CONROY ROAD SANITARY SEWER EXTENSION
DESIGN BRIEF



Project No.: CCO-25-1505

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1.0 PROJECT DESCRIPTION

1.1 Purpose of Report

Egis Canada Ltd. (Egis) has been retained by WO MW Realty Limited to prepare this Sanitary Design Brief in support of the proposed sanitary sewer extension required to service the development at 3145 Conroy Road in the City of Ottawa.

The purpose of this report is to document the design basis, servicing strategy, and hydraulic assessment for the proposed sanitary sewer extension from the existing 1200mm diameter trunk sanitary sewer located within Johnston Road to the subject property along Conroy Road. The report provides supporting rationale for the proposed design approach, including consideration of interim and future tributary drainage conditions, applicable City of Ottawa design requirements, and site-specific constructability constraints.

This report has been prepared to support the Site Plan Control approval process and should be read in conjunction with the associated sanitary design drawings, drainage area plans, sewer design sheets, and supporting technical studies included within the appendices.

1.2 Project Description

The subject lands consist of approximately 4.86ha of industrial-zoned property located on the east side of Conroy Road north of Johnston Road. The proposed development consists of an industrial building with associated parking and servicing infrastructure requiring connection to the municipal sanitary system.

As municipal sanitary servicing is not currently available along the Conroy Road frontage, a new sanitary sewer extension is proposed from the existing trunk sanitary sewer located within Johnston Road. The proposed sanitary sewer will extend approximately 229m north along Conroy Road to provide servicing to the subject site and to accommodate potential future servicing opportunities for adjacent frontage lands.

Throughout the design development process, several sanitary sewer connection and drop structure alternatives were evaluated with consideration for constructability, maintenance requirements, operational performance, lifecycle implications and compliance with applicable City of Ottawa and MECP design criteria. The assessment also considered both interim and ultimate servicing conditions to support the long-term servicing objectives of the area.

1.3 Study Area and Servicing Limits

The sanitary design considers not only the subject development but also the broader tributary lands fronting the proposed sanitary extension along Conroy Road, consistent with City of Ottawa Sewer Design Guidelines requirements for sewer sizing based on the ultimate drainage area.

Sanitary drainage area plans have been prepared to assess the following servicing scenarios:

- Site-only servicing condition (interim condition)
- Near-term development condition including adjacent City lands
- Future development condition including additional frontage lands
- Ultimate tributary servicing condition

These scenarios were evaluated to confirm the adequacy of the proposed sanitary sewer sizing and to assess hydraulic performance under both interim and long-term servicing conditions.

1.4 Approvals and Review Process

The proposed sanitary servicing works are subject to review and approval through the City of Ottawa Site Plan Control process. As part of the review process, the City requested additional documentation to support the sanitary sewer sizing, tributary drainage assumptions and the evaluation of drop structure alternatives at the trunk sewer connection.

This design brief has been prepared to address these review comments and to provide supporting engineering rationale for the proposed design approach, including discussion of hydraulic performance, servicing assumptions and constraints associated with the deep sanitary trunk connection.

The proposed sanitary sewer extension will be reviewed and approved through the City of Ottawa's Consolidated Linear Infrastructure (CLI) approval process. The design has been completed in accordance with the *Design Criteria for Sanitary Sewers, Storm Sewers and Forcemains for Alterations Authorized under an Environmental Compliance Approval*, and the proposed works have been developed to satisfy the applicable design, hydraulic, and operational requirements outlined therein.

2.0 BACKGROUND INFORMATION AND REFERENCES

2.1 Background Information

The proposed sanitary servicing strategy for 3145 Conroy Road has been developed based on review of available background information, existing record drawings, site survey information, applicable City of Ottawa guidelines and supporting technical investigations. The design has also been informed by City review comments received through the Site Plan Control process, including requests to assess the full tributary drainage area fronting the proposed sanitary extension and to further evaluate sanitary sewer connection and drop structure alternatives to support the connection at Johnston Road.

The subject site is currently not serviced from a municipal sanitary perspective. As documented in the Site Servicing & Stormwater Management Report, the nearest municipal sanitary sewer is the existing 1200mm concrete sanitary sewer within Johnston Road and a new sanitary sewer extension is therefore required to service the proposed development.

To address the City's review comments, sanitary drainage area plans were prepared for multiple servicing scenarios, including interim, future, and ultimate tributary conditions. These plans assess not only the subject site at 3145 Conroy Road, but also adjacent frontage lands that may reasonably connect to the proposed extension over time. Corresponding sanitary sewer design sheets were prepared for each scenario to review design flows, hydraulic capacity and pipe velocities for each sewer segment.

In addition to the drainage area and hydraulic design work, the design has considered available supporting information including zoning mapping, existing as-built drawings, topographic survey information and other technical investigations appended to this submission.

2.2 Applicable Design Guidelines and Standards

The sanitary sewer extension has been designed generally in accordance with the following documents:

- City of Ottawa Sewer Design Guidelines, Second Edition, October 2012, including applicable technical bulletins and amendments
- Design Guidelines for Sewage Works, Ministry of the Environment, Conservation and Parks
- Design Criteria for Sanitary Sewers, Storm Sewers and Forcemains for Alterations Authorized under an Environmental Compliance Approval
- Ontario Provincial Standard Drawings and Specifications (OPSD/OPSS), where applicable
- City of Ottawa Standard Tender Documents and Standard Details, where applicable
- City of Ottawa Sewer Use By-law, where applicable

The City of Ottawa Sewer Design Guidelines require that sanitary sewers be sized based on the ultimate sewage flows expected from the tributary area, and that sanitary sewers be designed to achieve a minimum full-flow velocity of 0.6m/s and a maximum full-flow velocity of 3.0m/s. The proposed sewer extension has been reviewed in this context using interim, future and ultimate servicing scenarios.

2.3 Pre-Consultation and Design Development Process

A pre-consultation meeting was previously completed for the proposed development, during which it was confirmed that municipal sanitary servicing is not currently available to the site and that a sanitary sewer extension from Johnston Road would be required. As documented in the Site Servicing Report, preliminary servicing strategies included extending the sewer along Conroy Road or obtaining servicing access through adjacent lands.

During the design development stage, two potential sanitary sewer alignments within the Conroy Road right-of-way were evaluated:

- East boulevard alignment
- Median alignment

The east boulevard alignment was initially considered due to its separation from existing backbone watermain however review of available utility information identified potential conflicts with existing telecommunications infrastructure, including Bell fibre located within the boulevard and sidewalk corridor. Installation of the sanitary sewer in this location would have introduced increased risk of utility conflicts, potential service disruptions and possible relocation requirements for critical communications infrastructure.

Based on discussions with the City of Ottawa, the median alignment was identified as the preferred approach, despite the presence of an existing 400mm diameter backbone watermain within the median. The median alignment was considered preferable from an overall municipal servicing coordination perspective and reduced the risk of conflicts with private utilities located within the boulevard. The selected median alignment also provides improved opportunities for future connections to the sanitary sewer, as Conroy Road consists of a four-lane cross-section. A boulevard alignment would require significantly longer service connections and additional road crossings, which would increase both construction complexity and long-term maintenance considerations.

To mitigate potential risks to the existing watermain during construction, the sanitary sewer alignment was designed to maintain separation distances exceeding minimum regulatory requirements. While applicable guidance typically requires a minimum horizontal separation distance of 2.5m between sanitary sewers and watermains, the proposed design maintains a minimum separation of approximately 4.0m at the closest point near the subject site, with separation increasing further toward the Johnston Road connection where the watermain diverges from the sanitary alignment.

This increased separation distance was intentionally incorporated to reduce construction risk to the existing watermain, improve constructability and provide additional tolerance for excavation support requirements. The selected median alignment therefore represents the lowest overall servicing and construction risk solution based on City input and utility coordination considerations.

In addition to alignment discussions, coordination meetings were also held with the City regarding the proposed connection to the existing deep trunk sanitary sewer at Johnston Road. Due to the significant depth of the existing sewer (approximately 9.9m), a conventional drop structure solution presents constructability challenges within the arterial roadway intersection, including deep excavation requirements, traffic staging impacts/signal impacts, and increased complexity associated with utility coordination.

During discussions with the City, Egis reviewed a range of potential connection and drop structure configurations to accommodate the proposed sanitary sewer connection to the existing trunk sewer at Johnston Road. Alternatives considered during design development included external drop structures, internal vortex drop structures and hybrid arrangements incorporating features of both approaches. Each alternative was evaluated with consideration for hydraulic performance, constructability, maintenance access, operational requirements, impacts to existing infrastructure and compliance with applicable design criteria.

As part of the evaluation, consideration was given to the physical constraints associated with the existing trunk sewer connection, including the existing maintenance hole configuration, depth of infrastructure, utility conflicts, excavation requirements and potential impacts to ongoing operation of the trunk sewer system. The assessment also considered the extent of modifications that may be required to existing infrastructure to accommodate various drop structure arrangements.

Through the design development process, it was recognized that multiple alternatives were determined to be technically feasible based on the design evaluation, subject to utility coordination, structural assessment of existing infrastructure and City approval. The relative advantages and limitations of each alternative were evaluated with consideration for constructability, long-term maintenance requirements, lifecycle implications and operational performance.

City staff provided input regarding the evaluation of drop structure alternatives and indicated that the selected approach should maintain the intended hydraulic function of the connection while satisfying applicable City requirements. The City also identified the value of incorporating vortex drop technology where appropriate to enhance hydraulic performance and energy dissipation characteristics.

The City requested that additional context and engineering rationale be provided within the Design Brief to document the constraints associated with the trunk sewer connection and the evaluation of potential servicing alternatives. Detailed design information, including supporting manufacturer information and shop drawings where required, will be submitted for review and approval through the applicable City processes.

The design development process therefore reflects ongoing coordination with City staff and incorporates consideration of multiple technically feasible alternatives to address the trunk sewer connection while maintaining appropriate hydraulic performance, constructability, operability and long-term maintenance objectives.

2.4 Supporting Technical Studies

The sanitary sewer design has been developed based on available background information, field investigations, and supporting technical studies prepared as part of the overall servicing design. These documents provide supporting information regarding existing conditions, subsurface constraints, and design considerations relevant to the proposed sanitary extension.

Supporting documentation included in the appendices includes:

- Sanitary drainage area plans for interim, future, and ultimate servicing scenarios
- Sanitary sewer design sheets documenting design flows, pipe sizing, and hydraulic performance
- Existing record drawings and available municipal infrastructure information
- Topographic survey information
- Zoning and land use mapping
- Subsurface Utility Engineering (SUE) investigation to identify existing utility constraints

- Geotechnical investigation to characterize subsurface conditions and support trench design considerations
- Soil characterization information to support excavation planning and excess soils management requirements
- Dewatering considerations associated with the deep sanitary sewer installation

These supporting documents were used to confirm the feasibility of the proposed sanitary sewer alignment, identify utility conflicts, assess construction constraints, and verify hydraulic performance of the proposed design.
The sanitary sewer design sheets were also independently reviewed and verified to confirm compliance with City of Ottawa design criteria, including confirmation that minimum self-cleansing velocity requirements are achieved under interim and future servicing conditions.

3.0 EXISTING CONDTIONS

3.1 Existing Sanitary Infrastructure

The subject site at 3145 Conroy Road is not currently serviced by municipal sanitary infrastructure. The nearest available municipal sanitary sewer is an existing 1200mm diameter concrete trunk sanitary sewer located within Johnston Road, south of the site.

The proposed sanitary servicing strategy involves extending a new sanitary sewer from this existing trunk sewer north along Conroy Road to service the proposed development and to accommodate potential future connections from adjacent frontage lands.

Based on available record information, the existing trunk sewer is located at significant depth at the connection location, requiring a deep connection and the use of a drop structure to facilitate the proposed tie-in.

3.2 Existing Utility Infrastructure

The Conroy Road corridor contains significant existing municipal and private infrastructure which influenced the proposed sanitary sewer alignment and construction approach. Major existing infrastructure within the study limits includes:

- 400 mm diameter ductile iron watermain within the Conroy Road median
- Large diameter trunk storm sewer infrastructure within the corridor
- Smaller diameter local storm sewer infrastructure and catchbasin leads
- Telecommunications infrastructure including fibre within the boulevard corridor
- Natural gas infrastructure
- Streetlighting infrastructure and associated duct banks

- Traffic plant infrastructure including conduits, loops, and handholes
- Catchbasins and associated drainage infrastructure

Due to the density of existing infrastructure within both the boulevard and median corridors, the sanitary sewer design required careful consideration of utility conflicts, construction tolerances, and long-term servicing considerations.

Given the number of existing utilities within the corridor, construction of the sanitary sewer extension will require careful utility coordination, verification of existing infrastructure locations, and appropriate excavation support and utility support measures to minimize risk to existing utilities.

Subsurface Utility Engineering (SUE) information was reviewed to support identification of potential conflicts and inform the final sewer alignment.

3.3 Existing Topography and Depth Constraints

Review of available topographic survey information indicates that Conroy Road generally slopes toward Johnston Road at an approximate longitudinal grade of 1.0% along the proposed sanitary sewer corridor.

The proposed sanitary sewer profile was developed to generally follow the roadway grade. Maintaining a similar longitudinal slope allows the sewer to be installed with consistent cover while minimizing excavation depths along the alignment. A design slope of approximately 1.0% was therefore adopted for the proposed sanitary sewer extension.

This approach allows the proposed sewer to maintain the City of Ottawa minimum cover requirement of 2.5m along the alignment while also supporting appropriate hydraulic performance.

The existing trunk sanitary sewer within Johnston Road is located at a significantly greater depth than the proposed sewer extension. As a result, a drop structure is required at the connection to accommodate the elevation difference between the proposed sanitary sewer and the existing trunk sewer while maintaining the established sewer profile along Conroy Road.

The proposed sanitary sewer therefore maintains a relatively uniform profile along the alignment, with the additional depth requirements being localized to the connection area at Johnston Road. The connection approach and associated drop structure strategy were developed with consideration for hydraulic performance, constructability, maintenance requirements, impacts to existing infrastructure and long-term operational objectives.

These site-specific constraints informed the assessment of feasible connection and drop structure alternatives and the development of the proposed servicing strategy presented herein.

4.0 PROPOSED SANITARY SERVICING STRATEGY

4.1 Overview of Proposed Sanitary Extension

A new municipal sanitary sewer is proposed to extend from the existing 1200mm diameter trunk sanitary sewer located within Johnston Road north along Conroy Road to service the proposed development at 3145 Conroy Road. The sanitary extension is approximately 229m in length and will be constructed within the Conroy Road median.

The proposed sewer will also provide servicing opportunities for adjacent frontage lands consistent with City of Ottawa servicing objectives and design requirements to consider the full tributary drainage area fronting the sewer.

4.2 Design Objectives

The proposed sanitary sewer design was developed to achieve the following objectives:

- Provide sanitary servicing to the proposed development
- Size the sewer to accommodate tributary frontage lands in accordance with City guidelines
- Minimize utility conflicts within the corridor
- Maintain minimum cover requirements
- Achieve minimum hydraulic velocity requirements
- Allow flexibility for future servicing connections
- Provide a sanitary sewer connection to the existing trunk sewer that satisfies applicable hydraulic, operational and regulatory requirements
- Incorporate constructability, maintenance requirements, lifecycle considerations and existing infrastructure constraints into the development of the proposed servicing solution

4.3 Sewer Alignment Rationale

As discussed previously, alternative sanitary alignments within both the boulevard and median were reviewed during design development. The median alignment was selected following discussions with the City due to reduced conflicts with telecommunications infrastructure and improved long-term servicing efficiency for future connections.

Locating the sewer within the median also reduces the length of future service connections given the four-lane cross-section of Conroy Road. A boulevard alignment would require longer service laterals and additional crossings of the roadway, increasing both construction complexity and future maintenance considerations.

The proposed sanitary alignment was also positioned to maintain increased separation from the existing median watermain to reduce construction risk. A minimum horizontal separation of approximately 4.0m is maintained at the closest location, exceeding typical minimum requirements.

4.4 Sewer Profile and Design Parameters

The proposed sanitary sewer consists of a 250mm diameter PVC sewer designed at an approximate slope of 1.0%, generally following the longitudinal grade of Conroy Road. This approach minimizes excavation depth while maintaining the City's minimum cover requirement of 2.5m along the alignment.

The 250mm diameter was selected to satisfy City minimum pipe size requirements for municipal sanitary sewers and to allow accommodation of future development connections along the corridor.

The sewer was designed using the following general parameters:

- Minimum pipe diameter: 250mm
- Manning's roughness coefficient: 0.013
- Minimum full-flow velocity: 0.6m/s
- Maximum full-flow velocity: 3.0m/s
- Minimum cover: 2.5m

4.5 Maintenance Holes

Two new maintenance holes are proposed as part of the sanitary sewer extension to provide access for maintenance and inspection and to facilitate the connection to the existing trunk sewer.

The proposed maintenance holes will consist of 1200mm diameter precast concrete maintenance holes constructed in accordance with OPSD standards and City of Ottawa Sewer Design Guidelines. Standard City frames and covers will be provided. Larger diameter maintenance hole structures may be required at the trunk sewer connection location to accommodate the proposed drop structure configuration, subject to the manufacturer's requirements and applicable design standards.

Maintenance hole spacing has been designed in accordance with City of Ottawa requirements, which permit a maximum spacing of 120m for a 250mm diameter sanitary sewer. The proposed sewer segments are approximately 114.5m in length, which complies with this requirement.

5.0 SANITARY FLOW ASSESSMENT

5.1 Design Criteria

Sanitary flows for the proposed sewer extension were calculated in accordance with the City of Ottawa Sewer Design Guidelines (2012) and applicable technical bulletins. The sewer was designed to accommodate flows from the subject development as well as potential future tributary lands fronting the sewer extension.

The following sanitary design criteria were applied:

General Hydraulic Criteria:

- Minimum sanitary sewer diameter: 250mm
- Manning's roughness coefficient: 0.013
- Minimum full-flow velocity: 0.6m/s
- Maximum full-flow velocity: 3.0m/s
- Minimum cover: 2.5m

Land Use Flow Criteria:

- Average residential flow: 280L/cap/day
- Population density (Neighbourhood zoning): 60 persons/gross hectare
- Average industrial flow: 55,000L/gross ha/day
- Average commercial flow: 28,000L/gross ha/day
- Truck wash flow: 400L per truck wash (per Ottawa Sewer Design Guidelines)

Peaking Factors:

- Industrial/Institutional peaking factor: 5.1 (Ottawa Sewer Design Guidelines Appendix 4-B)
- Commercial peaking factor: 1.5 (Ottawa Sewer Design Guidelines)
- Residential peaking factor: Harmon Formula

Allowance Factors:

- Infiltration allowance: 0.33L/s/gross hectare

As the proposed sanitary sewer is part of a separate sanitary system and not a combined sewer, foundation drains from future development are not anticipated to discharge to the sanitary system. Consistent with current

City of Ottawa servicing practices, foundation drainage is expected to discharge to the storm system. As a result, no additional allowance for foundation drain extraneous flows was included beyond the standard infiltration allowance.

For lands zoned Neighbourhood, sanitary flows were initially calculated using the residential population density assumption of 60 persons per gross hectare and an average residential flow of 280L/cap/day. However, this approach resulted in lower design flows than would be expected if these lands were to redevelop with mixed-use or commercial uses, which are permitted within the zoning framework.

Two of the tributary properties currently contain commercial-type developments (including office and fuel service uses) that are presently serviced through alternative sanitary connections. Given their frontage along Conroy Road, these properties could reasonably connect to the proposed sanitary sewer extension in the future if servicing arrangements change or redevelopment occurs.

To provide a conservative assessment of long-term sanitary capacity, these lands were therefore evaluated using commercial flow criteria based on gross site area, as this approach results in higher flows than the residential population-based method. This conservative assumption was adopted solely to confirm that the proposed sewer has adequate capacity under potential future servicing conditions and does not represent a commitment regarding future servicing strategy.

6.0 TRIBUTARY DRAINAGE SCENARIOS

6.1 Overview

In response to City review comments requesting that the sanitary sewer be designed based on the drainage area fronting the sewer and not solely the proposed development, multiple tributary drainage scenarios were evaluated.

Sanitary drainage area plans and corresponding sewer design sheets were prepared to assess interim, future and ultimate servicing conditions. These scenarios were developed to confirm that the proposed sanitary sewer provides adequate capacity and hydraulic performance under both initial servicing conditions and potential future development scenarios.

6.2 Servicing Scenarios Considered

The following servicing scenarios were evaluated:

- Scenario 1 – Interim Condition (Subject Site Only)
  This scenario considers sanitary flows generated solely from the proposed development at 3145 Conroy Road. This represents the initial operating condition following construction of the sewer extension.
- Scenario 2 – Interim Condition Including Adjacent City Lands
  This scenario includes flows from the subject site as well as adjacent City-owned lands identified during pre-consultation as having future development potential.

- Scenario 3 – Future Development Condition
  This scenario includes the subject site, adjacent City lands, and additional frontage lands along Conroy Road that could reasonably connect to the proposed sanitary sewer as part of future redevelopment.

- Scenario 4 – Ultimate Tributary Condition
  This scenario represents a conservative long-term servicing condition including all tributary frontage lands that could potentially connect to the proposed sewer extension.

6.3 Hydraulic Assessment of Scenarios

Sanitary sewer design sheets were prepared for each scenario to evaluate pipe capacity, flow depth and velocity within each sewer segment. The analysis confirmed that the proposed 250mm sanitary sewer provides adequate hydraulic capacity under all servicing scenarios.

Hydraulic review confirms that the proposed sewer achieves the City of Ottawa velocity requirement of 0.6m/s under all scenarios, including the interim condition where only the subject site is connected.

A summary of the calculated velocities for each scenario is provided in the following table:

Scenario	Description	Pipe Segment MH1-MH2 Velocity (m/s)	Pipe Segment MH1-MH2 Capacity (%)	Pipe Segment MH2-EX Velocity (m/s)	Pipe Segment MH2-EX Capacity (%)
1	Interim – 3145 Conroy only	0.69	6	0.70	7
2	Interim – 3145 + adjacent City lands	1.11	34	1.11	34
3	Future Conroy frontage condition	1.15	39	1.21	48
4	Ultimate tributary condition	1.27	62	1.31	70

7.0 HYDRAULIC DESIGN ASSESSMENT

7.1 Hydraulic Design Methodology

Hydraulic analysis of the proposed sanitary sewer was completed using Manning's equation to confirm pipe capacity, flow depth and velocity under each servicing scenario.

The Manning equation used in the analysis is:

$$Q = \frac{1}{n} A R^{2/3} S^{1/2}$$

Where:

- Q = Flow (m^3/s)
- n = Manning's roughness coefficient (0.013)
- A = Flow area (m^2)
- R = Hydraulic radius (m)
- S = Pipe slope (m/m)

Pipe flow depths and velocities were determined using standard circular pipe hydraulic relationships consistent with industry practice and City of Ottawa design methodology.

7.2 Pipe Capacity Assessment

The proposed 250mm sanitary sewer has a full flow capacity of approximately 62.0L/s at the design slope of 1.0%, based on Manning's equation and City of Ottawa design charts.

Hydraulic analysis confirms that under all servicing scenarios, the proposed sanitary sewer operates well below full capacity. Under ultimate servicing conditions, the sewer utilizes approximately 70% of available capacity, confirming that the proposed pipe size is appropriate for both interim and future conditions.

7.3 Velocity Assessment

Hydraulic review confirms that the proposed sanitary sewer achieves the City of Ottawa minimum velocity requirement of 0.6m/s under all servicing scenarios.

Even under interim conditions where only the subject development is connected, calculated velocities exceed the minimum requirement. Velocities increase under future servicing scenarios as additional tributary flows enter the system.

Based on this review:

- Minimum self-cleansing velocity requirements are satisfied
- No low-flow operational concerns are anticipated
- No special maintenance measures are required

7.4 Flow Depth and Hydraulic Performance

Review of flow depth to diameter ratios confirms that the sewer operates within acceptable hydraulic limits under all scenarios and does not approach surcharge conditions.

The sewer operates partially full under all servicing scenarios, consistent with typical municipal sanitary sewer design practice. This confirms adequate hydraulic capacity and appropriate pipe sizing.

7.5 Hydraulic Design Summary

Based on the hydraulic analysis completed:

- The proposed 250mm sanitary sewer provides adequate hydraulic capacity
- Minimum velocity requirements are achieved under interim and future conditions
- The sewer does not operate under surcharge conditions

- The proposed slope of 1.0% provides appropriate hydraulic performance
- The proposed design satisfies City of Ottawa sanitary sewer design criteria

The hydraulic assessment confirms the proposed sanitary sewer design is appropriate for both initial servicing and long-term development conditions.

8.0 DEEP TRUNK CONNECTION CONSTRAINTS

8.1 Existing Trunk Sewer Constraints

The proposed sanitary sewer extension connects to the existing 1200mm diameter trunk sanitary sewer located within Johnston Road. Based on available information, the existing sewer is located at significant depth, resulting in a connection depth of approximately 9.9m.

This depth presents constructability challenges associated with:

- Deep excavation within a major arterial intersection
- Traffic staging constraints
- Temporary excavation support requirements
- Groundwater management considerations
- Coordination with existing utilities

Due to the elevation difference between the proposed sewer and the trunk system, a drop structure is required to facilitate the connection.

8.2 Drop Structure Alternatives Considered

In accordance with City of Ottawa Sewer Design Guidelines Section 6.2.14, external drop structures are typically preferred unless site constraints limit their feasibility. As part of the design process, multiple drop structure configurations were reviewed to determine the most practical solution.

- Alternatives reviewed included:
    - External Drop Structure:
        - An external drop structure was evaluated to accommodate the elevation difference between the proposed sanitary sewer and the existing trunk sewer. Under this approach, flow would be conveyed through an external drop chamber adjacent to the connection maintenance hole prior to discharge into the existing trunk sewer system.

- Internal Drop Structure:
  - An internal vortex drop structure was evaluated as an alternative means of conveying flow to the existing trunk sewer. This approach incorporates a vortex drop pipe installed within a suitably sized maintenance hole structure to provide controlled flow conveyance, energy dissipation and maintenance access within a single structure.
- Combined External Drop Structure with Internal Vortex Drop Pipe:
  - A combined configuration incorporating both an external drop structure and an internal vortex drop arrangement was also evaluated. Under this approach, flow would be conveyed through an external drop chamber before entering a vortex drop structure at the trunk sewer connection, providing a combination of external conveyance and internal energy dissipation.

Each alternative was reviewed with consideration for hydraulic performance, constructability, maintenance requirements, impacts to existing infrastructure, operational considerations, and compliance with applicable City of Ottawa and MECP design criteria.

8.3 Alternative Evaluation Considerations

The drop structure alternatives reviewed during the design process were assessed with consideration for hydraulic performance, constructability, maintenance requirements, impacts to existing infrastructure, utility coordination, traffic management and long-term operational objectives. The following sections summarize the key considerations that informed the development of the proposed servicing strategy.

- Hydraulic Performance:

  Hydraulic performance was a key consideration in the evaluation of the drop structure alternatives. The proposed connection must adequately convey sanitary flows from the proposed sewer extension to the existing trunk sanitary sewer while accommodating the significant elevation difference at the connection location.

  External drop structures, internal vortex drop structures and combined configurations are all feasibile methods of managing vertical sewer drops and providing controlled flow conveyance to the receiving sewer. The alternatives assessed are each capable of satisfying the hydraulic requirements of the project when designed in accordance with applicable City of Ottawa and MECP design criteria.

  As a result, hydraulic performance was not considered a limiting factor in the assessment of alternatives, allowing greater emphasis to be placed on constructability, maintenance requirements, impacts to existing infrastructure and long-term operational considerations.

- Constructability:

Constructability was a key consideration in the evaluation of the drop structure alternatives due to the depth of the existing trunk sanitary sewer connection, the location of the works within the Conroy Road and Johnston Road intersection and the presence of existing underground utilities and infrastructure.

All alternatives reviewed are considered technically feasible; however, each presents differing construction requirements and associated constraints. The external drop structure alternative requires the greatest excavation footprint and deepest excavation adjacent to the existing trunk sewer connection, resulting in increased requirements for shoring, utility support, traffic staging and construction sequencing. Excavation depths of approximately 9-10m are anticipated in the vicinity of the connection.

The internal vortex drop structure alternative would reduce the extent of new external infrastructure but would require modification or reconstruction of the existing maintenance hole structure to accommodate the vortex drop unit. This introduces additional considerations associated with working within and modifying existing trunk sewer infrastructure.

The combined external drop structure and internal vortex drop structure alternative presents many of the same constructability considerations associated with both approaches, including deep excavation requirements and modifications at the connection structure.

For all alternatives, construction activities would require coordination with existing utilities and infrastructure within the Johnston Road intersection, including traffic signal and hydro/streetlighting duct banks, catchbasin leads and existing gas infrastructure. Temporary support, protection, or localized adjustments may be required to maintain service continuity during construction. These requirements are typical of deep sewer construction within urban arterial road corridors and can be addressed through standard construction practices.

While the nature and extent of construction activities vary between alternatives, constructability considerations formed an important component of the overall alternatives assessment.

- Operations and Maintenance:

  Long-term operations and maintenance requirements were also considered in the evaluation of the drop structure alternatives. Key considerations included maintenance access, inspection requirements, operational reliability and the ability to safely access and maintain the connection infrastructure over the service life of the system.

  External drop structures provide separate access to the drop chamber and receiving maintenance hole, allowing inspection and maintenance activities to be undertaken without requiring access to specialized internal components. This arrangement may simplify routine maintenance activities and is consistent with the City's generally preferred approach for significant sewer drops.

Internal vortex drop structures consolidate the drop and maintenance functions within a single structure and provide controlled energy dissipation within the maintenance hole. However, larger diameter maintenance hole structures may be required to accommodate the vortex unit and provide acceptable maintenance access.

Combined configurations incorporate elements of both approaches and require consideration of maintenance access to both the external and internal drop structure components.

All alternatives considered can be designed to provide adequate maintenance access and operational functionality when constructed in accordance with applicable design standards and manufacturer recommendations. Operations and maintenance considerations nevertheless formed an important component of the alternatives assessment, particularly given the depth of the trunk sewer connection and the long-term servicing requirements of the system.

- Existing Infrastructure Constraints:

  The external drop structure alternative generally minimizes modifications to the existing trunk sewer maintenance hole by locating the majority of the drop infrastructure outside the existing structure. However, the larger excavation footprint and additional infrastructure associated with this alternative increase the potential for conflicts with adjacent utilities and infrastructure, including the existing Bell fibre vault located near the proposed connection.

  The internal vortex drop structure alternative reduces the overall surface footprint of the drop infrastructure but would require modification or reconstruction of the existing maintenance hole to accommodate the vortex drop unit. This approach introduces additional considerations related to the condition of the existing structure, construction within an active trunk sewer system, and the integration of new infrastructure within the existing chamber.

  Combined configurations incorporate elements of both approaches and may require both deep excavation adjacent to the existing maintenance hole and modifications within the receiving structure.

- Utility Coordination:

  Existing utility infrastructure in the vicinity of the connection includes traffic signal and hydro/streetlighting duct banks, catchbasin leads, gas infrastructure, telecommunications infrastructure and fibre optic facilities. Utility coordination may be required to facilitate infrastructure protection, temporary support measures, and potential utility relocations, depending on the selected drop structure configuration and construction methodology.

- Traffic Management:

  Traffic management considerations were evaluated as part of the assessment of drop structure alternatives due to the location of the proposed connection within the Conroy Road and Johnston Road intersection.

Construction activities will require coordination within an active roadway corridor while maintaining safe access for vehicular, pedestrian, cyclist, and transit movements.

The external drop structure alternative results in a larger construction footprint within the intersection area and may require more extensive traffic staging and lane closures during construction. The internal vortex drop structure alternative generally reduces the overall surface footprint of the works; however, significant traffic control measures may still be required to facilitate excavation and modifications to the existing maintenance hole structure. Combined configurations present considerations associated with both approaches.

While the extent and duration of traffic impacts vary between alternatives, all options can be accommodated through standard traffic management and construction staging practices in accordance with applicable City requirements. Traffic management considerations formed an important component of the overall alternatives assessment due to the operational significance of the intersection and the need to minimize disruption during construction.

- Long Term Operational Considerations:

  Long-term operational considerations were evaluated as part of the assessment of drop structure alternatives to ensure reliable operation of the sanitary sewer system over its service life. Key considerations included system reliability, maintenance accessibility, inspection requirements, resilience of the connection infrastructure and the ability to accommodate future maintenance activities.

  External drop structures provide separation between the drop infrastructure and the receiving maintenance hole which can simplify future inspection and maintenance activities and reduce the need to work within the trunk sewer structure. Internal vortex drop structures consolidate the drop function within a single structure and provide effective flow control and energy dissipation but may require larger maintenance hole structures and specialized components. Combined configurations incorporate elements of both approaches and require consideration of operational requirements for multiple system components.

  All alternatives considered can provide acceptable long-term operational performance when designed and constructed in accordance with applicable standards and manufacturer recommendations. Long-term operations, maintenance accessibility and system reliability were therefore important considerations in the overall evaluation of alternatives and development of the proposed servicing strategy.

9.0 SUPPORTING TECHNICAL STUDIES SUMMARY

9.1 Overview

The sanitary sewer design was supported by several technical investigations and background studies to confirm existing conditions, identify potential constraints, and inform design decisions. These reports are included in the appendices and provide supporting information related to utilities, subsurface conditions, and construction considerations.

9.2 Subsurface Utility Engineering Summary

Subsurface Utility Engineering (SUE) information was reviewed to identify existing underground infrastructure within the Conroy Road corridor. The SUE investigation provided information regarding the location of existing water, storm, telecommunications, gas, and traffic infrastructure that could influence the proposed sanitary sewer alignment.

This information was used to:

- Assist in selection of the preferred sewer alignment
- Identify potential utility conflicts
- Support constructability review
- Inform separation requirements from existing infrastructure

Final utility locations will be confirmed by the Contractor through standard utility locate procedures prior to construction.

9.3 Geotechnical Investigation Summary

The geotechnical investigation indicates subsurface conditions generally consist of silty sand fill overlying native silty clay soils. Excavation conditions are generally consistent with Type 3 soils in accordance with OHSA classifications, with the potential for Type 4 conditions below groundwater levels.

Key geotechnical considerations include:

- Excavation Conditions: Deep excavation will require engineered trench support systems consistent with Type 3 soil conditions
- Backfill Suitability: Existing fill containing organics is generally unsuitable for reuse. Native soils may be reused subject to moisture conditioning. Granular materials are recommended in confined areas and adjacent to structures
- Road Reinstatement: Pavement reinstatement for Conroy Road is recommended to consist of approximately 50mm surface asphalt, 100mm binder asphalt, 150mm Granular A, and 450mm Granular B, or matching existing pavement structure where greater

These findings confirm that the proposed sanitary sewer can be constructed using conventional deep trench construction practices.

9.4 Soil Characterization Summary

A Due Diligence Soil Characterization Report was completed to assess the environmental quality of soils anticipated to be generated during construction of the sanitary sewer extension and to support excess soil management planning.

The investigation included drilling of three boreholes along the proposed sewer alignment and laboratory analysis of representative soil samples for petroleum hydrocarbons, metals, PAHs, and other potential contaminants of concern.

Key Findings:

The soil characterization identified the following general findings relevant to construction:

- Soils generally consist of fill over native silty clay materials typical of the Ottawa area
- Some deeper native soils contained elevated metals (vanadium and chromium) exceeding certain excess soil quality standards, likely related to naturally occurring Champlain Sea sediments common in the Ottawa region
- Some deeper soils may require disposal at an appropriate licensed landfill or reuse site depending on final characterization and receiver site requirements

The report also notes that additional soil characterization during construction could reduce disposal volumes through further sampling and segregation of materials.

Based on the analytical results:

- Some soils may be suitable for reuse on-site or at appropriate reuse sites subject to excess soil regulations
- Some soils may require disposal depending on final characterization and regulatory requirements
- Soil reuse opportunities may be confirmed through additional sampling and testing during construction

The acceptance of excess soils will ultimately depend on the receiving site's requirements and compliance with Ontario Regulation 406/19 (On-Site and Excess Soil Management).

The Soil Characterization Report recommends that soils be monitored during excavation for visual or olfactory evidence of potential impacts. If impacted soils are encountered, they should be segregated and managed appropriately.

During construction, a Qualified Person (QP) will be required to:

- Confirm soil characteristics during excavation
- Direct soil segregation if required

- Confirm reuse or disposal requirements
- Provide guidance on excess soil documentation
- Support preparation of excess soil tracking documentation where required

These measures will ensure excess soils are managed in accordance with applicable provincial regulations. Final excess soil management requirements will be determined by the Contractor in consultation with a Qualified Person during construction.

9.5 Dewatering Requirements

Construction of the proposed sanitary sewer will require deep excavation, particularly near the Johnston Road connection. Based on the hydrogeological investigation, temporary groundwater control measures will likely be required during construction to maintain safe excavation conditions.

Subsurface investigations indicate groundwater levels were encountered between approximately 2.6m and 4.5m below existing grade. The native soils generally consist of low permeability silty clay deposits, resulting in relatively low anticipated groundwater inflow rates.

Measured hydraulic conductivities were on the order of approximately 10^{-9} m/s, which is consistent with low permeability clay soils and indicates limited groundwater inflow potential during excavation.

A hydrogeological assessment was completed to estimate anticipated dewatering requirements for the conceptual excavation geometry. Based on this assessment, temporary construction dewatering volumes were estimated to be approximately:

- 17,769L/day (≈18 m^3/day)

This estimate includes groundwater inflow, incident precipitation, and a factor of safety applied to groundwater contributions.

Based on these estimates, dewatering volumes are anticipated to remain below 50,000L/day, which is generally considered minor construction dewatering.

Based on the estimated dewatering volumes, no Permit to Take Water (PTTW) is anticipated to be required for the conceptual excavation scenario. Construction dewatering activities may instead require registration under the Environmental Activity and Sector Registry (EASR) depending on the Contractor's final pumping methodology and volumes.

The Contractor will be responsible for confirming regulatory requirements and obtaining any required registrations or permits prior to construction.

Groundwater sampling and laboratory testing were completed as part of the hydrogeological investigation to assess discharge suitability. Results indicate groundwater quality is generally consistent with native soil conditions within the area.

Additional groundwater quality testing may be required during construction to confirm compliance with discharge requirements and to determine whether temporary treatment measures are required prior to discharge.

Due to the limited availability of local sanitary infrastructure along portions of Conroy Road, discharge of dewatering flows will require coordination with the City to identify an acceptable discharge location. Potential discharge options may include:

- Controlled discharge to the existing Johnston Road trunk sanitary sewer
- Discharge to the storm sewer system where permitted
- Alternative approved discharge locations

Any discharge to municipal infrastructure will be required to comply with the City of Ottawa Sewer Use By-law and will require a Private Water Discharge Agreement with the City.

Depending on groundwater quality, temporary treatment measures such as sediment tanks, filtration systems, or other best management practices may be required to meet discharge criteria.

During construction, the Contractor will be responsible for:

- Obtaining required permits or EASR registrations
- Confirming groundwater quality through field testing
- Retaining a Qualified Person (QP) to oversee excess soil and water management requirements
- Implementing temporary treatment measures if required
- Coordinating discharge approvals with the City
- Managing dewatering in accordance with Ontario Regulation 406/19 and City requirements

Based on the hydrogeological assessment, anticipated dewatering requirements are considered typical for deep sanitary sewer construction within clay soils. Estimated groundwater inflows are relatively minor and are not expected to present a constraint to construction of the proposed sanitary sewer extension.

9.6 Environmental Considerations

Environmental considerations associated with the proposed sanitary sewer construction primarily relate to erosion and sediment control (ESC), excess soil management, and groundwater discharge management during construction.

Construction within the Conroy Road right-of-way will require implementation of erosion and sediment control measures to prevent the migration of sediment into the municipal drainage system during excavation activities.

ESC measures will be implemented in accordance with City of Ottawa standards and specifications and typical urban construction practices. Typical measures are expected to include:

- Sediment control barriers where required
- Filter fabric protection beneath catchbasin grates within the work zone
- Temporary stockpile protection measures
- Stabilization of disturbed areas following construction
- Street cleaning as required to prevent sediment tracking
- Inspection and maintenance of ESC measures during construction

ESC measures will be maintained throughout construction and removed once disturbed areas are stabilized.

Excess soils generated during construction will be managed in accordance with Ontario Regulation 406/19 (On-Site and Excess Soil Management) and recommendations provided in the Soil Characterization Report.

A Qualified Person (QP) will be retained during construction to support soil management decisions including soil segregation, reuse suitability, and disposal requirements.

Temporary dewatering associated with construction will be managed in accordance with regulatory requirements and the City Sewer Use By-law. Groundwater discharge locations and any required treatment measures will be confirmed prior to construction.

Environmental impacts associated with the proposed sanitary sewer installation are typical of urban infrastructure construction and can be effectively managed through standard construction practices and adherence to City specifications.

10.0 CONCLUSIONS

10.1 Conclusions

This Design Brief was prepared to support the proposed sanitary sewer extension along Conroy Road to service the proposed development at 3145 Conroy Road and to address City review comments related to drainage area servicing, hydraulic performance, and constructability of the connection to the existing trunk sewer.

Based on the analysis completed, the following conclusions are provided:

- The proposed sanitary sewer extension has been designed to service not only the subject development but also tributary frontage lands in accordance with City of Ottawa Sewer Design Guidelines
- Multiple servicing scenarios were evaluated to confirm both interim and ultimate servicing capacity

- The proposed alignment within the Conroy Road median minimizes utility conflicts and supports future servicing connections
- The proposed 250mm sanitary sewer provides adequate capacity under all servicing scenarios
- Hydraulic analysis confirms the sewer achieves the minimum City velocity requirement of 0.6m/s under both interim and future servicing conditions
- The sewer operates below full capacity under all scenarios and does not approach surcharge conditions
- The proposed design satisfies City of Ottawa sanitary design criteria
- The connection to the existing trunk sewer requires accommodation of a significant elevation difference at the existing trunk maintenance hole
- Multiple drop structure alternatives were evaluated, each capable of satisfying the hydraulic, operational and servicing requirements of the proposed sanitary sewer connection
- Constructability considerations associated with deep excavation, existing infrastructure, and utility coordination were reviewed as part of the alternatives assessment and can be addressed through conventional construction practices and appropriate construction staging
- Utility conflicts have been considered in the alignment selection
- Traffic management requirements associated with construction of the trunk sewer connection can be addressed through standard traffic staging measures and coordination with the City
- Supporting technical investigations confirm the proposed design is constructible
- Geotechnical, soil characterization, hydrogeological, and SUE investigations support the feasibility of the proposed sanitary sewer design
- No significant technical constraints were identified that would preclude construction
- Environmental impacts can be managed through standard construction practices
- The proposed sanitary sewer extension is suitable to service the subject development and future tributary lands
- The proposed sewer alignment and profile are appropriate given existing constraints
- The proposed servicing strategy is considered appropriate to accommodate the connection to the existing trunk sewer having regard for hydraulic performance, constructability, maintenance requirements, existing infrastructure constraints and long-term operational objectives
- Shop drawings and supporting manufacturer information for the selected drop structure configuration will be submitted to the City for review and approval as required
- Construction should proceed in accordance with supporting technical report recommendations and applicable City standards
- The final drop structure configuration should be implemented in accordance with applicable City of Ottawa standards, MECP design criteria, and manufacturer recommendations, where applicable.

11.0 STATEMENT OF LIMITATIONS

This report was prepared for the exclusive use of WO MW Realty Limited to support the proposed sanitary servicing works at 3145 Conroy Road. The purpose of this report is to document the proposed sanitary servicing design and demonstrate compliance with applicable guidelines and standards of the Ministry of the Environment, Conservation and Parks (MECP), the City of Ottawa, and other applicable approval agencies.

Egis Canada Ltd. has relied upon available background information, technical reports, and design information referenced in this report. While available information was reviewed and site visits were undertaken to observe general site conditions, no detailed field verification or survey confirmation of existing infrastructure was completed as part of this assignment unless otherwise noted.

This report has been prepared solely for the purposes described herein. Any use of this report by third parties, or any reliance on decisions made based on this report by third parties, is the responsibility of such parties. Egis Canada Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions or actions based on this report without written authorization or a reliance letter from Egis Canada Ltd.

The findings, conclusions, and recommendations presented in this report are based on information available at the time of preparation and are valid as of the date of this report. No assurance is made regarding changes in site conditions, regulations, or other factors that may occur subsequent to this date. Should additional information become available, Egis Canada Ltd. should be retained to review the new information and, if necessary, revise the conclusions and recommendations provided herein.

Based on the information presented in this report, it is our opinion that the proposed sanitary servicing strategy is appropriate and satisfies applicable City and MECP requirements.

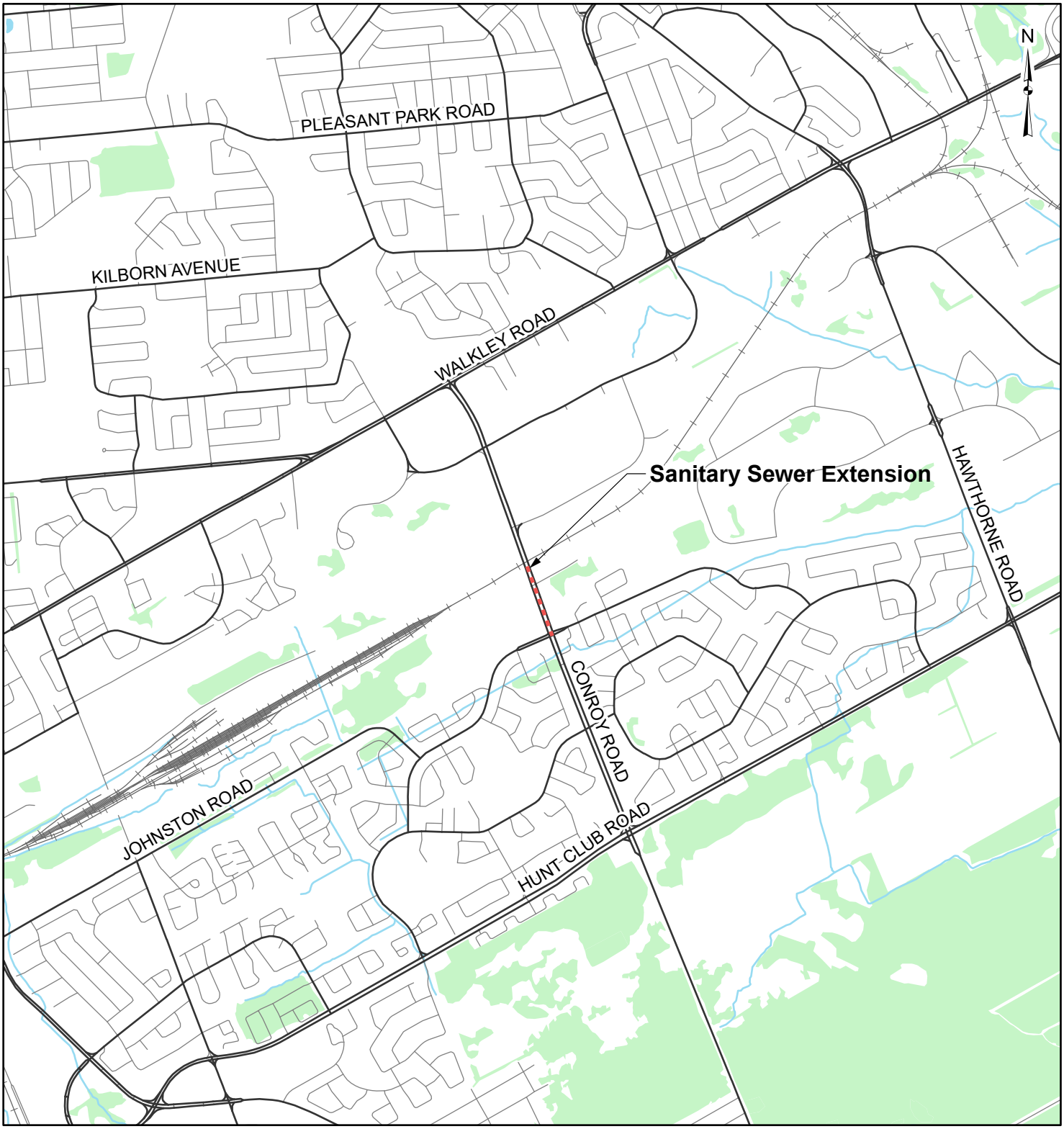
This report is respectfully submitted for review and approval.

EGIS CANADA LTD.



Calum MacDonald, P. Eng
Technical Lead, Municipal Engineering
613-778-8609

APPENDIX A
LOCATION PLAN



800 400 0 800

Scale 1:25,000 Metres

LEGEND

- Sanitary Extension
- Local Road
- Major Road
- Railroad
- Watercourse
- Waterbody
- Wooded Area

REFERENCE

GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2025.

CLIENT: MILLER WASTE SYSTEMS
112 BALES DRIVE EAST, EAST GWILLIMBURY, ON

PROJECT: 3145 CONROY ROAD

TITLE: LOCATION PLAN

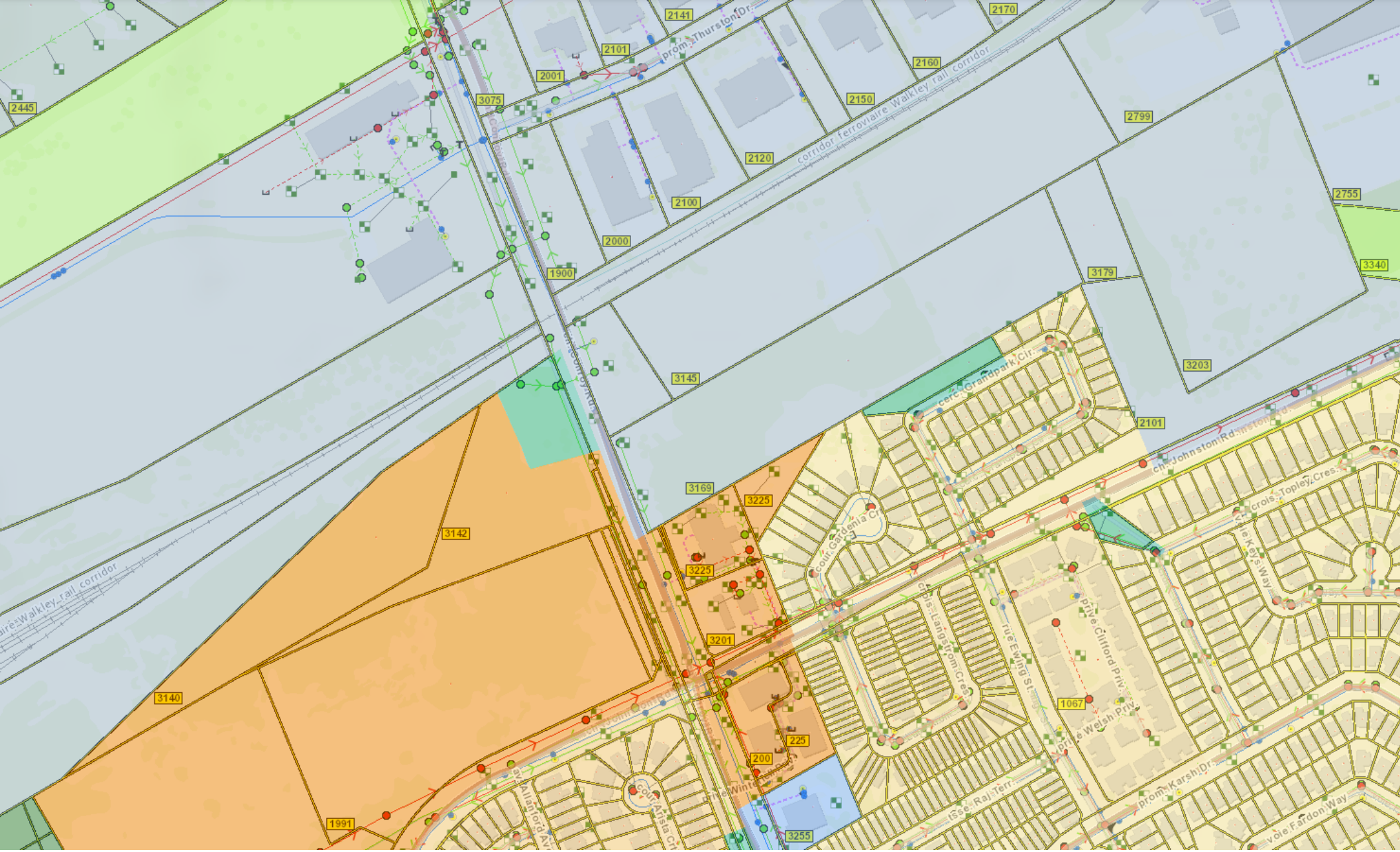
egis
750 Palladium Dr, Suite 310, Kanata, ON K2V 1C7
Tel: 613-836-2184 Fax: 613-836-3742

PROJECT NO:	CO-25-1505
Date	Jul., 28, 2025
GIS	CZ
Checked By	RP

FIGURE: 00

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APPENDIX B
ZONING



Zoning Legend

- N1 - Neighbourhood Zone
- N2 - Neighbourhood Zone
- N3 - Neighbourhood Zone
- N4 - Neighbourhood Zone
- N5 - Neighbourhood Zone
- N6 - Neighbourhood Zone
- IH, IL, IM, - Urban Industrial Zones
- T1, T2 - Transportation Zones
- INZ - Institutional Zone
- LGZ - Large-Scale Institutional and Recreation Zone
- REC - Recreation Zone
- GRN - Greenspace Zone

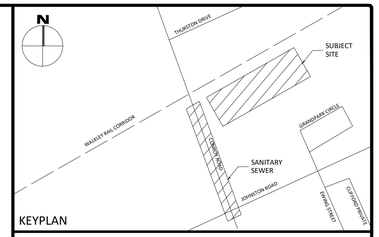
WHITE OWL

Ottawa

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APPENDIX C
SANITARY DRAINAGE AREA PLANS





No.	Revisions	Date
1	FOR SPA SUBMISSION	03.23.2026

Check and verify all dimensions before proceeding with the work

Do not scale drawings

egis

Stamp:

Client:

WO MW REALTY LIMITED
180 RENFREW DRIVE
MARKHAM, ON

Project:

PROPOSED OFFICE/INDUSTRIAL BUILDING
3145 CONROY ROAD
OTTAWA, ON

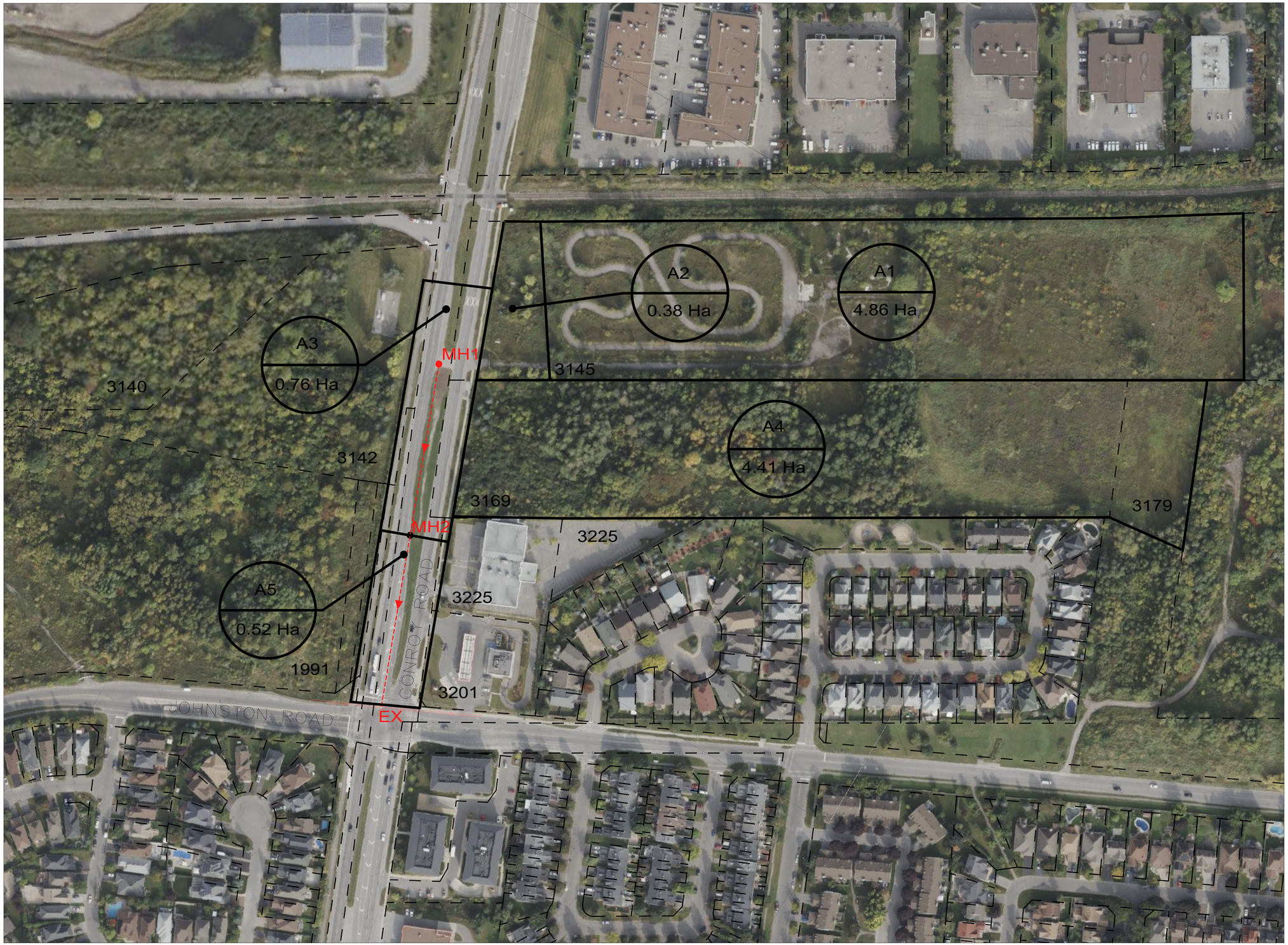
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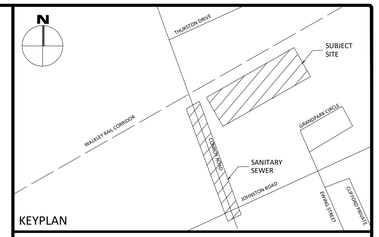
SANITARY DRAINAGE AREA PLAN
INTERIM 3145 CONROY

Scale: 1:500	Project Number: CO-25-1505
Drawn By: CDM	
Checked By: CDM	Drawing Number: C105
Designed By: CDM	

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LAST SAVED: Monday, March 23, 2026 LAST SAVED BY: cmacdonald
LAST PLOTTED: Monday, March 23, 2026 CTB FILE USED: —





No.	Revisions	Date
1	FOR SPA SUBMISSION	03.23.2026

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Stamp:

Client:

WO MW REALTY LIMITED
180 RENFREW DRIVE
MARKHAM, ON

Project:

PROPOSED OFFICE/INDUSTRIAL BUILDING
3145 CONROY ROAD
OTTAWA, ON

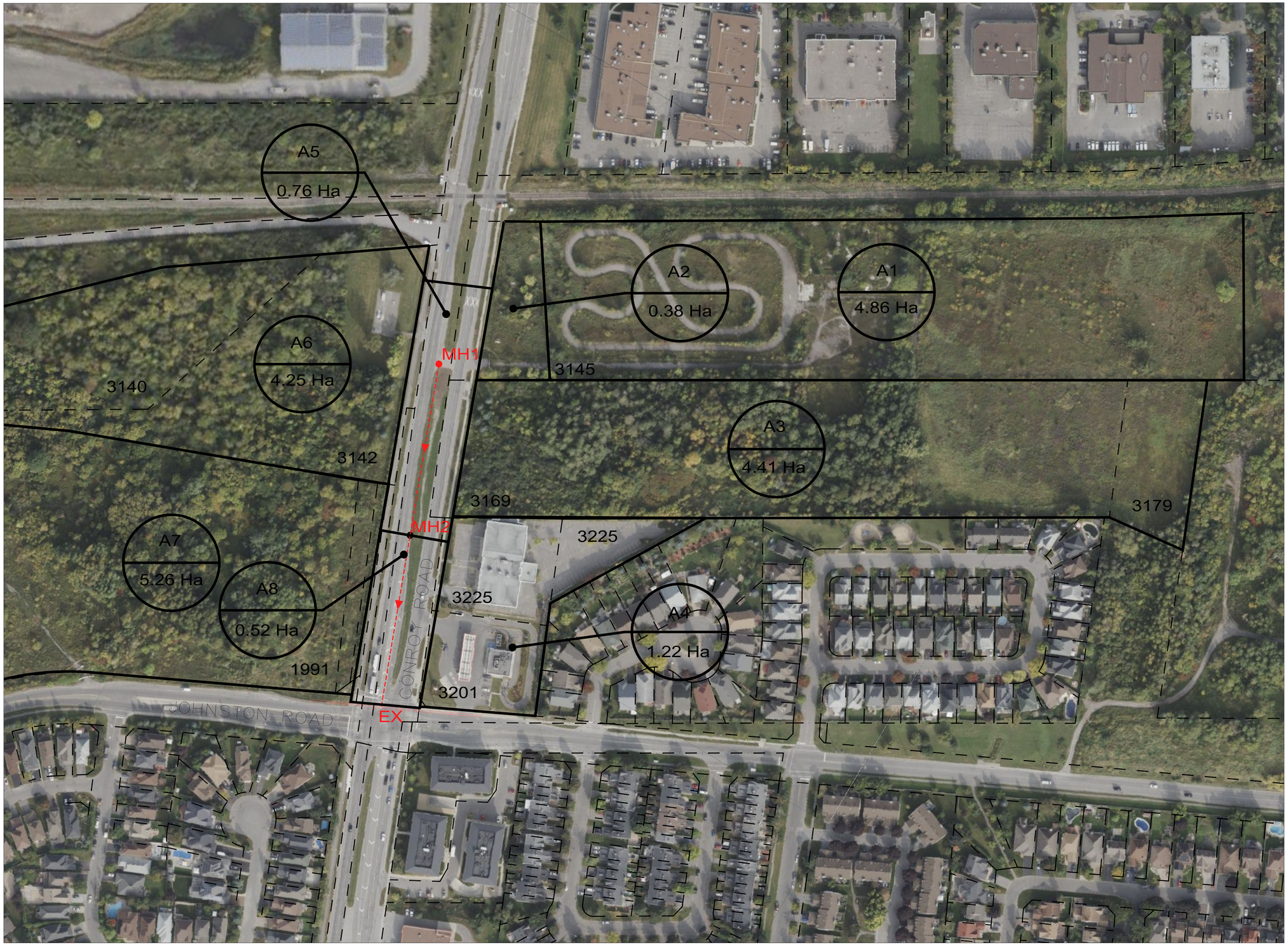
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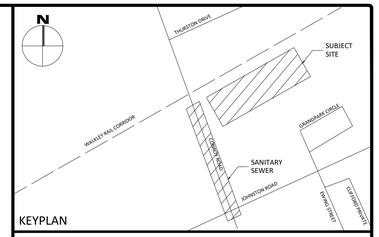
SANITARY DRAINAGE AREA PLAN
INTERIM 3145 & 3169 CONROY

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Drawn By: CDM	
Checked By: CDM	Drawing Number: C106
Designed By: CDM	

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No.	Revisions	Date
1	FOR SPA SUBMISSION	03.23.2026

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Client:
WO MW REALTY LIMITED
180 RENFREW DRIVE
MARKHAM, ON

Project:
PROPOSED OFFICE/INDUSTRIAL BUILDING
3145 CONROY ROAD
OTTAWA, ON

Drawing Title:
SANITARY DRAINAGE AREA PLAN
FUTURE/ULTIMATE CONROY

Scale: 1:500	Project Number: CO-25-1505
Drawn By: CDM	
Checked By: CDM	Drawing Number: C107
Designed By: CDM	

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LAST SAVED: Monday, March 23, 2026 LAST SAVED BY: cmacdonald
LAST PLOTTED: Monday, March 23, 2026 FILE USED: —

APPENDIX D
SANITARY SEWER DESIGN SHEETS

SANITARY SEWER DESIGN SHEET - INTERIM 3145 CONROY

PROJECT: 3145 Conroy Road - Sanitary Sewer Extension
LOCATION: Conroy Road
CLIENT: WO MW Realty Limited

LOCATION				TRUCK WASH				RESIDENTIAL					ICI AREAS							INFILTRATION ALLOWANCE			EXRANEOUS ALLOWANCE			FLOW	PIPE									
								AREA	POPULATION		PEAK	PEAK	AREA (ha)						PEAK	AREA (ha)		FLOW	AREA (ha)		FLOW	DESIGN	LENGTH	DIA	Material	SLOPE	PIPE FULL	VELOCITY	FLOW	VELOCITY	AVAILABLE		RATIO
													INSTITUTIONAL		COMMERCIAL		INDUSTRIAL																CAPACITY		
STREET	AREA ID	FROM	TO	TRUCKS WASHED	FLOW L/S	PEAK FACTOR	PEAK FLOW L/S	(ha)	IND	CUM	FACTOR	FLOW L/S	IND	CUM	IND	CUM	IND	CUM	FLOW L/S	IND	CUM	L/S	IND	CUM	L/S	FLOW L/S	(m)	(mm)		(%)	CAPACITY (L/s)	(full) (m/s)	DEPTH (mm)	(actual) (m/s)	L/s	(%)	q/Q
Run 1																																			
Conroy Road	A1, A2,A3	MH1	MH2	40	0.19	5.1	0.94	0.00	0	0	4.00	0.00	0.00	0.00	0.00	0.00	0.30	0.30	0.98	6.00	6.00	1.98	0.00	0.00	0.00	3.91	114.50	250	PVC	1.0%	62.04	1.22	45.0	0.69	58.13	93.71	0.06
Run 2																																			
Conroy Road	A4	MH2	EXISTING	40	0.19	5.1	0.94	0.00	0	0	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.98	0.52	6.52	2.15	0.00	0.00	0.00	4.08	114.50	250	PVC	1.0%	62.04	1.22	45.9	0.70	57.96	93.43	0.07

Design Parameters:
Manning Roughness Coefficient: 0.013 per Ottawa Sewer Design Guidelines
Truck Wash: 400L per Truck per Ottawa Sewer Design Guidelines Appendix 4-A
Average Heavy Industrial Flow: 55,000L/gross Ha/day per Ottawa Sewer Design Guidelines
Peaking Factor for Industrial Areas: 5.1 per Ottawa Sewer Design Guidelines Appendix 4-B
Average Commercial Flow: 28,000L/gross Ha/day per Ottawa Sewer Design Guidelines
Peaking Factor for Commercial Areas: 1.5 per Ottawa Sewer Design Guidelines
Average Residential Flow: 280L/c/day per Ottawa Sewer Design Guidelines
Population Density: 60 persons/gross hectare per City of Ottawa Sewer Design Guidelines
Peaking Factor for Residential Areas (Harmon): 4.0 per Ottawa Sewer Design Guidelines
Infiltration Allowance: 0.33L/s/gross Ha per Ottawa Sewer Design Guidelines

Designed: CDM

Checked: CDM

Project No.: CCO-25-1505

No.	Revision	Date
1	FOR SPA SUBMISSION	2026-03-23

Date:
2026-03-23

Sheet No:
1 of 4

SANITARY SEWER DESIGN SHEET - INTERIM 3145 & 3169 CONROY

PROJECT: 3145 Conroy Road - Sanitary Sewer Extension
LOCATION: Conroy Road
CLIENT: WO MW Realty Limited

LOCATION				TRUCK WASH				RESIDENTIAL					ICI AREAS							INFILTRATION ALLOWANCE			EXRANEOUS ALLOWANCE			FLOW	PIPE									
								AREA	POPULATION		PEAK	PEAK	AREA (ha)						PEAK	AREA (ha)		FLOW	AREA (ha)		FLOW	DESIGN	LENGTH	DIA	Material	SLOPE	PIPE FULL	VELOCITY	FLOW	VELOCITY	AVAILABLE		RATIO
													INSTITUTIONAL		COMMERCIAL		INDUSTRIAL								FLOW					CAPACITY	(full)	DEPTH	(actual)	CAPACITY		
STREET	AREA ID	FROM	TO	TRUCKS WASHED	FLOW L/S	PEAK FACTOR	PEAK FLOW L/S	(ha)	IND	CUM	FACTOR	FLOW L/S	IND	CUM	IND	CUM	IND	CUM	FLOW L/S	IND	CUM	L/S	IND	CUM	L/S	L/S	(m)	(mm)		(%)	(L/s)	(m/s)	(mm)	(m/s)	L/s	(%)	q/Q
Run 1																																				
Conroy Road	A1, A2,A3, A4	MH1	MH2	40	0.19	5.1	0.94	0.00	0	0	4.00	0.00	0.00	0.00	0.00	0.00	5.09	5.09	16.52	10.41	10.41	3.44	0.00	0.00	0.00	20.90	114.50	250	PVC	1.0%	62.04	1.22	101.2	1.11	41.14	66.30	0.34
Run 2																																				
Conroy Road	A4	MH2	EXISTING	40	0.19	5.1	0.94	0.00	0	0	4.00	0.00	0.00	0.00	0.00	0.00	0.00	5.09	16.52	0.52	10.93	3.61	0.00	0.00	0.00	21.08	114.50	250	PVC	1.0%	62.04	1.22	101.6	1.11	40.96	66.03	0.34

Design Parameters:
Manning Roughness Coefficient: 0.013 per Ottawa Sewer Design Guidelines
Truck Wash: 400L per Truck per Ottawa Sewer Design Guidelines Appendix 4-A
Average Heavy Industrial Flow: 55,000L/gross Ha/day per Ottawa Sewer Design Guidelines
Peaking Factor for Industrial Areas: 5.1 per Ottawa Sewer Design Guidelines Appendix 4-B
Average Commercial Flow: 28,000L/gross Ha/day per Ottawa Sewer Design Guidelines
Peaking Factor for Commercial Areas: 1.5 per Ottawa Sewer Design Guidelines
Average Residential Flow: 280L/c/day per Ottawa Sewer Design Guidelines
Population Density: 60 persons/gross hectare per City of Ottawa Sewer Design Guidelines
Peaking Factor for Residential Areas (Harmon): 4.0 per Ottawa Sewer Design Guidelines
Infiltration Allowance: 0.33L/s/gross Ha per Ottawa Sewer Design Guidelines

Designed: CDM

Checked: CDM

Project No.: CCO-25-1505

No.	Revision	Date
1	FOR SPA SUBMISSION	2026-03-23

Date:
2026-03-23

SANITARY SEWER DESIGN SHEET - FUTURE CONROY

PROJECT: 3145 Conroy Road - Sanitary Sewer Extension
LOCATION: Conroy Road
CLIENT: WO MW Realty Limited

LOCATION				TRUCK WASH				RESIDENTIAL					ICI AREAS							INFILTRATION ALLOWANCE			EXRANEOUS ALLOWANCE			FLOW	PIPE									
								AREA	POPULATION		PEAK	PEAK	AREA (ha)						PEAK	AREA (ha)		FLOW	AREA (ha)		FLOW	DESIGN	LENGTH	DIA	Material	SLOPE	PIPE FULL	VELOCITY	FLOW	VELOCITY	AVAILABLE		RATIO
													INSTITUTIONAL		COMMERCIAL		INDUSTRIAL								FLOW					CAPACITY	(full)	DEPTH	(actual)	CAPACITY		
STREET	AREA ID	FROM	TO	TRUCKS WASHED	FLOW L/S	PEAK FACTOR	PEAK FLOW L/S	(ha)	IND	CUM	FACTOR	FLOW L/S	IND	CUM	IND	CUM	IND	CUM	FLOW L/S	IND	CUM	L/S	IND	CUM	L/S	L/S	(m)	(mm)		(%)	(L/s)	(m/s)	(mm)	(m/s)	L/s	(%)	q/Q
Run 1																																				
Conroy Road	A1, A2,A3, A4	MH1	MH2	40	0.19	5.1	0.94	0.00	0	0	4.00	0.00	0.00	0.00	4.25	4.25	5.09	5.09	18.59	14.66	14.66	4.84	0.00	0.00	0.00	24.37	114.50	250	PVC	1.0%	62.04	1.22	109.7	1.15	37.67	60.71	0.39
Run 2																																				
Conroy Road	A4	MH2	EXISTING	40	0.19	5.1	0.94	0.00	0	0	4.00	0.00	0.00	0.00	6.48	10.73	0.00	5.09	21.74	7.00	21.66	7.15	0.00	0.00	0.00	29.83	114.50	250	PVC	1.0%	62.04	1.22	122.5	1.21	32.21	51.91	0.48

Design Parameters:
Manning Roughness Coefficient: 0.013 per Ottawa Sewer Design Guidelines
Truck Wash: 400L per Truck per Ottawa Sewer Design Guidelines Appendix 4-A
Average Heavy Industrial Flow: 55,000L/gross Ha/day per Ottawa Sewer Design Guidelines
Peaking Factor for Industrial Areas: 5.1 per Ottawa Sewer Design Guidelines Appendix 4-B
Average Commercial Flow: 28,000L/gross Ha/day per Ottawa Sewer Design Guidelines
Peaking Factor for Commercial Areas: 1.5 per Ottawa Sewer Design Guidelines
Average Residential Flow: 280L/c/day per Ottawa Sewer Design Guidelines
Population Density: 60 persons/gross hectare per City of Ottawa Sewer Design Guidelines
Peaking Factor for Residential Areas (Harmon): 4.0 per Ottawa Sewer Design Guidelines
Infiltration Allowance: 0.33L/s/gross Ha per Ottawa Sewer Design Guidelines

Designed: CDM

Checked: CDM

Project No.: CCO-25-1505

No.	Revision	Date
1	FOR SPA SUBMISSION	2026-03-23

Date:
2026-03-23

Sheet No:
3 of 4

SANITARY SEWER DESIGN SHEET - ULTIMATE CONROY

PROJECT: 3145 Conroy Road - Sanitary Sewer Extension
LOCATION: Conroy Road
CLIENT: WO MW Realty Limited

LOCATION				TRUCK WASH				RESIDENTIAL					ICI AREAS							INFILTRATION ALLOWANCE			EXRANEOUS ALLOWANCE			FLOW	PIPE									
								AREA	POPULATION		PEAK	PEAK	AREA (ha)						PEAK	AREA (ha)		FLOW	AREA (ha)		FLOW	DESIGN	LENGTH	DIA	Material	SLOPE	PIPE FULL	VELOCITY	FLOW	VELOCITY	AVAILABLE		RATIO
STREET	AREA ID	FROM	TO	TRUCKS WASHED	FLOW L/S	PEAK FACTOR	PEAK FLOW L/S	(ha)	IND	CUM	FACTOR	FLOW L/S	INSTITUTIONAL		COMMERCIAL		INDUSTRIAL		FLOW L/S	IND	CUM	L/S	IND	CUM	L/S	FLOW L/S	(m)	(mm)		(%)	CAPACITY (L/s)	(full) (m/s)	DEPTH (mm)	(actual) (m/s)	CAPACITY L/s	CAPACITY (%)	q/Q
													IND	CUM	IND	CUM	IND	CUM																		
Run 1																																				
Conroy Road	A1, A2,A3, A4	MH1	MH2	0	0.00	5.1	0.00	0.00	0	0	4.00	0.00	0.00	0.00	4.25	4.25	9.65	9.65	33.39	14.66	14.66	4.84	0.00	0.00	0.00	38.23	114.50	250	PVC	1.0%	62.04	1.22	141.8	1.27	23.81	38.37	0.62
Run 2																																				
Conroy Road	A4	MH2	EXISTING	0	0.00	5.1	0.00	0.00	0	0	4.00	0.00	0.00	0.00	6.48	10.73	0.00	9.65	36.54	7.00	21.66	7.15	0.00	0.00	0.00	43.69	114.50	250	PVC	1.0%	62.04	1.22	154.6	1.31	18.35	29.57	0.70

Design Parameters:

Manning Roughness Coefficient: 0.013 per Ottawa Sewer Design Guidelines
Truck Wash: 400L per Truck per Ottawa Sewer Design Guidelines Appendix 4-A
Average Heavy Industrial Flow: 55,000L/gross Ha/day per Ottawa Sewer Design Guidelines
Peaking Factor for Industrial Areas: 5.1 per Ottawa Sewer Design Guidelines Appendix 4-B
Average Commercial Flow: 28,000L/gross Ha/day per Ottawa Sewer Design Guidelines
Peaking Factor for Commercial Areas: 1.5 per Ottawa Sewer Design Guidelines
Average Residential Flow: 280L/c/day per Ottawa Sewer Design Guidelines
Population Density: 60 persons/gross hectare per City of Ottawa Sewer Design Guidelines
Peaking Factor for Residential Areas (Harmon): 4.0 per Ottawa Sewer Design Guidelines
Infiltration Allowance: 0.33L/s/gross Ha per Ottawa Sewer Design Guidelines

Designed: CDM

Checked: CDM

Project No.: CCO-25-1505

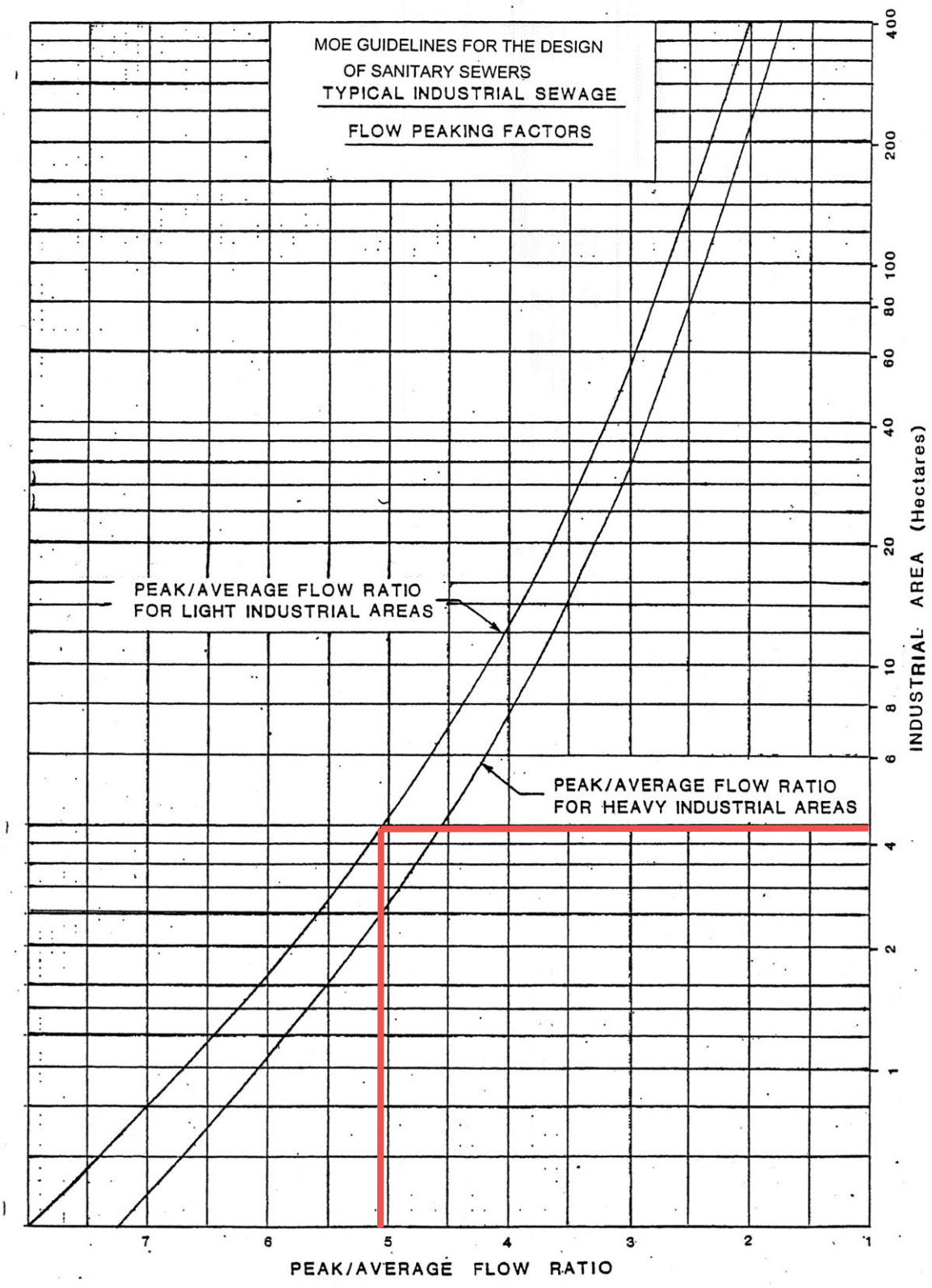
No.	Revision	Date
1	FOR SPA SUBMISSION	2026-03-23

Date: 2026-03-23

Sheet No: 4 of 4

APPENDIX E
PEAKING FACTOR FOR INDUSTRIAL AREAS

APPENDIX 4-B PEAKING FACTOR FOR INDUSTRIAL AREAS



APPENDIX F
EXISTING AS-BUILT DRAWINGS

DWG. FRAME 790mm x 534mm RMOC-06/93-WG

Regional Municipality of Ottawa-Carleton Environmental Services Department
Municipalité d'Ottawa-Carleton Services environnementaux

Approved

DATE ..... WATER WORKS

RECORD DRAWING

L. LICENSED PROFESSIONAL ENGINEER D.A.HEARDEN PROVINCE OF ONTARIO

REGISTERED PROFESSIONAL ENGINEER P.G.SHARPE PROVINCE OF ONTARIO

DELCAN ENGINEERS PLANNERS

NO.	REVISIONS	BY	DATE
1	DEP. CURBS @ JOHNSTON	DAH	07/98
2	MH/CB/DI & ST. TABLES	DAH	07/98
3	DR 35 PIPE	DAH	07/98
4	SERVICES AT JOHNSTON	DAH	07/98
5	ADD MEDIAN SEWER	DAH	08/98
6	RECORD DRAWING	DGH	11/00

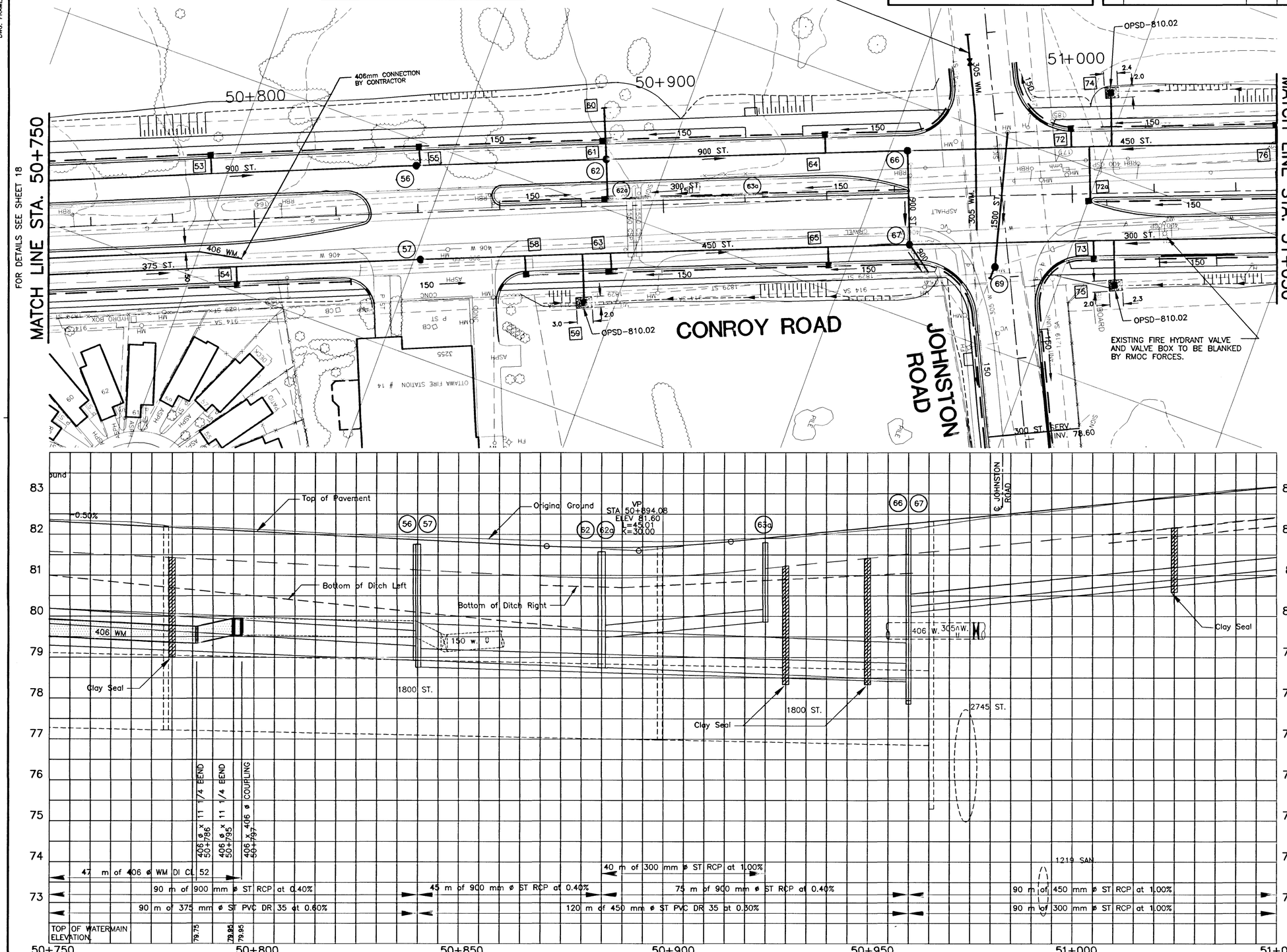
Ottawa-Carleton

CONROY ROAD
HUNT CLUB ROAD TO WALKLEY ROAD
GRADING AND DRAINAGE STA 50+750 TO STA 51+050

J. MILLER, P.ENG. Director, Engineering Division
W. BENNETT, P.ENG Manager, Transportation Projects

DWG. NO. R-3010-19
SHEET 019 OF ---
CONTRACT NO. 98-505
Date: MAY, 1998
HORIZONTAL 0m 5 10 20 / 0m 1 2 VERTICAL

NOTES:
1. FOR ADDITIONAL GRADING & DRAINAGE INFORMATION ON JOHNSTON ROAD SEE SHEET 25



MANHOLES, CATCHBASINS AND DITCH INLET DATA

No.	STATION	OFFSET (m)	TYPE OF STRUCTURE STD. No.	NEW GRATE STD. No.	ELEVATION TOP OF GRATE	ELEVATION LOW INVERT
53	50+790	15.25 L	705.010	J-3.4	81.94	80.19
54	50+795	15.25 R	705.010	J-3.4	81.91	80.16
55	50+841	15.25 L	705.010	J-3.4	81.68	79.93
56	50+840	11.50 L	701.012	J-3.10	81.73	78.93
57	50+840	11.50 R	701.010	J-3.10	81.73	78.67
58	50+866	15.25 R	705.010	J-3.4	81.61	79.86
59	50+880	23.39 R	705.030	403.01	80.75	79.26
60	50+885	28.78 L	804.030	–	–	79.70
61	50+885	15.25 L	705.020	J-3.4(2)	81.49	79.07
62	50+885	11.50 L	701.012	J-3.10	81.57	78.74
62a	50+885	1.00 L	705.020	J-3.4(2)	81.68	79.47
63	50+885	15.25 R	705.020	J-3.4(2)	81.56	79.81
63a	50+925	1.00 L	705.010	J-3.4	81.91	79.87
64	50+940	15.25 L	705.010	J-3.4	81.88	80.21
65	50+940	15.25 R	705.010	J-3.4	81.88	80.13
66	50+960	11.50 L	701.013	J-3.10	82.15	77.95
67	50+960	11.50 L	701.013	J-3.10	82.15	77.86
69	50+980	17.00 R	701.013	J-3.10	82.26	75.18
72	51+000	15.25 L	705.010	J-3.4	82.48	80.73
72a	51+005	1.78 R	705.010	400.02	82.71	80.96
73	51+005	15.25 R	705.010	J-3.4	82.53	80.78
74	51+010	24.85 L	705.030	403.01	81.90	80.87
75	51+010	22.55 R	705.030	403.01	82.10	80.85
76	51+050	15.25 L	705.010	J-3.4	83.15	81.40

* Offsets for Curb Inlets are to Face of Curb.
** Elve. for Curb Inlet Covers are Finished Asphalt at Grate.

STORM SEWER DATA

LOCATION No. TO No.	DIA. SIZE (mm)	CLASS OF PIPE	LENGTH (m)	INVERT ELEVATION UPSTREAM	INVERT ELEVATION DOWNSTREAM
MH 49 – MH 56	900	100 D	120	79.41	78.93
MH 56 – MH 62	900	100 D	46	78.93	78.74
MH 62 – MH 66	900	100 D	71.1	78.74	78.45
MH 78 – MH 66	450	100 D	120	81.29	80.09
MH 50 – MH 57	375	DR 35	120	79.99	79.27
MH 57 – MH 67	450	DR 35	121.3	78.67	78.31
MH 79 – MH 67	300	100 D	124	81.44	80.24
MH 66 – MH 67	900	100 D	23	77.95	77.86
MH 67 – EXIST.	900	100 D	10.7	77.86	77.81
EXIST. – MH 69	1500	100 D	28.7	75.25	75.16
53 – PIPE	250	3 ES	4	80.19	–
54 – PIPE	250	3 ES	4	80.16	–
55 – PIPE	250	3 ES	4	79.93	–
58 – PIPE	250	3 ES	4	79.86	–
59 – PIPE	300	100 D	12	79.26	–
60 – 61	600	100 D	12	79.70	79.07
61 – MH 62	600	100 D	4.3	79.07	79.04
62a – 62	300	100 D	10	79.47	79.34
63 – PIPE	250	3 ES	4	79.81	–
63a – 62a	300	100 D	40	79.87	79.47
64 – PIPE	250	3 ES	4	80.21	–
65 – PIPE	250	3 ES	5.2	80.13	–
72 – PIPE	250	3 ES	4	80.73	–
72a – PIPE	250	3 ES	13	80.96	–
73 – PIPE	250	3 ES	4.1	80.78	–
74 – PIPE	300	100 D	13	80.87	–
75 – PIPE	300	100 D	11	80.85	–
76 – PIPE	250	3 ES	4	81.40	–

1013

DWG. FRAME 790mm x 534mm RMOC-06/93-WG

R-3010-20

10313

1 RECORD DRAWING DGH 11/00

RECORD DRAWING

LICENSED PROFESSIONAL ENGINEER D.A.HEARDEN PROVINCE OF ONTARIO

REGISTERED PROFESSIONAL ENGINEER P.G.SHARPE PROVINCE OF ONTARIO

DELCAN ENGINEERS PLANNERS

NO.	REVISIONS	BY	DATE
1	DEP. CURBS @ JOHNSTON	DAH	07/98
2	MEDIAN O/S @ RWY.	DAH	07/98
3	MH/CB/DI TABLES	DAH	07/98
4	SERVICES AT JOHNSTON	DAH	07/98
5	REC PATH & GRADING AT CN TRACK NORTH	PGS	08/98
6	DROP PIPE AT EXIST. MH	DAH	08/98
7	THUNDERBIRD–LT TURN LANE	DAH	06/99

Ottawa-Carleton

CONROY ROAD
HUNT CLUB ROAD TO WALKLEY ROAD
GRADING AND DRAINAGE STA 51+050 TO STA 51+350

J. MILLER, P.ENG. — Director, Engineering Division

W. BENNETT, P.ENG — Manager, Transportation Projects

DWG. NO. R-3010-20

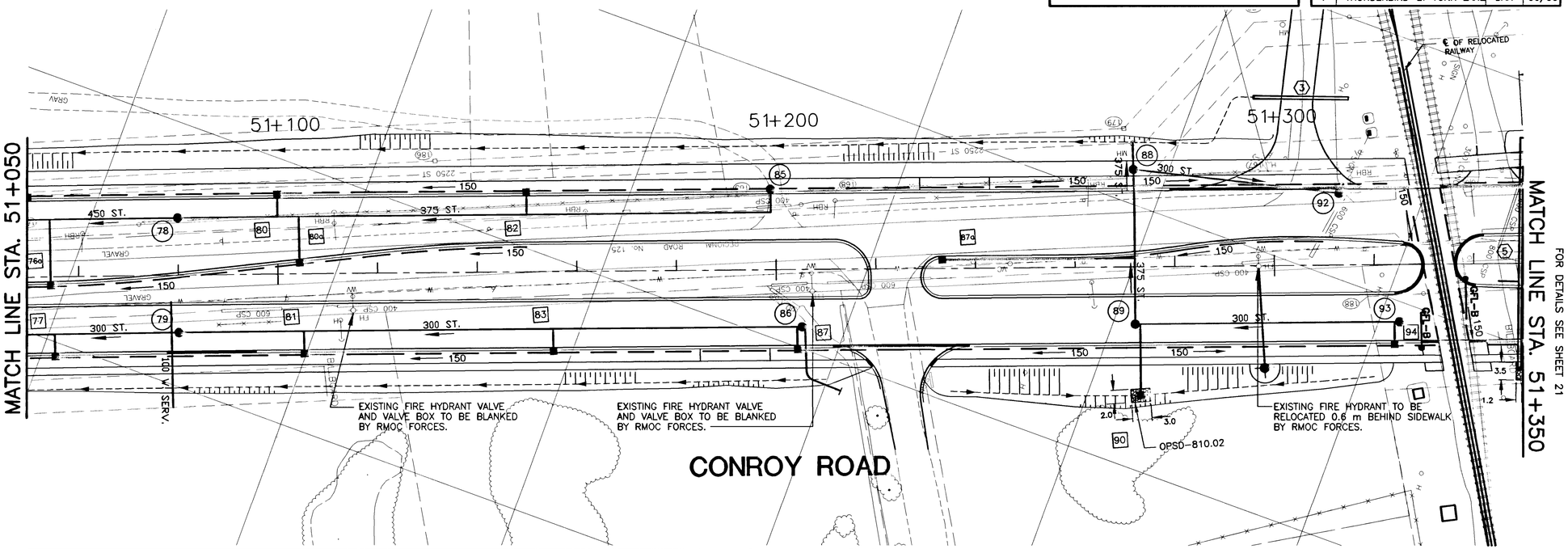
SHEET 020 OF ---

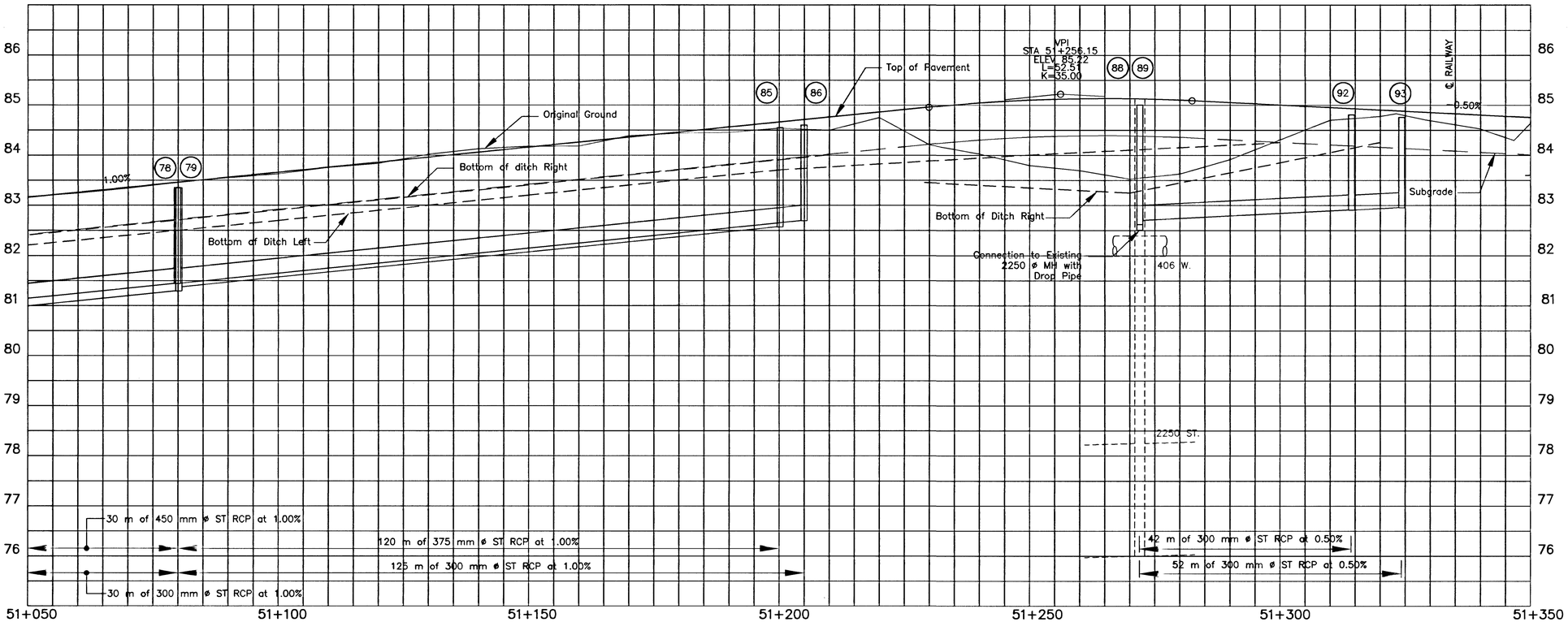
CONTRACT NO. 98-505

Date: MAY, 1998

HORIZONTAL 0m 5 10 20

VERTICAL 0m 1 2





MANHOLES, CATCHBASINS AND DITCH INLET DATA

No.	STATION	OFFSET (m)	TYPE OF STRUCTURE STD. No.	NEW GRATE STD. No.	ELEVATION TOP OF GRATE	ELEVATION LOW INVERT
76a	51+055	0.96 R	705.010	J–3.4	83.21	81.46
77	51+055	15.25 R	705.010	J–3.4	83.03	81.28
78	51+080	11.50 L	701.010	J–3.10	83.40	81.29
79	51+080	11.50 R	701.010	J–3.10	83.35	81.44
80	51+100	15.25 L	705.010	J–3.4	83.51	81.76
80a	51+105	2.93 L	705.010	J–3.4	83.71	81.96
81	51+105	15.25 R	705.010	J–3.4	83.53	81.78
82	51+150	15.25 L	705.010	J–3.4	83.98	82.23
83	51+155	15.25 R	705.010	J–3.4	84.03	82.28
~~84~~	~~51+189~~	~~15.25 L~~	~~705.010~~	~~J–3.4~~	~~84.47~~	~~82.72~~
85	51+200	11.50 L	701.010	J–3.10	84.55	82.57
86	51+205	15.25 R	701.010	J–3.10	84.60	82.69
87	51+204	15.25 R	705.010	J–3.4	84.52	82.77
87a	51+233.3	2.50 R	705.010	J–3.4	84.91	83.16
88	51+272	19.50 L	701.010	J–3.10	85.01	82.51
89	51+272	11.50 R	701.010	J–3.10	85.01	82.62
90	51+273	25.84 R	705.030	403.01	83.35	82.84
~~91~~	~~51+314~~	~~14.95 L~~	~~705.010~~	~~400.02~~	~~84.87~~	~~83.12~~
92	51+315	11.50 L	701.010	J–3.10	84.89	82.91
93	51+325	11.50 R	701.010	J–3.10	84.82	82.91
94	51+324	15.25 R	705.010	J–3.4	84.76	83.01

* Offsets for Curb Inlets are to Face of Curb.

** Elve. for Curb Inlet Covers are Finished Asphalt at Grate.

STORM SEWER DATA

LOCATION No. TO No.	DIA. SIZE (mm)	CLASS OF PIPE	LENGTH (m)	INVERT ELEVATION UPSTREAM	INVERT ELEVATION DOWNSTREAM
MH 85 – MH 78	375	100 D	120	82.57	81.37
MH 86 – MH 79	300	100 D	125	82.69	81.44
MH 92 – MH 88	300	100 D	44.5	82.91	82.70
MH 93 – MH 89	300	100 D	48	82.96	82.70
MH 89 – MH 88	375	100 D	31	82.62	82.51
MH 88 – EXIST.	375	100 D	4.6	82.51	82.44
76a – PIPE	250	3 ES	13	81.46	–
77 –PIPE	250	3 ES	4	81.28	–
80 – PIPE	250	3 ES	3	81.76	–
80a – PIPE	250	3 ES	9	81.96	–
81 – PIPE	250	3 ES	4	81.78	–
82 – PIPE	250	3 ES	2	82.23	–
83 – PIPE	250	3 ES	4	82.28	–
~~84 – PIPE~~	~~250~~	~~3 ES~~	~~4~~	~~82.72~~	Deleted
87 – PIPE	250	3 ES	4	82.77	–
87a – PIPE	250	3 ES	39	83.16	–
90 – PIPE	300	100 D	14	82.84	–
~~91 – PIPE~~	~~250~~	~~3 ES~~	~~3~~	~~83.12~~	Deleted
94 – PIPE	250	3 ES	4		
MHB6 – ThunderBird	250	100 D	19.4		

DWG. FRAME 790mm x 534mm RMOC-08/93-WG

TABLE OF RESTRAINED JOINTS AND NUMBER OF JOINTS WITH RETAINING RINGS EACH SIDE OF FITTING

FITTING TYPE	SIZE	# JOINTS
11 1/4 BEND	305mm DI	1
22 1/2 BEND	305mm DI	1
22 1/2 BEND	406mm DI	1
CAP	610mm CPC	6
305x406x610 CROSS	305mm DI	1
	406mm DI	1
	610mm CPC	1

NOTES (WATERMAIN):

1. ASSUMES FULL PIPE LENGTH EACH SIDE OF FITTING
   PIPE LENGTHS: DUCTILE IRON CL52 = 5.5m
   CONC. PRESSURE PIPE AWWA C301 = 7.32m
2. ANY FITTING LOCATED WITHIN THE REACTION LENGTH SHALL BE RESTRAINED
3. SEE DWG No. 26 FOR WATERMAIN DETAILS ON THURSTON DRIVE

Regional Municipality of Ottawa-Carleton Environmental Services Department
Municipalité d'Ottawa-Carleton Services environnementaux
Approved
DATE ..... WATER WORKS

D.A.HEARDEN — LICENSED PROFESSIONAL ENGINEER — PROVINCE OF ONTARIO
P.G.SHARPE — REGISTERED PROFESSIONAL ENGINEER — PROVINCE OF ONTARIO
DELCAN ENGINEERS PLANNERS

NO.	REVISIONS	BY	DATE
1	MH/CB/DI TABLES	DAH	07/98
2	REC PATH & GRADING AT CN TRACK NORTH	PGS	08/98
3	DROP PIPE AT EXIST. MH	DAH	08/98
4	RELOCATE PARKING LOT	DAH	08/98
5	REV. CB 110 CONN. & REVISE 103 -101	DSG	11/98
6	REVISE 610 WATERMAIN	DAH	04/99
7	610 WATERMAIN STUB	DAH	04/99
8	RECORD DRAWING	DGH	11/00

Ottawa-Carleton

CONROY ROAD
HUNT CLUB ROAD TO WALKLEY ROAD
GRADING AND DRAINAGE STA 51+350 TO STA 51+650

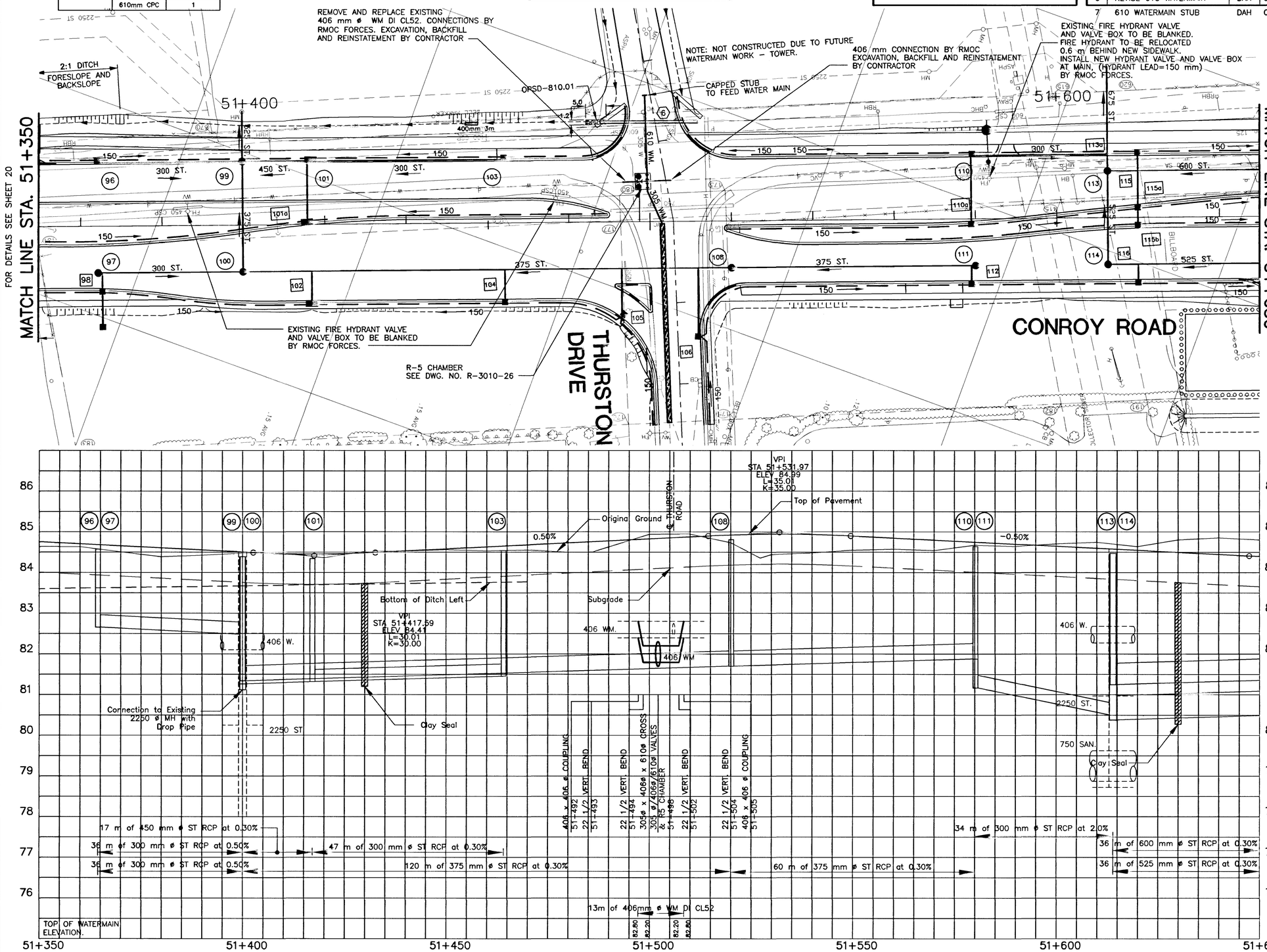
J. MILLER, P.ENG. — Director, Engineering Division
W. BENNETT, P.ENG — Manager, Transportation Projects

DWG. NO. R-3010-21
SHEET 021 OF ---
CONTRACT NO. 98-505
Date: MAY, 1998
HORIZONTAL 0m 5 10 20 — VERTICAL 0m 1 2

RECORD DRAWING

NOTES:

1. FOR ADDITIONAL GRADING & DRAINAGE INFORMATION ON THURSTON DRIVE SEE SHEET 26



MANHOLES, CATCHBASINS AND DITCH INLET DATA

No.	STATION	OFFSET (m)	TYPE OF STRUCTURE STD. No.	NEW GRATE STD. No.	ELEVATION TOP OF GRATE	ELEVATION LOW INVERT
96	51+365	15.25 L	701.010	J-3.4	84.69	82.89
97	51+365	11.50 R	701.010	J-3.10	84.57	82.66
98	51+366	15.31 R	705.010	J-3.4	84.53	82.78
99	51+400	15.55 L	701.011	J-3.10	84.53	81.12
100	51+400	11.50 R	701.010	J-3.10	84.43	81.34
101	51+415	15.25 L	701.011	J-3.4(2)	84.29	81.23
101a	51+414	0.15 L	705.020	J-3.4(2)	84.45	82.70
102	51+415	18.75 R	705.020	J-3.4(2)	84.26	82.51
103	51+465	15.25 L	701.010	J-3.4	84.46	81.37
104	51+465	18.75 R	705.010	J-3.4	84.46	82.71
108	51+520	11.50 R	701.010	J-3.10	84.78	81.70
110	51+579	15.25 L	701.010	J-3.4	84.62	81.17
110a	51+579	0.52 R	705.010	J-3.4	84.76	83.01
111	51+580	11.50 R	701.010	J-3.10	84.64	81.88
112	51+579	15.25 R	705.010	J-3.4	84.59	82.84
113	51+612	11.50 L	701.012	J-3.10	84.50	80.38
114	51+612	11.50 R	701.011	J-3.10	84.53	81.25
115	51+620	15.25 L	705.010	J-3.4	84.39	82.64
115a	51+620	3.20 L	705.010	J-3.4	84.55	81.74
115b	51+620	2.60 R	705.010	J-3.4	84.55	82.80
116	51+620	15.25 R	705.010	J-3.4	84.43	82.68


* Offsets for Curb Inlets are to Face of Curb.
** Elve. for Curb Inlet Covers are Finished Asphalt at Grate.

STORM SEWER DATA

LOCATION No. TO No.	DIA. SIZE (mm)	CLASS OF PIPE	LENGTH (m)	INVERT ELEVATION UPSTREAM	INVERT ELEVATION DOWNSTREAM
MH 96 – MH 99	300	100 D	35	82.89	82.70
MH 101 – MH 99	450	100 D	17	81.23	81.18
MH 103 – MH 101	450	100 D	50.5	81.37	81.23
MH 110 – MH 103	375	100 D	33	81.80	81.45
MH 119 – MH 113	600	100 D	68	80.58	80.38
MH 97 – MH 100	300	100 D	35	82.66	82.48
MH 100 – MH 99	375	100 D	31.35	81.34	81.27
MH 99 – EXIST	525	100 D	11	81.12	81.06
MH 108 – MH 100	375	100 D	120	81.70	81.34
MH 111 – MH 108	375	100 D	60	81.88	81.70
MH 120 – MH 114	525	100 D	68	81.45	81.25
MH 114 – MH 113	525	100 D	22.4	81.25	81.18
MH 113 – EXIST	675	100 D	27	80.38	80.30
98 – PIPE	250	3 ES	4	82.78	–
101a – PIPE	250	3 ES	15.5	82.70	–
102 – PIPE	250	3 ES	8	82.48	–
104 – PIPE	250	3 ES	7	82.71	–
110a – PIPE	250	3 ES	17	83.01	–
112 – PIPE	250	3 ES	4.5	82.84	–
115 – PIPE	250	3 ES	5	82.64	–
115a – PIPE	250	3 ES	8	82.74	–
115b – 115a	250	3 ES	5	82.80	82.74
116 – PIPE	250	3 ES	4	82.68	–

103/3

APPENDIX G
TOPOGRAPHIC SURVEY



SEWER INVERT DATA TABLE

MH/CB	DIRECTION	DIAMETER	INVERT	TOP OF LID/ GRATE ELEV.	INVERT ELEVATION	NOTES
CB#1	N SW	150 300±	1.31 1.58	82.63	81.32 81.05	
SICB#2	W	250	1.87	82.50	80.63	
DICB#3	W	300	1.52	82.10	80.58	
CB#4	W	250	1.79	82.99	81.20	
SICB#5	W	250	1.91	83.54	81.63	
SICB#6	W	250	1.92	84.07	82.15	
SICB#7	W	250	1.79	84.54	82.75	
SICB#8	*W	*250	N/A	83.22	N/A	FULL OF WATER
STM MH#1	N S	300 300	1.99 2.00	83.38	81.39 81.38	
STM MH#2	N S	250 300	2.00 2.02	84.64	82.64 82.62	
SAN MH#1	NE SE SW	*1200 *900 *1200	N/A N/A N/A	82.22	N/A N/A N/A	HEAVY FLOW; UNABLE TO MEASURE INVERT
SAN MH#2	NE SW	*1200 *1050	N/A N/A	82.53	N/A N/A	HEAVY FLOW; UNABLE TO MEASURE INVERT
SAN MH#3	NE SW	*1050 *1050	N/A N/A	81.73	N/A N/A	HEAVY FLOW; UNABLE TO MEASURE INVERT
SAN MH#4	NE SW S	*1200 *1200 250	N/A N/A 3.10	80.70	N/A N/A 77.60	HEAVY FLOW; UNABLE TO MEASURE INVERT

*INFORMATION OBTAINED FROM RECORDS PROVIDED BY CITY OF OTTAWA NOT FIELD VERIFIED BY ONSITE LOCATES INC.

SKETCH SHOWING

TOPOGRAPHIC DETAIL AND SUBSURFACE OF CONROY AND JOHNSTON ROAD

CITY OF OTTAWA

J.D. BARNES LIMITED
© COPYRIGHT 2025

SCALE 1 : 300

5 0 5 10 20 metres

METRIC DISTANCES AND/OR COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

CAUTION!

THIS IS NOT A PLAN OF SURVEY AND SHALL NOT BE USED EXCEPT FOR THE PURPOSE INDICATED IN THE TITLE BLOCK.

THIS PLAN IS PROTECTED BY COPYRIGHT.

NOTES

THE TOPOGRAPHIC INFORMATION WAS COLLECTED SEPTEMBER 9, 2025.

CONTOUR INTERVALS ARE SHOWN AS 1.00m FOR MAJOR AND 0.25m FOR MINOR.

CONTOURS SHOWN HERON ARE DERIEVED FOR MEASURED ELEVATIONS WHICH HAVE BEEN REMOVED FOR THE CLARITYOF THIS PLAN.

SKETCH AND CORRESPONDING CAD FILE ARE NAD 83 MTM ZONE 9 (CSRS)

BOUNDARY INFORMATION HAS BEEN COMPILED FROM AVAILABLE REGISTRY OFFICE PLANS.

ELEVATION NOTE

1. ELEVATIONS ARE GEODETIC AND ARE REFERRED TO CITY OF OTTAWA CONTROL POINT 2016-0300 HAVING A PUBLISHED ELEVATION OF 84.20 METRES (CGCD-1928 DATUM).
2. IT IS THE RESPONSIBILITY OF THE USER OF THIS INFORMATION TO VERIFY THAT THE SITE BENCHMARK HAS NOT BEEN ALTERED OR DISTURBED AND THAT ITS RELATIVE ELEVATION AND DESCRIPTION AGREES WITH THE INFORMATION SHOWN ON THIS DRAWING.

LEGEND

— SAN —	DENOTES UNDERGROUND SANITARY SEWER
— STM —	DENOTES UNDERGROUND STORM SEWER
— G —	DENOTES UNDERGROUND GAS LINE
— W —	DENOTES UNDERGROUND WATER LINE
— UE —	DENOTES UNDERGROUND HYDRO LINE
— UT —	DENOTES UNDERGROUND TELEPHONE LINE
— FO —	DENOTES UNDERGROUND FIBRE OPTIC LINE
SAN MH	DENOTES SANITARY MANHOLE
STM MH	DENOTES STORM MANHOLE
SICB	DENOTES SIDE INLET CATCHBASIN
DICB	DENOTES DITCH INLET CATCHBASIN
CB	DENOTES CATCHBASIN
WV	DENOTES WATER VALVE
WC	DENOTES WATER CHAMBER
H	DENOTES HYDRANT
LS	DENOTES LIGHT STANDARD
HP	DENOTES HYDRO POLE
HW	DENOTES HANDWELL
TSC	DENOTES TRAFFIC SIGNAL CONTROL
S/T	DENOTES SUBJECT TO

MACHINE DEPTH NOTE

ELECTROMAGNETIC MACHINE DEPTH MEASUREMENTS WERE OBTAINED WHERE POSSIBLE.

DEPTHS ARE NOT SUITABLE FOR EXCAVATION PURPOSES. SEWER NETWORK CONNECTIONS WERE COMPILED WHERE FIELD EVIDENCE COINCIDED WITH AS-BUILT RECORDS

WHERE NO DEPTH INFORMATION COULD BE OBTAINED, UTILITIES ARE ASSUMED TO BE AT STANDARD INSTALLATION DEPTH FOR THE SPECIFIC TYPE OF UTILITY.

THE MOST RELIABLE WAY TO PRECISELY DETERMINE THE HORIZONTAL AND VERTICAL LOCATION OF AN UNDERGROUND UTILITY IS THROUGH PHYSICAL EXPOSURE USING SAFE DIGGING TECHNIQUES (COMMONLY PERFORMED WITH HYDRO VACUUM EXCAVATION)

INVERT DEPTH MEASUREMENTS HEREON ARE PROVIDED IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

SEWER INVERT NOTE:

SEWER INVERT DEPTHS ARE MANUALLY MEASURED FROM THE LID/GRATE OF THE GIVEN FEATURE.

ANNOTATIONS DISPLAYED AS *ITALICIZED* WITH AN ASTERISK* HAVE BEEN INTERPOLATED FROM RECORDS AND WERE NOT FIELD VERIFIED BY ONSITE LOCATES LTD.

INVERT DEPTH MEASUREMENTS ARE FROM THE ASSUMED BOTTOM OF THE FACILITY STRUCTURE.

DEPTHS ARE NOT SUITABLE FOR EXCAVATION PURPOSES. SEWER NETWORK CONNECTIONS WERE COMPILED WHERE FIELD EVIDENCE COINCIDED WITH AS-BUILT RECORDS

WHERE NO DEPTH INFORMATION COULD BE OBTAINED, UTILITIES ARE ASSUMED TO BE AT STANDARD INSTALLATION DEPTH FOR THE SPECIFIC TYPE OF UTILITY.

THE MOST RELIABLE WAY TO PRECISELY DETERMINE THE HORIZONTAL AND VERTICAL LOCATION OF AN UNDERGROUND UTILITY IS THROUGH PHYSICAL EXPOSURE USING SAFE DIGGING TECHNIQUES (COMMONLY PERFORMED WITH HYDRO VACUUM EXCAVATION)

INVERT DEPTH MEASUREMENTS HEREON ARE PROVIDED IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

CAUTION: CALL BEFORE YOU DIG

THIS PLAN IS INTENDED FOR DESIGN PURPOSES ONLY. OTHER BURIED UTILITIES MAY EXIST WHICH ARE NOT SHOWN DUE TO INSUFFICIENT INFORMATION OR IMPROPER INSTALLATION. CONTACT ALL POTENTIAL OWNERS OF UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION OR BREAKING GROUND.
IT IS THE RESPONSIBILITY OF THE CONTRACTOR/BUILDER TO ENSURE THE APPROPRIATE LEGAL REQUIREMENTS ARE MET.

UNDERGROUND UTILITY NOTES

THE UTILITY DATA DEPICTED ON THIS DRAWING WERE ACQUIRED IN ACCORDANCE WITH ASCE STANDARD 38-02. THE INFORMATION IS SHOWN BY ATTRIBUTED QUALITY LEVELS WHICH ARE DEFINED AS FOLLOWS:

DATA QUALITY LEVEL

HIGHEST QUALITY — QUALITY LEVEL A — QUALITY LEVEL B — QUALITY LEVEL C — QUALITY LEVEL D — LOWEST QUALITY

QUALITY LEVEL "A" - INFORMATION OBTAINED BY ACTUAL PHYSICAL EXPOSURE OF TARGETED UTILITIES AND SUBSEQUENT MEASUREMENT OF THE EXPOSED PRECISE HORIZONTAL AND VERTICAL POSITION.

QUALITY LEVEL "B" - INFORMATION OBTAINED USING GEOPHYSICAL LOCATE TECHNIQUES TO IDENTIFY THE EXISTENCE AND APPROXIMATE HORIZONTAL POSITION OF THE DESIGNATED UTILITIES.

QUALITY LEVEL "C" - INFORMATION OBTAINED BY SURVEYING AND PLOTTING VISIBLE UTILITY FEATURES AND BY USING PROFESSIONAL JUDGMENT IN CORRELATING THIS INFORMATION TO THE QUALITY "D" INFORMATION OBTAINED.

QUALITY LEVEL "D" - INFORMATION DERIVED FROM UTILITY RECORDS OR VERBAL RECOLLECTIONS

ALL SERVICES ARE QUALITY "D" UNLESS NOTED OTHERWISE.
LEVEL "D" RECORD INFORMATION SHOWN ON THIS PLAN HAVE BEEN PLOTTED APPROXIMATELY AS PER THE RECORDS FOUND AND COULD NOT BE FIELD VERIFIED WITHIN THE SCOPE OF THIS PROJECT. IF FURTHER VERIFICATION IS REQUIRED, IT IS SUGGESTED THAT LEVEL "A" METHODOLOGIES BE EMPLOYED.

LOST SIGNAL- DENOTES/INDICATES A POINT WHERE QL-B METHODS COULD NO LONGER ASCERTAIN THE HORIZONTAL POSITION OF A FACILITY.

QUALITY LEVEL "D" INFORMATION COMPILED FROM RECORDS PROVIDED BY CITY OF OTTAWA ;FILE NAME-10313 P-20,25

SUBSURFACE UTILITY FIELD WORK WAS COMPLETED ON THE SEPTEMBER 24TH,2025

ONSITE LOCATES INC.
UTILITY LOCATE SERVICES
A wholly owned subsidiary of J.D. Barnes Ltd.
140 RENFREW DRIVE, SUITE 100, MARKHAM, ON L3R 6B3
T: 1-800-805-6155 www.onsitelocates.ca

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LAND INFORMATION SPECIALISTS
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DRAWN BY:	CHECKED BY:	REFERENCE NO.:	DRAWN BY:	CHECKED BY:	REFERENCE NO.:
CM	VAC	25-46-41731	M.C.	S.L.	24-10-029-01
		DATED: 10/08/2025			DATED: 2025/10/14

APPENDIX H
SUBSURFACE UTILITY ENGINEERING REPORT

ONSITE LOCATES INC.
UTILITY LOCATE SERVICES
A wholly owned subsidiary of J.D. Barnes Ltd.

October 8, 2025

Christine Yee
Christine.yee@whiteowlgroup.ca
Senior Director, Development
White Owl Family Office Group
180 Renfrew Drive, Suite 230
Markham, ON L3R 9Z2

Re: **Subsurface Utility Mapping (SUM) – 3145 Conroy Road, Ottawa**
Project Ref: 25-46-41731

Project Summary

OnSite Locates Inc. (OSL) was engaged to complete Subsurface Utility Mapping of the above noted property by White Owl Family Office Group on August 28th,2025.

The SUM Investigation was completed in accordance with *CI/ASCE Standard 38-02: Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data*.

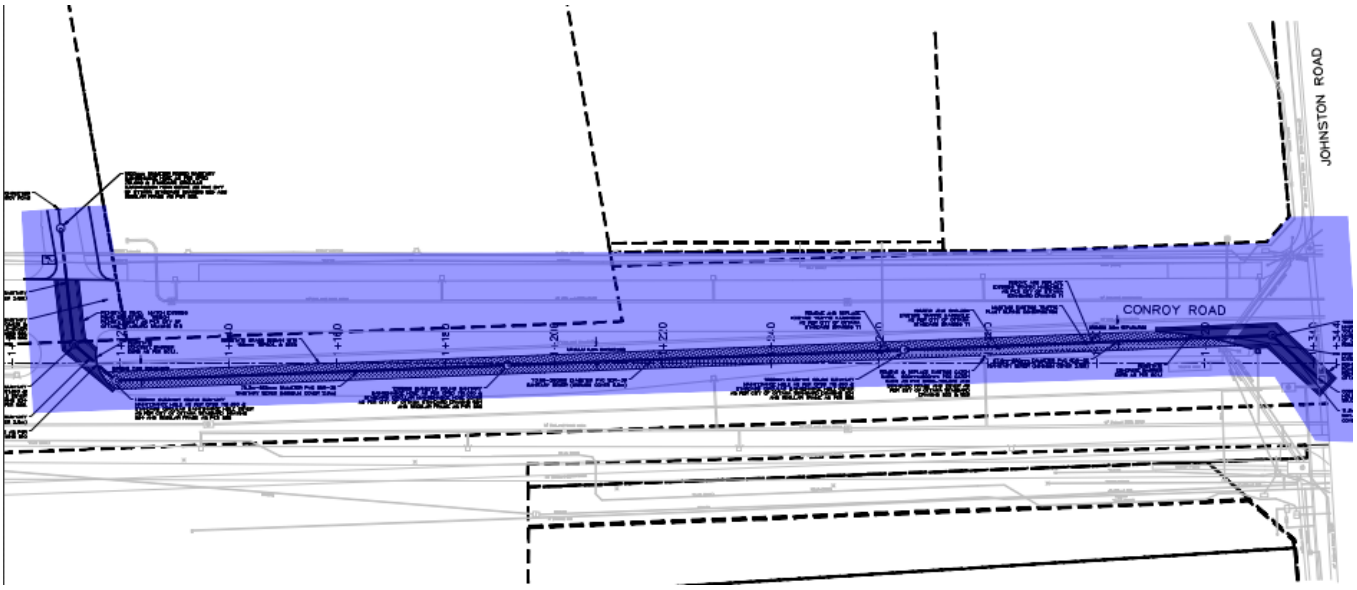
The work was conducted on September 24th,2025 and was successful in designating the alignment of the underground utilities within the Project Area.

The following utilities were identified:

- Hydro
- Gas
- Telecommunications
- Water
- Sanitary and Storm

This Report was created to supplement the digital file(s) 25-46-41731-Oct8.dwg that make up the final deliverable of the project.

Project Area



Subsurface Utility Mapping Investigation Standards

OnSite Locates Inc. performed the SUM Investigation in accordance with the *CI/ASCE Standard 38-02: Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data*.

CI/ASCE Standard 38-02 Summary

Quality Level D (QL-D) - information derived from utility records or oral recollections.

Quality Level C (QL-C) - Information obtained by surveying and plotting visible above-ground utility features and by using professional judgment in correlating this information to quality level D information.

Quality Level B (QL-B) - Information obtained through the application of appropriate surface geophysical methods to determine the existence and approximate horizontal position of subsurface utilities. Quality level B data should be reproducible by surface geophysics at any point of their depiction. This information is surveyed to applicable tolerances defined by the project and reduced onto plan documents.

Quality Level A (QL-A) - Precise horizontal and vertical location of utilities obtained by the actual exposure (or verification of previously exposed and surveyed utilities) and subsequent measurement of subsurface utilities, usually at a specific point. Minimally intrusive excavation equipment is typically used to minimize the potential for utility damage. A precise horizontal and vertical location, as well as other utility attributes, is shown on plan documents. Accuracy is typically set to 15-mm vertical and to applicable horizontal survey and mapping accuracy as defined or expected by the project owner.

Equipment and Techniques

JDB/OSL survey crews are trained to use the tools provided to them in accordance with the JDB/OSL Standard Operating Procedures, project scope, conditions, and the manufacturer's instructions to ensure the work is completed safely, accurately, and on time. Below is a description of the equipment and techniques used by JDB/OSL during the SUM Investigation.

Electromagnetic Designating Equipment
JDB/OSL uses industry standard electromagnetic cable and pipe locate kits. This equipment consists of a transmitter and receiver operating in a range of frequencies. In essence, the transmitter is used to induce a signal on a utility either through direct connection to the utility or electromagnetic induction and the signal is detected by the transmitter allowing the operator to mark on the ground the approximate horizontal location of the utility. The receiver also provides a depth estimation of the buried utility.

It is important to note that this type of equipment has its limitations, since it is the electromagnetic field that is detected, and not the utility itself. It will not locate non-metallic lines such as plastic pipes. Additionally, there are several factors that may distort the signal, causing the designation to be inaccurate, or making the utility impossible to detect. These factors are broken tracer wires, utility congestion, and change in utility material etc.

Invert Elevation Measurement
Sewer invert depths were manually measured using measuring tapes from the lid/grate of the given feature. Invert elevations were calculated from elevations provided in the topographic survey.

Survey Equipment
JDB/OSL employs the use of typical surveying instruments such as Total Stations and high accuracy Global Navigation Satellite Systems (GNSS). GNSS units are primarily used, with Total Stations being an alternative when there is no good satellite signal: under trees, near buildings etc.

Computer-Aided Design (CAD) Drafting
JDB/OSL employs the use of industry standard programs e.g. MicroStation and AutoCAD to manipulate and present data.

Subsurface Utility Mapping Investigation Summary

Utility Circulation Request
The record search process commenced on September 4th, 2025, the final records were obtained on September 20th, 2025. The results and status of the records search are provided below:

- Bell-Received/September 20th,2025
- Enbridge-Received/September 8th,2025
- GT-Cleared/ September 10th,2025
- Hydro One-Cleared/ September 11th,2025
- City of Ottawa-Received/ September 19th,2025
- Ottawa Hydro-Received/ September 19th,2025
- Rogers-Received/ September 17th,2025
- Telus-Received/ September 4th,2025

Field Investigation
The field investigation was conducted using geophysical locate techniques. All above ground features related to underground utilities, such as pedestals, ground level boxes etc. were investigated.
All manholes and catch basins in the investigation area were inspected to obtain invert depth and diameters measurements for storm and sanitary sewers.

Data Analysis
Field and record data were analyzed using professional judgement to provide a comprehensive presentation of the utility plant and infrastructure within the workspace.

SAN MH#1

First set of steps on North side Depth(m)	Second set of steps on North side Depth(m)	Steps on South side Depth(m)
0.92	6.20	3.90
1.22	**Unable to measure further**	4.22
1.55		4.55
1.84		4.86
2.10		
2.39		
2.65		
2.94		
3.25		
3.55		
3.85		
4.15		
4.45		
4.75		

Two platforms present inside manhole

- Depth of platform 1- 4.62m
- Depth of platform 2- 7.10m

A series of steps between Platform 1 and Platform 2 on the east side were observed. However, due to the presence of the platform, depth measurements could not be obtained.

Depth measurement of the bottom of the chamber – 9.40m



Figure 1:Sets of North side steps



Figure 2:Set of South side steps



Figure 1:Platforms



Figure 4: Chamber

SAN MH#2

First set of steps on North side Depth(m)	Second set of steps on North side Depth(m)
0.66	≈6.20
0.96	Unable to measure further since steps are recessed; extends till concrete layers possibly at 30cm intervals
1.25	
1.55	
1.98	
2.44	
2.95	
3.36	
3.73	
4.10	
4.67	
4.97	
5.27	
5.56	
5.87	
6.18	

One platform present inside manhole in N-S direction

- Depth of platform 1- 6.43m

Another series of steps were observed on the north side. However, due to their recessed condition, depth measurements could not be obtained.

Depth measurement of the bottom of the chamber – 9.80m



Figure51: First set of North side steps



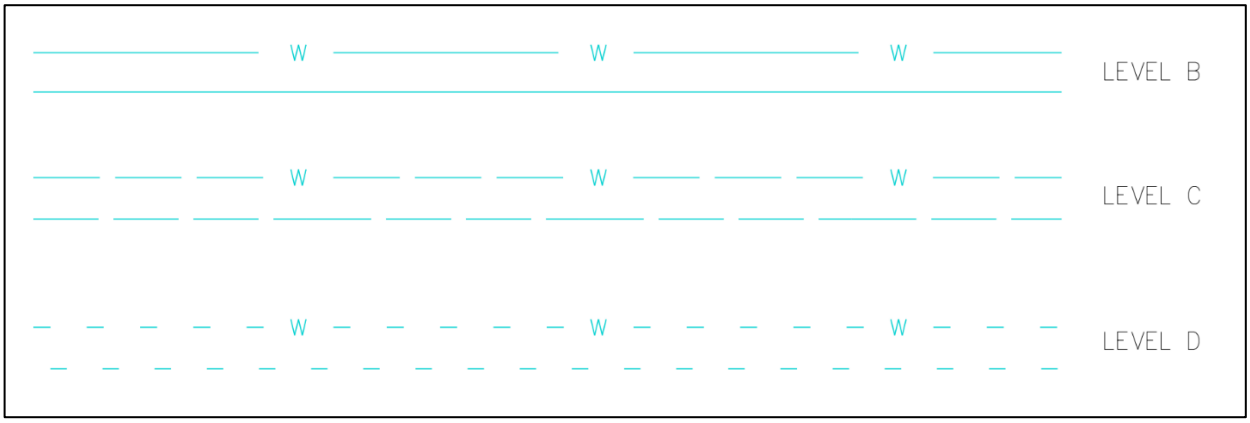
Figure 6: Second Set of North side steps



Figure 7: Chamber

CAD Presentation

Line styles are designated as per the CI/ASCE Standard 38-02 and are depicted in the CAD deliverable as seen below.



Report Prepared by:

Chandana Murali
CAD Technologist, Utility Surveys

VJ Andrea Corpuz
Project Supervisor, Utility Surveys

APPENDIX I
GEOTECHNICAL INVESTIGATION

GEOTECHNICAL INVESTIGATION

Extension of Sanitary Services
Conroy Road, Ottawa, Ontario

CO1004.01

FINAL REPORT

February 25, 2026

Prepared for:

WO MW REALTY LTD.

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environment@terrapex.com
www.terrapex.com

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APPENDICES

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Appendix B	Site and Borehole Location Plan
Appendix C	Borehole Log Sheets
Appendix D	Geotechnical Laboratory Test Results
Appendix E	Certificate of Chemical Analyses
Appendix F	Guidelines for Excavation Support
Appendix G	Photo of the Cored Asphalt Pavement

1.0 INTRODUCTION

Terrapex Environmental Ltd. (Terrapex) has been retained by WO MW Realty Ltd. to carry out a geotechnical investigation for the proposed sanitary sewer installation along Conroy Road in Ottawa, Ontario (the "Site"). Authorization to proceed with this study was given by Mr. Paul McGuigan of WO MW Realty Ltd.

It is understood that the Client plans to redevelop the property with civic address 3145 Conroy Road in Ottawa, and as a condition of the development, a sanitary sewer connection should be made. Client provided the preliminary design drawing titled Sanitary Sewer Plan & Profile, Project No. CO-25-1505, Drawing # C103 and C104, prepared by Egis, dated November 21, 2025. Based on the drawing, the proposed sanitary sewer will be a 250 mm PVC pipe with a length of 229 m along Conroy Road, extending between the 3145 Conroy Road and Johnston Road, installed at an approximate depth of 2.5 m to 3.0 m. The proposed sanitary sewer will be connected to an existing maintenance manhole on Johnston Road, with an internal drop structure to a depth of approximately 5.5 m.

The purpose of this investigation was to characterize the underlying soil and groundwater conditions, to determine the relevant geotechnical properties of encountered soils and to provide recommendations pertaining to the proposed development.

The geotechnical investigation was carried out in conjunction with hydrogeological and environmental studies undertaken by Terrapex, reported under separate covers.

This report presents the results of the investigation performed in accordance with the general terms of reference outlined above and is intended for the guidance of the owner and the design architects or engineers only. It is assumed that the design will be in accordance with the applicable building codes and standards.

2.0 FIELDWORK

The fieldwork for this study was carried out during the period December 30 to 31, 2025. It consisted of three (3) boreholes advanced by a drilling contractor commissioned by **Terrapex** utilizing conventional drilling techniques. The boreholes are designated as MW101, BH102, and MW103, advanced to a depth of approximately 5.2 m below ground surface (mbgs). Boreholes MW101 and MW103 were instrumented with monitoring wells for long-term monitoring of groundwater levels.

The boreholes were advanced at the locations shown on the borehole Location Plan in **Appendix B**. Borehole BH102 was initially located on the asphalt pavement of the road, however, the borehole hit an obstruction at a depth of approximately 0.45 mbgs. Accordingly, the borehole was moved to the grass area of the median in the centre of Conroy Road.

Standard penetration tests were carried out in the course of advancing the boreholes through the overburden soils to take representative soil samples and to measure penetration index values (N-values) to characterize the condition of the various soil materials. The number of blows of the striking hammer required to drive the split spoon sampler through 300 mm depth increments was recorded and these are presented on the logs in **Appendix C** as penetration index values (N values).

Groundwater level observations were made by Terrapex in the open boreholes during their advancement.

The ground surface elevation at the borehole locations were referenced to geodetic datum and was surveyed by Terrapex utilizing a Trimble GNSS Receiver and Rod.

The fieldwork for this project was carried out under the supervision of an experienced technician from this office who laid out the position of the borehole in the field; arranged locates of buried services; effected the drilling, sampling and in situ testing; observed groundwater conditions; and prepared field borehole log sheets.

3.0 LABORATORY TESTS

The soil samples recovered from the split spoon sampler were properly sealed, labelled and brought to our laboratory. They were visually classified and water content tests were conducted on all samples retained from the boreholes. The results of the classification, water contents, and Standard Penetration tests are presented on the borehole log sheets in **Appendix C**.

Grain-size analyses were carried out on three (3) soil samples (BH101-SS4, BH102-SS5, and BH103-SS5). All three (3) samples were also subjected to Atterberg Limits tests. The results of these tests are enclosed in **Appendix D**.

In addition, two (2) soil samples (BH101 samples SS6, BH103 sample SS4) were submitted to BV Laboratories for determination of pH and sulphate content and its potential for sulphate attack on buried concrete. The results of these tests are enclosed in **Appendix E**; discussed in **Section 5.7** of this report.

4.0 SITE AND SUBSURFACE CONDITIONS

Full details of the subsurface soil, groundwater conditions at the site are given on the Borehole Log Sheets attached in **Appendix C** of this report.

The following paragraphs present a description of the site and a commentary on the engineering properties of the various soil materials contacted in the boreholes.

It should be noted that the boundaries of soil types indicated on the borehole logs are inferred from non-continuous soil sampling and observations made during drilling. These boundaries are intended to reflect transition zones for the purpose of geotechnical design, and therefore, should not be construed as exact planes of geological change.

4.1 SITE DESCRIPTION

The Site is located on Conroy Road, from Johnston Road to approximately 230 m north to the front of 3145 Conroy Road, in Ottawa, Ontario. A median covered with grass is present at the center of Conroy Road.

The ground surface elevations at the locations of the boreholes ranged from 82.73 m at Borehole BH102 to 84.71 m at Borehole MW103.

4.2 SURFACE COVER

Asphaltic concrete pavement was present at the initial location of Borehole BH102. The thickness of the asphaltic concrete at the borehole location was measured to be approximately 150 mm. The photo of the cored asphalt pavement is attached in **Appendix G** of this report. Asphaltic concrete was underlain by intermixed granular base material consisting of sand and gravel. The thickness of the granular material was not measured due to an unforeseen obstruction, which resulted to abandoning the hole and shifting the borehole to the median.

Topsoil is present at the ground surface of all the boreholes. The thickness of the topsoil at the borehole locations are measured to be approximately 50 mm.

It should be noted that the topsoil thickness will vary along the median, and thicker topsoil than that found in the boreholes may be present in the surrounding places. This renders it difficult to estimate the quantity of topsoil to be stripped based on the findings at the borehole location.

4.3 FILL MATERIAL

Fill material is present below the surface cover in all boreholes. It extends to a depth of approximately 1.5 mbgs. The fill material consists of silty sand to sandy silt and gravel with trace to some organic, rootlets, and clay.

The fill is dark brown, grey and brown in colour and moist in appearance. The water content of the samples of fill obtained from Boreholes ranged from 7 to 24% by weight.

SPT in the fill provided N-values ranging from 13 to 21, indicating a compact condition.

4.4 NATIVE SOIL

The native soils below the fill material consist of layers of silty clay and sandy silt.

4.4.1 Silty Clay

A deposit of silty clay with trace of sand was encountered beneath the earth fill layer in all boreholes, extended to a depth of approximately 4.6 mbgs in borehole BH101 and extended to the explored depths of the remaining boreholes.

Silty clay is grey in colour and the water content of the samples obtained from Boreholes BH101, BH102 and BH103 ranged from 17% to 56% by weight, moist to wet in appearance.

SPT testing in the silty clay layer yielded N-values ranging from 2 to 12, indicating a soft to stiff consistency.

Grain size analyses and Atterberg Limits tests were carried out on three (3) representative samples of silty clay obtained from borehole BH101, BH102 and BH103. The test results are enclosed in **Appendix D** and summarized in the following table.

Sample No. and Depth	Sample Description (According to CFEM, 4th Edition)	Gravel %	Sand %	Silt %	Clay %	Plastic Limit	Liquid Limit	Soil Classification (According to USCS)
BH101 Sample 4	SILT AND CLAY trace sand, trace gravel	1.8	3.3	49.5	45.9	19.5	53.3	CH
BH102 Sample 5	CLAY AND SILT trace sand	0.6	3.3	36.9	59.2	22.0	55.7	CH
BH103 Sample 5	SILTY CLAY trace sand	0.4	1.7	22.0	75.9	29.8	76.9	CH

Based on the results of the grain size analyses, the Coefficient of Permeability (k) of the silty clay is estimated to be less than 10^{-7} cm/sec, corresponding to very low relative permeability, and based on the Atterberg limits tests the silty clay has a high plasticity.

4.4.2 Sandy Silt Till

A deposit of sandy silt till is present below the silty clay in Borehole MW101, extending to the explored depth of the borehole.

The sandy silt till is a glacial deposit consisting of a random mixture of soil particles ranging from clay to gravel, with sand and silt being the predominant fractions.

Sandy silt till is grey in colour and the water content of the sample obtained from BH101 is 9% weight, moist in appearance.

SPT carried out in the sandy silt till deposit provided N-value of 10, indicating a loose compactness condition.

4.5 GROUNDWATER

Groundwater observations were made in the open boreholes during their advancement and groundwater level measurements were made in the monitoring wells following their installation.

The groundwater levels measured in the monitoring wells are summarized in the following table.

Borehole No.	Ground Surface Eelevation (m)	Date	Groundwater Depth (mbgs)	Groundwater Elevation (m)
MW101	83.19	January 22, 2026	4.40	78.79
MW102	84.71	January 22, 2026	4.52	80.19

It should be noted that groundwater levels are subject to seasonal fluctuations. A higher groundwater level condition may also develop following significant rainfall events.

5.0 DISCUSSION AND RECOMMENDATIONS

The following discussions and recommendations are based on the factual data obtained from the boreholes advanced at the site by **Terrapex** and are intended for use by the client and design architects and engineers only.

It is understood that the Client plans to redevelop the property with civic address 3145 Conroy Road in Ottawa, and as a condition of the development, a sanitary sewer connection should be made. Client provided the preliminary design drawing titled Sanitary Sewer Plan & Profile, Project No. CO-25-1505, Drawing # C103 and C104, prepared by Egis, dated November 21, 2025. Based on the drawing, the proposed sanitary sewer will be a 250 mm PVC pipe with a length of 229.0 m along Conroy Road, extending between the 3145 Conroy Road and Johnston Road, installed at an approximate depth of 2.5 m to 3.0 m. The proposed sanitary sewer will be connected to an existing maintenance manhole on Johnston Road, with an internal drop structure to a depth of approximately 5.5 m.

The construction methods described in this report are not specifications or recommendations to the contractors or as the only suitable methods. The collected data and the interpretation presented in this report may not be sufficient to assess all the factors that may influence the construction. Contractors bidding on this project or conducting work associated with this project should make their own interpretation of the factual data and/or carry out their own investigations as they might deem necessary. The contractor should also select the method of construction, equipment and sequence based on their previous experience on similar projects.

5.1 EXCAVATION

Based on the field results, excavations for the sanitary sewer are not expected to pose any unusual difficulty in the overburden. Excavation of the overburden materials can be carried out with hydraulic excavators. Provisions must be made in the excavation and foundation installation contracts for the removal of possible obstructions such as concrete and construction debris associated with former structures at the site.

The native soil at this site is a glacial deposit, a non-sorted sediment, which may contain boulders. Provisions must be made in the foundation and excavation contracts for the removal of possible boulders.

All excavations must be carried out in accordance with the latest Occupational Health and Safety Act (OHSA). With respect to the latest OHSA, the fill material and native soils are expected to conform to Type 3 Soil above groundwater level and Type 4 Soil below groundwater level.

Temporary excavation sidewalls in Type 3 soils should not exceed 1.0 horizontal to 1.0 vertical. Excavation extended below the water table must be sloped at a maximum inclination of 3.0 horizontal to 1.0 vertical (Type 4 soil in accordance with the OHSA) will be required.

Locally, where loose or soft soil is encountered at shallow depths or within zones of persistent seepage, it will be necessary to flatten the side slopes as necessary to achieve stable conditions.

For excavations through multiple soil types, the side slope geometry is governed by the soil with the highest number designation. Excavation side-slopes should not be unduly left exposed to inclement weather.

Where workers must enter excavations extending deeper than 1.2 m below grade, the excavation sidewalls must be suitably sloped and/or braced in accordance with the Occupational Health and Safety Act and Regulations for Construction Projects.

In the planning of the trench shoring and excavation, the presence of the adjacent existing buried service pipes should be considered. In addition to the stability of these existing adjacent pipes, which must be maintained without detrimental settlements, the backfill in these trenches and especially the granular bedding surrounding the existing service pipes, manholes, etc. may be a source of water, which, if encountered, must be dealt with.

Excavations shall be undertaken in a manner to prevent damage to adjacent property, existing structures, utilities, roads, and sidewalks. During excavations, adjacent existing structures and public right of way, if present, must be protected by proper shoring or sloping. General guidelines for underpinning in soil and excavation support are presented in **Appendix F**.

5.2 REUSE OF ON-SITE EXCAVATED SOIL

On-site excavated inorganic soils are considered suitable for reuse as backfill material or engineering fill, provided their water content is within 2% of their optimum water content (OWC) as determined by Standard Proctor test, and the materials are effectively compacted with a suitably sized compactor. The compactors must be of sufficient size and energy to break down the lumps and to knead the soil into a homogeneous mass as water and compaction effort is applied. If the equipment does not have sufficient energy to break down the lumps, there is a tendency to bridging and post construction settlements.

The soils excavated from below the groundwater level are expected to be too wet to be re-used. The moisture content of the soils and the lift thickness for compaction must be properly controlled and monitored by a qualified field engineer/geotechnical inspector during backfilling. Alternatively, suitable imported material can be used.

On-site soils that are wetter than their OWC should be dried sufficiently prior to use as backfill in order to achieve the specified degree of compaction.

The fill material encountered at the site contained organics, and therefore not suitable for re-use. The underlying native soils were found generally much wetter than their optimum moisture content and will require significant drying before re-use.

In areas of narrow trenches or confined spaces such as around manholes, the use of aggregate fill such as Granular 'B' (OPSS 1010) is required if there is to be post-construction grade integrity.

5.3 GROUNDWATER CONTROL

Based on observations made during the drilling of the boreholes and close examination of the soil samples extracted from the boreholes, significant groundwater seepage is not anticipated to be encountered within the presumed excavation depths.

The silty clay soil possesses low permeability coefficient; the groundwater yield from this soil is expected to be small. It is anticipated that adequate control of the groundwater can be achieved by pumping from filtered sumps in the bases of the excavation within the fill and silty clay soils.

The underlying native sandy silt till soils encountered at the location of BH/MW101 is expected to have a moderate permeability.

If encountered, water-bearing sand seams below groundwater level or granular backfill of existing nearby utility trenches and manholes could yield significant seepage.

Surface water should be directed away from open excavations. However, the construction dewatering requirements should refer to the project hydrogeology study.

5.4 SERVICES TRENCHES

Based on the assumed site grades, sanitary sewer pipes are anticipated to be supported on undisturbed native deposits which which is considered competent to support the pipe bedding in a satisfactory manner provided the soil which lies in the base of the trench is undisturbed.

Installation and construction of the sanitary sewer should meet municipal and OPS standards.

If unsuitable bedding conditions occur, careful preparation and strengthening of the trench bases prior to pipe installation will be required.

The type of bedding depends mainly on the strength of the subgrade immediately below the invert levels.

Normal Class ‘B’ bedding is recommended for underground utilities. Granular ‘A’ or 19 mm crusher-run limestone can be used as bedding material; all granular materials should meet OPS 1010 specifications. The bedding material should be compacted to a minimum of 95% SPMDD. Bedding details should follow the applicable governing design detail. Trenches dug for these purposes should not be unduly left exposed to inclement weather.

Pipe bedding and backfill for flexible pipes should be undertaken in accordance with OPSD 802.010.

If unsuitable bedding conditions occur, careful preparation and strengthening of the trench bases prior to sewer installation will be required. The subgrade may be strengthened by placing a thick mat consisting of 50 mm crusher-run limestone. Field conditions will determine the depth of stone required. Geotextiles and/or geogrids may be helpful, and these options should be reviewed by Terrapex on a case-by-case basis.

Sand cover material should be placed as backfill to at least 300 mm above the top of pipes. Placement of additional granular material (thickness dictated by the type of compaction equipment) as required or use of smaller compaction equipment for the first few lifts of native material above the pipe will probably be necessary to prevent damage to the pipe during the trench backfill compaction.

To minimize any post construction settlement, it is recommended that the trenches be backfilled with Granular ‘A’ or Granular ‘B’ Type II material, compacted to 98% of its SPMDD.

5.5 PAVEMENT DESIGN

It is anticipated that the pavement within the trench sections along the right-of-way of Conroy Road will be restored. Based on the existing topography of the site and the presumption that there will be minor re-grading, it is anticipated that the sub-grade material for the pavement will generally comprise of granular backfill or native silty clay.

Preparation for construction of the new pavement should include the removal of existing pavement components (asphaltic concrete and granular materials) and any unsuitable materials such as organic, weak/softened and/or disturbed soils. After removal of all unsuitable soils, the subgrade should be proof-rolled with heavy rubber-tired equipment. The proof-rolling operation should be witnessed by the Geotechnical Engineer. Any soft or wet subgrade areas which deflect significantly should be sub-excavated and replaced with suitable approved granular fill material compacted to at least 98% of SPMDD.

The fill placement should not be performed during winter months when freezing temperatures occur persistently or intermittently. All fill must be placed in lifts not exceeding 200 mm in thickness and compacted to at least 98% of the material’s SPMDD.

Given the frost susceptibility and drainage characteristics of the subgrade soils, the pavement design presented below is recommended.

RECOMMENDED ASPHALTIC CONCRETE PAVEMENT STRUCTURE DESIGN (MINIMUM COMPONENT THICKNESSES)

Pavement Layer	Compaction Requirements	Material Type and Thickness*
Surface Course Asphaltic Concrete	92% to 97% MRD	50 mm Hot-Laid HL3 or SP12.5 B (PG64-34)
Binder Course Asphaltic Concrete	92% to 97% MRD	100 mm Hot-Laid HL8 or SP19.0 B (PG64-34)
Granular Base	100% SPMDD	150 mm compacted depth Granular A
Granular Sub-Base	100% SPMDD	450 mm compacted depth Granular B

* Or match existing pavement structure, whichever is greater

The subgrade must be compacted to at least 98% of SPMDD. The granular base and sub-base materials should be compacted to a minimum of 100% SPMDD.

Asphaltic concrete materials should be rolled and compacted per OPSS 310. The granular and asphaltic concrete pavement materials and their placement should conform to OPSS 310, 501, 1010 and 1150, and the pertinent Municipality specifications.

The pavement thickness designs provided above presume that construction will take place under favourable conditions. In the event that construction takes place during the spring thaw, the late fall, or following heavy rainfall events, a thicker granular sub-base layer may be required to compensate for reduced subgrade strength.

The long-term performance of the proposed pavement structure is highly dependent upon the subgrade support conditions. Stringent construction control procedures should be maintained to ensure that uniform subgrade moisture and density conditions are achieved as much as practically possible when fill is placed and that the subgrade is not disturbed and weakened after it is exposed.

All asphalt joints shall include a minimum 500 mm wide by 50 mm deep step joint into the existing top coarse asphalt. The new granular base and sub-base layers should be keyed (a step of about 300 mm) into the existing base and sub-base layers. It is recommended that compactive energy is applied to the surface of each granular layer at the interface of the old and new layer to ensure uniformity and adequate compaction. Care should be taken during construction of the new pavement such that voids or gaps do not develop at the underside of the existing pavement layers and result in future cracks. Also, care should be taken when constructing the excavations into the granular sub grade soils such that no ground movement is allowed in the adjacent soils supporting the existing pavement structure.

5.6 CHEMICAL CHARACTERIZATION OF SUBSURFACE SOIL

Two (2) oil samples obtained from Boreholes BH101 samples SS6 and BH103 sample SS4 were submitted to BV Laboratories for pH index test and water-soluble sulphate content to determine the potential of attacking the subsurface concrete. The Certificate of Analysis provided by the analytical chemical testing laboratory is contained in **Appendix E** of this report.

The test results revealed that the pH index of the soil samples are 7.38 and 7.89, indicating a slight alkalinity.

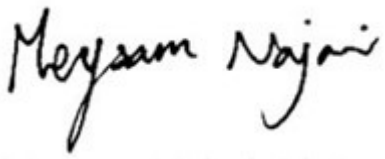
The water-soluble sulphate content of the tested samples are 0.021% and 0.054%. The concentration of water-soluble sulphate content of the tested samples is below the CSA Standard of 0.1% water-soluble sulphate (Table 12 of CSA A23.1, Requirements for Concrete Subjected to Sulphate Attack). Special concrete mixes against sulphate attack are therefore not required for the sub-surface concrete of the proposed structure.

6.0 LIMITATIONS OF REPORT

The Limitations of Report, as quoted in **Appendix 'A'**, are an integral part of this report.

Yours respectfully,
TERRAPEX ENVIRONMENTAL LTD.





Yacouba Doro, MBA, PMP®, P.Eng. Senior Geotechnical Project Manager	Meysam Najari, Ph.D., P.Eng. Vice President – Geotechnical Services

APPENDIX A
LIMITATIONS OF REPORT

LIMITATIONS OF REPORT

This report has been completed in accordance with the terms of reference for this project as agreed upon by **WO MW Realty Ltd** and Terrapex Environmental Ltd. (Terrapex) and generally accepted engineering consulting practices in this area.

The conclusion and recommendations in this report are based on information determined at the inspection locations. Soil and groundwater conditions between and beyond the test holes may differ from those encountered at the test hole locations, and conditions may become apparent during construction which could not be detected or anticipated at the time of the soil investigation. If new or different information is identified, Terrapex should be requested to re-evaluate its conclusions and recommendations and amend the report as appropriate.

The design recommendations given in this report are applicable only to the project described in the text, and then only if constructed substantially in accordance with details of alignment and elevations stated in the report. Since all details of the design may not be known to us, in our analysis certain assumptions had to be made as set out in this report. The actual conditions may, however, vary from those assumed, in which case changes and modifications may be required to our recommendations.

This report was prepared for the sole use of **WO MW Realty Ltd**. Terrapex accepts no liability for claims arising from the use of this report, or from actions taken or decisions made as a result of this report, by parties other than **WO MW Realty Ltd**. The material herein reflects Terrapex's judgement in light of the information available to it at the time of preparation. We recommend, therefore, that we be retained during the final design stage to review the design drawings and to verify that they are consistent with our recommendations, or the assumptions made in our analysis. We also recommend that we be retained during construction to confirm that the subsurface conditions throughout the site do not deviate materially from those encountered in the test holes. In cases where these recommendations are not followed, Terrapex's responsibility is limited to accurately interpreting the conditions encountered at the test holes, only.

The comments given in this report on potential construction problems and possible methods are intended for the guidance of the design engineer, only. The number of inspection locations may not be sufficient to determine all the factors that may affect construction methods and costs. Contractors bidding on this project or undertaking the construction should, therefore, make their own interpretation of the factual information presented and draw their own conclusions as to how the subsurface conditions may affect their work.

APPENDIX B
BOREHOLE LOCATION PLAN



LEGEND

- SITE BOUNDARY
- CANADIAN NATIONAL RAILWAY
- PROPOSED SANITARY SEWER ALIGNMENT
- BOREHOLE
- MONITORING WELL

0 20 40 60 80 100
Metres

DATA SOURCE: CITY OF OTTAWA
MAP PROJECTION: NAD 1983 UTM ZONE 18N

CLIENT:
WHITE OWL FAMILY PROPERTIES LIMITED

SITE LOCATION:
3145 CONROY ROAD
OTTAWA, ONTARIO

TERRAPEX

TITLE:
GENERAL SITE LAYOUT

DRAWN BY:	PROJECT NO.:	CHECKED BY:
JS/SF	CO1004.01	KWB
REVISION: 00	DATE: JANUARY 2026	FIGURE: 1

SFinlay \C:\Users\s.finlay\OneDrive - Terrapex Environmental Ltd\PROJECTS\Ottawa\CO1000\CO1004.01 3145 Conroy Rd, Ottawa\GIS\CO1004.01.aprx

APPENDIX C
BOREHOLE LOGS

CLIENT: WHITE OWL FAMILY PROPERTIES LIMITED	PROJECT NO.: CO1004.01	**RECORD OF: MW101**
ADDRESS: 3145 CONROY ROAD	STATION:	
CITY/PROVINCE: OTTAWA, ONTARIO	NORTHING (m): 5024663.66	EASTING (m): 451097.00 ELEV. (m) 83.19
CONTRACTOR: STRATA DRILLING GROUP	METHOD: DT 45	
BOREHOLE DIAMETER (cm): 12.7	WELL DIAMETER (cm): 5.08	SCREEN SLOT #: 10 SAND TYPE: #2 SEALANT TYPE: BENTONITE

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON | GRAB

GWL (m)	SOIL SYMBOL	SOIL DESCRIPTION	DEPTH (m)	ELEVATION (m)	SHEAR STRENGTH (kPa) 40 80 120 160 / N-VALUE (Blows/300mm) 20 40 60 80	WATER CONTENT (%) PL W.C. LL 20 40 60 80	SAMPLE NO.	SAMPLE TYPE	RECOVERY (%)	CSV/TOV (ppm or %LEL)	LABORATORY TESTING	WELL INSTALLATION	REMARKS
		TOPSOIL (50 mm)	0	83	19	12.5	1		85	<5			
		FILL compact, moist, dark brown gravel some clay, sand, organics	0.5	82.5									
		FILL compact, moist, dark brown sandy silt some gravel, clay	1	82	21	10.4	2		85	<5			
		stiff, moist, grey SILTY CLAY trace sand	1.5	81.5	11	32.1	3		70	<5			
		--- soft	2	81									
			2.5	80.5	2	49.3	4		100	<5			GW Ele. 80.55 masl
		--- stiff --- wet	3	80		16.7							
			3.5	79.5	12		5		40	<5			
			4	79									
		compact, moist, grey, SANDY SILT (TILL) trace gravel	4.5	78.5	10	9.4	6		-	<5			
			5										
		END OF BOREHOLE											

TERRAPEX

LOGGED BY: HM	DRILLING DATE: 30-DEC-2025
INPUT BY: SAF	MONITORING DATE: 14-JAN-2026
REVIEWED BY: HM	PAGE 1 OF 1

CLIENT: WHITE OWL FAMILY PROPERTIES LIMITED	PROJECT NO.: CO1004.01	**RECORD OF: BH102**
ADDRESS: 3145 CONROY ROAD	STATION:	
CITY/PROVINCE: OTTAWA, ONTARIO	NORTHING (m): 5024720.15	EASTING (m): 451073.04 ELEV. (m) 82.73
CONTRACTOR: STRATA DRILLING GROUP	METHOD: DT 45	
BOREHOLE DIAMETER (cm): 12.7	WELL DIAMETER (cm): -	SCREEN SLOT #: - SAND TYPE: - SEALANT TYPE: -

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON | GRAB

GWL (m)	SOIL SYMBOL	SOIL DESCRIPTION	DEPTH (m)	ELEVATION (m)	SHEAR STRENGTH (kPa) 40 80 120 160 / N-VALUE (Blows/300mm) 20 40 60 80	WATER CONTENT (%) PL W.C. LL 20 40 60 80	SAMPLE NO.	SAMPLE TYPE	RECOVERY (%)	CSV/TOV (ppm or %LEL)	LABORATORY TESTING	WELL INSTALLATION	REMARKS
		TOPSOIL (50 mm)	0	82.5	15	13.1	1		75	<5			
		FILL compact, moist, dark brown silty sand and gravel	0.5										
		FILL compact, moist, grey/brown sandy silt trace gravel, clay	1	82	18	24.2	2		70	<5			
			1.5	81.5									
		stiff, moist, grey SILTY CLAY trace sand	2	81	8	31.7	3		75	<5			
		--- firm	2.5	80.5		50.3							
			3	80	6		4		100	<5			
		--- soft	3.5	79.5	3	39.6	5		100	<5			
			4	79									
		--- wet	4.5	78.5									
		--- firm --- (TILL)	5	78	4	28.8	6		100	<5			
		END OF BOREHOLE											

TERRAPEX

LOGGED BY: HM	DRILLING DATE: 30-DEC-2025
INPUT BY: SAF	MONITORING DATE: -
REVIEWED BY: HM	PAGE 1 OF 1

CLIENT: WHITE OWL FAMILTY PROPERTIES LIMITED	PROJECT NO.: CO1004.01	**RECORD OF: MW103**
ADDRESS: 3145 CONROY ROAD	STATION:	
CITY/PROVINCE: OTTAWA, ONTARIO	NORTHING (m): 5024809.46	EASTING (m): 451038.81 ELEV. (m) 84.71
CONTRACTOR: STRATA DRILLING GROUP	METHOD: DT 45	
BOREHOLE DIAMETER (cm): 12.7	WELL DIAMETER (cm): 5.08	SCREEN SLOT #: 10 SAND TYPE: #2 SEALANT TYPE: BENTONITE

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON | GRAB

GWL (m)	SOIL SYMBOL	SOIL DESCRIPTION	DEPTH (m)	ELEVATION (m)	SHEAR STRENGTH (kPa) 40 80 120 160 / N-VALUE (Blows/300mm) 20 40 60 80	WATER CONTENT (%) PL W.C. LL 20 40 60 80	SAMPLE NO.	SAMPLE TYPE	RECOVERY (%)	CSV/TOV (ppm or %LEL)	LABORATORY TESTING	WELL INSTALLATION	REMARKS
		TOPSOIL (50 mm) FILL compact, moist, brown silty sand some gravel, trace clay	0 0.5	84.5	15	13.8	1		65	<5			
			1	84	13	6.8	2		15	<5			
		stiff, moist, grey SILTY CLAY trace sand	1.5	83.5									
			2	83	8	23.0	3		85	<5			
			2.5	82.5									
			3	82	8	42.5	4		90	<5			
		--- firm	3.5	81.5	4	56.0	5		100	<5			GW Ele. 80.75 masl
			4	81									
		--- stiff --- very moist	4.5	80.5									
			5	80	10	17.8	6		50	<5			
		END OF BOREHOLE											

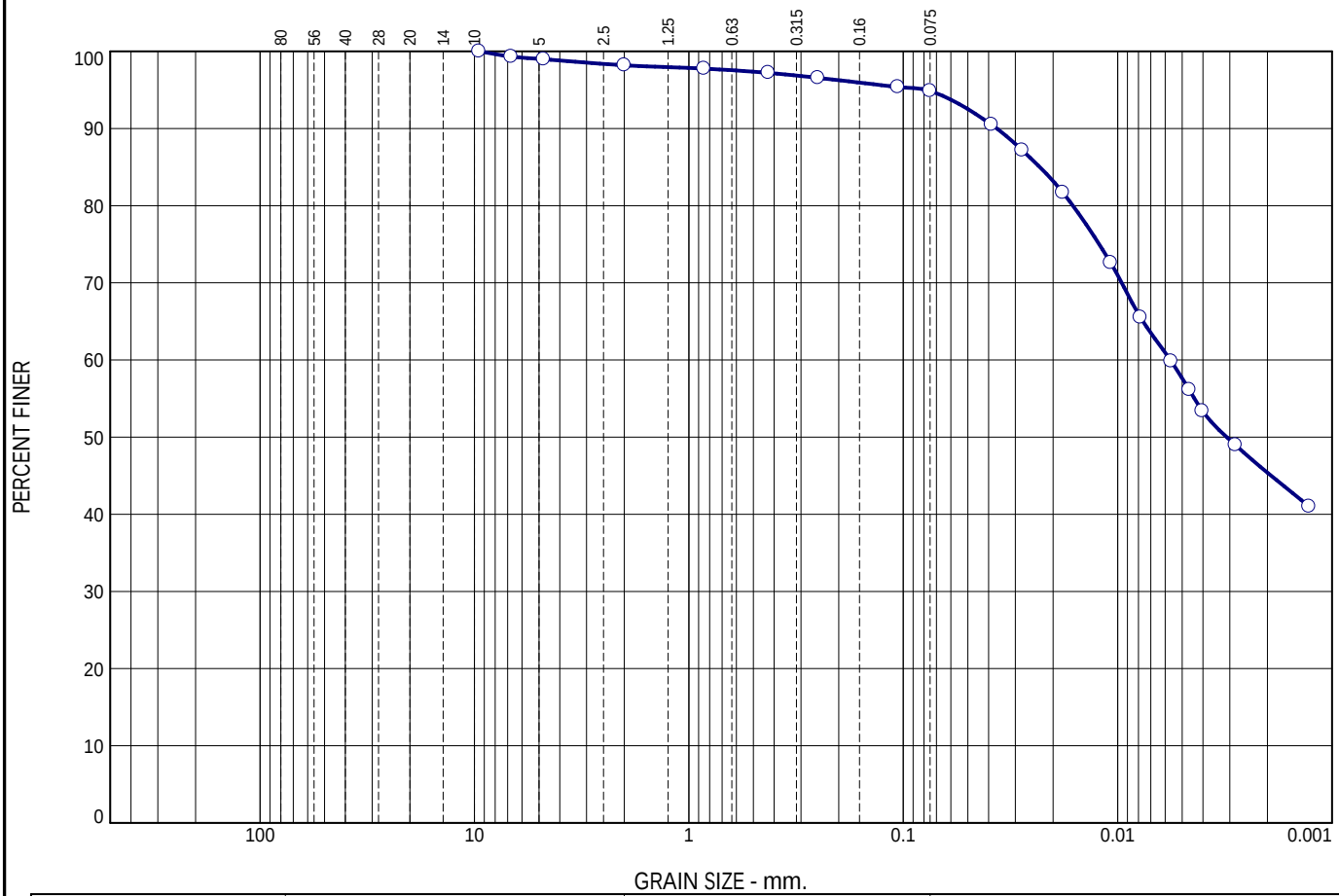
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REVIEWED BY: HM	PAGE 1 OF 1

APPENDIX D
GEOTECHNICAL LABORATORY TEST RESULTS

Particle Size Distribution Report

ASTM D422



	% +3"	% Gravel	% Sand		% Fines	
			Coarse	Fine	Silt	Clay
○	0.0	1.8	1.0	2.3	49.5	45.4

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	53.3	19.5	0.0231	0.0057	0.0031					

Material Description	Test Date	USCS	NM
○ SILT AND CLAY trace sand trace gravel	Jan 12/26	CH	

Project No. CO1004.01 Client: WO MW Realty Limited

Project: 3145 Conroy Road, Ottawa, ON

○Sample Number: BH101 SS4

Terrapex

Toronto, Ontario

Remarks:

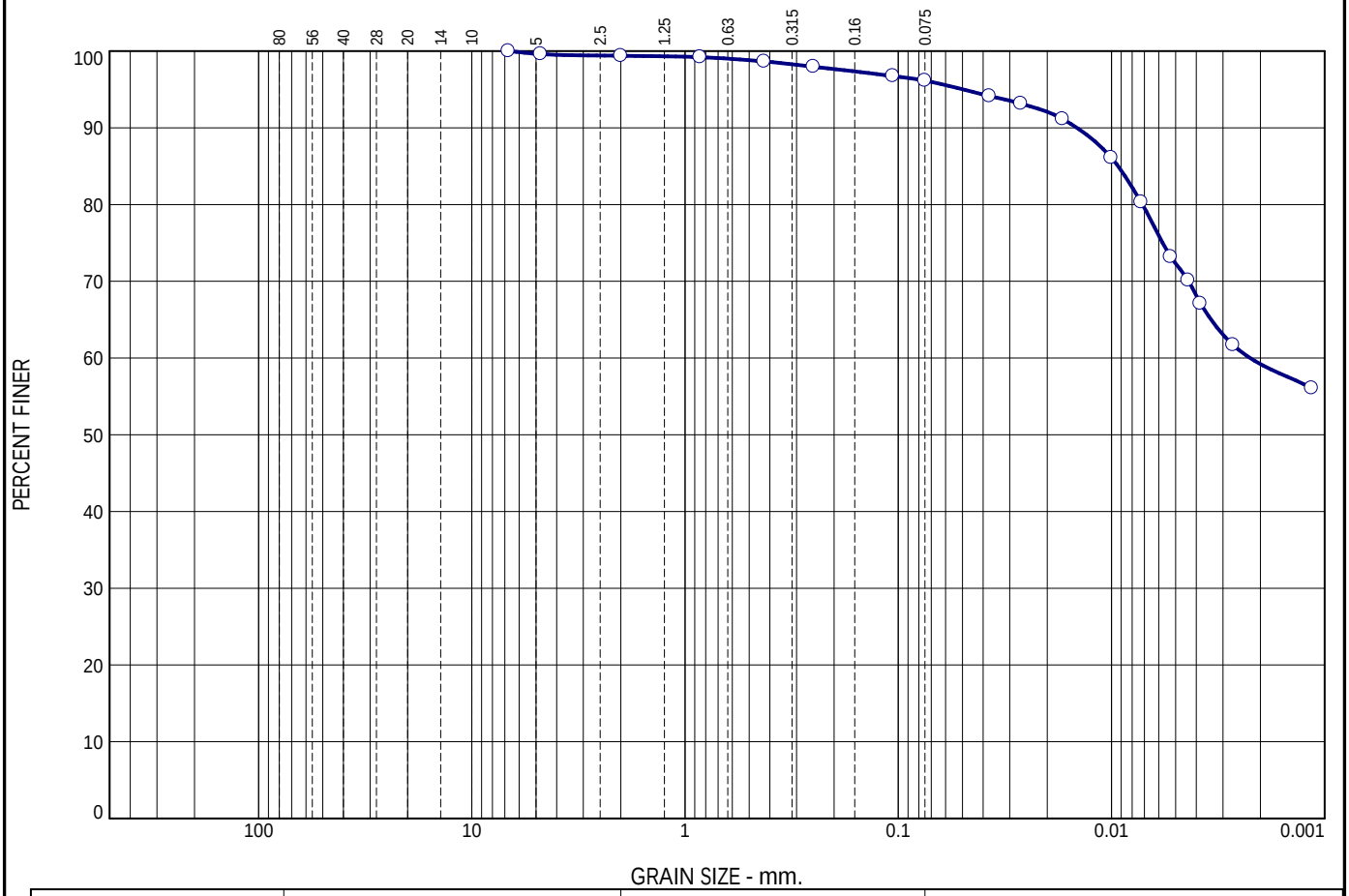
○Hydrometer Details: Spc. Grav. = 2.75(assumed); Vb=53cm^3; L2=13.8cm; L1=10.7cm; hs= 0.16cm/Div; A=30.2cm^2; Mass of Disp. Agent=40g/l

Figure 1

Tested By: AR/AM

Particle Size Distribution Report

ASTM D422



	% +3"	% Gravel	% Sand		% Fines	
			Coarse	Fine	Silt	Clay
○	0.0	0.6	0.7	2.6	36.9	59.2

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	55.7	22.0	0.0093	0.0022						

Material Description	Test Date	USCS	NM
○ SILT AND CLAY trace sand	Jan 13/26	CH	

Project No. CO1004.01 Client: WO MW Realty Limited

Project: 3145 Conroy Road, Ottawa, ON

○Sample Number: BH102 SS5

Terrapex

Toronto, Ontario

Remarks:

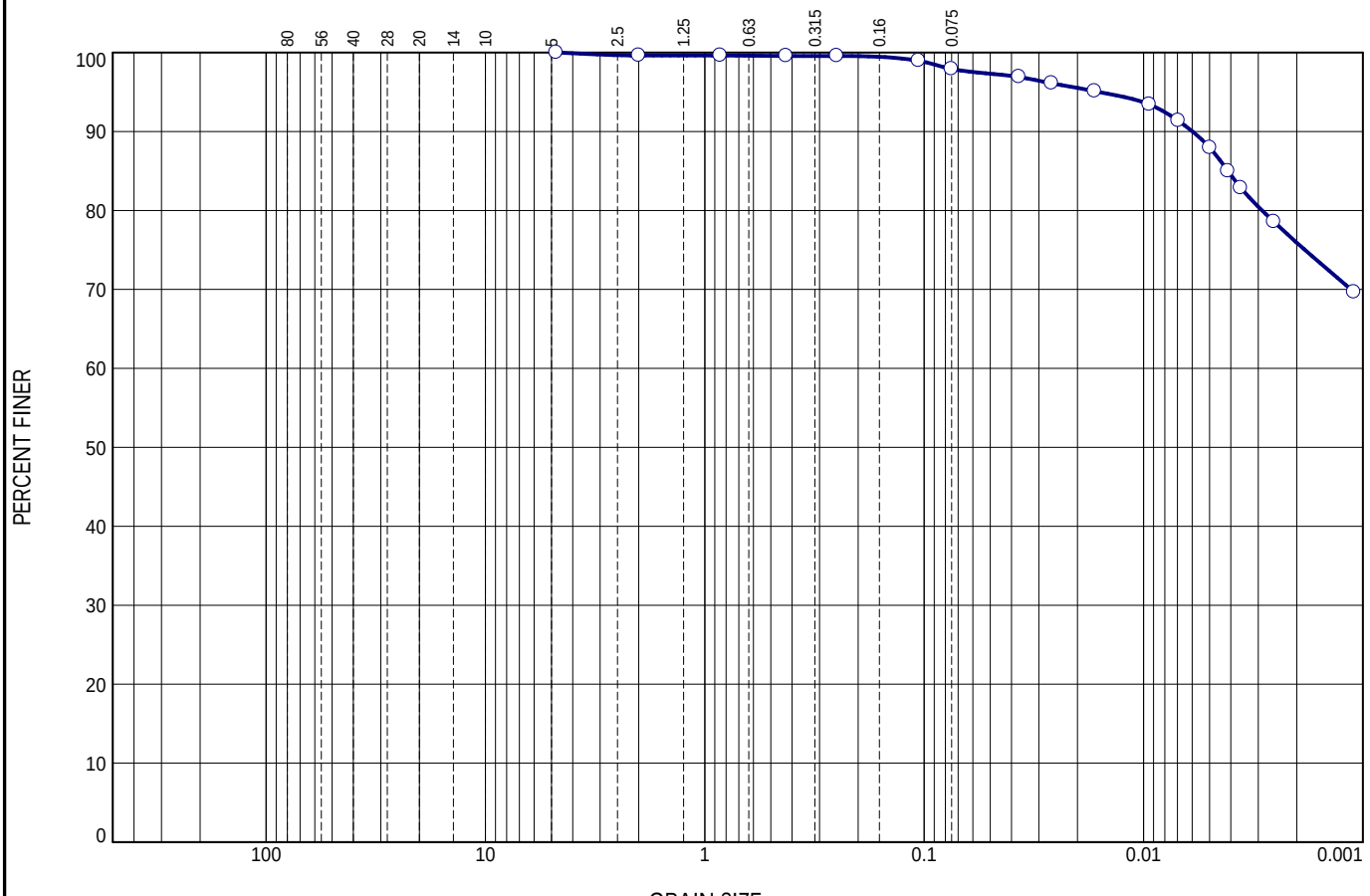
○Hydrometer Details: Spc. Grav. = 2.75(assumed); Vb=53cm^3; L2=13.8cm; L1=10.7cm; hs= 0.16cm/Div; A=30.2cm^2; Mass of Disp. Agent=40g/l

Figure 2

Tested By: AR/AM

Particle Size Distribution Report

ASTM D422



	% +3"	% Gravel	% Sand		% Fines	
			Coarse	Fine	Silt	Clay
○	0.0	0.4	0.0	1.7	22.0	75.9

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	76.9	29.8	0.0041							

Material Description	Test Date	USCS	NM
○ SILTY CLAY trace sand	Jan 13/26	CH	

Project No. CO1004.01 Client: WO MW Realty Limited

Project: 3145 Conroy Road, Ottawa, ON

○Sample Number: BH103 SS5

Terrapex

Toronto, Ontario

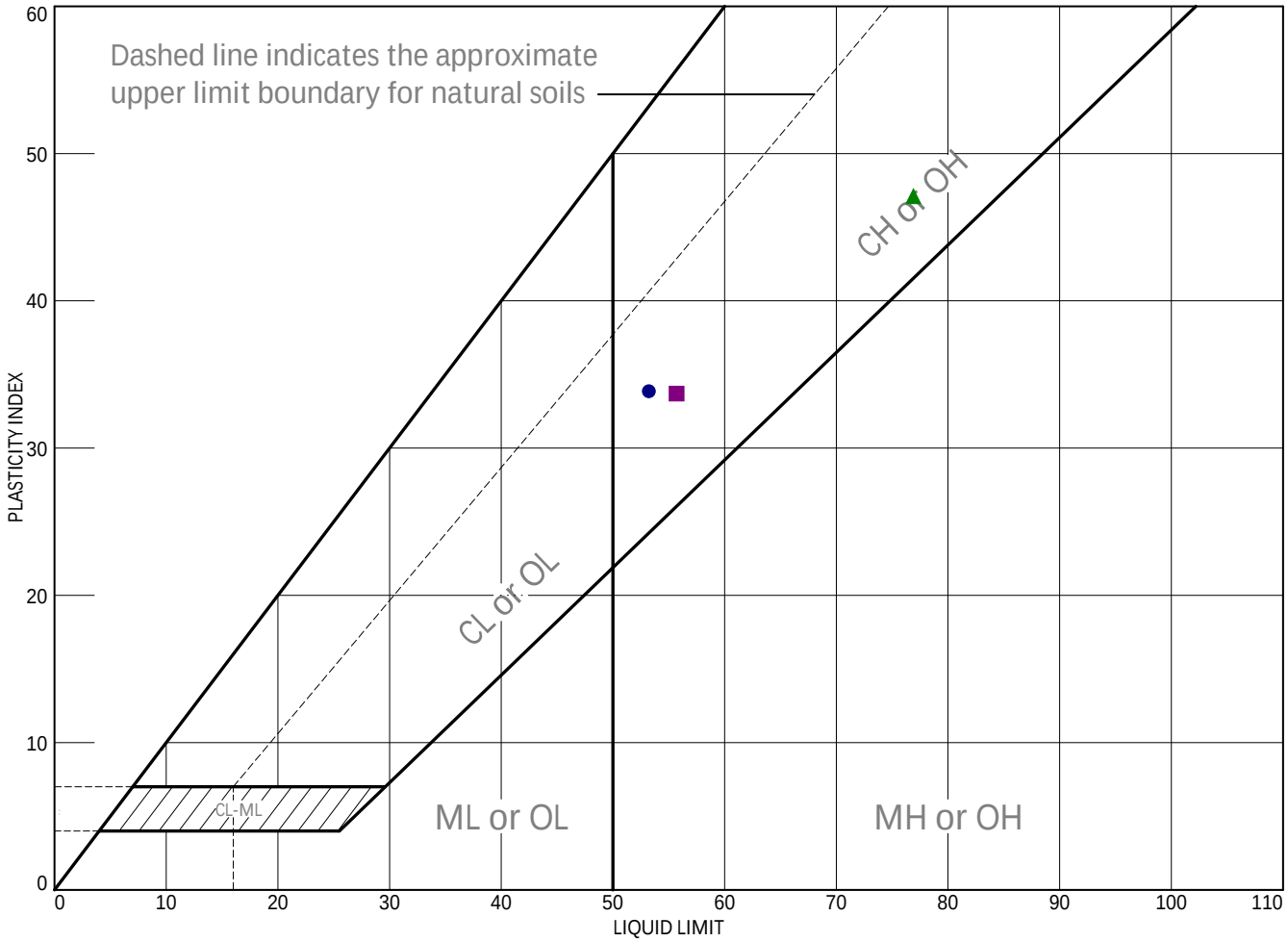
Remarks:

○Hydrometer Details: Spc. Grav. = 2.75(assumed); Vb=53cm^3; L2=13.8cm; L1=10.7cm; hs= 0.16cm/Div; A=30.2cm^2; Mass of Disp. Agent=40g/l

Figure 3

Tested By: AR/AM

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	SILT AND CLAY trace sand trace gravel	53.3	19.5	33.8	97.2	94.9	CH
■	SILT AND CLAY trace sand	55.7	22.0	33.7	98.7	96.1	CH
▲	SILTY CLAY trace sand	76.9	29.8	47.1	99.6	97.9	CH

Project No. CO1004.01 Client: WO MW Realty Limited

Project: 3145 Conroy Road, Ottawa, ON

●Sample Number: BH101 SS4
■Sample Number: BH102 SS5
▲Sample Number: BH103 SS5

Remarks:
●Test Date: Jan 20, 2026
■Test Date: Jan 21, 2026
▲Test Date: Jan 20, 2026

Terrapex

Toronto, Ontario

Figure 4

Tested By: AM

APPENDIX F
CERTIFICATE OF CHEMICAL ANALYSES

Your Project #: CO1004.01
Site Location: 3145 CONROY RD
Your C.O.C. #: N/A

Attention: Hussain Mohammed

Terrapex Environmental Ltd
20 Gurdwara Road
Unit 1
Ottawa, ON
CANADA K2E 8B3

Report Date: 2026/01/13
Report #: R8680843
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C600994
Received: 2026/01/06, 14:49

Sample Matrix: Soil
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
pH CaCl2 EXTRACT (1)	2	2026/01/12	2026/01/12	CAM SOP-00413	EPA 9045 D m
Sulphate (20:1 Extract) (1)	2	2026/01/12	2026/01/13	CAM SOP-00464	MOE E3013 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, APHA or the Quebec Ministry of Environment.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas Mississauga, 6740 Campobello Rd , Mississauga, ON, L5N 2L8

Your Project #: CO1004.01
Site Location: 3145 CONROY RD
Your C.O.C. #: N/A

Attention: Hussain Mohammed

Terrapex Environmental Ltd
20 Gurdwara Road
Unit 1
Ottawa, ON
CANADA K2E 8B3

Report Date: 2026/01/13
Report #: R8680843
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C600994
Received: 2026/01/06, 14:49

Encryption Key



Bureau Veritas
13 Jan 2026 16:29:40

Please direct all questions regarding this Certificate of Analysis to:
Katherine Szozda, Project Manager
Email: Katherine.Szozda@bureauveritas.com
Phone# (613)274-0573 Ext:7063633
==========
This report has been generated and distributed using a secure automated process.
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas Job #: C600994
Report Date: 2026/01/13

Terrapex Environmental Ltd
Client Project #: CO1004.01
Site Location: 3145 CONROY RD
Sampler Initials: HM

RESULTS OF ANALYSES OF SOIL

Bureau Veritas ID		AYVI24	AYVI25			AYVI25	
Sampling Date		2026/01/05 13:00	2026/01/05 14:00			2026/01/05 14:00	
COC Number		N/A	N/A			N/A	
	UNITS	BH101-SS6	BH103-SS4	RDL	QC Batch	BH103-SS4 Lab-Dup	QC Batch
Inorganics							
Available (CaCl2) pH	pH	7.83	7.49		A085765	7.38	A085765
Soluble (20:1) Sulphate (SO4)	ug/g	210	540	20	A085634		

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Bureau Veritas Job #: C600994
Report Date: 2026/01/13

Terrapex Environmental Ltd
Client Project #: CO1004.01
Site Location: 3145 CONROY RD
Sampler Initials: HM

TEST SUMMARY

Bureau Veritas ID: AYVI24 **Collected:** 2026/01/05
Sample ID: BH101-SS6 **Shipped:**
Matrix: Soil **Received:** 2026/01/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
pH CaCl2 EXTRACT	AT	A085765	2026/01/12	2026/01/12	Surinder Rai
Sulphate (20:1 Extract)	SKAL/EC	A085634	2026/01/12	2026/01/13	Massarat Jan

Bureau Veritas ID: AYVI25 **Collected:** 2026/01/05
Sample ID: BH103-SS4 **Shipped:**
Matrix: Soil **Received:** 2026/01/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
pH CaCl2 EXTRACT	AT	A085765	2026/01/12	2026/01/12	Surinder Rai
Sulphate (20:1 Extract)	SKAL/EC	A085634	2026/01/12	2026/01/13	Massarat Jan

Bureau Veritas ID: AYVI25 Dup **Collected:** 2026/01/05
Sample ID: BH103-SS4 **Shipped:**
Matrix: Soil **Received:** 2026/01/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
pH CaCl2 EXTRACT	AT	A085765	2026/01/12	2026/01/12	Surinder Rai

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	8.0°C

Results relate only to the items tested.

Bureau Veritas 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvna.com

Bureau Veritas Job #: C600994
Report Date: 2026/01/13

QUALITY ASSURANCE REPORT

Terrapex Environmental Ltd
Client Project #: CO1004.01
Site Location: 3145 CONROY RD
Sampler Initials: HM

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
A085634	Soluble (20:1) Sulphate (SO4)	2026/01/13	93	70 - 130	99	75 - 125	<20	ug/g	NC	35
A085765	Available (CaCl2) pH	2026/01/12			100	97 - 103			1.4	N/A

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Louise Harding, Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvna.com

C600994
2026/01/06 14:49

Received in Ottawa

www.BVNA.com

6740 Campobello Road, Mississauga, Ontario L5N 2L8
Phone: 905-817-5700 Fax: 905-817-5779 Toll Free: 800-563-6266

CHAIN OF CUSTODY RECORD

ENV COC - 00014v6

Page _____ of _____

Invoice Information	Invoice to (requires report)	Report Information (if differs from invoice)	Project Information	
Company:	TPx		Quotation #:	LAB USE ONLY - PLACE STICKER HERE
Contact Name:	Hussain Mohammed		P.O. #/ AFE#:	
Street Address:	20 Gurdwara RD		Project #:	C10004.01
City:	Nepean Prov: ON Postal Code: K2E 8B4	Prov: Postal Code:	Site #:	-
Phone:	613-745-6471		Site Location:	3145 Conray RD
Email:	H.Mohammed@Terrapex.com		Site Location Province:	-
Copies:	y.dore@Terrapex.com		Sampled By:	HM

Regulatory Criteria

REG 153: Table 1, Table 2, Table 3, Table _____; Res/Park, Ind/Comm, Agri/other, Med/Fine, Coarse, For RSC

OTHER: CCME, Reg 558*, *min 3 day TAT, MISA, PWQO, Reg 406, Table:, Sanitary Sewer Bylaw, Storm Sewer Bylaw Municipality, Other:

Include Criteria on Certificate of Analysis (check if yes):

SAMPLES MUST BE KEPT COOL (<10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

	Sample Identification (Please print or Type)	Date Sampled YYYY	MM	DD	Time (24hr) HH	MM	Matrix	FIELD FILTERED	FIELD PRESERVED	LAB FILTRATION REQUIRED	BTEX/ F1	F2 - F4	VOCs	Reg 153 metals and inorganics	Reg 153 ICPMS metals	Reg 153 metals (Hg, Cr VI, ICPMS metals, HWS - B)	Metal Soluble Sulph	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE
1	BH101-SS6	2026	01	5	13	20	S										X	1	
2	BH103-SS4	2026	01	5	14	40	S										X	1	
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			

OTT-2026-01-013

Regular Turnaround Time (TAT): 5 to 7 Day, 10 Day

Rush Turnaround Time (TAT) Surcharges apply: Same Day, 1 Day, 2 Day, 3 Day, 4 Day

Date Required: YYYY MM DD

Comments

*UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS AND CONDITIONS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/TERMS-AND-CONDITIONS OR BY CALLING THE LABORATORY LISTED ABOVE TO OBTAIN A COPY

LAB USE ONLY	Yes	No		LAB USE ONLY	Yes	No		LAB USE ONLY	Yes	No	
Seal present		✓	NO	Seal present				Seal present			
Seal intact		✓		Seal intact				Seal intact			
Cooling media present		✓	Ice	Cooling media present				Cooling media present			
°C	1	7		°C	1			°C	1		
	2	8			2				2		
	3	9			3				3		

Temperature reading by:

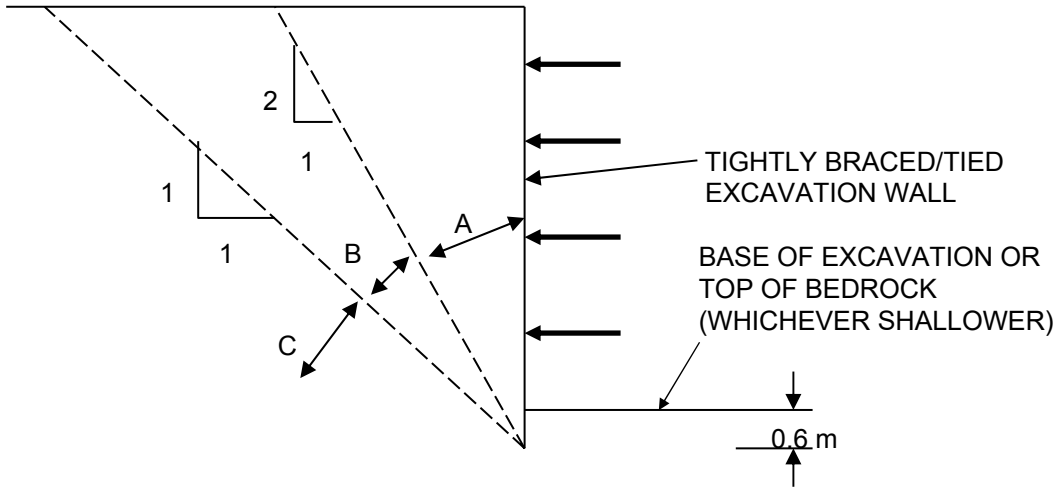
Relinquished by: (Signature/ Print)	Date YYYY	MM	DD	Time HH	MM	Received by: (Signature/ Print)	Date YYYY	MM	DD	Time HH	MM	Special instructions
1 Hussain Mohammed	2026	01	06	14	30	1 Leen Asad	2026	01	06	14	49	
2						2						

APPENDIX D

GUIDELINES FOR UNDERPINNING IN SOIL AND EXCAVATION SUPPORT

Guidelines for Underpinning in Soil and Excavation Support

Existing foundations located within Zone A normally require underpinning, especially for heavy structures. For some foundations in Zone A, it may be possible to eliminate underpinning and control foundation movement by tightly braced excavation walls, such as caisson walls.



Zone A Foundations located within this zone normally require underpinning. Horizontal and vertical pressures on the excavation wall of non-underpinned foundations must be considered

Zone B Foundations located within this zone normally do not require underpinning. Horizontal and vertical pressures on the excavation wall of non-underpinned foundations must be considered

Zone C Underpinning to structures is normally founded in this zone. Lateral pressure from underpinning is not normally considered

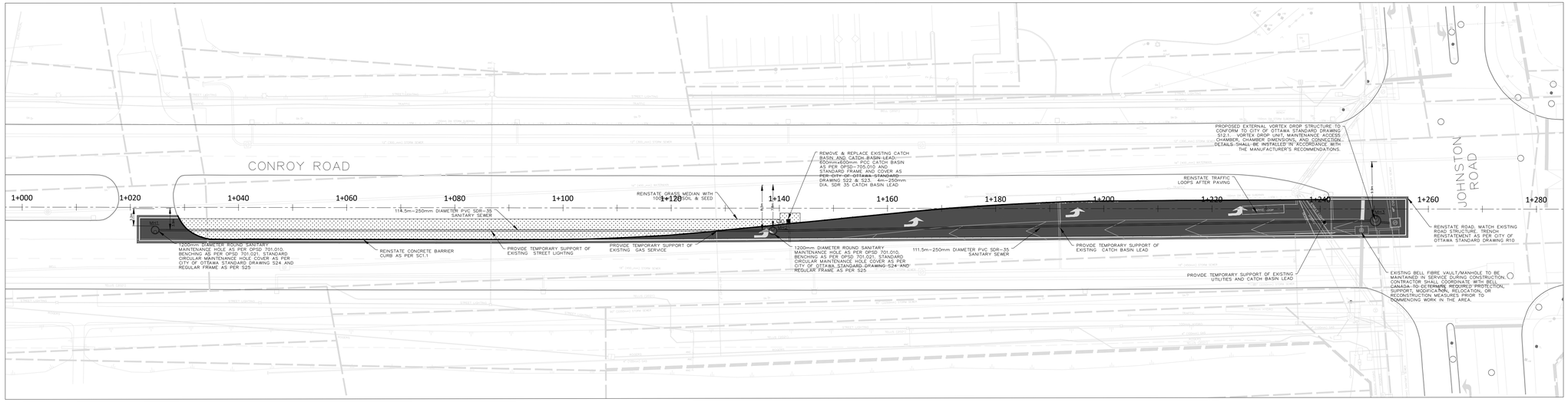
(Reference: Figure 26.27 from Canadian Foundation Engineering Manual, 4th Edition)

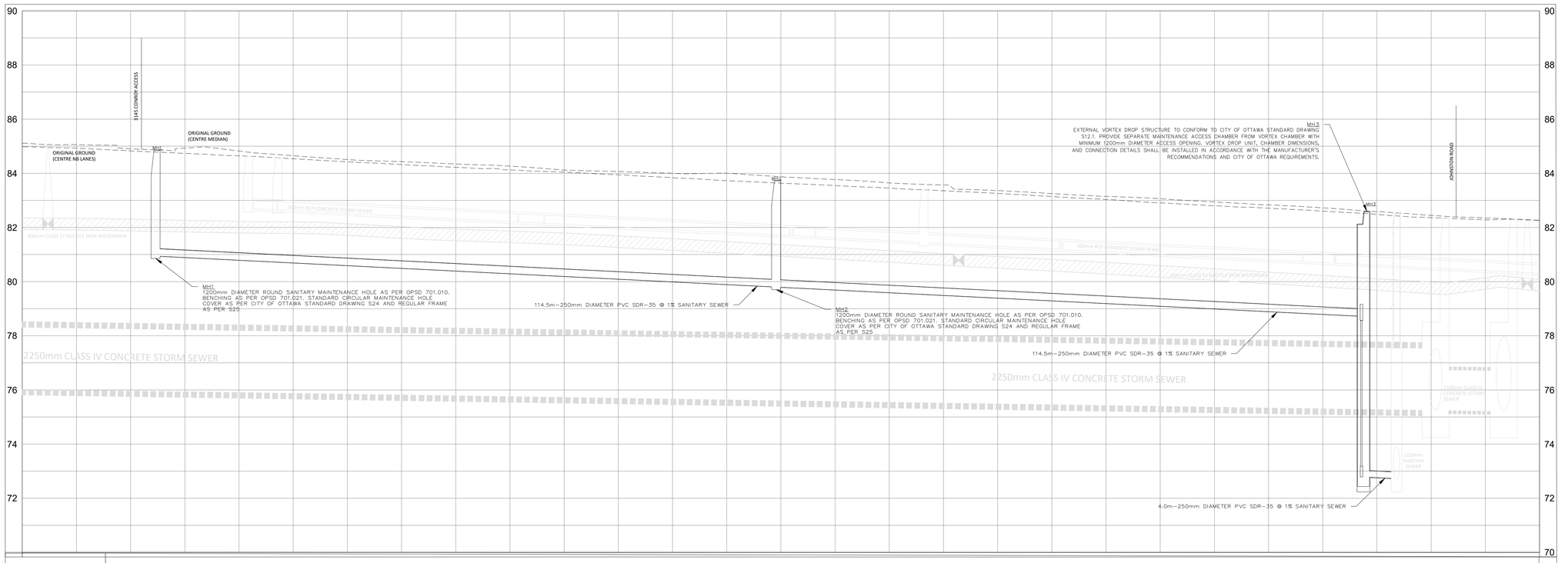
APPENDIX G
PHOTO OF THE CORED ASPHALT PAVEMENT


MAXIMUM
26ft
8m



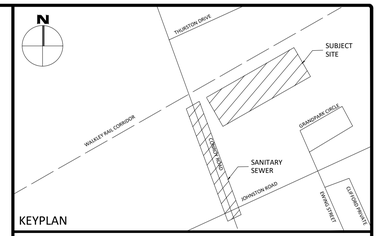
APPENDIX J
PROPOSED SANITARY SEWER EXTENSION PLAN & PROFILE





STATION	1+020	1+040	1+060	1+080	1+100	1+120	1+140	1+160	1+180	1+200	1+220	1+240	1+260	1+280
REINSTATEMENT ELEVATION	84.91 84.906	84.82 84.823	84.51 84.509	84.35 84.345	84.12 84.122	84.00 84.000	83.88 83.880	83.64 83.645	83.36 83.362	83.15 83.148	82.94 82.939	82.72 82.723	82.45 82.447	82.27 82.266
SANITARY SEWER	MH1 T/Cv=84.84m S: INV=80.94m	114.5m–250mm DIAMETER PVC SDR–35 @ 1% SANITARY SEWER					MH2 T/Cv=83.72m N: INV=79.77m S: INV= 79.77m	111.5m–250mm DIAMETER PVC SDR–35 @ 1% SANITARY SEWER				MH3 T/Cv=82.59m N: INV=78.73m S: INV=72.78	EX. MH T/Cv=82.57m N: INV=72.74m S: INV=72.68	

FOR REVIEW ONLY
NOT FOR CONSTRUCTION



KEYPLAN

No.	Revisions	Date
5	RE-ISSUED FOR SPA SUBMISSION	09.29.2026
4	RE-ISSED FOR SPA SUBMISSION	07.29.2026
3	RE-ISSUED FOR SPA SUBMISSION	03.23.2026
2	FOR SPA SUBMISSION	11.24.2025
1	FOR REVIEW	08.29.2025

Check and verify all dimensions before proceeding with the work — Do not scale drawings

egis

Stamp: LICENSED PROFESSIONAL ENGINEER — C. D. MACDONALD — 100130351 — Sept. 29th, 2026 — PROVINCE OF ONTARIO

Client:
WO MW REALTY LIMITED
180 RENFREW DRIVE
MARKHAM, ON

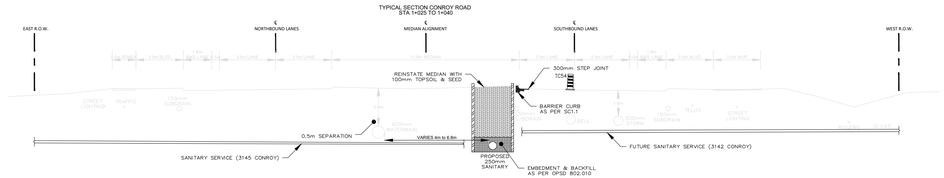
Project:
PROPOSED OFFICE/INDUSTRIAL BUILDING
3145 CONROY ROAD
OTTAWA, ON

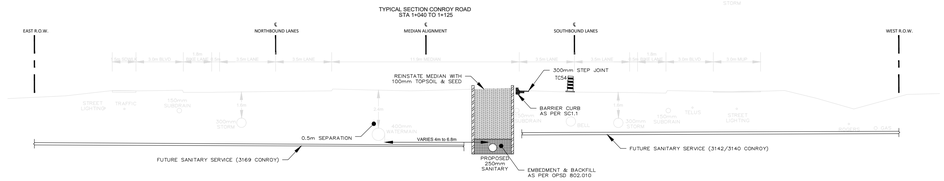
Drawing Title:
SANITARY SEWER PLAN & PROFILE

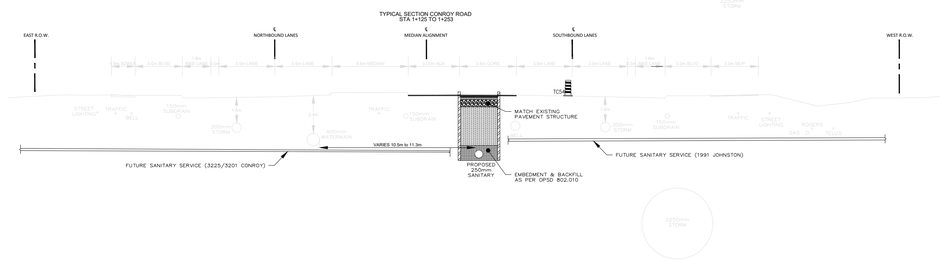
Scale: 1:400H - 1:80V	Project Number: CO-25-1505
Drawn By: CDM	
Checked By: CDM	Drawing Number: C103
Designed By: CDM	

#15862 D07-12-25-0107

FILENAME: U:\Ottawa\10 Project - Proposals\2002 Jobs\CO\CO-25-1505 White Owl Group_Due Diligence_3145 Conroy Road\12 - Drawings\Municipal\Conroy Road Sanitary Sewer Extension - Plan & Profile (External Drop Structure) - Sep 25 2026.dwg
LAST SAVED: Tuesday, September 29, 2026 LAST SAVED BY: c.macdonald
LAST PLOTTED: Tuesday, September 29, 2026 CTB FILE USED: ----



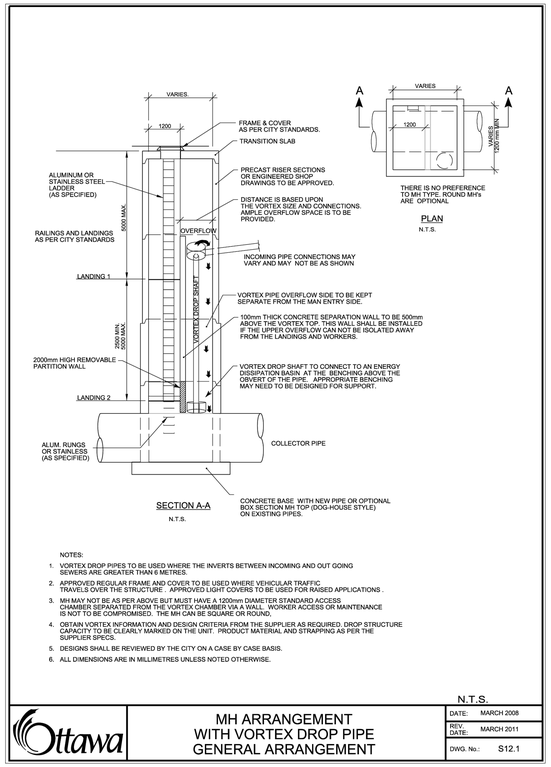




STANDARD DRAWINGS & SPECIFICATIONS						
CITY OF OTTAWA STANDARDS				ONTARIO PROVINCIAL STANDARDS		
DRAWINGS		SPECIFICATIONS		DRAWINGS	SPECIFICATIONS	
R10	S25	F-3101	F-4070	701.010	206	501
S10	SC1.1	F-3106	F-4100	705.010	314	510
S12.1	SC2	F-3130	F-8021	802.010	351	802
S22	SC7.3	F-3147	F-8041	802.013	353	804
S23	SC11.3	F-3510	F-9040	1003.030	407	904
S24	T1	F-3531	F-9045		410	

SANITARY STRUCTURE TABLE				
NAME	T/G	INVERT IN	INVERT OUT	DESCRIPTION
MH1	84.84	E81.00	S80.94	FRAME: CITY S25 COVER: CITY S24 STR: OPSD 701.010
MH2	83.72	N79.80	S79.77	FRAME: CITY S25 COVER: CITY S24 STR: OPSD 701.010
MH3	82.59	N78.73	N72.78	FRAME: CITY S25 COVER: CITY S24 STR: OPSD 701.012

STORM STRUCTURE TABLE				
NAME	T/G	INVERT IN	INVERT OUT	DESCRIPTION
CB1	83.87		W83.17	COVER: CITY S23 FRAME: CITY S22 STR: OPSD 705.010



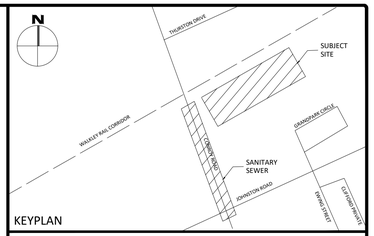
NOTES:
1. VORTEX DROP PIPES TO BE USED WHERE THE INVERTS BETWEEN INCOMING AND OUT GOING SEWERS ARE GREATER THAN 6 METRES.
2. APPROVED REGULAR FRAME AND COVER TO BE USED WHERE VEHICULAR TRAFFIC TRAVELS OVER THE STRUCTURE . APPROVED LIGHT COVERS TO BE USED FOR RAISED APPLICATIONS .
3. MH MAY NOT BE AS PER ABOVE BUT MUST HAVE A 1200mm DIAMETER STANDARD ACCESS CHAMBER SEPARATED FROM THE VORTEX CHAMBER VIA A WALL. WORKER ACCESS OR MAINTENANCE IS NOT TO BE COMPROMISED. THE MH CAN BE SQUARE OR ROUND.
4. OBTAIN VORTEX INFORMATION AND DESIGN CRITERIA FROM THE SUPPLIER AS REQUIRED. DROP STRUCTURE CAPACITY TO BE CLEARLY MARKED ON THE UNIT. PRODUCT MATERIAL AND STRAPPING AS PER THE SUPPLIER SPECS.
5. DESIGNS SHALL BE REVIEWED BY THE CITY ON A CASE BY CASE BASIS.
6. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

N.T.S.

Ottawa	MH ARRANGEMENT WITH VORTEX DROP PIPE GENERAL ARRANGEMENT	DATE: MARCH 2008 REV. DATE: MARCH 2011 DWG. No.: S12.1

NOTES

1. THE ORIGINAL TOPOGRAPHY, GROUND ELEVATION AND SURVEY DATA SHOWN ARE BASED ON TOPOGRAPHIC SURVEY INFORMATION PREPARED BY J.D. BARNES LIMITED, DATED OCTOBER 14, 2025, AND ARE SUPPLIED FOR INFORMATION PURPOSES ONLY. NO GUARANTEE OF ACCURACY IS EXPRESSED OR IMPLIED. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL INFORMATION SHOWN.
2. THIS PLAN IS NOT A CADASTRAL SURVEY SHOWING LEGAL PROPERTY BOUNDARIES AND EASEMENTS. THE PRECISE LOCATION OF THE CURRENT PROPERTY BOUNDARIES AND EASEMENTS CAN ONLY BE DETERMINED BY AN UP-TO-DATE LAND TITLES SEARCH AND A SUBSEQUENT CADASTRAL SURVEY PERFORMED AND CERTIFIED BY AN ONTARIO LAND SURVEYOR.
3. THE CONTRACTOR IS TO OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY BEFORE COMMENCING CONSTRUCTION.
4. THE CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT.
5. THE CONTRACTOR IS TO DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME ALL RESPONSIBILITY FOR EXISTING UTILITIES WHETHER OR NOT SHOWN ON THESE DRAWINGS. IF THERE IS ANY DISCREPANCY THE CONTRACTOR IS TO NOTIFY THE ENGINEER PROMPTLY.
6. RESTORE ALL TRENCHES AND SURFACES OF PUBLIC ROAD ALLOWANCES TO CONDITION EQUAL OR BETTER THAN ORIGINAL CONDITION AND TO THE SATISFACTION OF THE CITY.
7. EXCAVATE AND DISPOSE OF ALL EXCESS EXCAVATED MATERIAL, SUCH AS ASPHALT, CURBING AND DEBRIS, IN ACCORDANCE WITHTHE SOIL MANAGEMENT PLAN PREPARED BY OTHERS.
8. CONTRACTOR TO MINIMIZE THE ACTUAL LIMITS OF REMOVALS AND REINSTATEMENT WHEREVER POSSIBLE, AND SHALL MAKE THEIR OWN JUDGEMENT AND ACCOUNT FOR ALL MATERIAL AND LABOUR REQUIRED FOR ADEQUATELY REINSTATING THE AREA TO PRE-CONSTRUCTION CONDITIONS OR BETTER. NO ADDITIONAL PAYMENT WILL BE MADE FOR REINSTATEMENT WORK NOT SHOWN ON THE CONTRACT DRAWING AS A DIRECT RESULT FROM CONSTRUCTION.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRAFFIC CONTROL AND SAFETY MEASURES DURING THE CONSTRUCTION PERIOD, INCLUDING THE SUPPLY, INSTALLATION, AND REMOVAL OF ALL NECESSARY SIGNAGE, DELINEATORS, MARKERS AND BARRIERS.
10. CONTRACTOR RESPONSIBLE FOR TRAFFIC CONTROL PLAN ADHERING TO THE CITY OF OTTAWA TRAFFIC RESTRICTIONS AND OTM BOOK 7.
11. ALL DIMENSIONS AND INVERTS MUST BE VERIFIED PRIOR TO CONSTRUCTION, IF THERE IS ANY DISCREPANCY THE CONTRACTOR IS TO NOTIFY THE ENGINEER PROMPTLY.
12. CONSTRUCT ALL SEWERS, CATCH BASINS, MANHOLES AND APPURTENANCES IN ACCORDANCE WITH CITY OF OTTAWA & ONTARIO PROVINCIAL STANDARD DRAWINGS AND SPECIFICATIONS
13. SEWER TRENCHING AND BEDDING SHALL CONFORM TO OPSD 802.010 AND 802.013 UNLESS NOTED OTHERWISE.
14. BEDDING SHALL BE A MINIMUM 150mm OF GRANULAR "A", COMPACTED TO MINIMUM 95% STANDARD PROCTOR DRY DENSITY. CLEAR STONE BEDDING SHALL NOT BE PERMITTED.



No.	Revisions	Date
4	RE-ISSUED FOR SPA SUBMISSION	09.29.2026
3	RE-ISSED FOR SPA SUBMISSION	07.29.2026
2	RE-ISSUED FOR SPA SUBMISSION	03.23.2026
1	FOR SPA SUBMISSION	11.24.2025

Check and verify all dimensions before proceeding with the work

Do not scale drawings

egis

Stamp: LICENSED PROFESSIONAL ENGINEER C. D. MACDONALD 100130351 Sept. 29th, 2026 PROVINCE OF ONTARIO

Client:
WO MW REALTY LIMITED
180 RENFREW DRIVE
MARKHAM, ON

Project:
PROPOSED OFFICE/INDUSTRIAL BUILDING
3145 CONROY ROAD
OTTAWA, ON

Drawing Title:
SANITARY SEWER TYPICAL DETAILS

Scale: 1:500	Project Number: CO-25-1505
Drawn By: CDM	
Checked By: CDM	Drawing Number: C104
Designed By: CDM	

FOR REVIEW ONLY
NOT FOR CONSTRUCTION

#15862 D07-12-25-0107

FILENAME: U:\Ottawa\01 Project - Proposal\2025 Jobs\CO\CO-25-1505 White Owl Group_Due Diligence_3145 Conroy Road\12 - Drawings\Municipal\Conroy Road Sanitary Sewer Extension - Plan & Profile (External Drop Structure) - Sep 25 2026.dwg
LAST SAVED: Wednesday, September 30, 2026 LAST SAVED BY: c.macdonald
LAST PLOTTED: Wednesday, September 30, 2026 CTB FILE USED: ---