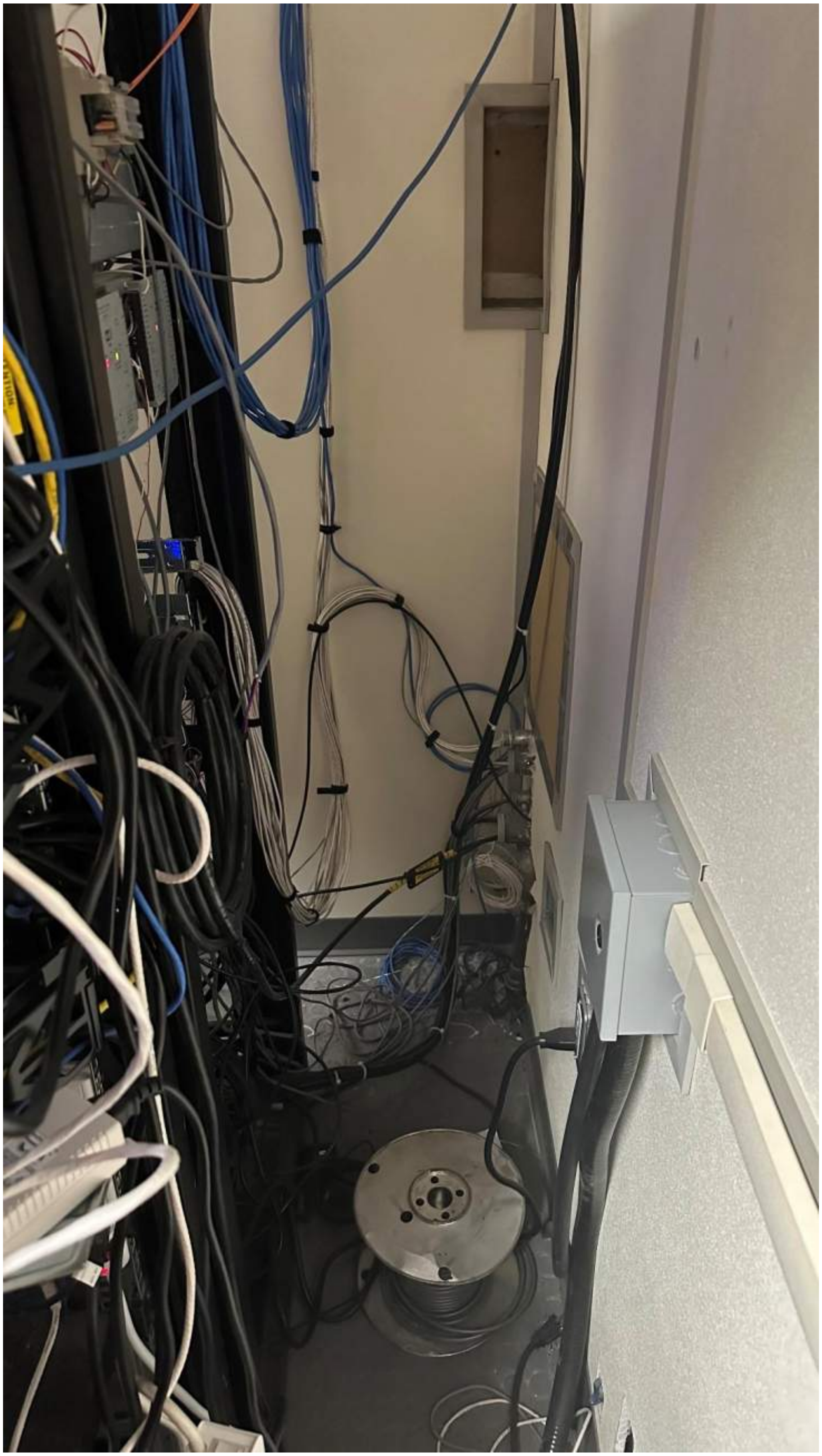

Image H.5: *Heating & Cooling Plant – IT Room Condition*

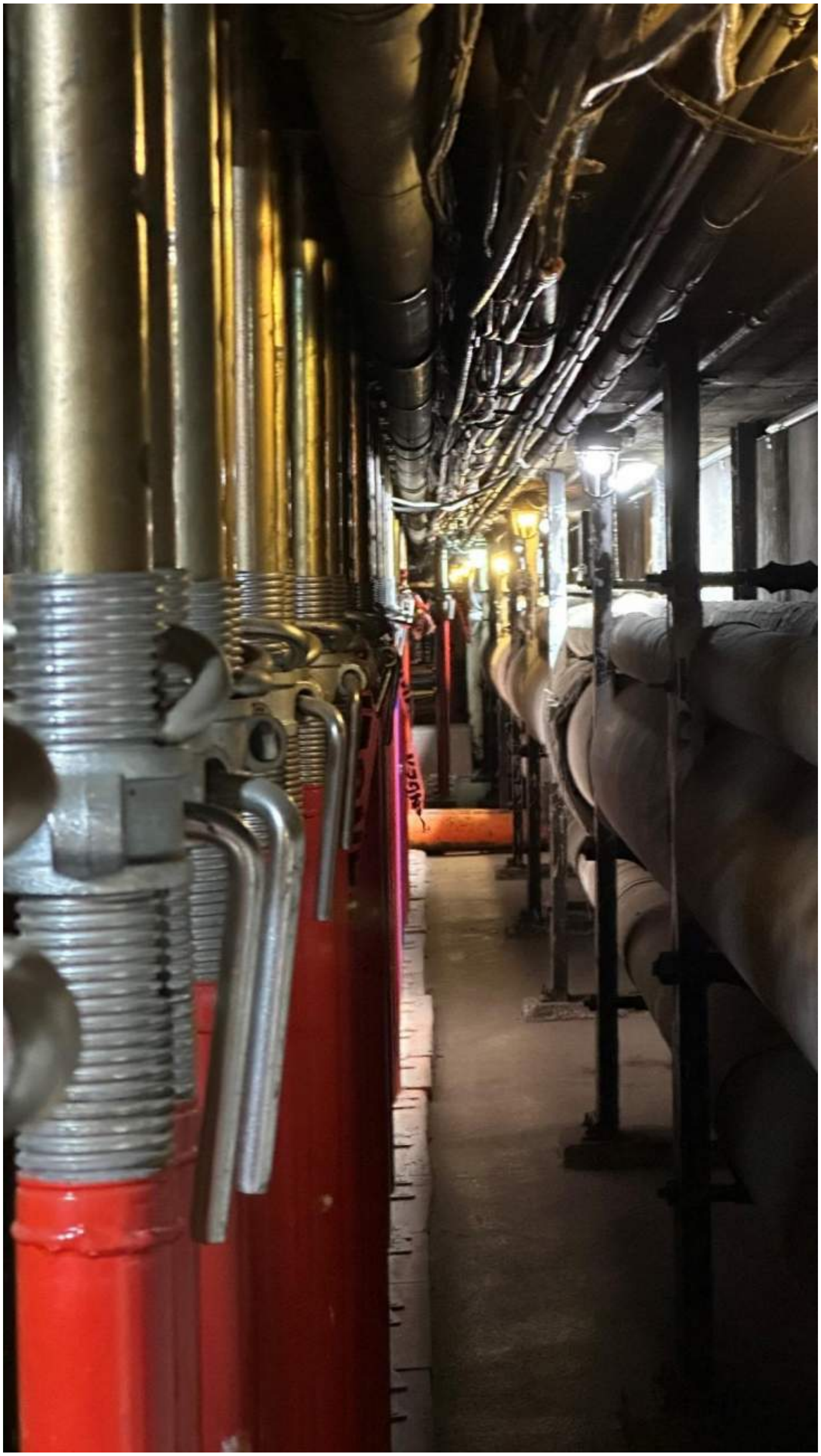

Image H.6: *Tunnel System – Current Condition Throughout*

Image H.7: *Personnel Records Building – Congested Pathways*

Image H.8: *Personnel Records Building – Congested Pathways & Aging Cabling*

__Image H.9:__ Personnel Records Building – Rogers Presence

__Image H.10:__ Personnel Records Building – Zayo Presence

Image H.11: *Personnel Records Building – Congested Pathways*

Image H.12: *Brooke Claxton Building – Pathways Incoming From Tunnel System (1)*

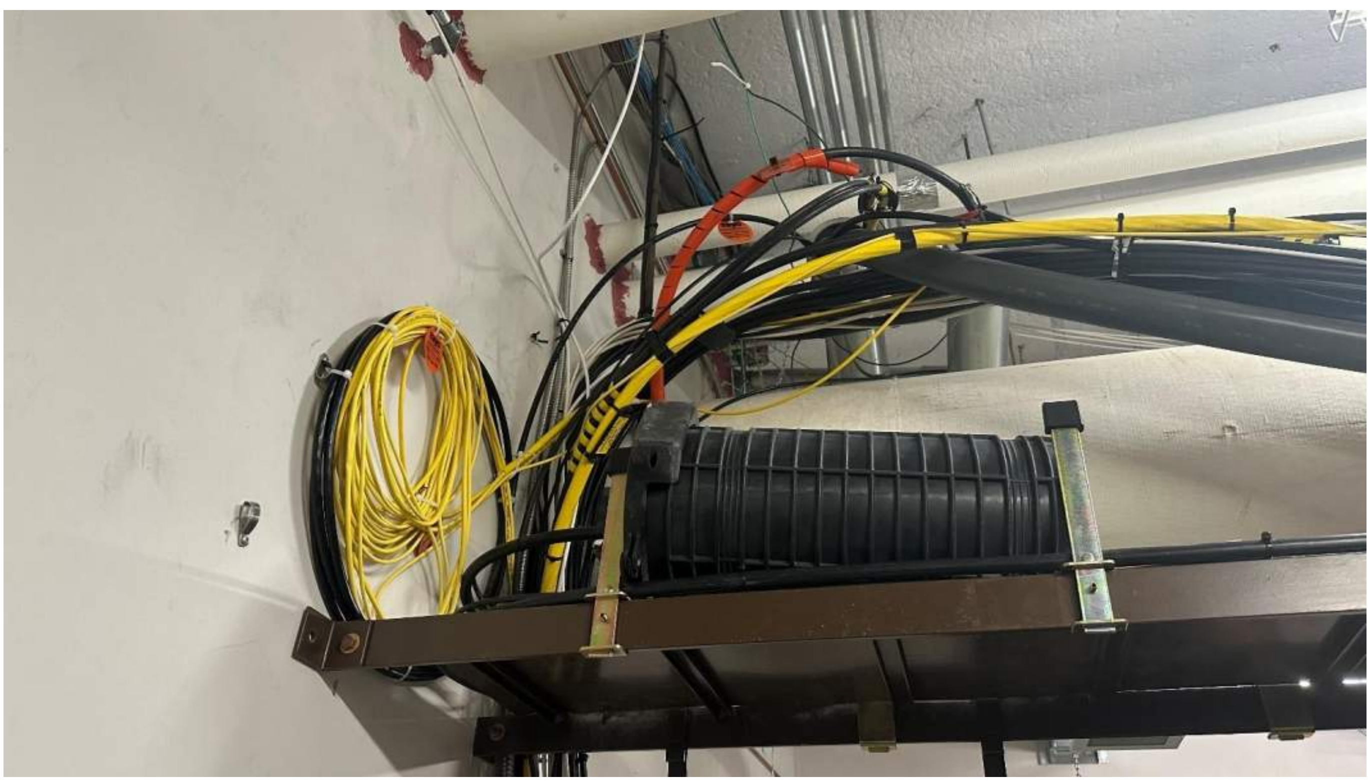

Image H.13: *Brooke Claxton Building – IT Room Cabling Condition (1)*

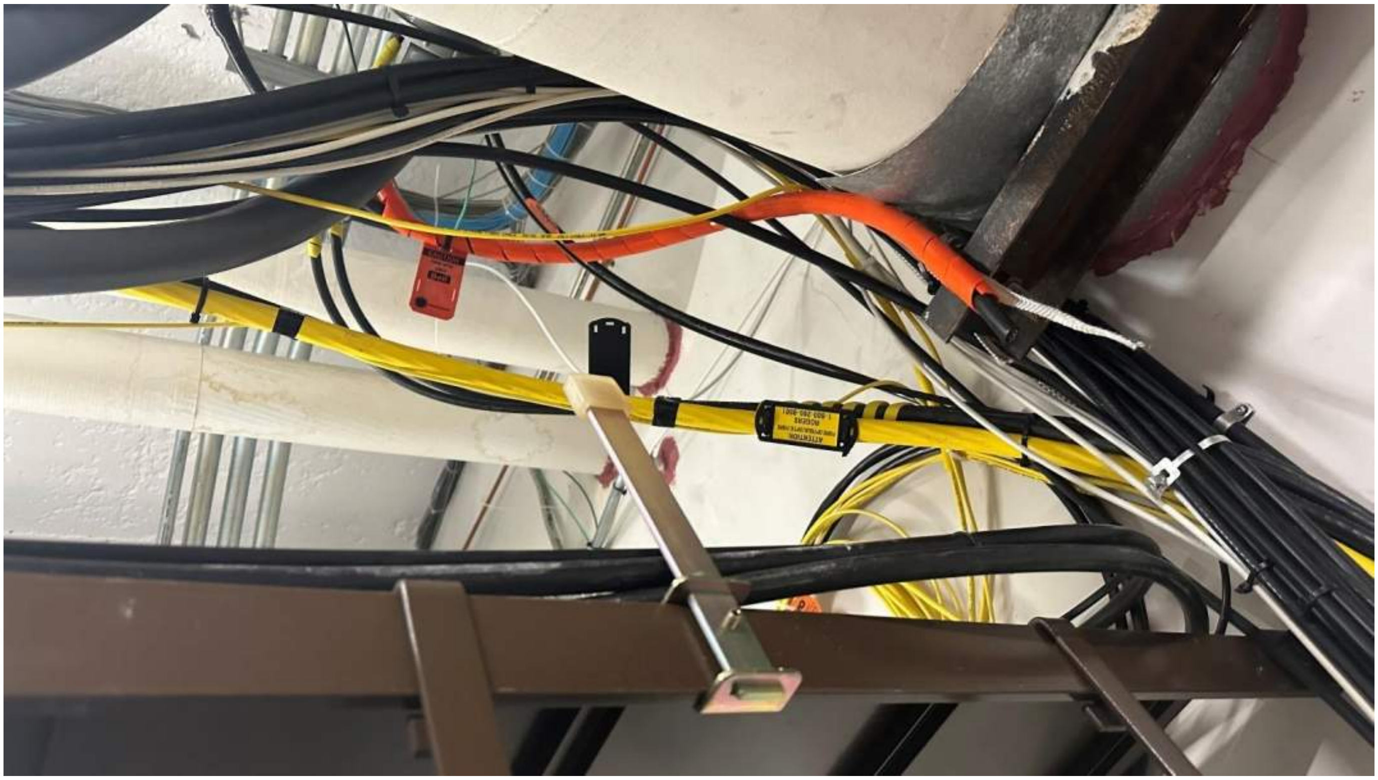

Image H.14: Brooke Claxton Building – Bell, Rogers, & Zayo Presence

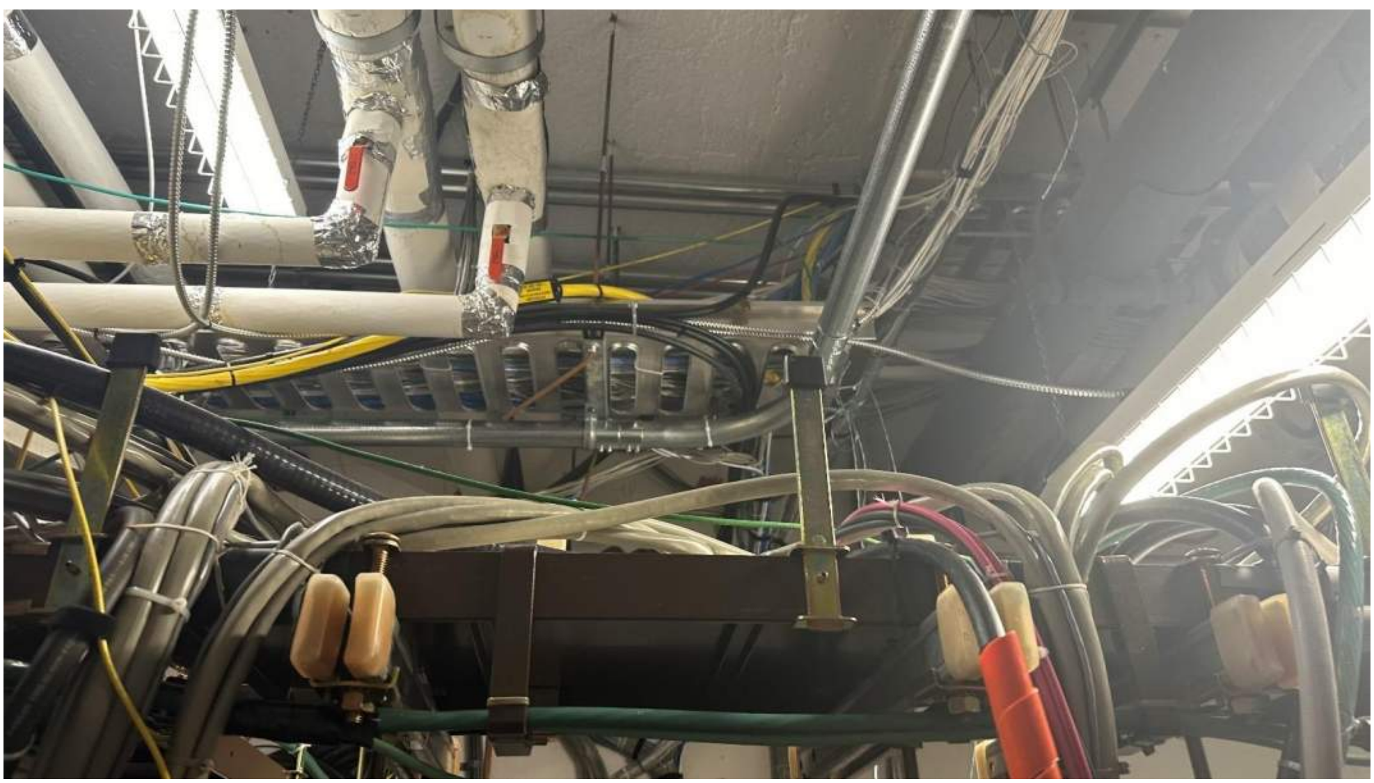

Image H.15: Brooke Claxton Building – IT Room Cabling Condition (2)

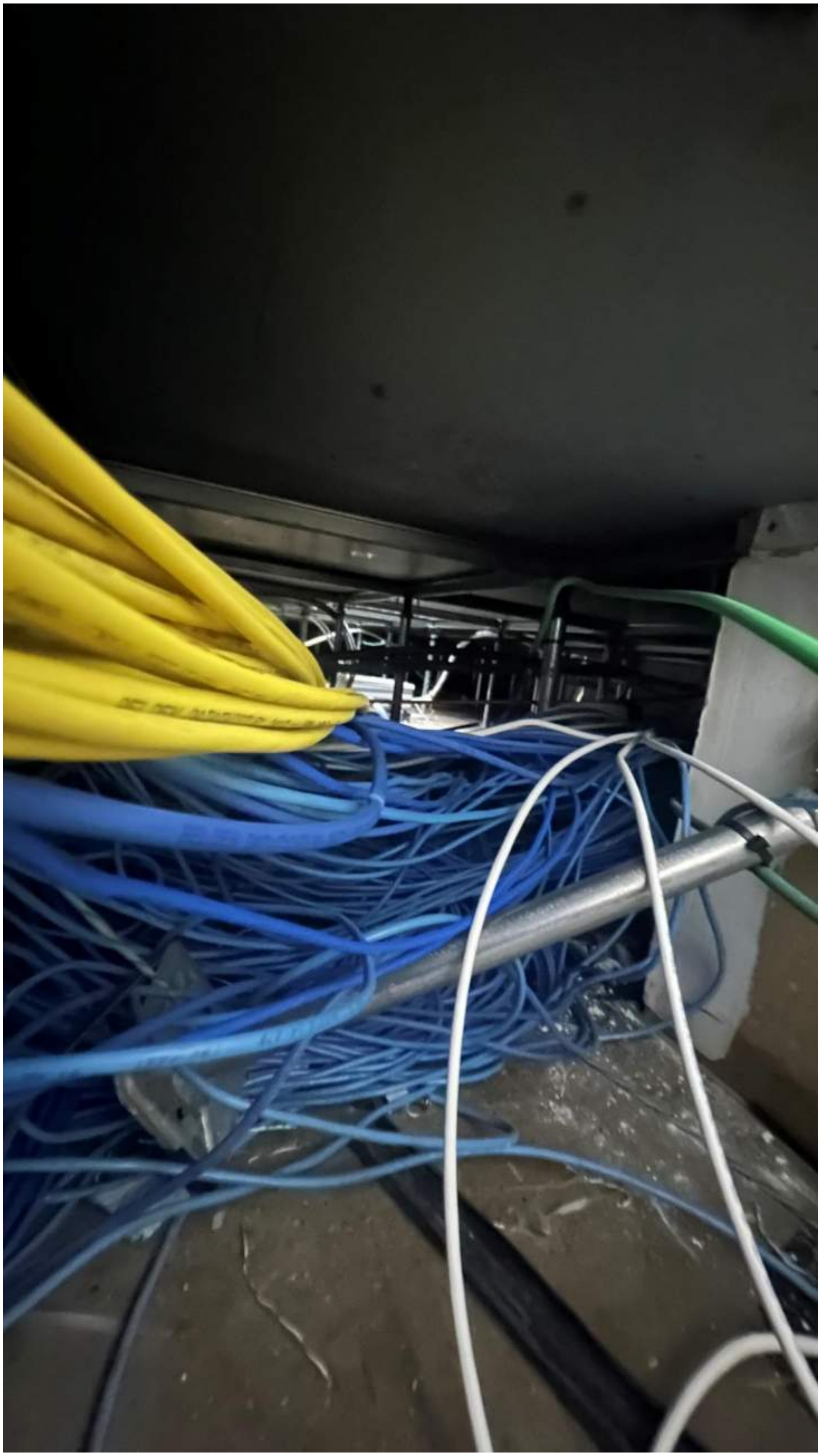

Image H.16: *Brooke Claxton Building – IT Room Raised Floor Cabling*

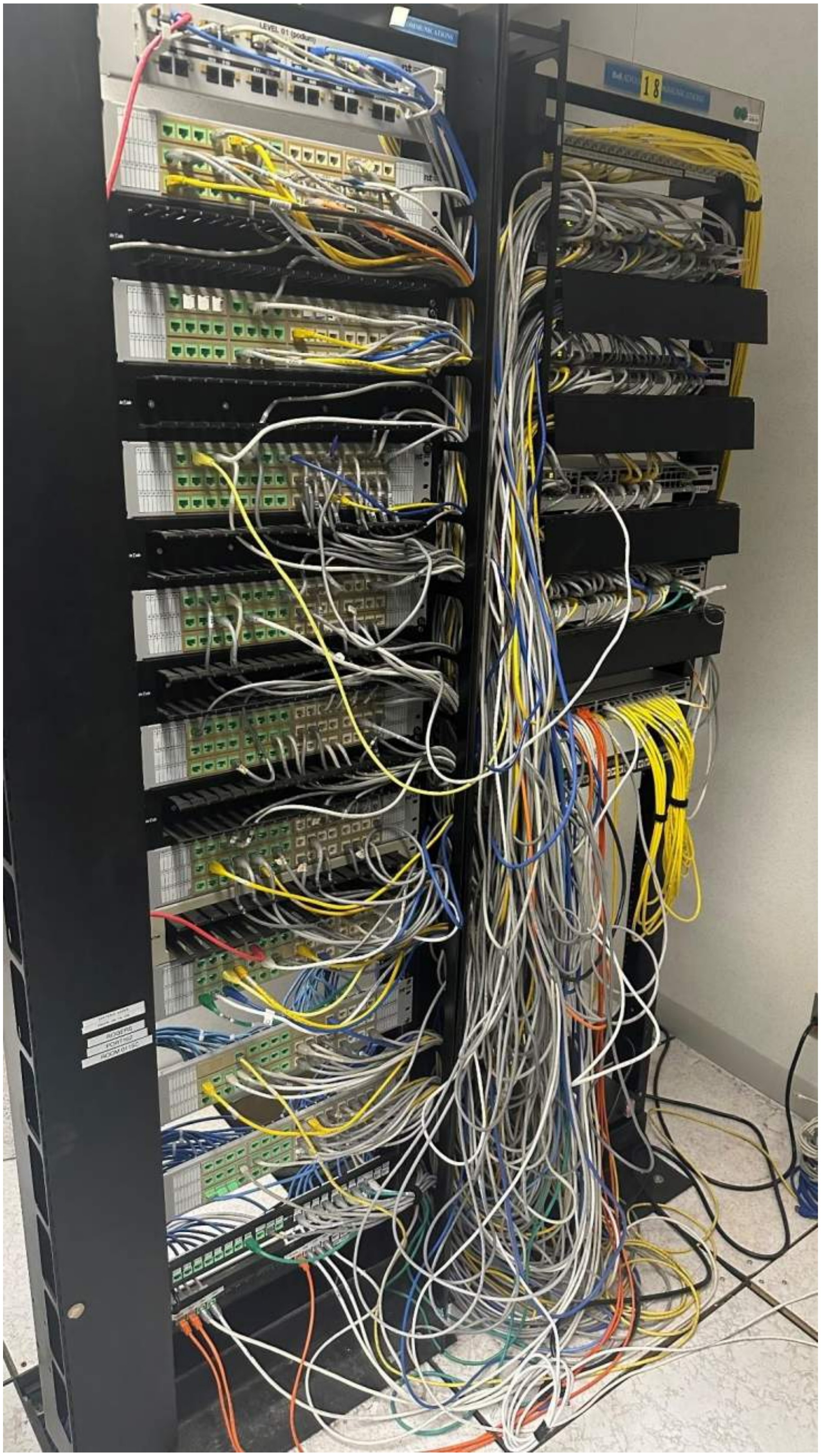

Image H.17: *Brooke Claxton Building – IT Room Cabling Condition (3)*

Image H.18: *Brooke Claxton Building – Pathways Incoming From Tunnel System (2)*

Image H.19: *Occupational Health Unit – Pathways Incoming Into IT Room*

Image H.20: *Occupational Health Unit – Pathways Incoming Into IT Room Rack*

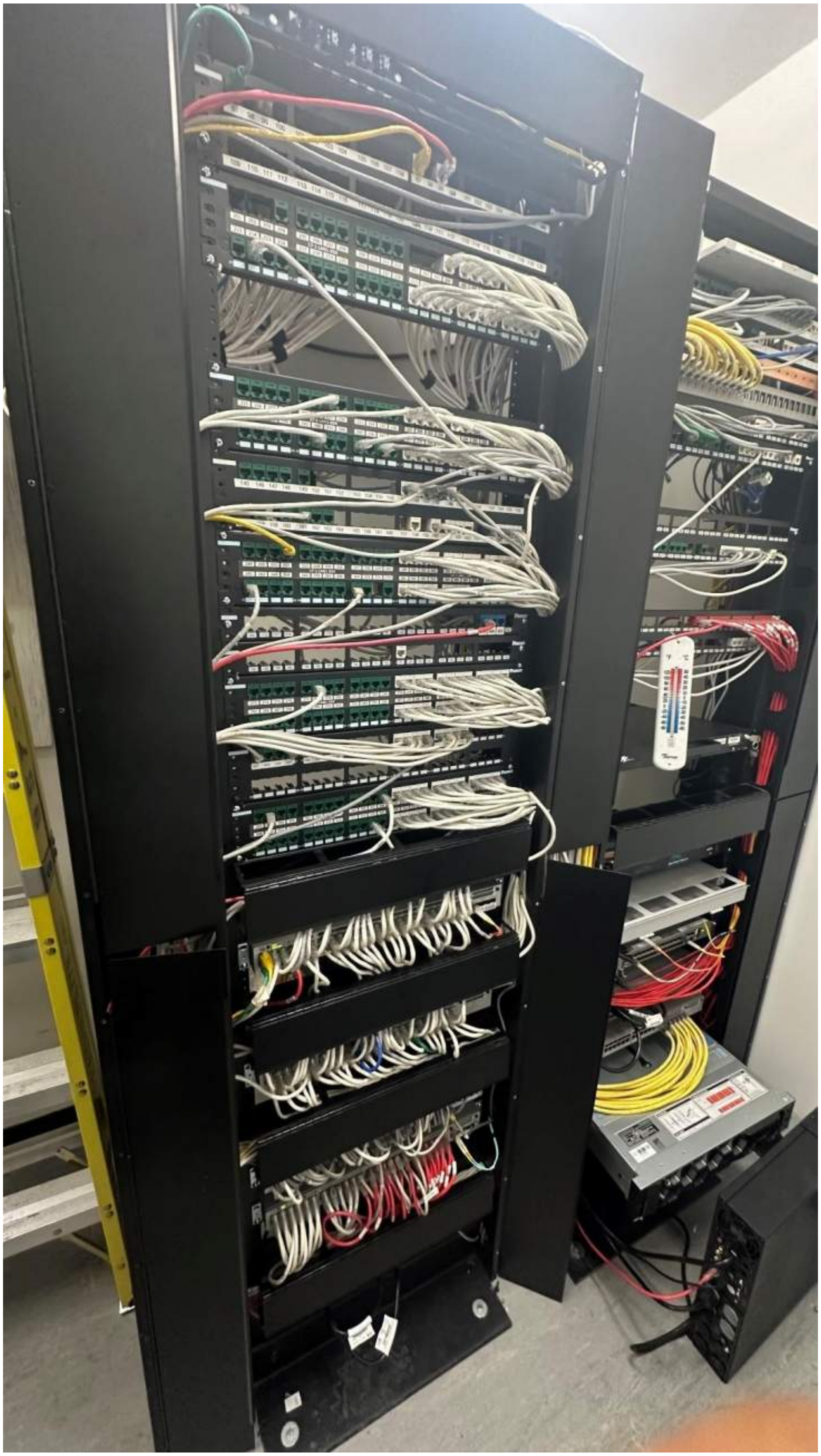

Image H.21: *Occupational Health Unit – IT Equipment Housed Within IT Rack*

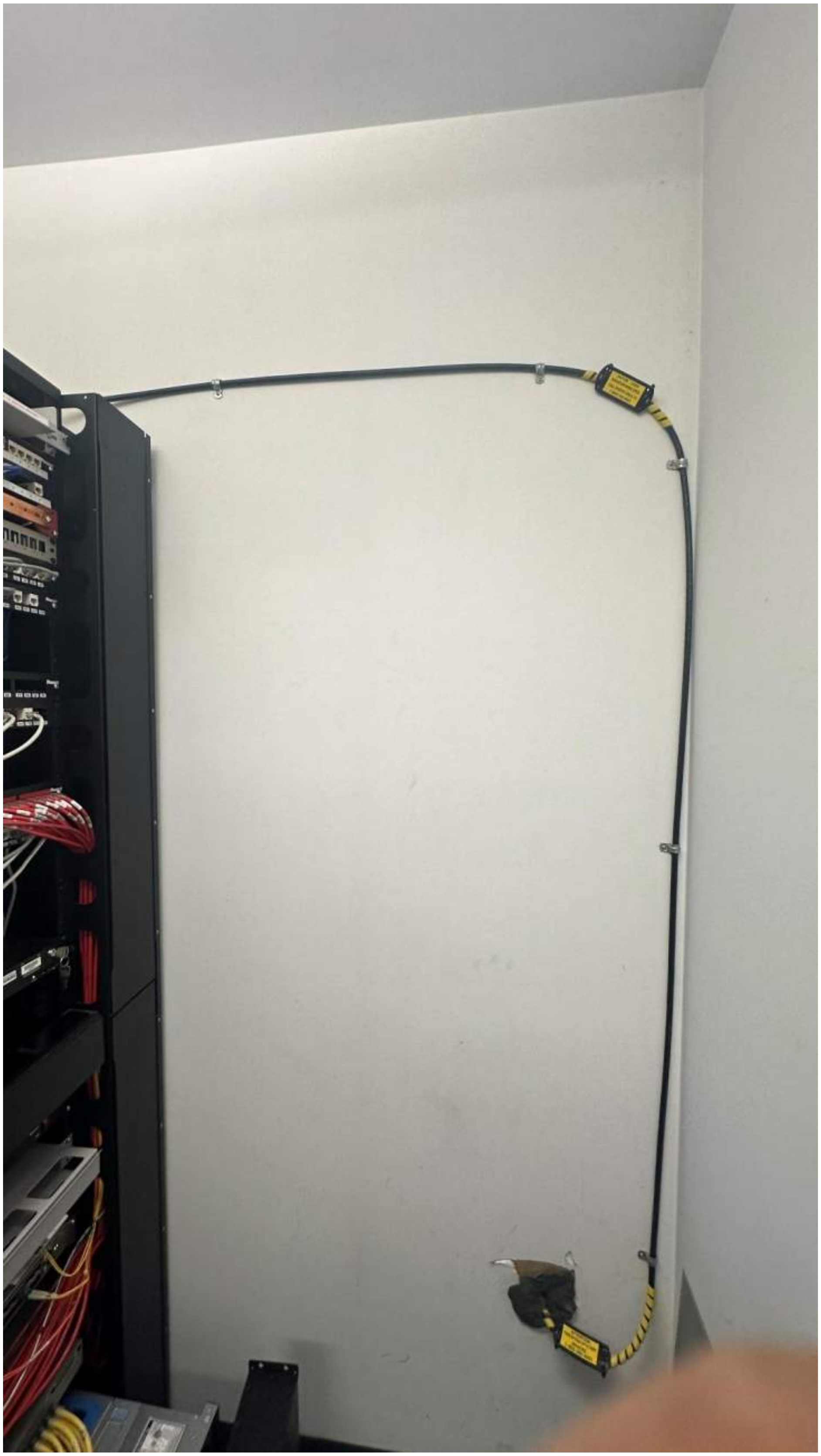

Image H.21: *Occupational Health Unit – Rogers Entry Into Building via East Side*

Image H.22: *Standards Building – Tunnel System Entry Into Building*

Image H.23: *Standards Building – Bell Fibre Presence & Entry via Tunnel System*

Image H.24: *Standards Building – Cabling Entry Into IT Room*

Image H.25: *Standards Building – BIX Presence*

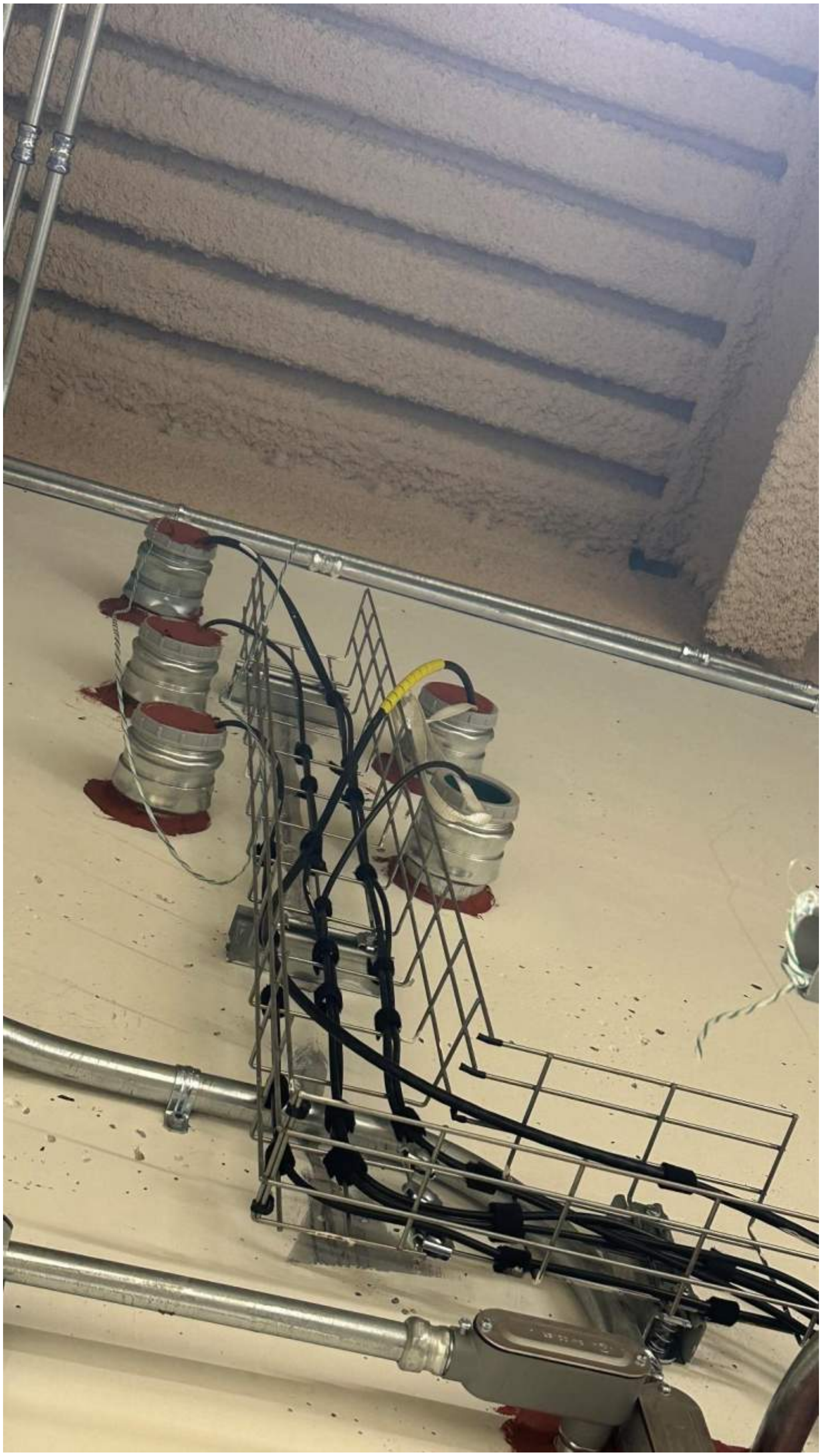

Image H.26: *Modernized H&C Plant – Pathway Infrastructure Capacity (1)*

Image H.27: Modernized H&C Plant – Pathway Infrastructure Capacity (2)

Image H.28: Sir Frederick Banting – Conjected Pathways & Aging Infrastructure

Image H.29: *Sir Frederick Banting – Congested, Undocumented Pathways*

Appendix I – Stakeholder Registry

Name	Representing	Role/Title	E-Mail
Attain Representatives			
Derrick Hanson	Attain	President - Technical Lead	derrick.hanson@theattaingroup.com
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Susan Cook	PSPC	N / A	susan.cook@tpsgc-pwgsc.gc.ca
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Valérie Bouillant	Arcadis IBI Group	N / A	valerie.bouillant@arcadis.com

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Equans Services			
Brent Mainville	Equans	1st Class Chief Engineer	brent.mainville@equans.com
Black & McDonald			
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Eric Lemieux	Black&Mac	N / A	elemieux@blackandmcdonald.com

Appendix J – Emergency Telephone Campus Locations

Image J.1: Emergency Telephone Locations (Dashed Outlines)

[END OF REPORT]

TUNNEY'S PASTURE
RE-DEVELOPMENT PHASE II

IT/TELECOMMUNICATIONS DRAWINGS SET

SHEET LIST	
T-001	COVER PAGE
T-101	OVERALL SITE PLAN & BUILDING PHASING
T-102	ROAD INFRASTRUCTURE RE-DEVELOPMENT PHASING
T-103	UNDERGROUND DUCT INFRASTRUCTURE PLAN (PREEMPTIVE)
T-201	EXISTING CARRIER SERVICES - BELL
T-202	EXISTING CARRIER SERVICES - ROGERS
T-203	EXISTING CARRIER SERVICES - ZAYO
T-301	HYDRO OTTAWA UNDERGROUND DUCT INFRASTRUCTURE
T-401	GENERAL DETAILS

C

PWGSC A0 (1189x841)

0 10 20mm 40 60 80 100 120 140 160 180 200mm

Canada

Public Works and Government Services Canada
Travaux publics et services gouvernementaux Canada

consultant consultant

attain

380 Hunt Club Road, Suite #203, Ottawa ON, K1V 1C1
Tel. 613-739-9424

client client

ARCADIS

project north projet nord

GENERAL DRAWING NOTES

DRAWING LEGEND

Contractor to verify all dimensions & conditions on site and immediately notify the engineer of all discrepancies.

L'entrepreneur doit vérifier toutes les dimensions et conditions sur le site et aviser immédiatement le représentant du ministère de toute divergence.

revisions	description	date
01	ISSUED FOR REVIEW	2025/10/24

A detail no. / no. du detail
B location drawing no. / sur dessin no.
C drawing no. / dessin no.

project projet

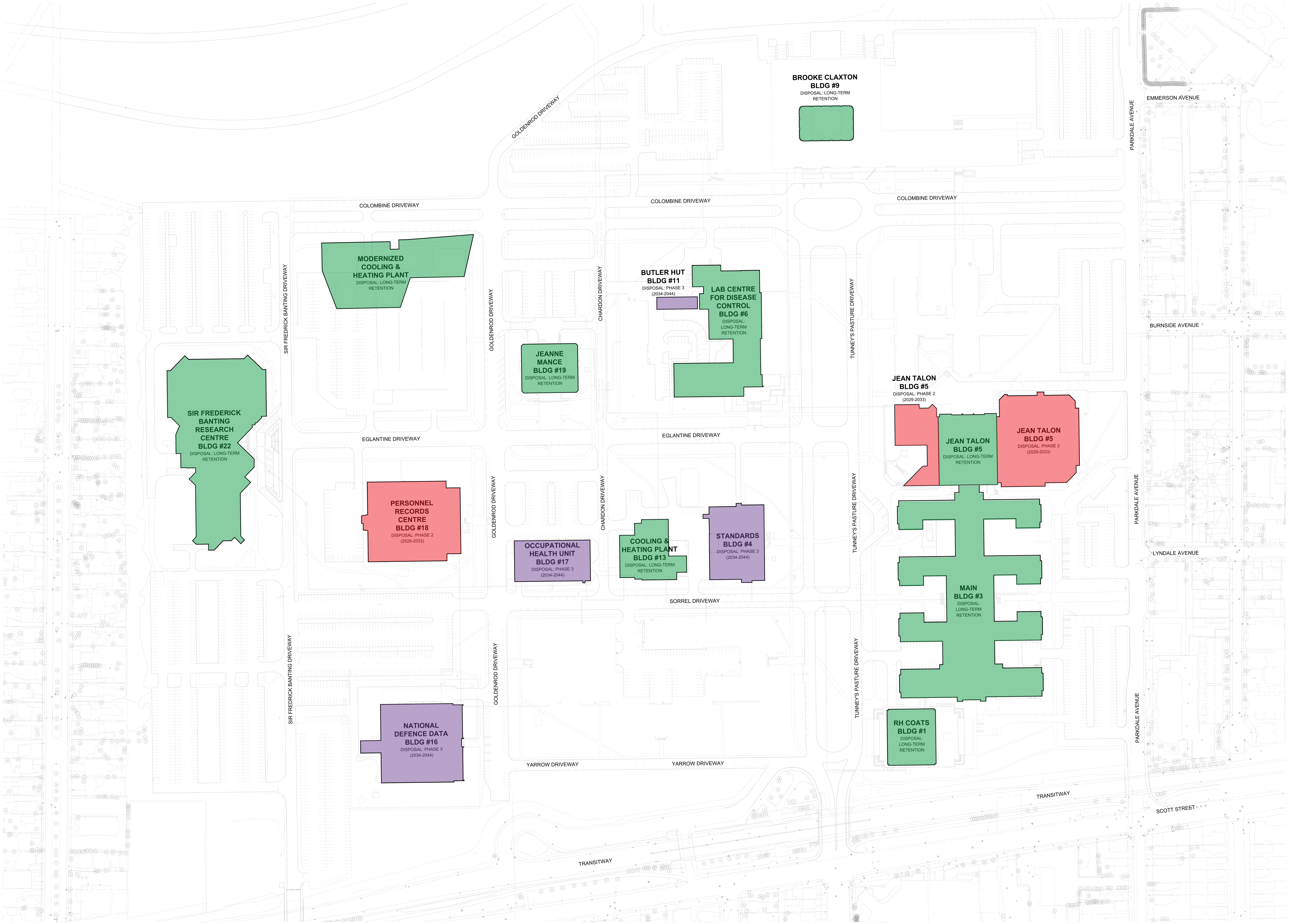
TUNNEY'S PASTURE

REDEVELOPMENT PHASE II - IT/TELECOMMUNICATIONS DRAWINGS SET

drawing dessin

COVER PAGE

Designed By	R. H / D. H	Conçu par
Date	2025-09-10	(yyyy/mm/dd)
Drawn By	A. S	Dessiné par
Date	2025-09-10	(yyyy/mm/dd)
Reviewed By	R. H / D. H	Examiné par
Date	2025-09-10	(yyyy/mm/dd)
Approved By	R. H / D. H	Approuvé par
Date	2025-09-10	(yyyy/mm/dd)
Tender	N / A	Soumission
Project Manager		Administrateur de projets
Project no.	PROJ05969	No. du projet
Drawing no.	T-001	No. du dessin



01
T-101

TUNNEY'S PASTURE OVERALL SITE PLAN

N T S

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GENERAL DRAWING NOTES

DRAWING LEGEND

- PHASE 2 (2029 - 2033)
- PHASE 3 (2034 - 2044)
- PHASE 4 (LONG - TERM RETENTION, 2044 +)

Contractor to verify all dimensions & conditions on site and immediately notify the engineer of all discrepancies.

L'entrepreneur doit vérifier toutes les dimensions et conditions sur le site et aviser immédiatement le représentant du ministère de toute divergence.

revisions	description	date
01	ISSUED FOR REVIEW	2025/10/24

A detail no. / no. du detail
B location drawing no. / sur dessin no.
C drawing no. / dessin no.

project / projet

TUNNEY'S PASTURE

REDEVELOPMENT PHASE II - IT/TELECOMMUNICATIONS DRAWINGS SET

drawing / dessin

OVERALL SITE PLAN & BUILDING PHASING

Designed By	R. H / D. H	Conçu par
Date	2025-09-10	(yyyy/mm/dd)
Drawn By	A. S	Dessiné par
Date	2025-09-10	(yyyy/mm/dd)
Reviewed By	R. H / D. H	Examiné par
Date	2025-09-10	(yyyy/mm/dd)
Approved By	R. H / D. H	Approuvé par
Date	2025-09-10	(yyyy/mm/dd)
Tender	N / A	Soumission
Project Manager		Administrateur de projets
Project no.	PROJ05969	No. du projet
Drawing no.	T-101	No. du dessin

PWGSC A0 (1189x841)

01
T-102

TUNNEY'S PASTURE ROAD INFRASTRUCTURE RE-DEVELOPMENT PHASING

NTS

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GENERAL DRAWING NOTES

DRAWING LEGEND

- ROAD INFRASTRUCTURE, STAGE 1 - PHASE 1
- ROAD INFRASTRUCTURE, STAGE 2 - PHASE 1
- ROAD INFRASTRUCTURE, STAGE 3 - PHASE 1
- ROAD INFRASTRUCTURE, FUTURE STAGE

Contractor to verify all dimensions & conditions on site and immediately notify the engineer of all discrepancies.

L'entrepreneur doit vérifier toutes les dimensions et conditions sur le site et aviser immédiatement le représentant du ministère de toute divergence.

revisions	description	date
01	ISSUED FOR REVIEW	2025/10/24

A detail no. / no. du detail
B location drawing no. / sur dessin no.
C drawing no. / dessin no.

project / projet

TUNNEY'S PASTURE

REDEVELOPMENT PHASE II - IT/TELECOMMUNICATIONS DRAWINGS SET

drawing / dessin

ROAD INFRASTRUCTURE RE-DEVELOPMENT PHASING

Designed By	R. H / D. H	Conçu par
Date	2025-09-10	(yyyy/mm/dd)
Drawn By	A. S	Dessiné par
Date	2025-09-10	(yyyy/mm/dd)
Reviewed By	R. H / D. H	Examiné par
Date	2025-09-10	(yyyy/mm/dd)
Approved By	R. H / D. H	Approuvé par
Date	2025-09-10	(yyyy/mm/dd)
Tender	N / A	Soumission
Project Manager		Administrateur de projets
Project no.	PROJ05969	No. du projet
Drawing no.	T-102	No. du dessin

PWGSC A0 (1189x841)

C

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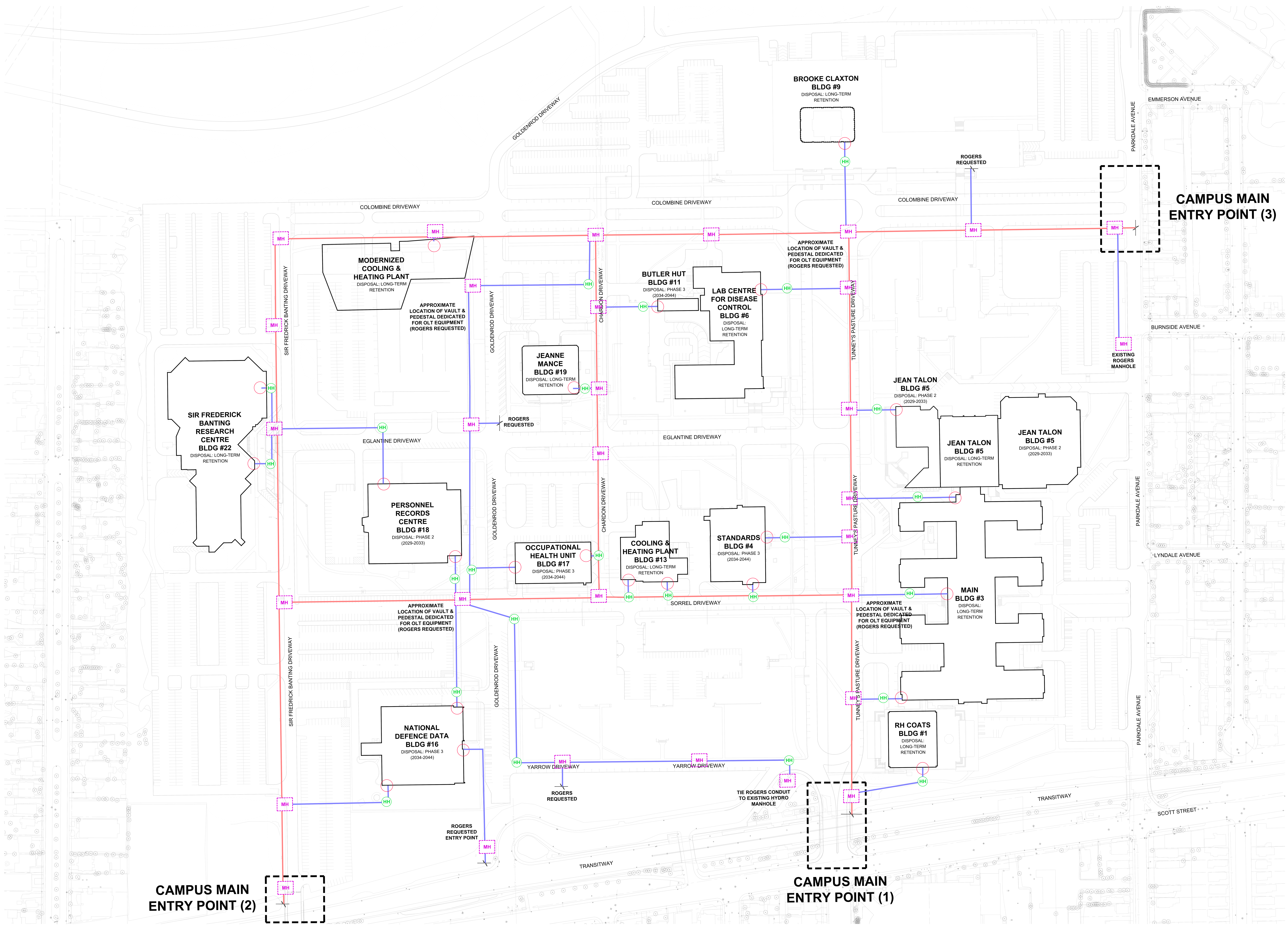

01
T-103
TUNNEY'S PASTURE UNDERGROUND DUCT INFRASTRUCTURE PLAN (PREEMPTIVE)
NTS

Canada

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client — client

ARCADIS

project north — projet nord

GENERAL DRAWING NOTES

1) DUCT PATHWAYS AND LOCATIONS SHOWN FOR INFORMATIONAL AND ILLUSTRATIVE PURPOSES ONLY. PRECISE LOCATION OF DUCTS AND HANDHOLES/MANHOLES MAY VERY DUE TO SITE CONDITIONS AND COMPLIANCE WITH CITY OF OTTAWA BYLAWS.

2) ENSURE COMMUNICATIONS PATHWAYS ARE INSTALLED/PLACED ON THE OPPOSITE SIDE OF THE EASEMENT FROM HYDRO LINES IN ORDER TO ENSURE NO INTERFERENCE. PLEASE REFER TO DRAWING 1/T-301 FOR AN ILLUSTRATION OF EXISTING UNDERGROUND DUCT PATHWAYS DEDICATED FOR HYDRO.

3) HANDHOLE/MANHOLE LOCATIONS SHOWN ARE APPROXIMATE. IN THE CASE A HANDHOLE/MANHOLE IS TO REMAIN, THEY MAY BE USED IN THE INSTALLATION OF NEW NETWORKING INFRASTRUCTURE. ENSURE THAT CITY OF OTTAWA STANDARDS ARE ADHERED TO.

4) PREEMPTIVE DESIGN; SUBJECT TO CHANGE.

5) PLEASE REFER TO DRAWING ??/T-401 DETAILS PAGE FOR ADDITIONAL INFORMATION ON CITY OF OTTAWA GUIDELINES AND PROCEDURES FOR THE INSTALLATION OF TELECOMMUNICATIONS DUCTS, MANHOLES, AND HANDHOLES.

DRAWING LEGEND

- MH — MANHOLE
- HH — HANDHOLE
- BUILDING ENTRANCE LOCATION
- TWO (2) 103mm (4") PVC DUCTS TO EACH BUILDING
- SIX (6) 103mm (4") PVC DUCTS AS INDICATED
- BREAK LINE

Contractor to verify all dimensions & conditions on site and immediately notify the engineer of all discrepancies.

L'entrepreneur doit vérifier toutes les dimensions et conditions sur le site et aviser immédiatement le représentant du ministère de toute divergence.

revisions	description	date
01	ISSUED FOR REVIEW	2025/10/24

A detail no. / no. du detail
B location drawing no. / sur dessin no.
C drawing no. / dessin no.

project — projet

TUNNEY'S PASTURE

REDEVELOPMENT PHASE II - IT/TELECOMMUNICATIONS DRAWINGS SET

drawing — dessin

UNDERGROUND DUCT INFRASTRUCTURE PLAN (PREEMPTIVE)

Designed By / Date	R. H / D. H 2025-09-10	Conçu par / (yyyy/mm/dd)
Drawn By / Date	A. S 2025-09-10	Dessiné par / (yyyy/mm/dd)
Reviewed By / Date	R. H / D. H 2025-09-10	Examiné par / (yyyy/mm/dd)
Approved By / Date	R. H / D. H 2025-09-10	Approuvé par / (yyyy/mm/dd)
Tender / Project Manager	N / A	Soumission / Administrateur de projets

Project no. — No. du projet
PROJ05969

Drawing no. — No. du dessin
T-103

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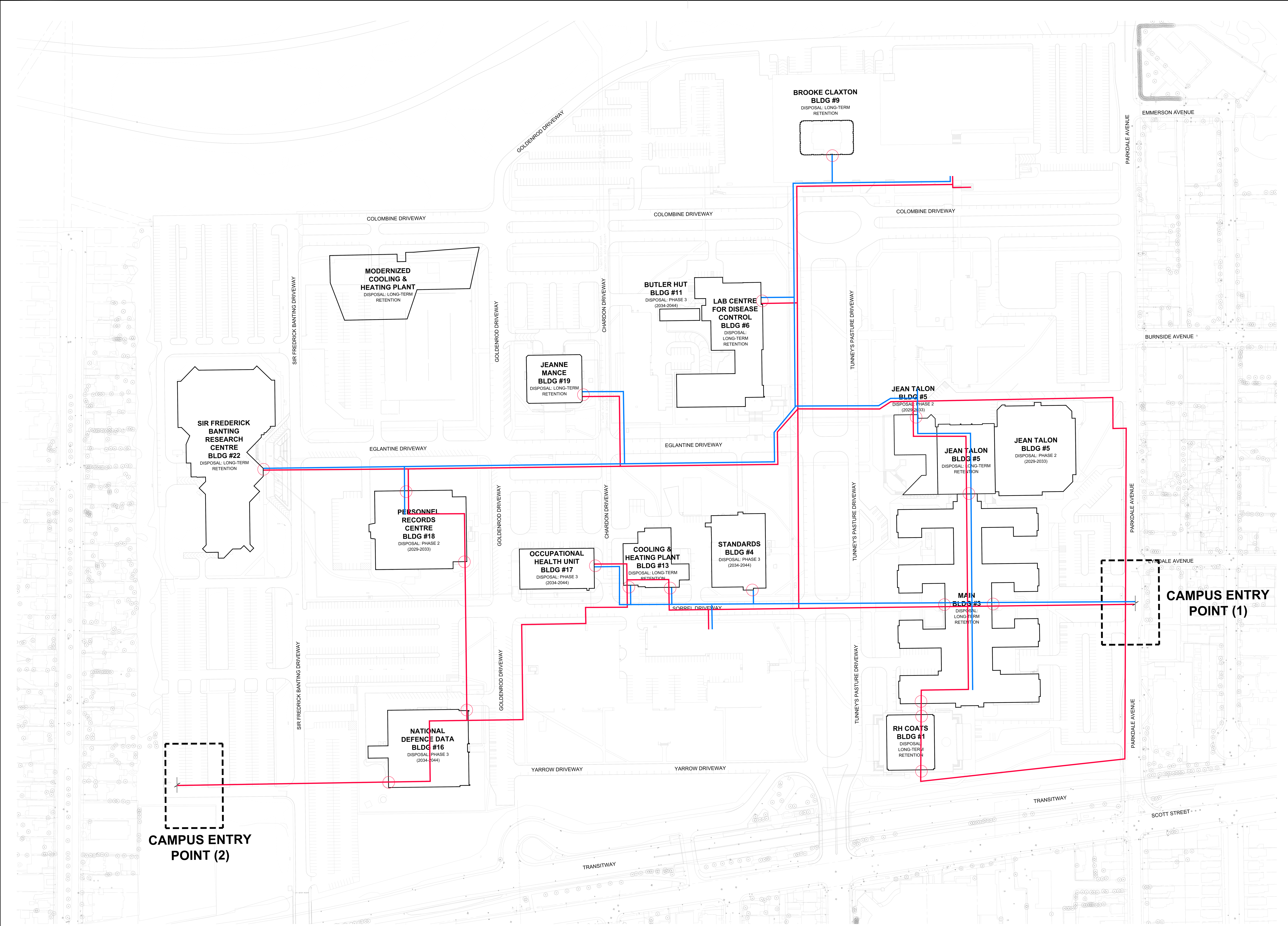

01
T-201
EXISTING CARRIER SERVICES - BELL
NTS

PWGSC A0 (1189x841)

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Canada

Public Works and Government Services Canada
Travaux publics et services gouvernementaux Canada

consultant / consultant

attain
380 Hunt Club Road, Suite #203, Ottawa ON, K1V 1C1
Tel. 613-739-9424

client / client

ARCADIS

project north / projet nord

GENERAL DRAWING NOTES

DRAWING LEGEND

- BUILDING ENTRANCE LOCATION
- BELL FIBER OPTIC
- BELL COPPER
- BREAK LINE

Contractor to verify all dimensions & conditions on site and immediately notify the engineer of all discrepancies.

L'entrepreneur doit vérifier toutes les dimensions et conditions sur le site et aviser immédiatement le représentant du ministère de toute divergence.

revisions	description	date
01	ISSUED FOR REVIEW	2025/10/24

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TUNNEY'S PASTURE

REDEVELOPMENT PHASE II - IT/TELECOMMUNICATIONS DRAWINGS SET

drawing / dessin

EXISTING CARRIER SERVICES - BELL

Designed By / Conçu par	R. H / D. H	
Date	2025-09-10	(yyyy/mm/dd)
Drawn By / Dessiné par	A. S	
Date	2025-09-10	(yyyy/mm/dd)
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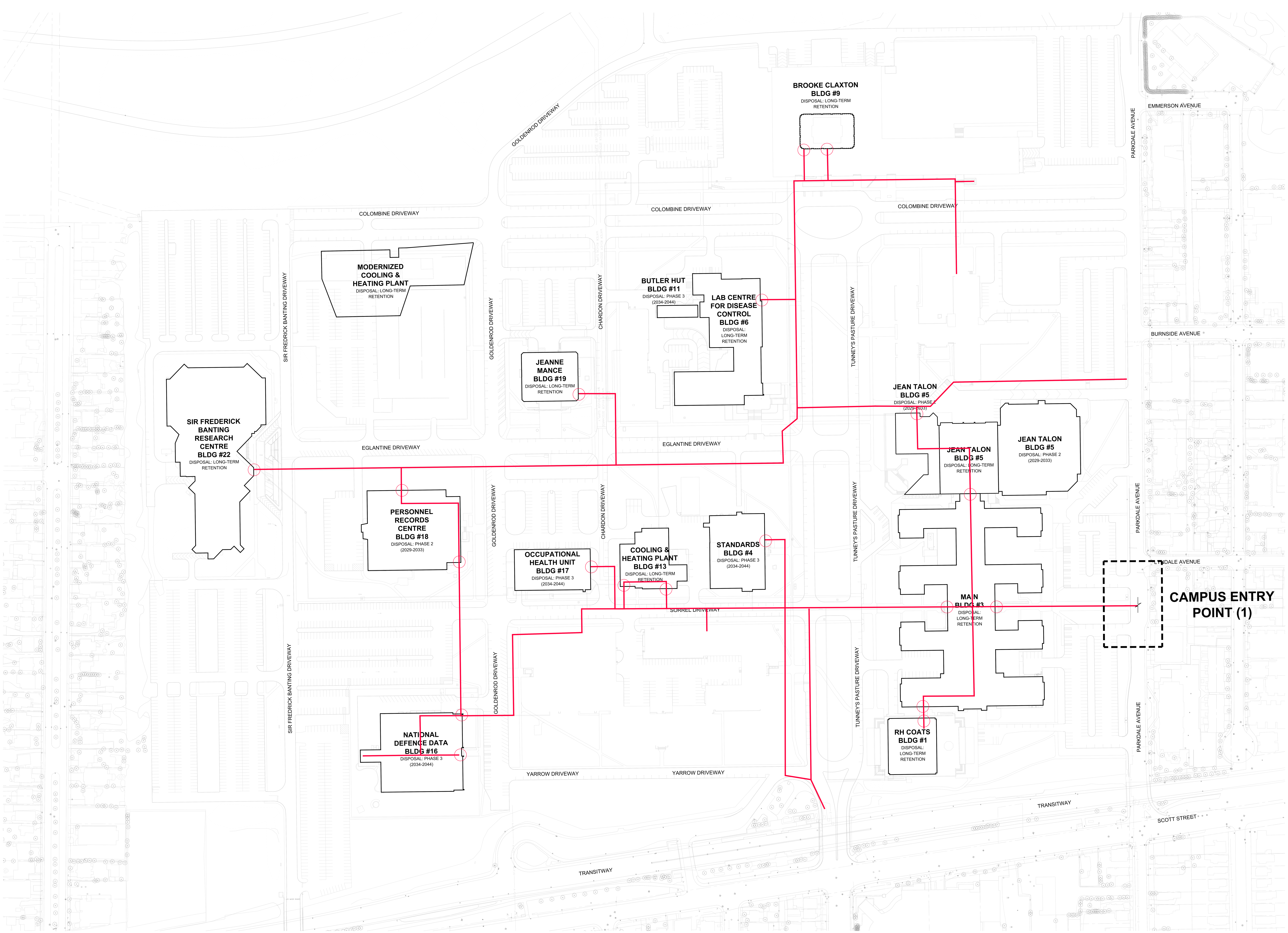
Approved By / Approuvé par	R. H / D. H	
Date	2025-09-10	(yyyy/mm/dd)
Tender / Soumission	N / A	
Project Manager / Administrateur de projets		
Project no. / No. du projet	PROJ05969	
Drawing no. / No. du dessin	T-201	



01
T-202

EXISTING CARRIER SERVICES - ROGERS
NTS

Canada

Public Works and Government Services Canada | Travaux publics et services gouvernementaux Canada

consultant | consultant

attain

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GENERAL DRAWING NOTES

DRAWING LEGEND

BUILDING ENTRANCE LOCATION
ROGERS FIBER OPTIC
BREAK LINE

Contractor to verify all dimensions & conditions on site and immediately notify the engineer of all discrepancies.

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project | projet

TUNNEY'S PASTURE

REDEVELOPMENT PHASE II - IT/TELECOMMUNICATIONS DRAWINGS SET

drawing | dessin

EXISTING CARRIER SERVICES - ROGERS

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Project Manager		Administrateur de projets
Project no.	PROJ05969	No. du projet
Drawing no.	T-202	No. du dessin

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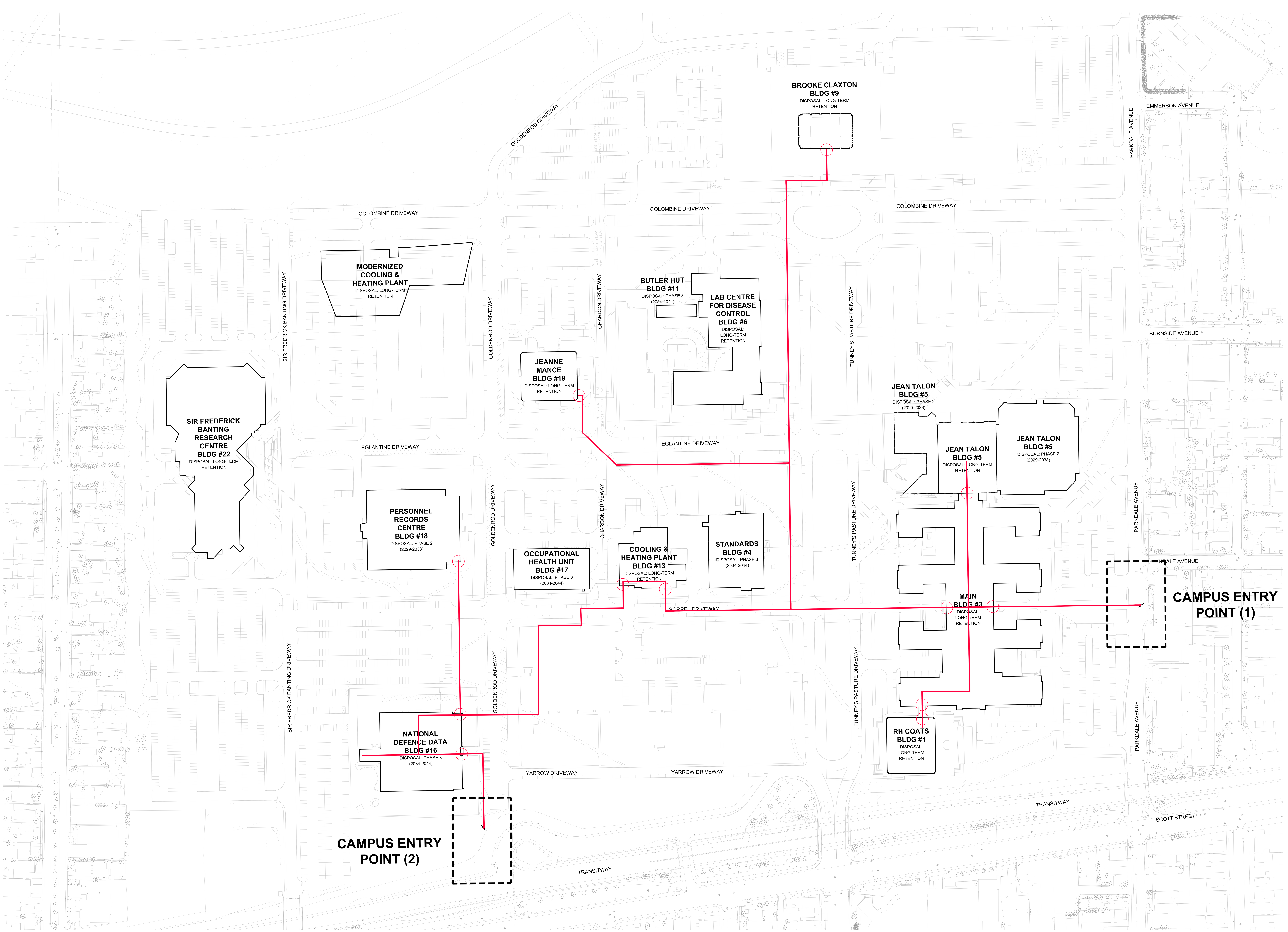

01 T-203 EXISTING CARRIER SERVICES - ZAYO
NTS

Canada
Public Works and Government Services Canada | Travaux publics et services gouvernementaux Canada

consultant | consultant
attain
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client | client
ARCADIS

project north | projet nord

GENERAL DRAWING NOTES

DRAWING LEGEND
BUILDING ENTRANCE LOCATION
ZAYO FIBER OPTIC
BREAK LINE

Contractor to verify all dimensions & conditions on site and immediately notify the engineer of all discrepancies.

L'entrepreneur doit vérifier toutes les dimensions et conditions sur le site et aviser immédiatement le représentant du ministère de toute divergence.

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C drawing no. / dessin no.

project | projet
TUNNEY'S PASTURE
REDEVELOPMENT PHASE II - IT/TELECOMMUNICATIONS DRAWINGS SET

drawing | dessin
EXISTING CARRIER SERVICES - ZAYO

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PROJ05969

Drawing no. | No. du dessin
T-203

PWGSC A0 (1189x841)

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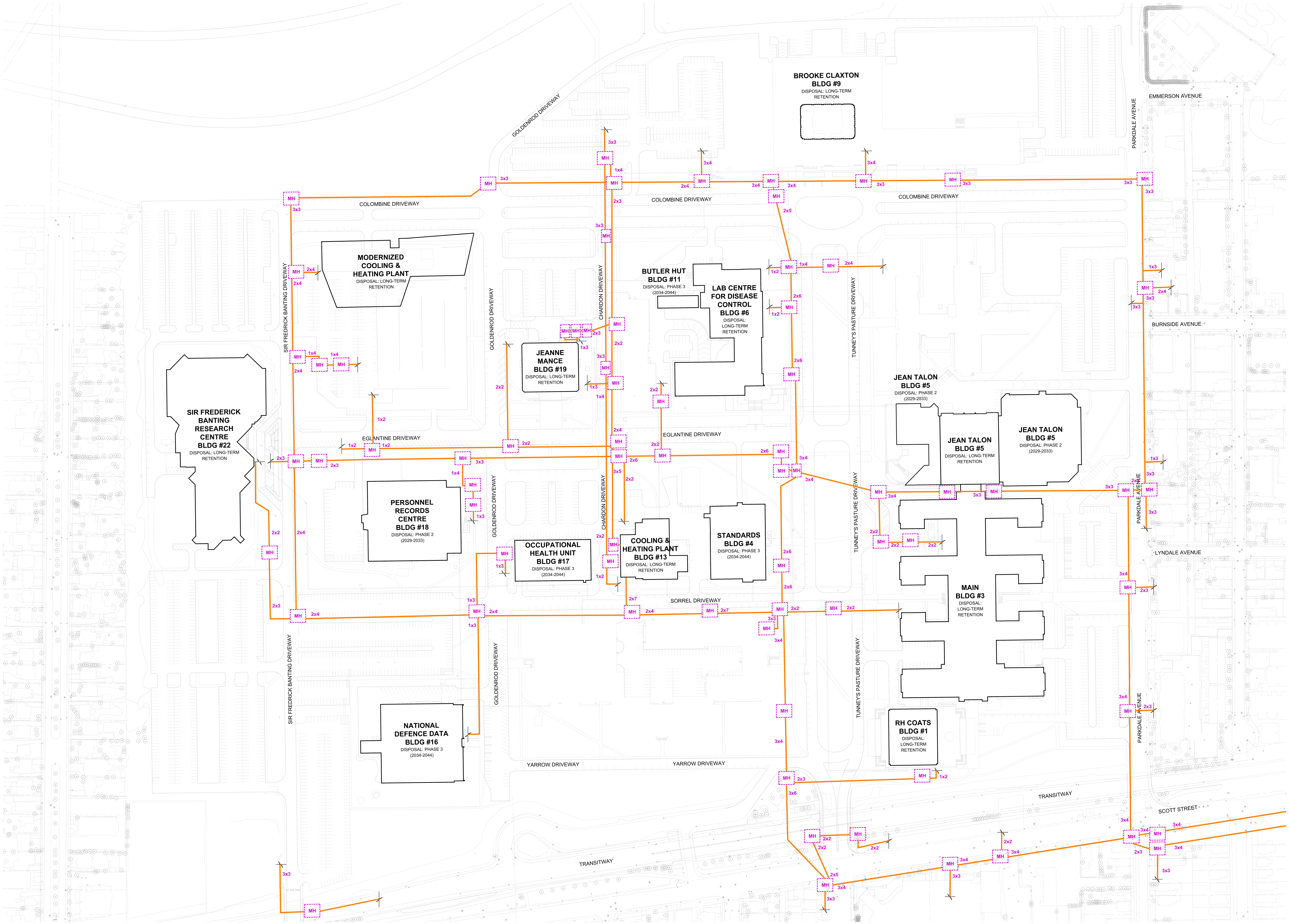

01
T-301

HYDRO OTTAWA UNDERGROUND DUCT INFRASTRUCTURE
NTS

Canada

Public Works and Government Services Canada
Travaux publics et services gouvernementaux Canada

consultant | consultant

attain
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Tel. 613-739-9424

client | client

ARCADIS

project north | projet nord

GENERAL DRAWING NOTES

1) HANDHOLE/MANHOLE LOCATION SHOWN ARE APPROXIMATE. SHOWN PATHWAYS ARE FOR ILLUSTRATIVE PURPOSES ONLY. PLEASE REFER TO HYDRO SITE PLANS FOR ADDITIONAL INFORMATION.

DRAWING LEGEND

- HYDRO OTTAWA UNDERGROUND DUCT
- BREAK LINE
- MH MANHOLE
- # x # MANHOLE CELL STRUCTURE CONFIGURATION

Contractor to verify all dimensions & conditions on site and immediately notify the engineer of all discrepancies.

L'entrepreneur doit vérifier toutes les dimensions et conditions sur le site et aviser immédiatement le représentant du ministère de toute divergence.

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C drawing no. / dessin no.

project | projet

TUNNEY'S PASTURE

REDEVELOPMENT PHASE II - IT/TELECOMMUNICATIONS DRAWINGS SET

drawing | dessin

HYDRO OTTAWA UNDERGROUND DUCT INFRASTRUCTURE

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Drawing no.	T-301	No. du dessin

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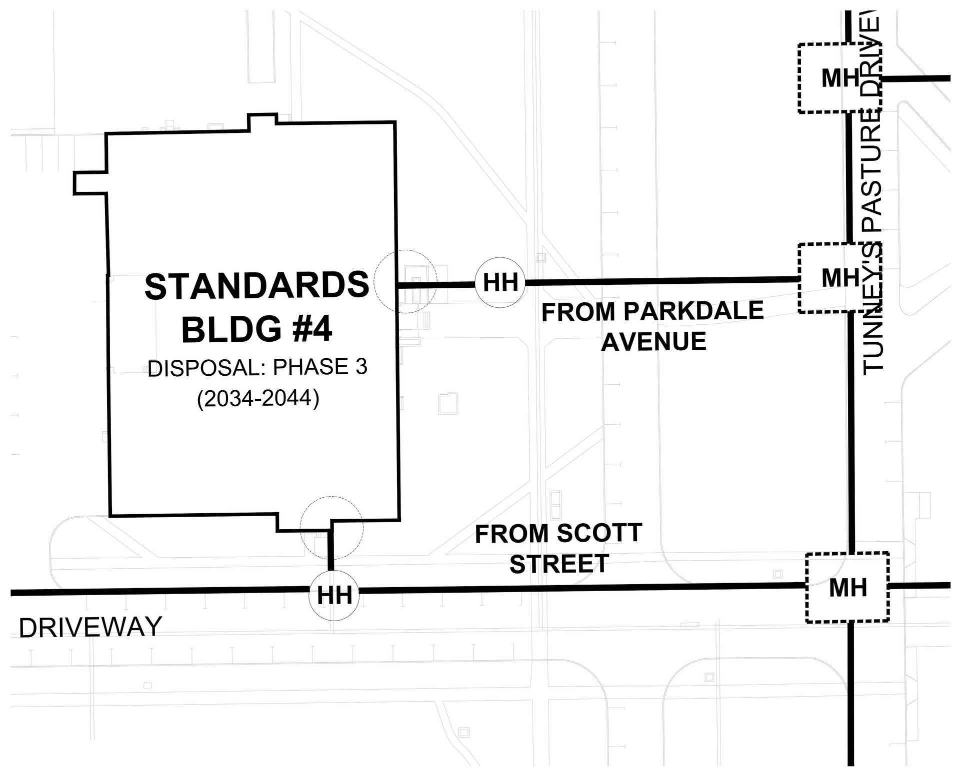
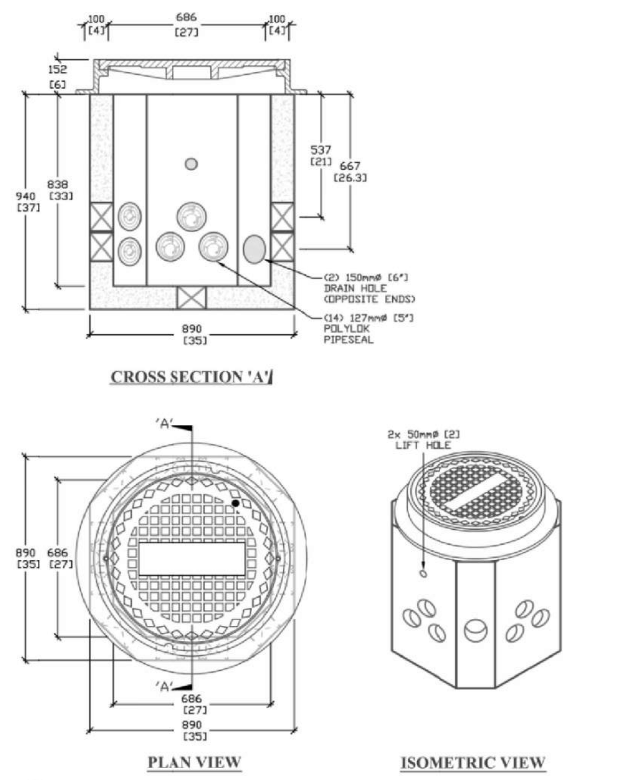
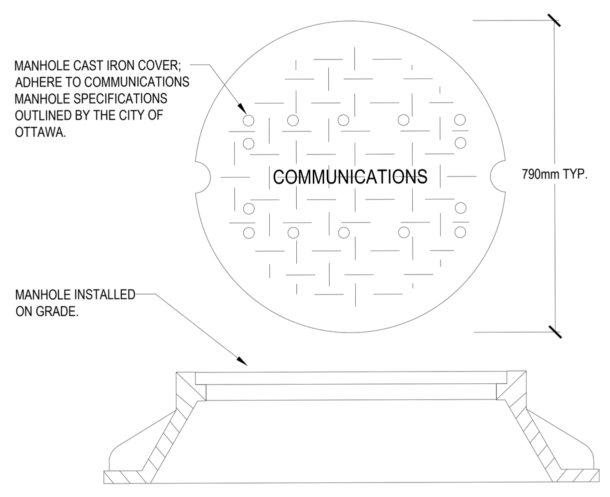


01 T-401 REDUNDANT ENTRANCE DETAIL TYP.
NTS



02 T-401 HANDHOLE DETAIL TYP.
NTS



03 T-401 MANHOLE COVER DETAIL TYP.
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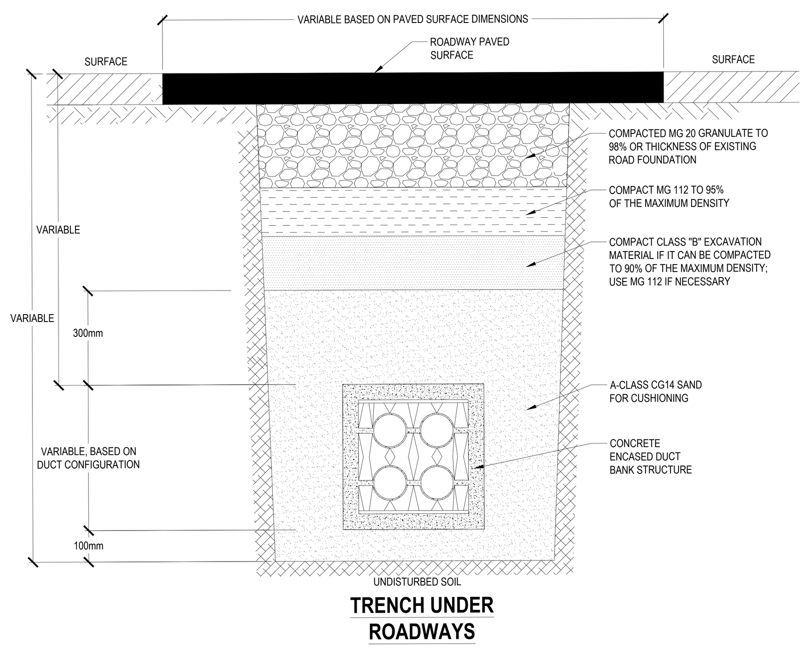

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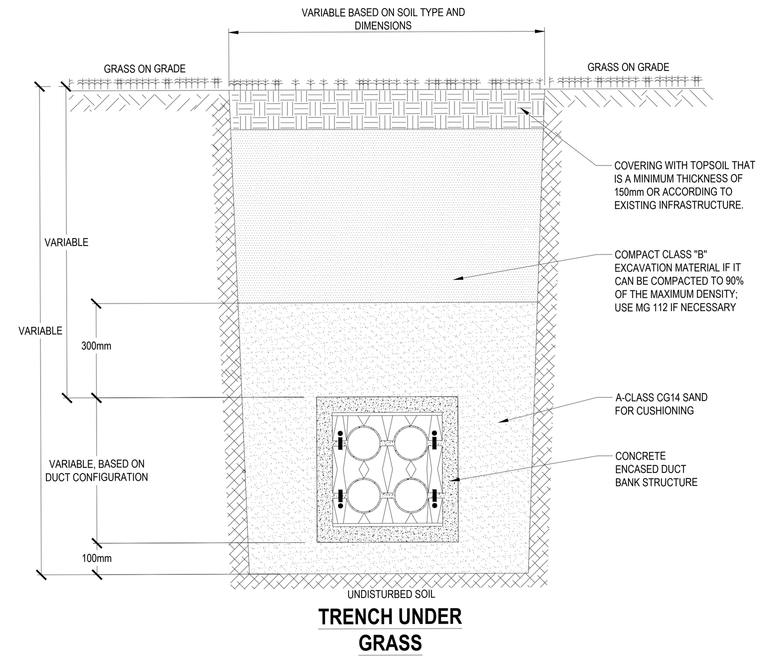
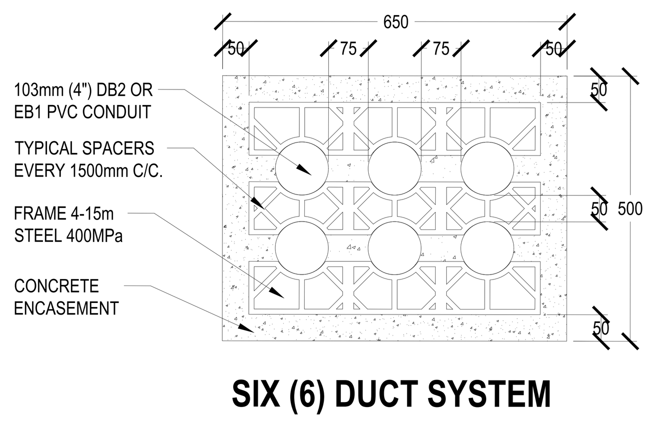
NTS



05 T-401 UNDERGROUND TRENCHING (GRASS) TYP.
NTS



06 T-401 DUCT BANK STRUCTURE (SIX (6) DUCTS) TYP.
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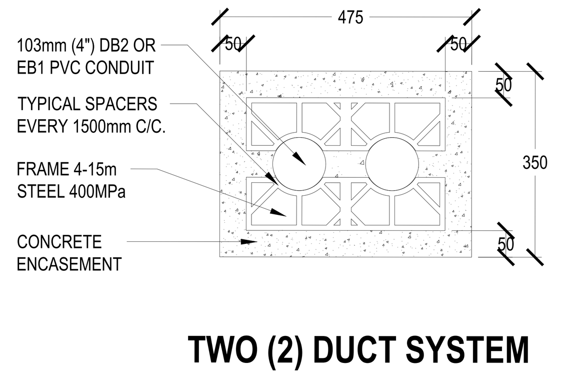

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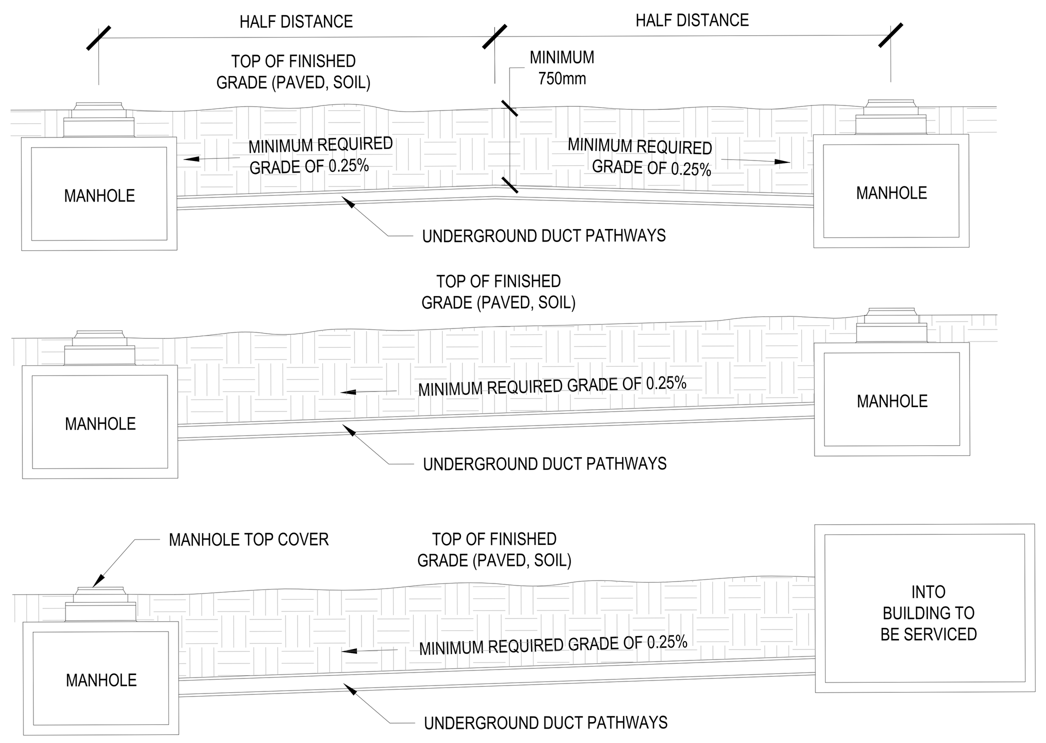
NTS



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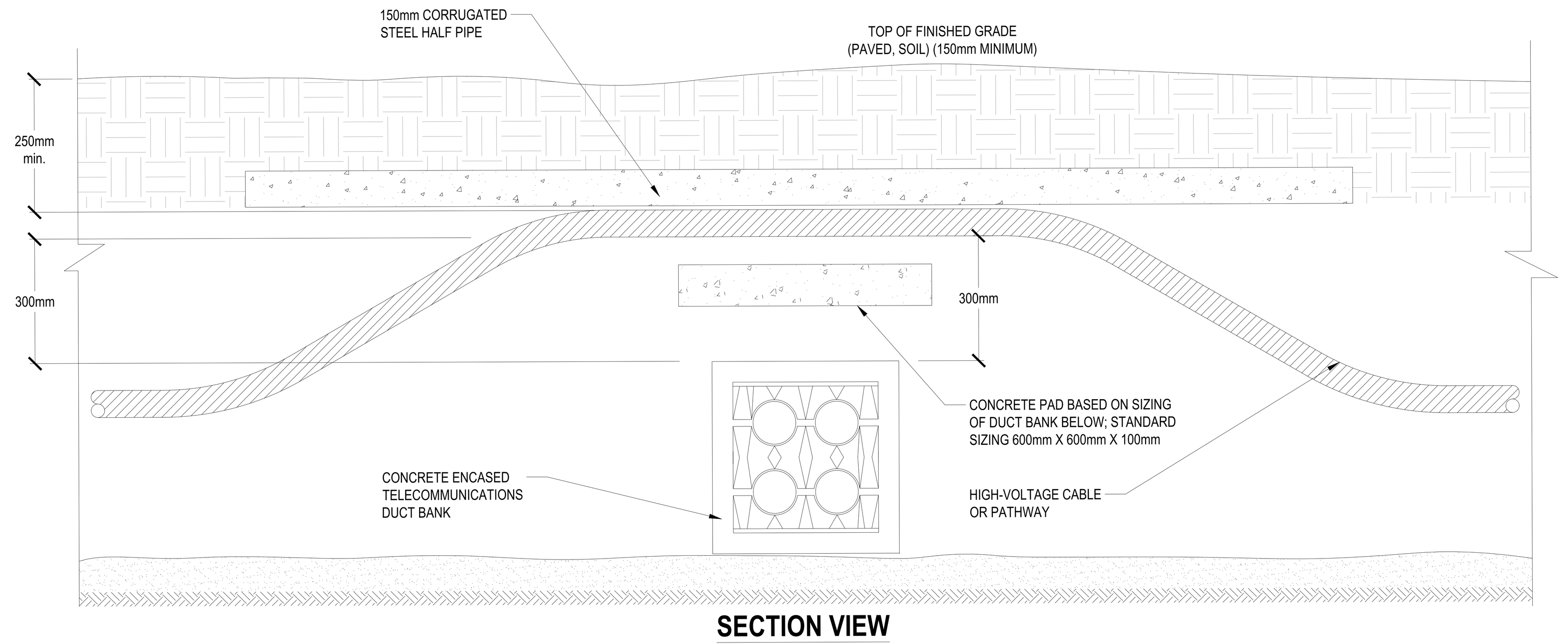

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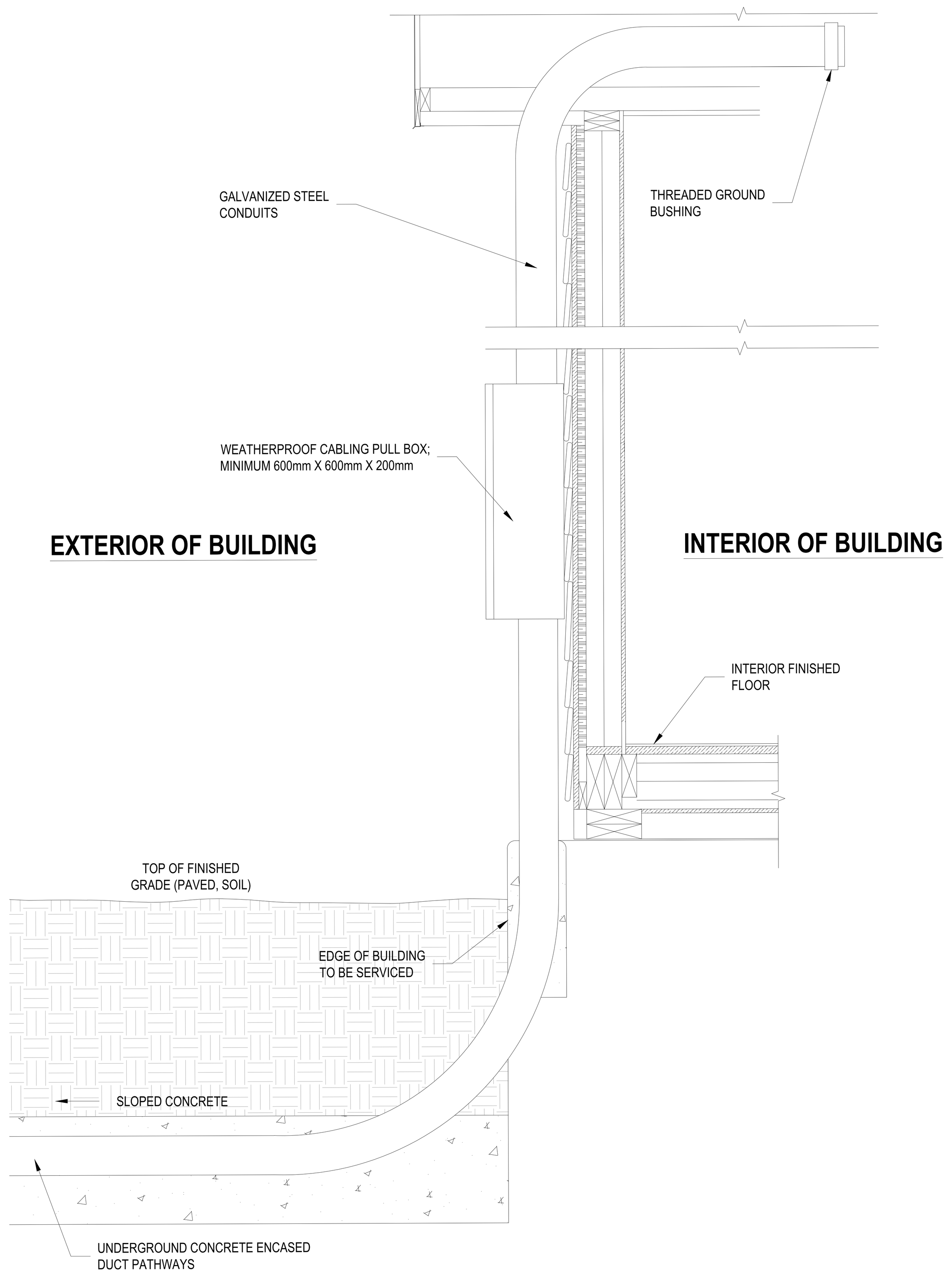
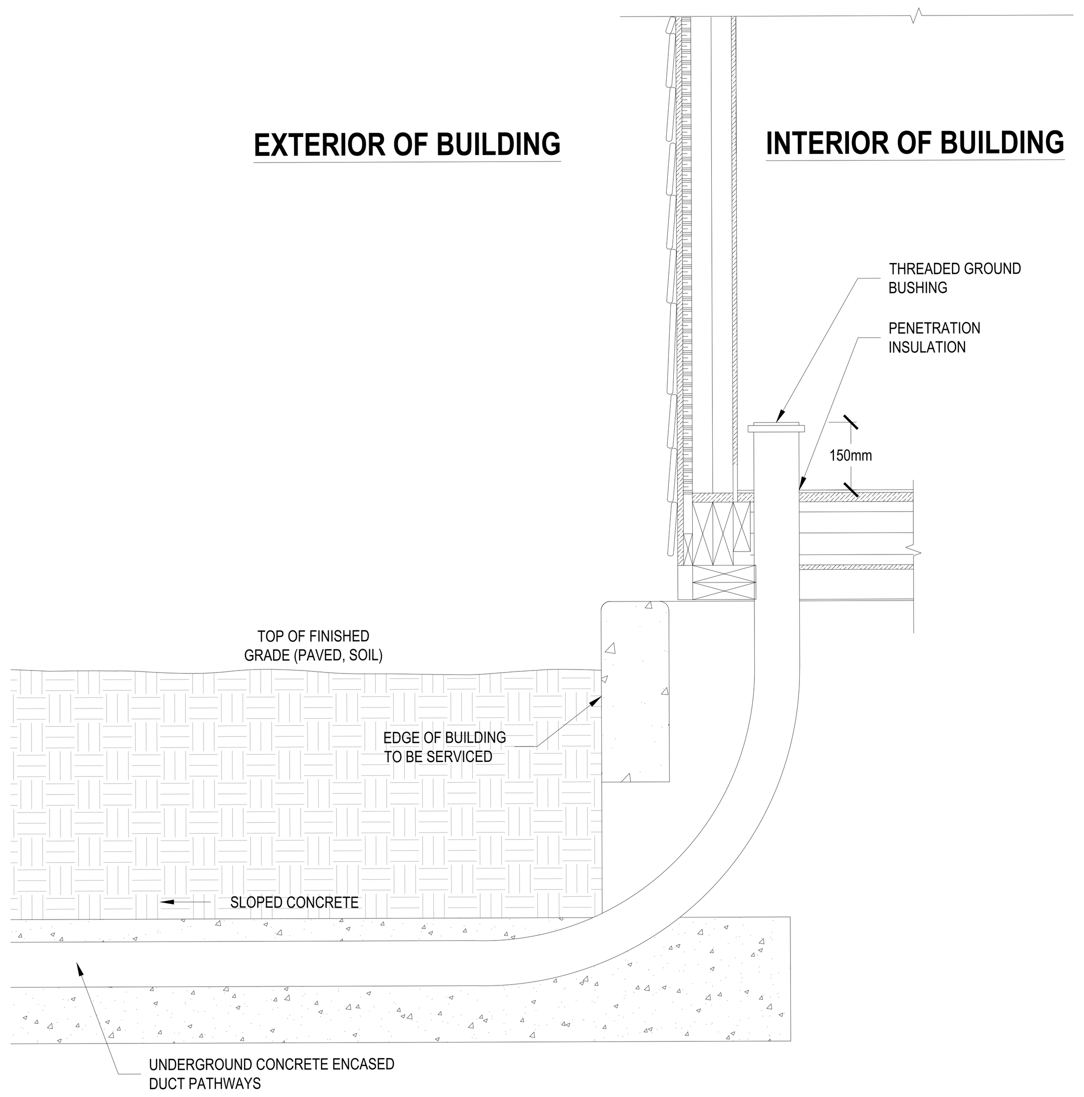


10 T-401 EXTERIOR DUCT INTO BUILDING (BUILDING SURFACE OPTION) TYP.
NTS



11 T-401 EXTERIOR DUCT INTO BUILDING (UNDERGROUND OPTION) TYP.
NTS

CITY OF OTTAWA TELECOMMUNICATIONS MANHOLE / HANDHOLE STANDARDS

THE CITY DOESN'T PUBLISH A "ONE NUMBER FITS ALL" RULE. INSTEAD, IT DRAWS FROM OPSS/OPSD STANDARDS AND THE CITY'S OWN MUNICIPAL CONSENT (MC) UTILITY COORDINATION PRACTICE. PLEASE SEE BELOW:

TYPICAL SPACING

1) STRAIGHT RUNS: APPROXIMATELY 80M IS THE CITY'S STANDARD PRACTICE FOR TELECOMMUNICATIONS DUCT BANKS IN NEW SUBDIVISIONS AND CORRIDORS. THIS ALIGNS WITH WHAT CARRIERS (BELL, ROGERS, ZAYO, ETC.) ACCEPT FOR PULLING CABLE.
2) MAXIMUM PULLS: MOST CARRIERS WON'T EXCEED 120M WITHOUT A STRUCTURE; 60M–80M IS PREFERRED IN DENSE URBAN AREAS.

REQUIRED LOCATIONS

1) AT CHANGES IN DIRECTION (HORIZONTAL OR VERTICAL).
2) AT INTERSECTIONS OR CROSSINGS (ROADS, RAIL, WATER, ETC.).
3) AT SPLICE POINTS OR CABLE BREAKOUTS.
4) AT BUILDING ENTRANCES (SERVING AS TRANSITION FROM ROW TO PRIVATE PROPERTY).
5) AT GRADE CHANGES STEEP ENOUGH TO MAKE PULLING DIFFICULT.

STRUCTURE TYPES

1) HANDHOLES (SMALL BOXES): USED FOR STRAIGHT PULLS AND DROP POINTS.
2) MANHOLES (VAULTS): REQUIRED WHERE SPLICING, LARGE CABLE COUNTS, OR MULTIPLE DUCT BANKS CONVERGE.

CITY PRECEDENT

1) OTTAWA'S FIBER CORRIDOR BUILDS (E.G. ALONG LRT) TYPICALLY USED 100mm PVC DUCTS WITH HANDHOLES EVERY 80M, UPSIZED TO MANHOLES AT INTERSECTIONS OR MAJOR SPLICE POINTS.
2) MC DRAWINGS SUBMITTED TODAY MUST SHOW THAT STRUCTURES ARE SPACED TO ALLOW PULLING AND MAINTENANCE ACCESS — REVIEWERS LOOK FOR APPROXIMATELY 80M SPACING AND BOXES AT ALL TURNS.

RULE OF THUMB FOR DESIGN IN OTTAWA

PLAN ONE STRUCTURE EVERY 80M, PLUS ONE AT EVERY TURN, INTERSECTION, OR ENTRANCE. USE HANDHOLES WHERE POSSIBLE, AND FULL MANHOLES/VAULTS WHERE CABLES WILL SPLICE, MULTIPLE DUCTS CONVERGE, OR HEAVY TRAFFIC LOADING IS EXPECTED.

CITY OF OTTAWA TELECOMMUNICATIONS DUCT STANDARDS

MATERIALS

1) CONDUIT: PVC DB2/ES2 (CSA C22.2 NO.211.1) OR RTRC, HEAVY WALL FOR DUCTS ≥100mm.
2) SIZE: 100mm (4") STANDARD TELECOM DUCT; LARGER SIZES BY CARRIER REQUEST.
3) SPACERS: PLASTIC, PLACED ≤1.5M APART; MAINTAIN DUCT SEPARATION & ALIGNMENT.
4) SLOPE: PROVIDE MIN 400H:1V SLOPE TOWARD STRUCTURES.
5) MANDREL & ROPE: MANDREL TEST ALL DUCTS; LEAVE PULL ROPE IN EACH.
6) MARKING: INSTALL ORANGE WARNING TAPE ≥300 MM ABOVE DUCT BANK.

DUCT BANK CONSTRUCTION

1) INSTALL WITH MINIMUM COVER DEPTH PER OPSS 603 AND CITY STANDARDS.
2) EXTEND ROAD CROSSINGS MIN 1.0 M BEYOND CURB LINE.
3) STAGGER CONDUIT COUPLINGS IN BANK.
4) CONCRETE ENCASEMENT AS DIRECTED (E.G. UNDER ROADS, CRITICAL CROSSINGS).
5) BACKFILL, COMPACTION & SURFACE RESTORATION PER CITY STANDARD TENDER DOCUMENTS.

HANDHOLES & CHAMBERS

1) PRECAST PER OPSD 2111/2112.
2) SPACING APPROXIMATELY EVERY **80M** OR AT ALL CHANGES OF DIRECTION.
3) ADDITIONAL HANDHOLES AT BUILDING ENTRANCES, INTERSECTIONS, OR SPLICES.
4) CHAMBERS SIZED FOR EXPECTED CABLE COUNT AND JOINTING NEEDS.

CLEARANCES (PER CITY UTILITY COORDINATION COMMITTEE, 2024)

1) BELL: 1.0M VERTICAL & HORIZONTAL PREFERRED.
2) ROGERS: 0.3M VERTICAL, 1.0M HORIZONTAL PREFERRED.
3) TELUS: APPROXIMATELY 1.0M BY DIRECTIONAL DRILL, 0.6M HORIZONTAL BY HYDROVAC.
3) CITY TRAFFIC / STREETLIGHT DUCTS: 0.3M VERTICAL, 1.0M HORIZONTAL.
4) ENSURE TO COORDINATE WITH ALL UTILITY OWNERS; VARIANCES REQUIRE WRITTEN APPROVAL.

JOINT USE TRENCHES

1) REFERENCE HYDRO OTTAWA UDS0014 (4-PARTY TRENCH) FOR SUBDIVISION & CORRIDOR SHARING.
2) MAINTAIN SEPARATION FROM HYDRO PRIMARY AS SPECIFIED.

PERMITS & APPROVALS

1) MUNICIPAL CONSENT (MC): REQUIRED BEFORE CONSTRUCTION DRAWINGS APPROVED. INCLUDE COVER LETTER & DRAWINGS SHOWING CLEARANCES AND STANDARDS (AS OF JUNE 16, 2025).
2) ROAD CUT PERMIT: REQUIRED FOR ALL CONSTRUCTION IN ROW.
3) FOLLOW CITY'S "STANDARD TENDER DOCUMENTS" & OPSS/OPSD REQUIREMENTS.

Canada

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client | client

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GENERAL DRAWING NOTES

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project | projet

TUNNEY'S PASTURE

REDEVELOPMENT PHASE II - IT/TELECOMMUNICATIONS DRAWINGS SET

drawing | dessin

GENERAL DETAILS

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Date	2025-09-10	(yyyy/mm/dd)
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Project no.	PROJ05969	No. du projet
Drawing no.	T-401	No. du dessin

ARCADIS

Prepared for:

Arcadis

TUNNEY'S PASTURE:
LOW IMPACT DEVELOPMENT DESIGN MEMO

Design Brief prepared by:

Aquafor Beech Limited

December 2025

5405 Eglinton Ave W, Suite 106

Toronto, ON, M9C 5K6

Reference #: 67074

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Appendix A: LID Right of Way Cross Section Concept Drawings

1 Project Introduction

In 2021, Public Service and Procurement Canada (PSPC) partnered with CLC under a collaboration project to leverage the strengths of each organization to deliver the long-term vision of Tunney's Pasture that includes the site's transition from a federal employment centre into a mixed-use, sustainable, transit-oriented community. CLC is a self-financing federal Crown corporation specializing in real estate and development with a mandate to transform former Government of Canada properties and reintegrates them into local communities while ensuring their long-term goals. Since the launch of this collaboration project, CLC has been committed to working with the community to define amendments to the TPMP and proposed upgrades to the existing roadway and servicing infrastructure that support both federal priorities and future development.

Aquafor Beech Limited (Aquafor) was retained by Arcadis on behalf of Canada Lands Company (CLC) and Public Service and Procurement Canada (PSPC) to complete Low Impact Development (LID) stormwater management designs for the development at Tunney's Pasture federal government campus and the adjacent road network. The LID designs will support a Draft Plan of Subdivision application to the City of Ottawa for the proposed Right of Ways (ROW) realignments, which will be the basis for redevelopment of property parcels within the campus. The designs will also serve as an integral part of the site's ability to achieve the water balance, quality, and quantity control targets in accordance with the City of Ottawa Low Impact Development (LID) Technical Guidance Report (February, 2021), the Tunney's Pasture Master Plan (September, 2014) and Tunney's Pasture Redevelopment Project Sustainability Charter (2018).

The Tunney's Pasture Re-Development project encompasses a 49-hectare federally-owned government workplace campus primarily constructed in the 1950s and 60s. The campus is located in Ottawa, Ontario, approximately 4km west of Parliament Hill, and is bounded by the Ottawa River to the north, Laroch Park to the east, Wellington West/Hintonburg to the south and Champlain Park to the west. The Tunney's Pasture Master Plan (September, 2014) detailed plans for the re-development of the site to a sustainable, transit-oriented, mixed-use community and federal employment node over the next 25 years, including transfer of the Municipal Right of Ways to the City of Ottawa. Operation and maintenance responsibilities for the Municipal Right of Ways shall also be transferred to the City.

The purpose of this memo is to summarize the design development process including design objectives, background review, site investigations and the presentation of conceptual LID designs. The proposed LID features will contribute to the achievement of the design objectives listed in **Section 3** and advancing the work to mitigate the impacts of increased runoff and stormwater pollution, while increasing climate adaption and resiliency.

2 Objectives of LID Implementation

Stormwater Management through LID involves treating runoff at the source and as a resource to be managed and protected. The emphasis in managing runoff at the project site will be to retain/maintain the existing infiltration of water into the ground by managing runoff through lot level (source) and conveyance (street level) LID measures using what is referred to by the Ministry of the Environment (MOE) as a "treatment train" approach to stormwater management.

The Draft Low Impact Development Stormwater Management Guidance Manual (MECP, 2022) recommends the use of lot-level controls followed by traditional end-of-pipe controls in a "treatment train" approach for maximum water quality, balance, quantity and erosion control benefits. To strengthen protection and sustainability, an increased emphasis on maintaining the natural hydrologic cycle to the greatest extent possible is required. In order to achieve this, a Runoff Volume Control Target (RVCT) is provided as a performance target in this guidance manual. A hierarchical approach is outlined within the guidance manual that stipulates prioritization of retention through infiltration, reuse and evapotranspiration, filtration through low impact development technologies, and finally conventional treatment via end-of-pipe SWM infrastructure.

Consistent with this hierarchical approach, LID measures will be implemented on individual property parcels and combined with LID measures within the ROWs to create sustainable stormwater management features that are integrated into the fabric of the re-development project. Sustainability from a Low Impact Development context in stormwater management relates to the integration of natural, renewable, and/or recyclable materials into the proposed stormwater management system of new or re-development areas with the objective of preserving or mimicking the natural hydrological cycle and water balance. These materials are used to create stormwater management features, placed upstream near the source of the urban stormwater runoff that encourage infiltration, evapotranspiration, and uptake by vegetation. From a resource sustainability perspective, LID systems improve capture and natural use of urban rainfall runoff in comparison to traditional grey infrastructure, thus promoting sustainable use. The proposed LID measures will encourage infiltration where site conditions allow, encourage evapotranspiration, improve water quality, and reduce the quantity of runoff reaching local drainage features. They will also allow the development to better manage the increased frequency of high intensity storm events associated with climate change and re-introduce natural hydrological and ecological processes that have the capacity to withstand and recover from the pressures of heatwave, drought and flood events. Many opportunities exist to implement varying types of LIDs within the project area, which are detailed further in this memo.

LID implementation, including design and selection of building materials for construction of the infrastructure, will be completed in adherence to the overarching goals of the Greening Government Strategy (Treasury Board of Canada Secretariat, June 2024). As part of the government real property portfolio strategies, the design and implementation of LID features on site will comply with the Buy Clean: Low-Carbon Construction objectives. The objectives generally relate to reducing embodied carbon of major construction projects, completing life-cycle assessments of construction materials, and minimizing use of harmful materials in construction such as volatile organic compounds.

Additional objectives of the site design approach were identified within the Technical Reference for Office Building Design (PSPC, 2017) and include the following relevant LID and sustainability focused urban design technical requirements:

1. Reduce impervious elements by designing with natural landscaping materials.
2. Parking areas and circulation routes must maximize sustainable best practices and reduce impacts on natural stormwater environment.
3. Where sustainable best practices are adopted, consider the use of green infrastructure; the reducing, recycling, and reusing of materials; and other sustainable practices and strategies.
4. Design and construction must protect and conserve water. Designed using native plants to limit maintenance and promote biodiversity

3 Background Information

A review of existing site conditions, policies, and relevant design standards was completed to support the development of the LID features. The following subsections outline relevant information from both review exercises.

3.1 Relevant Design Standards

The following design standards were referenced in the design development process for the proposed LID features:

1. City of Ottawa Sewer Design Guidelines (Second Edition, October 2012)
2. Stormwater Management Planning and Design Manual (Ministry of Environment, Conservation, and Parks, March 2003)
3. Low Impact Development Stormwater Management Guide (TRCA/CVC, 2010)
4. Draft - Consolidated Linear Infrastructure: Environmental Compliance Approval, Appendix A. in C. a. Ministry of the Environment (Ministry of Environment, Conservation, and Parks, March 2022)
5. Road Corridor Planning & Design Guidelines: Urban Village & Collectors – Rural Arterials & Collectors (City of Ottawa, 2008)
6. City of Ottawa Official Plan (City of Ottawa, 2022)
7. Technical Reference for Office Building Design (Public Services and Procurement Canada, 2017)
8. Tunney's Pasture Sustainability Charter (Public Services and Procurement Canada (prepared by Urban Equation), 2018)
9. Tunney's Pasture Redevelopment Project Sustainability Charter - Summary of Recommended Changes (PSPC (prepared by MCW Consultants Ltd.), February 2023)

3.2 Relevant City of Ottawa Policies

3.2.1 City of Ottawa Infrastructure Master Plan (September 2024)

One of the priority recommendations to improve Ottawa's stormwater infrastructure resiliency is to promote the implementation of LID practices to assist with maintaining the existing level of service during more frequent storm events. As detailed in the Infrastructure Master Plan, LID requirements were included in the City's Stormwater Retrofit Program as a result of the Ottawa River Action Plan. The City's Consolidated Linear Infrastructure Environmental Compliance Approval (CLI-ECA) also includes stormwater system performance criteria requirements from the MECP, including the ability to establish area-specific runoff volume control targets through subwatershed level studies. Since there is no subwatershed study or environmental management plan, the runoff volume control target and SWM criteria is to be defined subject to MECP CLI ECA approvals.

3.2.2 CLI-ECA 008-S701

Water balance, water quality, erosion control, water quantity, and flood control stormwater management criteria are detailed in Appendix A of the City's CLI-ECA. Per the City's Infrastructure Plan, the stormwater management at Tunney's Pasture must follow the criteria outlined in the CLI-ECA. The specific requirements are outlined in **Table 4-1** of **Section 4**.

3.2.3 City of Ottawa Low Impact Development Technical Guidance Report (February 2021)

This Technical Report provides guidance on the implementation of LIDs in areas with potential hydrogeological constraints, as found at the Tunney's Pasture Site. As displayed in the mapping within this

Guidance Report and confirmed by the geotechnical investigation completed by Paterson Group, this site has shallow bedrock. Therefore, LIDs proposed for this site will utilize filtration as the main control mechanism, rather than infiltration.

3.2.4 Technical Bulletin IWSTB-2024-04

This Technical Bulletin published by the City of Ottawa provides an interim policy guidance document on new development for the feasibility of infiltration-type LIDs in greenfield scenarios. As this project is a retrofit to an existing developed area that is being modified, greenfield development guidelines as discussed in this Bulletin do not apply. Additionally, as discussed above the proposed LIDs for this site will focus on filtration rather than infiltration.

3.3 Relevant Site Studies

The following sub sections outline the relevant site studies that were referenced in support of LID design for the Right of Way regions of the Tunney's Pasture site.

3.3.1 Geotechnical Investigation

In support of detailed design, Paterson Group was retained by Arcadis Group to complete a geological investigation at the project site. The goals of the investigation were to determine the subsoil and groundwater conditions, and provide geotechnical recommendations for the design of proposed roadway and site servicing works, including construction considerations which may affect the design. This investigation was conducted between April 2, 2024 and April 5, 2024 which included the following components:

- Drilling of eighteen (18) boreholes to a maximum depth of 11.9m below ground surface (m bgs);
- Installation of ten (10) monitoring wells and groundwater level monitoring.
- Collection of soil samples from auger flights or split spoon sampler for analytical testing, and coring of bedrock to assess bedrock quality;
- Slug testing (falling and rising head testing) at six (6) groundwater monitoring well locations to establish estimated hydraulic conductivity of underlying bedrock; and
- Analytical testing of one soil sample for sulphate, chloride, resistivity and pH to assess corrosion potential for ferrous metals and potential for sulphate attacks against subsurface concrete structures.

Findings from the geotechnical investigations show the following:

- Subsurface profile was found to generally consist of fill material with an approximate thickness of 0.5 m to over 4.0 m overlaying bedrock surface or glacial till deposit consisting of silty sand with trace clay, gravel, cobbles and boulders.
- Bedrock across the majority of the site consists of limestone or limestone with dolomite interbedding and shale partings in some locations. Bedrock surface elevations range from 56 m to 64m across the site. Bedrock depths on site range from approximately 0.5m to over 2m below ground surface, with an approximate average depth of 1 m throughout the ROW.
- Water levels were measured at a minimum of 1.98 m bgs (58.77 masl) and maximum of 6.85 m bgs (56.53 masl) on April 23, 2024. Anticipated long-term groundwater table is located within the upper 3 m of the bedrock surface, fluctuating with the depth of bedrock across the site.
- Hydraulic conductivity values of the bedrock formation range from 1.46×10^{-7} m/s to 4.61×10^{-5} m/s.

Recommendations and conclusions drawn from these findings from an LID feature design perspective included:

- Conventional infiltration-based LID measures are not generally considered suitable due to shallow depth and relative impermeability of bedrock across the site. While small amounts of groundwater recharge and discharge may occur, conditions are overall not suitable for recharge and discharge on a large scale. As such, partial infiltration-based LIDs are proposed and are anticipated to utilize filtration as the main control mechanism.
- Hydrostatic pressures and groundwater influx is not expected to impact service design due to low permeability of the bedrock.
- Effective control of ground water and surface water during construction is considered essential to maintaining the integrity of the bearing strata as well as maintaining the stability of excavation side slopes.
- The subgrade soils are considered to be frost susceptible, therefore care and adequate protection during winter construction will be required. 2.2 m of soil cover is recommended for protection of watermain services, and 1.8 m for storm and sanitary sewer services.
- All side slopes in overburden materials should be cut back at 1H:1V or shallower to maintain stability, or trench boxes should be used where this is not suitable.
- Bedrock stabilization measures may be required within trenches where weathered bedrock or seams/joints are observed.

3.3.2 Existing Conditions Memo

Arcadis IBI Group was retained by Canada Lands Company (CLC) and Public Service and Procurement Canada (PSPC) to complete an Existing Conditions Report (December, 2022) reviewing existing municipal infrastructure within the Tunney's Pasture federal government campus and the adjacent road network. This review of existing conditions and summary of key background information formed part of the Scoping component for the Master Servicing Study in support of a Draft Plan of Subdivision application to for the conveyance of the municipal services within newly created Right of Ways (ROW) to the City of Ottawa, and to inform the Infrastructure Upgrade and Divestiture Strategy Report. The report included a review of water network, sanitary, and stormwater infrastructure, assessing existing infrastructure as well as anticipated works, and also reviewed high level utilities (hydro, natural gas and telecommunications). Stormwater management design-related findings from the report included the following:

- **Sanitary Infrastructure:** Sanitary sewers will need to be realigned to suit the proposed ROW alignment, and some sewers need to be extended to service parcels without fronting sewers. Various sanitary sewers may also need to be removed and replaced to suit municipality approved cross sections. LID feature layouts shall adhere to City of Ottawa horizontal vertical clearances and consider locations of realigned sanitary sewers at the detailed design stage.
- **Water Network Infrastructure:** The on-campus distribution network is generally adequate in capacity, but will require relocation and extension at various locations to suit the incorporation of municipal ROWs. LID feature layouts shall adhere to City of Ottawa horizontal vertical clearances and consider locations of realigned water mains at the detailed design stage.
- **Stormwater Infrastructure:** While there is not a history of concerns regarding surface ponding during rainfall events, the Infrastructure Overview indicated that most of the local sewers do not have sufficient capacity to meet current City of Ottawa design guidelines. Many segments of existing storm sewer will need to be realigned to suit the proposed ROW cross section or extended where none currently exist to service fronting buildings.

- **Hydro Ottawa:** Hydro Ottawa has advised the existing Hydro Ottawa distribution system in the vicinity of the Tunney's Pasture Campus has ample spare capacity to accommodate the redevelopment of the Campus. Proximity of hydro infrastructure to the proposed LID features will be reviewed at the detailed design stage.
- **Natural Gas:** Once the new Municipal ROW network has been finalized, a review of the underground natural gas network will be undertaken and if required, relocations coordinated with Enbridge Gas. Proximity of the current and realigned gas mains to the proposed LID features will be reviewed at the detailed design state.
- **Telecommunications:** All existing telecommunications services will be relocated to the new Municipal ROW network for ease of maintenance. Proximity of telecommunications infrastructure to the proposed LID features will be reviewed at the detailed design stage.

3.3.3 Topographic Survey

Existing topographic survey data was provided to Aquafor via Arcadis as part of the background data gathered for the site. This existing condition topographic survey was referenced as a general outline of future Right of Way corridor grading when determining drainage patterns to all proposed LID locations.

3.3.1 LID Constraints Memo

Aquafor completed an LID Site Servicing Constraints Memorandum in 2023 to identify site servicing constraints associated with implementing LIDs in the project area, as well as overall design requirements. Selection of LID features and function within this memo are developed in conjunction with the findings of this memo. A summary of key findings is provided under **Section 5.1** of this memo.

4 Applicable Stormwater Management Criteria

Table 4-1 below outlines the applicable stormwater management criteria for the site, including LID/green infrastructure design.

Table 4-1: Summary of Applicable Stormwater Management Criteria

Criteria	Sustainability Charter (Tunney's Pasture, 2018)	City of Ottawa	Rideau Valley Conservation Authority	MECP Stormwater Management and Planning Design Manual (2003)	MECP Draft 2022 & CLI ECA Appendix A (MECP, 2022)	Federal (PSPC, 2017)	Applicable Criteria
Flooding / Volume Control	n/a – see Water Balance criteria	Site discharge controlled to pre-development rates Build resilience to flood risks and stormwater runoff by: - Restricting development in flood plains and mitigating risks in areas vulnerable to flooding under future climate conditions - Implementing SWM practices and infrastructure that is resilient to future climate conditions - Using LID SWM features where feasible to manage smaller rainfall events (City of Ottawa, 2022) Site- level measures should be used to reduce and control volume and rate of runoff Assess impact of 100-year event outlined in the City's Sewer Design Guidelines (2012) with a 20% increase of rainfall intensity for climate change sensitivity. Maximum depth of flow under static or dynamic conditions less than 0.3m. Provide adequate emergency overflow conveyance off-site. For further storm sewer design, refer to City of Ottawa (2012)	n/a	Peak flows must not exceed pre development values for 2–100 year return period storms. Ensure that there will not be any increase in flood damage potential For specific control design guidance criteria see MECP (2003)	Development Manage peak flow control as per watershed/subwatershed plans. Municipal criteria of a minimum 100-year return storm, other plans (Master SWM Plan, Class EA, etc.,) as appropriate. Retrofit: If 'development' approach not feasible, improve level of flood control currently provided to Maximum Extent Possible based on environmental site feasibility studies. Regulate water quantity as per municipal standards, Master Stormwater Management Plan, or Class EA e.t.c., as appropriate for the project End-of-pipe control is 3rd priority.	See infiltration section: All surface runoff must be addressed on site ("Addressed" assumed to mean control) Site planning must include strategy to minimize volume of stormwater and snowmelt runoff going into municipal systems based on historical ecosystem conditions of the region. Gravity-based system must have as a minimum: • Pipe flow velocity 0.6 m/s to 3 m/s under full flow conditions • Optimization of on-site water detention • The following SWM components: ○ 200 mm minimum diameter catch basin leads ○ 1200 mm diameter maintenance holes ○ Sumps in maintenance holes and catch basins ○ Safety platforms in maintenance holes >5m deep. Major drainage system must be designed to address 1:100 year storm event • Where a minor drainage system is required, must address 1:5 year storm event	(City of Ottawa) Site discharge controlled to pre-development rates **OR** *Discharge rate set by city based on existing system capacity limits (TBD)* Assess impact of 100-year event outlined in the City's Sewer Design Guidelines (2012) with a 20% increase of rainfall intensity for climate change sensitivity. **Road ROIW:** Major/ Minor system design. (MECP, 2022) Development Manage peak flow control as per watershed/subwatershed plans. Municipal criteria of a minimum 100-year return storm, other plans (Master SWM Plan, Class EA, etc.,) as appropriate. *City to confirm if watershed/ subwatershed study exists Retrofit: If 'development' approach not feasible, improve level of flood control currently provided to Maximum Extent Possible based on environmental site feasibility studies. Regulate water quantity as per municipal standards, Master Stormwater Management Plan, or Class EA etc., as appropriate for the project (PSPC, 2017) Where a minor drainage system is required, must address ("addressed" assumed to mean control) 1:5 year storm event

Criteria	Sustainability Charter (Tunney's Pasture, 2018)	City of Ottawa	Rideau Valley Conservation Authority	MECP Stormwater Management and Planning Design Manual (2003)	MECP Draft 2022 & CLI ECA Appendix A (MECP, 2022)	Federal (PSPC, 2017)	Applicable Criteria
Water Quality	Best Management Practices must be capable of removing 80% average annual post-dev TSS load via capture of 95th percentile of regional or local rainfall events runoff managed on site using LID and green infrastructure	Reference not found, assumed 80% TSS removal required. City to confirm.	n/a	End of pipe facility (w/ 24hr drawdown) removal dependant on the downstream aquatic habitat sensitivity, from most sensitive to least: *Enhanced Protection* - 80% removal of TSS *Normal Protection* - 70% removal of TSS *Basic Protection* - 60% removal of TSS See table 3.2 in MECP (2003) Bacteria: If no downstream recreational water activities (swimming), wet SWM facilities adequately control bacteria. If yes downstream swimming, additional considerations req'd. If development >= 10% of drainage area discharging to swimming area, undertake subwatershed plan. Temperature SWM facilities will always raise temperatures. Ways to reduce water temperature include: - Pond configuration, Riparian planting in the shoreline fringe, bottom draw outlet e.t.c., If temperature is a significant concern, consult with DFO and OMNR (nat. resources). Ensure that water quality will be protected	Development: Generally: • Characterize water quality to be protected and stormwater contaminants • Watershed/sub watershed plan to minimize or prevent contaminant loads Suspended Solids (SS): • Control 90th percentile storm event and, if conventional methods are necessary, aim for 80%/70%/60% S.S. removal. Retrofit: Improve level of water quality currently provided on site **AND** Follow 'development' criteria for SS **OR** design a treatment train to achieve 'development' criteria within 10 years **OR** Control as per 'Maximum Extent Possible'.	All surface runoff must be addressed on site ("Addressed" assumed to mean control) Site drainage plan include development of a strategy to improve water quality based on historical ecosystem conditions of the region. Minimize volume of stormwater and snowmelt going to municipal systems, improve water quality Control stormwater and sanitary sewage to meet discharge standards of authority having jurisdiction Proper drainage to eliminate standing water	(Tunney's Pasture, 2018) Best Management Practices must be capable of removing 80% average annual post-dev TSS load Runoff from 95th percentile (27mm event) of regional or local rainfall events runoff managed on-site using LID and green infrastructure, including **Road ROW**. (MECP, 2003) If water temperature is a significant concern, consult with DFO / OMNR Ensure that water quality will be protected Development: Generally: • Characterize water quality to be protected and stormwater contaminants • Watershed/sub watershed plan to minimize or prevent contaminant loads Retrofit: Improve level of water quality currently provided on site **AND** Follow 'development' criteria for SS **OR** design a treatment train to achieve 'development' criteria within 10 years **OR** Control as per 'Maximum Extent Possible'. (PSPC, 2017) All surface runoff must be addressed on-site ("Addressed" assumed to mean control) Minimize volume of stormwater and snowmelt going to municipal systems, improve water quality (MECP, 2022) The Runoff Volume Control Target (RVCt) hierarchy: 1. Priority 1 Retention – Infiltration, Re-use and Evapotranspiration 2. Priority 2 – LID Filtration 3. Priority 3 – Conventional Treatment Where management/ control of the 95th percentile isn't possible due to Site Restrictions (Constraints) using Priority 1 and Priority 2, achieve control to the Maximum Extent Possible (MEP).

Criteria	Sustainability Charter (Tunney's Pasture, 2018)	City of Ottawa	Rideau Valley Conservation Authority	MECP Stormwater Management and Planning Design Manual (2003)	MECP Draft 2022 & CLI ECA Appendix A (MECP, 2022)	Federal (PSPC, 2017)	Applicable Criteria
Erosion Control	n/a	Reference not found, assumed defer to MECP (2003). City to confirm.	n/a	Follow Detailed or Simple Erosion Design Plan as given by Section 3.4. Ensure that the watercourse will not undergo undesirable and costly geomorphic change	Follow erosion assessment in watershed/subwatershed plan OR Follow MECP (2003) detailed or simplified design approaches based on proponent preference or size of drainage area. In the absence of a study, detain at a minimum, runoff volume generated from 25mm event over 24 to 48 hours.	Plan and design must include strategy to control and minimize erosion, waterway sedimentation and airborne dust. Must conform to erosion and sediment requirements of provinces/municipalities. Mitigate risk of erosion of embankments/slope areas especially those that could impact riparian zones, waterways and stormwater retention ponds.	(Tunney's Pasture, 2018) Runoff from 95th percentile (27mm event) of regional or local rainfall events runoff managed on-site using LID and green infrastructure, including **Road ROW**. (MECP, 2022) Follow erosion assessment in watershed/subwatershed plan OR Follow MECP (2003) detailed or simplified design approaches based on proponent preference or size of drainage area. In the absence of a study, detain at a minimum, runoff volume generated from 25mm event over 24 to 48 hours.
Water Balance/ Infiltration Retention – Infiltration	95th percentile of regional or local rainfall events runoff managed on site using LID and green infrastructure	Use of dual drainage principle (City of Ottawa, 2012) Site discharge controlled to pre-development rates	n/a	Pre-development water balance should be maintained or restored via water balance on a site-by-site basis (modelling or calculation) Ensure that groundwater and baseflow characteristics are conserved Lot-level infiltration controls are also suggested such as: Reduced grading to allow ponding or directing roof leaders to rear yard ponding areas or cisterns (for more examples see p. 4-3 of MECP (2003))	New Development: • Complete assessment to control pre- and post- development water balance changes using site level strategies (see document) • Assessment study NOT completed: ○ Control recharge to meet pre development **OR** control runoff from 90th percentile event Retrofit Scenarios: • Complete assessment to control pre- and post- development water balance changes using site level strategies • Assessment study not completed: ○ Control recharge to meet pre development **OR** control runoff from 90th percentile event	Design of site drainage must minimize impacts of site grading strategies to municipal infrastructure among other items All surface runoff must be addressed on site ("Addressed" assumed to mean control) Storm drainage systems must rely on gravity flow wherever possible. Minimize volume.	The more stringent of: 1) (MECP, 2022) • Complete assessment to control pre- and post- development water balance changes using site level strategies (see document) OR 2) (Tunney's Pasture, 2018) • 95th percentile of regional or local rainfall events runoff managed on-site using LID and green infrastructure Retrofit Scenarios (MECP, 2022): • Complete assessment to control pre- and post- development water balance changes using site level strategies • Assessment study not completed: ○ Control recharge to meet pre development

Criteria	Sustainability Charter (Tunney's Pasture, 2018)	City of Ottawa	Rideau Valley Conservation Authority	MECP Stormwater Management and Planning Design Manual (2003)	MECP Draft 2022 & CLI ECA Appendix A (MECP, 2022)	Federal (PSPC, 2017)	Applicable Criteria
Retention - Water Re-use	Site-wide distribution system to utilize river water for toilets and irrigation. No potable water in flush toilets. No potable water irrigation Install Greywater reuse in all multi unit residential buildings more than six storeys in height.	Reference not found, assumed defer to MECP (2003). City to confirm.	n/a	Lot-level storage controls as a starting point for treatment train include methods such as: - Rooftop, parking lot, superpipe and rear yard All with the intention of detaining stormwater and reducing peak runoff rates.	LID Retention (with water re-use features) is a 1st priority control and must be utilized to the maximum extent possible before going to 2nd control	Integrated stormwater retention and detention system for the roof in order to reduce runoff and, where applicable, provide irrigation Eliminate use of potable water for irrigation and using where required grey water irrigation systems and plantings. e.g., rainwater harvesting strategy Provision of grey water irrigation to assist on-site vegetation growth.	(Tunney's Pasture, 2018) Site-wide distribution system to utilize river water* for toilets and irrigation. No potable water in flush toilets. No potable water irrigation **: to be amended to rainwater only* Install greywater reuse in all multi-unit residential buildings more than six storeys in height. (PSPC, 2017) Integrated stormwater retention and detention system for the roof in order to reduce runoff and, where applicable, provide irrigation Eliminate use of potable water for irrigation and using where required grey water irrigation systems and plantings e.g., rainwater harvesting strategy Provision of grey water irrigation to assist on-site vegetation growth
Retention - Evapotranspiration	n/a	Protect and enhance tree canopy and protect wetlands and other nature-based solutions by: - Protecting, enhancing and managing trees, shorelines wetlands and other natural areas - Considering and mitigating impacts of climate change on the environment - Managing risks of wildland fire. The City of Ottawa has a target of 40 percent urban canopy cover by 2050 (City of Ottawa, 2022)	n/a	Potential for increase in evapotranspiration based on lot-level control selection.	LID Retention (with evapotranspiration features) controls is a 1st priority control and must be utilized to the maximum extent possible before going to 2nd control	Planned with trees placed to provide shaded rest areas, reducing heat via canopy. Conservation and enhancement of natural areas and restoration of damaged areas. Two new trees reinstated for every tree removed.	(City of Ottawa, 2022) The City of Ottawa has a target of 40 percent urban canopy cover by 2050 (PSPC, 2017) Planned with trees placed to provide shaded rest areas, reducing heat via canopy. Conservation and enhancement of natural areas and restoration of damaged areas Two new trees reinstated for every tree removed

Notes:
n/a – relevant source document does not have information available

5 LID Feature Selection

5.1 CLI ECA Site Constraints

Site specific constraints within the project area relating to Appendix A, Table A-2 of the City of Ottawa CLI-ECA 008-S701 include the following:

- Item A: Shallow Bedrock, areas of blasted bedrock, and Karst:
  - Conventional LID measures that adopt infiltration of stored runoff into the underlying subsoils for groundwater recharge are generally not considered suitable for the subject site from a geotechnical perspective due to the shallow bedrock observed on site. Some techniques, such as catchbasins and amended topsoil finishes used in conjunction with soak-away pits, may be considered suitable due to the presence of impermeable bedrock. LID measures featuring filtration practices are generally considered to be feasible.
  - Aquafor has developed preliminary LID designs that utilize partial-infiltration and adopt runoff filtration as the primary mechanism to achieve the required water quality target of the site, as outlined in **Section 6** below. Infiltration of the captured runoff is anticipated to occur on a limited basis and will be value added.
- Item H: Existing municipal Rights of Way infrastructure where reconstruction is proposed and where surface and subsurface areas are not available based on a site-specific assessment completed by a QP.
  - Preliminary review of the proposed Right of Way alignments and existing infrastructure indicates opportunity for LID does exist through retrofit methods to accommodate existing and proposed surface and subsurface infrastructure.
  - Dense utility corridors identified as part of the background review may limit LID feasibility and implementation within the site rights-of-way over their full extents. Localized constraints may require use of alternative cross-sections, mitigation measure, additional infrastructure and/or alternative LID approaches (i.e. filtration vs. infiltration etc.).
  - Preliminary LID sizing provided in **Section 6.6** below includes a 50% reduction in available LID area as a conservative estimate to factor reduced footprint availability due to existing utilities, driveways, sidewalks, and other infrastructure that must be accommodated in the Right of Way.

5.2 Proposed LID Features

Low impact development comprises a set of naturalized design features that minimize runoff and distributed, small scale structural practices that mimic natural or predevelopment hydrology through processes such as infiltration, evapotranspiration, harvesting, filtration and detention of stormwater. The proposed LID practices for the Tunney's Pasture realigned ROW design are listed below.

1. **Permeable Pavements and Pavers** – Collective terms for a variety of surface treatments including pervious concrete, porous asphalt, permeable interlocking pavers, rubberized granular surfaces, and plastic or concrete grid systems. These systems contain pore spaces that allow stormwater to pass through into a stone base for treatment. Emission impacts and embodied carbon have not been quantified as part of this LID assessment. At the detailed design stage, embodied carbon and emissions impacts will be considered when looking to select the preferred permeable surface typology (permeable unit pavers/permeable concrete/ permeable asphalt etc.). Climate Positive Design's Pathfinder Tool 3.0 will assist in this decision-making process. Per the tool, precast

permeable unit pavers have an embodied carbon value of 0.28 $kgCO_2e$ per kg, permeable concrete is 0.14 $kgCO_2e$ per kg while standard cast-in-place concrete is 0.236 $kgCO_2e$ per kg. The Pathfinder Tool will be utilized at the detailed design stage to inform material selection alongside other economic, environmental and urban design criteria.

2. **Dry Swale Filtration Facilities** – Designed to mimic the tributaries of the Ottawa River using a limestone creek bed typology at the surface that will meander through medians and boulevards, widening at bump out locations. Stormwater will be directed to the creek bed from road, sidewalk and cycle track surfaces via curb cuts and will drain from the surface into a subsurface filtration trench below. The filtration trench is composed of a rectangular trench lined with geotextile fabric and filled with a sand media to encourage filtration and cooling of runoff while omitting organic matter or mulch to discourage plant establishment and reduce operation and maintenance needs. The creek bed at the surface will be composed of limestone aggregate and boulders ranging in size and shape to mimic natural tributary form and aesthetic. Where these facilities intersect with key amenity nodes, plazas and parks, the creek bed can be hardened to activate these spaces by keep runoff at the surface. This can be accomplished by grouting joints between the stones or installing an impermeable liner between the limestone creek bed and filtration gallery in specific locations. At the downstream end of these ‘hardened’ zones, runoff will again be permitted to drain into the galleries below where it will be filtered and cooled before being directed back to the storm sewer. The meandering form of the creek bed will create pockets for integration of street trees and plant material to allow for enhanced stormwater treatment, urban cooling and habitat integration.
3. **Bioretention -** located to take advantage of available space in the boulevard to enhance stormwater capture and filtration and provide passive irrigation of street trees. They can be designed to take runoff from the sidewalk or street and are composed of engineered soils such as biomedia and an underdrain to direct overflow to the storm sewer.
4. **Enhanced Swales -** small engineered grassy basins that incorporate engineered soil such as biomedia and an optional perforated underdrain pipe designed to mimic natural depressions in upland forests, meadows and prairies that capture, filter and slow runoff, provide topographic interest and support biodiversity. These basins may be planted with more elaborate landscaping, and allow for enhanced filtration and storage of runoff in comparison to enhanced grass swales.
5. **Bioswale** – vegetated open channels designed to convey, treat and attenuate stormwater runoff. Check dams and vegetation in the swale slows water to allow filtration of sediments, evapotranspiration, and infiltration into underlying soils to occur where site conditions allow. Additionally, a biomedia channel bed encourages filtration of runoff through this soil-based layer and into a perforated subdrain below for conveyance into the storm sewer system as treated runoff.

6 LID Feature Design

The following subsections outline the design development process used in sizing the LID SWM facilities.

6.1 Soil Cell

The biomedia layer within the proposed bioretention, bioswale, and enhanced swale profiles as outlined in the following subsections has been specified at 0.5m due to site constraints associated with bedrock depths (0.5m-2m below ground surface, with an approximate average depth of 1 m throughout the ROW). Shallow media profiles will introduce constraints to street tree soil volume standards. The maximum available soil profile has been illustrated in the proposed conceptual design cross sections and soil volume calculations will be completed at the detailed design stage to guide plant selection, identifying locations that can support large, medium or small stature trees and those facilities that will not be able to meet required soil volumes and instead will be designed to support herbaceous and grass-based plantings. Additionally, should soil cells be utilized as part of the approved landscape plan they can be incorporated into the LID design to maximize soil volumes and support continuous root zones.

6.2 Bioretention

Table 6-1 below outlines the basic design parameters adopted for the proposed bioretention LID features (i.e., bump-outs and planters), further used to determine overall capacity of the ROW LID systems by Block throughout the site.

Table 6-1: Bioretention Design Parameters

Design Parameter	Value (or Range Where Applicable)
Top Width (m)	2-5.4
Bottom Width (m)	1.7-2.7
Length (m)	Varies by location
Subsurface Media Depth - no stone layer (m)	0.7
Surface Ponding Depth (m)	0.1
Storage (m^3)	TBD at detailed design
Underdrain Size (mm)	100-150

6.3 Bioswales

Table 6-2 below outlines the basic design parameters adopted for the proposed bioswale LID features, further used to determine overall capacity of the ROW LID systems by Block throughout the site.

Table 6-2: Bioswale Design Parameters

Design Parameter	Value (or Range Where Applicable)
Top Width (m)	3-5.25
Bottom Width (m)	1.7-3.75
Length (m)	Varies by location
Subsurface Media Depth - includes stone layers (m)	0.7
Surface Ponding Depth (m)	0.1
Storage (m^3)	TBD at detailed design
Underdrain Size (mm)	100-150

6.4 Dry Swale Filtration Trenches

Table 6-3 below outlines the basic design parameters adopted for the proposed dry swale LID features, further used to determine overall capacity of the ROW LID systems by Block throughout the site.

Table 6-3: Dry Swale Design Parameters

Design Parameter	Value (or Range Where Applicable)
Width (m)	2.5-4.5
Length (m)	Varies by location
Subsurface Media Depth - includes stone layers (m)	0.5
Surface Ponding Depth (m)	0.05
Storage (m^3)	TBD at detailed design
Underdrain Size (mm)	100-150

6.5 Enhanced Swale

Table 6-4 below outlines the basic design parameters adopted for the proposed enhanced swale LID features, further used to determine overall capacity of the ROW LID systems by Block throughout the site.

Table 6-4: Enhanced Swale Design Parameters

Design Parameter	Value (or Range Where Applicable)
Top Width (m)	3-5
Bottom Width (m)	2-5
Length (m)	Varies by location
Subsurface Media Depth - includes stone layers (m)	0.5
Surface Ponding Depth (m)	0.1
Storage (m^3)	TBD at detailed design
Underdrain Size (mm)	100-150

6.6 Permeable Pavements

Table 6-5 below outlines the basic design parameters adopted for the proposed permeable pavement LID features, further used to determine overall capacity of the ROW LID systems by Block throughout the site.

Table 6-5: Permeable Pavement Design Parameters

Design Parameter	Value (or Range Where Applicable)
Width (m)	
Length (m)	Varies by location
Subsurface Media Depth - includes stone layers (m)	0.4
Surface Ponding Depth (m)	0
Storage (m^3)	TBD at detailed design
Underdrain Size (mm)	100-200

6.7 Stormwater Management Facilities Summary

Contributing catchments were delineated within the site area using existing conditions topographic survey data under the assumption that general grading patterns will be respected in the proposed grading design. Should any catchments require refinement based on proposed grading once developed, re-delineation of catchments and revised LID design shall be undertaken as required.

Table 6-6 below outlines the key hydrologic parameters produced from catchment delineation for each LID feature location. The overall storage values reported indicate that the preliminary LID feature design and layout within the proposed site right-of-way areas is sufficient to capture and control the 90th percentile storm event runoff. A detailed breakdown of storage by LID type will be developed as part of the detailed design stage. As such, the water quality and erosion control SWM criteria outlined in Table 4-1 can be effectively met. Benefits to water balance and quantity control will be quantified at the detailed design stage. Conceptual design cross sections of the standard LID Right of Way layouts are provided in **Appendix A**.

Table 6-6: Hydrologic Parameters of LID Feature Locations

Block Number	ROW Width (m)	Catchment Area (ha)	Impervious Area (m^2)	Total LID Surface Footprint Area (m^2)*	LID Subsurface Storage Footprint (m^2)	I:P Ratio**	Water Quality Target – 27mm (m^3)	Total Design Storage (m^3)
11	24	0.95	6,789	2,716	1,762	3.9:1	257	659
12	24	0.69	5,505	1,385	877	6.3:1	186	333
13	24	0.30	2,550	492	319	8.0:1	82	119
15	26 & 34	1.28	11,105	1,695	1,398	7.9:1	346	444
16	34	0.95	8,175	1,349	1,301	6.3:1	257	330
17	26	0.74	5,809	1,582	938	6.2:1	200	250
18	26	0.69	5,372	1,538	890	6.0:1	187	242
19	24	0.34	2,698	718	465	5.8:1	92	174
20	24	0.15	1,213	318	206	5.9:1	41	77
21	24	0.38	2,989	794	515	5.8:1	102	193
22	24	0.15	1,213	318	206	5.9:1	41	77
23	24	0.38	2,988	794	515	5.8:1	102	193
24	24	0.43	3,436	912	591	5.8:1	117	266
26	18	0.25	2,192	338	260	8.4:1	68	98
27	24	0.30	2,540	502	325	7.8:1	82	122
28	22 & 24	0.63	4,599	1,713	1,655	2.8:1	170	392
29	43	2.05	14,553	5,961	4,946	2.9:1	554	1,135

Notes:
*includes 50% factor of safety reduction in consideration of future driveway access points, utilities, and other surface features limiting available space for LID features
**I:P ratio calculated using surface area of LID storage basins to reflect true surface area of storage

7 Operation and Maintenance Considerations

A number of operation and maintenance (O&M) practices should be considered by the site owner to ensure the features maintain their as-designed function in future years. The considerations outlined in **Tables 7-1** to **7-4** are summarized from previous industry experience of Aquafor and the TRCAs' Low Impact Development Stormwater Management Practice Inspection and Maintenance Guide.

Table 7-1: Operation and Maintenance Considerations for Bioswales and Dry Swales.

Design Component	O&M Description	Frequency
Contributing Drainage Area	CDAs should be free of point sources of pollutants (e.g., leaking waste containers, spills, failing ESCs). Trash, sediment and debris should be removed regularly from pavements and other stormwater conveyances (e.g., gutters, eavestroughs) draining to the BMP.	Biannual visual inspections.
Inlet Conveyance System	Inlets must remain unobstructed to ensure that stormwater enters the BMP as designed. Scour protection features (e.g., stone cover, flow spreader) may also be needed for curb-cut or pipe inlets to prevent erosion of the filter bed from concentrated flow.	Visual Inspection – biannual Flushing & CCTV – when clogging/damage suspected.
Pretreatment	Proper pretreatment extends the operating life cycle of the BMP by reducing the rate of accumulation of coarse sediment in the BMP. Devices include vegetated filter strips, gravel diaphragms, forebays, check dams, oil and grit separators and manholes containing baffles or filters and sumps. Pretreatment devices require frequent (e.g., annual or bi-annual) trash, sediment and debris removal.	Biannual visual inspections. .
Perimeter	Inspection of the perimeter: confirm dimensions of the BMP are acceptable, ensure the structural integrity of side slopes or vertical walls is maintained and confirm that the BMP continues to provide the designed surface ponding water storage capacity. Periodic maintenance of side slopes may be needed to repair erosion rills or damage from vehicle or foot traffic.	Annual visual inspections.
Filter Bed	Filter beds should be checked for presence of standing water. Trash should be removed from the filter bed regularly. Mulch or stone cover should be maintained on non-vegetated areas to prevent weed growth and soil erosion. Accumulated sediment should be periodically removed to maintain surface draining function. Repair of animal burrows, sunken areas, erosion rills or damage from vehicle or foot traffic may also be needed to prevent short	Annual visual inspections. Flushing & Vac Truck – when drawdown exceeds 92hrs **OR** sediment accumulation impeding inlet/outlet function.

Design Component	O&M Description	Frequency
	circuiting of flow through the filter media soil. Maximum ponding depth should be checked to ensure designed water storage capacity is maintained.	
Vegetation	Routine maintenance of vegetation is the same as a conventional planting bed (i.e., weeding, mowing, pruning, irrigation during droughts). In the first 2 months of establishment, plantings need to be irrigated frequently (e.g., bi-weekly). As bioretention practices are intended to retain nutrients from inflowing stormwater, applying fertilizer to the filter bed should not be a part of routine maintenance.	Routine maintenance, varies with plantings
Overflow Outlets	Overflow outlet structures must be kept free of obstructions to ensure stormwater is safely conveyed during major storm events.	Biannual visual inspections.
Sub-drain	Sub-drains may be included where the permeability of the underlying native sub-soil is low or, due to other constraints, an impermeable liner is required. The perforated pipe must be kept free of obstructions to ensure that the subsurface water storage capacity of the BMP drains within a specified time period. A maintenance port standpipe may be connected to the perforated pipe to provide a means of flushing and inspecting it. Perforated pipes should be routinely flushed with water to remove sediment. If the sub-drain is equipped with a flow-restrictor (e.g., orifice plate, ball valve) to attenuate flow rates, the flow restrictor must be inspected and cleaned regularly.	Biannual visual inspections.
Monitoring well	Monitoring wells are needed to determine if the BMP drains within an acceptable time period and to track drainage performance over its operating lifespan. Standpipes should be securely capped on both ends and remain undamaged and free of sediment which may require periodic flushing.	Biannual access function inspections.

Table 7-2: Operation and Maintenance Considerations for Permeable Pavements and Pavers

Design Component	O&M Description	Frequency
Contributing Drainage Area	CDAs should be free of point sources of pollutants (e.g., leaking waste containers, spills, failing ESCs). Trash, sediment and debris should be removed regularly from pavements and other stormwater conveyances (e.g., gutters, eavestroughs) draining to the BMP.	Biannual visual inspections.

Design Component	O&M Description	Frequency
Pavement surface	Surface should be inspected for damage, deformation (e.g. ruts), unevenness, open joints and sediment accumulation. Should not allow ponding of water on the surface to occur when functioning acceptably so any observation of surface ponding indicates that a problem exists. Trash and natural debris should be periodically removed. Surface needs to be swept and vacuumed regularly to remove fine sediment from joints and pores, and plowed of snow and spread with de-icing salt as needed during winter. Sand should not be spread as an anti-slip agent as it will clog the joints or pores. Grid systems with topsoil and grass fill are maintained like lawns.	Biannual visual inspections and routine maintenance.
Vegetation	Permeable interlocking grid systems may be filled with topsoil and planted with grass. Routine maintenance of grid system grass cover is the same as conventional lawns (i.e., weeding, mowing, watering during droughts). In the first 2 months of establishment, plantings need to be irrigated frequently (e.g., bi-weekly). Where compost amended topsoil is used to fill grid cells, periodic top dressing with compost should be all that is needed to maintain healthy vegetation cover (i.e., application of chemical fertilizers should not be a part of routine maintenance).	Routine maintenance, varies with plantings
Overflow outlets	Flows exceeding the storage capacity of the BMP are conveyed to an adjacent drainage system via an overflow outlet structure (e.g., flush curb, curb-cut, catch basin). Overflow outlet structures must be kept free of obstructions to ensure stormwater is safely conveyed during major storm event.	Biannual visual inspections.
Sub-drain	Sub-drains may be included where the permeability of the underlying native sub-soil is low or where an impermeable liner is required. The perforated pipe must be kept free of obstructions to ensure that the subsurface water storage capacity of the BMP drains within a specified time period. A maintenance port standpipe may be connected to the perforated pipe to provide a means of flushing and inspecting it. Perforated pipes should be routinely flushed	Biannual visual inspections.

Design Component	O&M Description	Frequency
	with water to remove sediment. If the sub-drain is equipped with a flow-restrictor (e.g., orifice plate, ball valve) to attenuate flow rates, the flow restrictor must be inspected and cleaned regularly.	
Monitoring Well	Monitoring wells are needed to determine if the BMP drains within an acceptable time period and to track drainage performance over its operating lifespan. Standpipes should be securely capped on both ends and remain undamaged and free of sediment which may require periodic flushing.	Biannual access function inspections.
Control structure	The manhole or catch basin which provides access to the sub-drain and flow restrictor device, if present. Inspect for damage and sediment accumulation.	Biannual visual inspections.

Table 7-3: Operation and Maintenance Considerations for Enhanced Swales

Design Component	O&M Description	Frequency
Contributing Drainage Area	CDAs should be free of point sources of pollutants (e.g., leaking waste containers, spills, failing ESCs). Trash, sediment and debris should be removed regularly from pavements and other stormwater conveyances (e.g., gutters, eavestroughs) draining to the BMP.	Biannual visual inspections.
Inlet Conveyance System	Inlets must remain unobstructed to ensure that stormwater enters the BMP as designed. Scour protection features (e.g., stone cover, flow spreader) may also be needed for curb-cut or pipe inlets to prevent erosion of the filter bed from concentrated flow.	Visual Inspection – biannual Flushing & CCTV – when clogging/damage suspected.
Pretreatment	Proper pretreatment extends the operating life cycle of the BMP by reducing the rate of accumulation of coarse sediment in the BMP. Devices include vegetated filter strips, gravel diaphragms, forebays, check dams, oil and grit separators and manholes containing baffles or filters and sumps. Pretreatment devices require frequent (e.g., annual or bi-annual) trash, sediment and debris removal.	Biannual visual inspections. .
Perimeter	Inspection of the perimeter: confirm dimensions of the BMP are acceptable, ensure the structural integrity of side slopes or vertical walls is maintained and confirm that the BMP continues to provide the designed	Annual visual inspections.

Design Component	O&M Description	Frequency
	surface ponding water storage capacity. Periodic maintenance of side slopes may be needed to repair erosion rills or damage from vehicle or foot traffic.	
Filter Bed	Filter beds should be checked for presence of standing water. Trash should be removed from the filter bed regularly. Mulch or stone cover should be maintained on non-vegetated areas to prevent weed growth and soil erosion. Accumulated sediment should be periodically removed to maintain surface draining function. Repair of animal burrows, sunken areas, erosion rills or damage from vehicle or foot traffic may also be needed to prevent short circuiting of flow through the filter media soil. Maximum ponding depth should be checked to ensure designed water storage capacity is maintained.	Annual visual inspections. Flushing & Vac Truck – when drawdown exceeds 92hrs **OR** sediment accumulation impeding inlet/outlet function.
Vegetation	Routine maintenance of vegetation is the same as a conventional planting bed (i.e., weeding, mowing, pruning, irrigation during droughts). In the first 2 months of establishment, plantings need to be irrigated frequently (e.g., bi-weekly). As bioretention practices are intended to retain nutrients from inflowing stormwater, applying fertilizer to the filter bed should not be a part of routine maintenance.	Routine maintenance, varies with plantings.
Overflow Outlets	Flows exceeding the storage capacity of the BMP are conveyed to an adjacent drainage system via an overflow outlet structure (e.g., pipe, standpipe, curb-cut, swale, catch basin). Overflow outlet structures must be kept free of obstructions to ensure stormwater is safely conveyed during major storm events.	Biannual visual inspections.
Sub-drain	Sub-drains may be included where the permeability of the underlying native sub-soil is low or where an impermeable liner is required. The perforated pipe must be kept free of obstructions to ensure that the subsurface water storage capacity of the BMP drains within a specified time period. A maintenance port standpipe may be connected to the perforated pipe to provide a	Biannual visual inspections.

Design Component	O&M Description	Frequency
	means of flushing and inspecting it. Perforated pipes should be routinely flushed with water to remove sediment. If the sub-drain is equipped with a flow-restrictor (e.g., orifice plate, ball valve) to attenuate flow rates, the flow restrictor must be inspected and cleaned regularly.	
Monitoring Well	Monitoring wells are needed to determine if the BMP drains within an acceptable time period and to track drainage performance over its operating lifespan. Standpipes should be securely capped on both ends and remain undamaged and free of sediment which may require periodic flushing.	Biannual access function inspections.

Table 7-4: Operation and Maintenance Considerations for Bioretention

Design Component	O & M Description	Frequency
Contributing Drainage Area	CDAs should be free of point sources of pollutants (e.g., leaking waste containers, spills, failing ESCs). Trash, sediment and debris should be removed regularly from pavements and other stormwater conveyances (e.g., gutters, eavestroughs) draining to the BMP.	Biannual visual inspections.
Inlet Conveyance System	Inlets must remain unobstructed to ensure that stormwater enters the BMP as designed. Scour protection features (e.g., stone cover, flow spreader) may also be needed for curb-cut or pipe inlets to prevent erosion of the filter bed from concentrated flow.	Visual Inspection – biannual Flushing & CCTV – when clogging/damage suspected.
Pretreatment	Proper pretreatment extends the operating life cycle of the BMP by reducing the rate of accumulation of coarse sediment in the BMP. Devices include vegetated filter strips, gravel diaphragms, forebays, check dams, oil and grit separators and manholes containing baffles or filters and sumps. Pretreatment devices require frequent (e.g., annual or bi-annual) trash, sediment and debris removal.	Biannual visual inspections.
Perimeter	Inspection of the perimeter: confirm dimensions of the BMP are acceptable, ensure the structural integrity of side slopes or vertical walls is maintained and confirm that the BMP continues to provide the designed surface ponding water storage capacity. Periodic maintenance of side slopes may be	Biannual visual inspections.

Design Component	O & M Description	Frequency
	needed to repair erosion rills or damage from vehicle or foot traffic.	
Filter Bed	Filter beds should be checked for presence of standing water. Trash should be removed from the filter bed regularly. Mulch or stone cover should be maintained on non-vegetated areas to prevent weed growth and soil erosion. Accumulated sediment should be periodically removed to maintain surface draining function. Repair of animal burrows, sunken areas, erosion rills or damage from vehicle or foot traffic may also be needed to prevent short circuiting of flow through the filter media soil. Maximum ponding depth should be checked to ensure designed water storage capacity is maintained.	Annual visual inspections. Flushing & Vac Truck – when drawdown exceeds 92hrs **OR** sediment accumulation impeding inlet/outlet function.
Vegetation	Routine maintenance of vegetation is the same as a conventional planting bed (i.e., weeding, mowing, pruning, irrigation during droughts). In the first 2 months of establishment, plantings need to be irrigated frequently (e.g., bi-weekly). As bioretention practices are intended to retain nutrients from inflowing stormwater, applying fertilizer to the filter bed should not be a part of routine maintenance.	Routine maintenance, varies with plantings.
Overflow Outlets	Flows exceeding the storage capacity of the BMP are conveyed to an adjacent drainage system via an overflow outlet structure (e.g., pipe, standpipe, curb-cut, swale, catchbasin). Overflow outlet structures must be kept free of obstructions to ensure stormwater is safely conveyed during major storm events.	Biannual visual inspections.
Sub-drain	Sub-drains may be included where the permeability of the underlying native sub-soil is low or where an impermeable liner is required. The perforated pipe must be kept free of obstructions to ensure that the subsurface water storage capacity of the BMP drains within a specified time period. A maintenance port standpipe may be connected to the perforated pipe to provide a means of flushing and inspecting it. Perforated pipes should be routinely flushed	Biannual visual inspections.

Design Component	O & M Description	Frequency
	with water to remove sediment. If the sub-drain is equipped with a flow-restrictor (e.g., orifice plate, ball valve) to attenuate flow rates, the flow restrictor must be inspected and cleaned regularly	
Monitoring Well	Monitoring wells are needed to determine if the BMP drains within an acceptable time period and to track drainage performance over its operating lifespan. Standpipes should be securely capped on both ends and remain undamaged and free of sediment which may require periodic flushing.	Biannual access function inspections.
Trees	Tree pruning should be completed by a qualified forestry crew for safety concerns, tree health & vitality, and disease control. Standard tree pruning involves removing all dead, dying, diseased, decayed, interfering, noticeably weak or crowded branches, the removal of lower branches and stem suckers, clearing stop signs to a minimum of 25 metres clear view, clearing traffic signals to a minimum 25 metres clear view and reporting any other defects to the Forestry Coordinator for inspection and action.	Tree pruning is required approximately every 7–10 years.

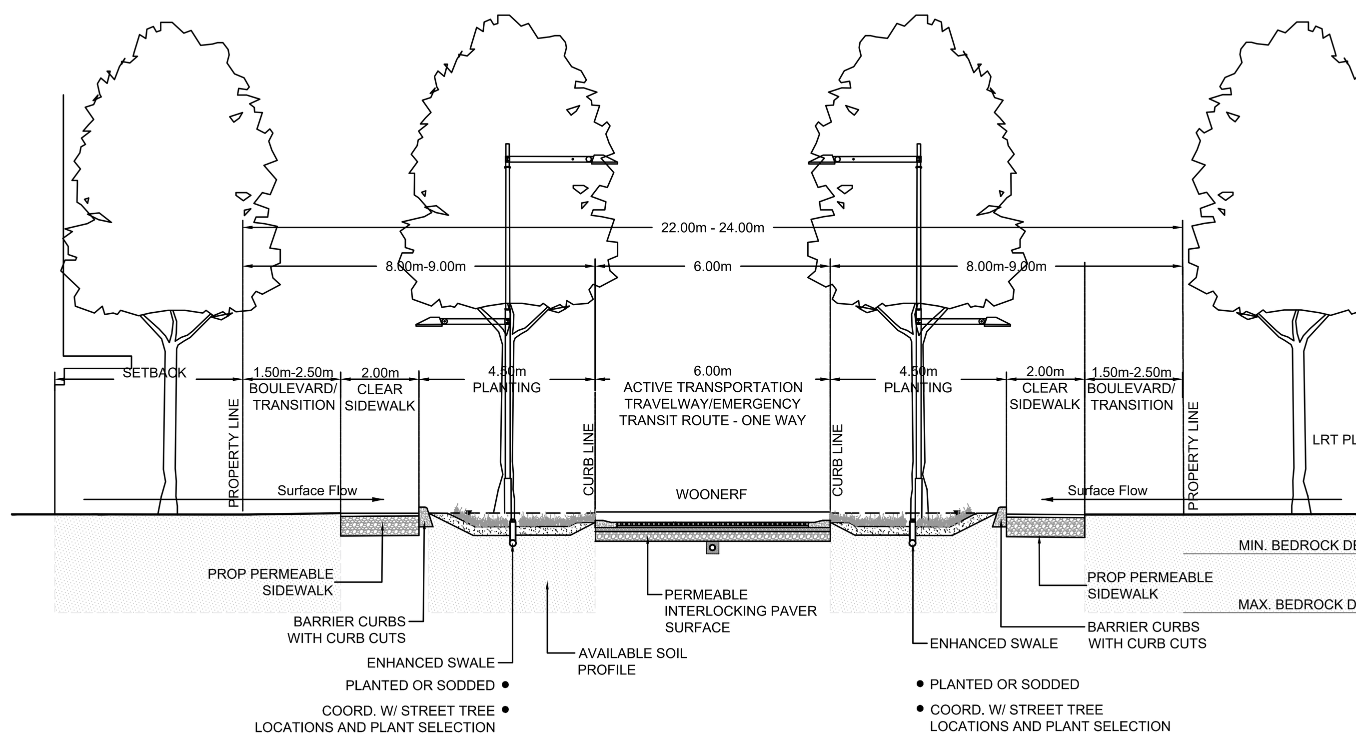
8 Conclusion

An LID treatment train approach was designed for the proposed Right of Way realignments within the Tunney's Pasture study area as part of the proposed stormwater management system that considers a number of technical site constraints, provides an aesthetic finish to the proposed right of ways, adheres to the recommended SWM Criteria and considers incorporation that compliments the layout of the proposed shared-use transportation corridors. The proposed LID features vary by location throughout the site and include bioswales, enhanced swales, permeable pavements, dry swale filtration trenches, and bioretention. These LID designs adopt a number of general design features to meet existing site constraints, effective LID design per the relevant design standards outlined in **Section 3.1**, and the SWM criteria outlined in **Section 4** of this memo. **Table 8-1** below outlines the various notable design features and the relevant guideline or criteria. The LID strategy will be further advanced as part of subsequent detailed design tasks.

Table 8-1: Summary of Design Features and Relevant Guidelines/Criteria

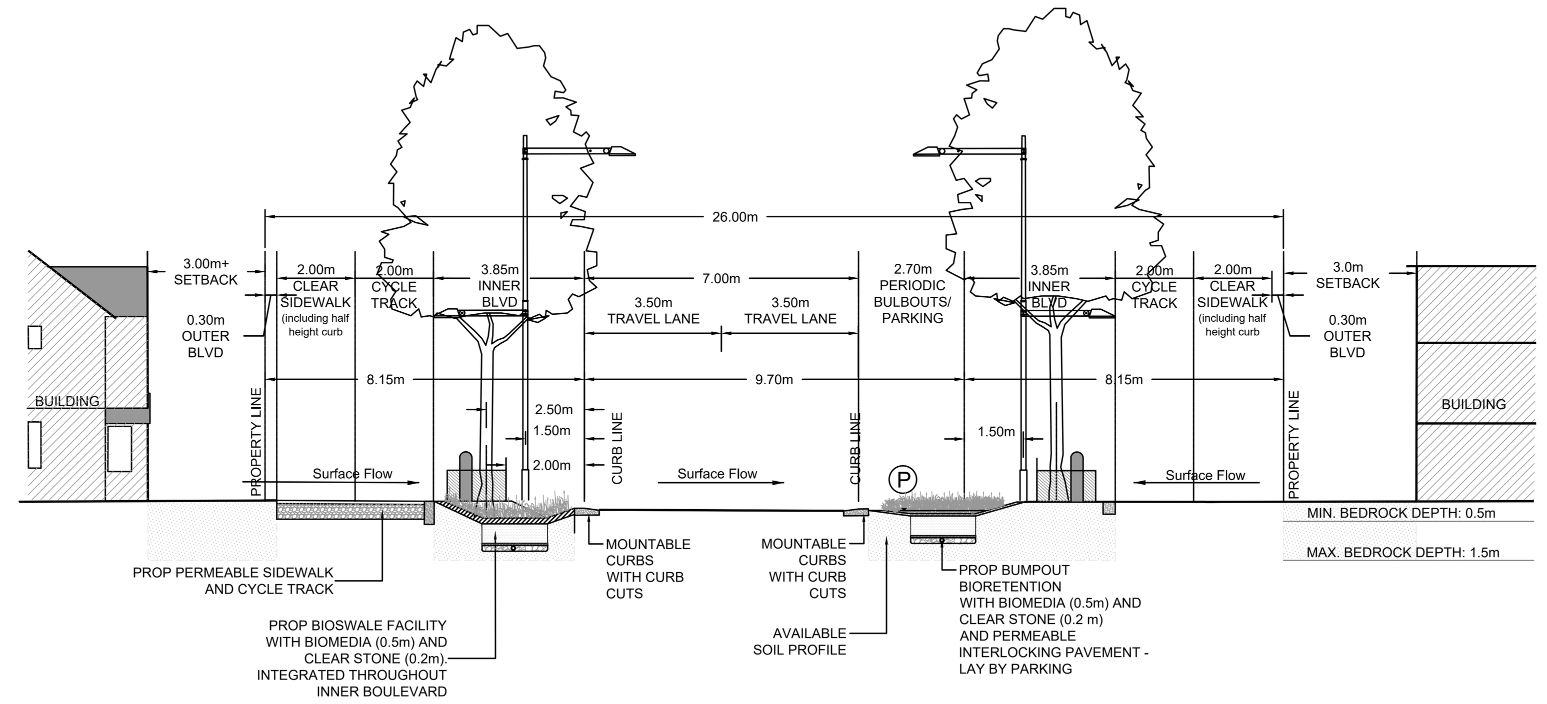
Design Feature	Relevant Guideline/Criteria	Justification
Partial-infiltration included in any LID feature (all contain subdrains).	Patterson Group Site-Specific Geotechnical Investigation	Investigation determined that conventional infiltration only LID measures that adopt infiltration only as the primary mechanism are not generally considered suitable due to shallow depth and relative impermeability of bedrock across the site.
Maximum depth of facility of 0.5m	Patterson Group Site-Specific Geotechnical Investigation	Depth of LID measures considers the minimum bedrock depth of the site to ensure that excavations for LID features do not extend into bedrock. LID feature preliminary layouts and footprints have been designed to accommodate this limitation with preliminary sizing provided in **Table 6-6**.
Impervious to Pervious Ratio: does not exceed 10:1	Low Impact Development Stormwater Management Guide (CVC, 2010)	Typical recommended range for I:P ratio to a bioretention facility is 5:1 to 15:1. For filtration trenches, a maximum of 10:1 is recommended when runoff from roadways or parking lot contributes to the facility.
Maximum Allowable Ponding Depth: does not exceed 0.3m	Low Impact Development Stormwater Management Guide (CVC, 2010)	Limits ponded standing water time to under the mosquito breeding cycle and supports vegetation health.
Total Storage Volume > 95th Percentile Storm Event Runoff Volume	Table 4-1, LID/green infrastructure design	Ensures complete capture and treatment of the 95th percentile event runoff.

Appendix A: LID Right of Way Cross Section Concept Drawings



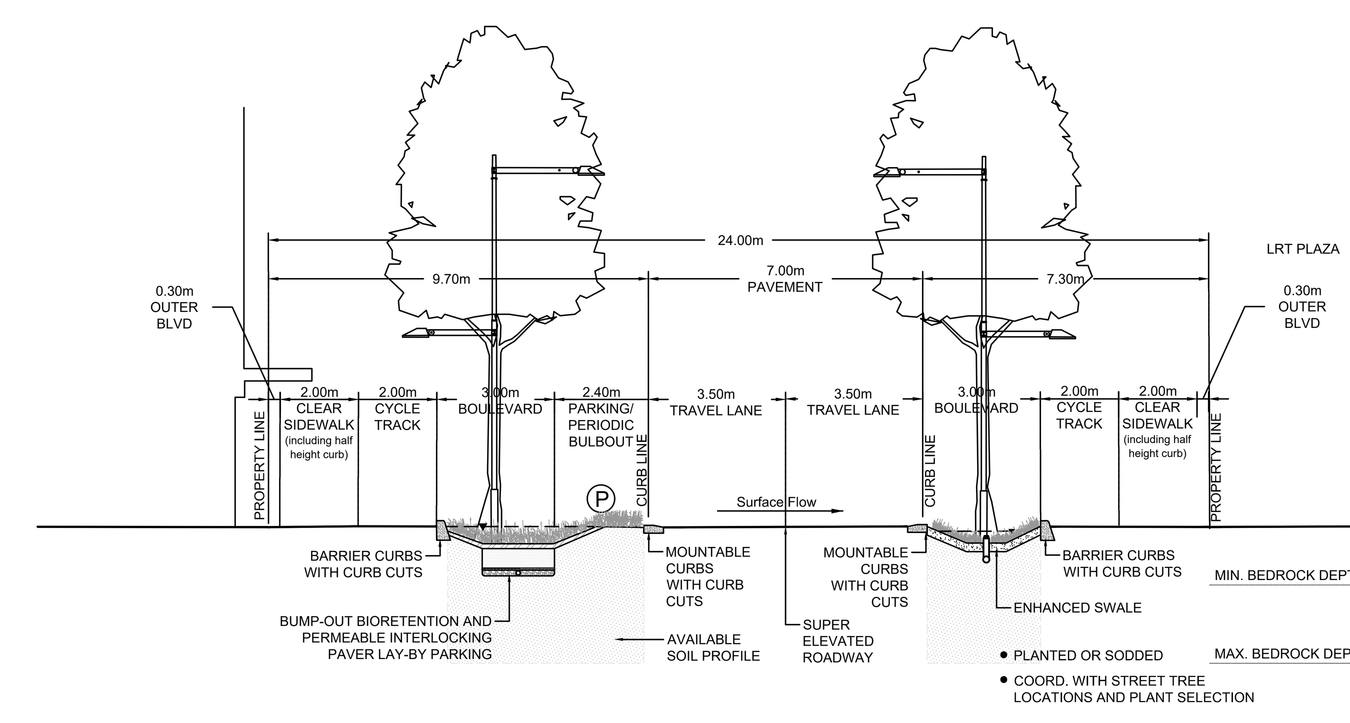
22.0 - 24.0m ROW
YARROW DRIVEWAY
(from BUS LOOP EMERGENCY ACCESS to TUNNEY'S PASTURE)
WOONERF

TARGETED PERCENTAGE OF ROW WIDTH ALLOCATED FOR NON-AUTO USES (URBAN DESIGN MANUAL 2018): 40%
NON-AUTO PERCENTAGE ACHIEVED FOR THIS TYPICAL CROSS SECTION: 100%



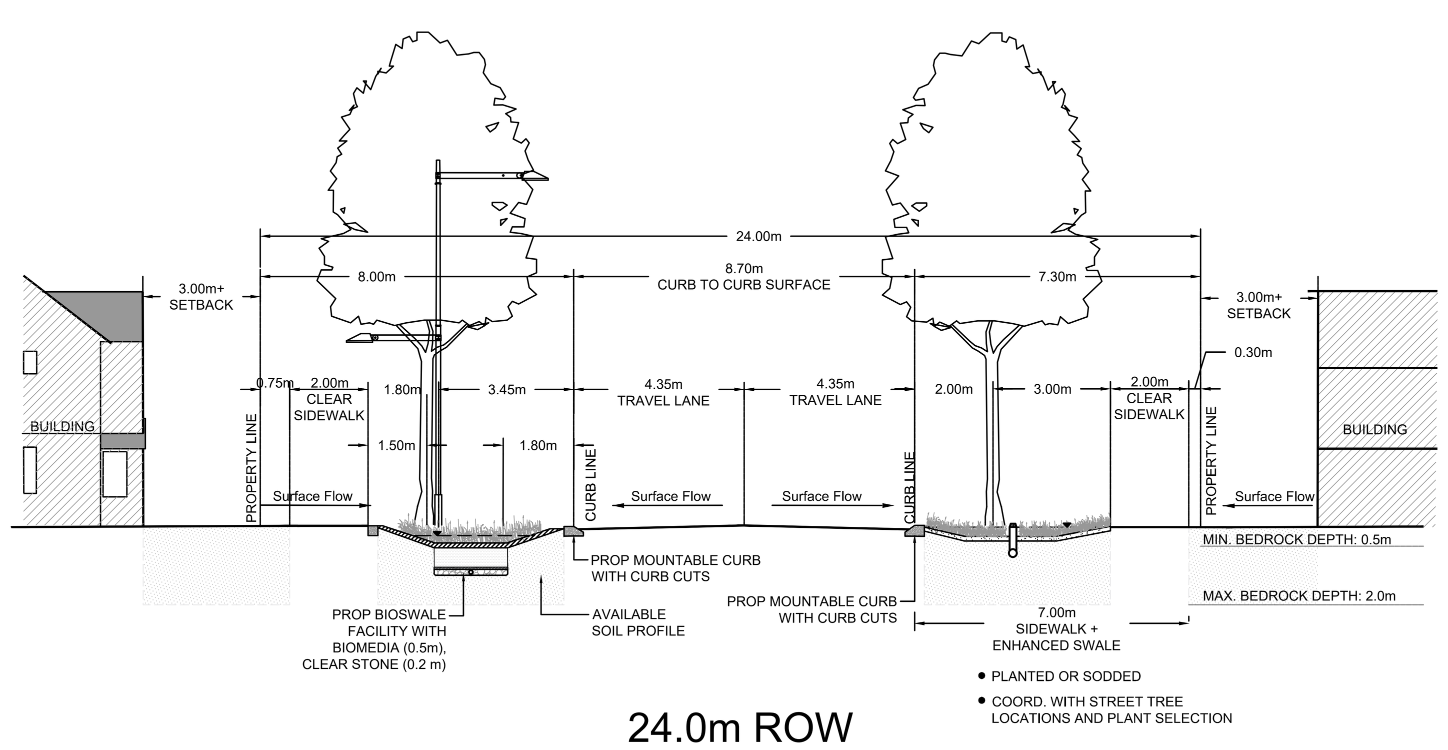
26A TREED BOULEVARDS
26m ROW COLLECTOR STREETS

TARGETED PERCENTAGE OF ROW WIDTH ALLOCATED FOR NON-AUTO USES (URBAN DESIGN MANUAL 2018): 40%
NON-AUTO PERCENTAGE ACHIEVED FOR THIS TYPICAL CROSS SECTION: 63%



24.0m ROW
YARROW DRIVEWAY
(from GOLDENROD to BUS LOOP EMERGENCY ACCESS)

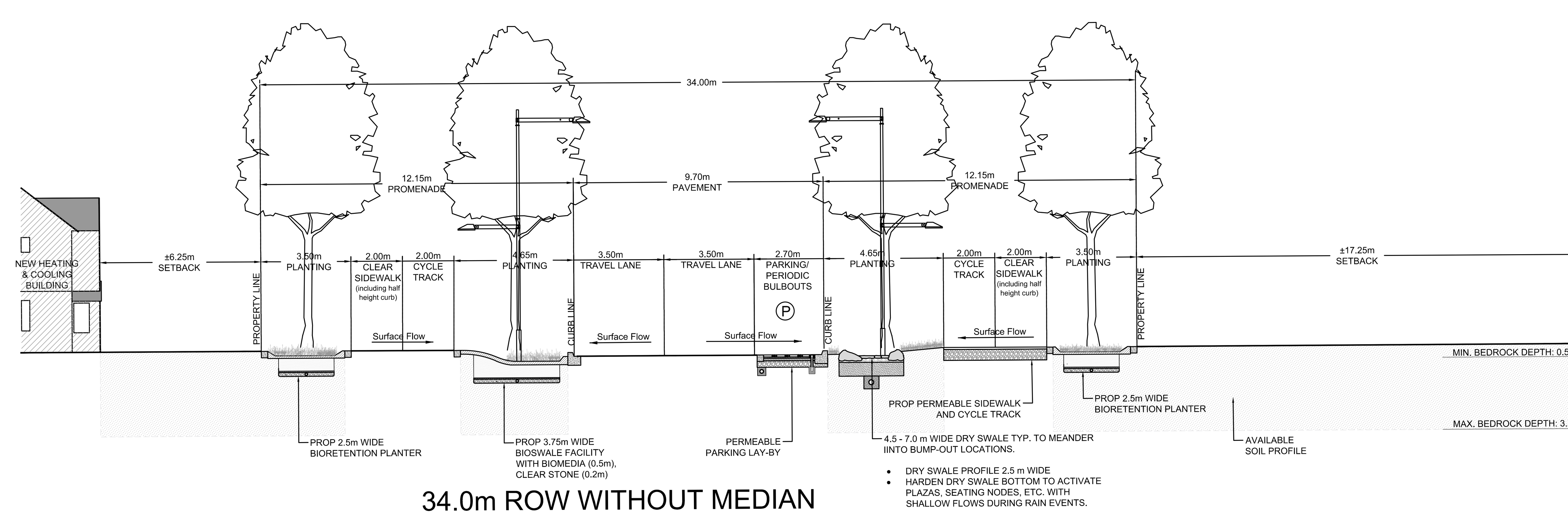
TARGETED PERCENTAGE OF ROW WIDTH ALLOCATED FOR NON-AUTO USES (URBAN DESIGN MANUAL 2018): 40%
NON-AUTO PERCENTAGE ACHIEVED FOR THIS TYPICAL CROSS SECTION: 60%



24.0m ROW
LOCAL STREETS WITH LID

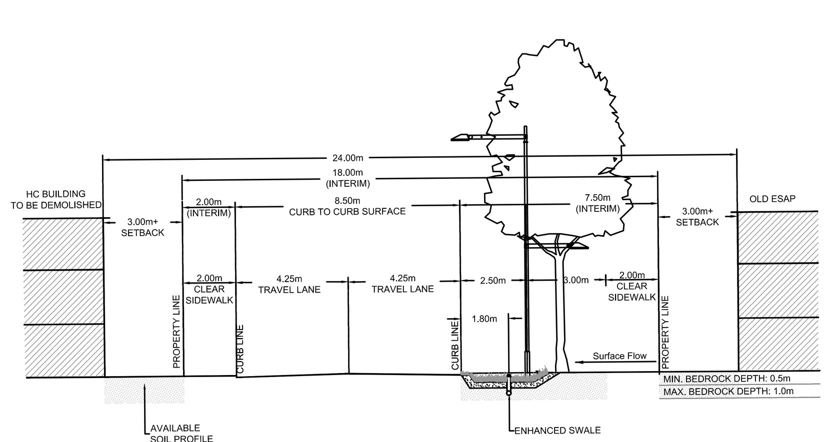
TARGETED PERCENTAGE OF ROW WIDTH ALLOCATED FOR NON-AUTO USES (URBAN DESIGN MANUAL 2018): 40%
NON-AUTO PERCENTAGE ACHIEVED FOR THIS TYPICAL CROSS SECTION: 64%

NOTE:
BIOSWALE TO BE LOCATED IMMEDIATELY BEHIND THE CURB. BIOSWALE LOCATION CAN ALTERNATE ON EITHER SIDE OF THE ROADWAY. TO BE IMPLEMENTED WHERE FEASIBLE.



34.0m ROW WITHOUT MEDIAN
COLOMBINE DRIVEWAY (FROM GOLDENROD TO PARKDALE)

TARGETED PERCENTAGE OF ROW WIDTH ALLOCATED FOR NON-AUTO USES (URBAN DESIGN MANUAL 2018): 40%
NON-AUTO PERCENTAGE ACHIEVED FOR THIS TYPICAL CROSS SECTION: 71%

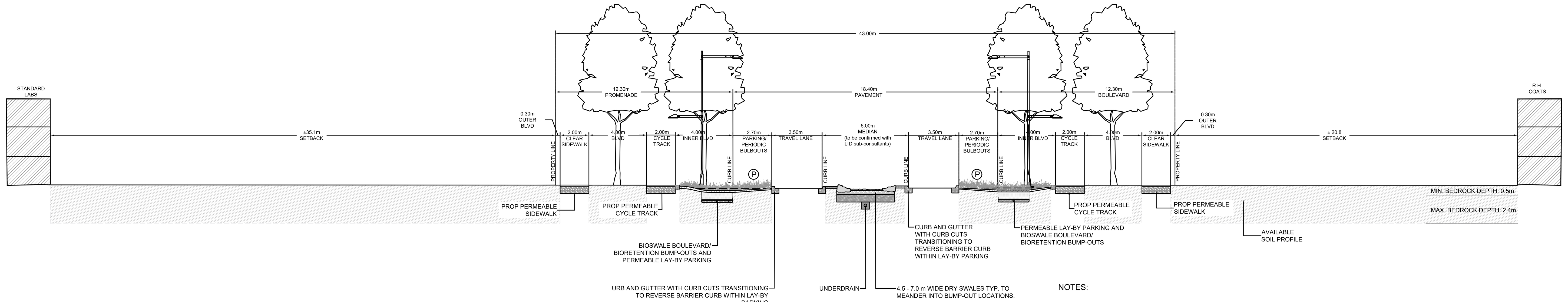


PLANTED OR SODDED
COORD. W/ STREET TREE LOCATIONS AND PLANT SELECTION

TARGETED PERCENTAGE OF ROW WIDTH ALLOCATED FOR NON-AUTO USES (URBAN DESIGN MANUAL 2018): 40%
NON-AUTO PERCENTAGE ACHIEVED FOR THIS TYPICAL CROSS SECTION: 53%

NOTE:
STAGE 1 IMPLEMENTATION: 18.0m + 3.0m + 3.0m = 24.0m
EFFECTIVE WIDTH BETWEEN BUILDINGS = 24.03m TO 24.12m
ON STREET ALTERNATING PARKING

18.0m ROW
STAGE 1 IMPLEMENTATION - CHARDON
(FROM SORREL TO EGLANTINE)



TARGETED PERCENTAGE OF ROW WIDTH ALLOCATED FOR NON-AUTO USES (URBAN DESIGN MANUAL 2018): 40%
NON-AUTO PERCENTAGE ACHIEVED FOR THIS TYPICAL CROSS SECTION: 71%

DRY SWALE PROFILE 4.5 m WIDE. HARDEN DRY SWALE BOTTOM TO ACTIVATE PLAZAS, SEATING NODES, ETC. WITH SHALLOW FLOWS DURING RAIN EVENTS.

43.0m ROW
WITH LID IN MEDIAN
TUNNEY'S PASTURE DRIVEWAY
(FROM COLOMBINE TO YARROW)

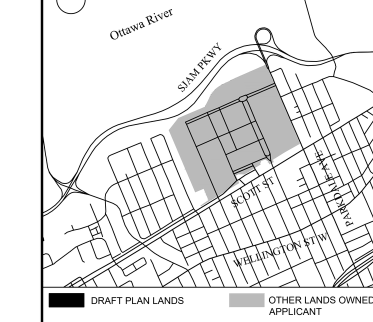
NOTES:

1. SET-BACK FROM BUILDINGS IS CALCULATED FROM DISTANCE BETWEEN FRONTAGE OF STANDARDS LAB AND EXTENSION OF FRONTAGE OF R.H. COATS BUILDING.
2. ROW WIDTH CAN BE FURTHER REDUCED BY KEEPING SINGLE-ROW OF TREES ON EITHER SIDE.
3. MEDIAN MAY RESULT IN SIGHT LINE ISSUES AT INTERSECTIONS ALONG TUNNEY'S PASTURE DRIVEWAY, ESPECIALLY IF THERE IS VEGETATION/PLANTINGS WITHIN CLOSE PROXIMITY TO THESE JUNCTIONS.
4. ONE-WAY VEHICLE LANES SEPARATED BY A MEDIAN ARE LIKELY TO ENCOURAGE HIGHER OPERATING SPEEDS AND MAY NOT BE COMPATIBLE A WITH 40KM/H POSTED SPEED WITHOUT SIGNIFICANT TRAFFIC CALMING MEASURES.
5. LID EFFICIENCY IN MEDIAN IS NOT OPTIMAL. LID IS RECOMMENDED BEHIND THE CURB.

PUBLIC ROAD REDEVELOPMENT

TUNNEY'S PASTURE
OTTAWA, ON

KEY PLAN - N.T.S.



INFORMATION REQUIRED
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ANNIS, O'SULLIVAN, VOLLEBEKK LTD

DATE ______________

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CANADA LANDS COMPANY

DATE ______________

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18	PUBLIC ROW (Sir Frederick Banting Driveway)	0.691
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23	PUBLIC ROW (Eglantine Driveway)	0.378
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25	ROW WIDENING - FUTURE (Chardon Driveway)	0.063
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30	ROW WIDENING (Parkdale Avenue)	0.175
	TOTAL:	21.395

#	DATE	BY	DESCRIPTION
1	2025-12-15	JS	Preliminary Draft LID Concept Plan

DRAWING ISSUE RECORD

APPROVALS

ARCADIS

Aquafor Beech Limited
#6-202-2600 SKYMARK Ave,
MISSISSAUGA, ONTARIO, L4W 5B2
PHONE: (905) 629-0099, FAX: (905) 629-0089

BENCHMARK
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SCALE 15 0 10 20 40
1:1000 (m)

PROJECT NO:
139833

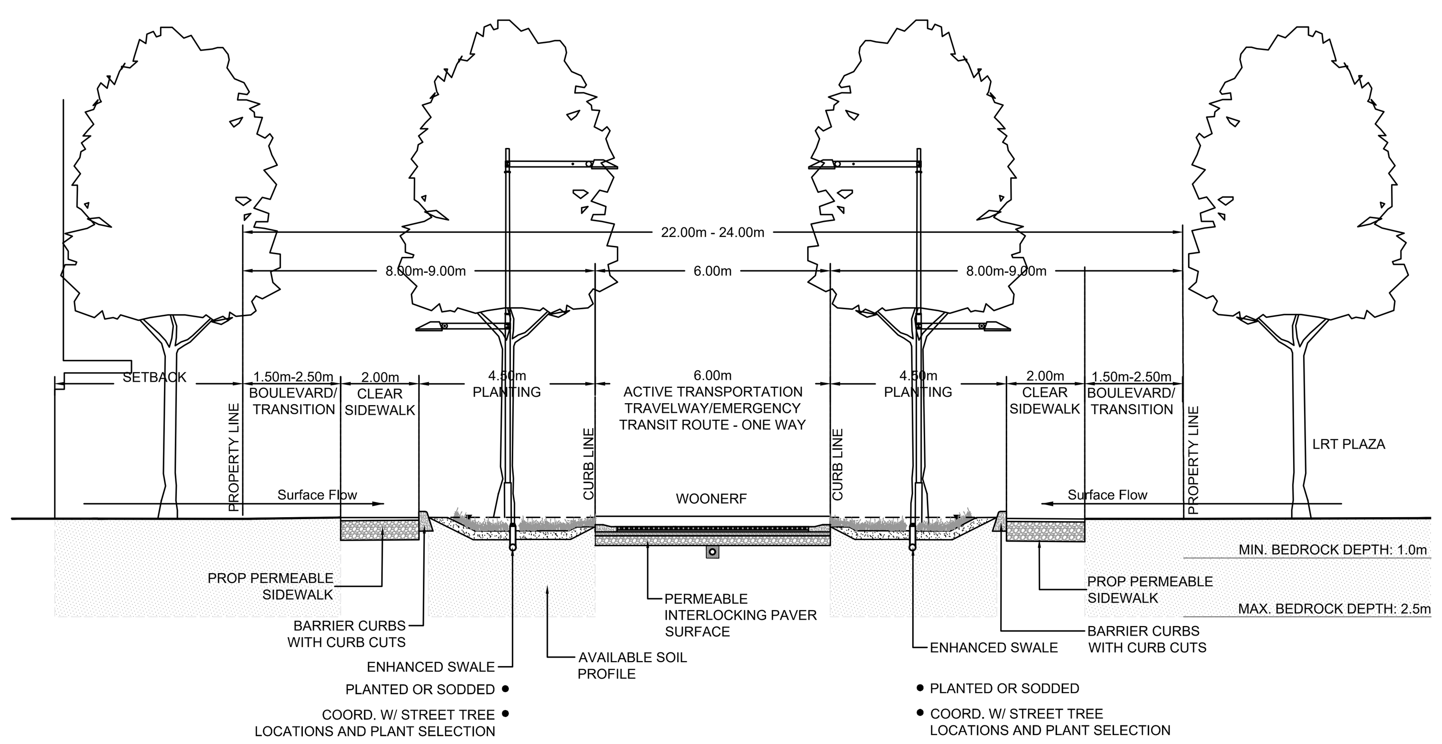
DRAWN BY: SD
CHECKED BY:
PROJECT MGR: SA
APPROVED BY:

SHEET TITLE
DRAFT PLAN OF SUBDIVISION

SHEET NUMBER 2
ISSUE 1.8

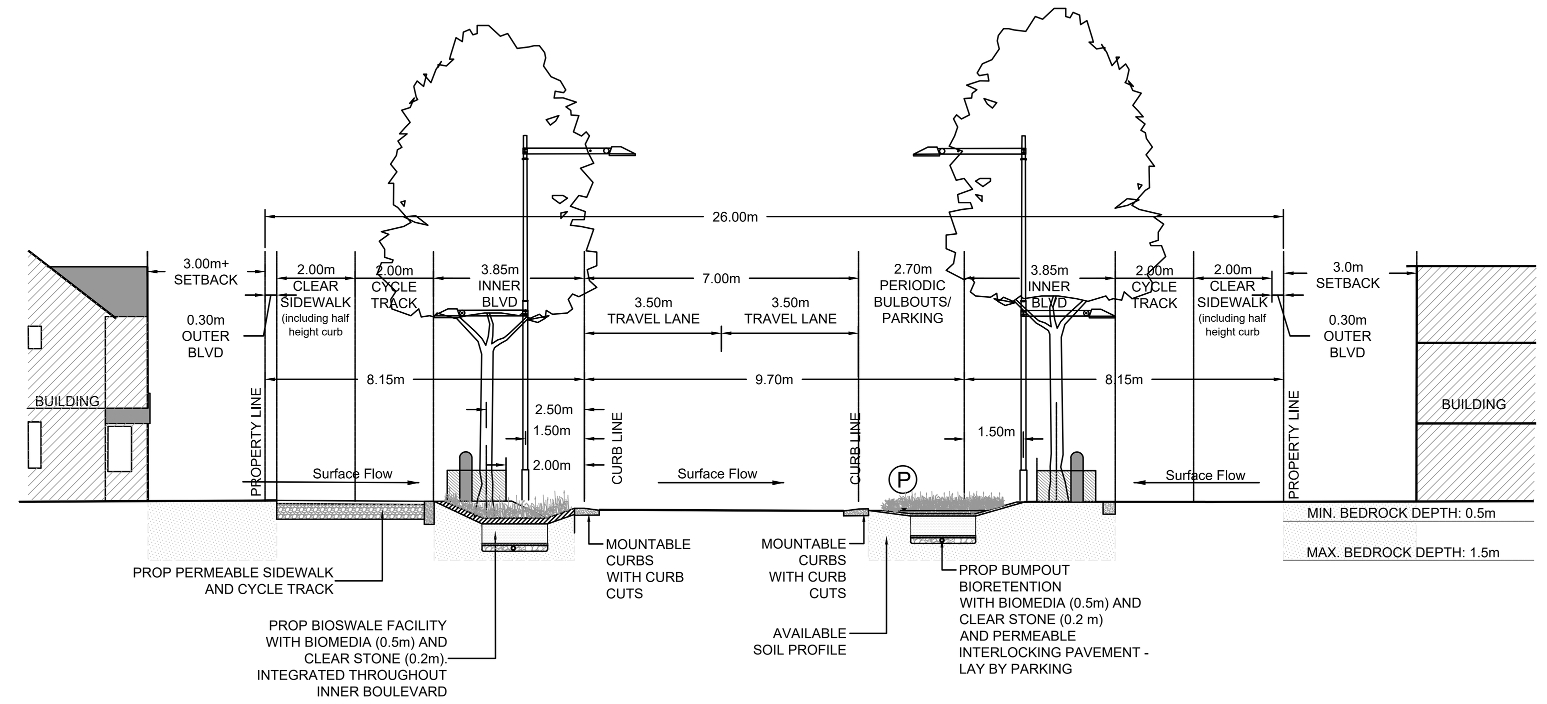
File Location: J:\139833_TunneyPasture\7.0_Production\7.03_Design\17_Planning\Draft Plan of Subdivision

SCALE CHECK 1 in 10mm



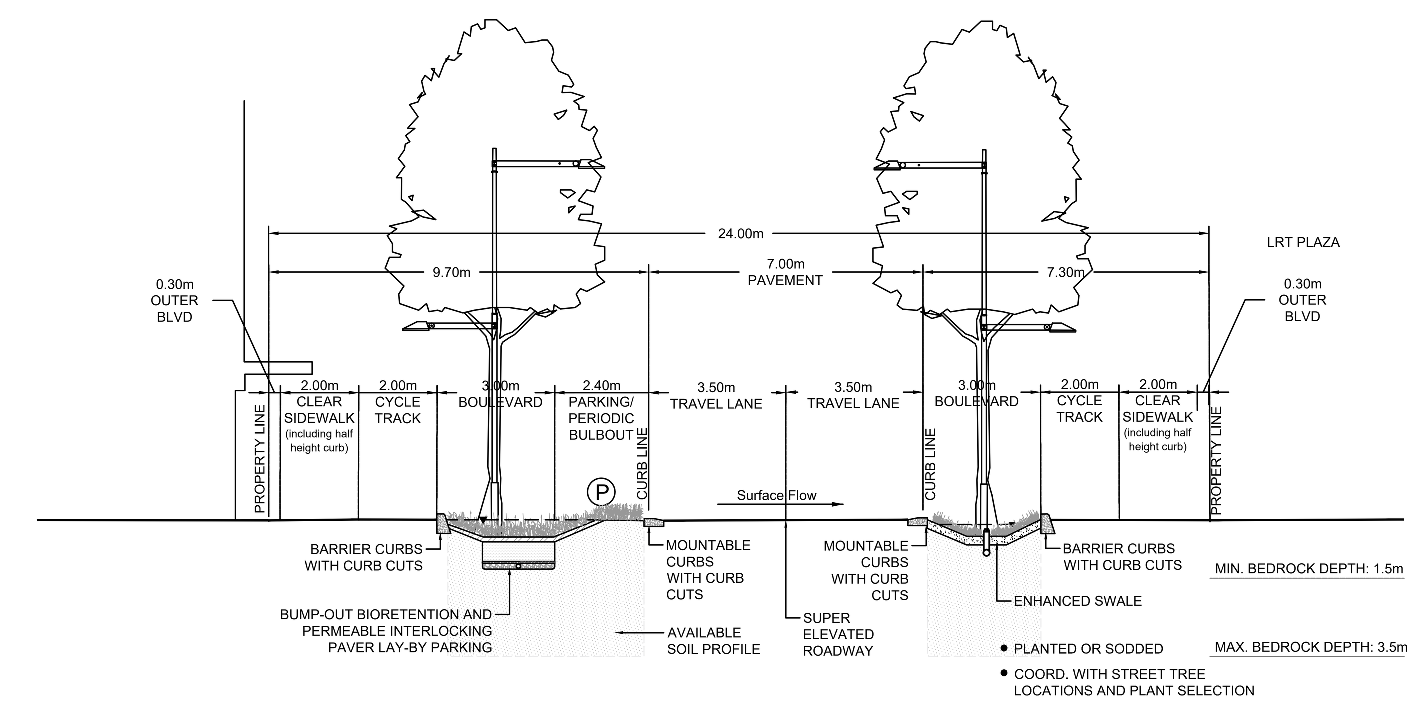
22.0 - 24.0m ROW
YARROW DRIVEWAY
(from BUS LOOP EMERGENCY ACCESS to TUNNEY'S PASTURE)
WOONERF

TARGETED PERCENTAGE OF ROW WIDTH ALLOCATED FOR NON-AUTO USES (URBAN DESIGN MANUAL 2018): 40%
NON-AUTO PERCENTAGE ACHIEVED FOR THIS TYPICAL CROSS SECTION: 100%



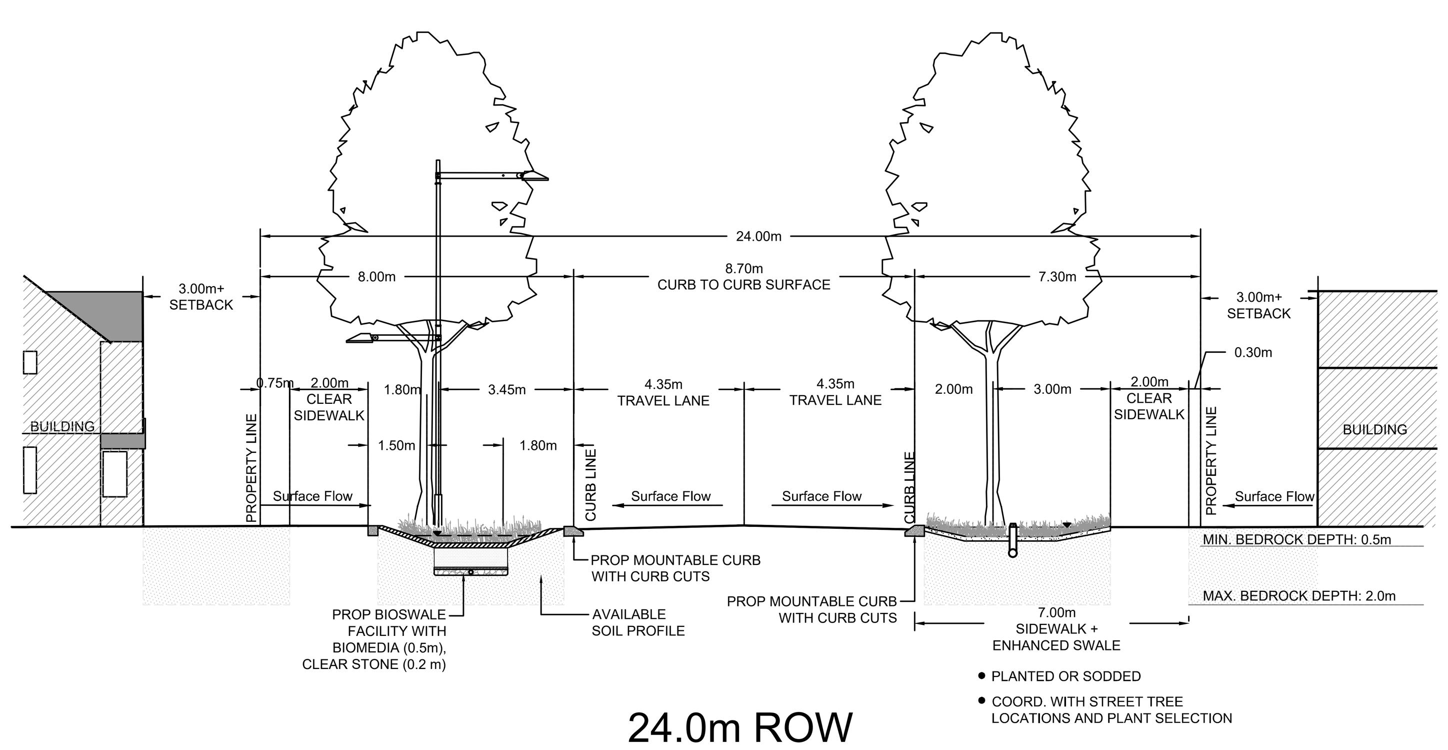
26A TREED BOULEVARDS
26m ROW COLLECTOR STREETS

TARGETED PERCENTAGE OF ROW WIDTH ALLOCATED FOR NON-AUTO USES (URBAN DESIGN MANUAL 2018): 40%
NON-AUTO PERCENTAGE ACHIEVED FOR THIS TYPICAL CROSS SECTION: 63%



24.0m ROW
YARROW DRIVEWAY
(from GOLDENROD to BUS LOOP EMERGENCY ACCESS)

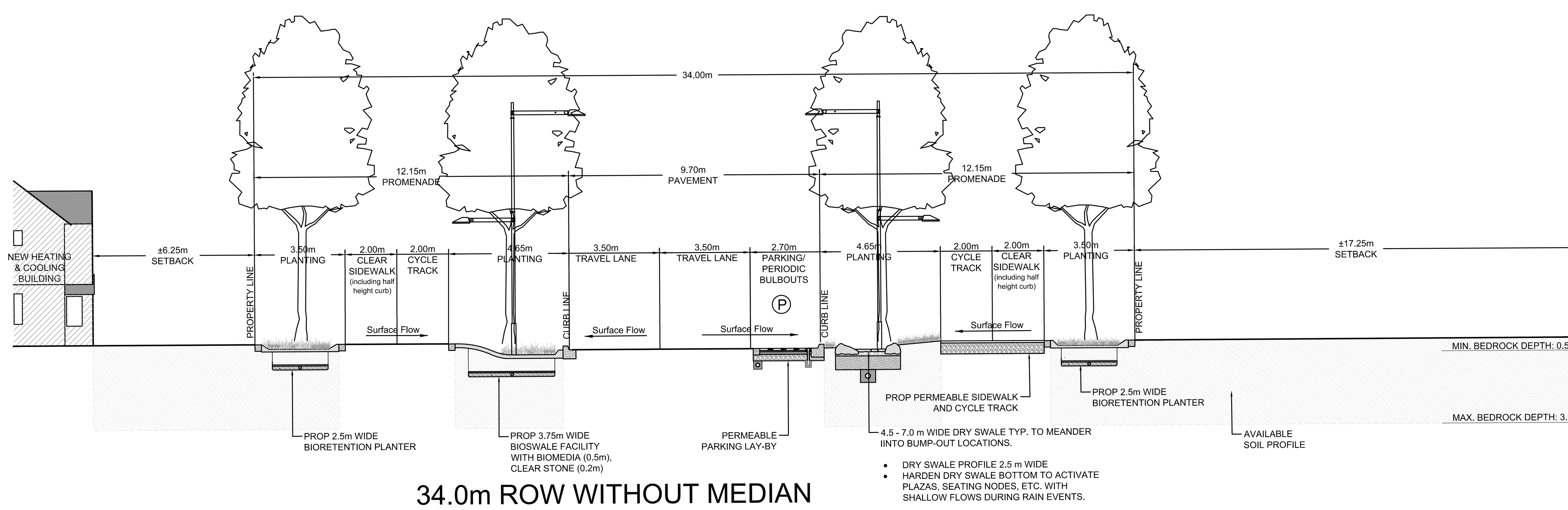
TARGETED PERCENTAGE OF ROW WIDTH ALLOCATED FOR NON-AUTO USES (URBAN DESIGN MANUAL 2018): 40%
NON-AUTO PERCENTAGE ACHIEVED FOR THIS TYPICAL CROSS SECTION: 60%



24.0m ROW
LOCAL STREETS WITH LID

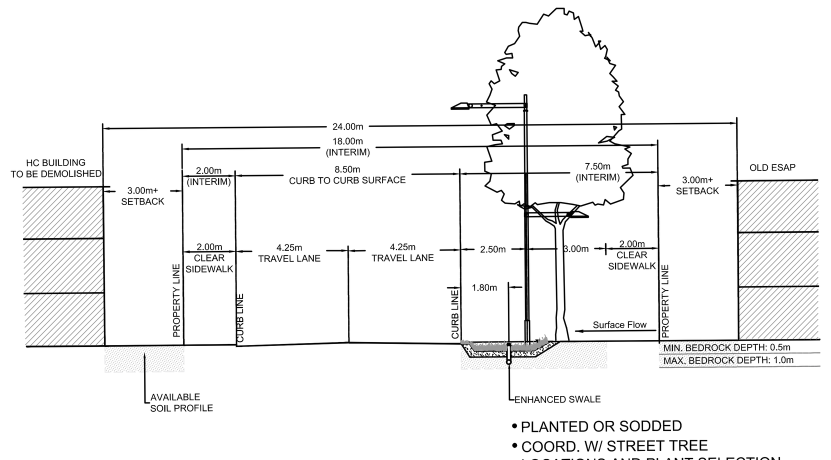
TARGETED PERCENTAGE OF ROW WIDTH ALLOCATED FOR NON-AUTO USES (URBAN DESIGN MANUAL 2018): 40%
NON-AUTO PERCENTAGE ACHIEVED FOR THIS TYPICAL CROSS SECTION: 64%

NOTE:
BIOSWALE TO BE LOCATED IMMEDIATELY BEHIND THE CURB. BIOSWALE LOCATION CAN ALTERNATE ON EITHER SIDE OF THE ROADWAY. TO BE IMPLEMENTED WHERE FEASIBLE.



34.0m ROW WITHOUT MEDIAN
COLOMBINE DRIVEWAY (FROM GOLDENROD TO PARKDALE)

TARGETED PERCENTAGE OF ROW WIDTH ALLOCATED FOR NON-AUTO USES (URBAN DESIGN MANUAL 2018): 40%
NON-AUTO PERCENTAGE ACHIEVED FOR THIS TYPICAL CROSS SECTION: 71%

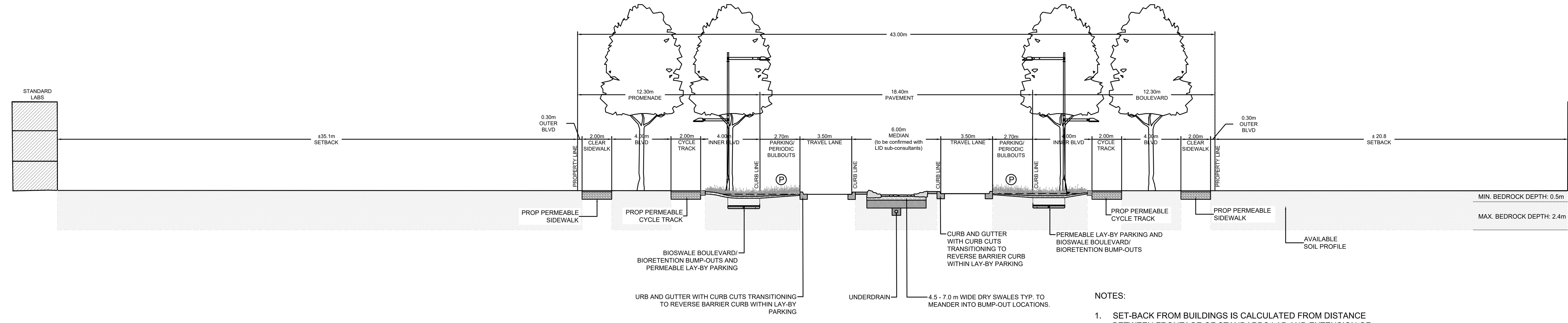


- PLANTED OR SODDED
- COORD. W/ STREET TREE LOCATIONS AND PLANT SELECTION

TARGETED PERCENTAGE OF ROW WIDTH ALLOCATED FOR NON-AUTO USES (URBAN DESIGN MANUAL 2018): 40%
NON-AUTO PERCENTAGE ACHIEVED FOR THIS TYPICAL CROSS SECTION: 53%

NOTE:
STAGE 1 IMPLEMENTATION: 18.0m + 3.0m + 3.0m = 24.0m
EFFECTIVE WIDTH BETWEEN BUILDINGS = 24.03m TO 24.12m ON STREET ALTERNATING PARKING

18.0m ROW
STAGE 1 IMPLEMENTATION - CHARDON
(FROM SORREL TO EGLANTINE)



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NON-AUTO PERCENTAGE ACHIEVED FOR THIS TYPICAL CROSS SECTION: 71%

DRY SWALE PROFILE 4.5 m WIDE. HARDEN DRY SWALE BOTTOM TO ACTIVATE PLAZAS, SEATING NODES, ETC. WITH SHALLOW FLOWS DURING RAIN EVENTS.

43.0m ROW
WITH LID IN MEDIAN
TUNNEY'S PASTURE DRIVEWAY
(FROM COLOMBINE TO YARROW)

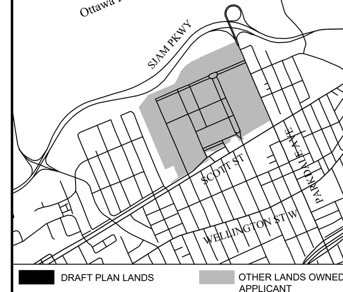
NOTES:

1. SET-BACK FROM BUILDINGS IS CALCULATED FROM DISTANCE BETWEEN FRONTAGE OF STANDARDS LAB AND EXTENSION OF FRONTAGE OF R.H. COATS BUILDING.
2. ROW WIDTH CAN BE FURTHER REDUCED BY KEEPING SINGLE-ROW OF TREES ON EITHER SIDE.
3. MEDIAN MAY RESULT IN SIGHT LINE ISSUES AT INTERSECTIONS ALONG TUNNEY'S PASTURE DRIVEWAY, ESPECIALLY IF THERE IS VEGETATION/PLANTINGS WITHIN CLOSE PROXIMITY TO THESE JUNCTIONS.
4. ONE-WAY VEHICLE LANES SEPARATED BY A MEDIAN ARE LIKELY TO ENCOURAGE HIGHER OPERATING SPEEDS AND MAY NOT BE COMPATIBLE A WITH 40KM/H POSTED SPEED WITHOUT SIGNIFICANT TRAFFIC CALMING MEASURES.
5. LID EFFICIENCY IN MEDIAN IS NOT OPTIMAL. LID IS RECOMMENDED BEHIND THE CURB.

PUBLIC ROAD REDEVELOPMENT

TUNNEY'S PASTURE
OTTAWA, ON

KEY PLAN - N.T.S.



DRAFT PLAN LANDS | OTHER LANDS OWNED BY APPLICANT

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SCALE CHECK 1 in 10mm