CORPORATION OF THE COUNTY OF DUFFERIN

BY-LAW NUMBER 2023-59

A BY-LAW TO RATIFY THE ACTIONS OF THE WARDEN AND THE CLERK FOR EXECUTING AN AGREEMENT BETWEEN THE CORPORATION OF THE COUNTY OF DUFFERIN AND OPTRUST AMARANTH 6 INC. (Temporary Intersection Improvements Agreement)

BE IT ENACTED BY THE MUNICIPAL COUNCIL OF THE CORPORATION OF THE COUNTY OF DUFFERIN AS FOLLOWS:

1. That the agreement between the County of Dufferin and OPTrust Amaranth 6 Inc., in a form substantially the same as attached hereto as Schedule "A" be approved.

2. That the staff of the County of Dufferin is hereby authorized to take such actions as are appropriate, and the Warden and Clerk are herby authorized to execute such documents as are appropriate to implement the agreement referred to herein.

READ a first, second and third time and finally passed this 14th day of December, 2023.

Darren White, Warden

Michelle Dunne, Clerk

Execution Version

TEMPORARY INTERSECTION IMPROVEMENTS AGREEMENT

THIS AGREEMENT (the "**Agreement**") is entered into as of the 10th day of November, 2023 (the "**Effective Date**")

BETWEEN:

THE CORPORATION OF THE COUNTY OF DUFFERIN
(the "County")

AND

OPTRUST AMARANTH 6 INC.
("OPTrust" and together with the County, the "Parties")

WHEREAS:

A. OPTrust is the owner of the lands described in Schedule "A" (the "**Lands**") and seeks to develop a portion of the Lands by constructing a warehouse distribution and office center (the "**Development**") in the Township of Amaranth (the "**Township**").

B. The Lands are currently zoned with a Holding "H" Provision (the "**Holding Provision**"), the lifting of which by the Township in whole or in part is conditional upon OPTrust satisfying certain requirements, including developing, securing and/or implementing any required transportation improvements for the Lands pursuant to Section 10 iv) h) of Township Zoning By-law No. 17-2014 (the "**Transportation Improvement Condition**").

C. The conditions of lifting the Holding Provision, including the Transportation Improvement Condition, engages the County's interest. The site plan agreement under negotiation between the Township and OPTrust states that Township approval to lift the Holding Provision is in part conditional upon, among other matters, the Township securing the obligation of OPTrust to pay for the full cost of the "**Temporary Intersection Improvements**" required by the County to facilitate the Development and the development of the lands to the south of the Lands, which includes the construction of temporary traffic signals on Dufferin County Road 109 at the intersection of Dufferin County Road 109 and 2nd Line, as well as the Operation and Maintenance Costs (as defined below).

D. The County issued an invitation to tender ("**ITT**") to solicit bids on the construction contract for the Temporary Intersection Improvements in accordance with the construction plans and specifications attached hereto as Schedule "C", has selected a successful bidder (the "**Awarded Contractor**") and wishes to formally award the ITT and enter into a stipulated sum construction contract with the Awarded Contractor (the "**Construction Contract**") forthwith upon receipt of 125% of the Construction Contract costs (defined in Section 1.3 below as the Temporary Improvement Funds).

E. OPTrust has agreed with the Township and County that OPTrust shall pay the Temporary Improvement Funds and the Operation and Maintenance Costs to the County in accordance with the terms and conditions set out in this Agreement, and that such payments shall satisfy the condition noted in Recital C.

NOW THEREFORE in consideration of the mutual covenants and agreements of the Parties hereinafter contained and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged by each of the Parties, the Parties covenant and agree as follows:

1.1 The Recitals form an integral part of this Agreement and are incorporated by reference.

1.2 Forthwith following the execution of this Agreement and the delivery of the funds described in Section 1.3, the County shall enter into the Construction Contract substantially in the form included in the ITT. The Construction Contract shall include a stipulated price of $553,687.88 inclusive of applicable taxes (the "**Contract Price**") and shall require that the intent of the Construction Contract be that all work be substantially performed by **June 28, 2024** (the "**Substantial Completion Date**"). The County shall deliver a fully executed copy of the Construction Contract to OPTrust within two (2) business days following the execution thereof, subject to the redaction of such confidential business information the County deems appropriate.

1.3 OPTrust agrees to pay to the County the "**Temporary Improvement Funds"** being the aggregate amount of $692,109.86, which collectively includes the Contract Price plus a contingency amount equal to 25% of the Contract Price (the "**Contingency Amount**"). In addition to the Temporary Improvement Funds, OPTrust agrees to pay the County the amount of $32,000.00 (inclusive of taxes) to cover the anticipated operation and maintenance costs of the constructed Temporary Intersection Improvements (the "**Operation and Maintenance Costs**"). The County hereby directs OPTrust to pay the Temporary Improvement Funds and the Operation and Maintenance Costs by wire transfer of immediately available funds to the County in accordance with the payment instructions attached hereto as Schedule "B" in satisfaction of the County's condition described in Recital C, and this shall be OPTrust's good and sufficient authority to do so. Immediately upon receipt of the Temporary Improvement Funds and the Operation and Maintenance Costs, the County shall deliver written notice to OPTrust confirming the same.

1.4 The County shall be solely responsible for administering, managing and enforcing the Construction Contract and shall be permitted to use the Temporary Improvement Funds as required to pay the Awarded Contractor for work performed under the Construction Contract. The County shall use commercial reasonable efforts to ensure the Awarded Contractor diligently performs and completes the work under the Construction Contract (a) in a good and workmanlike manner; (b) in accordance with the Contract Price; (c) in accordance with all design and construction documents incorporated into the Construction Contract, including those attached hereto as Schedule "C"; and (d) in accordance with all applicable laws. The County shall use reasonable efforts to ensure the Awarded Contractor performs the works by the intended Substantial Completion Date, subject to permissible construction season conditions and availability of materials. The County warrants to OPTrust that the Awarded Contractor is a qualified and reputable entity, duly licensed to practice its profession in the jurisdiction where the Temporary Intersection Improvements are located (if required by applicable law). The County shall exercise commercially reasonable efforts to cause the Awarded Contractor to perform the work under the Construction Contract with the degree of skill, diligence, prudence, and foresight which would reasonably be expected to be observed by a skilled, qualified contractor engaged in carrying out activities the same as or similar to the Temporary Intersection Improvements under the same or similar circumstances.

1.5 Subject to Section 1.7, OPTrust agrees that in the event that the County is required to make payments to the Awarded Contractor under to the Construction Contract (including any change orders related thereto) which results in the remaining Temporary Improvement Funds held by the County being equal to or less than $173,027.46, OPTrust shall, within five (5) business days following receipt of notice and reasonable supporting evidence from the County that the Temporary

Improvement Funds have been so depleted, transfer additional contingency funds to the County in the amount of $173,027.46 (the "**Additional Contingency**"), to enable the County to complete the construction of the Temporary Infrastructure Improvements.

1.6 The County will prepare and submit to OPTrust monthly reports on the progress of the Temporary Intersection Improvements, which will include a summary of the state of construction, copies of invoices, change orders, progress payments, or expenses incurred, and any potential cost or schedule impacts ("**Progress Reports**").

1.7 Any material change to the Construction Contract shall be subject to the prior written approval of OPTrust, which approval shall not be unreasonably withheld, delayed or conditioned. For the purposes of this Agreement, a "material change" shall mean any change to the Construction Contract which (a) will result in the extension of the Substantial Completion Date beyond June 28, 2024; or (b) will result in payments to the Awarded Contractor greater than $865,137.32.

1.8 The County shall forthwith deliver written notice to OPTrust upon the Awarded Contractor achieving substantial completion of the work under the Construction Contract. Upon the achievement of substantial completion of the work under the Construction Contract, the County shall be permitted to apply the Operation and Maintenance Costs in its sole discretion to cover any direct costs and expenses required to maintain and operate the Temporary Intersection Improvements. If the amount of the Operation and Maintenance Costs have been depleted by an amount equal to or greater than 50% of the Operation and Maintenance Costs, the County shall notify OPTrust of the same and, within five (5) business days following receipt of notice and reasonable supporting evidence from the County that the Operation and Maintenance Costs have been so depleted, OPTrust shall transfer additional funds to the County sufficient to top-up funds held by the County to 100% of the Operation and Maintenance Costs.

1.9 Within sixty (60) calendar days following substantial completion of the work under the Construction Contract, the County shall provide notice to OPTrust of the actual costs incurred by the County in the completion of the work under the Construction Contract (the "**Actual Cost**"). If the Actual Cost is less than the amount of the Temporary Improvement Funds plus any Additional Contingency delivered to the County pursuant to Section 1.4 plus any further amounts delivered by OPTrust to the County pursuant to any consent provided in accordance with Section 1.7, the balance of such savings shall be refunded by the County to OPTrust within five (5) business days following the County's delivery of the Actual Cost notice.

1.10 **Notice.** All notices, requests, demands, instructions, certificates, consents and other communications required or permitted under this Agreement shall be in writing and sent by email as follows: (a) if to OPTrust, mdave@nicolawealth.com; and (b) if to the County, sburns@dufferincounty.ca. Notice shall be effective, provided that such transmission is completed no later than 5:00 PM on a business day, at the end of the business day on which the electronic transmission is complete.

1.11 **Binding Effect.** This Agreement shall be binding upon and shall inure to the benefit of the parties hereto and their respective successors and assigns.

1.12 **Governing Law and Currency.** This Agreement, and each of the documents contemplated by or delivered under or in connection with this Agreement, shall be governed by and construed in accordance with the laws of Ontario and the laws of Canada applicable therein and shall be treated in all respects as an Ontario contract, without regard to conflict of laws principles. All references to payments under this Agreement shall refer to Canadian dollars.

1.13 **Further Assurances.** The Parties shall promptly execute and deliver such further instruments and do such further acts and things as may be required to carry out the intent and purposes of this Agreement.

1.14 **Amendment or Termination**. This Agreement may not be varied, amended, supplemented, or terminated except by an agreement in writing signed by duly authorized representatives of the Parties and stating on its face that it is intended to be an amendment, restatement, or other modification, as the case may be, to this Agreement.

1.15 **Counterparts**. This Agreement may be executed in any number of counterparts, each of which when executed and delivered, including any counterpart executed by a Party and transmitted by email by way of .pdf attachment or facsimile transmission, shall be deemed an original, but all of which together will constitute one instrument binding upon the Parties hereto, notwithstanding that all such Parties may not have executed the same counterpart.

[Signature page follows.]

IN WITNESS WHEREOF, the Parties have duly executed this Agreement as of the Effective Date.

THE CORPORATION OF THE COUNTY OF DUFFERIN

Per: _____

Name:
Title: Authorized Signing Officer

OPTRUST AMARANTH 6 INC.

Minesh Dave Digitally signed by Minesh Dave Date: 2023.10.24 13:53:03 -04'00'

Peter L. Stafl
Vice President, Operations – Ontario Region
Blackwood Partners Inc.

Digitally signed by Peter L. Stafl Date: 2023.10.24 15:22:48 -04'00'

Per: _____

Name:
Title: Authorized Signing Officer

IN WITNESS WHEREOF, the Parties have duly executed this Agreement as of the Effective Date.

THE CORPORATION OF THE COUNTY OF DUFFERIN

Per: _____
Name: Wade Mills
Title: Warden

Per: _____
Name: Michelle Dunne
Title: County Clerk

OPTRUST AMARANTH 6 INC.

Per: _____
Name:
Title: Authorized Signing Officer

SCHEDULE "A"

THE SUBJECT LANDS

LEGAL DESCRIPTION:

all properties below are PIN no 34038- 0167:

PT LT 2, CON 2, PT 1, 7R5083; AMARANTH; COUNTY OF DUFFERIN and as more specifically set out in PIN No. 34038-0127 (LT);

Together with:

PT LTS 2 & 3, CON 2, PTS 5 TO 10, 7R1146 EXCEPT PTS 1 & 2, 7R5083 AND PT 1, 7R5475; T/W MF163994; S/T AM17163; MF38499; AMARANTH, COUNTY OF DUFFERIN and as more specifically set out in PIN No. 34038-0142 (LT);

Together with:

PT LOT 3, CON 2 DES AS PT 1, 7R5475; T/W MF 163994; AMARANTH; COUNTY OF DUFFERIN and as more specifically set out in PIN No. 34038-0141 (LT);

Together with:

PT LOT 1, CON 2, PT 12, 7R1146; AMARANTH; COUNTY OF DUFFERIN and as more specifically set out in PIN No. 34038-055 (LT).

SCHEDULE "B"

PAYMENT INSTRUCTIONS

See attached.

Incoming Wire Instructions: To Canada in currencies other than USD

Beneficiary Information	
Beneficiary Name:	CORPORATION OF THE COUNTY OF DUFFERIN
Beneficiary Address: **P.O. Box not accepted**	
Beneficiary Account Number (12 digits):	
Beneficiary Bank Information	
Bank Name:	
Bank Identifier (SWIFT Code or Canadian Clearing Code)	
Bank Address: (Input based on use of either the SWIFT Code or the Canadian Clearing Code)	

SCHEDULE "C"

ITT CONSTRUCTION PLANS AND DOCUMENTS

See attached.

SCHEDULE 1:
SPECIFICATIONS AND SCOPE OF WORK

DESCRIPTION OF WORK

The work under this Contract is being completed on Dufferin County Road 109 at the intersection of Dufferin County Road 109 and 2nd Line. The work on Dufferin County Road 109 includes installation of temporary traffic signals at the intersection of County Road 109 and 2nd Line, widening of the roadway to accommodate the extended existing eastbound right turn storage and taper west of the intersection, replacement of guide rails, placement of full-depth asphalt, granular 'A' shoulder, pavement marking and signage, and regrading beyond the extended roadway including topsoil restoration. All work is further detailed within the issued for tender drawings and as described within the proceeding tender documents.

GENERAL

.1 The following specifications combined with the related Contract Drawings provide a complete summary of the work to be completed under this Contract.

Where reference is made to OPSS or OPSD, the Contractor shall refer to the latest revision of the Ontario Provincial Standard Specifications and the Ontario Provincial Standard Drawings. These specifications and drawings may not be bound within this document. They are available on-line at: www.library.mto.gov.on.ca/SydneyPLUS/TechPubs/Portal/tp/TechnicalPublications.aspx

All numerical specification references shall be considered as references to the latest revision of OPSS.MUNI, unless identified differently. If there is only a specification for OPSS or OPSS.PROV for the numerical reference given, that specification shall apply.

.2 Primary access to the project site shall be gained via Dufferin County Roads or King's Highways. There is to be no construction traffic on adjacent residential or Township roads.

.3 The preservation, protection and restoration of the local environment will form part of the work of this Contract.

It is intended that the works proposed be executed in such a manner which, to the fullest possible extent, minimizes any adverse effect on the cultural and natural environment of the project area. The environmental conditions of the Contract stated herein must be complied with in all respects. It is a responsibility of the Contractor that all his personnel be sufficiently instructed so that the work is carried out in a manner consistent with minimizing environmental impact.

.4 The Contractor shall undertake a detailed review of his proposed route of construction to plan access routes and fueling areas. Refueling and maintenance of equipment shall not be undertaken in or adjacent to a watercourse. Suitable fueling and maintenance areas shall be established away from the waterway and all maintenance and fueling conducted in these areas. The locations of such areas are subject to review by the County of Dufferin. Procedures for the interception and rapid clean-up and disposal of

spillages that do occur shall be submitted to the County of Dufferin for review prior to starting work. All materials required for clean-up of fuel spillages shall be maintained readily accessible on site.

The exception of these fueling locations requirements shall be generators, cranes, backhoes or shovels which may be fueled at other than the designated fueling areas. However, no fueling of backhoes shall be carried out within thirty metres of any watercourse.

Any spills apt to cause impairment to the natural environment must be immediately reported by the Contractor to the County of Dufferin and to the local Ministry of the Environment District Office.

.5 The Contractor shall take all precautions so as not to affect the quality of water as it passes through the area and to prevent eroded material from construction operations from entering streams, watercourses or private property. Appropriate sediment retention measures shall be incorporated in the work to ensure that sediment discharge to watercourses adjacent to the working area is minimized. These may include sedimentation ponds to which pumped water or run-off is directed prior to discharge to the adjacent watercourse.

As part of the work to be performed under this contract and where sediment traps are required they shall be constructed downstream of all road culverts where run-off from slopes under construction may enter a watercourse or private property. Sediment traps or similar sediment protection shall be constructed for receiving the discharge from dewatering operations. Temporary sediment traps shall be constructed in advance of any work where eroded materials could enter the watercourse. The overflow rate from settling or sedimentation ponds shall be such that the solids carryover is minimal. The Contractor shall incorporate filter berms or sandbags, as required, to retard and filter run-off prior to discharge to the watercourse.

In general, concentrated run-off from un-stabilized areas shall be intercepted and diverted to stabilized areas under sheet flow conditions. Any water pumped for the purposes of trench or structure excavation or dewatering shall be directed to a settling basin or other device to reduce suspended solids content prior to discharge to a storm sewer, drainage ditch or natural watercourse.

The Contractor shall clean and maintain the sediment traps as required. The traps shall be cleaned when approximately 50% filled with sediment and as directed by the County of Dufferin. Sediment material removed from the traps shall be hauled and disposed of outside the contract limits in areas arranged for by the Contractor.

The sediment traps shall be maintained until embankment slopes and ditches in the area are reinstated. The traps shall then be removed and the area restored to its original grade or as shown on the drawings.

The Contractor shall not permit any excavated materials or other material to be deposited in any watercourses except as indicated in the contract documents such as rip rap, river stone or clear stone.

.6 The requirements set out in any permits issued for the project shall form part of this Contract and shall be strictly adhered to.

Any deviation from the prescribed requirements and/or methods contained in or implied by the permits as issued and this contract will result in a work stoppage until such time as the Contractor produces suitably approved or revised permits acknowledging the proposed deviation. All costs associated with revised work permits and any stoppages in work will be solely the responsibility of the Contractor.

.7 Restoration shall not be undertaken as a final project task but shall be initiated as soon as backfilling and

compaction activities have been completed.

The Contractor shall maintain and/or repair all siltation and erosion control measures (installed as part of this Contract), during site construction activities and prior to demobilization.

.8 The Contractor shall remove and dispose of all siltation and erosion control measures following adequate vegetation and stabilization of the project site. All protective measures shall remain in place until approved for removal by the County of Dufferin or applicable Conservation Authority.

There will be no direct measurement of quantities for work related to environmental protection measures as described above. The work will be administered as being part of the related items in the Form of Tender.

.9 The Contractor is responsible for the preservation, required adjustments, temporary removal and reinstatement of all road signs within the contract limits as required to facilitate construction. The Contractor shall complete a detailed inventory of all road signage and other roadside features before mobilizing any equipment to the project site. A copy of this inventory is to be provided to the County of Dufferin as part of the preconstruction meeting and prior to construction. All associated works required to complete such activities shall be provided at no additional cost to the County of Dufferin.

.10 The Contractor shall be responsible for coordinating the collection of all garbage, blue box, green bin and other components of waste collection within the limits of the Contract for the full duration of the project. This co-ordination shall include consultation with the County of Dufferin's Waste Collections Contractor, Green for Life (GFL). GFL can be contacted at 1-888-941-3345. The Contractor shall confirm with the County of Dufferin, two (2) weeks prior to commencing construction that this co-ordination has taken place and shall disclose the agreed upon method to ensure continued waste collection within the construction site.

.11 When necessary the Contractor shall develop and implement an appropriate detour route, to be approved by the County of Dufferin. This includes the supply, erection, maintenance, and ultimate removal of all control signs and/or traffic signals for detours, road closures, etc.

.12 The Contractor is responsible for notifying local municipalities with the intended haul routes for all materials entering and leaving the job site. A written copy of the intended haul routes shall be given to the affected municipalities and counties, as well as a copy provided to the County of Dufferin. Haul routes are to avoid residential and township roads whenever possible.

.13 The Contractor is responsible for obtaining Utility locates, from all utility companies in the area. A copy of the locates is to be maintained onsite at all times during construction. The Contractor shall be responsible for locating and protecting all utilities in the field. The Contractor shall bear all costs from any damages to utilities caused by their forces. Where relocations are required, the Contractor shall maintain and protect utilities in their existing location until they are relocated by the Utility Company and shall re-schedule their work to accommodate such relocations.

.14 All references in the Contract to the Manual of Uniform Traffic Control Devices (MUTCD), including all Parts and Divisions thereof, or MTO Traffic Control Manual for Roadway Work Operations, or Traffic Control Manual for Roadway Operations Field Editions are hereby deleted and replaced by the following books of the Ontario Traffic Manual (OTM):

Book 5 – Regulatory Signs;

Book 6 – Warning Signs;
Book 7 – Temporary Conditions (and Temporary Conditions Field Edition);
Book 11 – Pavement, Hazard and Delineation Markings;
Book 12 – Traffic Signals.

Any reference in the Contract to OTM shall be deemed to be the Ontario Traffic Manual (Books 5, 6, 7, 11 and 12).

The Contractor shall comply with the applicable requirements of the above Ontario Traffic Control Manual book(s).

.15 The Contractor is responsible for arranging equipment and material storage areas for the site. The contractor may store equipment inside the project right-of-way limits. Storage of materials and equipment must be planned as to not impede any travelled lanes or roadside shoulders. Equipment shall be located as to not interfere with sightlines to intersections or driveways. The Contractor is responsible for the reinstatement of all areas disturbed by staging operations to a condition equal to or better than the original condition at no additional cost to the County.

If the Contractor chooses to use private property as an equipment staging area, the Contractor shall provide the County with a written agreement, signed by the Contractor and the private owner, indicating that the Contractor has permission to use the land for equipment staging purposes and that the Contractor has agreed to re-instate the staging area to a condition better than the original condition and to the satisfaction of the Property Owner.

Any such agreement between the Contractor and the adjacent Property Owner shall be considered outside of this Contract. The County of Dufferin shall not be held responsible for any damages to private property caused by the Contractor on any private property used for equipment staging purposes.

.16 Section GC 8.01.02 of the Ontario Provincial Standards for Roads and Public Works, General Conditions of Contracts, variations in tender quantities only applies to major contract items as defined in the OPS General Conditions of Contract. For the purpose of this Contract all Provisional Contract Items will not be considered as a major item and therefore are not eligible for underrun or overrun adjustments to either the County of Dufferin or Contractor. Payment for works completed under provisional tender items will be paid at the specified unit rate of the tender item.

PROJECT SCHEDULE

.1 In preparing the tender bid for this project and for scheduling the work for this Contract, the bidder is advised of the following:

The County of Dufferin requires that all construction under this Contract be completed no later than November 17, 2023.

.2 Work is permitted only from Monday to Friday 7:00 am to 7:00 pm inclusive, or as described within the

local municipal by-law. Any weekend work must be approved by the County of Dufferin and notification of such requests must be provided a minimum of 48 hours prior to the weekend in which the work is proposed.

.4 As soon as the contract is awarded, the contractor shall place the purchase orders for all the items, including the traffic signal controller, to avoid delays in procurements.

.5 Handover the traffic signal controller and the signal timing plan provided in the contract document to the County minimum fourteen (14) days in advance of the controller installation date, for bench testing and programming the controller with the signal timing plan.

.6 Work must be performed on a continuous basis from the start of the project to final completion. The Contractor agrees to submit a detailed project schedule to the County of Dufferin clearly illustrating each significant project milestone and the chronological order of carrying out the work. The County of Dufferin reserves the right to adjust the schedule as required.

PRE-CONSTRUCTION AND CONSTRUCTION PROGRESS MEETINGS

.1 A Pre-Construction Meeting will be held following award of the Contract by the County of Dufferin and immediately prior to commencement of construction on the project. The Contractor and other interested parties will be invited to the Pre-Construction Meeting. The Pre-Construction Meeting will include identification of all pertinent personnel to be involved on the project, sub-Contractors, suppliers, project details, and the Contractor's proposed schedule. The issues to be discussed at this meeting will not be limited to the above items, and may be outlined in a prior agenda by the County of Dufferin.

.2 Construction Progress Meetings will be held as deemed appropriate by the County of Dufferin. These meetings, during the construction period, will be to review the Contractor's progress, the sequence of operations, issues and constraints that may arise during construction, details of the construction progress, changes to the Contract, and to provide general coordination for the overall successful completion of the project. The Contractor's representative will be required to attend these meetings as they are convened, and the location for the Construction Progress Meetings will be determined by the County on a per-meeting basis.

.3 In conjunction with all terms and conditions of the Contract, the Contractor shall prepare a project work schedule for presentation at the Pre-Construction Meeting. The project work schedule shall be in sufficient detail to provide information on calendar dates, sequencing and scheduling of all major items of work (e.g. traffic signal installation, asphalt paving, shouldering, etc.), and the integration of other requirements/sub-Contractor work programs.

.4 The Contractor's schedule shall be updated as required and submitted to the County of Dufferin prior to the regularly scheduled Construction Progress Meeting. The agenda for each Construction Progress Meeting shall include a review of the Contractor's work schedule, relative to the completion date and in relation to working day balances.

.5 There will be no separate payment for work required by the Contractor in the preparation and updating

of the Contractor's work schedule. Further, there will be no separate payment for the Contractor's representatives to attend the regularly scheduled project meetings, all such costs being included in the unit tender prices for this project.

INCIDENTAL ITEMS

The following is a partial list of items, the cost of which are to be included in the unit prices of the Tender Items. No additional payment will be made for the following:

.1 The Contractor shall provide all labor, equipment and material required to mobilize the equipment and materials to the site, and to demobilize the equipment and surplus materials from the site at no additional cost to the County of Dufferin.

.2 The Contractor's equipment shall arrive on site clean and free of mud.

.3 The responsibility to acquire permits prior to commencing construction work will be allocated as follows:

- Conservation Authority – County of Dufferin
- Permit to Take Water or EASR (for dust control) - Contractor

.4 Cost of providing and maintaining a field office and site privy or water closet and private phone line or mobile phone for the use of the Contractor.

.5 Cost of maintaining uninterrupted access to all private properties and businesses that may be impacted by the construction.

.6 Cost of coordination of any work that may be associated with utility companies who may be effected by the project, or may be required to perform work simultaneously with the work of this Contract.

.7 Cost of normal roadway maintenance on existing roads and streets which may be effected by the Contractor's operations for the duration of the Contract.

.8 Cost of locating, supporting and protecting existing utilities and services.

.9 Cost of preparing, maintaining, updating and providing a detailed project work schedule to the County of Dufferin.

.10 Cost of organization, maintenance and administration of a Project Safety Committee.

.11 Cost of preparing and submitting any shop drawings, as may be required under this Contract.

.12 Cost of restoring or repairing any private property damaged as part of the Contractors operations. Such restorations are to be completed to the satisfaction of the County of Dufferin.

INDEX TO DOCUMENT – SPECIAL PROVISIONS

Item No. **Description** **Page No.**

SP1 TENDER ITEM A1.1 – MOBILIZATION AND DEMOBILIZATION

.1 The work of this item shall include, without limitation, the following:

a. Mobilization and demobilization

i. The work shall include the cost of mobilizing onto the site, demobilization, and final clean up upon completion of the work. The Contractor shall bear all costs associated with the provision of temporary facilities for construction.

.2 There will be no measurement for payment for this item. Payment of the tendered lump sum price for this item shall be compensation in full for all related costs. Item will be paid under subsequent progress payment certificates in increments proportional to the value of the work completed.

SP2 TENDER ITEM A1.2 – MAINTENANCE AND PROTECTION OF TRAFFIC INCLUDING TEMPORARY SIGNAGE

.1 The work of this item shall include, without limitation, the development of and continued implementation of appropriate Traffic Controls and Signage, including:

a. As the roadway will remain open to traffic during construction, the Contractor shall provide adequate signs, barricades and barriers to safely protect the work area from vehicle and pedestrian traffic. On occasion, the Contractor may be required to provide a Pilot Truck to guide vehicle traffic through the site. The requirement for a Pilot Truck will be at the discretion of the Contractor and as recommended by the County of Dufferin.

b. Signage shall be in accordance with OPSS.MUNI 706, including the following:

i. OPSS.MUNI 706.01 (Scope) shall be amended to include; Work performed under this item will include the supply, placement, maintenance, replacement as necessary and removal, of all advisory signs, construction signs, warning signs, TC 54 delineators and temporary concrete barriers, if necessary, to advise the public and to control traffic to ensure the work area is protected during construction.

c. All businesses and residents with access onto the project site, shall be continuously provided such access. The Contractor shall maintain at least one lane open onto intersecting roadways, driveways and other accesses at all times during construction.

d. Road closures are not permitted on Dufferin County Road 109 and 2nd Line for the duration of the project. Continuous and unobstructed flow of two-way directional traffic is required to be sustained throughout the entire duration of the construction process.

.2 The Contractor shall:

a. Provide the County of Dufferin with a detailed Construction Sign Plan three (3) weeks prior to mobilizing to the site. This plan shall include all necessary advisory signs, as well as all work zone warning signs including type, location and size, as well as all required signs and barricades to limit/prevent vehicle and pedestrian traffic during construction.

b. Provide the County of Dufferin with a detailed Traffic Management Plans three (3) weeks prior to mobilizing to the site using Ontario Traffic Manual – Book 7 – Temporary Conditions, as a minimum guide. This plan shall include all necessary advisory signs, as well as all work zone warning signs including type, location and size, as well as all required signs and barricades to limit/prevent vehicle and pedestrian traffic during construction.

c. Where required the Contractor shall protect the work area through the use of barricades. Barricades shall be preceded by warning signs and will be sufficient to prevent an errant vehicle from accessing any work area or open excavation. Barricades shall not be placed in a manner that will restrict access to local entrances.

d. Provide the County of Dufferin with a detailed description of the proposed traffic control procedures and equipment which they intend on using during the project.

e. Maintain an updated Traffic Protection Plan on site for the duration of the Contract work.

f. Schedule work such that there will be no open excavation left unprotected adjacent to an active lane carrying traffic overnight or during non-working days. Excavations shall be backfilled with the specified granular material to an elevation equal to the centreline road profile grade.

g. Supply appropriate traffic control signage in accordance with the Ontario Traffic Manual – Book 7 – Temporary Conditions.

h. Maintain all traffic control signage in good order throughout the duration of the Contract and repair or replace any signage as necessary.

    i. Supply, install, erect, maintain, repair and replace all signs, flashing lights, beacons, etc. as required to ensure the public is properly warned upon approaching the Contract site. This shall be in accordance with OTM Book 6 Warning Signs and OTM Book 7 Temporary Conditions – Field Edition.

    ii. Using construction fence and appropriate signage, completely enclose all open excavations during non-working hours.

    iii. Supply, install, erect and maintain all suitable barricades, signs, snow fence, etc. along the travelled lanes (pedestrian or vehicle), if construction is taking place adjacent to any travelled lane.

    iv. Provide any traffic control, or traffic control measures, as necessary during the course of the work. These measures may include paid duty police traffic control, temporary traffic signals, etc.

.3 The Contractor may be required to provide temporary traffic control using flag-persons during construction. All traffic control for/during this Contract shall be in conformance with Ministry of Labour Policies and the Occupational Health and Safety Act.

.4 There will be no measurement for payment for this item. Payment of the tendered lump sum price for this item shall be compensation in full for all related costs. Item will be paid under subsequent progress payment certificates in increments proportional to the value of the work completed.

SP3 TENDER ITEM A1.3 – CONSTRUCTION LAYOUT

.1 The work of this item shall include, without limitation the requirements for setting out of all construction works and undertakings for this Contract. The Contractor shall use qualified personnel to complete the layout work. They shall be thoroughly experienced in surveying and have extensive previous experience in construction layout.

.2 The County will supply the Contractor with the available land plans, alignment details, and a list of bench mark elevations. From these benchmarks and points of reference the Contractor shall do its complete construction layout. The County will be responsible only for the correctness of the information supplied.

.3 The Contractor will be responsible for the true and proper setting out of the Work and for the correctness of the position, levels, dimensions and alignment of all parts of the Work, and for the provision of all necessary instruments and labour for the construction layout. If, at any time during the progress of the Work, any error appears or arises in the positions, levels, dimensions or alignment of any part of the Work, the Contractor shall, at its own expense, rectify such error to the satisfaction of the County, unless such error is based on incorrect data supplied in writing by the County. The checking of the setting out of any line or level by the County shall not in any way relieve the Contractor of its responsibility for the correctness of the Work.

.4 The Contractor shall supply the County with a copy of all necessary information to enable the County to use the Contractor's field layout. All information, both on work sheets and on stakes, shall be neat and legible.

.5 Payment shall be made at the lump sum price and shall be full compensation for all labour, equipment and materials necessary to completely lay out the Work. Payment shall be made on each payment certificate based on the estimate of the amount of layout completed. The layout required due to alterations in Contract items shall be considered incidental to the work of this item; therefore, no change will be made to the lump sum price for this item

SP4 TENDER ITEM A1.4 – ENVIRONMENTAL PROTECTION, MEASURES, AND MONITORING

.1 The work of this item shall include, without limitation the requirements for the installation, maintenance and removal of temporary erosion and sediment control measures indicated in the contract document.

.2 The requirements of OPSS.MUNI 805 shall apply to this work.

.3 Payment at the contract price for this contract item shall be full compensation for all labour, equipment and materials necessary to do the work in accordance with OPSS.MUNI 805.

SP5 TENDER ITEM A1.5 – PAYMENT OF BONDS

.1 The work of this item shall include, without limitation the requirements for both Performance and Labour and Material Payment Bonds.

.2 Payment at the contract price for this contract item shall be full compensation for all work including all labour, equipment and materials as well as any change in the work approved by the County.

.3 100% of the tendered price will be paid on the first payment certificate, subject to the bonds being

accepted by the Owner.

SP6 TENDER ITEM A2.1 – CLEARING AND GRUBBING

.1 The work of this item shall include, without limitation the requirements for the removal of trees, brush, bushes, stumps, windfalls, surface boulders and piled boulders.

.2 The requirements of OPSS.MUNI 201 shall apply to this work.

.3 Measurement for payment shall be per unit rate as described in the Tender Items. Payment at the tendered unit price shall be compensation in full for all related works.

SP7 TENDER ITEM A2.2 - REMOVE EXISTING ASPHALT PAVEMENT (FULL DEPTH)
SP7 TENDER ITEM A2.3 - REMOVE AND DISPOSE OF EXISTING GUIDERAIL
SP7 TENDER ITEM A2.4 - REMOVE AND DISPOSE OF EXISTING POST AND SIGN

.1 The work for these items shall include the removal and offsite disposal of all items as illustrated with the Contract Drawings and as described within Contract Documents. The work shall include the required excavation and offsite disposal of all associated works.

These items include, but are not limited to the removal of:

a. Remove Existing Asphalt Pavement (Full Depth)
b. Remove and Dispose of Existing Guide Rail
c. Remove and Dispose of Existing Post and Sign

.2 Work shall be done in accordance with OPSS.MUNI 510 except as specified herein.

.3 Restoration with native backfill including compaction and testing shall be included within the unit bid price of this tender item.

.4 Restoration that requires the import of additional materials shall be in accordance with, and paid under:

a. SP12 Tender Items A3.4 - Supply, Place, and Compact Granular 'A'
b. SP13 Tender Items A3.6 – 150mm Imported Topsoil
c. SP14 Tender Items A3.7 – Sodding
d. SP12 Tender Items A3.5 - Supply, Place, and Compact Granular 'B' Type II

.5 The Contractor must receive consent from the County of Dufferin prior to the import and placement of any materials required for restoration.

.6 Measurement for payment shall be per unit rate as described in the Tender Items. Payment at the tendered unit price shall be compensation in full for all related works.

SP8 TENDER ITEM A2.5 – TOPSOIL REMOVAL, STORAGE AND REUSE

.1 The work of this item shall include, without limitation the requirements for removal, storage and reuse of topsoil.

.2 The requirements of OPSS.MUNI.206, OPSS.MUNI.510 and OPSS.MUNI 802 shall apply except as specified herein.

.3 Material meeting the requirements of topsoil according to OPSS 802 that is required for re-use shall be stockpiled within the project right-of-way limits. Stockpile of materials must be planned as to not impede any travelled lanes or roadside shoulders. Stockpile shall be located as to not interfere with sightlines to intersections or driveways. Stockpile shall have silt fence protection to prevent eroded material from stockpile entering streams, watercourses, or private property.

.4 Measurement for payment shall be per unit rate as described in the Tender Item. Payment at the tendered unit price shall be compensation in full for all related works.

SP9 TENDER ITEM A2.6 – PAVEMENT MARKING OBLITERATING

.1 The work of this item shall include, without limitation the requirements for pavement marking removals.

.2 The requirements of OPSS.MUNI.719 shall apply except as specified herein.

.3 Subsection 710.07.03 of OPSS 710 is amended by the addition of the following:

a. 710.07.03.02 Abrasive Blasting

i. Pavement markings shall be removed by abrasive blasting, using equipment and material as specified in the Designated Sources for Materials listing for Line Removal Systems, Pavement Markings.

ii. The depth of the removal shall be the minimum required to totally remove the existing pavement markings, to a normal depth, typically averaging 3 mm.

iii. Pavement marking obliterating shall be carried out using a soft abrasive blast cleaning system at the locations specified in the contract.

iv. The Contractor shall control the operation so that the asphalt pavement is not damaged in any way and to ensure that no pavement marking remains visible upon completion.

v. The Contractor's operation shall be carried out in accordance with approved methods as specified in the Designated Sources for Materials listing for Line Removal Systems, Pavement Markings, so as to control any dust or effluent generated by the operation.

.4 Payment will be made at the unit price and shall be compensation in full for all labour, equipment and materials required to achieve the specifications of this item. Progress payments for this item will be made on the following basis:

SP10 TENDER ITEM A3.1 - EARTH EXCAVATION (GRADING) – CUT & FILL

.1 The work of this item shall include, without limitation the requirements for grading, including earth and rock excavation and embankment construction, rock face, and the management of excavated materials.

.2 The requirements of OPSS.MUNI 206 shall apply to this work except as specified herein.

.3 Suitable earth materials excavated from shoulder, ditching and other associated sites shall be used in earth grading and embankment construction. Surplus excavated materials shall be used to flatten the

slope within the right-of-way, as per OPSD 202.010.

.4 Payment at the contract price for this contract item shall be full compensation for all labour, equipment and materials necessary to do the work in accordance with OPSS.MUNI 206.

SP11 TENDER ITEM A3.2 - HOT MIX ASPHALT – HL3 (50mm)
SP11 TENDER ITEM A3.3 – HOT MIX ASPHALT – HL8 (100mm; Two 50mm LIFTS)

.1 Work shall be done in accordance with OPSS.MUNI 310, OPSS.PROV 313, and OPSS.MUNI 1150. Weighing of material shall be in accordance with OPSS.MUNI 102.

.2 When applicable the work of this item shall include, without limitation, and at no additional cost to the County of Dufferin:

a. Any required repairs to the pulverized granular subbase surface, grading of any Granular 'A' road base prior to placement of base course asphalt.
b. Cleaning of the base course asphalt prior to the placement and compaction of HL3 surface course asphalt.
c. The application of tack coat in accordance with OPSS.PROV 308. along the entire surface of each lift of base course asphalt, recycled asphalt surface, and along all hard surfaces including concrete curbs.
d. Removal of all ramps installed with the binder course asphalt, including those where the binder asphalt mated into an existing surface course, and those around structures.

.3 Performance Graded Asphalt Cement (PGAC) shall be in accordance to OPSS.MUNI 1101, excluding PGAC zone requirements and as follows:

a. HL3 Surface course asphalt PG 64-28
b. HL8 Base course asphalt PG 58-28

.4 If any of the existing asphalt edges to which new asphalt is to mate have been damaged, such asphalt edges shall be saw cut and the damaged portions of asphalt shall be removed under this item.

.5 Base coarse asphalt shall be placed in no lift greater than 50 millimetre thickness as per industry standard. Any lift greater than 50mm will require placement of multiple lifts. The cost of placing multiple lifts shall be included in the unit price of this tender item.

.6 The granular material stockpile is to be inspected by a County of Dufferin representative and granted approval prior to the start of construction. The material shall be tested by the Contractor according to MTO Standards and Specifications for use in hot mix.

.7 The Contractor shall provide mix designs for all mixes at least two (2) weeks prior to placement, and all mix designs shall be approved by the County of Dufferin prior to the placement of materials. To ensure adherence to the mix design, samples of the mix will be taken at least daily by the County of Dufferin for analysis by an M.T.O. approved laboratory. The approved mix design shall contain **no more than 10% reclaimed asphalt material (RAP)**.

.8 Paving shall not be carried out when ambient temperature does not correspond with OPSS.MUNI.310.07.06.02, when the road is wet, or rain is imminent.

.9 The surface of a pavement upon which hot mix asphalt is to be placed shall be dry at the time of HMA placement

.10 The Contractor shall avoid exposed longitudinal joints at the completion of the working day. Where unforeseen circumstances arise and paving cannot be completed to match the full pavement width as specified in the Contract Documents, the Hot Mix Asphalt course shall be temporarily ramped down to existing at a slope of 10H:1V. The temporary longitudinal ramp shall be removed prior to paving the adjacent lane with a clean vertical face. All costs for temporary longitudinal ramp down including removals shall be included in the bid price of this tender item.

.11 All centerline longitudinal cold joints require to be reheated prior to placing asphalt. Contractor shall use an infrared heating system to produce a warm joint, without scorching or burning the mix. All re-heating methods shall be approved by the County of Dufferin prior to the placement of any asphalt pavement. All labour and material costs associated to the infrared joint heater shall be included in the bid price of this tender item. No additional payment will be provided for heating of asphalt cold joints.

.12 Asphalt compaction shall be in accordance with OPSS.MUNI 310, Table 10 (minimum pavement compaction based on Maximum Relative Density (MRD) of 92%), as determined by nuclear density gauge. The Contractor shall provide documentation to the County demonstrating that the specified compaction has been achieved. All costs associated with the compaction testing and reporting shall be included and paid under this Tender Item. Additional Density Testing will be performed periodically throughout the Contract by a representative appointed and paid for by the County of Dufferin.

.13 The Contractor will be responsible for ensuring that the asphalt pavement is not damaged by traffic. Traffic, including construction equipment, shall be kept off the freshly placed asphalt for a minimum of 1 hour or the appropriate time to prevent damage to the surface. The Contractor shall replace the damaged asphalt to the satisfaction of and at no additional cost to the County of Dufferin.

.14 Temporary pavement markings shall be self-adhering yellow reflective tape and shall be placed on the centreline of the newly placed asphalt pavement (base and surface course) after compaction. The markings shall be 100 millimetres x 300 millimetres and placed at a maximum spacing of 5 metres along the length of the road alignment. The cost for the marking tape shall be included in the cost of the tender item.

.15 The cost of supplying performance graded asphalt cement shall be included in the bid price of this Tender Item and shall be fixed for the period of this Contract with the following exception:

a. Between the time the tender has closed and the Contract has been completed, the tender prices bid shall be increased or decreased by the exact amount of any tax or duty changes levied by the Federal or any Provincial government or the imposition of any new tax or duties.
b. The Contractor shall notify the County of Dufferin in writing immediately of any such price change so that the bid prices can be amended and invoices processed without undue delay.

.16 Measurement for payment for this item shall be per tonne asphalt installed and compacted, as evidenced by weigh scale slips from an approved scale and signed by a County representative onsite. Payment at the tendered unit prices shall be compensation in full for all related works.

SP12 TENDER ITEM A3.4 – SUPPLY, PLACE AND COMPACT GRANULAR 'A'
SP12 TENDER ITEM A3.5 – SUPPLY, PLACE AND COMPACT GRANULAR 'B' TYPE II

.1 The work of this item shall include, without limitation, the requirements for the aggregates and construction of untreated granular subbase, base, roadway surface and shoulder.

.2 The requirements of OPSS.MUNI 314 and OPSS.MUNI 1010 shall apply to this work except as specified herein.

.3 The work of this item shall include, without limitation, the supply to site, placement and compaction to 100% SPMDD of Granulars as per OPSS.MUNI 1010. In general, such Granular 'A' and Granular 'B' shall be placed to a compacted thickness as noted on the Contract Drawings or as directed by the County of Dufferin.

.4 Placement, compaction, and weighing of materials for this item shall be in accordance with OPSS.MUNI 314, OPSS.MUNI 501 and OPSS.MUNI 102, respectively. Section OPSS.MUNI 501.08.03 Compaction Testing Method 'B' is deleted. No additional payment will be made for water used for compaction. All costs for water shall be included within this item.

.5 Measurement for payment for this item shall be per tonne of Granulars placed and compacted on the site, as evidenced by weigh scale slips from an approved scale and signed onsite by a County of Dufferin representative upon delivery. Payment at the tendered unit price shall be compensation in full for all related works

SP13 TENDER ITEM A3.6 – 150mm IMPORTED TOP SOIL

.1 The work of this item shall include, without limitation, the requirements for stockpiling, supplying, and placing topsoil.

.2 The requirements of OPSS.MUNI 802 shall apply to this work except as specified herein.

.3 Payment under this item considers only the topsoil specified to be placed where grading is proposed as indicated on the Contract Drawings or as directed by the County of Dufferin. All areas disturbed outside of the original project scope of work shall be restored by the Contractor at no additional cost to the County of Dufferin. Such areas include but not limited to equipment storage sites, material stockpile locations, or areas disturbed by construction methodologies adopted by the Contractor to complete the work.

.4 Measurement for payment for this item shall be per cubic metre topsoil and for all labour, equipment and materials necessary to do the work in accordance with OPSS.MUNI 803. Payment at the tendered unit price shall be compensation in full for all related works.

SP14 TENDER ITEM A3.7 – SODDING

.1 The work of this item shall include, without limitation, the requirements for sodding.

.2 Work shall be in accordance with the requirements of OPSS.MUNI 803.

.3 Measurement for payment for this item shall be per square metre of sod and for all labour, equipment

and materials necessary to do the work in accordance with OPSS.MUNI 803. Payment at the tendered unit price shall be compensation in full for all related works.

SP15 TENDER ITEM A3.8 – SUPPLY AND INSTALL M20 STEEL BEAM GUIDE RAIL

.1 The work of this item shall include, without limitation, all labour, equipment and materials required to supply and install new Type M20 steel beam guide rail at the locations identified on the Contract Drawings and as directed by the County of Dufferin.

.2 Work shall be in accordance with the manufacturer's specifications and OPSS.MUNI 721 except as specified herein.

.3 Steel beam guide rail must adhere to the following OPSD standard drawings:

- OPSD 912.101 Guider Rail System, Steel Beam Rail Component
- OPSD 912.102 Guide Rail System, Steel Beam Channel Component
- OPSD 912.103 Guide Rail System, Steel Beam Plastic Offset Blocks Component
- OPSD 912.123 Guide Rail System, Steel Beam Type M Rail
- OPSD 912.124 Steel Beam Type M Transition Rail
- OPSD 912.125 Steel Beam Type M Rail
- OPSD 912.127 Steel Beam M20 Steel Post with Offset Block
- OPSD 912.185 Steel Beam Type M20 Installation
- OPSD 912.186 Steel Beam Type M20 - Adjacent to 2H:1V Slope

.4 Steel beam guide rail mounting height shall be 785mm, ±25mm to the top of rail measured from the finished grade elevation.

.5 Measurement for payment shall be per linear metre of guide rail installed complete. Energy attenuating terminal end treatments shall be considered to be 15.0 metres in length each, as per OPSD 922.165, which will be subtracted from the total length of installation to determine the length of guide rail installed for payment purposes. Payment at the tendered unit price shall be compensation in full for all related works.

SP16 TENDER ITEM A3.9 – SUPPLY AND INSTALL M20 STEEL BEAM GUIDE RAIL END TREATMENT

.1 The work of this item shall include, without limitation, all labour, equipment and materials required to supply and install new energy attenuating terminal end treatments at the locations shown on the Contract Drawings and as directed by the County of Dufferin.

.2 Work shall be in accordance with the manufacturer's specifications, and OPSS.MUNI 732 except as specified herein.

.3 Steel beam guide rail energy terminal systems must adhere to the following OPSD standard drawings:

- OPSD 922.165 Energy Attenuator, End Treatment Steel Beam Energy Attenuating Terminal MASH Softstop Terminal System.
- OPSD 922.186 Energy Attenuator, End Treatment Steel Beam Energy Attenuating Terminal MASH
- OPSD 984.201 End Treatment Delineation Installation – Approach End
- OPSD 984.202 End Treatment Delineation Installation – Leaving End

.4 End terminal to be installed at 15.0m length and placed at a 50:1 flare.

.5 Included in the unit price of this item shall be the supply and installation of a high intensity object marker (Wa-33) mounted on a flexible post and a 250mm x 250mm green and white reflective snowplow marker (Wz-2) where end terminal is terminated. Installation procedure and location shall be as OPSS.MUNI 732.07.05.

.6 Measurement for payment shall be as per each energy attenuating terminal unit installed. Payment at the tendered unit price shall be compensation in full for all related works.

SP17 TENDER ITEM A3.10 – PERMANENT DURABLE PAVEMENT MARKING – 60cm STOP BAR
SP17 TENDER ITEM A3.11 – PERMANENT DURABLE PAVEMENT MARKING – TURNING ARROWS
SP17 TENDER ITEM A3.12 – PERMANENT DURABLE PAVEMENT MARKINGS – 10cm WHITE AND YELLOW LINE (SOLID, AND 3-3-3)

.1 The work of this item shall include, without limitation, the requirements for the application of pavement markings onto bituminous or concrete pavements.

.2 Work shall be in accordance with the requirements of OPSS.MUNI 710.

.3 Measurement for payment shall be as per linear meter of pavement marking placed and all labour, equipment and materials necessary to do the works in accordance with OPSS.MUNI 710. Payment at the tendered unit price shall be compensation in full for all related works.

SP18 TENDER ITEM A3.13 – SUPPLY AND INSTALL PERMANENT SIGNAGE
SP18 TENDER ITEM A3.14 – SUPPLY AND INSTALL PERMANENT SIGNAGE POST

.1 The work of this item shall include, without limitation, the requirements for the installation and removal of permanent small signs and support systems, and the relocation of small signs.

.2 Work shall be in accordance with the requirements of OPSS.MUNI 703.

.3 Measurement for payment shall be as per each sign and all labour, equipment and materials necessary to do the works in accordance with OPSS.MUNI 703. Payment at the tendered unit price shall be compensation in full for all related works.

SP19 TENDER ITEM A4.1 – SURFACE MOUNTED DUCT SYSTEM (TEMPORARY)

.1 The work of this item shall include, without limitation, all labour, equipment and materials required to supply and install new Surface Mounted Duct Systems at the locations identified on the Contract Drawings and as directed by the County of Dufferin.

.2 Work shall be in accordance with the manufacturer's specifications and OPSS.MUNI 603 except as specified herein.

.3 Measurement for payment shall be as per linear metre of duct system installed and all labour, equipment and materials necessary to do the works in accordance with OPSS.MUNI 603. Payment at the tendered unit price shall be compensation in full for all related works.

SP20 TENDER ITEM A4.2 – LOW VOLTAGE CABLES, AERIAL ON MESSENGER CABLE (TEMPORARY)

.1 The work of this item shall include, without limitation, all labour, equipment and materials required to supply and install new Aerial Low Voltage Cables on Messenger Cable at the locations identified on the Contract Drawings and as directed by the County of Dufferin.

.2 Work shall be in accordance with the manufacturer's specifications and OPSS.MUNI 604 except as specified herein.

.3 Measurement for payment shall be as per linear metre of Aerial Low Voltage Cables on Messenger Cable installed and all labour, equipment and materials necessary to do the works in accordance with OPSS.MUNI 604. Payment at the tendered unit price shall be compensation in full for all related works.

SP21 TENDER ITEM A4.3 – EXTRA LOW VOLTAGE CABLES, AERIAL ON MESSENGER CABLE (TEMPORARY)

.1 The work of this item shall include, without limitation, all labour, equipment and materials required to supply and install new Aerial Extra Low Voltage Cables on Messenger Cable at the locations identified on the Contract Drawings and as directed by the County of Dufferin.

.2 Work shall be in accordance with the manufacturer's specifications and OPSS.MUNI 604 except as specified herein.

.3 Measurement for payment shall be as per linear metre of Aerial Extra Low Voltage Cables on Messenger Cable installed and all labour, equipment and materials necessary to do the works in accordance with OPSS.MUNI 604. Payment at the tendered unit price shall be compensation in full for all related works.

SP22 TENDER ITEM A4.4 – TRAFFIC SIGNAL CABLES, AERIAL ON MESSENGER CABLE (TEMPORARY)

.1 The work of this item shall include, without limitation, all labour, equipment and materials required to supply and install new Aerial Traffic Signal Cables on Messenger Cable at the locations identified on the Contract Drawings and as directed by the County of Dufferin.

.2 Work shall be in accordance with the manufacturer's specifications and OPSS.MUNI 604 except as specified herein.

.3 Measurement for payment shall be as per linear metre of Aerial Traffic Signal Cables on Messenger Cable installed and all labour, equipment and materials necessary to do the works in accordance with OPSS.MUNI 604. Payment at the tendered unit price shall be compensation in full for all related works.

SP23 TENDER ITEM A4.5 – STEEL MESSENGER CABLES, AERIAL (TEMPORARY)

.1 The work of this item shall include, without limitation, all labour, equipment and materials required to supply and install new Aerial Steel Messenger Cables at the locations identified on the Contract Drawings and as directed by the County of Dufferin.

.2 Work shall be in accordance with the manufacturer's specifications and OPSS.MUNI 604 except as specified herein.

.3 Measurement for payment shall be as per linear metre of Aerial Steel Messenger Cables installed and all labour, equipment and materials necessary to do the works in accordance with OPSS.MUNI 604. Payment at the tendered unit price shall be compensation in full for all related works.

SP24 TENDER ITEM A4.6 – GROUND WIRES (TEMPORARY)

.1 The work of this item shall include, without limitation, all labour, equipment and materials required to supply and install new Ground Wires at the locations identified on the Contract Drawings and as directed by the County of Dufferin.

.2 Work shall be in accordance with the manufacturer's specifications and OPSS.MUNI 609 except as specified herein.

.3 Measurement for payment shall be as per linear metre of Ground Wires installed and all labour, equipment and materials necessary to do the works in accordance with OPSS.MUNI 609. Payment at the tendered unit price shall be compensation in full for all related works.

SP25 TENDER ITEM A4.7 – GROUND ELECTRODES (TEMPORARY)

.1 The work of this item shall include, without limitation, all labour, equipment and materials required to supply and install new Ground Electrodes at the locations identified on the Contract Drawings and as directed by the County of Dufferin.

.2 Work shall be in accordance with the manufacturer's specifications and OPSS.MUNI 609 except as specified herein.

.3 Measurement for payment shall be as per each Ground Electrode installed and all labour, equipment and materials necessary to do the works in accordance with OPSS.MUNI 609. Payment at the tendered unit price shall be compensation in full for all related works.

SP26 TENDER ITEM A4.8 – WOOD POLES, DIRECT BURIED IN EARTH (TEMPORARY)

.1 The work of this item shall include, without limitation, all labour, equipment and materials required to supply and install new Wood Poles, Direct Buried In Earth at the locations identified on the Contract Drawings and as directed by the County of Dufferin.

.2 Work shall be in accordance with the manufacturer's specifications and OPSS.MUNI 615 except as specified herein.

.3 Measurement for payment shall be as per each Wood Pole, Direct Buried In Earth installed and all labour, equipment and materials necessary to do the works in accordance with OPSS.MUNI 615. Payment at the tendered unit price shall be compensation in full for all related works.

SP27 TENDER ITEM A4.9 – GUY ANCHORS (TEMPORARY)

.1 The work of this item shall include, without limitation, all labour, equipment and materials required to supply and install new Guy Anchors at the locations identified on the Contract Drawings and as directed by the County of Dufferin.

.2 Work shall be in accordance with the manufacturer's specifications and OPSS.MUNI 615 except as specified herein.

.3 Measurement for payment shall be as per each Guy Anchor installed and all labour, equipment and materials necessary to do the works in accordance with OPSS.MUNI 615. Payment at the tendered unit price shall be compensation in full for all related works.

SP28 TENDER ITEM A4.10 – ROADWAY LIGHTING LUMINAIRE (SIGNIFY SERIES, 54W LED, IES DISTRIBUTION TYPE III, MANUFACTURED BY LUMEC) (TEMPORARY)

SP28 TENDER ITEM A4.11 – ROADWAY LIGHTING LUMINAIRE (SIGNIFY SERIES, 72W LED, IES DISTRIBUTION TYPE IV, MANUFACTURED BY LUMEC) (TEMPORARY)

SP28 TENDER ITEM A4.12 – 2.4m ELLIPTICAL BRACKET FOR LUMINAIRE (TEMPORARY)

.1 The work of this item shall include, without limitation, all labour, equipment and materials required to supply and install new Roadway Lighting Luminaires and Elliptical Brackets for Luminaires at the locations identified and specified on the Contract Drawings and as directed by the County of Dufferin.

.2 Work shall be in accordance with the manufacturer's specifications and OPSS.MUNI 617 except as specified herein.

.3 The lighting luminaire shall be manufactured by Lumec or approved equivalent.

.4 Measurement for payment shall be as per each Roadway Lighting Luminaire and Elliptical Bracket installed and all labour, equipment and materials necessary to do the works in accordance with OPSS.MUNI 617. Payment at the tendered unit price shall be compensation in full for all related works.

SP29 TENDER ITEM A4.13 – SINGLE MEMBER ARMS AND SIGNAL HANGERS

.1 The work of this item shall include, without limitation, all labour, equipment and materials required to supply and install new Single Member Arms and Signal Hangers at the locations identified and specified on the Contract Drawings and as directed by the County of Dufferin.

.2 Work shall be in accordance with the manufacturer's specifications and OPSS.MUNI 620 except as specified herein.

.3 Measurement for payment shall be as per each Single Member Arm and Signal Hanger installed and all labour, equipment and materials necessary to do the works in accordance with OPSS.MUNI 620. Payment at the tendered unit price shall be compensation in full for all related works.

SP30 TENDER ITEM A4.14 – HIGHWAY-TYPE SIGNAL HEADS

.1 The work of this item shall include, without limitation, all labour, equipment and materials required to supply and install new Highway Type Signal Heads at the locations identified and specified on the Contract Drawings and as directed by the County of Dufferin.

.2 Work shall be in accordance with the manufacturer's specifications and OPSS.MUNI 620 except as specified herein.

.3 Measurement for payment shall be as per each Highway Type Signal Head installed and all labour,

equipment and materials necessary to do the works in accordance with OPSS.MUNI 620. Payment at the tendered unit price shall be compensation in full for all related works.

SP31 TENDER ITEM A4.15 – TRAFFIC SIGNAL CONTROLLERS

.1 The work of this item shall include, without limitation, all labour, equipment and materials required to supply and install a new Traffic Signal Controller at the location identified and as specified on the Contract Drawings and as directed by the County of Dufferin.

.2 Work shall be in accordance with the manufacturer's specifications and OPSS.PROV 622 except as specified herein.

.3 The traffic signal controller supplied shall be handed over to the County minimum of fourteen (14) days in advance of the required installation date, for bench testing and programming the signal timing plan. Hand over the signal timing plan provided in the contract document to the county. Once the County completes the bench testing and programming, take over the controller and install it as specified on the Contract Drawings.

.4 Measurement for payment shall be as per each Traffic Signal Controller installed and all labour, equipment and materials necessary to do the works in accordance with OPSS.PROV 622. Payment at the tendered unit price shall be compensation in full for all related works, including coordination with the County for bench testing and programming of the traffic signal controller.

SP32 TENDER ITEM A4.16 – NON-INTRUSIVE DETECTION SYSTEM (NIDS) (TEMPORARY)

.1 The work of this item shall include, without limitation, all labour, equipment and materials required to supply and install new Non-Intrusive Detection Systems (NIDS) at the locations identified and as specified on the Contract Drawings and as directed by the County of Dufferin.

.2 Work shall be in accordance with the manufacturer's specifications and OPSS.PROV 623 except as specified herein.

.3 Measurement for payment shall be as per each Non-Intrusive Detection System installed and all labour, equipment and materials necessary to do the works in accordance with OPSS.PROV 623. Payment at the tendered unit price shall be compensation in full for all related works.

SP33 TENDER ITEM A4.17 – POWER SUPPLY CONTROL CABINET ASSEMBLIES (TEMPORARY)
SP33 TENDER ITEM A4.18 – POWER SUPPLY CONNECTION (TEMPORARY)

.1 The work of this item shall include, without limitation, all labour, equipment and materials required to supply and install a new Power Supply Control Cabinet Assembly at the location identified on the Contract Drawing and as directed by the County of Dufferin, and for coordination with the local Hydro authority to obtain Power Supply Connection.

.2 Work shall be in accordance with the manufacturer's specifications and OPSS.MUNI 614 except as specified herein.

.3 Measurement for payment shall be as per each Power Supply Control Cabinet Assembly installed and all

labour, equipment and materials necessary to do the works in accordance with OPSS.MUNI 614. Payment at the tendered unit price shall be compensation in full for all related works.

SP34 TENDER ITEM A4.19 – TRAFFIC SIGNAL PRE-EMPTION EQUIPMENT FOR EMERGENCY VEHICLES (TEMPORARY)

.1 The work of this item shall include, without limitation, all labour, equipment and materials required to supply and install new Emergency Vehicle Pre-Emption Equipment at the location identified on the Contract Drawings and as directed by the County of Dufferin.

.2 Work shall be in accordance with the manufacturer's specifications and OPSS.MUNI 620 except as specified herein.

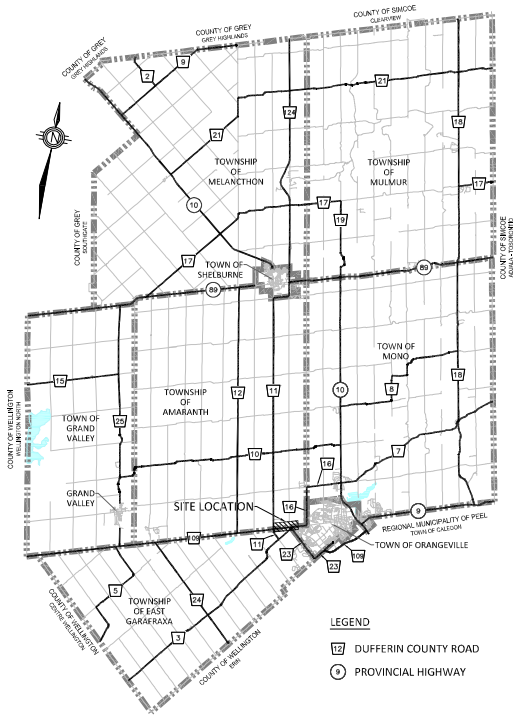
.3 Measurement for payment shall be as per each Emergency Vehicle Pre-Emption Equipment installed and all labour, equipment and materials necessary to do the works in accordance with OPSS.MUNI 620. Payment at the tendered unit price shall be compensation in full for all related works.

PUBLIC WORKS DEPARTMENT

ENGINEERING SERVICES

DUFFERIN COUNTY ROAD 109 AND 2ND LINE
TEMPORARY TRAFFIC SIGNAL

CONTRACT NO. PW-23-12
ISSUED FOR TENDER



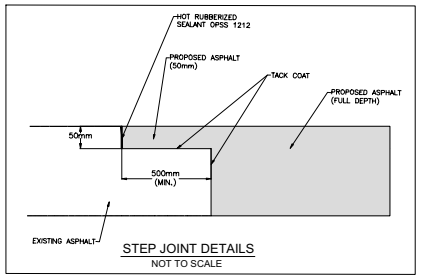
LIST OF DRAWINGS

DRAWING	LOCATION	DESCRIPTION
C1	STA. 0+000.00 TO 0+259.00	REMOVAL
C2	STA. 0+000.00 TO 0+259.00	NEW CONSTRUCTION
C3	STA. 0+000.00 TO 0+259.00	PAVEMENT MARKING & SIGNAGE
C4	STA. 0+000.00 TO 0+259.00	TYPICAL CROSS-SECTIONS
E5	STA. 0+000.00 TO 0+259.00	ELECTRICAL LAYOUT
E6	STA. 0+000.00 TO 0+259.00	WIRING DIAGRAM

DUFFERIN COUNTY ROAD 109 AND 2ND LINE - TEMPORARY TRAFFIC SIGNAL
CONTRACT No. PW-23-12 - ISSUED FOR TENDER

LEGEND

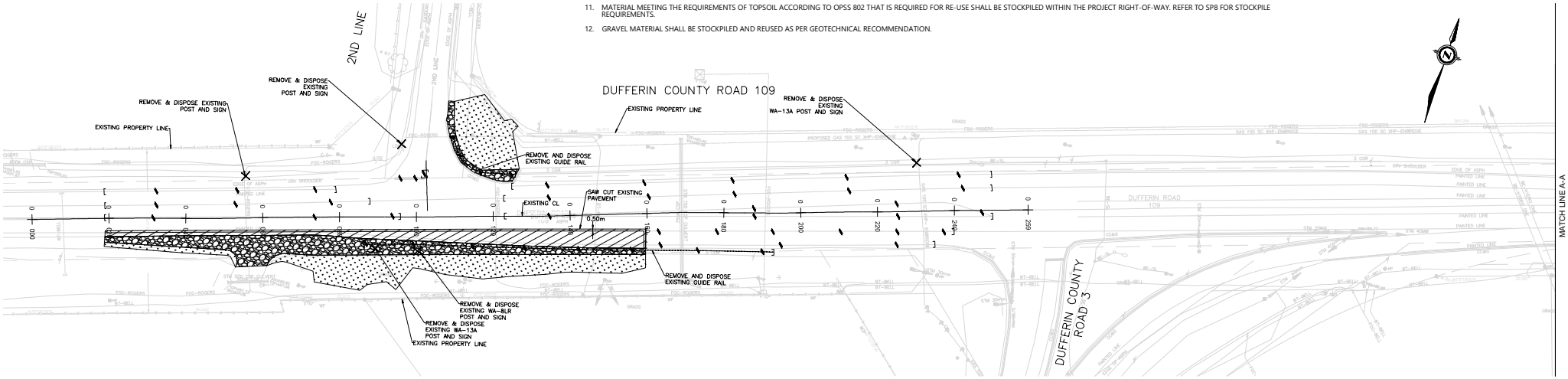
- FULL DEPTH ASPHALT REMOVAL
- GRAVEL REMOVAL (STOCK PILE AND REUSE AS PER GEOTECHNICAL RECOMMENDATION)
- TOPSOIL AND SOD/CLEARING AND GRUBBING
- [ ] LIMIT OF REMOVAL
- MISCELLANEOUS REMOVAL

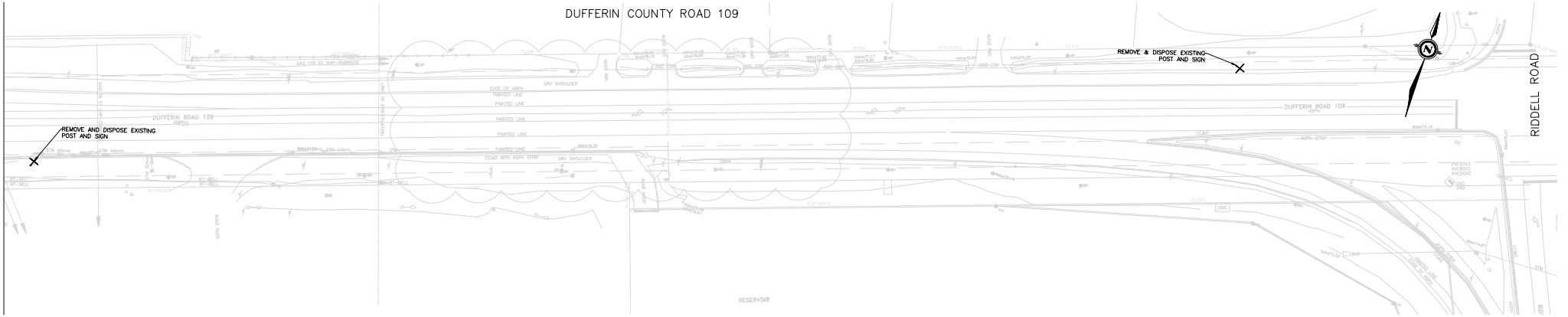


STEP JOINT DETAILS
NOT TO SCALE

NOTES:

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
2. THE CONTRACTOR SHALL VERIFY ALL RELEVANT ELEVATIONS, DIMENSIONS AND DETAILS ON SITE, ADJUST DIMENSIONS AS REQUIRED TO MATCH EXISTING CONDITIONS ON SITE, AND AS APPROVED BY THE CONTRACT ADMINISTRATOR.
3. THE LOCATION OF UTILITIES SHOWN ON PLAN IS APPROXIMATE AND THE EXACT LOCATION SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL AUTHORITIES AND APPROPRIATE UTILITY COMPANY CONCERNED. THE CONTRACTOR SHALL PROVE THE LOCATION OF UTILITIES AND SHALL ASSUME LIABILITY FOR DAMAGE DURING THE COURSE OF CONSTRUCTION.
4. ALL MATERIALS AND CONSTRUCTION METHODS SHALL CONFORM TO THE CURRENT DUFFERIN COUNTY STANDARD AND OPS STANDARD SPECIFICATIONS.
5. THE CONTRACTOR SHALL PROVIDE A 48 HOUR ADVANCE NOTICE TO THE CONTRACT ADMINISTRATOR PRIOR TO THE START OF ANY WORK ON MILLING OR SURFACING OPERATION.
6. ANY DAMAGE TO EXISTING STRUCTURES, SERVICES OR UTILITIES DURING REMOVALS OR CONSTRUCTION SHALL BE REPAIRED BY THE CONTRACTOR TO THE SATISFACTION OF THE CONTRACT ADMINISTRATOR, AT NO COST TO THE COUNTY.
7. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO PRIVATE PROPERTY AND SHALL REINSTATE /REPAIR SAME AT NO COST TO THE COUNTY.
8. PROPOSED ROADWAY PAVEMENT STRUCTURE:
   a.50mm HL 3
   b.100mm HL 8 (TWO 50mm LIFTS)
   c.150mm GRANULAR 'A'
   d. 500mm GRANULAR 'B' TYPE II
9. A STEPPED JOINT SHALL BE PREPARED BY GRINDING THE EXISTING SURFACE COURSE ADJACENT TO ALL PAVEMENT SAWCUTS, AS PER THE STEPPED JOINT DETAILS
10. DRIVEWAY STRUCTURE/MATERIAL TO MATCH EXISTING CONDITION
11. MATERIAL MEETING THE REQUIREMENTS OF TOPSOIL ACCORDING TO OPSS 802 THAT IS REQUIRED FOR RE-USE SHALL BE STOCKPILED WITHIN THE PROJECT RIGHT-OF-WAY. REFER TO SP8 FOR STOCKPILE REQUIREMENTS.
12. GRAVEL MATERIAL SHALL BE STOCKPILED AND REUSED AS PER GEOTECHNICAL RECOMMENDATION.





100 COMMERCE VALLEY DRIVE WEST, THORNHILL
L3T 0A1, ONTARIO, TEL. 905-882-1100. FAX. 905-882-0055

DUFFERIN COUNTY

TEMPORARY SIGNAL AT COUNTY RD. 109 AND 2nd LINE INTERSECTION REMOVAL

DESIGN	A.S.	DRAWN	A.S.	CHECKED	A.G.	CONTRACT No. XXX
SCALE:	1 : 500					
DATE:	08/24/2023			DRAWING NUMBER	C1	SHEET 1

No.	DATE (MM/DD/YY)	ISSUED FOR	INITIAL	SIGNED
0	08/24/2023	ISSUED FOR TENDER	A.S.	

DESIGN
BASE PLAN
SURVEY PLAN
DIGITAL INFORMATION

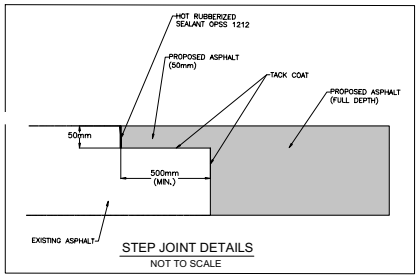
LICENSED PROFESSIONAL ENGINEER A. CONDYAR 08/24/2023 PROVINCE OF ONTARIO

Dufferin county

X:\ENV\BUS\2CAD\01484-3704-Dufferin County - 109 Temporary Signals - County Road 109 Temp. Signal\F. CAD\Plans\Layout1.dwg

LEGEND

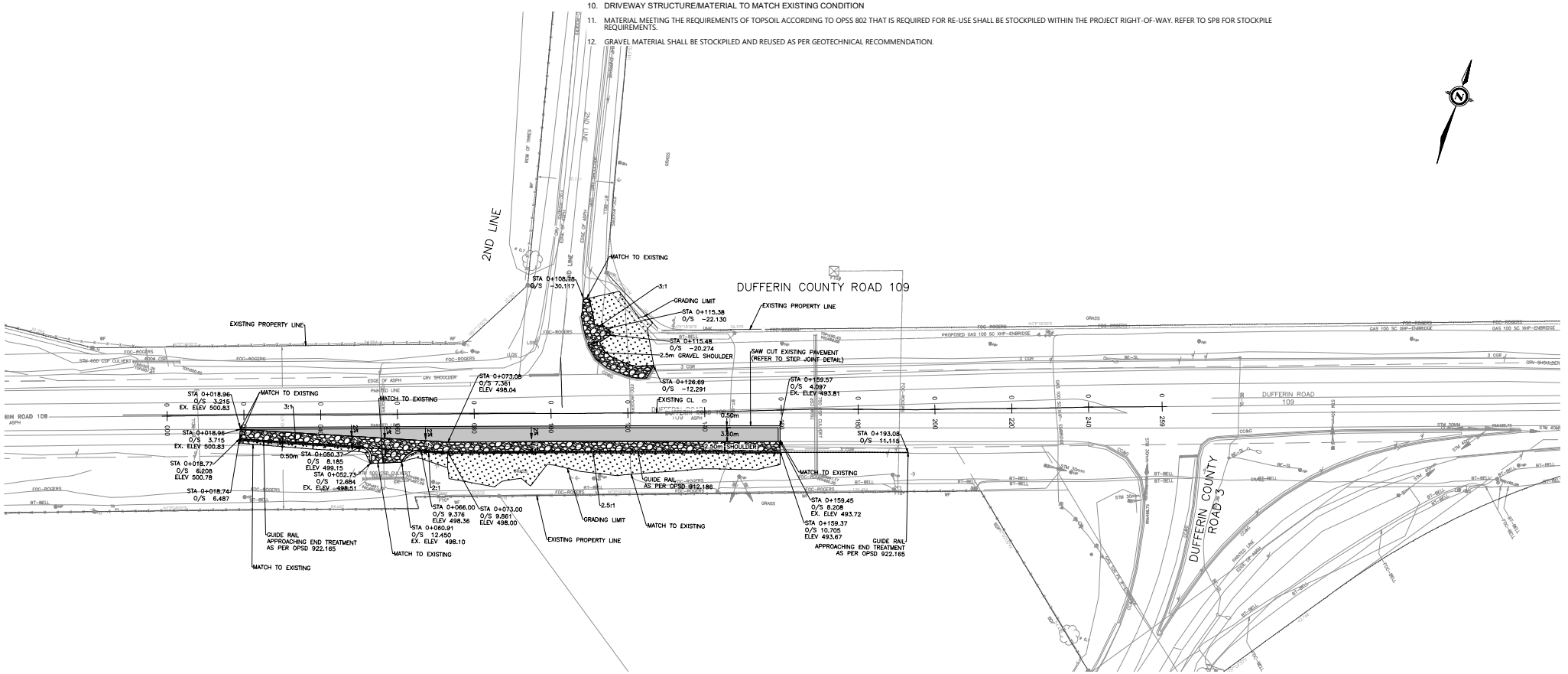
- FULL DEPTH ASPHALT
- GRAVEL SHOULDER
- 150mm TOPSOIL AND SOD
- GUIDE RAIL



STEP JOINT DETAILS
NOT TO SCALE

NOTES:

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
2. THE CONTRACTOR SHALL VERIFY ALL RELEVANT ELEVATIONS, DIMENSIONS AND DETAILS ON SITE, ADJUST DIMENSIONS AS REQUIRED TO MATCH EXISTING CONDITIONS ON SITE, AND AS APPROVED BY THE CONTRACT ADMINISTRATOR.
3. THE LOCATION OF UTILITIES SHOWN ON PLAN IS APPROXIMATE AND THE EXACT LOCATION SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL AUTHORITIES AND APPROPRIATE UTILITY COMPANY CONCERNED. THE CONTRACTOR SHALL PROVE THE LOCATION OF UTILITIES AND SHALL ASSUME LIABILITY FOR DAMAGE DURING THE COURSE OF CONSTRUCTION.
4. ALL MATERIALS AND CONSTRUCTION METHODS SHALL CONFORM TO THE CURRENT DUFFERIN COUNTY STANDARD AND OPS STANDARD SPECIFICATIONS.
5. THE CONTRACTOR SHALL PROVIDE A 48 HOUR ADVANCE NOTICE TO THE CONTRACT ADMINISTRATOR PRIOR TO THE START OF ANY WORK ON MILLING OR SURFACING OPERATION.
6. ANY DAMAGE TO EXISTING STRUCTURES, SERVICES OR UTILITIES DURING REMOVALS OR CONSTRUCTION SHALL BE REPAIRED BY THE CONTRACTOR TO THE SATISFACTION OF THE CONTRACT ADMINISTRATOR, AT NO COST TO THE COUNTY.
7. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO PRIVATE PROPERTY AND SHALL REINSTATE /REPAIR SAME AT NO COST TO THE COUNTY.
8. PROPOSED ROADWAY PAVEMENT STRUCTURE:
   a.50mm HL 3
   b.100mm HL 8 (TWO 50mm LIFTS)
   c.150mm GRANULAR 'A'
   d. 500mm GRANULAR 'B' TYPE II
9. A STEPPED JOINT SHALL BE PREPARED BY GRINDING THE EXISTING SURFACE COURSE ADJACENT TO ALL PAVEMENT SAWCUTS, AS PER THE STEPPED JOINT DETAILS
10. DRIVEWAY STRUCTURE/MATERIAL TO MATCH EXISTING CONDITION
11. MATERIAL MEETING THE REQUIREMENTS OF TOPSOIL ACCORDING TO OPSS 802 THAT IS REQUIRED FOR RE-USE SHALL BE STOCKPILED WITHIN THE PROJECT RIGHT-OF-WAY. REFER TO SP8 FOR STOCKPILE REQUIREMENTS.
12. GRAVEL MATERIAL SHALL BE STOCKPILED AND REUSED AS PER GEOTECHNICAL RECOMMENDATION.



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L3T 0A1, ONTARIO, TEL. 905-882-1100. FAX. 905-882-0055

DUFFERIN COUNTY

TEMPORARY SIGNAL AT COUNTY RD. 109 AND 2nd LINE INTERSECTION
NEW CONSTRUCTION

DESIGN	A.S.	DRAWN	A.S.	CHECKED	A.G.	CONTRACT No. XXX
SCALE:	1 : 500					
DATE:	08/24/2023			DRAWING NUMBER	C2	SHEET 2

No.	DATE (MM/DD/YY)	ISSUED FOR	INITIAL	SIGNED
0	08/24/2023	ISSUED FOR TENDER	A.S.	

DESIGN
BASE PLAN
SURVEY PLAN
DIGITAL INFORMATION

LICENSED PROFESSIONAL ENGINEER A. LONDWAY PROVINCE OF ONTARIO 08/24/2023

Dufferin county

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LEGEND

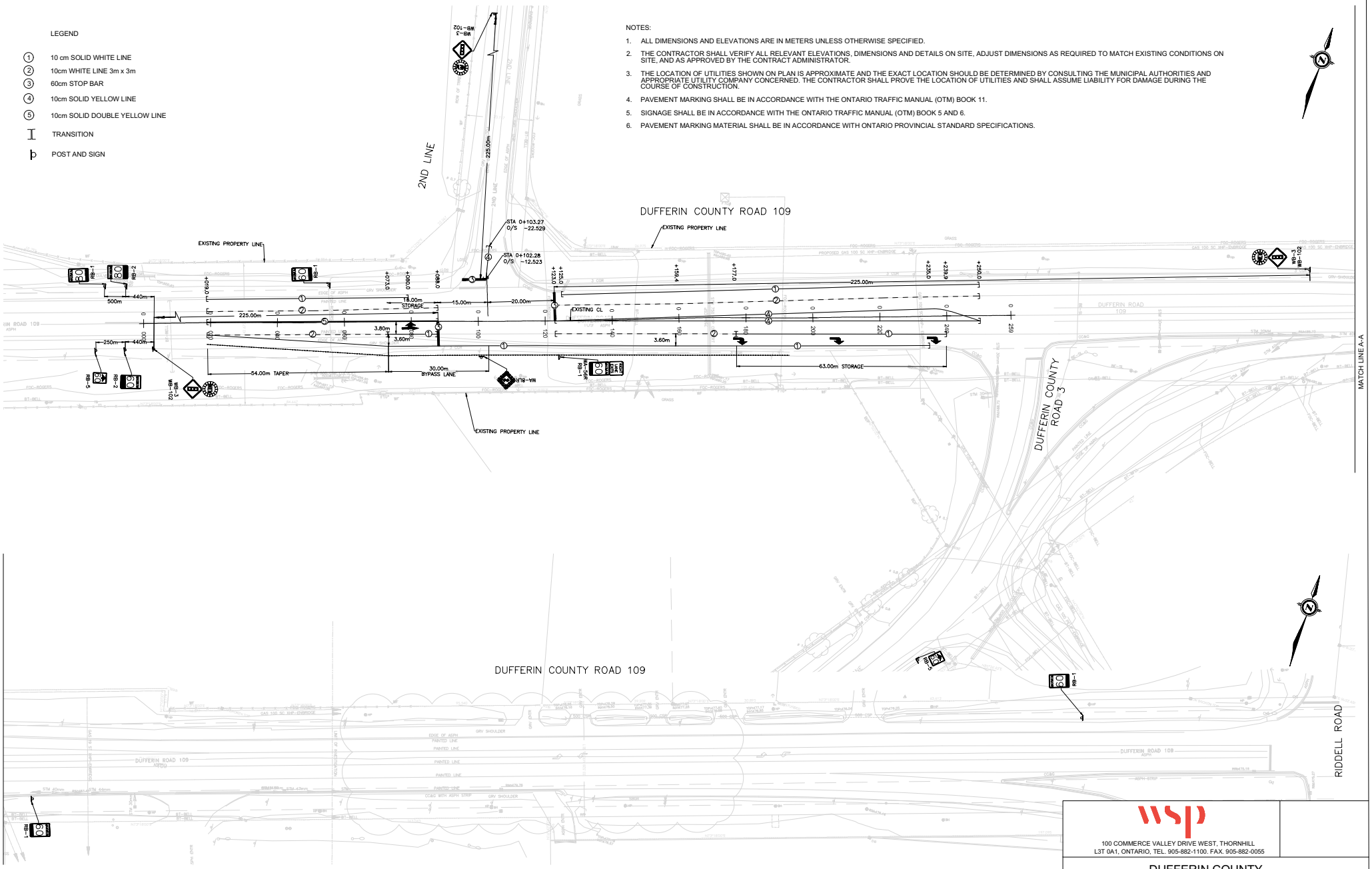
1. 10 cm SOLID WHITE LINE
2. 10cm WHITE LINE 3m x 3m
3. 60cm STOP BAR
4. 10cm SOLID YELLOW LINE
5. 10cm SOLID DOUBLE YELLOW LINE

TRANSITION

POST AND SIGN

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
2. THE CONTRACTOR SHALL VERIFY ALL RELEVANT ELEVATIONS, DIMENSIONS AND DETAILS ON SITE, ADJUST DIMENSIONS AS REQUIRED TO MATCH EXISTING CONDITIONS ON SITE, AND AS APPROVED BY THE CONTRACT ADMINISTRATOR.
3. THE LOCATION OF UTILITIES SHOWN ON PLAN IS APPROXIMATE AND THE EXACT LOCATION SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL AUTHORITIES AND APPROPRIATE UTILITY COMPANY CONCERNED. THE CONTRACTOR SHALL PROVE THE LOCATION OF UTILITIES AND SHALL ASSUME LIABILITY FOR DAMAGE DURING THE COURSE OF CONSTRUCTION.
4. PAVEMENT MARKING SHALL BE IN ACCORDANCE WITH THE ONTARIO TRAFFIC MANUAL (OTM) BOOK 11.
5. SIGNAGE SHALL BE IN ACCORDANCE WITH THE ONTARIO TRAFFIC MANUAL (OTM) BOOK 5 AND 6.
6. PAVEMENT MARKING MATERIAL SHALL BE IN ACCORDANCE WITH ONTARIO PROVINCIAL STANDARD SPECIFICATIONS.



100 COMMERCE VALLEY DRIVE WEST, THORNHILL
L3T 0A1, ONTARIO, TEL. 905-882-1100. FAX. 905-882-0055

DUFFERIN COUNTY

TEMPORARY SIGNAL AT COUNTY RD. 109 AND 2nd LINE INTERSECTION
PAVEMENT MARKING & SIGNAGE

DESIGN	A.S.	DRAWN	A.S.	CHECKED	A.G.	CONTRACT No. XXX
SCALE:	1 : 500					
DATE:	08/24/2023			DRAWING NUMBER	C3	SHEET 3

DIGITAL INFORMATION	No.	DATE (MM/DD/YY)	ISSUED FOR	INITIAL	SIGNED
DESIGN					
BASE PLAN					
SURVEY PLAN	0	08/24/2023	ISSUED FOR TENDER	A.S.	

LICENSED PROFESSIONAL ENGINEER A. CONOVAL 08/24/2023 PROVINCE OF ONTARIO

Dufferin county

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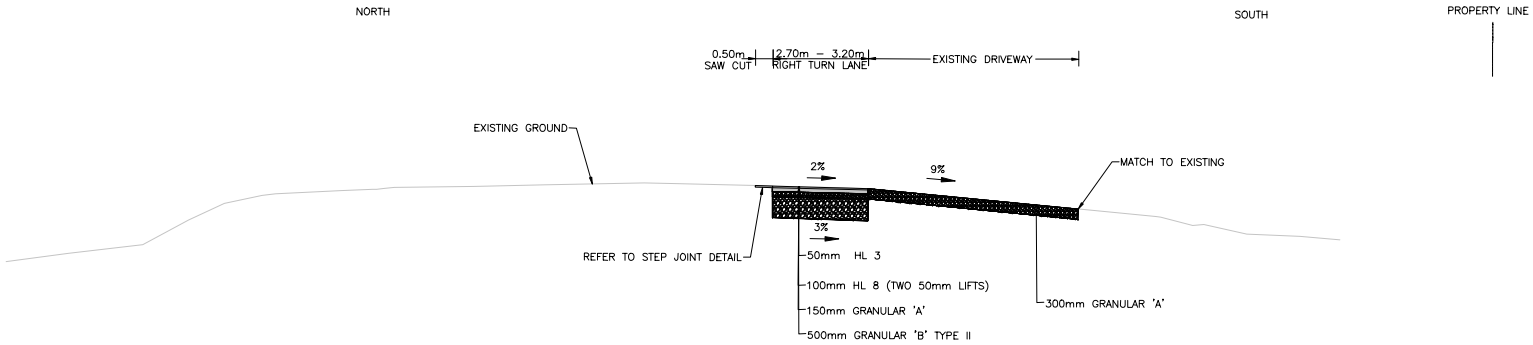
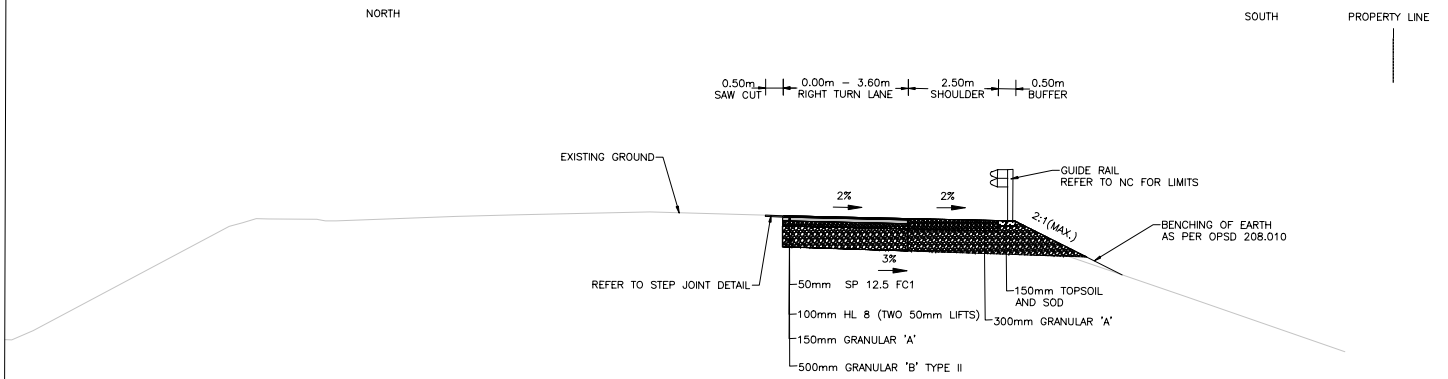


PROPOSED RIGHT TURN LANE AT EXISTING DRIVEWAY
STA 0+52.73 TO STA 0+60.91



PROPOSED RIGHT TURN LANE (TYPICAL SECTION)
STA 0+18.74 TO STA 0+52.73 AND STA 0+60.91 TO STA 0+159.57

NOTES:

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
2. THE CONTRACTOR SHALL VERIFY ALL RELEVANT ELEVATIONS, DIMENSIONS AND DETAILS ON SITE, ADJUST DIMENSIONS AS REQUIRED TO MATCH EXISTING CONDITIONS ON SITE, AND AS APPROVED BY THE CONTRACT ADMINISTRATOR.
3. PROPOSED ROADWAY PAVEMENT STRUCTURE:
   a. 50mm HL 3
   b. 100mm HL 8 (TWO 50mm LIFTS)
   c. 150mm GRANULAR 'A'
   d. 500mm GRANULAR 'B' TYPE II
4. A STEPPED JOINT SHALL BE PREPARED BY GRINDING THE EXISTING SURFACE COURSE ADJACENT TO ALL PAVEMENT SAWCUTS, AS PER THE STEPPED JOINT DETAILS
5. DRIVEWAY STRUCTURE/MATERIAL TO MATCH EXISTING CONDITION

DIGITAL INFORMATION	No.	DATE (MM/DD/YY)	ISSUED FOR	INITIAL	SIGNED
DESIGN					
BASE PLAN					
SURVEY PLAN	0	08/24/2023	ISSUED FOR TENDER	A.S.	

LICENSED PROFESSIONAL ENGINEER — PROVINCE OF ONTARIO — 08/24/2023

wsp
100 COMMERCE VALLEY DRIVE WEST, THORNHILL
L3T 0A1, ONTARIO, TEL. 905-882-1100. FAX. 905-882-0055

Dufferin county

DUFFERIN COUNTY
TEMPORARY SIGNAL AT COUNTY RD. 109 AND 2nd LINE INTERSECTION
TYPICAL CROSS-SECTIONS

DESIGN	A.S.	DRAWN	A.S.	CHECKED	A.G.	CONTRACT No. XXX
SCALE:	N.T.S					
DATE:	08/24/2023			DRAWING NUMBER	C4	SHEET 4

X:\ENV\BUS\2CAD\01484-3704-Dufferin County - 109 Temporary Signals - County Road 109 Temp. Signals\F. CAD\Plans\Layout1.dwg

LEGEND:

- TP1 / TP5 — 12.0m DIRECT BURIED WOOD POLE COMPLETE WITH SIGNIFY SERIES, 54W LED, IES DISTRIBUTION TYPE III LUMINAIRE, MANUFACTURED BY LUMEC. (PHOTOMETRIC CURVE # RFS-54W16LED4K-G2-R3M), AND 2.4m LONG ELLIPTICAL BRACKET
- TP3 — 12.0m DIRECT BURIED WOOD POLE COMPLETE WITH SIGNIFY SERIES, 72W LED, IES DISTRIBUTION TYPE IV LUMINAIRE, MANUFACTURED BY LUMEC. (PHOTOMETRIC CURVE # RFS-72W32LED4K-G2-4), AND 2.4m LONG ELLIPTICAL BRACKET
- WD– — WAVETRONIX DETECTOR
- PD1 — 'OPTICOM' PRE-EMPTION DETECTOR
- DZ– — DETECTION ZONE
- PS1 — POWER SUPPLY CABINET, SQUARE 'D' QO SERIES LOAD CENTRE, SINGLE PHASE, 120/240V, 100A, 6 SPACES WITH 4, SINGLE POLE 15A BREAKERS
- ALL 30cm LENSES, HIGHWAY TYPE TRAFFIC SIGNAL HEAD, MAST ARM AND YELLOW BACKBOARD WITH REFLECTIVE TAPE ATTACHED
- TC1 — POLE MOUNTED TRAFFIC SIGNAL CONTROLLER THE CONTROLLER SHALL BE EITHER AN ECONOLITE COBALT 'C' SERIES, TS2 TYPE 2 OR A FORTRAN TS1 CABINET WITH ECONOLITE 'D' HARNESS. THE CONTROLLER SHALL BE PROVIDED TO THE COUNTY ALONG WITH THE TIMING PLAN INCLUDED IN THE CONTRACT DOCUMENTS, FOR PROGRAMING AND BENCH TESTING
- AERIAL CABLES WITH MESSENGER WIRE

GENERAL NOTES:

A. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED

B. THE CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS ON SITE.

C. THE LOCATIONS OF ALL UTILITIES SHOWN ARE APPROXIMATE. THE EXACT LOCATIONS SHOULD BE DETERMINED BY THE CONTRACTOR, CONSULTING THE MUNICIPAL AUTHORITIES AND APPROPRIATE UTILITY COMPANY CONCERNED.

D. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGES TO EXISTING UTILITIES OR PRIVATE PROPERTY. SUCH DAMAGES SHALL BE REINSTATED / REPAIRED TO THE SATISFACTION OF THE CONTRACT ADMINISTRATOR, AT NO COST TO THE COUNTY.

E. ALL MATERIALS AND CONSTRUCTION METHODS SHALL CONFORM TO THE CURRENT ONTARIO PROVINCIAL STANDARD (OPS) SPECIFICATIONS AND DRAWINGS, AND THE COUNTY REQUIREMENTS.

F. PRIOR TO COMMENCEMENT OF THE ELECTRICAL WORK, CONTACT LOCAL HYDRO FOR DETAIL INFORMATION REGARDING THE LOCATION OF POWER SUPPLY FEEDS, LOCATION OF DISCONNECTING MEANS AND ALL OTHER ELECTRICAL DATA THAT MAY BE RELEVANT TO THE SAFE PERFORMANCE OF THE SYSTEM.

G. ENSURE THAT THE NEARBY EXISTING ELECTRICAL ENTITIES ARE NOT ENERGIZED WHILE WORK IS ON-GOING.

H. THE CONTRACTOR SHALL HANDOVER THE INSTALLED AND ACTIVATED TEMPORARY TRAFFIC SIGNALS TO THE COUNTY. THE COUNTY WILL MAINTAIN AND OPERATE THE TEMPORARY TRAFFIC SIGNALS THROUGH OUT ITS OPERATIONAL PERIOD.

I. THE SIGNAL TIMING PLAN AND PHASING INFORMATION ARE PROVIDED IN THE CONTRACT DOCUMENTS.

J. SUPPLY AND INSTALL TEMPORARY TC23 SIGN AS PER OTM BOOK 7, PLACED 100m IN ADVANCE OF THE INTERSECTION IN EACH DIRECTION. THE SIGNS SHALL BE INSTALLED WHEN SIGNALS ARE ACTIVATED AND REMAIN IN PLACE FOR A MINIMUM OF 30 DAYS AND REMOVED WITHIN 60 DAYS OF THE SIGNAL ACTIVATION.

K. SUBMIT FOUR SETS OF SHOP DRAWINGS FOR THE LUMINAIRE AND ITS PHOTOMETRIC DATA, WAVETRONIX DETECTOR, PRE-EMPTION DETECTOR, TRAFFIC SIGNAL HEADS, AND THE CONTROLLER TO THE CONTRACT ADMINISTRATOR FOR REVIEW, PRIOR TO THE PURCHASE OF THE ITEMS.

L. INVITE THE CONSULTANT AND THE COUNTY WHEN CARRYING OUT THE REQUIRED TESTS TO CONFIRM THAT THE NEWLY INSTALLED TEMPORARY TRAFFIC SIGNALS SYSTEM IS OPERATING SATISFACTORILY.

M. AS SOON AS THE CONTRACT IS AWARDED, THE CONTRACTOR SHALL PLACE THE PURCHASE ORDERS FOR ALL THE ITEMS, INCLUDING THE TRAFFIC SIGNAL CONTROLLER, TO AVOID DELAYS IN PROCUREMENTS.

PHASING DIAGRAM

SCALE
10m 0 20m

NOTES:

1. SUPPLY SUFFICIENT LENGTHS OF POWER SUPPLY CABLES AND LEAVE THEM COILED ON THE HYDRO POLE FOR LOCAL HYDRO TO CONNECT THEM TO THE HYDRO POWER SOURCE.
2. PURCHASE THE TRAFFIC SIGNAL CONTROLLER AND HANDOVER IT TO THE COUNTY FOR SIGNAL TIMING PROGRAMMING AND BENCH TESTING, TOGETHER WITH THE SIGNAL TIMING PLAN PROVIDED IN THE CONTRACT DOCUMENT (SEE NOTE I). THE CONTROLLER SHALL BE HANDED OVER TO THE COUNTY MINIMUM FOURTEEN (14) DAYS IN ADVANCE OF THE REQUIRED INSTALLATION DATE. ONCE THE COUNTY COMPLETES THE PROGRAMING AND BENCH TESTING, TAKE OVER AND INSTALL IT ON THE WOODEN POLE TP1, AS SHOWN.
3. CLAMP THE AERIAL CABLES AND MESSENGER WIRE TO POLE TP3.

TRAFFIC SIGNAL POLE COORDINATES

POLE #	NORTHING	EASTING
P1	4862086.615	568501.220
P2	4862062.950	568508.833
P3	4862055.842	568484.267
P4	4862050.781	568467.106
P5	4862071.641	568459.823

No.	DATE (MM/DD/YY)	ISSUED FOR	INITIAL	SIGNED
0	08/24/2023	ISSUED FOR TENDER	A.J.	

DESIGN
BASE PLAN
SURVEY PLAN
DIGITAL INFORMATION

LICENSED PROFESSIONAL ENGINEER — A. JEYAKUMAR — 24 Aug, 2023 — PROVINCE OF ONTARIO

Dufferin county

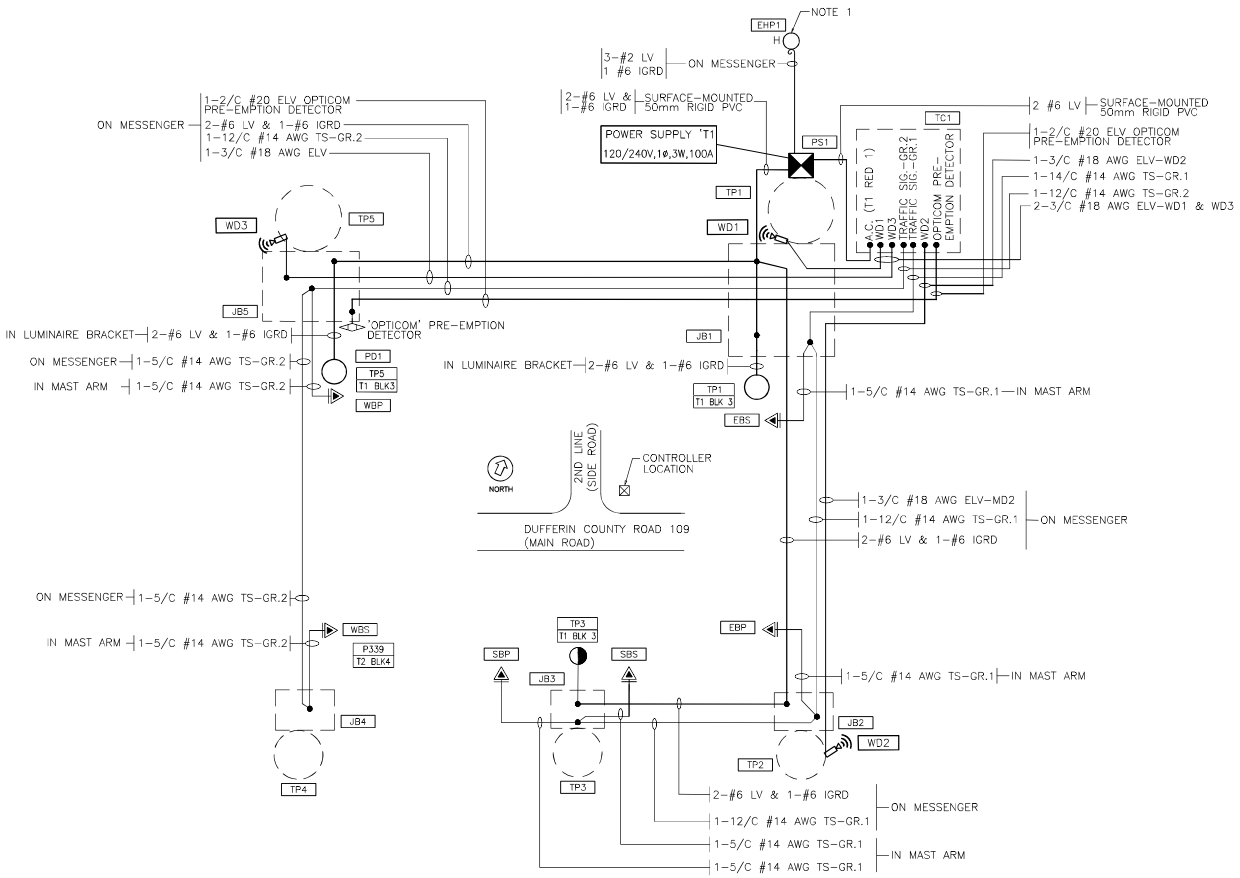
100 COMMERCE VALLEY DRIVE WEST, THORNHILL
L3T 0A1, ONTARIO, TEL. 905-882-1100. FAX. 905-882-0055

DUFFERIN COUNTY

TEMPORARY TRAFFIC SIGNALS AT COUNTY RD. 109 AND 2nd LINE INTERSECTION
ELECTRICAL LAYOUT

DESIGN	A.J.	DRAWN	M.S.	CHECKED	A.J.	CONTRACT No. XXX
SCALE:	1 : 500			DRAWING NUMBER	E5	SHEET 5
DATE:	08/23/2023					

X:\DN\16\2023\CA0001464-3704-Dufferin County 109 Temporary Signals - County Road 109 Temp. Signal\F. CAD\Electrical\Temp\Temp TS Layout1.dwg



POWER SUPPLY 'T1' LOADING TABLE–100A SERVICE

SUPPLY POLE	CIRCUIT	LOAD DESCRIPTION	LOAD	TOTAL
EHP1	T1 RED 1 (1P–60A)	Traffic Heads (Max. Load)	6x25W	150W
		Traffic Controller	1x250W	250W
		Cabinet Heater	1x400W	400W
	T1 BLK 3 (1P–15A)	TP1, TP5	2x54W	180W
		TP3	1x72W	
			TOTAL LOAD	980W

NOTE:

1. CONNECTION TO HYDRO PLANT WILL BE PERFORMED BY THE SUPPLY AUTHORITY. LEAVE CABLES COILED FOR CONNECTIONS BY HYDRO.

wsp
100 COMMERCE VALLEY DRIVE WEST, THORNHILL
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DUFFERIN COUNTY

TEMPORARY SIGNAL AT COUNTY RD. 109 AND 2nd LINE INTERSECTION

WIRING DIAGRAM

DESIGN	A.J.	DRAWN	M.S.	CHECKED	A.J.	CONTRACT No. XXX
SCALE:	N.T.S.			DRAWING NUMBER	E6	SHEET 6
DATE:	08/23/2023					

No.	DATE (MM/DD/YY)	ISSUED FOR	INITIAL	SIGNED
0	08/24/2023	ISSUED FOR TENDER	A.J.	

DESIGN
BASE PLAN
SURVEY PLAN
DIGITAL INFORMATION

LICENSED PROFESSIONAL ENGINEER
A. JEYAKUMAR
24 Aug, 2023
PROVINCE OF ONTARIO

Dufferin county

X:\DN\16\2023\CA0001464-3704-Dufferin County 109 Temporary Signals - County Road 109 Temp Signal\F. CAD\Electrical\Wiregram\Dufferin County Road 109 - Temp TS WD.dwg

MEMO

TO: Mike Hooper, Manager of Engineering, Dufferin County

FROM: Mohammed Kamala and Atiqur Rahman.

SUBJECT: Geotechnical and Pavement Investigation, Dufferin County Road 109, Dufferin County ON

PROJECT NUMBER: 22578610

DATE: July 07, 2023

INTRODUCTION

WSP Canada Inc. (WSP), has been retained by Dufferin County to carry out a geotechnical and pavement investigation for the proposed temporary 140 m widening for single design at County Road 109 and 2nd Line intersection to undertake the Schedule 'C' Municipal Class Environmental Assessment (MCEA) Study to consider potential solutions to realign Dufferin County Road 109 and 2nd Line (Amaranth). 2nd Line is proposed to be realigned as the fourth leg of the Dufferin County Road 109 and Dufferin County Road 3 intersection. This realignment could precipitate a domino effect of impacting other intersections, namely Dufferin County Road 3 and Dufferin County Road 23, which is less than 100m south of the Dufferin County Road 109 and Dufferin County Road 3 intersection.

The purpose of this investigation was to check the existing pavement structures, subsurface soil and groundwater conditions at the site and provide engineering recommendations for the temporary widening.

SITE DESCRIPTION

It is understood that the study area for this project is located at the intersection of County Road 109 and 2nd Line intersection in Township of Amaranth (Dufferin County), Ontario. The limits of the site are shown on the Location Plan, Figure 1.

TRAFFIC VOLUMES

The traffic volumes for Dufferin County Road 109 (CR109) provided by the Dufferin County were used to carry out the analysis and to develop temporary widening pavement design strategy. A summary of the relevant traffic information is presented in **Table 1**.

Table 1: Traffic Volumes for Dufferin County Road 109

LOCATION	Year (AADT)	AADT	Commercial Truck (%)
CR109, West of County Road 11	2022	14,481	11.6
	2017	11,210	9.9

LOCATION	Year (AADT)	AADT	Commercial Truck (%)
CR109, between County Road 11 and County Road 3	2010	11,398	13
CR109, County Road 3 to Riddell Road	2021	16,915	10.3
CR109, East of Riddell Road	2022	14,452	4.8
	2019	15,139	4.5
	2017	14,711	5.1

INVESTIGATIVE PROCEDURES

The field work for this geotechnical investigation was carried on May 05, 2023, during which time a total of six (6) boreholes (designated as boreholes BH23-01 to BH23-06), were advanced at the locations shown on the Borehole Location Plan, **Appendix A**, following the text of this report. The boreholes were advanced using a track-mounted drill rig supplied by TCI Drilling under WSP's supervision. Standard Penetration Testing (SPT, ASTM D15860) and sampling were carried out at 0.76 m depth in the boreholes using conventional 38 mm internal diameter split spoon sampling equipment.

The groundwater conditions were noted in the open boreholes during and following completion of drilling and were backfilled upon completion in accordance with Ontario Regulation 903 (as amended). The field work for this investigation was monitored by members of WSP's engineering staff, who located the boreholes in the field, arranged for the clearance of underground services, observed the drilling investigation and soil sampling, recorded observations, observed the in situ testing operations, logged the boreholes and examined the soil samples. The soil samples obtained during this investigation were classified in the field, placed and labelled in appropriate containers. Soil index testing consisting of water content and grain size distribution were conducted on selected samples at WSP's laboratory in Mississauga, Ontario.

EXISTING PAVEMENT STRUCTURE

The boreholes were advanced on representative areas within the project limit. The table below summarizes the pavement structures encountered within the study limits and the borehole logs are presented in **Appendix B.**

Table 2: Existing Pavement Structure

BH No.	Hot-Mix Asphalt (mm)	Gravel Surface (mm)	Granular Base/Subbase Material Total (mm)	Total Pavement Structure (mm)
BH23-01	320	N/A	470	810
BH23-02	N/A	200	630	830

BH No.	Hot-Mix Asphalt (mm)	Gravel Surface (mm)	Granular Base/Subbase Material Total (mm)	Total Pavement Structure (mm)
BH23-03	270	N/A	530	800
BH23-04	N/A	115	690	800
BH23-05	180	N/A	680	860

HOT-MIX ASPHALT

Hot-Mix Asphalt (HMA) was encountered at the ground surface in boreholes BH23-01, BH23-03 and BH23-05 advanced at the road. Borehole BH23-02 and BH23-04 were advanced along the south shoulder of Dufferin County Road 109. Based on the results of the boreholes, the HMA thickness along Dufferin County Road 109 ranged from about 180 to 320 millimetres (mm) with an average thickness of about 260 mm.

TOPSOIL

A layer of surficial topsoil was encountered in boreholes BH22-06 with average thickness of 80 mm.

GRANULAR BASE/SUBBASE

Granular base/subbase was encountered directly below the asphalt, with an average thickness of 600 mm.

The granular base/subbase comprises gravelly sand to sand and gravel. The granular base/subbase was found to contain varying amounts of fines.

In general, the granular base/subbase was observed to be brown in colour with an average moisture content of 6%, and a range of 4% to 12%.

Two (2) grain size distribution analyses were carried out in the laboratory on selected samples recovered from the boreholes and the results are presented in **Table 3** below.

Table 3: Grain Size Results – Existing Granular Base/Subbase

BH No.	Sample No.	Gravel (%)	Sand (%)	Fines (%)	Soil Classification	Acceptability of OPSS 1010 Gradation Requirements
BH23-01	AS1	21	60	19	Gravelly sand, some fine	Unacceptable Granular A or Granular B Type I
BH23-05	AS1	36	42	22	Sand and gravel, some fine	Unacceptable Granular A or Granular B Type I

Based on the laboratory testing results, none of the two granular base/subbase samples tested meet OPSS 1010 gradation requirements for Granular A. and Granular B Type I. The laboratory testing results are presented in **Appendix B.**

SUBGRADE CONDITIONS

SILTY SAND

A deposit of silty sand was encountered below the granular base/subbase in all boreholes at an average depth of 0.82 m below ground surface (bgs) and extended to the borehole termination depth (1.5 m bgs). The silty sand contained varying amounts of trace to some gravel and clay.

The natural moisture content measured in the laboratory was found to have an average of 17% and a range of 6% to 11%. SPT N-values ranged between 13 to 42 blows/0.3 m in the silty sand, which indicate a compact to dense consistency.

Two (2) particle size distribution analyses were carried out in the laboratory on selected samples obtained from the silty sand material. The results are provided in **Table 4**.

Table 4: Particle Size Results – Subgrade

BH No.	Sample No.	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Soil Classification	Susceptibility to Frost Heaving
BH23-01	SS1	8	61	24	7	Silty sand, trace gravel, trace clay	LSFH
BH23-05	SS1	6	66	21	5	Silty sand, trace gravel, trace clay	LSFH

Based on the particle size distribution analyses, the existing subgrade materials have low susceptibility to frost heaving (LSFH). The laboratory testing results are attached in **Appendix C**.

FROST SUSCEPTIBILITY

The frost susceptibility of the subgrade soils was assessed using the Ministry of Transportation of Ontario's guidelines, which are based on the percentage of silt sized particles in the 75µm to 5µm range as outlined in **Table 5**. The subgrade soil's susceptibility to frost heave is low to moderate with 18% to 22% of material passing 75 µm and retained on 5 µm.

Table 5: MTO Frost Susceptibility Guidelines

GRAIN SIZE (75 – 5 µM)	SUSCEPTIBILITY TO FROST HEAVING
0 – 40%	Low (LSFH)
40 – 55%	Moderate (MSFH)
55 – 100%	High (HSFH)

GROUNDWATER CONDITIONS

Groundwater was not encountered in any of the boreholes. There may not have been sufficient time for the groundwater to stabilize in the boreholes. It should be noted that the groundwater levels can vary and are subject to seasonal fluctuations as well as fluctuations in response to major weather events.

PAVEMENT DESIGN ANALYSIS

The findings from the borehole investigation indicate that the existing HMA has an average thickness of 260 mm, the existing granular base/subbase materials have an average thickness of 600 mm and ranged in thickness from about 470 to 690 mm. The predominant subgrade material is silty sand.

The pavement designs were carried out in accordance with the "1993 AASHTO Guide for the Design of Pavement Structures". Traffic loads have been estimated in accordance with MTO's "Procedures for Estimating Traffic Loads for Pavement Design, J. Hajek, 1995" (Traffic Loads Estimating Procedures). The design parameters have been selected from MTO's Materials Information Report "Adaptation and Verification of AASHTO Pavement Design Parameters for Ontario Condition".

The details of the AASHTO design analyses are included in **Appendix D**.

EQUIVALENT SINGLE AXEL LOAD (ESAL) CALCULATION

The traffic information (AADT volumes and percentage of trucks) provided by Dufferin County, and the applicable truck factors selected from the recommendations in MTO's MI-183, "Adaptation and Verification of AASHTO Pavement Design Guide for Ontario" March 2008, were used to estimate the Equivalent Single Axle Loads (ESALs) over a 2-year design life for the new temporary widening for signal design at the intersection of Dufferin County Road 109 and 2nd Line.

The estimated ESALs for the selected design periods are provided in **Table 6**.

Table 6: Summary of Estimated ESALs

Location	Design Life	AADT (2024)	Commercial Heavy Truck (%)	Traffic Growth Rate (%)	Estimated ESALs
New Dufferin County Road 109 Temporary Widening	2-Year	23,331	13	5.25	2,388,000

AASHTO DESIGN PARAMETERS

The design parameters for the pavement design were selected based on the road classification, the results of the borehole investigations and the laboratory test results. The parameters used for the design are listed in **Table 7**.

Table 7: AASHTO Parameters Selected for Pavement Designs

Design Parameters	CR109 Temporary Widening
Initial Serviceability	4.5
Terminal Serviceability	2.5
Reliability Level	90
Overall Standard Deviation	0.49
Truck Factor	2.335
Subgrade Resilient Modulus (MPa)	35

Design Parameters	CR109 Temporary Widening
Structural / Drainage Coefficient of New HMA	0.42
Structural / Drainage Coefficient of New Granular A Base Material	0.14 / 1.0
Structural / Drainage Coefficient of New Granular B, Type I Subbase Material	0.09 / 1.0

PAVEMENT DESIGN RECOMMENDATIONS

It is understood that the County would like to temporarily widen Dufferin County Road 109. It is anticipated that the below temporary pavement design will provide adequate structural capacity for approximately two years. The recommended pavement structure for the temporary widening is as follows:

Starting at the edge of the existing shoulder, excavate to 800 mm below proposed finished grade and place the following:

- 50 mm HL3 Surface Course
- 50 mm HL8 Upper Binder Course
- 50 mm HL8 Lower Binder Course
- 150 mm New Granular 'A' Base
- 500 mm New Granular 'B' Type II

  Over compacted and approved subgrade.

At the widening sections, the granular base and subbase materials should be placed across the full width of shoulders and should daylight into ditches where applicable.

The above-noted temporary pavement structure provides for a minimum design SN of 129, which exceeds the required design SN of approximately 114 required to accommodate up to two years of traffic.

OTHER DESIGN CONSIDERATIONS

CONSTRUCTION JOINTS TRANSITION

Longitudinal and transverse joints should be constructed to key the new HMA into the existing pavement in accordance with OPSS.PROV 313.

REUSE OF EXISTING GRANULAR MATERIAL

Based on the field investigation and laboratory test results, the existing granular base and subbase materials are not suitable for re-use in the pavement structure. The excavated granulars and subgrade soil may be re-used as acceptable earth fills or transported off site.

ASPHALT CEMENT GRADE

The asphalt cements should conform to OPSS.PROV 1101 (November 2020). PGAC 64-28 is recommended for the surface and binder course mixes placed.

TOPSOIL AND ORGANIC MATERIAL

Topsoil, organic material and any other deleterious material present within the limits of the proposed temporary realignment should be removed regardless of depth. Based on the results of the investigation, the topsoil has an average thickness of 80 mm.

CONSTRUCTION MATERIALS

The HL3 surface course, and HL8 binder course hot asphalt should meet the requirements of OPSS.MUNI 1150 (November 2018). The new granular base and subbase materials should meet the requirements of OPSS.PROV 1010 (April 2013) for Granular A and Granular B, Type II. They should be placed in accordance with the OPSD 200 series. All granular materials should be uniformly compacted to 100% Standard Proctor Maximum Dry Density (SPMDD) in accordance with OPSS.PROV 501 (November 2014). The HMA should be compacted in accordance with OPSS.PROV 313 (April 2021).

A summary of the recommended granular types is as follows:

Table 8: Material Types

Item/ Location	Material Type
Granular Base	Granular A
Granular Subbase	Granular B, Type II

TACK COAT

It is recommended that a tack coat be applied to all milled surfaces and between all new lifts of HMA. Tack coat should conform to the requirements of Ontario Provincial Standard Specification OPSS.PROV 308 (April 2012).

CONVERSION FACTORS

HL3 – 2.51 t/m^3,

HL8 – 2.45 t/m^3,

Granular A – 2.2 t/m^3, and,

Granular B, Type II – 2.1 t/m^3 .

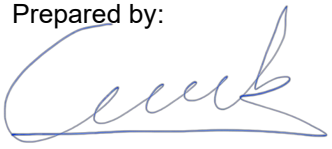
TESTING AND INSPECTION

During construction, monitoring by a qualified technician should be carried out during any required trench backfill placement, as well as pipe bedding and cover. In addition, sufficient subgrade inspections and in situ materials testing should be carried out to confirm that the conditions exposed are consistent with those encountered in the boreholes and to monitor conformance to the pertinent project specifications.

CLOSURE

We trust that this report provides sufficient geotechnical engineering information for the design of this project. If you have any questions regarding the contents of this report or require additional information, please do not hesitate to contact this office.

Prepared by:



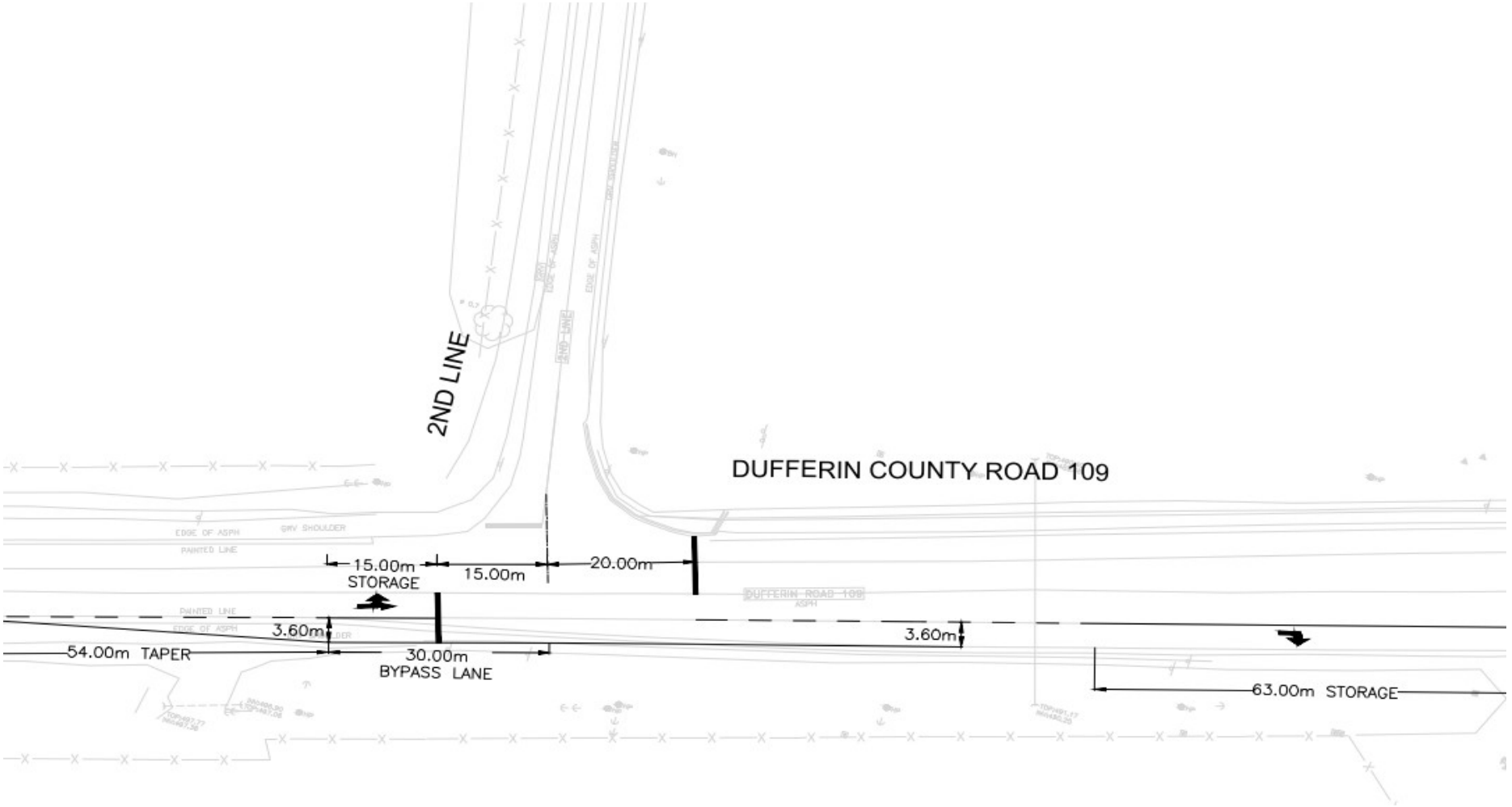
Mohammed Kamala, P.Eng.
Pavement Engineer

Reviewed by:

Atiqur Rahman M.Eng., P.Eng., PMP
Principal Pavement Engineer

Figure 1

Site Location Plan



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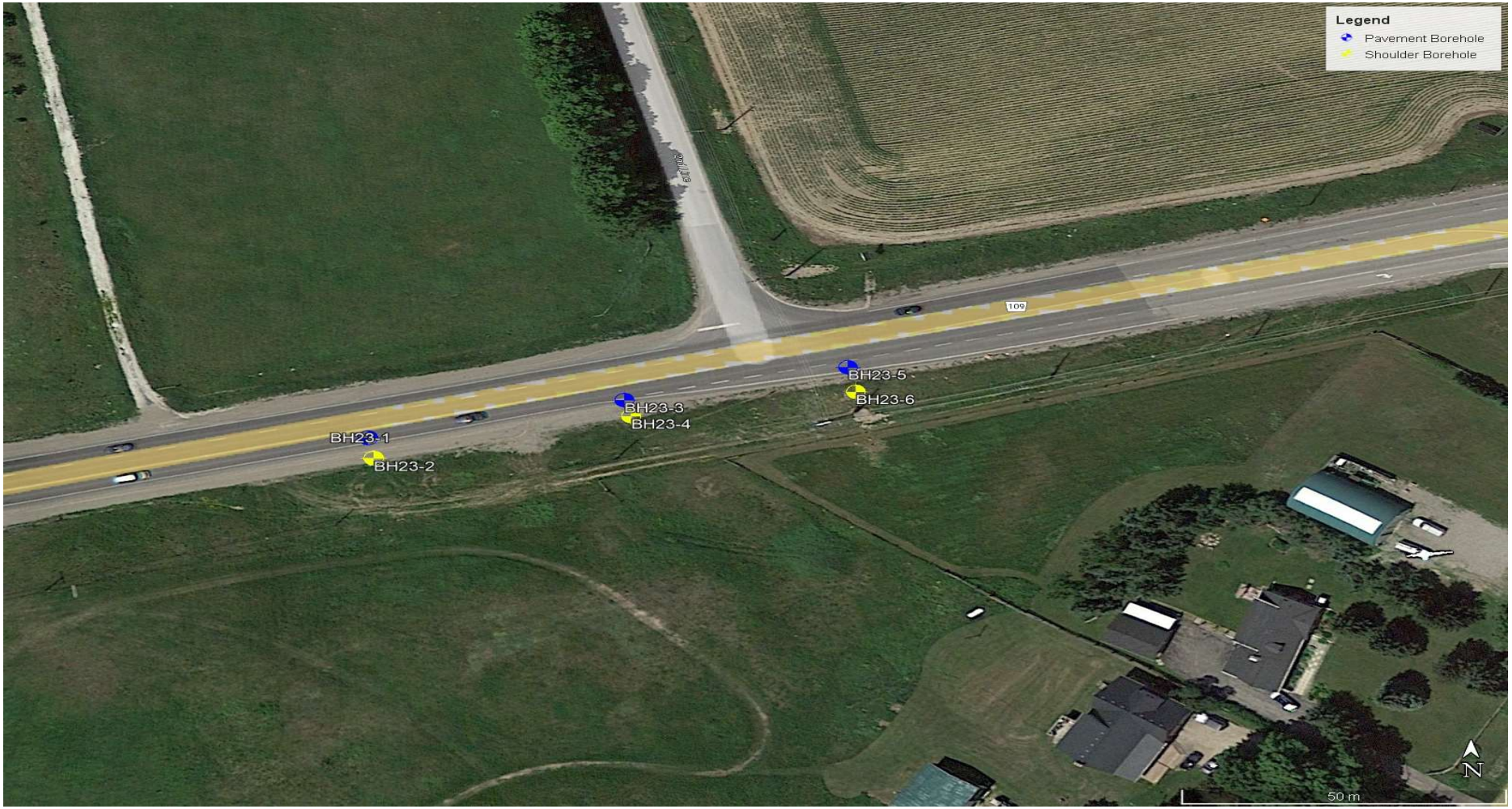
Drawn:	**MK**	Approved:		Title:	**Borehole Location Plan**
Date:	**19-May-23**	Scale:	**N.T.S**	Project:	**Geotechnical Investigation Dufferin County Road 109**
Original Size:	**Letter**	Rev:	**N/A**		

Appendix A

BOREHOLE LOCATION PLAN



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Drawn:	**MK**	Approved:		Title:	**Borehole Location Plan**
Date:	**19-May-23**	Scale:	**N.T.S**	Project:	**Geotechnical Investigation Dufferin County Road 109**
Original Size:	**Letter**	Rev:	**N/A**		

Appendix B

Method of Soil Classification
Abbreviations and Terms Used on Records of Boreholes
List of Symbols
Records of Boreholes

METHOD OF SOIL CLASSIFICATION

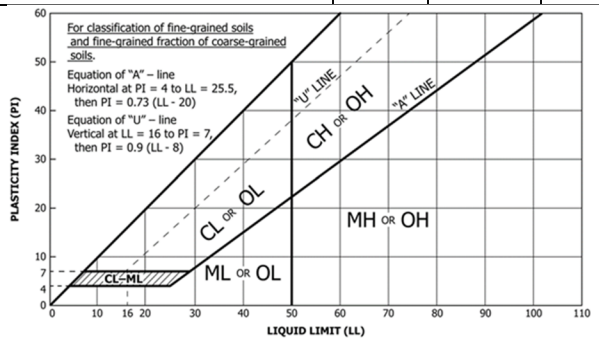
The WSP Canada Soil Classification[1] System is based on the Unified Soil Classification System (USCS) (after ASTM D2487)

Organic or Inorganic	Soil Group	Type of Soil		Gradation or Plasticity	$Cu = \frac{D_{60}}{D_{10}}$		$Cc = \frac{(D_{30})^2}{D_{10} x D_{60}}$	Organic Content [6,9]	USCS Group Symbol [3,5,7]	Primary Group Name [2]
INORGANIC (Organic Content <30% by mass)	COARSE-GRAINED SOILS (>50% by mass is larger than 0.075 mm)	GRAVELS (>50% by mass of coarse fraction is larger than 4.75 mm)	Clean Gravels with <5% fines [3] (by mass)	Well Graded	≥4	(and)	≥1 to ≤3	≤30%	GW	Well-graded GRAVEL [4,6]
				Poorly Graded	<4	(and/or)	<1 or >3		GP	Poorly graded GRAVEL [4,6]
			Gravels with >12% fines [3] (by mass)	Below A Line	n/a				GM	SILTY GRAVEL [4,6]
				Above A Line	n/a				GC	CLAYEY GRAVEL [4,5,6]
		SANDS (≥50% by mass of coarse fraction is smaller than 4.75 mm)	Clean Sands with <5% fines [7] (by mass)	Well Graded	≥6	(and)	≥1 to ≤3		SW	Well-graded SAND [6,8]
				Poorly Graded	<6	(and/or)	<1 or >3		SP	Poorly graded SAND [6,8]
			Sands with >12% fines [7] (by mass)	Below A Line	n/a				SM	SILTY SAND [6,8]
				Above A Line	n/a				SC	CLAYEY SAND [5,6,8]

Organic or Inorganic	Soil Group	Type of Soil	Laboratory Tests	Field Indicators					Organic Content [B,H]	USCS Group Symbol [A]	Primary Group Name [A]
				Dilatancy	Dry Strength	Shine Test	Thread Diameter (mm)	Toughness (of 3 mm thread)			
INORGANIC (Organic Content <30% by mass)	FINE-GRAINED SOILS (≥50% by mass is smaller than 0.075 mm)	SILTS (Nonplastic or PI and LL plot **below A-Line** on Plasticity Chart below) [C]	Liquid Limit <50 [D]	Rapid	None to Low	Dull to None	3 to >6	Low/can't roll 3 mm	<15%	ML	SILT [H]
				None to Slow	Low to Medium	Dull to Slight	3 to 6	Low	15% to 30%	OL	ORGANIC SILT
			Liquid Limit ≥50 [D]	None to V.Slow	Low to Medium	Slight	3 to 6	Low to Medium	<15%	MH	ELASTIC SILT[H]
				None	Medium to High	Dull to Slight	1 to 3	Low to Medium	15% to <30%	OH	ORGANIC SILT
		CLAYS (PI and LL plot **above A-Line** on Plasticity Chart below) [A]	Liquid Limit <50 [D]	None to Medium Slow	Medium to High	Slight to Shiny	1 to 3	Medium	<15%	CL	LEAN CLAY [A,E,F,G,H]
				None to V.Slow	Medium to High	Slight to Shiny	1 to 3	Medium	15% to <30%	OL	ORGANIC CLAY [E,F,G]
			Liquid Limit ≥50 [D]	None	High to V.High	Shiny	<1	High	<15%	CH	FAT CLAY [E,F,G,H]
				None	High	Shiny	<1 to 1	High	15% to <30%	OH	ORGANIC CLAY [E,F,G]
HIGHLY ORGANIC SOILS (Organic Content >30% by mass)		Peat and mineral soil mixtures	Relatively lightweight, possibly spongy. Some water may squeeze from sample. Some shrinkage may occur on air drying. Sand fraction may be visible. Low to high dilatancy. Thread weak near plastic limit. Low to medium dry strength.						30% to <75%	PT	SILTY PEAT, SANDY PEAT
		Predominantly peat, may contain some mineral soil, fibrous or amorphous peat	Lightweight, spongy. Much water squeezes from sample. Shrinks considerably on air drying (i.e., very high water content). Plant structure identiable to altered.						75% to 100%		PEAT

Coarse-Grained Soil Note(s):

1. Based on the material passing the 75 mm sieve.
2. If field sample contains or drilling observations indicate cobbles or boulders or both, add, "with cobbles" or "with cobbles and boulders". Include notes on the depth(s) encountered, and sizes if possible.
3. Gravels with 5% to 12% fines require dual symbols:
   (GW-GM) Well-graded GRAVEL with silt,
   (GW-GC) Well-graded GRAVEL with clay,
   (GP-GM) Poorly graded GRAVEL with silt,
   (GP-GC) Poorly graded GRAVEL with clay.
4. If soil contains ≥15% sand, add "with sand" to Group Name.
5. If fines classify as CL-ML, use dual symbol (GC-GM) or (SC-SM) for Group Symbol.
6. If the soil has an organic content (OC) 15%≤OC<30% the prefix "Organic" should be added before the Group Name. If the soil has an organic content 3%≤OC<15% add "with organic fines" to Group Name. If the soil contains >0% to ≤3% organics, the descriptor "trace organics" may be added.
7. Sands with 5% to 12% fines require dual symbols:
   (SW-SM) Well-graded SAND with silt,
   (SW-SC) Well-graded SAND with clay,
   (SP-SM) Poorly graded SAND with silt,
   (SP-SC) Poorly graded SAND with clay.
8. If soil contains ≥15% gravel, add "with gravel" to Group Name.



Fine-Grained Soil Note(s):

- **A.** If Atterberg limits plot above the A-line but in the 'hatched' area on the plasticity chart, soil is a (CL-ML) SILTY CLAY.
- **B.** If the soil contains >0% to ≤3% organics, the descriptor "trace organics" may be added.
- **C.** If fine-grained materials are nonplastic (i.e., a plastic limit (PL) cannot be measured), soil is a (ML) SILT.
- **D.** If soil has a liquid limit (LL) >30% to <50%, the term 'medium plasticity' may be included in the description, but the Group Name/Symbol is not changed.
- **E.** If soil contains 15% to <30% +No.200, add "with sand" or "with gravel".
- **F.** If soil contains ≥30% +No.200 mainly sand, add "Sandy" to Group Name.
- **G.** If soil contains ≥30% +No.200 mainly gravel, add "Gravelly" to Group Name.
- **H.** If the soil has an organic content (OC) 3%≤OC<15% add "with organic fines" to Group Name.

ABBREVIATIONS AND TERMS USED ON RECORDS OF BOREHOLES AND TEST PITS

PARTICLE SIZES OF CONSTITUENTS

Soil Constituent	Particle Size Description	Millimetres	Inches (US Std. Sieve Size)
BOULDERS	Not Applicable	>300	>12
COBBLES	Not Applicable	75 to 300	3 to 12
GRAVEL	Coarse Fine	19 to 75 4.75 to 19	0.75 to 3 (4) to 0.75
SAND	Coarse Medium Fine	2.00 to 4.75 0.425 to 2.00 0.075 to 0.425	(10) to (4) (40) to (10) (200) to (40)
SILT/CLAY	Classified by plasticity	<0.075	< (200)

GRADATIONAL COMPONENT TERMS

% (by mass)	Term
≤ 5	Use “trace”
> 5 to ≤ 12	Use “few”
> 12 to <30	Use “little”
≥ 30 to <50	Use “some”
≥ 50	Use “mostly”

PENETRATION RESISTANCE

Standard Penetration Resistance (SPT), N:

The number of blows by a 63.5 kg (140 lb) hammer dropped 760 mm (30 in.) required to drive a 50 mm (2 in.) split-spoon sampler for a distance of 300 mm (12 in.). Values reported are as recorded in the field and are uncorrected.

Cone Penetration Test (CPT)

An electronic cone penetrometer with a 60° conical tip and a project end area of 10 cm^2 pushed through ground at a penetration rate of 2 cm/s. Measurements of tip resistance (q_t), porewater pressure (u) and sleeve frictions are recorded electronically at 25 mm penetration intervals.

Dynamic Cone Penetration Resistance (DCPT); Nd:

The number of blows by a 63.5 kg (140 lb) hammer dropped 760 mm (30 in.) to drive uncased a 50 mm (2 in.) diameter, 60° cone attached to "A" size drill rods for a distance of 300 mm (12 in.).

PH: Sampler advanced by hydraulic pressure
PM: Sampler advanced by manual pressure
WH: Sampler advanced by static weight of hammer
WR: Sampler advanced by weight of sampler and rod

SAMPLES

AS	Auger sample
BS	Block sample
CS	Chunk sample
DD	Diamond Drilling
DO or DP	Seamless open ended, driven, pushed tube sampler, or geoprobe macro-core – note size
DS	Denison type sample
FS	Foil Sample
GS	Grab Sample
MC	Modified California Samples – note sample diameter and hammer weight
MS	Modified Shelby (for frozen soil)
RC	Rock core
SC	Soil core
SS	Split-spoon sampler (50 mm OD); larger sizes use MC
ST	Slotted tube
TO	Thin-walled, open – note size (Shelby tube)
TP	Thin-walled, piston – note size (Shelby tube)
WS	Wash sample

SOIL TESTS

w	water content
PL , w_p	plastic limit
LL , w_L	liquid limit
C	consolidation (oedometer) test
CHEM	chemical analysis (refer to text)
CID	consolidated isotropically drained triaxial test[1]
CIU	consolidated isotropically undrained triaxial test with porewater pressure measurement[1]
D_R	relative density (specific gravity, Gs)
DS	direct shear test
GS	specific gravity
M	sieve analysis for particle size
MH	combined sieve and hydrometer (H) analysis
MPC	Modified Proctor compaction test
SPC	Standard Proctor compaction test
OC	organic content test
SO_4	concentration of water-soluble sulphates
UC	unconfined compression test
UU	unconsolidated undrained triaxial test
V (FV)	field vane (LV-laboratory vane test)
γ	unit weight

1. Tests anisotropically consolidated prior to shear are shown as CAD, CAU.

NON-COHESIVE (COHESIONLESS) SOILS

Compactness[2]

Term	SPT ‘N’ (blows/0.3m)[1]
Very Loose	0 to 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very Dense	>50

1. SPT ‘N’ in general accordance with ASTM D1586, uncorrected for the effects of overburden pressure.
2. Definition of compactness terms are based on SPT ‘N’ ranges as provided in Terzaghi, Peck and Mesri (1996). Many factors affect the recorded SPT ‘N’ value, including hammer efficiency (which may be greater than 60% in automatic trip hammers), overburden pressure, groundwater conditions, and grainsize. As such, the recorded SPT ‘N’ value(s) should be considered only an approximate guide to the soil compactness. These factors need to be considered when evaluating the results, and the stated compactness terms should not be relied upon for design or construction.

Field Moisture Condition

Term	Description
Dry	Soil flows freely through fingers.
Moist	Soils are darker than in the dry condition and may feel cool.
Wet	As moist, but with free water forming on hands when handled.

COHESIVE SOILS

Consistency

Term	Undrained Shear Strength (kPa)	SPT ‘N’[1,2] (blows/0.3m)
Very Soft	<12	0 to 2
Soft	12 to 25	2 to 4
Firm	25 to 50	4 to 8
Stiff	50 to 100	8 to 15
Very Stiff	100 to 200	15 to 30
Hard	>200	>30

1. SPT ‘N’ in general accordance with ASTM D1586, uncorrected for overburden pressure effects; approximate only.
2. SPT ‘N’ values should be considered ONLY an approximate guide to consistency; for sensitive clays (e.g., Champlain Sea clays), the N-value approximation for consistency terms does NOT apply. Rely on direct measurement of undrained shear strength or other manual observations.

Water Content

Term	Description
w < PL	Material is estimated to be drier than the Plastic Limit.
w ~ PL	Material is estimated to be close to the Plastic Limit.
w > PL	Material is estimated to be wetter than the Plastic Limit.

LIST OF SYMBOLS

Unless otherwise stated, the symbols employed in the report are as follows:

I. GENERAL

π	3.1416
ln x	natural logarithm of x
$\log_{10}$	x or log x, logarithm of x to base 10
g	acceleration due to gravity
t	time

II. STRESS AND STRAIN

γ	shear strain
Δ	change in, e.g. in stress: $\Delta\sigma$
ε	linear strain
ε_v	volumetric strain
η	coefficient of viscosity
υ	Poisson's ratio
σ	total stress
σ'	effective stress ($\sigma' = \sigma - u$)
σ'_{vo}	initial effective overburden stress
$\sigma_1, \sigma_2, \sigma_3$	principal stress (major, intermediate, minor)
σ_{oct}	mean stress or octahedral stress $= (\sigma_1 + \sigma_2 + \sigma_3)/3$
τ	shear stress
u	porewater pressure
E	modulus of deformation
G	shear modulus of deformation
K	bulk modulus of compressibility

III. SOIL PROPERTIES

(a) Index Properties

$\rho(\gamma)$	bulk density (bulk unit weight)*
$\rho_d(\gamma_d)$	dry density (dry unit weight)
$\rho_w(\gamma_w)$	density (unit weight) of water
$\rho_s(\gamma_s)$	density (unit weight) of solid particles
γ'	unit weight of submerged soil ($\gamma' = \gamma - \gamma_w$)
D_R	relative density (specific gravity) of solid particles ($D_R = \rho_s / \rho_w$) (formerly G_s)
e	void ratio
n	porosity
S	degree of saturation

* Density symbol is ρ. Unit weight symbol is γ where $\gamma = \rho g$ (i.e. mass density multiplied by acceleration due to gravity)

(a) Index Properties (continued)

w	water content
w_l or LL	liquid limit
w_p or PL	plastic limit
I_p or PI	plasticity index = $(w_l - w_p)$
NP	nonplastic
w_s	shrinkage limit
I_L	liquidity index = $(w - w_p) / I_p$
I_C	consistency index = $(w_l - w) / I_p$
e_{max}	void ratio in loosest state
e_{min}	void ratio in densest state
I_D	density index = $(e_{max} - e) / (e_{max} - e_{min})$ (formerly relative density)

(b) Hydraulic Properties

h	hydraulic head or potential
q	rate of flow
v	velocity of flow
i	hydraulic gradient
k	hydraulic conductivity (coefficient of permeability)
j	seepage force per unit volume

(c) Consolidation (one-dimensional)

C_c	compression index (normally consolidated range)
C_r	recompression index (over-consolidated range)
C_s	swelling index
C_α	secondary compression index
m_v	coefficient of volume change
c_v	coefficient of consolidation (vertical direction)
c_h	coefficient of consolidation (horizontal direction)
T_v	time factor (vertical direction)
U	degree of consolidation
σ'_p	pre-consolidation stress
OCR	over-consolidation ratio = σ'_p / σ'_{vo}

(d) Shear Strength

τ_p, τ_r	peak and residual shear strength
ϕ'	effective angle of internal friction
δ	angle of interface friction
μ	coefficient of friction = tan δ
c′	effective cohesion
c_u, s_u	undrained shear strength ($\phi = 0$ analysis)
p	mean total stress $(\sigma_1 + \sigma_3)/2$
p′	mean effective stress $(\sigma'_1 + \sigma'_3)/2$
q	$(\sigma_1 - \sigma_3)/2$ or $(\sigma'_1 - \sigma'_3)/2$
q_u	compressive strength $(\sigma_1 - \sigma_3)$
S_t	sensitivity

Notes: 1 $\tau = c' + \sigma' \tan \phi'$

2 shear strength = (compressive strength)/2

LOG OF BOREHOLE BH01

PROJECT: Geotechnical Investigation
REF. NO.: CA0001494.3704
CLIENT: Dufferin County
Method: SOLID STEM AUGER
ENCL NO.: 1
PROJECT LOCATION: Dufferin County Road 109
Diameter: 152.4
ORIGINATED BY MK
DATUM: Geodetic
Date: May-05-2023 to May-05-2023
COMPILED BY MK
BH LOCATION: N 4848314.84 E 309925.686
CHECKED BY AR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa)	PLASTIC LIMIT / NATURAL MOISTURE CONTENT / LIQUID LIMIT / WATER CONTENT (%)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%)
(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS / 0.3 m "N"							
	Ground Surface											
0.0	**ASPHALT (320 mm)**											
0.3	**GRANULAR BASE/SUBBASE (470 mm)** gravelly sand, some fine, brown, moist		1	AS					○			GR 21 SA 60 SI (19)
0.8	**SILTY SAND** trace gravel, trace clay, brown, moist, dense		1	SS	42				○			GR 8 SA 61 SI 24 CL 7
1.5	**END OF BOREHOLE** Notes: 1) Borehole was open and dry upon completion											

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE; 20 40 60 80 100
PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%): 10 20 30

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
$+^3$, $\times^3$: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

LOG OF BOREHOLE BH02

PROJECT: Geotechnical Investigation
REF. NO.: CA0001494.3704
CLIENT: Dufferin County
Method: SOLID STEM AUGER
ENCL NO.: 2
PROJECT LOCATION: Dufferin County Road 109
Diameter: 152.4
ORIGINATED BY MK
DATUM: Geodetic
Date: May-05-2023 to May-05-2023
COMPILED BY MK
BH LOCATION: N 4848314.84 E 309925.686
CHECKED BY AR

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS "N" 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 10 20 30	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	Ground Surface											
0.0	**SAND AND GRAVEL (200 mm)** grey, moist											
0.2	**GRANULAR BASE/SUBBASE (630 mm)** gravelly sand, some fine, brown, moist		1	AS					○			
0.8	**SILTY SAND** some gravel, some clay, brown, moist, compact		1	SS	13				○			
1.5	**END OF BOREHOLE**											

Notes:
1) Borehole was open and dry upon completion

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+3, ×3: Numbers refer to Sensitivity
○ε=3% Strain at Failure

LOG OF BOREHOLE BH03

PROJECT: Geotechnical Investigation
REF. NO.: CA0001494.3704
CLIENT: Dufferin County
Method: SOLID STEM AUGER
ENCL NO.: 3
PROJECT LOCATION: Dufferin County Road 109
Diameter: 152.4
ORIGINATED BY MK
DATUM: Geodetic
Date: May-05-2023 to May-05-2023
COMPILED BY MK
BH LOCATION: N 4848314.84 E 309925.686
CHECKED BY AR

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS "N" 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 10 20 30	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
Ground Surface												
0.0	**ASPHALT (270 mm)**											
0.3	**GRANULAR BASE/SUBBASE (530 mm)** gravelly sand, some fine, brown, moist		1	AS					○			
0.8	**SILTY SAND** trace gravel, some clay, brown, moist, dense		1	SS	34				○			
1.5	**END OF BOREHOLE**											

Notes:
1) Borehole was open and dry upon completion

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
$+^3$, $\times^3$: Numbers refer to Sensitivity
○ $^{\varepsilon}$=3% Strain at Failure

LOG OF BOREHOLE BH04

PROJECT: Geotechnical Investigation
REF. NO.: CA0001494.3704
CLIENT: Dufferin County
Method: SOLID STEM AUGER
ENCL NO.: 4
PROJECT LOCATION: Dufferin County Road 109
Diameter: 152.4
ORIGINATED BY MK
DATUM: Geodetic
Date: May-05-2023 to May-05-2023
COMPILED BY MK
BH LOCATION: N 4848314.84 E 309925.686
CHECKED BY AR

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS "N" 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 10 20 30	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0.0	Ground Surface **ASPHALT (115 mm)**											
0.1	**GRANULAR BASE/SUBBASE (690 mm)** gravelly sand, some fine, brown, moist		1	AS					○			
0.8	**SILTY SAND** trace gravel, trace clay, brown, moist, compact		1	SS	15				○			
1.5	**END OF BOREHOLE** Notes: 1) Borehole was open and dry upon completion											

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+ 3, × 3: Numbers refer to Sensitivity
○ 3=3% Strain at Failure

LOG OF BOREHOLE BH05

PROJECT: Geotechnical Investigation
REF. NO.: CA0001494.3704
CLIENT: Dufferin County
ENCL NO.: 5
PROJECT LOCATION: Dufferin County Road 109
Method: SOLID STEM AUGER
ORIGINATED BY MK
DATUM: Geodetic
Diameter: 152.4
COMPILED BY MK
BH LOCATION: N 4848314.84 E 309925.686
Date: May-05-2023 to May-05-2023
CHECKED BY AR

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" BLOWS 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 10 20 30	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0.0	Ground Surface **ASPHALT (180 mm)**											
0.2	**GRANULAR BASE/SUBBASE (680 mm)** sand and gravel, some fine, grey, moist		1	AS					○			36 42 (22)
0.9	**SILTY SAND** trace gravel, trace clay, brown, moist, compact		1	SS	24				○			6 66 21 5
1.5	**END OF BOREHOLE** Notes: 1) Borehole was open and dry upon completion											

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+ 3, × 3: Numbers refer to Sensitivity
○ 8 ε=3% Strain at Failure

LOG OF BOREHOLE BH06

PROJECT: Geotechnical Investigation
REF. NO.: CA0001494.3704
CLIENT: Dufferin County
Method: MANUAL HAND AUGER
ENCL NO.: 6
PROJECT LOCATION: Dufferin County Road 109
Diameter: 152.4
ORIGINATED BY MK
DATUM: Geodetic
Date: May-05-2023 to May-05-2023
COMPILED BY MK
BH LOCATION: N 4848314.84 E 309925.686
CHECKED BY AR

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
Ground Surface												
0.0	**TOPSOIL (80 mm)**											
0.1	**SAND AND GRAVEL** dark brown, moist		1	AS					○			
1.0	**END OF BOREHOLE**											

Notes:
1) Borehole was open and dry upon completion

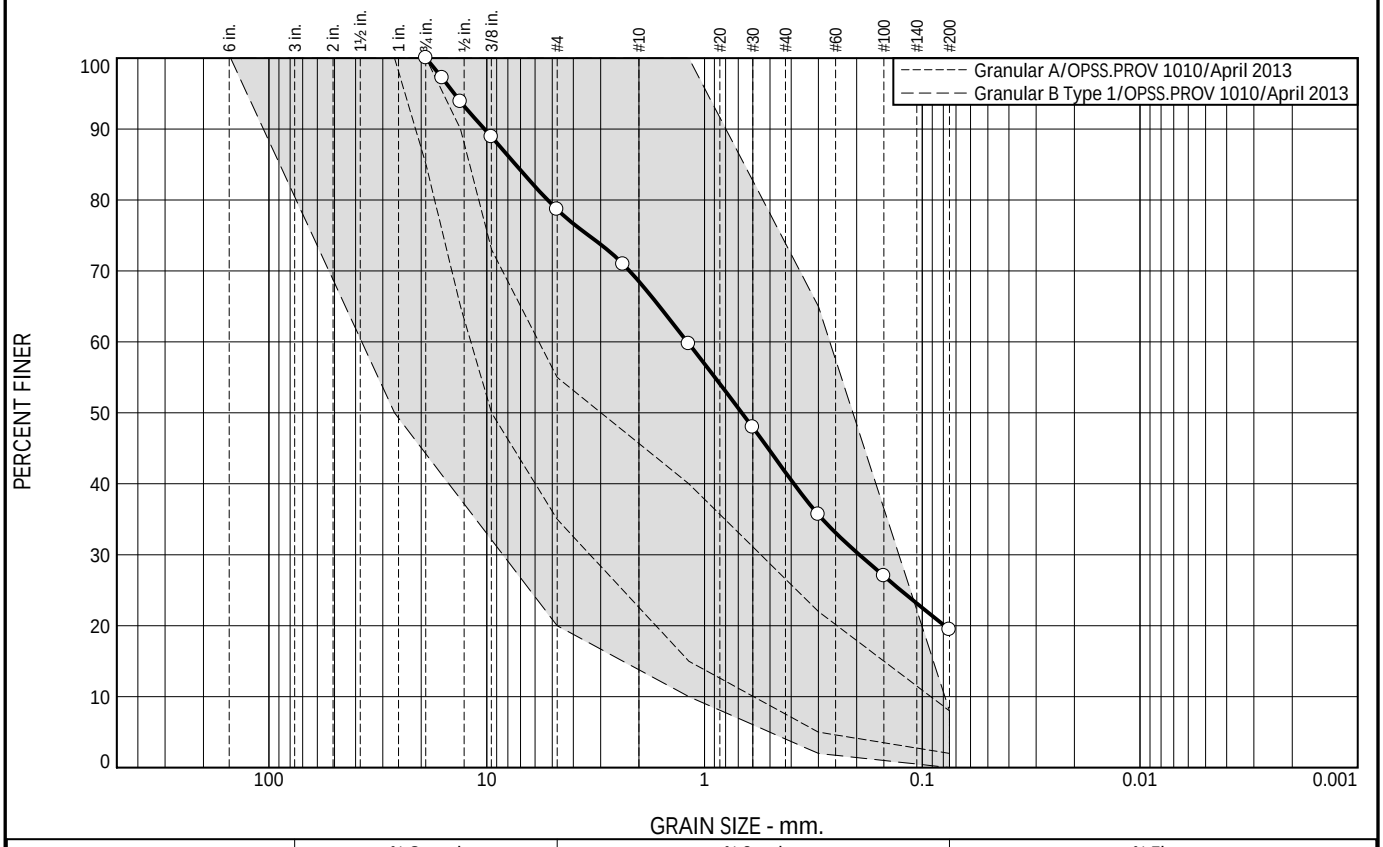
GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+ 3, × 3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

Appendix C

Laboratory Testing Results

PARTICLE SIZE DISTRIBUTION REPORT



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	21.3	10.2	26.9	22.2	19.4	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
19.0 mm	100.0	85-100	
16.0 mm	97.2		
13.2 mm	93.8	65-90	X
9.5 mm	88.9	50-73	X
4.75 mm	78.7	35-55	X
2.36 mm	70.9		
1.18 mm	59.7	15-40	X
0.60 mm	47.9		
0.30 mm	35.7	5-22	X
0.15 mm	27.0		
0.075 mm	19.4	2-8	X

* Granular A/OPSS.PROV 1010/April 2013

Soil Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 10.2468 D_{85}= 7.3657 D_{60}= 1.1993
D_{50}= 0.6741 D_{30}= 0.1944 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Location: BH 23-1, AS1
Sample Number: R23-98(1)

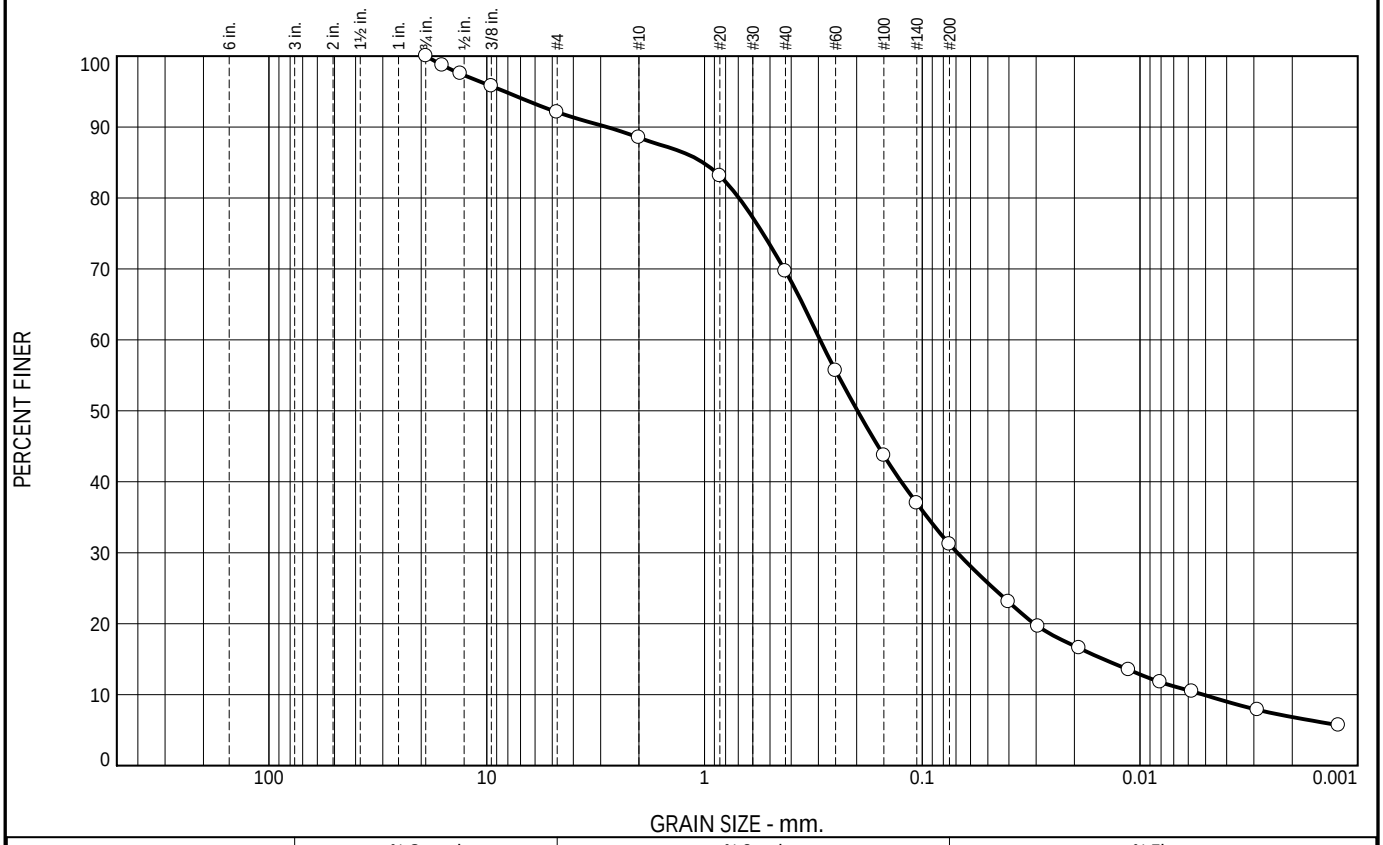
Date: May 15, 2023

Client:
Project: Dufferin Country Road 109

Project No: CA0001494.3704 Figure 01

Tested By: Shireen Jemmo Checked By: Harun Rashid

PARTICLE SIZE DISTRIBUTION REPORT



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	7.9	3.6	18.8	38.5	24.4	6.8

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
19.0 mm	100.0		
16.0 mm	98.7		
13.2 mm	97.5		
9.5 mm	95.8		
4.75 mm	92.1		
2.00 mm	88.5		
0.85 mm	83.1		
0.425 mm	69.7		
0.25 mm	55.7		
0.15 mm	43.7		
0.106 mm	37.0		
0.075 mm	31.2		
0.0402 mm.	23.1		
0.0293 mm.	19.6		
0.0190 mm.	16.6		
0.0113 mm.	13.5		
0.0081 mm.	11.8		
0.0058 mm.	10.5		
0.0029 mm.	7.8		
0.0012 mm.	5.7		

* (no specification provided)

Soil Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 2.8092 D_{85}= 1.0157 D_{60}= 0.2946
D_{50}= 0.1982 D_{30}= 0.0690 D_{15}= 0.0147
D_{10}= 0.0051 C_u= 57.42 C_c= 3.15

Classification

USCS= AASHTO=

Remarks

Location: BH 23-1, SS1
Sample Number: R23-98(2)

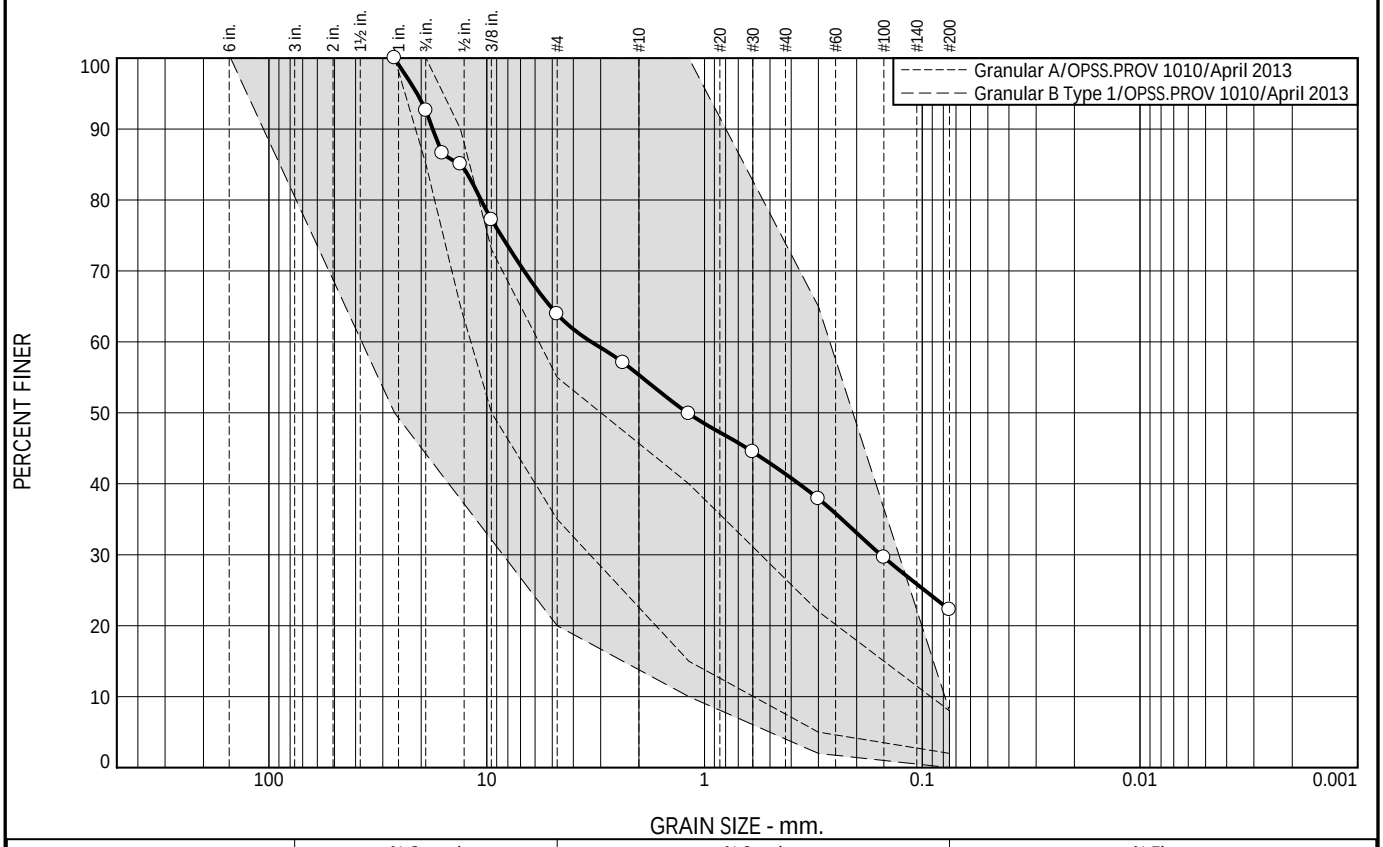
Date: May 11, 2023

Client:
Project: Dufferin Country Road 109

Project No: CA0001494.3704 Figure 02

Tested By: Shireen Jemmo Checked By: Harun Rashid

PARTICLE SIZE DISTRIBUTION REPORT



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	7.3	28.8	8.6	13.9	19.2	22.2	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
26.5 mm	100.0	100	
19.0 mm	92.6	85-100	
16.0 mm	86.6		
13.2 mm	85.0	65-90	
9.5 mm	77.2	50-73	X
4.75 mm	63.9	35-55	X
2.36 mm	57.1		
1.18 mm	49.9	15-40	X
0.60 mm	44.5		
0.30 mm	37.9	5-22	X
0.15 mm	29.6		
0.075 mm	22.2	2-8	X

* Granular A/OPSS.PROV 1010/April 2013

Soil Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 17.6934 D_{85}= 13.1629 D_{60}= 3.3065
D_{50}= 1.1949 D_{30}= 0.1550 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Location: BH 23-5, AS1
Sample Number: R23-98(3)

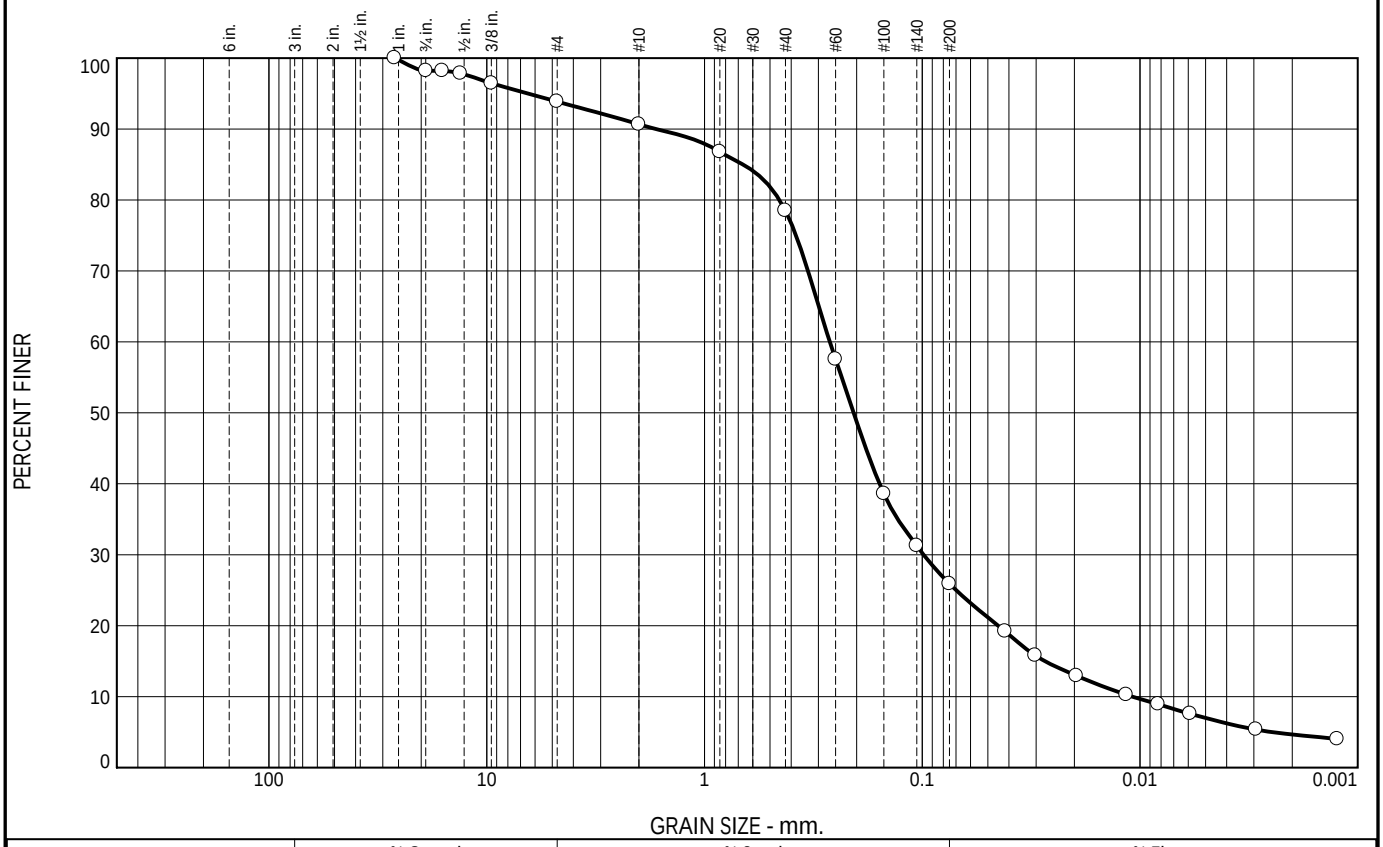
Date: May 15, 2023

Client:
Project: Dufferin Country Road 109

Project No: CA0001494.3704 Figure 03

Tested By: Shireen Jemmo Checked By: Harun Rashid

PARTICLE SIZE DISTRIBUTION REPORT



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	1.8	4.3	3.2	12.2	52.6	21.2	4.7

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
26.5 mm	100.0		
19.0 mm	98.2		
16.0 mm	98.2		
13.2 mm	97.8		
9.5 mm	96.5		
4.75 mm	93.9		
2.00 mm	90.7		
0.85 mm	86.8		
0.425 mm	78.5		
0.25 mm	57.5		
0.15 mm	38.6		
0.106 mm	31.3		
0.075 mm	25.9		
0.0416 mm.	19.2		
0.0302 mm.	15.8		
0.0196 mm.	12.9		
0.0115 mm.	10.3		
0.0082 mm.	8.9		
0.0059 mm.	7.6		
0.0029 mm.	5.4		
0.0012 mm.	4.0		

* (no specification provided)

Soil Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 1.6690 D_{85}= 0.6650 D_{60}= 0.2659
D_{50}= 0.2065 D_{30}= 0.0987 D_{15}= 0.0273
D_{10}= 0.0109 C_u= 24.48 C_c= 3.37

Classification

USCS= AASHTO=

Remarks

Location: BH 23-5, SS1
Sample Number: R23-98(4)

Date: May 11, 2023

Client:
Project: Dufferin Country Road 109

Project No: CA0001494.3704 Figure 04

Tested By: Shireen Jemmo Checked By: Harun Rashid

Appendix D

AASHTO Design Sheets

Table D-1
EQUIVALENT SINGLE AXLE LOAD CALCULATION

Dufferin County
New County Road 109 Temporary Widening
2 Year ESAL Calculation

1) Traffic Analysis

Traffic Data Year		2010		2024	2026
Design Year		**2024**			
Traffic Analysis Period			14		2
Average Annual Daily Traffic (AADT)		11398.00		23331.00	25845.00
Average Rate of Increase in Traffic (%)			5.25		5.25
Truck Fraction of Total Traffic (%)		13		13	13
Average Rate of Increase in Truck Fraction (%)			0.00		0.00
Number of Lanes in One Direction		2		2	2
Directional Factor		0.5		0.5	0.5
Lane Distribution Factor		0.9		0.8	0.8
Daily Truck Volume		**1,365**		**1,213**	**1,344**

2) Daily ESALs Analysis

Road Classification		***Rural Principal Arterial***		
Traffic Analysis Base Year		2024	2024	2026
Breakdown of Truck Proportions (%)	Class 1	25		
	Class 2	5		
	Class 3	45		
	Class 4	25		
Daily Truck Volumes for 4 Classes	Class 1	341	303	336
	Class 2	68	61	67
	Class 3	614	546	605
	Class 4	341	303	336
Truck Factors for 4 Classes of Truck	Class 1	0.5		
	Class 2	2.3		
	Class 3	1.6		
	Class 4	5.5		
Weighted Average Truck Factor			**2.335**	
Daily ESALs per Truck Class	Class 1	171	152	168
	Class 2	157	140	155
	Class 3	983	874	968
	Class 4	1,877	1,668	1,848
Total Daily ESALs in Design Lane		**3,187**	**2,833**	**3,138**

3) Total ESALs for Base Year

Base Year	2024	2024	2026
Number of Days of Truck Traffic	365	365	365
Total ESALs for Base Year	**1,163,239**	**1,033,990**	**1,145,406**

4) Cumulative ESALs for the Design Period

Design Period (Years)		**2**	
Span of Design Periods	2024 to 2024		2024 to 2026
Average Rate of Increase in Truck Volume (%)			5.25
Years of Design Periods		2	
Growth Factor	2.05		0.00
ESALs for the Design Periods	2,388,000		0
Cumulative ESALs for the Design Period		**2,388,000**	

Note: The ESAL calculations are baesd on the guidelines "Procedures for Estimating Traffic Loads for Pavement Design" by Jerry Hajek, 1995, and on MTO's "Adaptation and Verification of AASHTO Pavement Design Guide for Ontario Conditions", March 19, 2008.

Table D-2
PAVEMENT DESIGN AND ANALYSIS - FLEXIBLE STRUCTURAL DESIGN MODULE

Dufferin County
New County Road 109 Temporary Widening
2 Year Rehabilitation Design

Flexible Structural Design

80-kN ESALs Over Initial Performance Period	2,388,000
Initial Serviceability	4.5
Terminal Serviceability	2.5
Reliability Level (%)	90
Overall Standard Deviation	0.49
Roadbed Soil Resilient Modulus	35,000 kPa
Stage Construction	1.0
Calculated Design Structural Number	114

Specified Layer Design

Layer	Material Description	Struct Coef. (Ai)	Drain Coef. (Mi)	Thickness (Di) (mm)	Required Thickness (mm)	Calculated SN (mm)
1	New Hot Mix Asphalt	0.42	1.00	150	150	63
2	New Granular A Base	0.14	1.00	150	150	21
3	New Granular B,Type II	0.09	1.00	500	500	45
Total	-	-	-	800	800	129

Layered Thickness Design

Thickness precision

Layer	Material Description	Struct Coef. (Ai)	Drain Coef. (Mi)	Actual Spec Thickness (Di) (mm)	Actual Min Thickness (Di) (mm)	Elastic Modulus (kPa)	Calculated Thickness (mm)	Calculated SN (mm)
1	New Hot Mix Asphalt	0.42	1.00	-	-	2,750,000	134	56
2	New Granular A Base	0.14	1.00	-	-	250,000	27	4
3	New Granular B,Type II	0.09	1.00	-	-	210,000	597	54
Total	-	-	-	-	-	-	758	114

-

wsp.com

ASC/2
PROGRAM REFERENCE CARD

INTERSECTION

Dufferin 109 @ 2nd Line

CONTROLLER NUMBER _____ ENTERED BY _____ DATE Jul-23

BOOT _____ VER. _____ MAIN _____ VER. _____ HELP _____ VER _____ CONFIG _____

1. CONFIGURATION SUBMENU

1. CONTROLLER SEQUENCE

PRIORITY	1	2	3	4	5	6	7	8	9	10	11	12
RING 1	1	2	3	4								
RING 2	5	6	7	8								
CG		X		X								

2. PHASE NUMBER

	1	2	3	4	5	6	7	8	9	10	11	12
PHASES IN USE		X				X		X				
EXCLUSIVE PED												

3. PHASE TO LOAD SWITCH (MMU) ASSIGNMENT

LOAD SWITCH (MMU)	SIGNAL DRIVER GROUP		LOAD SWITCH (MMU)	SIGNAL DRIVER GROUP	
CHANNEL	PH/OLAP	PED	CHANNEL	PH/OLAP	PED
1	1		9	2	
2	2		10	4	
3	3		11	6	
4	4		12	8	
5	5		13	13	
6	6		14	14	
7	7		15	15	
8	8		16	16	

4. SDLC OPTIONS/ENABLES (BIU Number)

	1	2	3	4	5	6	7	8
TERM & FACIL								
DETECTOR RACK								
TYPE 2 RUNS AS TYPE 1								
MMU DISABLE								X
DIAGNOSTIC ENABLE (TEST FIXTURE)								
PEER TO PEER ENABLE								

PEER TO PEER ADDRESS:									
1		2		3		4		5	
6		7		8		9		10	

5. PORT2 CONFIGURATION

PORT2 PROTOCOL	
PORT2 ENABLE	
AB3418 ADDRESS	
AB3418 GROUP ADDRESS	
AB3418 RESPONSE DELAY	
AB3418 SINGLE FLAG ENABLE	
AB3418 DROP-OUT TIME	
AB3418 TOD SF SELECT	
DATE RATE (BPS)	
DATA, PARITY, STOP	

6. PORT3 CONFIGURATION

PORT3 PROTOCOL	
PORT3 ENABLE	
TELEMETRY ADDRESS	
SYSTEM DETECTOR 9-16 ADDRESS	
TELEMETRY RESPONSE DELAY	
AB3418 ADDRESS	
AB3418 GROUP ADDRESS	
AB3418 RESPONSE DELAY	
AB3418 SINGLE FLAG ENABLE	
AB3418 DROP-OUT TIME	
AB3418 TOD SF SELECT	
ADDITIONAL SCREEN(S)	
DUPLEX-HALF OR FULL	
MODEM DATA RATE (BPS)	
DATA, PARITY, STOP	

7. ENABLE EVENT LOSS

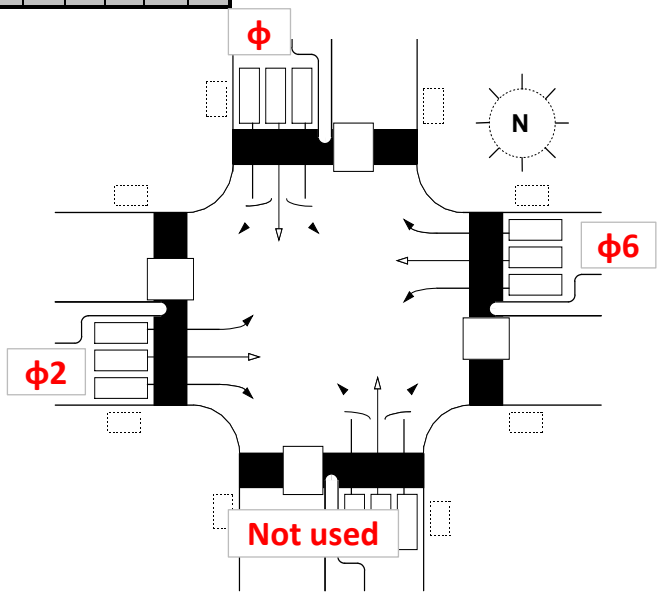
CRITICAL RFE'S (MMU/TE)	
NON-CRITICAL RFE'S (DET/TEST)	
DETECTOR ERRORS	
COORDINATION ERRORS	
MMU FLASH FAULTS	
LOCAL FLASH FAULTS	
PREEMPT	
POWER ON/OFF	
LOW BATTERY	
SPARE	
ALARM 1	
ALARM 2	
ALARM 3	
ALARM 4	
ALARM 5	
ALARM 6	
ALARM 7	
ALARM 8	
ALARM 9	
ALARM 10	
ALARM 11	
ALARM 12	
ALARM 13	
ALARM 14	
ALARM 15	
ALARM 16	

8. OPTIONS

SUPERVISOR ACCESS CODE	
DATA CHANGE ACCESS CODE	
KEY CLICK ENABLE	
BACKLIGHT ENABLE	

9. MMU PROGRAM CAN SERVE WITH

1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													



2. CONTROLLER SUBMENU

1. CONTROLLER TIMING DATA

PHASE	1	2	3	4	5	6	7	8	9	10	11	12
MIN GRN		10				10		10				
BIKE GRN												
CS MGRN												
WALK												
PED CLR												
VEH EXT		5				5		5				
VEH EXT 2												
MAX EXT												
MAX 1*		57.4				58.1		20.7				
MAX 2												
MAX 3												
DET MAX												
YELLOW		4.1				3.4		3.3				
RED CLR		2.5				2.5		2				
RED RVT	2	2	2	2	2	2	2	2				
ACT B4												
SEC/ACT												
MAX INI	30	30	30	30	30	30	30	30				
TIME B4												
CARS WT												
TTREDUC												
MIN GAP												

2. PHASE OVERLAP ASSIGNMENTS

OVERLAP CONSISTS OF PHASES:												
OVLP PHASE	1	2	3	4	5	6	7	8	9	10	11	12
1	X											
2		X										
3			X									
4				X								
5					X							
6						X						
7							X					
8								X				
9									X			
10										X		
11											X	
12												X

3. PED TIMING CARRYOVER

PHASE	CARRYOVER PHASE	PHASE	CARRYOVER PHASE
1		7	
2		8	
3		9	
4		10	
5		11	
6		12	

4. CONTROLLER RECALL DATA

PHASE	1	2	3	4	5	6	7	8	9	10	11	12
LOCKING MEMORY												
VEHICLE RECALL		X				X						
PED RECALL												
RECALL TO MAX												
SOFT RECALL												
DON'T REST HERE												
PED DARK N/CALL												

5. CONTROLLER OVERLAP DATA

OVERLAP A	1	2	3	4	5	6	7	8	9	10	11	12
STANDARD												
PROTECTED												
PERMITTED												
ENABLE LAG												
ENABLE LEAD												
SPARE												
ADVANCE GREEN TIMER												
LAG/LEAD GREEN TIMER												
LAG/LEAD YELLOW												
LAG/LEAD RED TIMER												
OVERLAP B	1	2	3	4	5	6	7	8	9	10	11	12
STANDARD												
PROTECTED												
PERMITTED												
ENABLE LAG												
ENABLE LEAD												
SPARE												
ADVANCE GREEN TIMER												
LAG/LEAD GREEN TIMER												
LAG/LEAD YELLOW												
LAG/LEAD RED TIMER												
OVERLAP C	1	2	3	4	5	6	7	8	9	10	11	12
STANDARD												
PROTECTED												
PERMITTED												
ENABLE LAG												
ENABLE LEAD												
SPARE												
ADVANCE GREEN TIMER												
LAG/LEAD GREEN TIMER												
LAG/LEAD YELLOW												
LAG/LEAD RED TIMER												
OVERLAP D	1	2	3	4	5	6	7	8	9	10	11	12
STANDARD												
PROTECTED												
PERMITTED												
ENABLE LAG												
ENABLE LEAD												
SPARE												
ADVANCE GREEN TIMER												
LAG/LEAD GREEN TIMER												
LAG/LEAD YELLOW												
LAG/LEAD RED TIMER												

PED OVERLAP ASSIGNMENTS OVERLAP CONSISTS OF PHASES:												
OVLP PHASE	1	2	3	4	5	6	7	8	9	10	11	12
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												

6. CONTROLLER START/FLASH DATA

PHASE	1	2	3	4	5	6	7	8	9	10	11	12
POWER START												
EXTERNAL START												
ENTRY REM FLASH												
EXIT REM FLASH												
REM FLASH YEL												
FL TOGETHER PHS												
FL TOGETHER OVLPS	A			B			C			D		
POWER START												
EXTERNAL START												
POWER START ALL RED ME												
POWER START FLASH ME												

REMOTE FLASH OPTIONS:	
OUT OF FLASH YELLOW	
OUT OF FLASH ALL RED	
MINIMUM RECALL	
SPARE	
FLASH THROUGH LOAD SWITCHES	
CYCLE THROUGH PHASES	

7. NO SERVE PHASES

CANNOT SERVE WITH:											
PHASE	12	11	10	9	8	7	6	5	4	3	2
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											

8. DIMMING

LOAD SWITCH	1	2	3	4	5	6	7	8
DIM GRN/WALK								
DIM YEL/PC								
DIM RED/DW								
LOAD SWITCH	9	10	11	12	13	14	15	16
DIM GRN/WLK								
DIM YEL/PC								
DIM RED/DW								

9. CONTROLLER OPTION DATA

PHASE	1	2	3	4	5	6	7	8	9	10	11	12
GUAR PASSAGE												
NONACTUATED I		X				X						
NONACTUATED II				X				X				
DUAL ENTRY		X		X		X		X				
COND SERVICE	X		X		X		X					
COND RESERVICE												
REST IN WALK												
FLASHING WALK												

FIVE SECTION TURN HEADS					
5-2		7-4		1-6	
3-8		11-10		9-12	

DUAL ENTRY	ON	RESERVED	
COND SERVICE ENABLE		PROTECTION GROUP 1	
COND. SERVICE DET X SWITCHING		BACKUP PROTECTION GROUP 2	
PED CLR PROTECT		BACKUP PROTECTION GROUP 3	
SPEC PREEMPT OVLP FLASH		SIMULTANEOUS GAP GROUP 1	
LOCK DETECTORS IN RED ONLY		SIMULTANEOUS GAP GROUP 2	
RESERVED		SIMULTANEOUS GAP GROUP 3	

3. COORDINATOR SUBMENU

1. COORDINATOR OPTIONS

SPLIT UNITS		ACT CRD PHASE	
OFFSET UNITS		ACT WALK/RESET	
INTERCNT FMT		INHIBIT MAX	
INTERCNT SRC		MAX2 SELECT	
RESYNC COUNT		MULTISYNC	
TRANSITION		FLOAT FORCE OFF	
DWELL PERIOD			

ALTERNATE SEQUENCE	A		B		C		D		E		F	

2. COORD. MANUAL AND SPLIT DEMAND

MANUAL ENABLE					MANUAL PATTERN							
SPLIT DEMAND					DEMAND 1				DEMAND 2			
DEMAND CALL TIME												
DEMAND CYCLE COUNT												
DEMAND	1	2	3	4	5	6	7	8	9	10	11	12
DEMAND 1 PHASE												
DEMAND 2 PHASE												

3. COORD. AUTO PERM MIN GREEN

PHASE	AUTO PERM MIN GRN	PHASE	AUTO PERM MIN GRN
1		7	
2		8	
3		9	
4		10	
5		11	
6		12	

4. PATTERN DATA STD FORMAT

COORD PATTERN		OFFSET	
CYCLE LENGTH		C/O/S	

PLAN FORMAT

COORD PATTER		OFFSET	
CYCLE LENGTH		PLAN	

TS2 FORMAT

COORD PATTERN		TIMING PLAN					
CYCLE LENGTH		OFFSETS	1		2		3	

SPLITS:												
PHASE 1		2			3			4				
PHASE 5		6			7			8				
PHASE 9		10			11			12				
VEH PERMISSIVE				1			2					
VEH PERM 2 DISP												
PHASE RESERVICE												
SPLIT EXTENSION/RING				1			2					
SPL DMD PATTERN				1			2					
XARTERY PATTERN												
PHASE	1	2	3	4	5	6	7	8	9	10	11	12
COOR PHASES												
VEHICLE RECAL												
VEH MAX RECAL												
PED RECALL												
PHASE OMIT												
SPARE												
	A	B	C	D	E	F						
ALT SEQUENCE												

STD FORMAT

COORD PATTERN		OFFSET	
CYCLE LENGTH		C/O/S	

PLAN FORMAT

COORD PATTERN		OFFSET	
CYCLE LENGTH		PLAN	

TS2 FORMAT

COORD PATTERN		TIMING PLAN					
CYCLE LENGTH		OFFSETS	1		2		3	

SPLITS:												
PHASE 1		2			3			4				
PHASE 5		6			7			8				
PHASE 9		10			11			12				
VEH PERMISSIVE				1			2					
VEH PERM 2 DISP												
PHASE RESERVICE												
SPLIT EXTENSION/RING				1			2					
SPL DMD PATTERN				1			2					
XARTERY PATTERN												
PHASE	1	2	3	4	5	6	7	8	9	10	11	12
COOR PHASES												
VEHICLE RECALL												
VEH MAX RECALL												
PED RECALL												
PHASE OMIT												
SPARE												
	A	B	C	D	E	F						
ALT SEQUENCE												

STD FORMAT

COORD PATTER		OFFSET	
CYCLE LENGTH		C/O/S	

PLAN FORMAT

COORD PATTER		OFFSET	
CYCLE LENGTH		PLAN	

TS2 FORMAT

COORD PATTER		TIMING PLAN						
CYCLE LENGTH		OFFSETS	1		2		3	

SPLITS:												
PHASE 1		2			3		4					
PHASE 5		6			7		8					
PHASE 9		10			11		12					
VEH PERMISSIVE				1		2						
VEH PERM 2 DISP												
PHASE RESERVICE												
SPLIT EXTENSION/RING				1		2						
SPL DMD PATTERN				1		2						
XARTERY PATTERN												
PHASE	1	2	3	4	5	6	7	8	9	10	11	12
COORD PHASES												
VEHICLE RECALL												
VEH MAX RECALL												
PED RECALL												
PHASE OMIT												
SPARE												
	A	B	C	D	E	F						
ALT SEQUENCE												

STD FORMAT

COORD PATTERN		OFFSET	
CYCLE LENGTH		C/O/S	

PLAN FORMAT

COORD PATTERN		OFFSET	
CYCLE LENGTH		PLAN	

TS2 FORMAT

COORD PATTERN		TIMING PLAN						
CYCLE LENGTH		OFFSETS	1		2		3	

SPLITS:												
PHASE 1		2			3		4					
PHASE 5		6			7		8					
PHASE 9		10			11		12					
VEH PERMISSIVE				1		2						
VEH PERM 2 DISP												
PHASE RESERVICE												
SPLIT EXTENSION/RING				1		2						
SPL DMD PATTERN				1		2						
XARTERY PATTERN												
PHASE	1	2	3	4	5	6	7	8	9	10	11	12
COORD PHASES												
VEHICLE RECALL												
VEH MAX RECALL												
PED RECALL												
PHASE OMIT												
SPARE												
	A	B	C	D	E	F						
ALT SEQUENCE												

STD FORMAT

COORD PATTER		OFFSET	
CYCLE LENGTH		C/O/S	

PLAN FORMAT

COORD PATTER		OFFSET	
CYCLE LENGTH		PLAN	

TS2 FORMAT

COORD PATTER		TIMING PLAN						
CYCLE LENGTH		OFFSETS	1		2		3	

SPLITS:												
PHASE 1		2			3		4					
PHASE 5		6			7		8					
PHASE 9		10			11		12					
VEH PERMISSIVE				1		2						
VEH PERM 2 DISP												
PHASE RESERVICE												
SPLIT EXTENSION/RING				1		2						
SPL DMD PATTERN				1		2						
XARTERY PATTERN												
PHASE	1	2	3	4	5	6	7	8	9	10	11	12
COORD PHASES												
VEHICLE RECALL												
VEH MAX RECALL												
PED RECALL												
PHASE OMIT												
SPARE												
	A	B	C	D	E	F						
ALT SEQUENCE												

STD FORMAT

COORD PATTERN		OFFSET	
CYCLE LENGTH		C/O/S	

PLAN FORMAT

COORD PATTERN		OFFSET	
CYCLE LENGTH		PLAN	

TS2 FORMAT

COORD PATTERN		TIMING PLAN						
CYCLE LENGTH		OFFSETS	1		2		3	

SPLITS:												
PHASE 1		2			3		4					
PHASE 5		6			7		8					
PHASE 9		10			11		12					
VEH PERMISSIVE				1		2						
VEH PERM 2 DISP												
PHASE RESERVICE												
SPLIT EXTENSION/RING				1		2						
SPL DMD PATTERN				1		2						
XARTERY PATTERN												
PHASE	1	2	3	4	5	6	7	8	9	10	11	12
COORD PHASES												
VEHICLE RECALL												
VEH MAX RECALL												
PED RECALL												
PHASE OMIT												
SPARE												
	A	B	C	D	E	F						
ALT SEQUENCE												

STD FORMAT

COORD PATTER		OFFSET	
CYCLE LENGTH		C/O/S	

PLAN FORMAT

COORD PATTER		OFFSET	
CYCLE LENGTH		PLAN	

TS2 FORMAT

COORD PATTER		TIMING PLAN						
CYCLE LENGTH		OFFSETS	1		2		3	

SPLITS:												
PHASE 1			2				3			4		
PHASE 5			6				7			8		
PHASE 9			10				11			12		
VEH PERMISSIVE					1				2			
VEH PERM 2 DISP												
PHASE RESERVICE												
SPLIT EXTENSION/RING					1				2			
SPL DMD PATTERN					1				2			
XARTERY PATTERN												
PHASE	1	2	3	4	5	6	7	8	9	10	11	12
COORD PHASES												
VEHICLE RECAL												
VEH MAX RECAL												
PED RECALL												
PHASE OMIT												
SPARE												
	A	B	C	D	E	F						
ALT SEQUENCE												

STD FORMAT

COORD PATTER		OFFSET	
CYCLE LENGTH		C/O/S	

PLAN FORMAT

COORD PATTER		OFFSET	
CYCLE LENGTH		PLAN	

TS2 FORMAT

COORD PATTER		TIMING PLAN						
CYCLE LENGTH		OFFSETS	1		2		3	

SPLITS:												
PHASE 1			2				3			4		
PHASE 5			6				7			8		
PHASE 9			10				11			12		
VEH PERMISSIVE					1				2			
VEH PERM 2 DISP												
PHASE RESERVICE												
SPLIT EXTENSION/RING					1				2			
SPL DMD PATTERN					1				2			
XARTERY PATTERN												
PHASE	1	2	3	4	5	6	7	8	9	10	11	12
COORD PHASES												
VEHICLE RECAL												
VEH MAX RECAL												
PED RECALL												
PHASE OMIT												
SPARE												
	A	B	C	D	E	F						
ALT SEQUENCE												

STD FORMAT

COORD PATTER		OFFSET	
CYCLE LENGTH		C/O/S	

PLAN FORMAT

COORD PATTER		OFFSET	
CYCLE LENGTH		PLAN	

TS2 FORMAT

COORD PATTER		TIMING PLAN						
CYCLE LENGTH		OFFSETS	1		2		3	

SPLITS:												
PHASE 1			2				3			4		
PHASE 5			6				7			8		
PHASE 9			10				11			12		
VEH PERMISSIVE					1				2			
VEH PERM 2 DISP												
PHASE RESERVICE												
SPLIT EXTENSION/RING					1				2			

STD FORMAT

COORD PATTERN		OFFSET	
CYCLE LENGTH		C/O/S	

PLAN FORMAT

COORD PATTERN		OFFSET	
CYCLE LENGTH		PLAN	

TS2 FORMAT

COORD PATTERN		TIMING PLAN						
CYCLE LENGTH		OFFSETS	1		2		3	

SPLITS:												
PHASE 1	2				3				4			
PHASE 5	6				7				8			
PHASE 9	10				11				12			
VEH PERMISSIVE					1				2			
VEH PERM 2 DISP												
PHASE RESERVICE												
SPLIT EXTENSION/RING					1				2			
SPL DMD PATTERN					1				2			
XARTERY PATTERN												
PHASE	1	2	3	4	5	6	7	8	9	10	11	12
COORD PHASES												
VEHICLE RECALL												
VEH MAX RECALL												
PED RECALL												
PHASE OMIT												
SPARE												
	A	B	C	D	E	F						
ALT SEQUENCE												

STD FORMAT

COORD PATTERN		OFFSET	
CYCLE LENGTH		C/O/S	

PLAN FORMAT

COORD PATTERN		OFFSET	
CYCLE LENGTH		PLAN	

TS2 FORMAT

COORD PATTERN		TIMING PLAN						
CYCLE LENGTH		OFFSETS	1		2		3	

SPLITS:												
PHASE 1	2				3				4			
PHASE 5	6				7				8			
PHASE 9	10				11				12			
VEH PERMISSIVE					1				2			
VEH PERM 2 DISP												
PHASE RESERVICE												
SPLIT EXTENSION/RING					1				2			
SPL DMD PATTERN					1				2			
XARTERY PATTERN												
PHASE	1	2	3	4	5	6	7	8	9	10	11	12
COORD PHASES												
VEHICLE RECALL												
VEH MAX RECALL												
PED RECALL												
PHASE OMIT												
SPARE												
	A	B	C	D	E	F						
ALT SEQUENCE												

STD FORMAT

COORD PATTERN		OFFSET	
CYCLE LENGTH		C/O/S	

PLAN FORMAT

COORD PATTERN		OFFSET	
CYCLE LENGTH		PLAN	

TS2 FORMAT

COORD PATTERN		TIMING PLAN						
CYCLE LENGTH		OFFSETS	1		2		3	

SPLITS:												
PHASE 1	2				3				4			
PHASE 5	6				7				8			
PHASE 9	10				11				12			
VEH PERMISSIVE					1				2			
VEH PERM 2 DISP												
PHASE RESERVICE												
SPLIT EXTENSION/RING					1				2			

SPL DMD PATTERN					1			2				
XARTERY PATTERN												
PHASE	1	2	3	4	5	6	7	8	9	10	11	12
COORD PHASES												
VEHICLE RECALL												
VEH MAX RECALL												
PED RECALL												
PHASE OMIT												
SPARE												
	A	B	C	D	E	F						
ALT SEQUENCE												

STD FORMAT

COORD PATTER		OFFSET	
CYCLE LENGTH		C/O/S	

PLAN FORMAT

COORD PATTER		OFFSET	
CYCLE LENGTH		PLAN	

TS2 FORMAT

COORD PATTER		TIMING PLAN					
CYCLE LENGTH		OFFSETS	1		2		3	

SPLITS:												
PHASE 1			2				3			4		
PHASE 5			6				7			8		
PHASE 9			10				11			12		
VEH PERMISSIVE					1				2			
VEH PERM 2 DISP												
PHASE RESERVICE												
SPLIT EXTENSION/RING					1				2			
SPL DMD PATTERN					1				2			
XARTERY PATTERN												
PHASE	1	2	3	4	5	6	7	8	9	10	11	12
COORD PHASES												
VEHICLE RECALL												
VEH MAX RECALL												
PED RECALL												
PHASE OMIT												
SPARE												
	A	B	C	D	E	F						
ALT SEQUENCE												

SPL DMD PATTERN					1			2				
XARTERY PATTERN												
PHASE	1	2	3	4	5	6	7	8	9	10	11	12
COORD PHASES												
VEHICLE RECALL												
VEH MAX RECALL												
PED RECALL												
PHASE OMIT												
SPARE												
	A	B	C	D	E	F						
ALT SEQUENCE												

STD FORMAT

COORD PATTERN		OFFSET	
CYCLE LENGTH		C/O/S	

PLAN FORMAT

COORD PATTERN		OFFSET	
CYCLE LENGTH		PLAN	

TS2 FORMAT

COORD PATTERN		TIMING PLAN					
CYCLE LENGTH		OFFSETS	1		2		3	

SPLITS:												
PHASE 1		2			3			4				
PHASE 5		6			7			8				
PHASE 9		10			11			12				
VEH PERMISSIVE					1			2				
VEH PERM 2 DISP												
PHASE RESERVICE												
SPLIT EXTENSION/RING					1			2				
SPL DMD PATTERN					1			2				
XARTERY PATTERN												
PHASE	1	2	3	4	5	6	7	8	9	10	11	12
COORD PHASES												
VEHICLE RECALL												
VEH MAX RECALL												
PED RECALL												
PHASE OMIT												
SPARE												
	A	B	C	D	E	F						
ALT SEQUENCE												

4. PREEMPTOR SUBMENU

1. PRIORITY PREEMPTOR 1

	1	2	3	4	5	6	7	8	9	10	11	12
TERM PHASE OVLP												
TRK CLR PHASE												
HOLD PHASES												
EXIT PHASES												
EXIT CALLS												
SPARE												
TERM OVERLAP	A			B			C			D		

ACTIVE		PED DARK	
PRIORITY		PED ACTIVE	
DET LOCK		ZERO PC TIME	
HOLD FLASH		PC THRU	
TERM OVLP ASAP		TERM	
DON'T OVERRIDE FLASH		ACTIVE ONLY DURING HOLD	
FLASH ALL OUTPUTS		NO CVM IN	
YELLOW-RED GOES GREEN		FAST FLASH GRN ON HOLD	
ENABLE MAX PREEMPT TIME		OUT OF	

MAX TIME		DURATION TIME	
MIN HOLD TIME		DELAY TIME	
MIN PED CLEAR		INHIBIT TIME	
EXIT MAX		HLD DELAY TIME	

	GRN	YEL	RED
MINIMUM			
TRACK CLEAR			
HOLD			

2. PRIORITY PREEMPTOR 2

	1	2	3	4	5	6	7	8	9	10	11	12
TERM PHASE OV												
TRK CLR PHASE												
HOLD PHASES												
EXIT PHASES												
EXIT CALLS												
SPARE												
TERM OVERLAP	A			B			C			D		

ACTIVE		PED DARK	
PRIORITY		PED ACTIVE	
DET LOCK		ZERO PC TIME	
HOLD FLASH		PC THRU	
TERM OVLP ASAP		TERM	
DON'T OVERRIDE FLASH		ACTIVE ONLY DURING HOLD	
FLASH ALL OUTPUTS		NO CVM IN	
YELLOW-RED GOES GREEN		FAST FLASH GRN ON HOLD	
ENABLE MAX PREEMPT TIME		OUT OF	

MAX TIME		DURATION TIME	
MIN HOLD TIME		DELAY TIME	
MIN PED CLEAR		INHIBIT TIME	
EXIT MAX		HLD DELAY TIME	

	GRN	YEL	RED
MINIMUM			
TRACK CLEAR			
HOLD			
LINKED PREEMPTOR			

3. PRIORITY PREEMPTOR 3

	1	2	3	4	5	6	7	8	9	10	11	12
TERM PHASE OVLP												
TRK CLR PHASE												
HOLD PHASES												
EXIT PHASES												
EXIT CALLS												
SPARE												
TERM OVERLAP	A			B			C			D		

ACTIVE		PED DARK	
PRIORITY		PED ACTIVE	
DET LOCK		ZERO PC	
HOLD FLASH		PC THRU	
TERM OVLP ASAP		TERM ACTIVE	
DON'T OVERRIDE FLASH		ONLY DURING	
FLASH ALL OUTPUTS		NO CVM IN	
YELLOW-RED GOES GREEN		FAST FLASH GRN ON	
ENABLE MAX PREEMPT TIME		OUT OF	

MAX TIME		DURATION TIME	
MIN HOLD TIME		DELAY TIME	
MIN PED CLEAR		INHIBIT TIME	
EXIT MAX		HLD DELAY TIME	

	GRN	YEL	RED
MINIMUM			
TRACK CLEAR			
HOLD			
LINKED PREEMPTOR			

4. PRIORITY PREEMPTOR 4

	1	2	3	4	5	6	7	8	9	10	11	12
TERM PHASE OVLP												
TRK CLR PHASE												
HOLD PHASES												
EXIT PHASES												
EXIT CALLS												
SPARE												
TERM OVERLAP	A			B			C			D		

ACTIVE		PED DARK	
PRIORITY		PED ACTIVE	
DET LOCK		ZERO PC	
HOLD FLASH		PC THRU	
TERM OVLP ASAP		TERM PHASES	
DON'T OVERRIDE FLASH		ACTIVE	
FLASH ALL OUTPUTS		NO CVM IN FLASH	
YELLOW-RED GOES GREEN		FAST FLASH	
ENABLE MAX PREEMPT TIME		OUT OF	

MAX TIME		DURATION TIME	
MIN HOLD TIME		DELAY TIME	
MIN PED CLEAR		INHIBIT TIME	
EXIT MAX		HLD DELAY TIME	

	GRN	YEL	RED
MINIMUM			
TRACK CLEAR			
HOLD			
LINKED PREEMPTOR			

5. PRIORITY PREEMPTOR 5

	1	2	3	4	5	6	7	8	9	10	11	12
TERM PHASE OVLP												
TRK CLR PHASE												
HOLD PHASES				X				X				
EXIT PHASES		X				X						
EXIT CALLS												
SPARE												
TERM OVERLAP	A			B			C			D		

ACTIVE	YES	PED DARK	NO
PRIORITY	YES	PED ACTIVE	NO
DET LOCK	NO	ZERO PC TIME	NO
HOLD FLASH	NO	PC THRU	NO
TERM OVLP ASAP	NO	TERM	NO
DON'T OVERRIDE FLASH		ACTIVE ONLY DURING HOLD	
FLASH ALL OUTPUTS		NO CVM IN	
YELLOW-RED GOES GREEN		FAST FLASH GRN ON HOLD	
ENABLE MAX PREEMPT TIME		OUT OF	GREEN

MAX TIME		DURATION TIME	
MIN HOLD TIME		DELAY TIME	
MIN PED CLEAR		INHIBIT TIME	
EXIT MAX		HLD DELAY TIME	

	GRN	YEL	RED
MINIMUM			
TRACK CLEAR			
HOLD			
LINKED PREEMPTOR			

6. PRIORITY PREEMPTOR 6

	1	2	3	4	5	6	7	8	9	10	11	12
TERM PHASE OVLP												
TRK CLR PHASE												
HOLD PHASES		X				X						
EXIT PHASES				X				X				
EXIT CALLS												
SPARE												
TERM OVERLAP	A			B			C			D		

ACTIVE	YES	PED DARK	NO
PRIORITY	YES	PED ACTIVE	NO
DET LOCK	NO	ZERO PC TIME	NO
HOLD FLASH	NO	PC THRU	NO
TERM OVLP ASAP	NO	TERM	NO
DON'T OVERRIDE FLASH		ACTIVE ONLY DURING HOLD	
FLASH ALL OUTPUTS		NO CVM IN	
YELLOW-RED GOES GREEN		FAST FLASH GRN ON HOLD	
ENABLE MAX PREEMPT TIME		OUT OF	GREEN

MAX TIME		DURATION TIME	
MIN HOLD TIME		DELAY TIME	
MIN PED CLEAR		INHIBIT TIME	
EXIT MAX		HLD DELAY TIME	

	GRN	YEL	RED
MINIMUM			
TRACK CLEAR			
HOLD			
LINKED PREEMPTOR			

7. BUS PREEMPTORS

	BUS PREEMPTOR			
	1	2	3	4
PREEMPTOR ACTIVE				
DETECTOR LOCK				
MAXIMUM TIME				
RESERVICE TIME				
DELAY TIME				
INHIBIT TIME				
ENTRANCE GREEN				
ENTRANCE PED CLR				
ENTRANCE YELLOW				
ENTRANCE RED				
MIN HOLD TIME				

	HOLD PHASE											
	1	2	3	4	5	6	7	8	9	10	11	12
PREEMPTOR 1												
PREEMPTOR 2												
PREEMPTOR 3												
PREEMPTOR 4												

5. NIC/TOD SUBMENU

1. NIC/TOD CLOCK/CALENDAR DATA

DATE SET	
TIME SET	
MANUAL NIC PROGRAM STEP	
MANUAL TOD PROGRAM STEP	
SYNC REFERENCE TIME	
SYNC REFERENCE	
WEEK 1 BEGINS ON 1ST SUNDAY	
DISABLE DAYLIGHT SAVINGS	
DST BEGINS LAST SUNDAY	

2. NIC/TOD WEEKLY PROGRAMS

WEEK	SUN	MON	TUES	WED	THURS	FRI	SAT
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

3. NIC/TOD YEARLY PROGRAMS

WEEK OF YEAR	1	2	3	4	5	6	7	8
WEEKLY PROGRAM								
WEEK OF YEAR	9	10	11	12	13	14	15	16
WEEKLY PROGRAM								
WEEK OF YEAR	17	18	19	20	21	22	23	24
WEEKLY PROGRAM								
WEEK OF YEAR	25	26	27	28	29	30	31	32
WEEKLY PROGRAM								
WEEK OF YEAR	33	34	35	36	37	38	39	40
WEEKLY PROGRAM								
WEEK OF YEAR	41	42	43	44	45	46	47	48
WEEKLY PROGRAM								
WEEK OF YEAR				49	50	51	52	53
WEEKLY PROGRAM								

4. NIC/TOD HOLIDAY PROGRAM

HOLIDAY	FLOAT/FIXED	MON/MON	DOW/DOM	WOM/YEAR	PROG
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
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30					
31					
32					
33					
34					
35					
36					

5. NIC PROGRAM STEP

STEP	PGM	TIME	PATTERN	OVERRIDE

STEP	PGM	TIME	PATTERN	OVERRIDE

TOD PROGRAM STEP												
DAY PGM NUM												
STEP BEGINS												
FLASH							DIM ENABLE					
RED REST							ALT VEH EXTSN					
SPARE 5							DET LOG ENABLE					
SPARE 3							SPARE 4					
TYPE 0 DELAY EN							SPARE 2					
DET DIAG PLAN												
ALTERNATE SEQUENCE	A		B		C		D		E		F	
PHASE	1	2	3	4	5	6	7	8	9	10	11	12
MAX2 ENABLE												
MAX3 ENABLE												
VEH RECALL												
VEH MAX RECALL												
PED RECALL												
COND SERV INH												
PHASE OMIT												
SPECIAL FCTNS									(1-8)			

TOD PROGRAM STEP												
DAY PGM NUM												
STEP BEGINS												
FLASH							DIM ENABLE					
RED REST							ALT VEH EXTS					
SPARE 5							DET LOG ENABLE					
SPARE 3							SPARE 4					
TYPE 0 DELAY EN							SPARE 2					
DET DIAG PLAN												
ALTERNATE SEQUENCE	A		B		C		D		E		F	
PHASE	1	2	3	4	5	6	7	8	9	10	11	12
MAX2 ENABLE												
MAX3 ENABLE												
VEH RECALL												
VEH MAX RECALL												
PED RECALL												
COND SERV INH												
PHASE OMIT												
SPECIAL FCTNS									(1-8)			

TOD PROGRAM STEP												
DAY PGM NUM												
STEP BEGINS												
FLASH							DIM ENABLE					
RED REST							ALT VEH EXTSN					
SPARE 5							DET LOG ENAB					
SPARE 3							SPARE 4					
TYPE 0 DELAY EN							SPARE 2					
DET DIAG PLAN												
ERNATE SEQUEN	A		B		C		D		E		F	
PHASE	1	2	3	4	5	6	7	8	9	10	11	12
MAX2 ENABLE												
MAX3 ENABLE												
VEH RECALL												
VEH MAX RECALL												
PED RECALL												
COND SERV INH												
PHASE OMIT												
SPECIAL FCTNS									(1-8)			

TOD PROGRAM STEP												
DAY PGM NUM												
STEP BEGINS												
FLASH							DIM ENABLE					
RED REST							ALT VEH EXTS					
SPARE 5							DET LOG ENA					
SPARE 3							SPARE 4					
TYPE 0 DELAY EN							SPARE 2					
DET DIAG PLAN												
ALTERNATE SEQUENCE	A		B		C		D		E		F	
PHASE	1	2	3	4	5	6	7	8	9	10	11	12
MAX2 ENABLE												
MAX3 ENABLE												
VEH RECALL												
VEH MAX RECALL												
PED RECALL												
COND SERV INH												
PHASE OMIT												
SPECIAL FCTNS									(1-8)			

TOD PROGRAM STEP												
DAY PGM NUM												
STEP BEGINS												
FLASH							DIM ENABLE					
RED REST							ALT VEH EXTSN					
SPARE 5							DET LOG ENAB					
SPARE 3							SPARE 4					
TYPE 0 DELAY EN							SPARE 2					
DET DIAG PLAN												
ERNATE SEQUEN	A		B		C		D		E		F	
PHASE	1	2	3	4	5	6	7	8	9	10	11	12
MAX2 ENABLE												
MAX3 ENABLE												
VEH RECALL												
VEH MAX RECALL												
PED RECALL												
COND SERV INH												
PHASE OMIT												
SPECIAL FCTNS									(1-8)			

TOD PROGRAM STEP												
DAY PGM NUM												
STEP BEGINS												
FLASH							DIM ENABLE					
RED REST							ALT VEH EXTS					
SPARE 5							DET LOG ENA					
SPARE 3							SPARE 4					
TYPE 0 DELAY EN							SPARE 2					
DET DIAG PLAN												
ALTERNATE SEQUENCE	A		B		C		D		E		F	
PHASE	1	2	3	4	5	6	7	8	9	10	11	12
MAX2 ENABLE												
MAX3 ENABLE												
VEH RECALL												
VEH MAX RECALL												
PED RECALL												
COND SERV INH												
PHASE OMIT												
SPECIAL FCTNS									(1-8)			

6. DETECTORS

1. DETECTOR TYPE/TIMERS

DET	TYPE	LOCK	EXTEND	DELAY	NO RESET	LOG ENABLE
1	1		5			
2	1		5			
3	1		5			
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						

2. DETECTOR PHASE ASSIGNMENT

	PHASE ASSIGNMENT											
DETECTOR	1	2	3	4	5	6	7	8	9	10	11	12
1						X						
2		X										
3								X				
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
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19												
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22												
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24												
25												
26												
27												
28												
29												
30												
31												
32												

3. PED AND SYSTEM DETECTOR LOCAL ASSIGNMENT

DETECTOR LOG INTERVAL					MINUTES	
	PHASE PED DETECTOR					
	1	2	3	4	5	6
LOCAL PED DET NUMBER						
	7	8	9	10	11	12
NUMBER						
	LOCAL SYSTEM DET NUMBER					
LOCAL DETECTOR NUMBER	1	2	3	4	5	6
	7	8	9	10	11	12
NUMBER						

4. CROSS SWITCHING

	PHASES											
DETECTOR	1	2	3	4	5	6	7	8	9	10	11	12
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
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26												
27												
28												
29												
30												
31												
32												

5. SPEED DETECTORS

SPEED DET NUMBER	1	2	3	4	5	6	7	8
ONE DETECTOR SPEED:								
LOCAL DET NUMBER								
VEHICLE LENGTH								
LOOP LENGTH								
TWO DETECTOR SPEED:								
LOCAL DET NUMBER								
SPEED TRAP LENGTH								
ENABLE LOG								
UNITS:								

6. VEHICLE DETECTOR DIAGNOSTIC PLAN

PLAN	DET NO.	1	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	DIAG NO.															
	SCALING															
2	DIAG NO.															
	SCALING															
3	DIAG NO.															
	SCALING															
4	DIAG NO.															
	SCALING															
5	DIAG NO.															
	SCALING															
6	DIAG NO.															
	SCALING															
7	DIAG NO.															
	SCALING															
8	DIAG NO.															
	SCALING															
FINAL ACTION																
PLAN	DET NO.	17	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	DIAG NO.															
	SCALING															
2	DIAG NO.															
	SCALING															
3	DIAG NO.															
	SCALING															
4	DIAG NO.															
	SCALING															
5	DIAG NO.															
	SCALING															
6	DIAG NO.															
	SCALING															
7	DIAG NO.															
	SCALING															
8	DIAG NO.															
	SCALING															
FINAL ACTION																

7. PED DETECTOR DIAGNOSTIC PLAN

PLAN	DET NO.	1	2	3	4	5	6	7	8	9	10	11	12
1	DIAG. NO.												
	SCALING												
2	DIAG. NO.												
	SCALING												
3	DIAG. NO.												
	SCALING												
4	DIAG. NO.												
	SCALING												
5	DIAG. NO.												
	SCALING												
6	DIAG. NO.												
	SCALING												
7	DIAG. NO.												
	SCALING												
8	DIAG. NO.												
	SCALING												

8. DETECTOR DIAGNOSTIC INTERVAL

DETECTOR DIAGNOSTIC INTERVAL			
DIAGNOSTIC NUMBER	NO ACTIVITY	MAX PRESENCE	ERRATIC COUNTS
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
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