Corporation of the Town of Cobourg

Albert Street Reconstruction

Contract Documents and Specifications

Contract No. CO-21-01 PWD

December 2020
Project No. C14-0270

Corporation of the Town of Cobourg

Albert Street Reconstruction

Contract No. CO-21-01 PWD

Sealed Tenders, clearly marked as to its contents with the Tender Bid Receipt Label provided, will be received by Legislative Services until:

2:00:00 P.M., Local Time, Tuesday, December 15, 2020

Staff will be present to receive tenders at rear delivery entrance to Victoria Hall. Tender openings will be completed by Town staff and unofficial results will be posted on the website shortly after tender openings. Due to COVID-19 restrictions, public will not be able to attend tender openings.

Approximate quantities of major items are as follows:

Earth Excavation	1,340	m^3
Granular 'A' and 'B'	2,125	t
Hot Mix Asphalt	450	t
300 – 375 mm Storm Sewers	122	m
300 mm Watermain	162	m
250 mm Sanitary Sewers	175	m
Concrete Curb and Gutter	400	m
Concrete Sidewalk	710	m^2
Traffic signals and residential hydro service relocations		

Plans, specifications and tender forms will be available for download as of **Tuesday, December 1, 2020** at www.biddingo.com.

Each tender must be accompanied by a Bid Bond or a certified cheque in the amount stipulated in the Tender Documents, and the successful bidder must provide Performance and Materials Bonds as specified, with the executed Contract.

Lowest or any tender not necessarily accepted.

Mr. Brent Larmer
Manager of Legislative Services
Corporation of the Town of Cobourg
55 King Street West
Cobourg, Ontario K9A 2M2

Tel: 905-372-4301

Mr. Steve May, C.E.T.
Senior Project Manager
CIMA Canada Inc.
415 Baseline Road West, 2nd Floor
Bowmanville, Ontario L1C 5M2

Tel: 905-697-4464

COBOURG

THE CORPORATION OF THE TOWN OF COBOURG

TENDER BID RECEIPT LABEL

THIS LABEL MUST BE SECURELY ATTACHED TO THE FRONT OF THE SEALED ENVELOPE CONTAINING THE TENDER BID.

ALL TENDER BIDS MUST BE RECEIVED AT:
LEGISLATIVE SERVICES, 55 King Street West, Cobourg ON K9A 2M2 905-372-4301

COMPLETED BY DEPARTMENT ISSUING TENDER BID	
TENDER BID NUMBER:	CO - 21 - 01 - PWD
TENDER BID NAME:	Albert Street Reconstruction
CLOSING DATE:	Tuesday, December 15, 2020
CLOSING TIME:	2:00 P.M.

COMPLETED BY COMPANY SUBMITTING TENDER BID	
SUBMITTED BY:	
COMPANY CONTACT:	
COMPANY NAME:	
COMPANY ADDRESS:	
COMPANY PHONE:	

LEGISLATIVE SERVICES USE ONLY		
TENDER BID RECEIPT:		
DATE:	TIME:	INITIALS:

LEGISLATIVE SERVICES USE ONLY			
TENDER BID OPENING:			
DATE:	TIME:	INITIALS:	INITIALS:

By-law 016-2012, Purchasing Policy (est March 19, 2012)
Part 7.1, Section 7, RETURN RECEIPT OF COMPETITIVE BID DOCUMENTS, Purchasing Policy,
"*All tender bids will be issued from and received at the office of the Municipal Clerk, located at the Main Floor of Victoria Hall, 55 King Street West, Cobourg, Ontario K9A 2M2,* ***using the appropriate label or envelope as provided in bid package***."

Contract Agreement

Contract No. CO-21-01 PWD

Contract Title Albert Street Reconstruction

THIS AGREEMENT made at_____ this ____ day of_____, 202__

B E T W E E N: **Corporation of the Town of Cobourg**

(hereinafter called the "Owner")

OF THE FIRST PART

- and -

_____

(hereinafter called the "Contractor")

OF THE SECOND PART

WITNESSETH

That the Owner and the Contractor in consideration of the fulfilment of their respective promises and obligations herein set forth covenant and agree with each other as follows:

ARTICLE 1

(a) A general description of the work is: Supply of materials, labour and equipment to reconstruct approximately 180 m of road, sanitary sewers and watermain, 65 m of storm sewer, and associated services on Albert Street from Hibernia Street to Third Street, including traffic signal upgrades in the Albert Street and Hibernia Street intersection, in the Town of Cobourg.

(b) The Contractor shall, for the prices set out in the Form of Tender and except as otherwise specifically provided, provide at no additional cost to the Owner all and every kind of labour, machinery, plant, structures, roads, ways, materials, appliances, articles and things necessary for the due execution and completion of all the work set out in this Contract and shall forthwith according to the instructions of the Contract Administrator, commence the works and diligently execute the respective portions thereof, and deliver the works complete in every particular to the Owner within the time specified in the Contract.

ARTICLE 2

In the event that the Form of Tender provides for and contains a Contingency Allowance, it is understood and agreed that such Contingency Allowance is merely for the convenience of accounting by the Owner, and the Contractor is not entitled to payment thereof except for extra or additional work carried out by him/her as directed by the Contract Administrator and in accordance with the Contract and only to the extent of such extra or additional work.

ARTICLE 3

In case of any inconsistency or conflict between the provisions of this Agreement and the Plans or Specifications or General Conditions or Form of Tender or any other document or writing, the provisions of such documents shall take precedence and govern in the following order, namely:

(1) This Agreement
(2) Addenda, if any
(3) Special Provisions, if any
(4) Information for Tenderers
(5) Supplemental General Conditions, if any
(6) General Conditions
(7) Supplementary Specifications, if any
(8) Specifications, if any
(9) Standard Specifications, if any
(10) Contract Drawings
(11) Standard Drawings
(12) Form of Tender

ARTICLE 4

The Contractor shall not without the consent in writing of the Contract Administrator and without restricting in any way the provisions of the General Conditions, make any assignment of any part of the whole of any monies due or to become due under the provisions of this Contract.

ARTICLE 5

The Owner covenants with the Contractor that the Contractor having in all respects complied with the provisions of this Contract, will be paid for and in respect of the works the sum of _____ exclusive of H.S.T. subject to Article 2 hereof and subject to such additions and deductions as may properly be made under the terms hereof, subject to the provision that the Owner may make payments on account monthly or otherwise as may be provided in the General Conditions attached hereto.

ARTICLE 6

Where any notice, direction or other communication is required to be or may be given or made by one of the parties hereto to the other or to the Contract Administrator or to his/her agent, it shall be deemed sufficiently given or made if mailed or delivered in writing to such party or to the Contract Administrator at the following addresses:

The Owner:
Corporation of the Town of Cobourg
55 King Street West
Cobourg, Ontario K9A 2M2

The Contractor:

The Contract Administrator:
CIMA Canada Inc.
415 Baseline Road West, 2nd Floor
Bowmanville, Ontario L1C 5M2

Where any such notice, direction or other communication is given or made to the Contract Administrator, a copy thereof shall likewise be delivered to any agent of the Contract Administrator appointed in accordance with the General Conditions of this Contract and where any such notice, direction or other communication is given or made to such agent a copy thereof shall likewise be delivered to the Contract Administrator.

ARTICLE 7

A copy of each of the General Conditions, Supplemental General Conditions (if any), Special Provisions, Form of Tender, Information for Tenderers and Addenda is/are hereto annexed and together with the Standard Specifications, Standard Drawings and Contract Drawings relating thereto are made part of this Contract as fully to all intents and purposes as though recited in full herein.

ARTICLE 8

No implied Contract of any kind whatsoever by or on behalf of the Owner shall arise or be implied by or inferred from anything in this Contract contained, nor from any position or situation of the parties at any time, it being clearly understood that the express covenants and agreements herein contained made by the Owner shall be the only covenants and agreements upon which any rights against the Owner may be founded.

ARTICLE 9

Time shall be deemed the essence of this Contract.

ARTICLE 10

The Contractor declares that in tendering for the works and in entering into this Contract he/she has either investigated for himself/herself the character of the work and all local conditions that might affect his/her tender or his/her acceptance or performance of the work, or that not having so investigated, he/she acknowledges that his/her responsibility under the Contract is in no way reduced or limited thereby and, in either case, he/she is willing to assume and does hereby assume all risk of conditions arising, developing, or being revealed in the course of the work which might or could make the work, or any items thereof, more expensive in character, or more onerous to fulfil, than was contemplated or known when the tender was made or the Contract signed. The Contractor also declares that he/she did not and does not rely upon information furnished by any methods whatsoever by the Owner or its officers, employees or agents, being aware that any information from such sources was and is approximate and speculative only, and was not in any manner warranted or guaranteed by the Owner.

ARTICLE 11

The Contract shall apply to and be binding on the parties hereto and their successors, administrators, executors and assigns and each of them.

IN WITNESS WHEREOF the parties hereto have hereunto set their hands and seals the day and year first above written or caused their corporate seals to be affixed, attested by the signature of their proper officers, as the case may be.

Owner: **Corporation of the Town of Cobourg**

Per: _____

Per: _____

(Seal)

Contractor:

_____

*Witness as to Signature of Contractor

Address _____ Per: _____

_____

Occupation _____ Per: _____

(Seal)

*Not necessary if corporate seal is affixed

Corporation of the Town Of Cobourg

Albert Street Reconstruction

Contract No. CO-21-01 PWD

Table of Contents

Corporation of the Town of Cobourg

Albert Street Reconstruction

Contract No. CO-21-01 PWD

Tenderer's Check List

Before submitting your tender, check the following points:

1. Has your tender been signed and your seal affixed? _____

2. Have you enclosed the required Tender Deposit or Bid Bond? _____

3. Have you enclosed the Agreement to Bond, signed and sealed by your proposed surety? _____

4. Have you entered all required prices in the Form of Tender? _____

5. Have you completed all schedules in the Form of Tender? _____

6. Have you completed, signed and included all Addenda where required to do so, and indicated the number of Addenda in your Form of Tender? _____

7. Have you listed your experience in succesfully completed similar work? _____

8. Have you listed your senior staff and stated their qualifications and experience? _____

9. Have you listed your subcontractors? _____

10. Have you provided your Workplace Safety and Insurance Board experience rating? _____

11. Are the documents complete? _____

<u>Note:</u> 1. *Your Tender will be informal and may be disqualified if **any** of the foregoing points (if applicable) have not been complied with.*

2. *Your Tender may be disqualified if you tender unbalanced prices for **any** item in the Form of Tender.*

Make sure that your tender is sealed in an envelope that is clearly marked "confidential" and properly identified with the Contract title, Contract number and your company or firm's name and postal address.

Corporation of the Town of Cobourg

Albert Street Reconstruction

Contract No. CO-21-01 PWD

Information For Tenderers

December 2020

Corporation of the Town of Cobourg

Albert Street Reconstruction

Contract No. CO-21-01 PWD

Index to Information for Tenderers

1. General

Sealed Tenders clearly marked "Albert Street Reconstruction, Contract No. CO-21-01 PWD" with the Tender Bid Receipt Label will be received until:

2:00:00 P.M., Local Time, Tuesday, December 15, 2020

and shall be addressed to: **Mr. Brent Larmer**
Manager of Legislative Services
Corporation of the Town of Cobourg
Victoria Hall, 55 King Street West
Cobourg, Ontario K9A 2M2

2. Delivery and Opening of Tenders

One (1) copy of the tender, on the forms provided, shall be submitted. All information requested shall be shown in the tender, in the space provided.

The use of mail or courier for delivery of a tender will be at the sole risk of the Tenderer and no consideration will be given to tenders deposited after the advertised deadline.

Staff will be present to receive tenders at rear delivery entrance to Victoria Hall. Tender openings will be completed by Town staff and unofficial results will be posted on the website shortly after tender openings. Due to COVID-19 restrictions, public will not be able to attend tender openings. Tenders will then be passed to the Owner's Contract Administrator who will check and analyze the tenders and submit a report and recommendation to the Owner.

3. Description of Works

The following is a general but not necessarily complete, description of the works to be constructed for the Corporation of the Town of Cobourg (Owner):

Albert Street Reconstruction

Supply of materials, labour and equipment to reconstruct approximately 180 m of road, storm sewer, sanitary sewers and watermain, and associated services on Albert Street from Hibernia Street to Third Street, including traffic signal upgrades in the Albert Street and Hibernia Street intersection, in the Town of Cobourg.

Generally, work as outlined in the Form of Tender is to be constructed to the Ontario Provincial Standard Specifications (OPSS) and various other Specifications they refer to unless otherwise stated in the Special Provisions forming part of these Contract Documents.

It is the Owner's intent to award the works to one prospective Tenderer.

The various OPSS referred to in the Form of Tender are not included in these Contract Documents. It is the Tenderer's and Contractor's responsibility to obtain the current issue of these Specifications.

4. Inquiries During Tendering

Tenderers are advised that inquiries regarding the interpretation of the plans or specifications shall be made before:

Thursday, December 10, 2020

and shall be directed to the Contract Administrator, CIMA+, Telephone: 905-697-4464, extension 6908, Attention: Steve May, C.E.T., Email: Steve.May@cima.ca.

5. Disqualification of Tenders

Under no circumstances will tenders be considered which:

a) are received after the time stated in the Tender Advertisement, as recorded by the Owner on the date and at the place of tender, on the advertised closing date for tenders; and,

b) are not accompanied by a certified cheque or bid bond in an amount not less than that specified.

6. Withdrawal or Qualifying Of Tenders

A Tenderer who has already submitted a tender may submit a further tender at any time up to the official closing time. The last tender received shall supersede and invalidate all tenders previously submitted by that Tenderer for the Contract.

A Tenderer may withdraw or qualify his/her tender at any time up to the official closing time by submitting a letter bearing his/her signature and seal as in his/her tender to be delivered to the Owner. Such a submission at the location stated in the tender advertisement for the receipt of tenders must be received in sufficient time to be marked with the time and date of receipt before advertised time, as recorded by the Owner on the date and at the place of tender, on the date for closing of tenders. The Tenderer shall show his/her name, the name of the project and the Contract number on the envelope containing such letter. No email, fax transmissions or telephone calls will be considered.

7. Informal or Unbalanced Tenders

All entries in the Form of Tender shall be made in ink or by typewriter. Entries or changes made in pencil shall, unless otherwise decided by the Owner, be invalid or informal.

Tenders which are incomplete, conditional, illegible or obscure, or that contain additions not called for, reservations, erasures, and alterations (unless properly and clearly made and initialled by the Tenderer's signing officer) or irregularities of any kind, may be rejected as informal.

Each Item in the tender form shall include a reasonable price for such Item. Under no circumstances will an unbalanced tender be considered. The Owner and the Contract Administrator will be the sole judge of such matters and should any tender be considered to be unbalanced, then it will be rejected by the Owner.

Wherever in a tender the amount tendered for an Item does not agree with the extension of the estimated quantity and the tendered unit price, the unit price shall govern and the amount and the Total Tender Price shall be corrected accordingly, unless otherwise decided by the Owner.

A discrepancy in addition or subtraction in a tender shall be corrected by the Owner by adding or subtracting the Items correctly and correcting the Total Tender Price accordingly, unless otherwise decided by the Owner. Where an error has been made in transferring an amount from one part of the Form of Tender to another, the amount shown before transfer shall, subject to any corrections as provided for above, be taken to be correct and the amount shown after transfer and the Total Tender Price shall be corrected accordingly.

If a Tenderer has omitted to enter a price for an Item of work set out in the Form of Tender, he/she shall, unless he/she has specifically stated otherwise in his/her tender, be deemed to have allowed elsewhere in the Form of Tender for the cost of carrying out the said Item of work and, unless otherwise agreed to by the Owner, no increase shall be made in the total Tender Price on account of such omission.

Tenders that are based upon an unreasonable period of time for the completion of the works may be rejected.

The Owner reserves the right to waive formalities at its discretion.

Tenderers who have submitted tenders that have been rejected by the Owner because of informalities will normally be notified of the reasons for the rejection within ten (10) days after the closing date for tenders.

8. Examination of Site

Each Tenderer must examine the location of the work and fully inform themselves of existing conditions by personal examination as to the local conditions to be met with during the construction and conduct of the work. All Contract Documents are to be carefully examined. No plea of ignorance of conditions or difficulties which may be encountered in the execution of the work hereunder by failure to make such inspections or investigations will be accepted as sufficient reason for failure on part of successful Tenderer to fulfill all requirements of the Contract.

The Owner has made no arrangements with private owners for site investigations to be carried out by prospective Tenderers. If any person proposes to carry out any investigation on any property relative to the proposed works, he/she shall, before entering the said property, and any other property for the purpose of obtaining access to the said property, and before commencing the said investigation, contact each owner and occupant of the said properties and advise them of the nature and extent of the proposed investigation and obtain an agreement in writing thereto of all such owners and occupants. The person (or firm) who was responsible for carrying out such an investigation or for making use of any access as aforesaid shall reinstate promptly all property which has been disturbed by such investigation or by use of such access and shall be responsible for all damage and claims resulting therefrom in accordance with the said agreement of such owners and occupants.

With respect to any matter referred to in the foregoing paragraph, no person referred to therein is authorized to act as agent of or to make any representation on behalf of the Owner and the Owner shall not be responsible for any disturbance to or reinstatement of any property or for any damage or claims referred to therein.

9. Provisional Items

After the tender closing, the Items in the Form of Tender noted as being "Provisional" may have quantities modified or may be deleted from the Contract at the sole discretion of the Owner without negotiating with the bidders regardless of the percentage of the Tender the individual or combined "Provisional Items" represent. No consideration for loss of overhead costs or loss of profit on work not performed will be considered should these Items be deleted from the Contract.

10. Tender

Each tender shall include a completed Form of Tender, on the forms provided, Statements A to C inclusive, and an Agreement to Bond, all as bound herein and a tender deposit as required herein, together with any further forms or sheets which the Tenderer is instructed elsewhere herein, or in any addendum hereto, to submit with his/her tender. The Tenderer may retain the rest of the tender documents issued to him/her.

The Tenderer shall give the total tender price both in words and in figures and, except as is otherwise specifically permitted in the Form of Tender, shall fill in all blank spaces for unit prices, Item prices, lump sums and other information in the Form of Tender. All prices tendered and all amounts to be paid will be in Canadian dollars.

11. Omissions, Discrepancies and Interpretations

Should a Tenderer find omissions from or discrepancies in any of the tender documents or should he/she be in doubt as to the meaning of any part of such documents, he/she should notify the Contract Administrator, preferably in writing and not later than four (4) days before the closing date for tenders. If the Contract Administrator considers that a correction, explanation or interpretation is necessary or desirable, he/she will issue an addendum to all who have taken out tender documents.

No oral explanation or interpretation shall modify any of the requirements or provisions of the tender documents.

12. Quantities are Estimated

The quantities shown for unit price Items in the Form of Tender are estimated only and are for the sole purpose of establishing a dollar amount based on the unit price. For any work done or materials supplied on a unit price basis, the Contractor will be paid for the actual measured quantities at the respective unit prices tendered.

The Contract Administrator has the right to increase or reduce the quantities required or to suspend or omit any Item or portion of the work at any time as he/she may deem advisable.

13. Acceptance or Rejection of Tenders

Subject to the General Conditions, except as provided hereunder, neither the Contract Administrator nor any officer or employee of the Owner has authority to make or accept an offer or to enter into a Contract on behalf of the Owner or to create any rights against or to impose any obligations on the Owner. The recommendation of a tender to the Owner for acceptance does not constitute acceptance of the tender by the Owner.

A tender is accepted by the Owner when an agreement in the form bound herein is executed by the Owner and by the Tenderer or when the Contract Administrator, with the written authorization of the Owner and within the period referred to in Clause 17 hereof, has issued a written order to commence work to the Tenderer and the Owner or anyone acting on its behalf has requested the Tenderer to execute the Agreement and to return it to the Owner and the acceptance of the tender and the execution of the Agreement by the Owner are subject to the express condition that the owner receive a Performance Bond and a Payment Bond in the forms bound herein and in accordance with the requirements hereof, within seven (7) days after notification of the execution of the Agreement by the Owner has been mailed to the Tenderer whose tender has been accepted as aforesaid.

The Owner shall not be responsible for any liabilities, costs, expenses, loss or damage incurred, sustained or suffered by any Tenderer prior or subsequent to or by reason of the acceptance or the non-acceptance by the Owner of any tender or by reason of any delay in the acceptance of a tender save as provided in the Contract. Tenders are subject to a formal Contract being prepared and executed.

The Tenderer agrees that the Owner has the right, at his or her own discretion, to accept or reject any non-compliant tenders without stating the reasons therefore and that the lowest or any tender will not necessarily be accepted.

The Tenderer understands that fundamental to this competition is the selection of a tender that, in the Owner's opinion, is in the best interest of the Owner. To this end, the Tenderer agrees that the Owner reserves the right to select a winning tender that may be non-compliant.

Each Item in the tender form shall include a reasonable price for such Item. Under no circumstances will an unbalanced tender be considered. The Owner and the Contract Administrator will be the sole judge of such matters and should any tender be considered to be unbalanced, then it will be rejected by the Owner.

14. Award of the Contract

The award of this Contract in whole or in part is subject to award by Town of Cobourg Council. The award date is anticipated on our about March 1, 2021.

15. Period of Validity of Tender

The prices entered by the Tenderer in the Form of Tender shall be based on the assumption that the Contract Administrator's written order to commence work will be issued to the Tenderer within a 90-day period after the opening date for tenders.

16. Tender Deposit

Each tender shall include a tender deposit in the form of a certified cheque or bid bond in the minimum amount defined below, made payable to the Owner, as a guarantee for the execution of the Contract.

Total Tender Amount			Minimum Deposit Required
$ 20,000.00	or	less	$ 1,000.00
20,000.01	to	50,000.00	2,000.00
50,000.01	to	100,000.00	5,000.00
100,000.01	to	250,000.00	10,000.00
250,000.01	to	500,000.00	25,000.00
500,000.01	to	1,000,000.00	50,000.00
1,000,000.01	to	2,000,000.00	100,000.00
2,000,000.01	and	over	200,000.00

The tender deposits of all but the two (2) lowest Tenderers will be returned within ten (10) days after the date of opening tenders. The tender deposits of the two (2) lowest Tenderers will be retained until a tender has been accepted and the Performance Bond, the Labour and Material Bond and the other documents required herein have been furnished to the satisfaction of the Solicitor and the Contract Administrator for the Owner, save that if a Tenderer has not been requested by the Owner to execute the Agreement within 90 days after the date of opening tenders or if the Contract Administrator has not issued to the Tenderer a written order to commence work within the said 90 days, his/her tender deposit will be returned, except as otherwise provided herein. After the execution of the Contract and the receipt by the Owner of the Performance Bond and the Labour and Material Payment Bond the tender deposit of the successful Tenderer will be returned.

If either of the above-mentioned two (2) Tenderers has not been notified within 90 days after the date of opening tenders that his/her tender has been recommended to the Owner for acceptance, he/she may apply to the Owner for the return of his/her tender deposit. Unless otherwise determined by the Owner, the tender deposit of one of the said two (2) tenders (normally the one who submitted the second lowest tender) will be returned when so applied for. The tender deposit of the other Tenderer will be retained or returned by the Owner as provided for elsewhere in this Clause.

The Owner may, in its discretion:

a) cash a tender deposit cheque or qualify a bid bond and deposit the proceeds to its account, without prejudice to the ultimate disposition of such tender deposit as provided for herein; or

b) return a tender deposit to a Tenderer at an earlier time than provided for herein; or

c) return a tender deposit to a Tenderer on receipt from the said Tenderer of an alternative security acceptable to the Owner in lieu of the said tender deposit; and no such action shall prejudice the validity of the tender to which such tender deposit relate.

Except as otherwise herein provided the Tenderer guarantees that if his/her tender is withdrawn before the Owner shall have considered the tenders or before or after he/she has been notified that his/her tender has been recommended to the Owner for acceptance or that if the Owner does not for any reason receive within the period of seven (7) days as stipulated and as required herein, the Agreement executed by the Tenderer, the Performance Bond and the Labour and Material Payment Bond executed by the Tenderer and the surety company and other documents required herein, the Owner may retain the tender deposit for the use of the Owner and may accept any tender, advertise for new tenders, negotiate a Contract or not accept any tender as the Owner may deem advisable.

17. Agreement

The Tenderer agrees that, if requested so to do by the Owner or anyone acting on its behalf within 90 days after the date of opening tenders, he/she will execute in triplicate and return to the Owner the Agreement in the form bound herein within seven (7) days after being so requested. If the Tenderer has not been so requested within the said 90 days or if the Contract Administrator's written order to commence work has not been mailed or delivered to the Tenderer or his/her office or his/her postal address within the said 90 days, the Tenderer may, unless he/she has otherwise agreed or offered and except as otherwise provided herein, withdraw his/her tender.

18. Performance and Payment Bonds

The Contractor, together with a surety company approved by the Owner and authorized by law to carry on business in the Province of Ontario, shall, unless otherwise directed, furnish to the Owner a Performance Bond and a separate Labour and Material Payment Bond in the forms attached hereto each in the amount of one hundred per cent (100%) of the total tender amount and such additional amount, if any, as may be required by the Owner. The Tenderer shall tender for the cost of the bonds in the Item provided for that purpose in the Form of Tender on the assumption that each bond will be in the amount of 100% of the total tender amount. In the event that either of the bonds is required to be in an amount in excess of 100% of the total tender amount the Owner will reimburse the Contractor in the amount of the premium for such excess amount after submission by the Contractor to the Owner of the surety company's relevant receipted invoice.

The Tenderer shall include with his/her tender the Agreement to Bond in the form enclosed herewith executed under its corporation seal by the surety company from which he/she proposes to obtain the required bonds.

The Owner may in its discretion decide to obtain the bonds from a surety company of its choice and may pay the premium for such bonds directly to the surety company so chosen. In that event, the Owner will notify the selected Tenderer

accordingly before the tender has been accepted and the Tenderer shall execute and furnish to the Owner the required bonds as provided for herein but the Item relating to the cost of the bonds in the Form of Tender shall be deleted from the Contract and no payment shall be made to the Contractor therefore.

The Tenderer will be required to furnish the Performance Bond and the Labour and Material Payment Bond in triplicate as required herein and in the forms bound herein within seven (7) days after notification of the execution of the Agreement by the Owner has been mailed to him. One copy of the said bonds shall be bound into each of the three (3) executed sets of the Contract.

19. Proof of Ability

In order to aid the Owner in determining the responsibility of each Tenderer, the Tenderer shall complete the following statement sheets which are bound herein:

Statement 'A': Stating the Tenderer's experience in similar work which he/she has successfully completed.

Statement 'B': Giving a list of the Tenderer's senior supervisory staff to be employed on the Contract with a summary of the experience of each.

If the Tenderer prefers, he/she may, in lieu of completing and submitting the above-mentioned statement sheets, submit the information required by the said sheets on similar forms prepared in his/her own office, provided that the said forms bear the Tenderer's name and the date of preparation and contain up-to-date information.

The Owner reserves the right to reject any tender where satisfactory evidence of sufficient capital, plant and experience to successfully prosecute and complete the work in the specified time, is not furnished by the Tenderer.

20. Subcontractors

The Tenderer shall give in Statement "C" sheet of the tender documents the name and address of each proposed Subcontractor used in making up his/her tender. Only one Subcontractor shall be named for each part of the work to be sublet.

If the successful Tenderer wishes to substitute a Subcontractor other than the one named in Schedule "C" of the Form of Tender for a specific Item of work, he/she shall submit documentation to the Contract Administrator pertaining to the proposed Subcontractor's experience and competence to carry out the work. Employment of the proposed Subcontractor on the works is subject to the written approval of the Contract Administrator.

21. Workplace Safety and Insurance Board

The Contractor shall at the time of entering into any Contract with the Owner, make a statutory declaration or furnish a satisfactory clearance letter from the Workplace Safety and Insurance Board stating that all assessments or compensation payable to the Workplace Safety and Insurance Board have been paid.

The selected Tenderer shall submit such statutory declaration or clearance letter to the Owner in triplicate together with the Agreement executed by the said Tenderer. One copy of the statutory declaration or clearance letter shall be bound into each of the three (3) executed sets of the Contract.

22. Occupational Health and Safety

In order to avoid any misunderstanding as to the nature of the work to be performed herein, the Contractor by executing this Contract unequivocally acknowledges that it is the constructor within the meaning of the Occupational Health and Safety Act, and the Contractor undertakes to carry out the duties and responsibilities of a constructor with respect to the work.

It is specifically drawn to the attention of the Tenderer that the Occupational Health and Safety Act provides in addition to other matters that,

"A constructor shall ensure, on a project undertaken by the constructor that,

a) the measures and procedures prescribed by this Act and the regulations are carried out on the project;

b) every employer and every worker performing work on the project complies with this Act and the regulations; and,

c) the health and safety of workers on the project is protected."

23. Review of Shop Drawings

The Contractor (or Subcontractor or equipment supplier acting on behalf of the Contractor) shall submit to the Contract Administrator in accordance with a procedure to be stipulated by the Contract Administrator all shop, working or setting drawings required in order to make clear the work proposed. The Contractor shall make any changes in such drawings that the Contract Administrator may require.

When submitting such drawings, the Contractor shall notify the Contract Administrator in writing of all respects in which such drawings differ from the requirements of the Contract or from previously notified requirements of the Contract Administrator. The Contract Administrator's review of such drawings shall not be construed as approval of such differences unless the Contractor has complied with the preceding sentence hereof and unless the Contract Administrator has specifically approved such differences in writing. The Contract Administrator's review of such drawings shall not relieve the Contractor from responsibility for the correctness of the drawings or the adequacy of the details shown on the drawings.

Work shall not be carried out before the Contract Administrator's review of the shop, working or setting drawings relating to such work has been carried out.

24. Machinery and Equipment Supplied by the Contractor

The Contractor is responsible for ensuring that all machinery and equipment supplied by him, or by any Subcontractor, under the Contract complies with the requirements of the Contract and in particular with the requirements of the Specifications for machinery and equipment, and that all suppliers of such machinery and equipment comply with such requirements. Failure on the part of a supplier to comply with such requirements shall not relieve the Contractor of responsibility for ensuring that the requirements of the Contract are fulfilled.

25. Harmonized Sales Tax

.1 Requirements of Tender

The Tenderer is instructed to exclude the Harmonized Sales Tax from his/her tendered amount.

.2 Payment of the Harmonized Sales Tax

Payment of the Harmonized Sales Tax will be made to the Contractor in conjunction with amounts certified as due on Monthly Payment Certificates as approved by the Contract Administrator. The amount of tax due will be shown as a separate Item.

26. Lump Sum for Other Requirements

In this Item of the Schedule of Items and Prices, or in the case of a lump sum type Contract, in the Breakdown Schedule, the Tenderer shall enter his/her tender amount for providing Items such as watchmen, permits and approvals (other than those to be paid by the Owner), Items required by the Drawings or Specifications but which have been omitted from the Schedule and other Items required by the Contract but not specifically covered by or related to the other Items in the Schedule.

Each Progress Payment Certificate will include a percentage of the tender amount for this Item in proportion to the percentage of the permanent works completed. The submission by a Tenderer of an unbalanced price for this Item renders the tender liable to disqualification.

These lengths shall be considered final for lump sum payment calculation purposes and the prorating percentage shall be applied and will be fixed at 67% for all tendered lump sum (LS) Items.

27. Soils Investigations

Investigations have been carried out in the Contract Area by Golder Associates Ltd. of Whitby, Ontario, and the following report has been produced:

1) Geotechnical Investigation and Pavement Design Report dated December 13, 2018

The borehole logs and chemical analysis from the above report are appended to the Tender Documents. It is to be clearly understood that the information was accumulated for design purposes only and any interpretation placed on it by the Tenderer is solely the responsibility of the Tenderer.

28. Time of the Essence of the Contract

Time shall be deemed to be the essence of the Contract.

The Tenderer, having carefully examined the site of the proposed works and having read, understood and accepted the provisions, plans, specifications and conditions attached hereto, each and all of which forms part of this tender, agrees to have accomplished completion of all Contract work as defined in Section 2.3 of *The Construction Act* on or before **August 27, 2021**.

Failure by the Contractor to complete any of the above works to the satisfaction of the Contract Administrator by the respective specified completion dates shall render the Contractor liable for Liquidated Damages.

The intersection of Hibernia Street and Albert Street is permitted to be closed for the installation of the new traffic signals only as stated in SPG Clause 35.

29. Caveats

This project is contingent upon approval of works by the governing authorities including but not limited to the Ministry of Environment. The Contract will not be awarded until or unless the work is approved.

It is also to be understood that no work can be commenced until the Owner has received the necessary approvals from authorities that may have jurisdiction over parts of the work in this document.

30. Workplace Safety & Insurance Board – Experience Rating

Tenderers must submit with their bid, their experience rating under the NEER, the CAD-7, or the MAP program for the last completed year. This experience rating may be used as a factor in the selection of the successful Tenderer.

31. Changes In Alignments

The Owner reserves the right to change the horizontal and vertical alignment of the proposed works. The Contractor shall install the works as directed at the prices covered in the tender.

32. Conformity to Legislation

The Contractor must conform to all applicable legislation and regulations. Without limiting the generality of the foregoing this shall include the Occupational Health and Safety Act and Regulations, the Labour Standards Act, the Highway Traffic Act, the Workplace Safety Insurance Board Act and the Environmental Protection Act.

33. Availability of Tender Bid Form

Should the Contractor make a request to the Contract Administrator, an excel copy of the Item Bid Form will be provided. The Contractor assumes full responsibility for ensuring any changes, or modifications to the Item Bid Form, whether by addenda or otherwise, are fully understood and followed as the Item Bid Form may not be reissued during the tender period by the Contract Administrator.

34. Town of Cobourg Purchasing By-Law

Acceptance of any bid submission or subsequent award shall be in compliance with the Town of Cobourg Purchasing By-Law 016-2012.

Corporation of the Town of Cobourg

Albert Street Reconstruction

Contract No. CO-21-01 PWD

Form Of Tender

(To Be Submitted By The Tenderer)

Form of Tender

Owner:	Corporation of the Town of Cobourg
Project:	**Albert Street Reconstruction** **Contract No. CO-21-01 PWD**
Contract Administrator:	CIMA Canada Inc. 415 Baseline Road West, 2nd Floor Bowmanville, Ontario L1C 5M2 Tel: 905-697-4464 Fax: 905-697-0443

TENDERER: _____
Name

_____

_____
Address Postal Code

Tel: _____ Fax: _____ E-mail: _____

_____
Name of Person Signing

_____
Position of Person Signing

Note: The Tenderer's name and address must be inserted above, and in the case of an unincorporated firm, the name and residence of each and every member of the first must be inserted.

(To be Completed and Submitted by the Tenderer)

To: Corporation of the Town of Cobourg
55 King Street West
Cobourg, Ontario K9A 2M2

I (We) _____

having carefully examined the locality and site of the proposed works, and all Contract documents relating thereto, including the: form of Agreement, Addendum/Addenda No._____to No._____ * inclusive, Special Provisions, if any, Information for Tenderers, Supplementary General Conditions, if any, General Conditions, Supplementary Specifications, if any, Specifications, if any, Standard Specifications, if any, Contract Drawings, Standard Drawings, Supplementary Reports, Form of Tender, forms of Performance Bond and Labour and Material Payment Bond, hereby tender and offer in accordance therewith to enter into a Contract within the prescribed time to construct the said works in strict accordance with the Contract Documents and such further detail drawings as may be supplied from time-to-time and to furnish all materials, labour, tools, plant, matters and things necessary therefore complete and ready for use within the time specified for the Total Tender Price (excluding HST) of:

_____

_____ dollars ($_____), or such other sum as may be ascertained in accordance with the Contract.

The Aforesaid Sum is Made up as Follows:

(To be Completed and Submitted by the Tenderer)

Schedule of Items and Prices

The Unit Prices tendered shall include all costs for labour, plant, the supply and installation of all materials, sheeting, dewatering, clearing, excavation, excavation stabilization, trenching, bedding surround, supporting, attaching, protecting, backfilling, testing, traffic control, barricades, signs, erosion control, silt control, dust control, disposal of surplus material off-site and complete restoration, all as detailed on the drawings and in the specifications.

Note that all costs for survey control, layout, clearing and grubbing, temporary protective fence, are to be included in the applicable Unit Prices for the Works.

Provisional Items may or may not be taken into account by the Owner in comparing tenders and awarding a Contract. Consideration of Provisional Items will be at the discretion of the Owner.

Index

Spec No. (ie. 401)	Refers to Ontario Provincial Standard Specifications (OPSS) as listed in Special Provision General Clause 2 (copies are not included in the Contract Documents and each Contractor must obtain the current issue of these specifications)
SP	Refers to the Special Provisions.
(P)	Plan Quantity Payment Item

(To be Completed and Submitted by the Tenderer)

ITEM NO.	DESCRIPTION	SPEC NO.	EST. QTY.	UNIT	UNIT PRICE	AMOUNT
PART 'A': ROADWORKS AND STORM SEWERS						
A1	Site Preparation	201 SP	100%	LS		
A2	Tree Maintenance and Trimming	SP	100%	LS		
A3	Tree Protection	801 SP	100	m		
A4	Earth Excavation (Grading)	206 SP	1,340	m^3 (P)		
A5	Hot Mix, H.L.-3	310 SP	190	t		
A6	Hot Mix, H.L.-3F in Entrances	310, 311 SP	25	t		
A7	Hot Mix, H.L.-8 in Road and Commercial Entrances	310 SP	230	t		
A8	Asphalt Cement Price Adjustment Allowance (ITO=$662.40)	SP	100%	LS	2,500.00	2,500.00
A9	Granular 'A'					
	a) 150mm Road and Commerical Entrances	314 SP	700	t		
	b) 100mm Concrete Sidewalk and Brick Boulevard	314 SP	260	t		
	c) 200mm Residential Entrances	314 SP	60	t		
A10	Granular 'B', Type I 300mm Depth	314 SP	1,200	t		
A11	Provisional Item Additional Depth Granular 'B', Type 1	206, 314 SP	1,000	t		
A12	Concrete Sidewalk and Entrances (OPSD 512.011)	351 SP	660	m^2		
A13	Coloured Concrete Crosswalk	351 SP	50	m^2		
A14	Tactile Walking Surface Indicators (OPSD 310.031 & 310.039)	351 SP	32	ea		
A15	Concrete Curb and Gutter (All Types) (OPSD 600.110 & 600.040)	353 SP	400	m		
A16	Removal of Concrete Sidewalk and Entrance	510 SP	560	m^2		
A17	Removal of Curb and Gutter	510 SP	85	m		
A18	Brick Pavers	355, SP	110	m^2		
A19	Remove, Salvage, and Reinstate Brick Pavers	510, 355 SP	110	m^2		

ITEM NO.	DESCRIPTION	SPEC NO.	EST. QTY.	UNIT	UNIT PRICE	AMOUNT
A20	150 mm Dia. PE Pipe Subdrains with Geotextile (OPSD 216.010)	405 SP	440	m		
A21	Core into Existing Storm Maintenance Hole and Connect Proposed 375mm CP Pipe on Third Street	SP	100%	LS		
A22	a) 300 mm PVC Storm Sewers, DR35, incl. Excavation, Embeddment and Granular 'B', Type I Backfill (OPSD 802.010)	401, 409, 410 SP	20.0	m		
	Provisional Item b) 300 mm PVC Storm Sewers, DR35, incl. Excavation, Embeddment and Granular 'B', Type I Backfill (OPSD 802.010)	401, 409, 410 SP	57.2	m		
A23	300 mm CP Storm Sewers, 50D, incl. Excavation, Cover, Bedding, and Granular 'B', Type I Backfill (OPSD 802.030)	401, 409, 410, SP	10.9	m		
A24	375 mm CP Storm Sewers, 50D, incl. Excavation, Cover, Bedding, and Granular 'B', Type I Backfill (OPSD 802.030)	401, 409, 410, SP	32.4	m		
A25	Insulate Storm Sewer (S - 100.050)	SP	30	m		
A26	Precast Catchbasins a) 600 mm x 600 mm (OPSD 705.010)	402, 407 SP	2	ea		
	b) 600 mm x 1450 mm (OPSD 705.020)	402, 407 SP	1	ea		
A27	Storm Sewer Maintenance Holes a) 1200 mm Dia. CBMH (OPSD 701.010)	402, 407 SP	1	ea		
	b) 1500 mm Dia. DCBMH (OPSD 701.011), c/w Twin Inlet Flat Cap (OPSD 703.021)	402, 407 SP	1	ea		
	Provisional Item c) 1200 mm Dia. CBMH (OPSD 701.010)	402, 407, SP	2	ea		
A28	Removal of Maintenance Holes and Catchbasins	510	5	ea		
A29	Removal of Storm Sewers	510 SP	10	m		
A30	Provisional Item Clear Stone (19 mm) Bedding for Storm Sewers	1001 SP	33	m^3		

ITEM NO.	DESCRIPTION	SPEC NO.	EST. QTY.	UNIT	UNIT PRICE	AMOUNT
A31	Supply and Install New Frame and Grates on Existing Catchbasins (OPSD 401.081)	407, SP	4	ea		
A32	Adjust Existing Structure Frames and Grates	408 SP	7	ea		
A33	Water for Compaction and Dust Control	506 SP	88	m^3		
A34	Calcium Chloride Flake	506	710	kg		
A35	Provisional Item Excavate for Utility Verification	SP	8	ea		
A36	Obliterate Existing Line Paintings	SP	30	m		
A37	Pavement Markings a) 100 mm Width Yellow - Traffic Paint	710 SP	90	m		
	b) 600 mm Stop Bars - Durable	710 SP	36	m		
	c) 100 mm Width White - Durable (Crosswalk)	710 SP	90.0	m		
	d) Traffic Symbols - Durable	710 SP	2	ea		
A38	Topsoil (Imported) and Sodding (Nursery, Unstaked)	802, 803 SP	275	m^2		
A39	Supply and Install Concrete Bollards	SP	4	ea		
A40	Provisional Item Miscellaneous Works Allowance	SP	100%	LS	4,000.00	4,000.00
	Total Part 'A' (Carried to Summary)					
PART 'B': SANITARY SEWERS AND APPURTENANCES						
B1	250 mm PVC Sanitary Sewers, DR 35, incl. Excavation, Granular 'A' Embedment and Approved Native Backfill (OPSD 802.010)	401, 409, 410 SP	175.0	m		
B2	150 mm PVC Sanitary Sewer Laterals by Open Excavation, DR 28, incl. Excavation, Granular 'A' Embedment and Approved Native Backfill (OPSD 802.010)	401, 409, 410 SP	85	m		
B3	Removal of Existing Sanitary Sewer	SP	175	m		

ITEM NO.	DESCRIPTION	SPEC NO.	EST. QTY.	UNIT	UNIT PRICE	AMOUNT
B4	Clean-outs on Sanitary Services a) PVC Cap (S-100.030)	401, 410 SP	10	ea		
	b) Ductile Iron Cap	401, 410 SP	4	ea		
B5	1200 mm Dia. Sanitary Sewer Maintenance Holes (OPSD 701.010)	402, 407 SP	3	ea		
B6	Provisional Item Clear Stone (19 mm) Bedding for Sanitary Sewers	1001 SP	42	m^3		
B7	Provisional Item Granular 'B', Type I Backfill for Sanitary Sewers	314 SP	250	t		
B8	Provisional Item Vacuum Excavation for Sanitary Service Pits	SP	5	ea		
B9	Break Into and Re-bench Existing Sanitary Maintenance Hole (OPSD 701.020) a) Albert Street and Hibernia Street	SP	1	ea		
	b) Albert Street and Third Street	SP	1	ea		
B10	Provisional Item Camera Existing Sewer Laterals	MUNI 409, SP	14	ea		
B11	Provisional Item Lining of Existing Sanitary Service Laterals by CIPP Method	MUNI 460, SP	20	m		
B12	Provisional Item Concrete Plug Sanitary Sewer	SP	2	ea		
	Total Part 'B' (carried to Summary)					
PART 'C': WATERMAINS AND APPURTENANCES						
C1	300 mm PVC Watermain Incl. Excavation, Granular 'A' Embedment and Approved Native Backfill (OPSD 802.010 & 802.013, S-201.030)	401, 441 SP	162	m		
C2	300 mm Dia. Gate Valves, Complete with Valve Box	402, 441 SP	1	ea		
C3	Provisional Item 300 mm Dia. Gate Valves, Complete with Valve Box	402, 441 SP	1	ea		
C4	Hydrant Assembly (Complete) (S-210.010)	401, 441 SP	2	ea		

ITEM NO.	DESCRIPTION	SPEC NO.	EST. QTY.	UNIT	UNIT PRICE	AMOUNT
C5	Watermain Testing a) Third Party Watermain Testing	SP	1	LS		
	b) Temporary Flushing Hydrant	401, 441 SP	1	ea		
	c) 50 mm Blow Off as per S-210.060	401, 441	1	ea		
C6	Water Service Connection a) 19 mm Main Stop	401,441 SP	14	ea		
	b) 19 mm Curb Stop	401, 441 SP	14	ea		
	c) 19 mm Municipex Piping (Open Excavation)	401, 441 SP	95	m		
	d) Connect to Existing Water Service with Proposed 19 mm Water Service	401, 441 SP	10	ea		
	e) 50 mm Main Stop	401,441 SP	1	ea		
	f) 50 mm Curb Stop	401, 441 SP	1	ea		
	g) 50 mm Municipex Piping (Open Excavation)	401, 441 SP	8	m		
	h) Connect to Existing Water Service with Proposed 50 mm Water Service	401, 441 SP	1	ea		
C7	Remove Existing Gate Valve and Box	510 SP	1	ea		
C8	Provisional Item Remove Existing Gate Valve and Box	510 SP	1	ea		
C9	Cathodic Protection a) 5.4 kg Zinc Anode	442 SP	12	ea		
	b) 14.5 kg Magnesium Anode	442 SP	2	ea		
C10	Connect to Existing Watermain a) Hibernia Street (1 Connection)	401,441 SP	100%	LS		
	b) Third Street (1 Connection)	401, 441 SP	100%	LS		
C11	Supply and Install Temporary Above Grade Water Supply System and Service Connections	493 SP	14	ea		
C12	Provisional Item Clear Stone (19 mm) Bedding for Watermains	1001 SP	40	m^3		

ITEM NO.	DESCRIPTION	SPEC NO.	EST. QTY.	UNIT	UNIT PRICE	AMOUNT
C13	Provisional Item Granular 'B', Type I Backfill for Watermain	314 SP	200	t		
C14	Adjust Existing Water Valve	408 SP	5	ea		
C15	Removal of Existing Fire Hydrant Set	SP	1	ea		
C16	Removal of Asbestos-Cement Pipe and Disposal Off-Site	SP	165	m		
C17	Asbestos Abatement/Environmental Impairment Liability Insurance	SP	100%	LS		
	Total Part 'C' (carried to Summary)					
PART 'D': GENERAL ITEMS						
D1	Supply and Maintain Field Office	SP	100%	LS		
D2	Mobilization and Demobilization	SP	100%	LS		
D3	Pre-Condition Survey	SP	100%	LS		
D4	Bonds, Insurance and Maintenance Security	SP	100%	LS		
	Total Part 'D' (carried to Summary)					
PART 'E': TRAFFIC SIGNALS AND UTILITIES						
E1	Supply and Install Pre-Cast Electrical Chambers					
	a) 460mm DIA.	602 SP	6	ea		
	b) 600mm x 600mm	602 SP	2	ea		
E2	Construct Concrete Pole Base c/w Anchorage Assembly					
	a) 406mm BCD, 760mm x 2200mm for 8620 Steel Pole	616, 904, 1350, SP	2	ea		
	b) 406mm BCD, 460mm x 2850mm for 8535 Steel Pole	616, 904, 1350, SP	2	ea		
	c) 300mm BCD, 300mm x 1200mm for Pedestrain Push ButtonPole	616, 904, 1350, SP	2	ea		
E3	Supply and Install Rigid PVC Ducts, By Open Cut					
	a) 1-50mm DIA.	401, 492, 603, SP	15	m		
	b) 2-75mm DIA.	401, 492, 603, SP	100	m		
	a) 2-100mm DIA., Concrete Encased Road Crossings	401, 492, 603, SP	50	m		

ITEM NO.	DESCRIPTION	SPEC NO.	EST. QTY.	UNIT	UNIT PRICE	AMOUNT
E4	Supply and Install Rigid PVC Duct, On Hydro Pole					
	a) 1-50mm DIA.	603 SP	1	ea		
	a) 6-75mm DIA.	603 SP	1	ea		
E5	Supply and Install Traffic Signal Cable					
	a) 19/C #14 AWG (Vehicle Signals)	604 SP	238	m		
	b) 12/C #14 AWG (Pedestrian Signals)	604 SP	238	m		
	c) 2/C #14 AWG (Push Buttons)	604 SP	250	m		
	c) 2/C #14 AWG (Wavetronix Home Run Cables)	604 SP	100	m		
E6	Supply and Install Street Lighting Cable					
	a) 2-1/C #6 AWG (Black & White)	604 SP	298	m		
E7	Supply and Install Ground Cable					
	a) 1-1/C #6 AWG (Insulated)	609 SP	178	m		
	b) 1-1/C #6 AWG (Bare)	609 SP	20	m		
E8	Supply and Install Ground Electrode					
	a) Plate	SP	5	ea		
E9	Supply and Install Poles, Base Mounted					
	a) 6.1m (8620) Octagonal Steel	615 SP	2	ea		
	b) 10.7m (8535) Octagonal Steel	615 SP	2	ea		
	c) 1.5m Round Aluminum Pedstrian pole	615 SP	2	ea		
E10	Supply and Install Traffic Signal Mast Arms, On Steel Poles					
	a) 3.6m (12ft) Arm (TR12SMA)	620 SP	2	ea		
	b) 4.6m (15ft) Arm (TR15SMA)	620 SP	3	ea		
	c) 6.1m (20ft) Arm (TR20SMA)	620 SP	3	ea		
E11	Supply and Install Dual-End Signal Head Hangers					
	a) Sky Bracket	SP	8	ea		

ITEM NO.	DESCRIPTION	SPEC NO.	EST. QTY.	UNIT	UNIT PRICE	AMOUNT
E12	Supply and Install Traffic Signal Heads a) 300x200x200mm (HWY)	620 SP	4	ea		
E13	Supply and Install Pedestrian Signal Head Mount Brackets, On Steel Poles a) 450mm	SP	8	ea		
E14	Supply and Install Pedestrian Signal Heads, On Brackets a) Countdown LED (Two Section)	620 SP	8	ea		
E15	Supply and Install Audible Pedestrian Signal Push Buttons, Signs and Stations, On Steel Poles a) Polara 2-Wire APS System w/Sign	623 SP	8	ea		
E16	Supply and Install 2 Wire Central Control Unit (CCU) for Audible Pedestrian Signal Station	623 SP	100%	LS		
E17	Supply and Install Luminaire Mast Arms, On Steel Poles a) 2.4m (8ft) Arm (RE-8MA-4125)	617 SP	2	ea		
E18	Supply and Install LED Luminaires, On Luminaire Mast Arms a) 101W LED (BXSP-C-HT-3ME-E-40K-UL-SV-R)	617 SP	2	ea		
E19	Supply and Install Power Supply Assembly, On Hydro Pole a) 60A, 120/240V, 1PH, 3W	614 SP	1	ea		
E20	Construct Concrete Base for Traffic Signal Controller	SP	100%	LS		
E21	Supply and Install Traffic Signal Controller to Base Foundation	622 SP	100%	LS		
E21A	Supply and Install Radar Detection System	622 SP	100%	LS		
E21B	Supply and Install UPS System Traffic Signal Controller	622 SP	100%	LS		
E22	Remove and Dispose of Existing Traffic Signal Equipment	106, 610 SP	100%	LS		
E23	Remove and Salvage of Existing Traffic Signal Equipment	106, 610 SP	100%	LS		
E24	Remove and Dispose of Existing Electrical Aerial Service and Equipment	SP	100%	LS		

ITEM NO.	DESCRIPTION	SPEC NO.	EST. QTY.	UNIT	UNIT PRICE	AMOUNT
E25	Installation of New Underground Services (Including Trenching, Conduit, Wiring, Meter Bases and all associated Equipment)	SP	100%	LS		
E26	Coordination with Cogeco for Residential Service Relocations	SP	100%	LS		
E27	Cogeco Road Crossings - Supply and Install Rigid PVC Ducts, By Open Cut: 2-75mm DIA., Concrete Encased	401, 492, 603, SP	20	m		
E28	Remove and Replace Existing Signal Pole at Albert and Third Street	SP	100%	LS		
	Total Part 'E' (carried to Summary)					
	SUMMARY					
	Total Part 'A' - Roadworks and Storm Sewers					
	Total Part 'B' - Sanitary Sewers and Appurtenances					
	Total Part 'C' - Watermain and Appurtenances					
	Total Part 'D' - General Items					
	Total Part 'E' - Traffic Signals and Utilities					
	Sub-Total (Excluding HST)					
	HST (13% of Sub-Total)					
	Total Tender Amount (Including HST)					

The Tenderer agrees that, if this tender is accepted by the Owner:

1) He/she will carry out any additional or extra work (including the supplying of any additional materials or equipment pertaining thereto) or will delete any work as may be required by the Contract Administrator in accordance with the Contract;
2) The carrying out of any work referred to in paragraph 1) above or the issuance by the Contract Administrator of a Contract Change Order relating to such work or the acceptance by the Tenderer of such Contract Change Order shall not, except as expressly stated in such Contract Change Order, waive or impair any of the terms of the Contract or of any Contract Change Order previously issued by the Contract Administrator or any of the rights of the Owner or of the Contract Administrator under the Contract;
3) He/she will pay to the Owner the sum specified in the Contract as liquidated damages for each calendar day that the work under the Contract as expressly modified by all Contract Change Orders issued by the Contract Administrator remains uncompleted after the expiry of the Time for Completion specified in the Contract or the extended time for completion allowed in writing by the Contract Administrator or the interim completion date as specified in the Contract.

The prices applicable to work referred to in paragraph 1) above shall be determined as follows:

(a) The Schedule of Items and Prices shall apply where applicable;
(b) If the above Schedule is inapplicable the prices shall be determined in accordance with Section 3.10 of the General Conditions.

The Tenderer agrees that he/she is not entitled to payment of Provisional Items, except for additional work carried out by him in accordance with the Contract and only to the extent of such additional work, as authorized by the Contract Administrator in writing.

The Tenderer agrees that, if so requested in writing by the Owner, he/she will enter into a Contract with the Owner based upon his tender but jointly in the names of the Tenderer and the Tenderer's parent company, if any. The Tenderer further agrees that any request by the Owner as indicated above is not and shall not be deemed to be a counteroffer by the Owner.

The Tenderer agrees that this tender is subject to a formal Contract being prepared and executed.

The Tenderer declares that no person, firm or corporation other than the Tenderer has any interest in this tender or in the proposed Contract for which this tender is made.

The Tenderer further declares that this tender is made without any connection, comparison of figures or arrangements with, or knowledge of, any other corporation, firm or person making a tender for the same work and is in all respects fair and without collusion or fraud.

The Tenderer further declares that no member of the Board and no officer or employee of the Contract Administrator is or will become interested directly or indirectly as a contracting party, partner, surety or otherwise in or in the performance of the Contract or in the supplies, work or business to which it relates, or in any portion of the profits thereof, or in any of the monies to be derived therefrom.

The Tenderer having carefully examined the site of the proposed work, and having read, understood and accepted the provisions, plans, specifications, and conditions attached hereto, each and all of which forms part of this Tender, agrees to accomplish completion of all Contract work as defined in *The Construction Act* as described in Clause 3 of the Information to Tenderers and Clause 5 of the Special Provisions General sections.

If the Contract time above specified is not sufficient to permit completion of the work by the Contractor working a normal number of hours each day or week on a single daylight shift basis, it is expected that additional and/or augmented daylight shits will be required throughout the life of the Contract to the extend deemed necessary by the Contractor to ensure that the work will be completed within the Contract time specified. Any additional costs occasioned by compliance with these provisions will be considered to be included in the prices bid for the various Items of work and no additional compensation will be allowed therefore.

The Tenderer agrees that he/she will furnish the Owner a copy of his latest financial statement within 4 days after being requested to do so by the Owner.

The “Agreement to Bond” of the _____
a company lawfully doing business in the Province of Ontario, to furnish a performance bond and a labour and material payment bond in the Owner’s forms of Performance Bond and Labour and Material Payment Bond each in an amount equal to 100% of the Contract price, or in such greater amount as may be required by the Owner, if this tender is accepted, is enclosed herewith.

The Tenderer agrees that the Owner reserves the right to reject any or all tenders and that the lowest or any tender will not necessarily be accepted.

The Tenderer solemnly declares that the several matters stated in the foregoing tender are in all respects true.

A certified cheque or bid bond in the amount specified in Clause 16 of the Information for Tenderers, made payable to the Owner is attached hereto as the required tender deposit. This cheque or bid bond shall constitute a deposit which shall be forfeited to the Owner if the successful Contractor fails to file with the Owner a 100% Performance Bond and a 100% Labour and Material Payment Bond, satisfactory to the Owner within ten (10) calendar days from the date of receipt of Notice of Acceptance of the Tender.

(To be Completed and Submitted by the Tenderer)

Dated at _____ this _____ day of _____, 20____.

_____ _____

_____ _____

Signature of Witness Signature of Tenderer

Note: If the tender is submitted by or on behalf of a corporation, it must be signed in the name of such corporation by the duly authorized officers and the seal of the corporation or water seal, must be affixed. If the tender is submitted by or on behalf of an individual or a partnership a seal must be affixed opposite the signature of the individual or of each partner and each signature shall be witnessed.

(To be Completed and Submitted by the Tenderer)

Statement "A"

Summary of Tenderer's Experience In Successfully Completed Similar Work. (Minimum Of Four (4) Contracts Required)

Date of Completion	
Description of Work	
Contractor Role (General, Sub, etc.)	
Name of Owner	
Name of Supervisor	
Value of Work	
Consulting Engineer Responsible for the Works and Contact Information	

Date of Completion	
Description of Work	
Contractor Role (General, Sub, etc.)	
Name of Owner	
Name of Supervisor	
Value of Work	
Consulting Engineer Responsible for the Works and Contact Information	

Date of Completion	
Description of Work	
Contractor Role (General, Sub, etc.)	
Name of Owner	
Name of Supervisor	
Value of Work	
Consulting Engineer Responsible for the Works and Contact Information	

Date of Completion	
Description of Work	
Contractor Role (General, Sub, etc.)	
Name of Owner	
Name of Supervisor	
Value of Work	
Consulting Engineer Responsible for the Works and Contact Information	

(To be Completed and Submitted by the Tenderer)

Statement "B"

Qualifications of Tenderer's Senior Supervisory and Field Supervisory staff to be employed by this Contract.

Name	Appointment	Qualifications and Years of Experience

(To be Completed and Submitted by the Tenderer)

Statement "C"

List of Proposed Subcontractors

Clause 20 of the Information for Tenderers requires the Tenderer to list on this Statement Sheet the name of each proposed Subcontractor. For the Tenderer's convenience and to ensure that a complete list is submitted with the tender, a list of possible sub-trades has been provided below. The Tenderer shall make an entry against each possible sub-trade listed either by naming the proposed Subcontractor or by entering "By Own Forces", whichever applies. No blank spaces are to be left.

If, in addition, the Tenderer proposes to sublet a part of the work which is not listed below, he/she shall add the sub-trade and the proposed Subcontractor's name to the list.

Failure by a Tenderer to Comply with the Foregoing Requirements May Result in His/Her Tender Being Disqualified by the Owner.

Sub-Trade	**Proposed Subcontractor**
Pre-Condition survey	
Survey control and layout	
Tree Removal / Trimming	
Installation of storm sewers, sanitary sewer and watermain and associated services by open excavation method	
Watermain cleaning, swabbing & disinfection (Third Party Required)	
Watermain pressure and leakage testing (Third Party Required)	
Chlorine residual and bacteriological testing	
Asphalt Paving	
Concrete Sidewalk / Curb and Gutter	
Landscape – Topsoil and Sod	
Concrete Pavers	
Traffic Signals	
Residential Unground Servicing	

(To be Completed and Submitted by the Tenderer)

Agreement to Bond

** _____
** _____
** _____
** _____
Date: _____
Bond No._____

The Corporation of the Town of Cobourg
55 King Street West
Cobourg, Ontario K9A 2M2

RE: Albert Street Reconstruction
Contract No. CO-21-01 PWD

In consideration of the Corporation of the Town of Cobourg, (hereinafter referred to as "the Owner") accepting the tender of and executing an Agreement with:

_____

(hereinafter referred to as "the Tenderer") for the construction of the **Albert Street Reconstruction, Contract No. CO-21-01 PWD**, subject to the express conditions that the Owner receive the Performance Bond and Labour and Material Payment Bond in accordance with the said tender, we the undersigned hereby agree with the Owner to become bound to the Owner as surety for the Tenderer in a Performance Bond and a Labour and Material Payment Bond each in an amount equal to 100% of the Contract price or other such greater amount as may be determined by the Owner, in the Owner's forms of Performance Bond and Labour and Material Payment Bond and in accordance with the said tender, and we agree to furnish the Owner with said Bonds within seven (7) days after notification of the acceptance of the said tender and execution of the said Agreement by the Owner has been mailed to us.

Yours very truly,

_____

(Seal)

Note: This Agreement To Bond must be executed on behalf of the Surety Company by its authorized officers under the company's corporate seal shall become a part of the tender.

* * Enter name, address and telephone no. of the Surety Company at the top of the page.

(To be Completed and Submitted by the Tenderer)

Corporation of the Town of Cobourg

Albert Street Reconstruction

Contract No. CO-21-01 PWD

Special Provisions General

Corporation of the Town of Cobourg

Albert Street Reconstruction

Contract No. 21-01 PWD

Index to Special Provisions General

1. Contract Drawings

The Contract Drawings listed below form part of the Contract Documents:

Dwg. No.	Dwg. Title
Index	Index, Construction Notes and Legend
Albert Street	
1	Existing Conditions and Removals from Sta. 0+980 to 1+120
2	Proposed Road and Storm Sewer Construction from Sta. 0+980 1+120
3	Proposed Sanitary and Watermain Construction from Sta. 0+980 1+120
4	Existing Conditions and Removals from Sta. 1+120 to 1+185
5	Proposed Road and Storm Sewer Construction from Sta. 1+120 to 1+185 and Typical Sections, Storm Sewer Chart and Details
6	Proposed Sanitary and Watermain Construction from Sta. 1+120 to 1+185
E1	Traffic Signal Removal
E2	Traffic Signal Proposed Installation
E3	Traffic Signal Wiring Diagram
E4	Hydro Aerial Services Removal and Relocation
E5	Hydro Services Standard Details
E6	Hydro Services Standard Details
E7	Hydro Service Connection Wiring Diagram
L1	Landscape Plan from Sta. 0+980 to 1+185 and Details

Additional drawings showing details in accordance with which work is to be constructed will be furnished from time to time by the Contract Administrator and will become part of the Contract Drawings.

Detail drawings take precedence over general drawings.

The location of utilities shown on Contract Drawings is in accordance with best information available and is not guaranteed. It is the Contractors responsibility to obtain locates for all utilities and provide protection of utilities during construction.

The Contractor is to obtain required dimensions not shown on Contract Drawings from the Contract Administrator before proceeding with construction of work.

2. Ontario Provincial Standard Specifications (OPSS)

The OPSS listed following and those referenced therein form part of the Contract Documents.

OPSS Spec. No.	Date	Title
MUNI 100	Nov 2019	General Conditions of Contract
MUNI 106	Apr 2017	General Specification for Electrical Work
PROV 127	Apr 2018	Schedule of Rental Rates for Construction Equipment, Including Model and Specification Reference
MUNI 180	Nov 2016	General Specification for the Management of Excess Materials
MUNI 201	Apr 2019	Construction Specification for Clearing, Close Cut Clearing, Grubbing and Removal of Surface and Piled Boulders
MUNI 206	Apr 2019	Construction Specification for Grading
MUNI 310	Nov 2017	Construction Specification for Hot Mix Asphalt
MUNI 311	Nov 2018	Construction Specification for Asphalt Sidewalk, Driveway, and Boulevard and for Sidewalk Resurfacing
MUNI 314	Nov 2016	Construction Specification for Untreated Granular Subbase, Base, Surface, Shoulder and Stockpiling
MUNI 351	Nov 2015	Construction Specification for Concrete Sidewalk
MUNI 353	Nov 2016	Construction Specification for Concrete Curb and Gutter Systems
MUNI 355	Nov 2014	Construction Specification for the Installation of Interlocking Concrete Pavers
MUNI 401	Nov 2018	Construction Specification for Trenching, Backfilling and Compacting
MUNI 402	Nov 2016	Construction Specification for Excavating, Backfilling, and Compacting for Maintenance Holes, Catch Basins, Ditch Inlets and Valve Chambers
MUNI 405	Nov 2017	Construction Specification for Pipe Subdrains
407	Nov 2015	Construction Specification for Maintenance Hole, Catch Basin, Ditch Inlet and Valve Chamber Installation

OPSS Spec. No.	Date	Title
408	Nov 2015	Construction Specification for Adjusting or Rebuilding Maintenance Holes, Catch Basins, Ditch Inlets, and Valve Chambers
MUNI 409	Nov 2017	Construction Specification for Closed-Circuit Television (CCTV) Inspection of Pipelines
MUNI 410	Nov 2018	Construction Specification for Pipe Sewer Installation in Open Cut
MUNI 441	Nov 2016	Construction Specification for Watermain Installation in Open Cut
MUNI 442	Nov 2016	Construction Specification for Corrosion Protection of New and Existing Watermains
MUNI 490	Nov 2018	Construction Specification for Site Preparation for Pipelines, Utilities and Associated Structures
MUNI 491	Nov 2017	Construction Specification for Preservation, Protection, and Reconstruction of Existing Facilities
MUNI 492	Nov 2018	Construction Specification for Site Restoration Following Installation of Pipelines, Utilities, and Associated Structures
MUNI 493	Nov 2015	Construction Specification for Temporary Potable Water Supply Services
MUNI 501	Nov 2017	Construction Specification for Compacting
MUNI 506	Nov 2017	Construction Specification for Dust Suppressants
MUNI 510	Nov 2018	Construction Specification for Removal
MUNI 602	Nov 2017	Construction Specification for Installation of Electrical Chambers
MUNI 603	Nov 2017	Construction Specification for Installation of Ducts
MUNI 604	Nov 2017	Construction Specification for Installation of Cable
MUNI 609	Nov 2019	Construction Specification for Grounding
MUNI 610	Apr 2017	Construction Specification for Removal of Electrical Equipment and Materials

OPSS Spec. No.	Date	Title
MUNI 614	Nov 2019	Construction Specification for Installation of Power Supply Equipment
MUNI 615	Nov 2017	Construction Specification for Installation of Poles
MUNI 616	Apr 2018	Construction Specification for Footings and Pads for Electrical Equipment
MUNI 617	Nov 2019	Construction Specification for Installation of Roadway Luminaires
MUNI 620	Apr 2018	Construction Specification for Traffic Signal Equipment and Electrical Traffic Control Devices
622	Apr 2017	Construction Specification for Installation of Traffic Signal Controllers
623	Nov 2018	Construction Specification for Traffic Actuation Equipment
MUNI 706	Apr 2018	Construction Specification for Traffic Control Signing
710	Nov 2010	Construction Specification for Pavement Marking
MUNI 801	Apr 2018	Construction Specification for the Protection of Trees
MUNI 802	Nov 2019	Construction Specification for Topsoil
MUNI 803	Apr 2018	Construction Specification for Sodding
MUNI 904	Nov 2012	Construction Specification for Concrete Structures
MUNI 1001	Nov 2018	Material Specification for Aggregates-Miscellaneous
MUNI 1350	Nov 2017	Material Specification for Concrete – Materials and Production
MUNI 1359	Nov 2016	Material Specification for Unshrinkable Backfill
1850	Nov 2018	Material Specifications for Frames, Grates, Covers, and Gratings

3. Plan Quantity Items

Measurement for payment of the Items designated (P) in the Form of Tender is by plan quantity, as may be revised by adjusted plan quantity at the discretion of the Contract Administrator.

4. Guaranteed Maintenance

The Contractor shall make good in a permanent manner, satisfactory to the Owner, any and all defects or deficiencies in the work, both during the construction and during the twenty-four (24) month period of maintenance per GC 7.16. The Contractor shall commence repairs on any work identified as defective under this Clause within forty-eight (48) hours of receipt of notice from the Owner or the Contract Administrator.

The decision of the Owner and the Contract Administrator shall be final as to the necessity for repairs or for any work to be done under this Clause.

5. Contract Time And Liquidated Damages

(1) Time

Time shall be of the essence for this Contract.

For purposes of this Contract, GC 1.04 of the General Conditions is revised, in that Contract Time means the time stipulated herein for completion of the Work as defined in the Construction Act.

(2) Progress of the Work and Contract Time

It is expected that the Contract Administrator will issue a written notice of award on or about **March 1, 2020**.

The Contractor shall accomplish completion of all Contract work as defined in Construction Act on or before **August 27, 2021.**

The intersection of Hibernia Street and Albert Street is permitted to be closed for the installation of the new traffic signals only as stated in SPG 35.

If the Contract time above specified is not sufficient to permit completion of the work by the Contractor working a normal number of hours each day or week on a single daylight shift basis, it is expected that additional and/or augmented daylight shifts will be required throughout the life of the Contract to the extent deemed necessary by the Contractor to ensure that the work will be completed within the Contract time specified. Any additional costs occasioned by compliance with these provisions will be considered to be included in the prices bid for the various Items of work and no additional compensation will be allowed therefore.

(3) Liquidated Damages

It is agreed by the parties to the Contract that in case all the work called for under the Contract is not completed by the dates specified, or as extended in accordance with Section GC 3.06 of the General Conditions, a loss or damage will be sustained by the Owner. Since it is and will be impracticable and extremely difficult to ascertain and determine the actual loss or damage which the Owner will suffer in

the event of and by reason of such delay, the parties hereto agree that the Contractor will pay to the Owner the sum of **One Thousand, Two Hundred Dollars ($1,200.00)** as liquidated damages for each and every days delay in achieving completion of the work beyond the dates prescribed. It is agreed that this amount is an estimate of the actual loss of damage to the Owner which will accrue during the period in excess of the prescribed date for completion.

The Owner may deduct any amount under this paragraph from any moneys that may be due or payable to the Contractor on any account whatsoever. The liquidated damages payable under this paragraph are in addition to and without prejudice to any other remedy, action or other alternative that may be available to the Owner.

6. Contractor's Authorized Representative

Authorized representative as referenced in GC 7.01.05 is defined as an employee of the Contractor.

7. OPS General Condition

Wherever in this Contract reference is made to the General Conditions, it shall be interpreted as meaning the OPS MUNI General Conditions of Contract (OPSS.MUNI 100, November 2019).

8. Layout By Contractor

Prior to the commencement of any construction layout, the Contractor shall verify the vertical accuracy of all temporary and permanent benchmarks and primary horizontal alignment control shown on the Contract Drawings. The Contractor shall also perform random checks on all survey control points and existing centreline road profiles. The Contractor shall provide a Summary Report of all aforementioned checks made to the Contract Administrator prior to the commencement of construction layout. Any discrepancies between the Contract Drawings and field checks shall be reported immediately to the Contract Administrator.

With the exception of the benchmark(s) specifically provided, no elevation within the Contract Drawings are to be used as a reference for any purpose.

The Contract Administrator shall provide AutoCAD drawing(s) for construction layout purposes prior to construction commencement. The Contractor shall ensure the AutoCAD Drawings are consistent with the conditions on the site.

Costs associated with all survey layout activities, including field verification work undertaken by the Contractor, shall be included in the Contractor's tender bid.

9. Restrictions on Open Burning

Open fires will not be permitted within the limits of this Contract. Brush and debris may as an alternative to burning, be disposed of outside the Contract Limits and in compliance with the requirements specified elsewhere for Management and Disposal of Excess Material.

10. Payments

Except as herein provided, payments under this Contract will be made in accordance with Subsection GC 8.02 of the General Conditions. Measurement for payment will be in accordance with GC 8.01, including items designated (P) on the Tender Form will be by Plan Quantity, and may be revised by adjusted Plan Quantity.

Progress Payments

Progress Payments shall be processed in accordance with GC 8.02.04.01. Progress payments shall be made on a monthly basis unless specified otherwise in the Contract Documents.

GC 8.02.04.01.04 is deleted and replaced with the following:

Payment shall be made within 30 days of receipt of a proper invoice and defined in this contract.

Fifteen percent (15%) of all monies due to the Contractor in accordance with the Progress Payment Certificate, up to a limit of fifteen percent (15%) of the contract price, shall be retained by the Owner and shall be termed the holdback. The holdback shall be comprised of a ten percent (10%) Statutory Holdback in accordance with the Construction Act and a five percent (5%) Maintenance Holdback of the total amount of all monies due the Contractor, which shall be held for the full duration of the twenty-four (24) month maintenance period. No interest shall be paid on the holdback.

The Contractor shall submit an invoice, which must include the following to be considered a Proper Invoice under the Construction Act:

1. The Contractor’s name and address;
2. The date of the application for payment and the period during which services or materials were supplied;
3. Information identifying the authority under which services or materials were supplied;
4. The amount payable for the services or materials that were supplied and the payment terms;
5. The name, title, telephone number and mailing address of the person to whom payment is to be sent;
6. Approved Change Orders signed by the Owner, Consultant and Contractor;
7. Copy of successful testing and commissioning reports where specified in the Contract Special Provisions,
8. Proposed payment certificate;
9. Copy of completed Time and Material breakdown form, when work was performed on a Time and Material basis; and

10. A Substantial Performance Release of Claims letter, a Completion Release of Claims letter or a Final Release of Claims letter (when applicable)

Substantial Performance Certificate, Payment and Statutory Holdback Release

At the time of Substantial Performance of the Contract, the Owner shall issue a Progress Payment with the Substantial Performance Certificate which shall show the total amount due the Contractor, less five percent (5%) Maintenance Holdback and any additional amounts which are to be retained to cover work to be performed as outlined in GC 8.02.04.11 Owners Set-off.

Ten percent (10%) holdback of completed work shall become payable after sixty (60) days from the date on which a copy of the Certificate of Substantial Performance is published in a construction trade newspaper, providing that no notice of liens or other claims against the Contract have been received by the Owner during this period. This payment shall be set forth on a Holdback Release Certificate.

The Contractor shall include in the price the publication of the Certificate of Substantial Performance. Publication is mandatory whether the Contractor requests Substantial Performance or not.

The Contractor shall submit an invoice, which must include a Substantial Performance Release of Claims letter in addition to the previously noted requirements to be considered a proper invoice.

The Contractor is advised that the Owner may withhold payment on Interim and Holdback Release Certificates up to twenty-eight (28) calendar days from the date of receipt of the executed Payment Certificates and Proper Invoices.

Completion Certification, Payment and Completion Holdback Release

At the time of completion of the Contract, the Owner shall issue a completion payment with the Completion Certificate which shall show the total amount due the Contractor, less the five percent (5%) maintenance holdback and any additional amounts which are to be retained to cover work to be performed as outlined in GC 8.02.04.11 Owners Set-off.

The Completion Payment Certificate is to include the completion holdback release will be issued within sixty-one (61) days after the date of completion as specified under Sub Section 2.03 of the Construction Act as amended in 2018. The date for interest due to late payment shall commence following ninety-one (91) days after the date of completion of the Work.

Ten percent (10%) of all work completed after the issuance of the Substantial Performance Certificate may be subject to holdback to become payable after issuance of the certificate of contract completion.

As a condition of the final holdback payment, the Contractor shall provide the required Property Owner’s Releases as specified in Section 10 and attached, as appropriate.

The Contractor shall submit an invoice, which must include A Final Release of Claims letter in addition to the previously noted requirements to be considered a proper Invoice.

11. Utilities

Sections GC 2.01.01 and GC 7.13.02 of the General Conditions are deleted in their entirety and are replaced by the following:

"The Contractor shall be responsible for the protection of all utilities at the job site during the time of construction."

The Owner will be responsible for the relocation of utilities where required. However, no claims will be considered which are based on delays or inconvenience resulting from the relocation not being completed before the start of this Contract.

The location of underground utilities shown on the Contract drawings are based on preliminary investigations made by the Owner and therefore the accuracy cannot be guaranteed. It is, however, the Contractor's responsibility to contact the appropriate agencies for further information prior to commencing work in regard to the exact location of all utilities, to exercise the necessary care in construction operations and to take the necessary precautions such as hand digging and hydro excavation to ensure the safeguard of existing utilities.

The Contractor shall be responsible for supporting of all existing utilities, including poles, within the Contract Limits, including co-ordination with the required utility stakeholder authorities.

12. Dust Control

As a part of the work required under Section GC 7.03 of the General Conditions, the Contractor shall take such steps as may be required to prevent dust nuisance resulting from his operations either within the right-of-way or elsewhere or by public traffic where it is the Contractor's responsibility to maintain a roadway through the work.

Where the work requires the sawing of asphalt or the sawing or grinding of concrete, blades and grinders of the wet type shall be used together with sufficient water to prevent the incidence of dust, wherever dust would affect traffic or wherever dust would be a nuisance to residents of the area where the work is being carried out.

The cost of all such preventative measures shall be borne by the Contractor.

13. Traffic Control, Flagging

Flagging for traffic control on this Contract shall be in conformance with the procedure outlined in OTM Book 7 (Ontario Traffic Manual), and as per the requirements of the Ontario Health and Safety Act Reg. 213/91, Section 69.1.

14. Construction Signs

In accordance with Section GC 7.06 of the General Conditions, the Contractor is responsible for the supply, erection, maintenance and subsequent removal of all temporary traffic controls, including signs, lights, barricades, delineators, cones, detour signage, etc., required on the work.

Traffic controls shall be provided in general accordance with the latest edition of the “OTM Book 7”.

A Traffic Control Plan indicating all traffic signage layout and types in a neat legible manner shall be submitted for approval by the Contract Administrator a minimum of three weeks prior to construction commencement and shall be in accordance with the latest edition of the “OTM Book 7”. Revisions to the Traffic Control Plan shall be made to reflect ongoing changes on the project as needed and shall be approved by the Contract Administrator.

Traffic controls shall be operational before work affecting traffic begins.

A minimum of six (6) TC-67 signs shall be supplied and erected by the Contractor at Contract limits with approved text, as directed by the Contract Administrator. The Contractor shall maintain signs for the duration of the construction, including removal upon completion. The signs shall be supplied and erected a minimum of two (2) weeks prior to commencement of construction.

15. Maintenance of Traffic

The Contractor will be permitted to temporarily close Albert Street, from Hibernia Street to Third Street. Access for local traffic must be maintained at all times, ensuring residents retain access to their properties.

The Contractor shall not be permitted to close the Albert and Hibernia Street intersection to traffic throughout the duration of the Contract except while work is actively being performed for traffic signal upgrades. The closure dates shall be communicated to and reviewed by the Contract Administrator and Town, prior to commencing.

Maintaining access to properties and their parking areas may involve constructing temporary entrances, temporary ramping, blocking only one driveway at a time, or carrying out such Work as may be required to provide the minimum amount of disruption.It is the responsibility of the Contractor to visit the site to become familiar with existing traffic volumes and patterns. No specific AADT (Average Annual Daily Traffic) is available at this time. However, the Contractor shall take into consideration all traffic information both within the limits of the Contract, as well as the surrounding area, as will occur during regular working hours.

It is understood that implementation of traffic controls will require ongoing review and adjustment to suit construction operations.

No claims for delays due to traffic will be considered for compensation.

Where work requires the modifications, installation or decommissioning of traffic signals, traffic through the affected intersection(s) shall be maintained with the use of Paid Duty Police Officers. Paid Duty Police shall be arranged by the Contractor.

At the end of each working day, trench backfill must be completed to allow for emergency vehicle access to all properties within the Contract limits. The Contractor shall notify Police, Fire and Ambulance services at least 48 hours prior to any street closures.

Safe pedestrian access to residences and businesses shall be maintained at all times.

16. Emergency and Maintenance Measures

Whenever the construction site is unattended by the general superintendent, the name, address and telephone number of a responsible official of the contracting firm, shall be given to the Contract Administrator. This official shall be available at all times and have the necessary authority to mobilize workmen and machinery and to take any action as directed by the Contract Administrator in case emergency or maintenance measures are required regardless whether the emergency or requirement for maintenance was caused by the Contractor's negligence, act of God, or any cause whatsoever.

It shall be the Contractor’s responsibility to ensure that erosion and sedimentation control measures within the limits of the Contract are in place and fully operational to the satisfaction of the Contract Administrator, should the onset of severe inclement weather be forecast.

Should the Contractor be unable to carry out immediate remedial measures required, the Owner will carry out the necessary repairs, the costs for which shall be charged to the Contractor.

17. Management and Disposal of Excess Material

The requirements of OPSS.MUNI 180 shall apply to this Contract, revised as follows:

.1 Section 180.03, Definitions, shall be amended by the addition of the following:

Work area: means the road allowance, right-of-way, and property with a boundary common to the road allowance or right-of-way within the Contract limits.

.2 Subsection 180.07.03, Conditions on Management as Disposable Fill, shall be amended by the addition of the following:

Recycled hot mix asphalt or excess bituminous pavement shall not be used as trench backfill or bedding and shall be disposed off-site in accordance with OPSS and MECP specifications.

.3 MECP O. Reg. 406/19 governs acceptance criteria for excess material.

All excess materials shall be managed, handled and disposed of at suitable locations, in accordance with applicable Municipal, Provincial, Federal and locally governing Conservation Authority jurisdictions, policies and legislations.

The Contractor's qualified person (QP) shall be responsible for confirming the receiving site for excess material is in accordance with the current provincial legislation and to the satisfaction of the Owner and Contract Administrator.

Contractors to note the requirement as stipulated in Town of Cobourg By-law 035-2012, Dumping of Fill and the Removal of Fill which can be viewed at: https://cobourg.civicweb.net/filepro/documents/145645?preview=7972

Prior to the commencement of any earth removal from the site, the Contract Administrator and the Owner shall be provided with proposed locations to allow for a preliminary screening, as the locations may relate to Provincially Significant Wetlands, future Municipal projects, or areas regulated by the local Conservation Authority.

The Contractor shall provide the Contract Administrator with the proposed disposal location two (2) weeks prior to the commencement of any earth removal from the site.

For the purpose of this Contract, all excess materials shall meet the requirements of the Ministry of Environment "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act" (April 15, 2011)", which can be viewed at the following website:

https://www.ontario.ca/environment-and-energy/soil-ground-water-and-sediment-standards-use-under-part-xv1-environmental

The Owner has undertaken an assessment of the environmental quality of the soils to provide a general measure with respect to on-site re-use or off-site disposal of the soils. Soils were subject to analyses of the parameters as described in the attached Geotechnical investigation Report prepared by Golder Associates Ltd. listed below:

- Geotechnical Investigation and Pavement Design Report dated December 13, 2018

The Contractor shall ensure excess material (fill) acceptors are aware of and have acknowledged (written) the concentrations as identified in the attached soils analysis reports, prior to use of any disposal site. Copies of completed forms and written acknowledgement of concentrations shall be provided to the Owner, in accordance with OPSS.MUNI 180 timelines.

The Contractor is responsible for any additional material testing required by the accepting site prior to delivery.

18. Occupational Health And Safety Act 2013 – Designated Substances

In accordance with the requirements of Part III 30.(1) of the Occupational Health and Safety Act, the Owner has determined that the designated substances as listed in act may be present on the site and are identified within the attached soils analysis reports if found.

It is the responsibility of the Contractor to ensure that all Subcontractors performing work under this Contract have received a copy of this specification, where Designated Substances are identified as being present at the site of the work.

The Contractor shall comply with the governing Ministry of Labour Regulations respecting protection of workers, removal, handling and disposition of the Designated Substances encountered on this Contract.

Prior to commencement of this work, the Contractor shall provide written notification to the Ministry of the Environment at 7 Overlea Boulevard, Toronto, Ontario M4H 1AB, of the location(s) proposed for disposal of Designated Substances. A copy of the notification shall be provided to the Contract Administrator a minimum of two weeks in advance of work starting.

In the event that the Ministry of the Environment has concerns with any proposed disposal location, further notification shall be provided until the Ministry of the Environment's concerns have been addressed.

All costs associated with the removal and disposition of Designated Substances herein identified, shall be deemed to be included in the appropriate tender Items.

Should a Designated Substance not herein identified be encountered in the work, then management of such substance shall be treated as Extra Work.

The requirements of Section GC4.03 of the General Conditions of the Contract shall apply.

19. Health and Safety Policy

The Tenderer shall submit, prior to award of the Contract, a copy of their Health and Safety Policy.

20. Workplace Hazardous Material Information System (WHMIS)

Reporting

Section GC 4.03.06 is deleted and replaced with the following:

Prior to the commencement of work the Contractor shall provide, to the Contract Administrator, a list of those products controlled under WHMIS which it expects to use on this Contract. Related Material Safety Data Sheets shall accompany the submission. All containers used in the application of products controlled under WHMIS shall be labelled.

The Contractor shall notify the Contract Administrator of changes to the list in writing and provide the relevant Material Safety Data Sheets.

21. Spills Reporting

Spills or discharges of pollutants or contaminants under the control of the Contractor, and spills or discharges of pollutants or contaminants that are a result of the Contractor's operations that cause or are likely to cause adverse effects shall forthwith be reported to the Contract Administrator. Such spills or discharges and their adverse effects shall be as defined in the Environmental Protection Act R.S.O. 1990.

All spills or discharges of liquid, other than accumulated rain water, from luminaires, internally illuminated signs, lamps, and liquid type transformers under the control of the Contractor, and all spills or discharges from this equipment that are a result of the Contractor's operations shall, unless otherwise indicated in the Contract, be assumed to contain PCB's and shall forthwith be reported to the Contract Administrator.

This reporting will not relieve the Contractor of his legislated responsibilities regarding such spills or discharges.

22. Environmental Protection Plan and Protection of Water Quality

If, in the opinion of the Contract Administrator or Approving Authorities the Contractor is not fulfilling the conditions and requirements of the Environmental Protection Plan as described herein, the Contract Administrator or Approving Agency has the right to stop the Contractor’s operation and/or work, at any time, until the deficiency or default has been resolved to their satisfaction. Compensation to the Contractor for any delays incurred as a result of this stoppage of work will not be considered.

Equipment and Operation

The Contractor shall control equipment and operations to limit disruption to the watercourse and surrounding areas to the greatest extent possible. Control measures shall include, but not be limited to, the following requirements:

- Equipment shall arrive at the site sufficiently clean such that the Contract Administrator may confirm that no invasive species or noxious weeds are transported onto the site by equipment.
- Equipment shall arrive on site in good repair and shall be regularly inspected and maintained by the Contractor throughout the duration of the contract to ensure that it remains free of fluid leaks.
- Equipment shall not work in watercourses where the Contract Documentation and Drawings do not indicate work to be completed within the watercourse. Under no circumstances shall equipment be permitted to travel in the active watercourse.
- Where Contract Documentation and Drawings indicate work to be completed within or adjacent to the active watercourse operations shall be kept to a minimum and be completed in an organized and efficient manner such that

the overall duration is minimized. These “in-water” operations will only be permitted between July 1st and September 15th.

- Restoration of disturbed areas shall be completed immediately following the disturbance of an area regardless of whether it is vegetation, hard surfaces, watercourse surfaces or embankment surfaces.
- Storage, maintenance and cleaning of equipment shall be performed a minimum of 30 meters away from the active watercourse and above the high water mark.
- Storage of fuel tanks and refueling operations shall be performed a minimum of 30 meters away from the active watercourse and above the high water mark. All fuel tanks shall be sound, leak free and where necessary certified by the required authority.
- Bio hazardous, Poisonous, Corrosive and/or Toxic Materials shall be stored a minimum of 30 meters away from the active watercourse and above the high water mark. Regulated materials shall be handled and used in accordance with applicable regulations. Quantities of these materials on site at any time shall be the minimum deemed required to carry out this Contract.
- A procedure for interception, clean-up, proper disposal and reporting of spills shall be in place prior to the commencement of the work and subject to the approval of the Contract Administrator and other Approving Authorities (i.e. MOE, Conservation Authority, DFO, MNR). Materials and equipment to facilitate spill clean-up shall be readily available and appropriately stored on-site prior to the commencement of work. All spills shall be reported to the Contract Administrator immediately.

No “in-water works” is anticipated for this project. However, these control measures still apply. A minimum distance of 30 meters from all sewer and watermain inlets will be required for cleaning, maintenance, fueling, storage, etc. as stated above.

23. Traffic and Street Signs

The Contractor will be responsible for the removal and salvage of existing traffic and street signs, and their re-erection as directed by the Contract Administrator following completion of the work.

Scheduling for sign removal shall be as approved in advance by the Contract Administrator.

Regulatory signs such as “Stop” and “Yield” must be maintained throughout.

24. Garbage Collection and Mail Delivery

The Contractor will be responsible for ensuring that garbage collection, including recyclables, is maintained and, when necessary, the Contractor shall make arrangements directly with the collecting agency to permit and coordinate pick-up.

The Contractor shall ensure that Canada Post employees have daily access to properties for mail delivery services at all times.

25. Asphalt Mix Designs

The Contractor shall be responsible for the provision of current mix designs for all hot mix asphalt required for the work, or for having the necessary mix designs prepared by a certified laboratory. The mix designs proposed for use by the Contractor shall be submitted in writing to the Contract Administrator for approval and no work shall commence until the design mixes are approved.

All costs associated with the provision of approved mix designs shall be borne by the Contractor.

Steel slag and blast furnace slag coarse and fine aggregates shall not be used in any hot mix required by this Contract.

Any requests by the Contractor for adjustment to previously approved mix designs shall be requested by the Contractor within 24 hours of the commencement of asphalt placement. After which period, no adjustments will be considered by the Contract Administrator.

26. Preparation and Posting of Requirements for Work in Confined Spaces

Clause GC 7.01.04 of the OPS General Conditions of Contract is amended by the addition of the following:

Detailed written procedures addressing the confined space requirements of the Occupational Health and Safety Act and Ontario Regulations for Construction Projects, Ontario Regulation 213/91, shall be clearly posted at the project site and available to all personnel, including the Contractor's workers, Owner staff, Contract Administrator, and Ministry of Labour inspectors.

The procedures must include the rescue procedures to be followed during a rescue or evacuation of all personnel from an unsafe condition or in the event of personal injury.

The Contractor shall have personnel trained in rescue procedures readily available on site.

27. Confined Space Entry

Without relieving the Contractor of his responsibilities under the Occupational Health and Safety Act the Contractor shall be responsible for the supply of personal protective equipment for the use of the Contract Administrator, in connection with confined space entry while the Contractor is operating on site.

The following equipment shall be made available on request:

- Mechanical Ventilation Equipment
- Gloves
- Gas Detector (C95-80)
- Full body harness securely attached to a rope
- Rope

- Gas mask or dust, mist or fume respirator (optional)
- 30 minute self-contained breathing apparatus (need not be worn but, if required, be readily available to supply air for instant egress)
- 7 minute Escape Pack
- Explosion-proof temporary lighting
- Adequate clothing to ensure protection against abrasions and contamination.

In addition, the Contractor shall provide a competent person who shall inspect all safety equipment prior to use to ensure that it is in good working order and appropriate for the task at hand.

28. Entry Onto Private Property

The Contractor shall not enter private property or property which is to be acquired to construct the works without the prior consent of the Contract Administrator. This requirement will be strictly enforced.

29. Storage Areas

Clause GC 7.03 of the General Conditions of Contract is amended by the addition of the following:

The use of the road right-of-way as a long-term storage area is not allowed under this Contract. The storage of materials and movement of equipment will only be allowed for normally accepted construction practices.

30. Commercial General Liability Insurance

The Corporation of the Town of Cobourg, Lakefront Utility Services Inc. and CIMA Canada Inc. shall be named as additional insureds with limits of not less than Five Million Dollars ($5,000,000) per occurrence. (See Clause GC 6.03.02.01).

31. Construction Act

The Contractor shall give the Owner notice in writing, immediately, of all lien claims or potential lien claims coming to the knowledge of the Contractor or his agents.

When a claim for lien is filed by a Subcontractor, labour or material supplier or equipment renter acting under the Contractor, and proceedings are commenced by the Owner to vacate the lien, the Contractor agrees and shall forthwith pay to the Owner, in addition to their reasonable legal fees therefore, all interest costs and expenses incurred by the Owner and an additional sum equal to ten percent (10%) of the sum found to be owing as liquidated damages, and such remedy shall be in addition to any other remedy available to the Owner under the Contract Documents.

Where any lien claimant asks from the Owner the production for inspection of the Contract Documents or the state of the accounts between the Owner and the Contractor, the Contractor shall be liable for an administration fee of Two Hundred Dollars ($200.00) for each request made as compensation for the preparation of

such accounting or for the preparation of the Contract, or both, as the case may be, and the Contractor acknowledges that such administrative fee shall be properly deductible, if the Owner should so choose, from monies otherwise payable to the Contractor under the terms of the Contract Documents.

Where an application is brought to a judge of a competent jurisdiction to compel production of any particular document to a lien claimant, the Contractor further agrees to indemnify the Owner from reasonable legal fees incurred in appearing on such an application and in addition agrees to pay to the Owner its reasonable costs incurred in producing such documents to the extent that the same is made necessary under the disposition of the matter by such judge, and the Contractor further agrees that such reasonable costs and fees incurred by the Owner as stated herein may be properly deductible from monies otherwise payable to the Contractor under the terms of the Contract Documents.

32. Construction Noise

Contractors are advised that construction operations shall be undertaken recognizing the restrictions imposed by Town of Cobourg By-law Number 011-2011 that can be viewed at

https://cobourg.civicweb.net/filepro/documents/108?preview-7432. Contractors attention is drawn to Clause 3.1 at the aforementioned website regarding maximum allowable sound levels over a twenty-four (24) hour period.

33. Variations in Tender Quantities

Clause GC 8.01.02.01 (b) of the General Conditions of Contract is amended as follows:

The last sentence beginning “Alternatively” and ending “paid” is deleted and replaced by “The Owner shall not be liable to the Company for loss of anticipated profit”.

34. Property Claims During Construction

The Contractor shall be the primary contact for claims made by homeowners and other property owners within the project limits during construction processes. The Contractor shall inform the Contract Administrator of said claims, immediately upon receipt. The Contractor shall inform the Owner, in writing, their intentions with regard to resolution of said claim within twenty-four (24) hours of receipt.

If it is deemed by the Owner that the Contractor is not adequately providing and/or retaining the services to resolve a claim by homeowners within the project limits during construction, the Owner may elect to holdback sufficient funds to resolve the claim. All claims, negotiations, and/or mediation completed under this Contract, including Arbitration, shall be completed in Accordance with Clauses and Sub-clauses of GC 3.13 and 3.14 of the General Conditions of Contract.

The application of this Clause shall not make the Owner or Contract Administrator liable in any way for subsequent performance, and in no way relieves the Contractor from his continuing responsibilities in accordance with this Contract.

35. Construction Staging

The Contractor shall provide a construction schedule detailing all major activities, including sequence of activities.

The Contractor shall not be permitted to close the Albert and Hibernia Street intersection to traffic throughout the duration of the Contract except while work is actively being performed for traffic signal upgrades. The closure dates shall be communicated to and reviewed by the Contract Administrator and Town, prior to commencing.

Underground and surface improvements shall be completed in an organized and sequential methodology, to accommodate adjacent homeowners' entrances, and travel to/from adjacent streets. The methodology is to be approved by the Contract Administrator, prior to the commencement of any work.

Consideration shall be given to the provision of potable water supply and maintenance of sewer (storm and sanitary) flows, at all times as part of this staging schedule.

Road granular placement for trench restoration shall not exceed thirty (30) metres separation from completed underground improvement operations.

36. Access to Private Property During Construction

The Contractor is reminded that access to private properties, buildings, driveways, lanes must be provided at all times. The Contractor is advised that every attempt must be made to provide access to private properties. During the evening and weekend periods, traffic is to be permitted on the roadway, using appropriate signage if a detour is not in place. Therefore, the Contractor will be required to schedule work and construct necessary temporary works as necessary to ensure this requirement is met. All costs anticipated for compliance with this Clause shall be included in the Tendered Price.

37. COVID-19 Pandemic

At the time of issuing this Tender it is unknown how long the COVID-19 pandemic situation will continue along with the resultant State of Emergency Orders and related restrictions imposed by the Government of Ontario and other levels of government.

Without limiting the parties' mutual obligation to mitigate the impact of the current and future COVID-19 related restrictions on the performance of their respective obligations under this Contact, the parties acknowledge and agree that if renewed, additional or increased COVID-19 related restrictions are imposed, and those restrictions impact the ability for the work called for under this Request for Tender to continue, then the Contract Time shall be extended for such reasonable duration as the Town and the Contractor shall agree based on the prevailing circumstances. The extension of time shall not be less than the delay/time lost as a result of renewed, additional or increased COVID-19 related restrictions that limit the ability for the work called for under this Request for Tender to continue, unless the Contactor agrees to a shorter extension. The Contractor shall not be entitled to

payment for costs incurred due to such delays and lost time. Upon reaching an agreement on the extension of time to be provided due to renewed, additional or increased COVID-19 related restrictions the Contractor and the Town shall execute a Change Order confirming the extension of Contract Time and establishing revised completion dates and confirming that there are no costs payable by the Township to the Contractor as a result of the extension of Contact Time.

Should renewed, additional or increased COVID-19 related restrictions require the Town to make a determination with respect to the essential nature of the work called for under this tender the Town will do so at its sole discretion. The Contractor shall not be entitled to any payment by the Town as a result of such decisions and determinations as the Town may be required to make.

The Contractor will be required to submit a plan that outlines how the Contractor will address the requirements of all COVID-19 related restrictions in the context of the Work called for under this Tender. This shall include, but not be limited to required social distancing, hygiene and personal protective equipment measures for the Contractor's employees, suppliers, subcontractors, as well as Town of Cobourg staff and their representatives and regulatory agency staff required to attend the site along with the general public. The plan shall also outline how the Contractor will suspend progress of the Work called for under this Tender in a safe and efficient manner should such action be required due to renewed, additional or increased COVID-19 related restrictions.

Corporation of the Town of Cobourg

Albert Street Reconstruction

Contract No. CO-21-01 PWD

Special Provisions Items

Corporation of the Town of Cobourg

Albert Street Reconstruction

Contract No. 21-01 PWD

Index to Special Provisions Items

PART 'A' – ROADWORKS AND STORM SEWERS

The Contractor must supply equipment or adjust his construction methods as required to ensure **minimal physical damage will be done to the existing trees (roots and canopy)** within the project limits. This may include the use "zero clearance" counterweighted equipment, exhaust diversions, hydro vacuum truck, mini excavator, subsurface installation of services or any other means as deemed appropriate by the Contract Administrator to ensure the safeguard of the existing trees and adjacent landscape features along Albert Street and the associated side streets. Any roots that are encountered should be clean cut and covered as soon as possible.

Site Preparation – Item No. A1

Reference: OPSS.MUNI 201

For the lump sum price bid, the Contractor shall complete the following work:

Remove, salvage, and reinstate:

- Plantings within gardens and landscape features within the grading limits. While every attempt has been made to identify all landscape or planting features on the Contract Drawings, it is the responsibility of the Contractor to remove, salvage and reinstall all features;
- Bollard at entrance to asphalt parking lot, Northeast corner of Albert and Hibernia Street;
- Wooden steps at 100/98, 99, and 94 Albert Street;
- Wooden garden curb at 87 Albert Street;
- Stone block retaining wall at 86 Albert Street;
- Wooden retaining wall at 77 Albert Street;
- Curb / wall at 100 Albert Street.

Should any of the salvaged materials be deemed not reusable for reinstatement / reinstallation, the Contractor shall replace in kind or with an approved equivalent at the lump sum price bid and to the satisfaction of the Contract Administrator.

Reinstated steps shall be built in accordance to the Ontario Building Code, section 3.4.6.8 'Treads and Risers'

This item shall also include the installation, maintenance and removal of catch basin siltation traps, as required. Siltation traps to be 16 gauge, 10 mm wire mesh overlain with Terrafix 420R, Mirafi 170N or Armtec 230 geotextile filter fabric and extend a minimum of 200 mm beyond all sides of the catch basin.

Tree Maintenance and Trimming – Item No. A2

Reference: OPSS.MUNI 201

The lump sum price shall also include for the careful pruning of existing trees as outlined in the in the table below to accommodate construction processes and equipment, as well as remove dead branches.

All removal and pruning works shall be reviewed and approved by the Contract Administrator prior to commencing the work. Works to be completed by qualified personnel as follows:

Address	Species	Description of Work
86 Albert Street	Schwedler Maple	Pruning
197 Third Street	Norway Maple	Pruning
197 Third Street	Norway Maple	Pruning
197 Third Street	Schwedler Maple	Pruning
77 Albert Street	Norway Maple	Pruning
77 Albert Street	Norway Maple	Pruning
87 Albert Street	Birch	Pruning

All additional pruning works shall be determined onsite by the Contractor and Contract Administrator prior to commencing the work.

Disposal shall be at an off site location arranged for by the Contractor.

Tree Protection – Item No. A3

Reference: OPSS.MUNI 801

The Contractor shall supply, install, maintain and remove any tree protection as per OPSS.MUNI 801 as directed by the Contract Administrator throughout the limits of the Contract.

The Contractor shall note that this Item is provisional and its use shall not be undertaken without prior approval from the Contract Administrator.

Earth Excavation (Grading) – Item No. A4

Reference: OPSS.MUNI 206

This Item shall include all excavation of materials as required, except as specifically provided for elsewhere in the Contract.

Payment under this Item shall also include the following:

- Removal and disposal of excess material off site including abandoned services, utilities, subdrains and storm sewers less than 300mm in diameter and other debris

encountered during excavation off site at an approved location.

- Removal and disposal of all boulders, rock slabs and concrete up to and including one (1) cubic meter in size.
- Removal and disposal of asphalt, regardless of the depth, on all streets including side streets.
- Sawcutting, removal, and disposal of asphalt from entrances and sidewalks.
- The volume of additional earth excavated below theoretical subgrade will be measured and paid for by the cubic metre under this Item. The extent of this additional sub-excavation will be agreed to on site with the Contract Administrator. Backfill for the sub-excavation shall be Granular 'B' (Type I), (under the appropriate Item) unless adverse drainage conditions are created (i.e.: non-drainage depressions) whereas select native material shall be used.
- Shaping and proof rolling of sub-grade. The Contractor shall take care and take direction from the Contract Administrator, or their delegates regarding vibratory compaction above and adjacent to the existing gas mains and services.
- Excavation and grading in entrances and boulevards.
- Hand excavation for subdrains in the vicinity of underground services or utilities.

Road granular placement for trench restoration shall not exceed 30 metres separation from completed underground improvement operations at any time.

The estimated quantities under this Item are as follows:

- Earth Cut (Including Stripping)…… 1,340 m^3
- Fill Required to Remain On-Site …. 0 m^3
- Surplus Material to be Disposed of Off-Site 1,340 m^3

Quantities do not include blow-up from sewer trenches that must also be disposed off-site. Payment for disposed of such surplus material shall be included in the unit rate bid under the appropriate pipe and maintenance hole items.

Hot Mix, H.L.-3, H.L.-3F in Entrances, H.L.-8 – Items No. A5, A6, A7

Reference: OPSS.MUNI 310, 311

The Contractor shall supply all materials required for the proper execution of the paving work in accordance with OPSS.MUNI 310. Asphalt cement supplied shall be PGAC 58-28 as a minimum.

The Marshall Stability for H.L.-3, H.L.-3F and H.L.-8 shall be a minimum of 8,900, 5,800 and 8,000 respectively.

The requirements of OPSS.MUNI 310 respecting a surface course trial area and the use of automatic screed controls are not applicable to this Contract.

OPSS.MUNI 310.09.01.03 and 310.10.02 (Hot Mix Miscellaneous) are amended in that payment shall be by the tonne placed and shall include all labour, equipment and material

to supply and place Hot Mix Asphalt in entrances in accordance with OPSS.MUNI 310 whether by hand or machine.

The Contractor is permitted to pave over manhole lids or steel plates and water valve boxes with the base asphalt paving. The Contractor shall saw cut, remove asphalt and raise manhole lids and valve boxes flush to surface asphalt grade. Infills shall be restored with hot mix HL-8 asphalt with tonnages included in Item No. A7 prior to surface asphalt paving.

The unit price bid for Item No. A5 shall include:

- Cleaning the base course with a power broom or other means capable of leaving a clean, dry surface free of dirt. The use of water required for cleaning shall be included in the unit price bid for this Item. Where padding is required, this will be supplied and paid for at the unit bid under the surface course Item.
- Grinding of lap joints at limits of construction, and all costs associated regardless of depth.
- Work under this Item also includes the application of tack coat on the road surface within the contract limits

Paved entrances and proposed asphalt boulevards to be paved with 50 mm H.L.-3F to match existing, and shall include all sawcutting of existing asphalt, regardless of depth. HL-3F for paved entrances and asphalt boulevards shall be paid under Item No. A6.

The unit price bid for Item No. A7 shall include:

- Sawcutting of all road asphalt at limits of construction, and all costs associated with sawcutting of asphalt regardless of depth. Sawcutting to be completed in a straight, neat manner to the satisfaction of the Contract Administrator. Sawcut edges damaged by the Contractor shall be re-cut at no additional cost and as approved by the Contact Administrator.
- Construction of 300 mm x 40 mm stepped joint at limits of road construction in preparation for surface course asphalt.
- Base course asphalt for commercial entrances.

For depths and types of asphalt, refer to Contract Drawings.

Asphalt Cement Price Adjustment Allowance (ITO = $622.40) – Item No. A8

The Owner will adjust the payment to the Contractor based on changes to the Ministry of Transportation's (MTO) performance graded asphalt cement price index unless the Contractor opts out by notifying the Town in writing within 5 business days of receiving permission to start work. Once the Contractor has opted out of payment adjustments based on the index, the Contractor will not be permitted to opt back in. The price index will be published monthly by the MTO. The MTO price index will be used to calculate the amount of the payment adjustment per tonne of new asphalt cement accepted into the Work.

The price index will be based on the price, excluding taxes, FOB the depots in the Toronto area, of asphalt cement grade PG 58-28 or equivalent. One index will be used to establish and calculate the payment adjustment for all grades.

A payment adjustment per tonne of new asphalt cement will be established for each month in which paving occurs when the price index for the month differs by more than 5% from the price index for the month prior to tender opening. When the price index differential is less than 5%, there will be no payment adjustment established for that month. Payment adjustments due to changes in the price index are independent of any other payment adjustments made to the hot mix tender Items.

The payment adjustment per tonne will apply to the quantity of new asphalt cement in the hot mix accepted into the Work during the month for which it is established.

The payment adjustment for the month will be calculated from the following formulae:

	Asphalt Cement Price Adjustment, PA	
I_P	**Paving Within Approved Contract Time**	**Paving Beyond Approved Contract Time**
$I_P > 1.05I_{TO}$	$PA=(I_P-1.05I_{TO}) \times T_{AC}$	$PA=(I_{AT}-1.05I_{TO}) \times T_{AC}$
$I_P < 0.95I_{TO}$	$PA=(0.95I_{TO}-I_P) \times T_{AC}$	

Where:

PA = payment adjustment for new asphalt cement, in dollars

I_{TO} = performance graded asphalt cement price index value to be used is $662.40 (as of October 2020)

I_P = performance graded asphalt cement price index for the month in which paving occurs

I_{AT} = performance graded asphalt cement price index for the month of expiry of approved Contract Time

T_{AC} = quantity of new asphalt cement in tonnes

The quantity of new asphalt cement includes all grades of asphalt cement supplied by the Contractor with and without polymer modifiers. For each month in which a payment adjustment has been established, the quantity will be calculated using the hot mix quantity accepted into the Work and its corresponding asphalt cement content as required by the job mix formula except for mixes which contain reclaimed asphalt pavement.

For mixes which contain reclaimed asphalt pavement, the quantity of new asphalt cement will be determined from the difference between the asphalt cement content required by the job mix formula and the asphalt cement content of the reclaimed asphalt pavement incorporated into the hot mix, as calculated by the Contract Administrator.

For mix containing a liquid anti-stripping additive, the quantity of anti-stripping additive will be deducted from the quantity of new asphalt cement. No other deductions will be made for any other additives.

For progress payment purposes, a final adjustment amount will be calculated once all asphalt has been placed.

Granular 'A' and 'B', Type 1 – Items No. A9, A10

Reference: OPSS.MUNI 314, 501

Payment shall be made under these Items for the supply, placing and compacting of Granular 'A' and Granular 'B', Type I to 100% SPMDD.

Granular 'B' shall extend 300 mm beyond back of curb.

The following construction standards shall apply:

• Albert Street	Granular 'A', 150 mm
	Granular 'B', Type I , 300 mm
• Concrete sidewalks	Granular 'A', 100 mm
• Paved and Gravel Private entrances	Granular 'A', 200 mm
• Commercial Entrances	Granular 'A', 150 mm
	Granular 'B', Type I , 300 mm
• Concrete Paver in Boulevards	Granular 'A', 100 mm
• Concrete Pavers in Entrances	Granular 'A', 150 mm
• Concrete Pavers in Walkways	Granular 'A', 100 mm

Granular 'A' and Granular 'B' that becomes contaminated due to Contractor's activity, shall be removed and replaced at the Contractor's expense.

Granular 'B', Type I shall be used in sub-excavated areas and backfill to subdrains.

Granulars used for any temporary entrances or accesses are not included in this Item.

Additional Depth Granular 'B', Type 1 (Provisional) – Item No. A11

Reference: OPSS.MUNI 206, 314

This Item shall be used where native excavated material is deemed to be unsuitable as determined by the Contract Administrator and the Soils Consultant.

Payment shall be made under this Item for supply, placing and compacting of additional Granular 'B', Type I to the specified depth, including excavation and disposal of unsuitable material off site at a location arranged by the Contractor.

No material shall be imported for use under this Item without the authorization of the Contract Administrator.

Concrete Sidewalk and Entrances – Item No. A12, A13

Reference: OPSS.MUNI 351, OPSD 310.010, 310.020 and 610.010

Areas of private sidewalk, private entrances, and concrete steps to be constructed to match new sidewalk will be measured and paid for under this Item. In the event that the Contract Administrator deems the removal of existing concrete steps required to facilitate construction as shown on the Contract Drawings, the Contractor shall reconstruct the

concrete steps in accordance with the Ontario Building Code, section 3.4.6.8 'Treads and Risers' to match existing.

Where new sidewalk abuts or connects to existing sidewalk or steps, an expansion joint shall be constructed at these locations. Full depth expansion joints to be placed every 6th sidewalk joint.

Contraction joints shall be completed by sawcutting every 1.5m. Blades shall be of the wet type and shall be used together with sufficient water to prevent the incidence of dust, wherever dust would affect traffic or wherever dust would be a nuisance to residents of the area where the Work is being carried out.

For the unit price bid, concrete in residential entrances are to have a thickness of 150 mm, and a thickness of 200mm in commercial entrances (see Contract Drawings for locations).

2.5 m wide, 200 mm thick coloured concrete crosswalk at Albert Street and Third Street to be reinstated as specified on the Contract Drawings and paid under Item No. A13. Colour to be submitted to the Contract Administrator for approval prior to placement.

The Contractor shall place adequate signs and physical barriers around all areas of freshly placed concrete to advise of its presence and prevent access into it. Barriers shall be placed as soon as the concrete has been placed and the crew has moved on, or as soon as the crew is five metres or more away from an unprotected area of a continuous pour. Barriers shall remain in place until at least 24 hours after the concrete has set hard enough to walk on. (This does not imply that areas can be opened to traffic after only 24 hours).

The above conditions shall be constructed as minimum requirements for safety around areas of freshly placed concrete.

Concrete surfaces marred by the public, or by traffic from the Contractor's own/sub-contractor forces, or due to animals, shall be replaced by the Contractor at his cost.

The unit price bid for Item No. A13 shall also include for the supply and install of welded wire mesh reinforcement for concrete in commercial entrances and road (150 mm x 150 mm weave, MW 18.7 x MW 18.7).

Tactile Walking Surface Indicators – Item No. A14

Reference: OPSS.MUNI 351, OPSD 310.031 & 310.039

For the unit price bid, the Contractor shall supply and install yellow tactile walking surface indicators at pedestrian crosswalk in accordance with OPSD 310.031 and 310.039 in locations as indicated on the Contract Drawings.

A minimum of two (2) 610mm x 610mm plates are to be used at each sidewalk ramp. When continuous plates are used for both directions of sidewalk ramp, radius plates shall be used. The radius shall match that of the curb return at each quadrant of the intersection.

The Contractor shall submit the layout of the tactile surface indicators at each cross-walk for approval prior to installation.

Concrete Curb and Gutter (All Types) – Item No. A15

Reference: OPSS.MUNI 353, OPSD 600.110 , 600.040

Concrete curb shall be installed as per OPSD 600.040 at locations indicated on the Contract Drawings. All concrete curb and gutter constructed adjacent to sidewalks are to have 50 mm wide key as in accordance with OPSD 600.040.

Payment shall be made under this item for all labour, equipment, and material required to perform the work.

Concrete curb and gutter shall be constructed as shown on the Contract Drawings, including the following:

- Concrete to be 30 MPa compressive strength at 28 days with 40 mm slump +/- 20 mm, 5 to 7 % air entrainment, and cement ratio to be min. 325 kg / m^3 and max. 20 mm aggregate size. (OPSS.MUNI 1350).
- Contraction joints are to be placed at intervals not exceeding 3.0 m and be cut with a wet saw. Blades of the wet type shall be used together with sufficient water to prevent the incidence of dust, wherever dust would affect traffic or be a nuisance to residents of the area where the work is being carried out. No additional payment will be made for water in this instance.
- All concrete curbs and gutters shall be fully in place prior to placement of HL-8 Binder or Surface Asphalt in Driveways.
- Match to existing concrete curb.
- Curb depressions, curb transitions and terminations as required. Locations to be verified by the Contract Administrator prior to placement.
- Curb set back around proposed catch basin maintenance hole as per S-101.020.

Coloured concrete curb to be constructed to match existing in locations as specified on the Contract Drawings in accordance with OPSD 600.110 and to be measured and paid for under this Item.

The Contractor shall place adequate signs and physical barriers around all areas of freshly placed concrete to advise of its presence and prevent access into it. Barriers shall be placed as soon as the concrete has been placed and the crew has moved on, or as soon as the crew is five metres or more away from an unprotected area of a continuous pour. Barriers shall remain in place until at least 24 hours after the concrete has set hard enough to walk on. (This does not imply that areas can be opened to traffic after only 24 hours).

The above conditions shall be constructed as minimum requirements for safety around areas of freshly placed concrete.

Concrete surfaces marred by the public, or by traffic from the Contractor’s own/sub-contractor forces, or due to animals, shall be replaced by the Contractor at his cost.

Removal of Concrete Sidewalk and Entrances – Item No. A16

Reference: OPSS.MUNI 510

The Contractor shall sawcut to the full depth of concrete, regardless of depth, at the limits of removal. Blades of the wet type shall be used together with sufficient water to prevent the incidence of dust, wherever dust would affect traffic or be a nuisance to residents of the area where the work is being carried out. No additional payment will be made for water in this instance.

The Contractor shall carefully remove and dispose of concrete sidewalk at the locations indicated on the Contract Drawings and as per the Contract Administrator's direction.

The Contractor shall be responsible for protecting all saw cut edges from damage for the duration of the Contract. Damage caused to sidewalk not approved for removal and replacement shall be replaced at the Contractor's expense, including 100mm of material bedding beneath the removed sidewalk.

Removal of Curb and Gutter – Item No. A17

Reference: OPSS.MUNI 510

The unit price bid shall include for all labour and equipment required for the removal and disposal off-site of concrete curb and gutter.

The Contractor shall sawcut the full depth of the concrete, regardless of depth, at the limits of removal. Blades of the wet type shall be used together with sufficient water to prevent the incidence of dust, wherever dust would affect traffic or be a nuisance to residents of the area where the work is being carried out. No additional payment will be made for water in this instance.

The Contractor shall be responsible for protecting all saw cut edges from damage for the duration of the Contract. Should the saw cut edge be damaged, the Contract Administrator can request that the curb be re-cut prior to placement of new curbs at no additional cost to the Owner.

Brick Pavers – Item No. A18

Reference: OPSS.MUNI 355, OPSD 561.020

Under this Item, the Contractor shall be paid for all labour, equipment and material necessary to supply and install interlocking brick pavers as specified in the Contract Drawings.

The unit price bid for this item shall include:

- Supply and install of concrete pavers with 60mm thickness (thickness increased through driveways as per OPSD 561.020 if required).
- Supply and install of 25mm sand base and joint sand.
- 40mm thick 30 MPa concrete base poured monolithically with the proposed sidewalk as shown in the Contract Drawings.

- Installation of 20mm dia. drain holes, placed at 750mm intervals, filled with sand, and covered with a geotextile fabric as specified in the Contract Drawings.

All work to be performed in accordance with OPSS.MUNI 355.

Remove, Salvage, and Reinstate Existing Brick Pavers – Item No. A19

Reference: OPSS.MUNI 355, 510

Under this Item, the Contractor shall be paid for all labour and equipment necessary to:

- Remove, salvage and reinstate existing unit pavers in locations as specified on the Contract Drawings.
- Excavate as required to suite depth of construction.
- Supply and place 25 mm bedding sand and 100mm Granular 'A' in walkways, respectively. Granular 'A' base shall be paid for under the Granular 'A' Item No. A9.
- Placement of salvaged brick pavers in an orientation to match original/existing configuration, including sawcutting as required.
- Placement, compaction, and sweeping of polymeric sand in brick joints, including water misting upon completion.

Any additional pavers remaining following the reinstallation shall remain as property of the respective homeowner unless given direction to dispose of the surplus pavers

Where bricks are broken or otherwise damaged during removal, the Contractor shall be required to supply pavers of colour and cut to match existing, at the Contractor's expense.

150 mm Dia. PE Pipe Subdrains with Geotextile – Item No. A20

Reference: OPSS.MUNI 405, OPSD 216.010, 216.021

Subdrain pipe shall be laid in a trench of dimensions conforming to OPSD 216.010.

The unit price bid shall include all labour and equipment to construct pipe subdrains in accordance with OPSD 216.010 and 216.021, as an independent trenching operation, separate from subgrade and trenching excavation. This Item shall include the disposal of excess material off site.

The unit price shall include the supply and installation of CSA approved 150 mm dia. perforated corrugated plastic pipe with fibre cloth as per CSA 41-G.P.-29, or approved equal.

No additional payment will be made for the connection of the subdrain to new or existing subdrain or storm drainage structures.

Backfill to subdrains shall be Granular 'B', Type 1 and will be paid under the Granular 'B' Item.

Hand excavation, as required, to protect existing utilities.

Core into Existing Storm Maintenance Hole and Connect Proposed 375mm CP Pipe on Third Street – Item No. A21

Reference: OPSS.MUNI 402

The unit price shall include for the following:

Storm sewer connection to existing structure on Third Street:

- Core into existing storm structure at Albert and Third Street
- Connect proposed 375mm CP storm sewer with method approved by Contract Administrator, as indicated on the Contract Drawings
- Parget all voids between pipe and structure walls using concrete and brick, as required. No wood will be accepted or any deleterious material deemed unacceptable by the Contract Administrator.
- Removal and replacement of any structure ladder rungs interfering with connection of the proposed storm pipe.
- Clean out structure upon completion.
- Backfill and compact as per sewer installation standards.

PVC / Concrete Storm Sewers and PVC Laterals – Items No. A22, A23, A24

Reference: OPSS.MUNI 401, 409, 410; OPSD 802.010, 802.030

Under these Items and for the unit prices bid, the Contractor shall supply all materials, including pipe of the required sizes and classes, all bends, plugs, tees, saddles, clamps and other fittings, perform all of the necessary excavation, and construct the sewers to the lines and grades established by the Contract Administrator.

- Removal and disposal of storm sewer encountered during installation. The unit price shall include for removal of existing pipe within the limits of the trench, and supply, placement and compaction of suitable earth material to underside of embedment material.
- Granular ‘A’ shall be used for embedment material for flexible pipe installation as per OPSD 802.010.
- Granular ‘A’ shall be used for bedding material for rigid pipe installations as per OPSD 802.030 to springline of pipe.
- Granular ‘A’ shall be used for cover material for rigid pipe installations where storm sewer cover is less than 1.5m, as per OPSD 802.030. Sand may be used for cover material for rigid pipe installations where storm sewer cover is greater than 1.5m, as per OPSD 802.030.
- Backfill shall be Granular ‘B’, Type I
- Maintenance of existing sewer flows, including temporary connections or by-passing, as required
- Offsite disposal of earth and rock material excavated to install storm sewers.

- Support of existing utilities and infrastructure which the proposed storm sewer and services cross under.

The unit price shall include the cost of a post construction closed circuit television inspection in accordance with OPSS.MUNI 409, of all storm sewers. The inspection shall take place in the presence of the Contract Administrator. Should any portion of the storm sewer require additional closed circuit television inspection following the correction of a fault in the work, the cost will be borne by the Contractor. It will be the Contract Administrator's decision whether additional closed circuit television inspection is required.

Laterals and services shall be connected to sewer main using an approved coring method or manufactured tees.

The Contractor is advised that no extra payment will be made for dewatering techniques required to install underground services. The unit prices bid for storm sewer installation will include for all dewatering required.

Insulate Storm Sewers – Item No. A25

Reference: S – 100.050

For the unit price bid, the Contractor shall include insulating storm sewers and storm laterals with less than 1.2m cover as per the Sewer Structure Data chart contained within the Contract Documents, and as directed by the Contract Administrator. Insulation shall be installed in accordance with S-100.050.

The unit price shall include:

- 75 mm of Extruded Polystyrene Insulation (Styrofoam HI 40 or approved equivalent); and,
- 100 mm of sand above the rigid insulation. The sand backfill may be reduced, at the direction of the Contract Administrator where sand backfill will impact road subgrades.

Storm Maintenance Holes and Catchbasins – Items No. A26, A27

Reference: OPSS.MUNI 402; OPSS 407, 1850; OPSD 401.081, 610.010, 701.010, 701.011, 703.021, 704.010, 705.010, 705.020

The unit price bid shall Be full compensation for all labour, equipment and material required for a complete and fully functional installation in strict accordance with the applicable Ontario Provincial Standards Specifications and Standard Drawings and inclusive of all connections to existing and proposed pipes.

For the unit price bid the Contractor shall:

- Provide 0.3 m sump on maintenance holes and minimum 0.6 m sumps on all precast catchbasins.
- All storm sewer manholes and catch basins shall be supplied with a 100 mm diameter opening left in the floor slab. Filter fabric, Terrafix Type 270R or equal, shall be placed on the outside at the floor slab opening.

- Provide minimum thickness of 300 mm Granular 'B' all around manholes, catch basins and ditch inlets, including under the floor slab.
- Parge all inlets and outlets inside structures.
- Adjustment to surface course asphalt grade including Moduloc and exterior parging of Moduloc as per OPSD 704.010 and 610.010.
- All excavation, to carry out all sheathing, shoring and dewatering as may be required to avoid impact on adjacent utilities.
- Supplying, placing and compacting all bedding, granular materials, and cover materials to match design elevations and adjacent asphalt.
- Supplying structures in accordance with OPSD's.
- Disposal of surplus excavated materials.
- Reconnecting existing pipes if required (connections to storm structures with PVC pipe shall have rubber gaskets (boots) eccentric type unless otherwise approved by the Contract Administrator).
- Dewatering, damming and pumping as required.

No additional payment shall be made for the use of clear stone.

The Contract Administrator reserves the right to withhold full payment of storm and sanitary structures until all concrete works, including sealing and pargeting of any proposed or existing pipes into new structures, are complete.

Catchbasins are to be fitted with fish pattern type grates in compliance with OPSD 401.081 as manufactured by McCoy Construction Castings or approved equivalent.

The Contractor shall note the requirement to adjust all frames and grates for surface asphalt, and this work shall be included in the unit price bid. Frames and grates set to final grade must be set in a bed of 30 MPa concrete as per OPSD 704.010 and 610.010. Bricks, broken pieces of concrete, wood, etc. shall not be permitted under any circumstance. Concrete bedding shall be completed in a neat manner, and shall not be placed on the road granulars below the hot mix asphalt.

All frame, grates and lids are to be in compliance with OPSS 1850.07.01.03 Finish; All surfaces shall be bare, without any coating. The surface of the casting shall be uniform and free of flaking rust or mounds of rust of debris.

Denso tape or approved equal shall be applied to all structures to fully cover adjustment units, ensure overlap onto structure (minimum 300 mm) and onto base of frame.

Removal of Maintenance Holes and Catchbasins – Item No. A28

Reference: OPSS.MUNI 510

For the unit price bid, the Contractor shall include for all labour and equipment required to remove and dispose of existing concrete structures. Voids left by structure removal shall be backfilled with approved, compacted native material.

Existing structure lids shall be salvaged and returned to the Town of Cobourg Public Works yard at 740 Division Street, Building 7.

Removal of Storm Sewers – Item No. A29

Reference: OPSS.MUNI 510

Consideration for payment under this item shall only be removal of storm sewers and structures requiring separate excavation. Pipe(s) encountered during excavation required under other items of this Contract shall be considered for payment under the respective item.

Backfill of excavations resulting from storm sewer removal, which is below subgrade level shall be approved and compacted with native material. Pipe shall be removed from site and disposed of at a location arranged for the Contractor.

Clear Stone (19 mm) Bedding for Storm Sewers (Provisional) – Item No. A30

Reference: OPSS.MUNI 1001

Should the trench bottom following excavation to grade for storm sewer construction be deemed unsuitable by the Contract Administrator, clear stone shall be used under this Item.

The unit price shall include for the following:

- Disposal of surplus excavated material.
- Supply and placing of clear stone in place of Granular 'A' bedding as specified.

Measurement for payment shall be on a theoretical trench width basis.

No material shall be imported for use under this Item without authorization of the Contract Administrator.

Supply and Install New Frame and Grates on Existing Catchbasins – Item No. A31

Reference: OPSS 408, 1850; OPSD 401.081 and 610.010

The unit price shall include for the removal and salvage of frame and grates on existing catchbasins/catchbasin maintenance holes, as shown on the Contract Drawings, and replacement with fish pattern type grates in compliance with OPSD 401.081 as manufactured by McCoy Construction Castings or approved equivalent.

Existing structure lids to be returned to the Town of Cobourg Public Works yard at 740 Division Street, Building 7.

Four (4) existing catchbasins will require new frames and grates, as noted above:

- Northwest corner of Albert and Hibernia Street, on Albert Street;
- Northwest corner of Albert and Hibernia Street, on Hibernia Street;
- Northeast corner of Albert and Hibernia Street, on Hibernia Street;
- Northwest corner of Albert and Third Street, on Third Street.

All frame, grates and lids are to be in compliance with OPSS 1850.07.01.03 Finish; All surfaces shall be bare, without any coating. The surface of the casting shall be uniform and free of flaking rust or mounds of rust of debris.

The unit price for this item shall include all work required to supply labour, equipment and materials to complete minor grade adjustments to existing catchbasins by the addition or removal or grade rings or adjustment units to surface asphalt grade.

Frames and grates set to final grade must be set in a bed of 30 MPa concrete as per OPSD 610.010. Bricks, broken pieces of concrete, wood, etc. shall not be permitted under any circumstance. Concrete bedding shall be completed in a neat manner, and shall not be placed on the road granulars below the hot mix asphalt.

Adjust Existing Structure Frames and Grates – Item No. A32

Reference: OPSS 408, OPSD 704.010 and 610.010

The unit price for this item shall include all work required to supply labour, equipment and materials to complete minor grade adjustments to existing structures by the addition or removal or grade rings or adjustment units.

Precast concrete units shall be used for structure adjustment as per OPSD 704.010.

Only those existing structures indicated on the drawings or as directed by the Contract Administrator shall be paid for under this Item. Adjustment of new structures shall be included in the price of the structure.

Frames and grates set to final grade must be set in a bed of 30 MPa concrete. Bricks, broken pieces of concrete, wood, etc. shall not be permitted under any circumstance. Concrete bedding shall be completed in a neat manner, and shall not be placed on the road granulars below the hot mix asphalt.

Water for Compaction and Dust Control – Item No. A33

Reference: OPSS.MUNI 506

Should the Contractor require water from the Lakefront Utility Services Inc., there will be a charge of $\$1.80/m^3$. If a new account is required, there will be a $300.00 deposit plus a non-refundable fee of $50 for access keys and dispenser keys.

Calcium Chloride Flake – Item No. A34

Reference: OPSS.MUNI 506

All Calcium Chloride Flake shall be applied in accordance with OPSS.MUNI 506.

The Contractor shall take such steps as may be required to prevent dust nuisance resulting from his operations either within the right of way or elsewhere or by public traffic, where it is the Contractor’s responsibility to maintain a roadway through the work.

The Contractor shall spread Calcium Chloride in a uniform manner to reduce waste. No payment will be made for Calcium placed on pulverized road.

Payment under this item shall include all labour, equipment, and materials for the supply and application of flaked Calcium Chloride for dust control as required for trench backfill areas or as directed by the Contract Administrator.

Excavate for Utility Verification (Provisional) – Item No. A35

Should it be determined necessary, test pits are to be excavated by the Contractor (by hand if necessary) to determine the field location and elevation of existing utilities where agreed upon with the Contract Administrator. The utility shall be exposed and field measured.

Payment at the unit price shall be full compensation for all labour, equipment and materials to do the work including excavation, measurements and backfilling.

Obliterate Existing Pavement Markings – Item No. A36

The unit price shall include for the supply of all labour, equipment, and materials required to obliterate pavement markings beyond the limits of construction as indicated on the Contract Drawings and/or as directed by the Contract Administrator.

The Contractor shall use a black-out method to remove existing line paint. The Contractor shall be responsible for determining and submitting to the Contract Administrator for approval, the required materials and equipment to perform works.

The Contract Administrator shall provide direction as to the limits and extent of the pavement marking removal prior to commencement of any work under this item.

Measurement for payment shall be by the horizontal length in metres of pavement markings obliterated, excluding gaps, regardless of line width.

Pavement Markings – Item No. A37

Reference: OPSS 710

For the unit price bid under these items the Contractor shall perform all line painting as indicated on the Contract Drawings including all labour, equipment and materials. The Contract Administrator shall provide direction as to the limits and extent of the pavement markings prior to commencement of any work under this item.

- 600mm wide white stop bars shall be painted in all approach lanes at the Albert and Hibernia Street intersection, as well as on Albert at Third Street.
- 100 mm wide yellow centrelines, 15 metres in length at minimum, shall be painted in all directions at the Albert and Hibernia Street intersection as well as on Albert Street at Third Street.
- A 3m wide crosswalk shall be painted, using screed applied durable thermoplastic type paint, with 100 mm wide white lines at the Albert and Hibernia Street intersection.
- The Contractor shall place a white right turn lane traffic symbol on Albert Street at Hibernia Street, centred in the lane, as indicated on the Contract Drawings or as directed by the Contract Administrator.

All pavement marking shall be applied in accordance with OPSS 710 in locations as indicated on the Contract Drawings.

Organic solvent traffic paint (Ontario white or yellow colour) shall be applied for the proposed centerline and lane delineations.

Screed applied durable thermoplastic type (Ontario white or yellow colour) shall be applied on surface asphalt. This applies to all stop bars, cross walks, and traffic symbols.

The Contract Administrator shall provide direction as to the limits and extent of the pavement markings prior to commencement of any work under this item. Pavement marking layout must be reviewed by Contract Administrator prior to paint being placed.

Topsoil (Imported) and Sodding (Nursery, Unstaked) – Item No. A38

Reference: OPSS.MUNI 802, 803

Screened topsoil shall be placed to a minimum depth of 150 mm in disturbed grass areas. The grading and depth of topsoil shall be approved by the Contract Administrator prior to placing sod or seed. Any sod or seed placed prior to approval of the topsoil shall be deemed to be unacceptable.

Subsection 802.05.01 of OPSS.MUNI 802, November 2019 is amended by the addition of the following:

The topsoil shall be tested to ensure there are no deficiencies with respect to fertility levels. A copy of the topsoil testing report prepared by a certified agronomist shall be provided to the Contract Administrator. The report shall document soil fertility levels and identify any deficiencies and how they are to be rectified. Payment for this testing shall be included in payment under the respective topsoil Items.

If the topsoil does not meet fertility requirements the soils shall be treated with the required amendments as recommended by the topsoil analysis report at no additional cost.

The Contractor shall note that placement and performance of sod under this Contract is a priority for the Town, and the requirements specified below will be strictly enforced.

Subsections 803.07.05, 803.08.01 and 803.08.02 of OPSS.MUNI 803, April 2018 is amended by the following:

Replace “30 consecutive Days” with “**120 consecutive Days**”. Contractor should note that for the purpose of calculating consecutive days, the winter dormant period shall be excluded (see Table No. 1, OPSS.MUNI 803). The Town of Cobourg is considered to be in the ‘Southern Ontario’ area and the winter dormant period is from November 1 to April 30, inclusive. The maintenance period shall commence once all deficiencies identified by the Contract Administrator after initial placement have been corrected.

There will be a maintenance holdback in the amount of 50% of the value of the topsoil and sod items. The holdback will be retained to ensure the sod receives sufficient monitoring and care by the contractor during the 120 consecutive day maintenance. It is the contractor’s responsibility to monitor the sod for excellent health for the duration of the Contract. If the Contractor fails to water and maintain the sod in a healthy condition at all times, the Contract Administrator may, without further notice and at their sole discretion, arrange to have the sod watered at a cost of $400 per load (1 load minimum

charge, assuming a 15,750 litre truck) and take a credit for the cost of the additional watering. The application of this clause shall not make the Town or Contract Administrator liable in any way for the subsequent performance of the sod, and in no way relieves the Contractor from his continuing responsibility to monitor and maintain the sod. In addition, should the Contract Administrator deem any or all of the sod unhealthy, uneven or not uniform in grade or unacceptable in general, at any point during the maintenance period, they shall notify the Contractor at which time such sod shall be replaced to the satisfaction of the Contractor Administrator within 72 hours, failing which, the Contract Administrator may arrange for the completion of the work by a third party and all costs for the work, including administration, will be deducted from the Contract payments.

Payment shall be made and holdback released once all deficiencies have been corrected following final inspection at the end of the maintenance period.

Supply and Install Concrete Bollards – Item No. A39

For the unit price bid, the Contractor shall supply all labour, equipment, and material required to supply and install bollards with the following parameters:

- Minimum 150mm dia. galvanized steel pipe, painted yellow, filled with 30 MPa concrete.
- Minimum 1000mm height above surface elevation.
- Minimum burial depth of 1500mm.
- Buried portion of bollard to be encased in 30 MPa concrete, minimum 150mm thick around the circumference of the bollard.

Measurement for Payment – Each bollard installed complete shall be considered as one unit for payment.

Miscellaneous Works Allowance (Provisional) – Item No. A40

Payment shall be made under this Item on an approved time and material basis, not included elsewhere in the Contract and where agreed with the Contract Administrator.

Where additional materials are needed, these shall be purchased by the Contractor and reimbursement shall be on the basis of invoicing.

No work shall be done under this Item without the authorization of the Contract Administrator.

PART ‘B’ – SANITARY SEWERS AND APPURTENANCES

Sanitary Sewer and Sanitary Services – Items No. B1 and B2

Reference: OPSS.MUNI 401, 409, 410; OPSD 802.010

The unit price shall include all material of the required type, size and class, Granular ‘A’ embedment as per OPSD 802.010, perform all necessary excavation, and repair to existing sanitary mains and services, including approved native backfill and required

maintenance of existing waste water flows, including pumping, if required. The unit price shall include the support of existing utilities and infrastructure which the proposed sanitary sewer and services cross under.

The unit price shall include for connections to existing sanitary sewers and structures, including drop structures, where not included for elsewhere in this Contract. The unit price shall also include for removal and disposal of any sewer pipes and existing, abandoned watermains encountered during installation, within the trenching limits of the sanitary sewer and laterals and not included for payment elsewhere in this Contract.

Existing sanitary sewer lateral location information is not available. The Contractor will be responsible for determining the locations for all existing sanitary sewer services to be replaced by dye testing and locating. Costs associated with this activity are deemed included in the unit price bid.

The Contractor is advised that no extra payment will be made for dewatering techniques required to install underground services. The unit price will include for all dewatering required.

Sweep bends are the only acceptable type of bends for risers, clean outs or any other application requiring a change in alignment.

Clause 410.10 “Basis of Payment” is amended in that unit prices bid for service repairs shall also include for the following:

a) The by-pass pumping of all sewage from service connections encountered in the work.
b) The maintenance of all intercepted flows in existing sewers.
c) Testing procedures as outlined herein.
d) Connection of existing facilities to new, where required.

The unit price shall include the cost of a post construction closed circuit video inspection in accordance with OPSS.MUNI 409 of all sanitary sewers, as well as any sanitary service laterals the Contract Administrator deems necessary for inspection. The inspection shall take place in the presence of the Contract Administrator. Should any portion of the sanitary sewers require additional video inspection following the correction of a fault in the work, the cost will be borne by the Contractor. It will be the Contract Administrator’s decision whether additional video inspection is required.

Deflection testing as per OPSS.MUNI 410.07.16.05 is required for all flexible pipe installations. Testing to be conducted a minimum of 30 days subsequent to the installation date.

Removal of Existing Sanitary Sewer – Item No. B3

Reference: OPSS.MUNI 510

The unit price shall include for the following:

- Excavation of materials as required.
- Disposal of excavated material.
- Removal and disposal of existing 250 mm dia. sanitary sewer as shown on the

Contract Drawings, or as directed by the Contract Administrator.

- Removal and disposal of any sanitary sewer services located outside of the trench limits for the proposed sanitary sewer main and sanitary services.
- Backfill with approved native backfill material and compaction.

Disposal of excavated material and abandoned sanitary sewer shall be at an off site location arranged for by the Contractor.

Clean Outs on Sanitary Services – Item No. B4

Reference: OPSS.MUNI 401, 410; S-100.030

The unit price shall include for ductile iron flush mount clean out caps for use in hard surfaces as manufactured by Watts or approved equivalent, or P.V.C. access lids in grassed areas as per S-100.030, as directed by the Contract Administrator.

Sanitary Maintenance Holes – Item No. B5

Reference: OPSS.MUNI 402; OPSS 407, 1850; OPSD 401.010, 701.010, 701.021, 704.010

The unit price bid shall include full compensation for all labour, equipment and material required for a complete and fully functional installation in strict accordance with the applicable Ontario Provincial Standards Specifications and Standard Drawings and inclusive of all connections to all existing and proposed pipes.

For the unit price bid the Contractor shall complete the following:

- Benching as per OPSD 701.021.
- Provide minimum thickness of 300 mm Granular ‘B’ all around manholes including under the floor slab.
- Parging all inlets and outlets inside structures.
- Adjustment to surface course asphalt grade (as required) including Moduloc and exterior parging of Moduloc as per OPSD 704.010.
- All excavation, to carry out all sheathing, shoring and dewatering as may be required to avoid impact on adjacent utilities.
- Supplying, placing and compacting all bedding, granular materials, and cover materials to match design elevations and adjacent asphalt.
- Supplying structures in accordance with OPSD’s.
- Disposal of surplus excavated materials.
- Reconnecting existing pipes as required.
- Dewatering, damming and pumping as required.

No additional payment shall be made for the use of clear stone.

The Contract Administrator reserves the right to withhold full payment of sanitary structures until all concrete works, including sealing and parging of any proposed or existing pipes into new structures, are complete.

The Contractor shall note the requirement to adjust all frames and grates for surface asphalt, and this work shall be included in the unit price bid. Frames and grates set to final grade must be set in a bed of 30 MPa concrete. Bricks, broken pieces of concrete, wood, etc. shall not be permitted under any circumstance.

All frame, grates and lids are to be in compliance with OPSS 1850.07.01.03 Finish; All surfaces shall be bare, without any coating. The surface of the casting shall be uniform and free of flaking rust or mounds of rust of debris.

Clear Stone (19mm) Bedding for Sanitary Sewers (Provisional) – Item No. B6

Reference: OPSS.MUNI 1001

Should the trench bottom following excavation to grade for sanitary sewer construction be deemed unsuitable by the Contract Administrator, clear stone shall be used under this Item.

The unit price shall include for the following:

- Disposal of surplus excavated material.
- Supply and placing of clear stone in place of Granular 'A' bedding as specified.

Measurement for payment shall be on a theoretical trench width basis.

Granular 'B', Type 1 Backfill for Sanitary Sewers (Provisional) – Item No. B7

Reference: OPSS.MUNI 314

Should approved native backfill for sanitary sewers construction be deemed unsuitable by the Contract Administrator, Granular 'B' backfill shall be used under this Item.

This unit price shall include for the following:

- Disposal of surplus excavated material off site.
- Supply and placing of Granular 'B', Type I backfill in place of approved native backfill as specified.

Measurement for payment shall be Granular 'B' required to backfill excavation to design subgrade. Those excavations which are found to be excessive by the Contract Administrator, will be paid for on a theoretical trench width basis.

Vacuum Excavation For Sanitary And Water Service Pits (Provisional) – Item No. B8

For the Contract price, the Contractor shall complete excavations by vacuum excavation method to facilitate sanitary and water service installations at or near property line to minimize damage to existing features. This Item shall be used in conjunction with relining method of installation and as approved by the Contract Administrator. Damage that is

incurred beyond the limits shown on the Contract Drawings shall be the responsibility of the Contractor.

Break Into and Re-bench Existing Sanitary Maintenance Hole – Item No. B9

Reference: OPSS.MUNI 402; OPSD 701.021

The unit price shall include for the following:

- Break into existing sanitary structure at the Albert and Hibernia Street intersection and at the Albert and Third Street intersection, as indicated on the Contract Drawings.
- Provide any temporary pumping required for existing flows.
- Connect proposed 250mm PVC sanitary sewer as indicated on the Contract Drawings, with method approved by the Contract Administrator.
- Re-bench existing sanitary structure in accordance with OPSD 701.021 or as directed by the Contract Administrator.
- Parget all voids between pipe and structure walls using concrete and brick, as required.
- Removal and replacement of any structure ladder rungs interfering with connection of the proposed sanitary pipe.
- Clean out structure upon completion.
- Backfill and compact as per sewer installation standards.

Camera Existing Sewer Laterals (Provisional) – Item No. B10

Reference: OPSS.MUNI 409

Should the Contractor encounter existing service pipes during excavation that require additional investigation, the Contract Administrator may request the condition of the service to be confirmed through video inspection.

The Contractor must have CCTV capabilities on-site at all times during construction.

If a service is no longer in use, the Contractor must notify the Contract Administrator for record purposes and either remove the service (should it be in the way of proposed construction) or plug the abandoned service with 20 MPa concrete, a minimum of 300mm in length (should it remain in place).

If required, the cost for plugging abandoned services shall be under the respective Item B12.

Lining of Existing Sanitary Sewer Laterals by CIPP Method (Provisional) – Item No. B11

Reference: OPSS.MUNI 460

For the unit price bid, the Contractor shall complete cured-in-place pipe rehabilitation in accordance with OPSS.MUNI 460, carried out by a certified Specialist.

This Item shall be utilized where there is an obstacle, such as a tree, preventing excavation from occurring and only as approved/directed by the Contract Administrator. As a result, the limits of lining would occur from the property line to the face of the proposed road curb or as directed by the Contract Administrator.

The Contractor shall be responsible for maintaining existing sewage flows to complete the lining process.

Should an access pit be required, Item No. B8 shall be utilized to provide the excavation method to access the service pipe.

Concrete Plug Sanitary Sewer (Provisional) – Item No. B12

Under this Item and for the Contract price, the Contractor shall supply and install a concrete plug in all open ends of existing sanitary sewer piping that is to be abandoned in place and as indicated on the Contract Drawings.

All concrete shall be 20 MPa and the minimum length of any concrete plug shall be 300mm.

Payment under this Item shall be made on a unit basis for each plug installed regardless of size of the sanitary sewer pipe involved.

PART 'C' – WATERMAINS

Watermains – Item No. C1

Reference: OPSS.MUNI 401, 441, OPSD 802.010, 802.013, S-201.030

Payment shall be made under this Item for the supply of all labour, equipment and materials required to install new watermain as shown on Contract Drawings. Watermain shall be installed to a minimum cover as noted on the Contract Drawings.

PVC watermain shall be C-900, Class 150. Cathodic protection shall be paid under the cathodic protection Item, Item No. C9.

All homes shall be supplied potable water via a temporary supply.

The unit price bid shall include for removal and disposal, off site, of existing waterman pipe(s), encountered during installation of new watermain pipe(s).

- Installation of PVC watermain at minimum 1.8m depth;
- Granular 'A' pipe embedment for PVC as per OPSD 802.010 and OPSD 802.013;
- Approved native backfill, unless deemed unacceptable by the Contract Administrator;
- Supporting existing utilities and infrastructure which the proposed watermains cross under;
- All work required to disinfect with a high concentration chlorine solution spray, and swab using a new foam swab one size larger than the watermain, each component of the deflection prior to installing;

- All bends and appurtenances needed to achieve required watermain depth.

Under this Item, the Contractor shall be responsible for the support and protection of existing hydro utility poles, as required, including co-ordination with the required utility stakeholder authorities. All scheduling, permitting and approvals costs are the responsibility of the Contractor.

Water services shall be “dry tapped” and shall be installed concurrently with the watermain and the entire system shall be pressure tested including water services to the curb stop valve and closed gate valves.

OPSS.MUNI 441 is amended to include the following:

(i) In Clause 441.07.24.01 “Hydrostatic Testing”, add the following:

The Contractor shall supply and insert two swabs into first pipe installed in each section. Swabs are to be flushed out slowly, immediately before testing, disinfection and final connection of the section. Swabs are to be 50 to 100 mm larger than the pipe diameter.

(ii) Clause 441.10 “Basis of Payment” is amended in that:

(a) The unit price for watermains shall include compensation in full for all water used in testing and flushing of the watermains and for provision of all watermain testing equipment and materials.

(b) The unit price shall include the removal and disposal of sections of existing watermains, that are encountered when excavating for the new watermain installation, with the exception of AC watermain which is included under the Removal Of Asbestos-Cement Pipe Item No. C16.

(c) The unit price shall include the supply and installation of tracer wire in accordance with S-201.030 on PVC watermain, including tracer wire connections to all water services.

All fittings installed shall be cathodically protected in accordance with the cathodic protection specification contained within this Contract and paid under the respective item.

The Contractor is advised that no extra payment will be made for dewatering techniques required to install underground services.

Co-operation with L.U.S.I.

Valves shall be operated only by the L.U.S.I.. The Contractor shall give at least 48 hours notice to the Contract Administrator and the L.U.S.I. prior to the commencement of any work requiring the shutting down of a section of watermain.

Third Party Watermain Testing

Watermain testing to be performed in accordance with and paid under Item C5.

Notification of Water Shutdown

It is the Contractor’s responsibility to deliver notices to businesses/residents affected by any water shortages as a result of watermain tie-ins, valve cut-ins, etc. The notices shall be delivered a minimum of 24 hours prior to the water shutdown. Notices shall be prepared and submitted to the Contract Administrator for review prior to circulation.

Thrust Restraint

Restrained joint fittings (Uniflange Series 1300 and 1390, or reviewed equivalent) shall be provided at all bends, tees, valves, plugs, etc. as shown on the standard detail drawings.

For ductile iron watermain, a mechanical joint retainer gland ring shall be used.

Protecting Existing Watermains

The Contractor shall exercise extreme care when carrying out his operations in the vicinity of existing watermains. Any damage resulting from his operations shall be promptly repaired by the Contractor at his expense. The Contractor shall keep at the work site sufficient pipe, fittings and repair clamps so that watermain breaks can be repaired in a minimum of time.

Maintaining Water Service

Except for very short durations when reconnecting water services, water supply must be maintained at all times to existing residences and other establishments within the limits of this Contract. The Contractor shall provide a minimum of 24 hours advance notice to all affected customers prior to shutting off water service for reconnecting of water services.

300 mm dia. Gate Valves, Complete with Valve Box – Item No. C2 and C3

Reference: OPSS.MUNI 402, 441

OPSS.MUNI 441 is amended by the following:

In Clause 441.05.09.03 “Gate Valves”, add the following:

Valves shall be double wedge seat gate valves.

a) Valves shall be supplied with a 50 mm square operating nut.
b) Valve boxes shall be a 3 piece slide type size D, Mueller A769 with guide plate, or reviewed equivalent.

Item No. C3 is provisional and shall be used only when approved by the Contract Administrator.

Hydrant Assembly (Complete) – Item No. C4

Reference: OPSS.MUNI 401, 402, 441, 442; S-210.010

The Contractor shall supply all labour, equipment and materials necessary to supply and install hydrants and appurtenances in the locations shown on the Contract Drawings, or as directed by the Contract Administrator. The Contract price shall include supply and installation of the hydrant, 150mm dia. gate valve, 150mm dia. watermain, granular thrust blocks, concrete blocks for support of valve and hydrant, earth excavation, backfill, and compaction. The Contract price shall also include final adjustment of the valve box to suit the final surface grade.

OPSS.MUNI 441 is amended by the following:

i) In Clause 441.05.10 “Hydrants”, add the following:

   a) Hydrants shall be Darling Century Type with (33B) pumper nozzle with a draining barrel as supplied by Canada Valve, or approved equivalent.

   b) Hydrant to be complete with two – 62mm hose couplings CSA B89-2 Ontario Fire Marshal Standard Thread, and one 112mm pumper nozzle, 31mm square operating nut with CSA specified screw thread and mechanical joint boot to match watermain.

   c) Anchor tees are the only acceptable tees unless otherwise approved by the Contract Administrator.

   d) Colour – Metro Yellow.

   e) Hydrants shall be repainted with one finish paint coat, metro yellow, following installation.

   f) Direction of Opening – Counter Clockwise.

   g) Hydrant to be supported with concrete blocking and Granular ‘A’ thrust blocking as shown on Standard Drawings or as directed by the Contract Administrator. 19mm clear stone shall be placed above Granular ‘A’ thrust blocking at the drainage holes for a depth of 0.3m to ensure proper drainage.

   h) Hydrant set to be fully restrained as per Standard Drawings.

ii) In Clause 441.05.09.03 “Gate Valves”, add the following:

   a) Valves shall be double wedge gate valves, Mueller or approved equivalent.

   b) Valves shall be supplied with a 50mm square operating nut.

   c) Valve boxes shall be 3 piece slide type size D, Mueller A769 with guide plate, or approved equivalent.

Watermain Testing – Item No. C5

Reference: OPSS.MUNI 401, 441

All works associated with swabbing, leakage testing, chlorination, dechlorination and bacteriological samples of the watermain is to be performed by a 3rd party company specializing in this work and approved by LUSI. The 3rd party company must provide detailed documentation on all results of the commissioning process. Works shall be performed in accordance with the Watermain Testing section of LUSI’s Watermain and Appurtenances Policy and Procedure document.

All cost associated with steps and procedures required for acceptance of the new watermain, as well as temporary and permanent connections to existing watermains shall be borne by the Contractor.

Disinfection of the watermain shall be completed with Sodium Hypochlorite, NSF certified. The Contractor shall provide a detailed plan to the Contract Administrator regarding all testing procedures including approval regarding the length of watermain being tested. The Contractor shall provide a sample location at the start and end of the watermain being

tested and shall ensure for the collection of samples not exceeding every 200 m of watermain length. The Specialist shall provide two (2) sets of samples at each sampling location for bacteriological testing. The first set of samples shall be taken 24 hours after flushing when system chlorine levels have reached residual system levels. The second set of samples shall be taken 16 hours after the first samples.

The temporary water system shall be disinfected in accordance with AWWA Standard C651-05, Disinfecting Water Mains. Water shall conform to MOE Ontario Regulation 169/03 Water Quality Standards and 170/03 Drinking Water Systems.

The Contractor is responsible for notifying LUSI of sampling. The 3rd party company shall conduct sampling in the presence of LUSI staff and deliver both sets of samples to an accredited testing facility.

The hydrostatic pressure test shall include for the testing of the watermain as well as services to the curb stop valves.

Payment for the temporary flushing hydrant shall be made under this Item for the following works:

- Excavation to grade and disposal of surplus materials.
- Supply of temporary hydrant without pumper nozzle and inner workings.
- Complete installation of piping, hydrant, blocking tie rods, etc., and remove upon completion.
- Backfill with approved native material, compaction and restoration.

The hydrant shall remain the property of the Contractor.

Water Service Connection – Item No. C6

Reference: OPSS.MUNI 401, 441; OPSD 1104.010

All new water service connections installed under this Contract shall be type Municipex piping conforming to AWWA C800-84 and shall be installed in accordance with the Standard Drawings .

Payment for each water service connection shall be made under the appropriate sub-items as required, and to include the following:

a) Supply and installation of the corporation main stop complete with service saddle as required.

b) Supply and installation of the curb stop complete with a stainless steel road and service box dependent on the size of curb stop required.

c) Supply and installation of the Municipex piping, c/w tracer wire as required. Measurement to be made horizontally from the center of the watermain to the end of the pipe as installed. Municipex piping shall be completed using open excavation and subsurface methodologies, as identified on the Contract Drawings and as directed by the Contract Administrator.

d) Connection to the existing water service at the street-line or as directed by the Contract Administrator. The Contract unit price for connecting to existing water services shall include the supply and installation of all fittings, reducers, couplings, etc., required to effect the connection, regardless of the size of piping involved.

All water services shall be installed to a minimum cover equal to the connecting watermain under roads and entrances, and a minimum cover of 1.8m under boulevards.

Service locations to be installed by subsurface method shall be as approved by the Contract Administrator. The subsurface method shall be approved by the Contract Administrator and ensure a minimum of 1.8 metres cover is achieved. The 1.8m minimum cover shall be confirmed by the Contract Administrator prior to the implementation of any subsurface methods.

Future water services are to have a short stub of copper (crimped end) from the corporation stop, towards private property.

Regardless of the size of the existing water service, the minimum size of main stop and piping to be installed under this Contract shall be 19 mm dia.

No couplings will be permitted between the main stop and the curb stop. The Contractor shall use Municipex piping as it can be purchased in long lengths.

The approved manufacturer for water service connection materials are shown on the following table:

Approved Products for Water Service Connections

Product	Type	Manufacturer	Description, Model No. or Name
Couplings	Compression	Cambridge Brass	Series 118
		Ford	C44G
		Mueller Canada Inc.	H15403 – No Lead
Curb Stops	Non-insulated c/w Electrical Nut	Cambridge Brass	Series 202 - No Lead
		Mueller Canada Inc.	B-2509W88 – No Lead
Main Stops	Insulated	Cambridge Brass	25 mm series 301 – No Lead
		Mueller Canada Inc.	N35008W88 – No Lead
	Non-insulated	Cambridge Brass	Series 301 – No Lead
		Mueller Canada Inc.	B25008W88 – No Lead
Pipe	HDPE (crosslinked polyethylene or PEX)	Rehau	Municipex
Service Boxes And Components		Clow Canada	9D1
		Mueller Canada Inc.	<25 mm A726 >38 mm A728

Approved Products for Water Service Connections			
Service Saddles	Stainless Steel Wide Band - For all services use 150 mm wide band and two bolts	Smith Blair	Service 371, 372 for up to 300 mm diameter pipe
		Robar	Style 2626DB
		Cambridge Brass	Series 8403

Remove Existing Gate Valves and Boxes – Item No. C7 and C8

Reference: OPSS.MUNI 510

Under this Item and for the Contract price, the Contractor shall include for all labour and equipment required to remove and dispose of existing gate valves and/or boxes from the locations shown on the Contract Drawings, or as directed by the Contract Administrator.

Item No. C8 is provisional and shall be used only when approved by the Contract Administrator.

Cathodic Protection – Item No. C9

Reference: OPSS.MUNI 442; S-201.030

The Contractor shall supply all labour, equipment and materials necessary to supply and install cathodic protection for all ferrous pipes and fittings.

The prices for these Items shall cover compensation in full for provision and installation of the cathodic protection as described herein.

i) 5.4 kg zinc anodes shall be used in the following applications:

- gate valves
- all fittings
- hydrants

ii) 14.5 kg magnesium anodes shall be used in the following applications:

- existing D.I. or C.I. watermain at tie in locations
- existing D.I. or C.I. which are exposed to the atmosphere for tapping services or exposed through excavation

Material shall be stored so as to prevent injury to persons and to prevent the delay of work by others. All materials which can be damaged by exposure to the elements must be stored in a clean and dry enclosure.

Joints and fittings shall be electrically bonded.

Packaged magnesium anodes shall have a 14.5 kg magnesium casting, have a length of 560 mm and an alloy composition as per ASTM B107 (1961 M-1 Specification) or equal. The magnesium casting and its backfill shall be contained in a cardboard tube 200 mm dia. x 700 mm long.

The magnesium casting within the container shall be supplied surrounded with a special backfill material having an electrical resistivity of less than 45 ohm/cm wet and the following composition by volume:

Gypsum	77%	+2%
Sodium Sulphate	8%	+1%
Bentonite	15%	+1%

The packaged magnesium anode shall be supplied with 3000 mm length of AWG#10/7 str. copper cable having TWH blue insulation.

Packaged zinc anodes shall have a 5.4 kg zinc casting as shown on the Standard Detail Drawings.

The anode shall not be lowered into the ditch by its lead wire.

The anode shall be backfilled with native soil.

The anode lead shall be wrapped around the pipe and knotted prior to thermite welding the copper conductor to the ferrous watermain.

The anode lead shall be thermite welded to the watermain, except at test station locations, using a #CHAA-1G welder and #CA-15F033 alloy cartridge.

The termite weld connections shall be tapped with a hammer to ensure that a strong connection has been accomplished.

Connect to Existing Watermain – Item No. C10

Reference: OPSS.MUNI 401 , 441

Under these Items and for the Contract prices, the Contractor shall supply all materials and shall perform all work necessary to connect the new watermains to the existing watermains at the locations shown on the Contract Drawings or as directed by the Contract Administrator.

Connections to existing mains shall be made only after the affected section of the waterworks has been isolated and the new main has been completed; including chlorination, testing, and flushing. Extreme care shall be taken to prevent contamination of the existing watermain and new closure fittings shall be rinsed with a chlorine solution prior to installation. Payment at the Contract prices shall be compensation in full for this work.

LUSI staff to be scheduled and present on-site when connections are being made as per LUSI policy. The Contractor shall provide a minimum of 48-72 hours advance notice to the Town when arranging for this work and shall provide 48-72 hours advance notice to all homeowners and businesses that will be affected by the temporary interruption in water supply (Contractor to supply and circulate “Shut-Down” Notices). Shut-Down Notices shall be prepared and submitted to the Contract Administrator for review prior to circulation.

Temporary Water Supply – Item No. C11

Reference: OPSS.MUNI 493

The temporary water system shall be disinfected in accordance with AWWA Standard C651-05, Disinfecting Water Mains. Water shall conform to MOE Ontario Regulation 169/03 Water Quality Standards and 170/03 Drinking Water Systems.

All temporary above ground watermains, service connections, materials, and fittings shall be approved for potable water use or NSF61 approved materials.

The unit price shall include the following:

- Supply and install minimum 50mm dia. header pipe and minimum 19mm dia. service connections complete with temporary bypass lines, valves, check valves, and backflow prevention devices as required and to the satisfaction of the Contract Administrator.
- Disinfection and testing in accordance with AWWA C651-05
- Mounding over the header pipe with asphalt or other acceptable material, wherever it crosses a driveway or sidewalk in order to prevent injury or damage to vehicular or pedestrian traffic, or other protection measures, as required.
- Cutting and removal of asphalt at street crossings to permit burying the header pipe, where applicable, or other protection measures, as required.
- Installation of tamper proof backflow preventer on each service connection, sized to suit.
- Installation of ball valve on each service connection, sized to suit., located at the header pipe with a removable handle.
- Supply and Installation of temporary hydrants, as required.
- Connection to exterior plumbing features or buried water services for each home requiring temporary water, including all required excavation.
- Installation of a “Y” fitting at the residence hose bib to permit homeowners to connect a garden hose to the fitting.
- Removal of the temporary water system upon completion of the works.
- Temporary connections to, or capping of, existing watermains or hydrants below or above ground surface to supply temporary water. Staging of temporary supply is a requirement and shall be included in this Item.

Except for very short durations when reconnecting water services, water supply must be maintained at all times to the buildings within the limits of this Contract. The Contractor shall provide a minimum of 48 hours advance notice to all affected customers prior to shutting of water service for reconnecting of water services.

The Contractor shall provide written documentation including methodology and drawings describing their proposed method of providing continuous water service one (1) week prior to watermain construction to the Contract Administrator and Owner for their review. The temporary water system shall not be connected to the buildings until it has been accepted by Lakefront Utility Services Inc.

Clear Stone (19mm) Bedding for Watermain (Provisional) – Item No. C12

Reference: OPSS.MUNI 1001

Should the trench bottom following excavation to grade for the watermain construction be deemed unsuitable by the Contract Administrator, clear stone shall be used under this Item.

The unit price shall include for the following:

- Disposal of surplus excavated material.
- Supply and placing of clear stone in place of Granular 'A' bedding as specified.

Measurement for payment shall be on a theoretical trench width basis.

Granular 'B', Type I Backfill for Watermain (Provisional) – Item No. C13

Reference: OPSS.MUNI 314

Should approved native backfill for watermain construction be deemed unsuitable by the Contract Administrator, Granular 'B' backfill shall be used under this Item.

This unit price shall include for the following:

- Disposal of surplus excavated material off site.
- Supply and placing of Granular 'B', Type I backfill in place of approved native backfill as specified.

Measurement for payment shall be Granular 'B' required to backfill excavation to design subgrade. Those excavations which are found to be excessive by the Contract Administrator, will be paid for on a theoretical trench width basis.

Adjust Existing Water Valve – Item No. C14

Reference: OPSS 408

Payment under this Item shall be made for adjustment of valve box and tracer wire to finish grade, and shall include removal and disposal of all existing asphalt, including sawcutting, and restoration of existing road base, including compaction, with 150 mm depth of Granular 'A' and 50 mm depth of Hot Mix H.L.-8 asphalt to match existing depth, as required. Hot Mix H.L.-8 placement shall be completed in accordance with the specifications for Hot Mix Asphalt, including tack coat. Adjustment shall be such that the top of structures sit flush with cross-fall of final pavement elevation.

The Contractor shall be responsible for protecting all sawcut edges from damage until paving. Should the sawcut edge be damaged, the Contract Administrator can request that the asphalt be re-cut prior to paving at no additional cost.

Removal of Existing Hydrant Set – Item No. C15

Reference: OPSS.MUNI 510

For the unit price bid, the Contractor shall include for all labour and equipment required to excavate, and remove existing hydrants and appurtenances in the locations shown on the Contract Drawings. Voids left by hydrant removal shall be backfilled with approved, compacted native material.

The Contract price shall include for removal and salvage of the hydrant and removal and disposal of the 150mm dia. gate valve, 150mm dia. watermain, valve box, thrust blocks, and any other associated materials encountered in excavation for removal.

Salvaged hydrants shall be returned to LUSI at 670 Ontario Street.

Removal Of Asbestos-Cement Pipe and Disposal Off-Site – Item No. C16

Reference: OPSS.MUNI 510

The unit price bid for this Item shall be for the removal and disposal of Asbestos material encountered in the excavation of existing watermain.

Include:

1. Excavation of materials as required.
2. Disposal of excavated earth material at an off-site location arranged for by the Contractor.
3. Remove existing asbestos-cement pipe and prepare for transportation in required containers and bags according to the Occupational Health and Safety Act and Regulations of the Ministry of Labour, the Ministry of the Environment and the Ministry of Transportation.
4. During construction operations with asbestos-cement pipe:
    a) Ensure pipe remains in a non-friable condition.
    b) Ensure pipe is wetted during removal/handling operations.
    c) Do not sand, saw, grind, chip, or use power tools for the removal of the asbestos-cement pipe.
5. Provide interim storage of encountered asbestos cement pipe at Contractor’s secured location prior to final disposal off site.
6. Dispose of asbestos-cement pipe at an approved site.
7. Provide all liability Insurance for the removal and shipping of asbestos “designated substance” waste.
8. Backfill with approved native backfill material and compaction.

Measurement for Payment:

1) Measurement shall be by length, in metres, of asbestos-cement pipe removed and properly disposed of.

Basis of Payment:

1) Payment at the Contract unit price shall be full compensation for all labour, equipment and materials to do the work.

Asbestos Abatement/Environmental Impairment Liability Insurance – Item No. C17

The Lump Sum price bid for this Item shall be for the remediation of Asbestos material encountered in replacing the existing sanitary sewer services and watermain.

Payment shall be made under this Item for Asbestos Abatement / Environmental Impairment liability insurance in accordance with Clause No. 30 of the Special Provisions – General.

PART 'D' – GENERAL ITEMS

Supply and Maintain Field Office – Item No. D1

The Contractor, shall, at no additional expense to the Authority, supply an office for the exclusive use of the Contract Administrator. This office shall be located as directed by the Engineer, but in no case shall be more than one kilometre from the Contract limit.

The Contract Administrator's office shall have a minimum of 17 m2 of floor area, with a clear ceiling height of not less than 2.3 m, weatherproof, insulated walls and roof and a tight wooden floor raised at least 0.3 m clear of the ground. The office shall be fitted with a minimum of two glazed windows, both of which can be opened and are fitted with screens. The door shall have a reliable lock, all keys for which shall be in the care of the Contract Administrator. The Contractor shall supply electric light, heat when required, and an air conditioner of 8,000 BTU minimum when required, to the Contract Administrator's satisfaction and shall furnish the office with a minimum of one desk with drawers, one office chair, one drafting table, five chairs, two drafting stools, one filing cabinet, a waste paper basket and a broom.

Where the contractor elects a generator to supply power to the office, it shall be required to have a low-decibel noise rating.

Provide a mobile internet stick for high-speed internet access (e-mail service).

Where the Contractor elects to supply a combination office for the use of the Contract Administrator and his own staff, the minimum requirements for the Contract Administrator's accommodation as outlined shall be met. In addition, separate outside access for each office shall be provided and the Contract Administrator's office shall be partitioned off from that of the Contractor, on the inside. Any inside connecting door between the two offices shall be fitted with a lock or closer on the Contract Administrator's side.

Where the field office is situated remote from a built-up area and where alternate toilet facilities are not available, the Contractor shall also supply an acceptable chemical or equivalent dry toilet, in a location convenient to the Contract Administrator's office.

The field office and other facilities shall be provided at the site within 14 days of the Date of Notification to Commence Work or on the date of the Contractor's actual commencement of work, whichever date occurs first, and shall remain at the site, if the Contract Administrator so requires, for a period of up to two months after the completed work is accepted by the Authority.

Payment shall be made at 50% on the first Payment Certificate and the 50% balance will be paid on the Payment Certificate following issuance of the Certificate of Substantial Performance.

Mobilization and Demobilization – Item No. D2

The Contract price stated in the Tender Form for this Item shall be compensation for the following:

1. Security protection of the Contractor’s office, plant and sorted materials during the course of the Contract.
2. Moving onto the site and setting up the Contractor’s office, storage facilities, plant, etc.
3. Providing all necessary access to the project including haul roads as required and the restoration of the surfaces to their original condition after the haul roads are removed.
4. Moving off the site and removal of the Contractor’s office, storage facilities, plant, etc.

Payment will be made as follows:

- 50% of the lump sum stated in the Tender Form for this Item will be paid on the first Payment Certificate; and,
- the 50% balance will be paid on the Payment Certificate following issuance of the Certificate of Substantial Performance.

Pre-Condition Survey – Item No. D3

Pre-Condition Survey shall be carried out to depict existing interior and exterior conditions of building, utilities, monuments, bridges, structural improvements, streets, driveways, sidewalks, within the area of influence of the work site and/or specified distances.

The “area of influence” is that radius of distance adjacent to heavy construction, within which structures and property are subject to possible damage.

The Pre-Condition Survey shall be completed on all structures, or part thereof, within 30 metres of any work, at a minimum. Additional inspections may be required, if deemed necessary by the Vibration & Noise Consultant commissioned to carry out this work.

Quality Assurance

A Vibration and Noise Consultant (VNC) with over five (5) years’ experience in loss control in urban areas shall be retained by the Contractor to complete this work. The person in

charge shall be a Professional Engineer Registered in Ontario. The Company shall carry Professional Errors & Omissions Insurance in the amount of $1,000,000.00.

Procedure

Immediately upon notice to proceed, all pertinent available data relevant to those applicable portions of the work and such other areas as deemed available to be Pre-surveyed is obtained by the VNC.

Introduction & Notification

A Letter of Introduction from the Owner is hand delivered to all properties within the "area of influence". The letter contains pertinent information regarding the proposed work and advises the identity, telephone number and name of contact person capable of answering questions or addressing complaints.

This letter serves to acquaint residents with proposed construction in the area.

Inaccessible Properties

Should access to a premises by the Inspector be prohibited for any reason, i.e., absent owner/lessor/manager; denial of authorization; vacant; safety hazard; in such case, particulars of efforts made to gain entry are recorded on the Pre-condition Survey Summary Sheet as follows:

- Time and date(s) of contact
- Means of contact (in person or by telephone)
- Authority (owner/lessor/manager)
- Reason(s) for entry refusal or inaccessibility

Photographic Documentation

Photographic equipment and materials used are capable of yielding high quality negatives from which detailed enlargements may be made.

Payment

100% payment of this Item shall be made on the first Payment Certificate on proof that the survey has been completed. A reduction in the lump sum payment under this Item shall be made for non-accessible properties or refusal to enter properties which deny access to interiors of buildings in the "area of influence", as follows:

- >75% of entry to building interiors, no reduction in the lump sum price bid.
- 75% - 50% of entry to building interiors, 20% reduction in the lump sum price bid.
- <50% of entry to building interiors, 40% reduction in the lump sum price bid.

The lump sum price shall include for a minimum of three (3) post construction complaint visits to a minimum of three (3) separate locations.

The Contract Administrator shall be provided with a copy of the pre and post construction reports and photographs of the area allegedly impacted, within ten (10) days of written request.

COVID-19

In the event that COVID-19 pandemic procedures restrict access and interior assessments cannot be completed, a 40% reduction will be applied to the lump sum bid

price. However, this does not absolve the contractor of liability on an interior post construction claim for a structure within the area of influence.

Pre-Condition Survey Report

Documentation of exterior and interior conditions of each property/item surveyed includes, as a minimum:

- Vintage and type of construction
- Description/depiction/dimension of differential settlements (visible cracks in walls, floors, ceilings) or any other apparent structural or cosmetic damage or defect

Copies of Introduction Letters, Notification Letters and Refusal Letters are to be included in the report. Completed Pre-condition Survey data is to be assembled in a formal comprehensive report, including Summary Sheet.

Bonds, Insurance and Maintenance Security – Item No. D4

Reference: RMDCS, Section 01001

Include:
1. 100% Performance and Guaranteed Maintenance Bond for 24 months.
2. 100% Labour and Materials Payment Bond.
3. Liability Insurance based on the Contract Price.

100% payment of this Item shall be made on the first Payment Certificate.

PART 'E' – TRAFFIC SIGNALS AND UTILITIES

Supply and Install Pre-Cast Electrical Chambers – Item No. E1

Reference: OPSS 602, OPSD 2112.02, 2112.040, 2116.01, 2117.02, 2123.01, 2123.02, 2123.03,

Work for this item shall be completed in compliance with OPSS 602 and the Contract Drawings.

The Contractor shall supply and install precast 600mm x 600mm square pre-cast concrete manholes in the locations as indicated on the Contract Drawings.

Electrical chambers supplied/constructed shall be as follows:

Size:	460 mm Diameter
Type:	Precast Concrete
Manufacturer:	USI
Notes:	N/A

Size:	600 mm x 600 mm
Type:	Precast Concrete
Manufacturer:	USI
Notes:	N/A

The handwells are not to be constructed until after the proposed curb and gutter has been placed.

The Contractor shall remove all sono-tube and debris from the inside of the handwells prior to final inspection by the Agency.

Handwell covers shall be securely bolted down when work at the handwell has been completed and The Contractor is leaving the place of the work.

An anti-seize compound shall be applied to all bolts for fastening the handwell cover to the handwell frame.

Payment shall be made at the contract unit price for each concrete handwell constructed and shall be full compensation for all labour, materials, and equipment required to complete the work as specified in the Contract Documents.

Construct Concrete Pole Base c/w Anchorage Assembly – Item No. E2

Reference: OPSS 616, OPSS.MUNI 904 & 1350, OPSD 2200.01, 2210.01, 2215.03, 2220.01, 2245.020, 2250.01, 2255.010

Work for this item shall be completed in compliance with OPSS 616 and the Contract Drawings.

The Contractor shall construct the concrete pole bases in the locations as indicated on the Contract Drawings.

The following manufacturers of anchorage assembly units are approved for use:

National Concrete Accessories; or
AMG. Metal Inc.
or; approved equivalent.

The Contractor shall only utilize a Hydro-Vac excavation system to install pole footings and controller cabinet foundations. When additional excavation is required beyond the limits, such excavation shall be a maximum of 300mm width beyond the needed dimensions of the foundation, to accommodate granular backfill.

When unsuitable material is encountered in the excavation, it shall be removed and disposed of outside the right-of-way limits. Material required to replace unsuitable material must be approved by the Contract Administrator.

Where rock is encountered, the earth excavation shall be widened to dimensions suitable for rock excavation or rock drilling operations.

Concrete shall be poured as one monolithic slab and formed, placed, vibrated, finished and cured, protected according to OPSS.MUNI 904. The alignment of the sleeves and/or duct entry points shall be scribed marked with indentations on the top of the concrete footing or slab. Concrete shall be sampled and tested according to OPSS.MUNI 1350.

Concrete bases shall be constructed as follows:

A)	Size:	406 mm BCD, 760 mm x 2200 mm
	Type:	Concrete 35 MPa
	Req'd Pole:	(8620)
B)	Size:	406 mm BCD, 760 mm x 2850 mm
	Type:	Concrete 35 MPa

	Req'd Pole:	(8535)
C)	Size:	300 mm BCD, 300 mm x 1200 mm
	Type:	Concrete 35 MPa
	Req'd Pole:	PDP-550B-AB190

The anchor assembly shall be spaced and supported by means of a wooden template. Before the concrete is poured, the Contractor shall "spin" the nuts on the studs assembly down snug to the top of the template and in accordance with the standard specification drawing. The Contractor when installing an anchor assembly with studs shall leave a minimum 120mm or maximum 140mm section of the studs above the top of the finished foundation. Once the pole plate has been installed a maximum 50mm of the stud shall extend above the double nuts (four threads). The anchorage assembly shall be installed and adjusted level in all directions on the wooden template using a carpenter's level. Upon initial setting of concrete the wood template shall be removed and the drainage channels, marking the entry points of conduits and other features shall be completed.

Anchorage assemblies shall be accurately positioned in the signal or lighting pole and sign footings. The alignment of the studs shall be parallel to the edge of the driving lane. Anchorage assemblies shall be securely tied to steel reinforcement.

Studs shall be factory inserted in the ferrules and held in place with a pre-applied to thread locking compound. A wooden template shall be provided. Nuts and washers shall be installed hand tight by the fabricator. Studs shall have the exposed threads above the ferrule coated with factory applied white lithium grease. The integrity of the compound shall be maintained throughout the installation and no attempt shall be made to remove or adjust the studs under normal circumstances

Under no conditions shall the studs or bolts be removed and left out of the ferrules while the concrete sets. Where the removal of the studs for repair or replacement purposes is required, the ferrules and the studs shall be cleaned to remove the old thread locking compound. New thread locking compound shall be applied to the insertion length of the studs prior to tightening to full depth.

After the setting of the concrete, the template shall be removed and the projecting threads of the studs shall be greased and protected until the metal pole is mounted in place. The formwork shall be completely removed on the external surface area at least 200mm below grade.

The Contract Administrator will inspect each pole footing. A maximum tolerance of 25mm will be allowed from the top elevation of the footing and controller pad to the adjacent grades or Contract Detail information.

Payment shall be made at the Contract unit price for each concrete base constructed and shall be full compensation for all labour, materials and equipment required to complete the Work as specified in the Contract Documents.

Supply and Install Rigid PVC Ducts by Open-Cut – Item No. E3 and E27

Reference: OPSS 401, 492, & 603. OPSD 2100.05, 2100.06, 2101.01, 2103.02, 2103.030, 2103.05,

Work for this item shall be completed in compliance with OPSS 603 and the Contract Drawings.

Non-metallic ducts installed and used when exposed to direct rays of the sun shall be specifically approved for the purpose and be marked (e.g., “SR,” “Outdoor,” “RTRC Type AG”) according to the Ontario Electrical Safety Code.

Rigid conduit systems installed by open cut, direct buried and subsurface installation shall be rigid polyvinyl chloride (PVC), unplasticized conduit conforming to CSA Standards C22.2 No. 211.0 and C22.2 No. 211.2, except where otherwise indicated.

Wobble joint fittings with expanded polystyrene bedding shall be installed where direct buried rigid ducts terminate at concrete structures such as bridge structures, retaining walls, and duct banks.

Rigid Conduits supplied shall be as follows:

A)	Size:	50 mm dia.
	Type:	Rigid PVC, CSA C22.2 No. 211.2
	Manufacturer:	IPEX (or Approved Equal)
	Cat. No.:	032120 / 032121
B)	Size:	75 mm dia.
	Type:	Rigid PVC, CSA/C22.2 No. 211.2
	Manufacturer:	IPEX (or Approved Equal)
	Cat. No.:	032130/032131
	Notes:	N/A
C)	Size:	100 mm dia.
	Type:	Rigid PVC, CSA C22.2 No. 211.2
	Manufacturer:	IPEX (or Approved Equal)
	Cat. No.:	032140 / 032141
	Notes:	1. Fittings and accessories required to complete duct installation as specified, shall be of the same manufacturer as the duct supplied and installed. 2. Ducts shall be supplied with bell ends.

The Contractor shall install marking tape at the centreline of the trench, a minimum 300 mm below finished grade or asphalt or concrete surfaces and no lower than midpoint depth of excavation.

All ducts, terminating in traffic signal control cabinets and electrical chambers shall have standard “Bell” ends.

All ducts shall be temporarily plugged or sealed until wiring is installed. All ducts, terminating in traffic signal control cabinets, power supply assemblies, with wiring

installed, shall be sealed with duct fill compound or expanding foam to a depth of no more than 100 mm (4”) of the top of the conduit.

When ducts are specified in the Contract Documents as “spare” or intended for future use, the duct ends shall be plugged with plastic plugs and taped shut.

Except when unshrinkable backfilling is used, backfilling shall be according to OPSS 401. Backfill materials containing rock fragments and stone larger than 50 mm in diameter shall not be placed within 300 mm of the duct.

Sand bedding shall be placed in trenches for flexible duct where the trench bottom contains sharp rock fragments and where crossover of flexible ducts is required.

Unshrinkable or granular backfill in trench for rigid ducts crossing paved areas shall extend to the wall of electrical chamber, where electrical chamber are required, otherwise, 1.0 m beyond the back face of curb or, where there is no curb, to the back edge of shoulder.

All grassed areas in boulevards will be reinstated with a minimum of 150mm of good topsoil and sod or seed as required under the Contract.

All sidewalk areas removed during the installation of conduit systems shall be reinstated with the respective asphalt or concrete surface material specified on the Contract drawings and in accordance with the Operating Authority reinstatement policy and standards. Temporary reinstatement of any removed sidewalk area is required at the end of the work day with a minimum 50mm depth of asphalt, matching the adjacent permanent sidwalk sections with a maximum 5mm lip.

When existing pavement is encountered, the Contractor shall saw cut trench limits and remove asphalt pavement. The existing pavement shall be cold planed to a depth of 50mm and a 300mm width on both sides of the trench.

The trench shall be backfilled with an unshrinkable fill to bottom of existing asphalt. The unshrinkable fill material shall be placed at a slump of between 150mm and 200mm. The material shall flow into the excavation so that it fills the entire space. Care shall be taken to ensure that no air is entrapped beneath horizontal projections or in other locations within the excavation.

Where bracing, shoring and/or sheeting is used to support the sides of the excavation or to prevent movements that could damage other services or adjacent pavements, this support system shall be removed as backfilling proceeds. Where road traffic is to be accommodated, the backfilled excavation shall be covered with steel plates or other protection for users of the road allowance until the unshrinkable backfill will support the weight of an adult person.

Fish line shall be installed in all ducts specified in the Contract Documents. A 1.5 m length of fish line shall extend out of each end of the duct beside the plastic plug, left coiled, and tied in an accessible location. Fish line shall be nylon or polypropylene material with minimum test strength of 400 N.

In all ducts specified as being spare or intended for future use a fish line along with a Cu RWU low voltage conductor of minimum size #14 AWG, shall be installed for conduit locating purposes.

The installation shall be made in a manner to the satisfaction of the Contract Administrator. All underground work must be inspected and approved by an Operating Authority representative, prior to proceeding with the installation of the above ground facilities.

The above ground installation shall not proceed until all deficiencies noted in the underground inspection have been corrected. On completion of the installation, the Contractor shall test all cable, signal heads, pedestrian heads and loops to ensure that there are no short circuits or open circuits and that all exposed equipment components are properly grounded.

The Contractor at his expense shall correct all defects disclosed by testing until all of the equipment is accepted as satisfactory by the Contract Administrator. Installation of the controller cabinet shall not proceed until all deficiencies have been corrected.

The Contract Administrator prior to the installation must approve any variations from this specification in writing.

Site restoration shall be according to OPSS 492.

Payment for conduit shall be per metre of conduit placed and shall include the supply and installation of the conduit, fish line, all bends, risers, caps, spacers, concrete, excavation of trenches, removal and disposal of materials, bedding, backfill and compaction.

Supply and Install Rigid PVC Duct on Hydro Pole – Item No. E4

Reference: OPSS 603, OPSD 2540.01 & 2552.01

Work for this item shall be completed in compliance with OPSS 603 and the Contract Drawings.

The Contractor shall supply and install conduit on poles to house the cables for the equipment it is servicing. This item shall include all conduit, junction boxes and associated equipment to install proposed traffic signal and roadway lighting equipment as indicated on the Contract Drawings and as per OPSD 2540.01 and 2552.01.

Payment shall be made at the contract unit price conduit installed for each pole and shall be full compensation for all labour, materials, and equipment required to complete the work as specified in the Contract Documents.

Supply and Install Traffic Signal Cable – Item No. E5

Reference: OPSS 604, OPSD 2540.01

Work for this item shall be completed in compliance with OPSS 604 and the Contract Drawings.

The Contractor shall supply and install traffic signal cable where shown on the Contract Drawings and in accordance with OPSD 2540.01.

The Contractor shall label all groups of traffic signal conductors in the controller cabinet, indicating the phase number, direction and movement.

The Contractor shall supply and install sufficient 14 gauge 7/C and 19/C colour coded traffic signal runner and riser cables, to accommodate all equipment and installation operations specified in this Contract.

All traffic signal cable shall be installed in the underground conduit system in the locations as indicated on the Contract Drawings.

Pedestrian detection cable shall be supplied and installed from the pedestrian actuation equipment to the traffic signal controller cabinet, leaving 3m coiled in the traffic signal controller cabinet, as per the Contract drawings.

The Contractor shall seal the conduit ducts in the controller pad with duct seal once all of the cables have been pulled into the controller cabinet.

Payment shall be made at the contract unit price per metre, based on plan quantity payment and shall be full compensation for all labour, materials, and equipment required to complete the Work as specified in the Contract Documents.

Note: Plan quantity payment is not a true quantity measurement (riser cables are not included) but is a horizontal measurement from the plan between handwells, poles, transformers, and controller cabinet. Riser wires shall be included in bid price.

Supply and Install Street Lighting Cable – Item No. E6

Reference: OPSS 604

Work for this item shall be completed in compliance with OPSS 604 and the Contract Drawings.

The Contractor shall supply and install all the necessary wire, including all accessories, required to complete the wiring of the proposed luminaires to the service pole.

All splices in the luminaire wire shall be made above ground. The Contractor shall ensure that all equipment is adequately grounded.

The luminaire wire shall be brought back and connected to the circuit breaker supplied and installed at the service pole.

The luminaire wire shall be installed in the proposed underground conduit, in the locations as indicated on the Contract Drawings.

All wire apertures drilled in steel poles shall be deburred and painted with grey zinc rich paint. Rubber grommets shall be installed after the paint is dry.

All joints in the luminaire wire shall be made above ground in the pole handholes, unless otherwise specified. The Vendor shall ensure that all equipment is adequately grounded. The ground wire for the luminaire poles shall be installed under another contract item and paid for under that item.

Payment shall be made at the contract unit price per metre, based on plan quantity payment and shall be full compensation for all labour, materials, and equipment required to complete the work as specified in the Contract Documents.

Note: Plan quantity payment is not a true quantity measurement (riser cables are not included) but is a horizontal measurement from the plan between handwells, poles, transformers, and controller cabinet. Riser wires shall be included in bid price.

Supply and Install Ground Cable – Item No. E7

Reference: OPSS 609

Work for this item shall be completed in compliance with OPSS 609 and the Contract Drawings.

The Contractor shall supply and install a #6 AWG insulated, stranded copper ground wire as required to maintain a continuous grounding system.

Handwell frames shall be connected to the grounding system by #6 AWG, Bare, Copper ground cable.

Ground plates are to be connected to the grounding system by a #6 AWG, Bare, Copper ground cable.

Ground cable supplied shall be as follows:

A)	Size:	1/C, #6 AWG
	Type:	RWU90 (-40°C), XLPE, Insulated (Green) stranded copper, 1000V 90°C, CSA C22.2 No. 38-05
	Manufacturer:	Nexans (or Approved Equal)
	Cat. No.:	N/A
	Notes:	N/A
B)	Size:	1/C, #6 AWG
	Type:	Stranded copper, Bare
	Manufacturer:	Nexans (or Approved Equal)
	Cat. No.:	N/A
	Notes:	N/A

There shall be a separate continuous #6 AWG TWU green stranded copper ground wire from the controller to the service.

The controller shall not be connected to the system ground.

A continuous #6 AWG TWU green, stranded copper ground wire shall be installed from the span wire on the poles to the ground rod located adjacent to these poles.

The luminaire fixtures shall be bonded to the ground system by means of a #12 AWG TWU green, stranded copper ground wire.

Connection to the ground rods shall be made with Thermit Weld connectors.

The Contractor shall ensure that all equipment is adequately grounded.

Payment shall be made at the contract unit price per metre and shall be full compensation for all labour, materials, and equipment required to complete the work as specified in the Contract Documents.

Supply and Install Ground Electrode – Item No. E8

The Contractor shall supply and install ground plates in locations as indicated on the Contract Drawings.

Ground wire shall be secured to ground plates by means of a clamp connection, buried at a minimum 600 mm depth.

Ground electrodes supplied shall be as follows:

A)	Size:	254 x 406 x 6.3 mm Minimum Dimension
	Type:	Galvanized Plate C/W JAB34C Ground Cable Connector
	Manufacturer:	Thomas & Betts
	Cat. No.:	1016BTB
	Notes	Galvanized to CAN/SA G164

Payment shall be made at the tender unit price for ground plates and shall include all labour, equipment, and materials required to complete the work including all earth excavation, backfill, all connections, and testing required.

Supply and Install Poles, Base Mounted – Item No. E9

Reference: OPSS 615

Work for this item shall be completed in compliance with OPSS 615 and the Contract Documents.

Pole holes are to be excavated using a non-destructive hydro-vac system. Poles are to be installed without luminaries or arms attached.

Poles supplied shall be as follows:

A)	Size:	6.1m
	Type:	Steel Octagonal Galvanized
	Colour/Finish:	Natural
	Manufacturer:	Sentinel Pole & Traffic Equipment Ltd. (or Approved Equal)
	Cat. No.:	8620
B)	Size:	10.7m
	Type:	Steel Octagonal Galvanized
	Colour/Finish:	Natural
	Manufacturer:	Sentinel Pole & Traffic Equipment Ltd. (or Approved Equal)
	Cat. No.:	8535
C)	Size:	1.5m (5’)
	Type:	Aluminum
	Manufacturer:	Sentinel Pole & Traffic Equipment Ltd. (or Approved Equal)
	Colour/Finish:	Natural
	Cat. No.:	PDP-550B-AB190 (or Approved Equal)

Payment shall be made at the unit price and shall include all labour, equipment and materials required to install each pole, including all hardware, and adjustments required. The unit price shall be fixed regardless of installation methods and/or site conditions. Extras for shale, utility conflicts, locate delay errors will not be considered.

Supply and Install Traffic Signal Mast Arms on Steel Poles – Item No. E10

Reference: OPSS 620, OPSD 2500.010, 2500.020, 2501.01, 2501.02, 2502.010, 2505.01, 2514.01, 2514.02, 2524.01, 2526.01, 2528.01, 2530.01, 2547.01

Work for this item shall be completed in compliance with OPSS 620 and the Contract Documents.

The Contractor shall supply and install the new mast arms in the locations indicated on the contract drawings.

The Contractor shall supply and install the following types of single member aluminum mast arms with steel pole plate. The length and size of single member mast arms and location of installation are as specified on the Contract Drawings.

Single Member Mast arms supplied shall be as follows:

A)	Size:	3.6m (12ft.) Arm
	Type:	Aluminum
	Colour/Finish:	Natural
	Manufacturer:	Sentinel Pole & Traffic Equipment Ltd. (or Approved Equal)
	Cat. No.:	TR12SMA
B)	Size:	4.6m (15ft.) Arm
	Type:	Aluminum
	Colour/Finish:	Natural
	Manufacturer:	Sentinel Pole & Traffic Equipment Ltd. (or Approved Equal)
	Cat. No.:	TR15SMA
C)	Size:	6.1m (20ft.) Arm
	Type:	Aluminum
	Manufacturer:	Sentinel Pole & Traffic Equipment Ltd. (or Approved Equal)
	Colour/Finish:	Natural
	Cat. No.:	TR20SMA

The Contractor shall confirm and supply the proper size of single member arm mounting bracket for the respective pole, when supplying the single member arms.

Payment shall be made at the contract unit price for each mast arm installed and shall be full compensation for all labour, materials, and equipment required to complete the work as specified in the Contract Documents.

Supply and Install Dual-End Signal Head Hanger – Item No. E11

Dual end signal head hanger shall be supplied and installed to mount signal heads in locations shown on the Contract drawings or as directed by the Operating Authority or the Contract Administrator.

The following manufacturer is approved for use:

1) Olson Aluminium Castings - Sky-Bracket – Model # SBMH\SB-248

Payment shall be made at the unit price and shall include all labour, equipment and materials required to install each signal head mount bracket, including all hardware, and adjustments required. The unit price shall be fixed regardless of installation methods and/or site conditions.

Supply and Install Traffic Signal Heads – Item No. E12

Reference: OPSS 620

Work for this item shall be completed in compliance with OPSS 620 and the Contract Drawings.

Traffic heads shall be in accordance with Ontario Highway Traffic Act and OTM Book-12.

Traffic Signal Heads shall be as follows:

a) “HWY Type” Signal Head - R300mm/A200mm/G200mm Sections

The type of traffic signal head to be installed and the location of each traffic signal head shall be as indicated on the Contract Drawings and in quantities as noted on the Form of Tender.

The vehicle traffic signal heads shall be complete assemblies constructed of Polycarbonate:

i) Signal sections finished with Yellow front sections and Yellow rear sections;
ii) Removal polycarbonate cowl / cap type visors, with Yellow external surface finish and Matt Black internal surface finish; and
iii) Polycarbonate Backboard with:
    a. Yellow front surface and Yellow back surface;

The front of the backboard surface shall have a 75mm strip of High Intensity reflective sheeting applied along the outer edge unless otherwise indicated in the Contract documents.

The following manufacturers or suppliers of vehicle traffic signal heads are approved for use:

Eagle Traffic Control,
Econolite Canada Incorporated,
McCain Incorporated; or
Peek Traffic Corporation

Cable termination shall be made in the “AMBER” housing with approved wing-nut connectors to a suitable length of 7/C #14 AWG riser cable between the head and the pole hand hole.

The vehicle traffic signal heads shall be installed in accordance with procedures specified by the Contract Administrator. With the exception of median island traffic signal poles, the traffic signal head mounting height shall be 5.0m; measured from the bottom of the head backboard to the road surface. Traffic signal heads mounted directly on median island traffic signal poles must be installed at a height of 4.7m.

All vehicle traffic signal heads shall be covered with black signal cover bags, while mounted and not in operation.

The signal head cover bags shall be supplied and installed in accordance with the Contract drawings or as directed by the Operating Authority or the Contract Administrator. The signal head cover bags shall be the property of the Contractor and shall remain such upon completion of the project.

The following pre-manufactured signal head cover bags are approved for use:

The Traffic Jacket - Supplied by:

A. Sentinel Pole & Traffic Equipment Limited, or
B. Tacel Limited
C. SignalSax – Supplied by Trans Canada Traffic Incorporated.

Payment shall be made at the contract unit price for each traffic signal head installed and shall be full compensation for all labour, materials, and equipment required to complete the Work as specified in the Contract Documents.

Supply and Install Pedestrian Signal Head Mount Brackets on Steel Poles – Item No. E13

Extruded aluminum arm brackets shall be supplied and installed to mount the following equipment at the location(s) shown on the Contract drawings or as directed by the Operating Authority or the Contract Administrator.

The following manufacturer of signal head extruded aluminum arm brackets is approved:

A) Sentinel Pole & Traffic Equipment Limited
Model EDA-450;
Model EDA-600;
Or; approved equivalent.

Payment shall be made at the unit price and shall include all labour, equipment and materials required to install each signal head mount bracket, including all hardware, and adjustments required. The unit price shall be fixed regardless of installation methods and/or site conditions.

Supply and Install Pedestrian Signal Heads on Brackets – Item No. E14

Reference: OPSS 620

Work for these items shall be completed in compliance with OPSS 620 and the Contract Drawings.

All pedestrian LED **countdown** signal heads supplied for the permanent set up shall be LED type with yellow polycarbonate housing, constructed of two (2) 300mm x 300mm lenses. All LED type signals shall meet or exceed ITE specifications.

The units shall be shall be Dialight by Econolite Canada Inc. They shall be programmed to countdown the flashing don't walk time, rest in a blank display and the numbers should not flash during countdown.

Payment shall be made at the contract unit price for each pedestrian signal head installed and shall be full compensation for all labour, materials, and equipment required to complete the work as specified in the Contract Documents.

Supply and Install Audible Pedestrian Signal Push Buttons, Signs, and Stations on Steel Poles – Item No. E15

AND

Supply and Install 2 Wire Central Control Unit (CCU) For Audible Pedestrian Signal Station – Item No. E16

Reference: OPSS 623

Work for this item shall be completed in compliance with OPSS 623 and the Contract Drawings.

Supply and Install Audible Pedestrian Signal Station

The Contractor shall supply and install an Audible Pedestrian Signal Station as manufactured by Polara Engineering Incorporated, Model N25ANO-Y, complete with mounting hardware.

The Audible Pedestrian Signal Station shall be installed in the location shown on the Contract Drawings and in accordance with the manufacturer's specifications.

The 2 wire Central Control Unit shall be supplied and installed under a separate Contract item paid for under that item.

The Contractor must also purchase a Configurator for the programming of the station. This unit shall become the property of the Region.

The audible sounds are as follows:

1) "Chirp" East-West
2) "Cuckoo" North-South

Final sound orientation of the unit shall be carried out jointly with the Town of Cobourg staff and the Contractor.

Payment shall be made at the Contract unit price for each Audible Pedestrian Signal Station supplied and installed and shall be full compensation for all labour, materials and equipment required to complete the Work as specified in the Contract Documents.

Set-up and Modifications for Audible Pedestrian Signal

This Item shall include the set-up and all modifications for the audible pedestrian signal.

The set-up of the audible pedestrian signal shall be carried out jointly with the Agency staff.

This Item shall also include any modifications to the traffic signal controller necessary to implement proper operation of the audible pedestrian signal.

Supply and Install Audible Pedestrian Signal Station Cable

The Audible Pedestrian Signal Station Cable shall be Beldon Inc., #8720 series stranded, #14 gauge, twisted pair cable with shielding (Beldfoil) and polyethylene insulation or an approved equal.

The cable shall run through the conduit system from the Audible Pedestrian Signal Station to the Central Control Unit in the traffic signal controller cabinet.

Each Audible Pedestrian Signal Station shall have its own cable.

Payment shall be made at the Contract unit price per metre of Audible Pedestrian Signal Station Cable supplied and installed, based on plan quantity payment, and shall be full compensation for all labour, materials and equipment required to complete the Work as specified in the Contract.

Supply and Install a 2 Wire Central Control Unit for Audible Pedestrian Signal Station

The Contractor shall supply and install a 2 wire Central Control Unit (CCU), manufactured by Polara Engineering Inc., for use with Audible Pedestrian Signal Stations.

The Central Control Unit shall be installed in the traffic signal controller cabinet. The Central Control unit interfaces between the traffic signal controller and the Audible Pedestrian Signal Stations.

Payment shall be made at the Contract unit price for each 2 wire Central Control unit supplied and installed, and shall be full compensation for all labour, materials and equipment required to complete the Work as specified in the Contract Documents.

Supply and Install Luminaire Mast Arms on Steel Poles – Item No. E17

Reference: OPSS 617

Work for this item shall be completed in compliance with OPSS 617 and the Contract Drawings.

The Contractor shall supply and install 2.4 m long elliptical aluminum luminaire mast arms:

a) 2.4m (8ft) Arm, Sentinel Pole & Traffic Equipment Cat. No. RE-8MA-4125 (or Approved Equal)

The mast arms shall be mounted on the poles in the locations as indicated on the Contract Drawings.

Payment shall be made at the contract unit price for each aluminum luminaire mast arm installed and shall be full compensation for all labour, materials, and equipment required to complete the work as specified in the Contract Document.

Supply and Install LED Luminaires on Luminaire Mast Arms – Item No. E18

Reference: OPSS 617, OPSD 2421.010

Work for this item shall be completed in compliance with OPSS 617 and the Contract Drawings.

The Contractor shall supply and install new luminaires at locations indicated on the contract drawings.

Luminaires shall be mounted on poles / arm brackets as indicated on the contract drawings.

Luminaire supplied shall be as follows:

A)	Size:	101W
	Type:	LED
	Colour/Finish:	Silver
	Manufacturer:	Cree
	Cat. No.:	BXSP-C-HT-3ME-E-40K-UL-SV-R

Should a Manufacturer, Distributor or Contractor request approval from the Operating Authority of an alternate LED luminaire fixture to that listed above, the Manufacturer, Distributor or Contractor shall be responsible for the all costs incurred by the Operating Authority or their Lighting Design Consultant to run the calculation of LED luminaire fixture IES files, based on an established or original Contract pole spacing set out in the roadway lighting design.

Luminaires shall be installed complete with photocells, fusing, and riser wires to be located in pole as follows:

Photocell:	Dark to Light – Acuity Brands – Cat No. DSS124F 1.0 TJJE (or Approved equal)
Fuse Holder:	30A, 600V, Single-pole break-away, 2 L Type
Fuse:	10A Cooper Bussman - Cat. No. KTK 10 (or Approved Equal)
Riser Wires:	#12 AWG Copper, Solid, 600 V NMWU 10-10-12

The existing roadway lighting shall be maintained in operation until the permanent roadway lighting is energized.

Payment shall be made at the unit price of each LED luminaire, photocell, fuse, wattage sticker, riser wires from the pole handhole to the luminaire, and shall include all labour and equipment pertaining to the installation, mounting, wiring and adjustments of the street lighting equipment to achieve operational status. The Contractor should note that the existing illumination must be maintained at all times. Extras for coordination time/conflicts, delays and errors will not be considered.

Supply and Install Power Supply Assembly on Hydro Pole – Item No. E19

Reference: OPSS 614, OPSD 2400.00, 2400.010, 2400.020, 2400.030, 2400.100, 2400.101, 2440.010, 2440.030, 2440.04, 2440.050, 2440.060

Work for this item shall be completed in compliance with OPSS 614 and the Contract Drawings.

The Contractor shall supply and install pole mounted power supply disconnect in the location indicated on the Contact Drawing.

The Contractor shall make prior arrangements with the Local Hydro Authority, **at least one week** prior to installing any services on existing Hydro Pole.

It shall be The Contractor's responsibility to arrange with Lakefront Utilities for the connection of the street lighting to the source of supply. The Contractor shall contact Lakefront Utilities for coordination of all work to be done on Hydro poles.

The Contractor shall provide 3-1/C #2 AWG stranded copper (Cu) RWU90 unjacketed XLPE 600 volt cables of sufficient length to reach from the supply disconnect to the Hydro One demarcation point. The Contractor shall leave a cables coiled at the 'service entrance fitting' for the final connection by to Hydro One to the existing secondary bus / transformer.

The ground wire and ground plates for the power supply shall be installed and paid for under other Contract items.

It shall also be The Contractor's responsibility to obtain an "Inspection Clearance" from the Electrical Safety Authority. The "Inspection Clearance" must be obtained well in advance of the power turn on to ensure the Hydro Authority will receive it prior to turn on.

The installation of the power supply equipment and the power connection must be completed very early in the Contract to ensure there is no delay to the illumination turn on. Therefore, The Contractor must have early communication with the Hydro Authority to ensure that their requirements (i.e., permits and inspections) have been satisfied. The Contractor shall be required to notify the Hydro Authority and arrange for the earliest possible power connection.

This item shall include all conduit, fittings, couplings, pipe straps, mounting hardware and accessories required to install the power supply disconnect on the Hydro poles in accordance with applicable Hydro standards and as per the details on the Contract Drawings.

Power service facilities shall be supplied as follows:

Size:	60A, 120/240V, 1PH, 3W
Type:	Pole Mounted
Manufacturer:	Square 'D'
Cat. No.:	CQO18M100RB70

The Contractor shall supply and install eight 40 amp (1P-40A breakers – Square 'D' O140) branch circuit breakers.

Payment shall include the disconnect, wiring, all ESA inspection fees, all labour, materials, hardware, equipment required to complete the installation. The Contractor is

responsible to arrange and pay for ESA inspection and to rectify any and all deficiencies to ultimately produce a permit from ESA permitting circuit energization by Hydro Authority.

Construct Concrete Base for Traffic Signal Controller – Item No. E20

The concrete pad where the traffic signal controller is mounted on, shall be constructed in the location shown on the Contract Drawings.

The Contractor shall obtain cabinet footprint dimensions from the cabinet supplier, Tacel Ltd.

Tacel Ltd.
179 Bartley Drive, Unit B
Toronto, Ontario
M4A 1E6
(416) 750-4646
info@tacel.ca

The Contractor shall obtain the anchor bolt patterns from supplier.

All grassed areas shall be reinstated with a minimum of 100 mm of good quality imported top soil and sod or seed as required by the Town of Cobourg.

Payment shall be made at the Contract unit price for each concrete pad constructed and shall be full compensation for all labour, materials and equipment required to complete the Work as specified.

Supply and Install Traffic Signal Controller to Base Foundation – Item No. E21

Reference: OPSS 622

Work for this item shall be completed in compliance with OPSS 622 and the Contract Drawings.

The Contractor is responsible for all modifications to the existing traffic signal controller, as necessary to accommodate the proposed concrete base foundation.

The Contractor is responsible for ensuring that all controller and conflict monitor programming is installed, and is responsible for the setting of all timing controls, switches and programming controls.

The Contractor is responsible for installing the traffic signal timing into the traffic signal controller. The existing signal timing sheet shall be reused by the Contractor for signal input timing into the new controller. The Contractor is responsible for verifying to his own satisfaction, that the signal timing is consistent and complete.

Payment shall be made at the Contract lump sum price for the relocation of the traffic signal controller installed and shall be full compensation for all labour, materials and equipment required to complete the Work as specified.

This specification describes the minimum acceptable requirements for a TS 2, type 2 cabinet assembly to house a Naztec 980 TS2 type 8 phase Controller complete with Auxiliary I/O harness. The assembly shall include the cabinet, flasher, 8 position card rack complete with 1ea. 24vdc power supply, 4ea. 2ch. Detectors, 1ea. Naztec 500 Series, 12 ch. NEMA conflict monitor complete with event logging and LCD display

capable of recognizing Canadian fast flash signal operation, a cabinet power supply, and 4 flash transfer relays. The assembly shall include a 12 position load bay complete with 12 load switches wired with cable assemblies for T2000 compatibility.

12 Position – 12 Channel NEMA TS2 Type 2 Backpanel

All terminals shall be permanently identified in accordance with the cabinet wiring diagram using an anodized silk screening process on the aluminum panel. Where through-panel solder lugs or other suitable connectors are used, both sides of the panel shall have the terminals properly identified. Identification shall be placed as close to the terminal strip as possible.

Each controller input and output function shall be distinctly identified with no obstructions, at each terminal point in the cabinet, with both a number and the function designation. The same identification must be used consistently on the cabinet wiring diagrams.

Each flash transfer base and power relay base shall be properly identified with no possible obstructions.

A 15 Ampere and a 40 Ampere thermal type circuit breaker shall be mounted and wired in the cabinet. The 15 ampere breaker shall protect the trouble light, GFCI receptacle, R.C.C.U. and fan. The 40 ampere breaker shall protect the signal load circuits, controller circuits, conflict monitor, flasher, and card rack detector power supply.

The cabinet shall be designed and equipped with enough transfer relays for the purchaser to change any main street indications (movements 2, 6, and/or 1, 5) to amber for the conflict and/or manual flash operation on the face of the back panel or a side panel, using only simple tools.

Detector Card Rack

The cabinet shall have a panel mounted on the inside of the cabinet door that contains test switches for eight (8) vehicle calls, 8 ped pedestrian calls and 4 pre-emption calls. Test switches shall be on-off-momentary.

The new traffic signal controller installation and accessory equipment shall be guaranteed by the Contractor against defects in materials and workmanship for a period of twenty-four (24) months from the date of Total Performance of the Work. The Contractor shall provide a warranty for the controller and its equipment from the time of pick up until the time that the controller is activated.

Payment shall be made at the unit price for each traffic Signal Controller, supplied, installed and activated, and shall be full compensation for all labour, materials and equipment required to complete the Work as specified in the Contract Documents.

Supply and Install Radar Detectors – Item No. E21A

The Contractor shall supply, install and activate a complete Wavetronix Smart Sensor Matrix (or approved equal) radar detector system (CSA Approved) as shown on the Drawings. The system shall be installed as per manufactures' specifications and shall be configured with assistance from the Town.

The unit price bid shall also include but not limited to two (2) Wavetronix Smart Sensor Matrix, two (2) Wavetronix sensor mounting brackets, two (2) 40 ft cable drops, two (2)

Wavetronix Junction boxes, Cabinet Interface (Wavetronix CKL650), minimum 500ft of Wavetronix Home Run cable and drawing/software USB kit.

The Contractor is to install the microwave detector units as per the manufacturer's recommendation and coordinate with the supplier to determine optimal mounting height, and provide on-site turn on assistance and programming from a Certified Factory Technician.

Payment shall be made at the unit price for each radar detector and supplied, installed and activated and for each metre of cable supplied and installed, and shall be full compensation for all labour, materials and equipment required to complete the Work as specified in the Contract Documents, including controller cabinet modifications.

Supply and Install UPS Cabinet and System for Traffic Signal Controller – Item No. E21B

Reference: OPSS 622

Work for this item shall be completed in compliance with OPSS 622 and the Contract Drawings.

The Contractor shall supply, install and activate a complete UPS system (CSA Approved) as shown on the Drawings. The system shall be installed as per manufactures' specifications and shall be configured with assistance from the Town.

The unit price bid shall also include but not limited to one (1) Alpha Technologies SE48-1919 48" Outdoor Traffic BBS Enclosesure, four (4) 195XTV batteries, one (1) Alpha Technologies FXM-1100 Rugged UPS Module and all associated materials to install a fully functioning UPS system.

The Contractor is to install the UPS system as per the manufacturer's recommendation.

Payment shall be made at the LS price for each UPS system supplied, installed and activated, and shall be full compensation for all labour, materials and equipment required to complete the Work as specified in the Contract Documents, including controller cabinet modifications.

Remove and Dispose of Existing Traffic Signal Equipment – Item No. E22

Reference: OPSS.MUNI 106, 610

Work for this item shall be completed in compliance with OPSS.MUNI 106, 610 and the Contract Drawings.

The Contractor shall completely remove and dispose of the existing traffic control signal equipment in the locations as indicated on the Contract Drawings.

All holes left from the removal of the pole bases and handwells shall be backfilled with Granular 'A' compacted to 100 per cent maximum dry density.

All materials removed under this item shall be disposed of at the approved dump site outside the limits of the Contract.

Payment shall be made at the contract lump sum price to be removed and disposed of **(based on the quantities indicated in the removal chart, on the Contract Drawings)**

and shall be full compensation for all labour, materials, and equipment required to complete the Work as specified in the Contract Document.

Remove and Salvage Existing Traffic Signal Equipment – Item No. E23

Reference: OPSS.MUNI 106, 610

Work for this item shall be completed in compliance with OPSS.MUNI 106, 610 and the Contract Drawings.

The Contractor shall be required to carefully remove and salvage the existing traffic control signal equipment in the location shown on the Contract Drawings. This equipment shall be removed immediately upon completion and switch over to the new signal installation and under no circumstances shall the existing signals be removed before the new traffic signals and illumination are put into operation. A pay duty police officer and a member of the Agency's Roads-Operations Section shall be required at the place of the work during the switch over to the new traffic control signal installation.

Each hole left from the removal of a pole base footing shall be filled with native material. Granular material shall be compacted to 100 percent maximum dry density and earth to 95 percent maximum dry density. Grassed areas shall be reinstated with a minimum of 100 mm of good quality imported topsoil and sodded or seeded as required by the Agency.

Equipment Being Salvaged and Transferred to the Contractor:

The Contractor shall calculate a credit for the equipment being transferred to it and is to reflect this credit in its bid.

Traffic Signal Equipment Being Salvaged and Returned to The Town of Cobourg:

The Contractor shall deliver all equipment to the Agency's yard site with a 48 hour notice provided to the Agency, to the address below:

Public Works Yard
740 Division Street, Building #7
Cobourg, ON

Payment shall be made at the Contract lump sum price for the equipment to be removed and salvaged (based on the quantities indicated in the removal chart, on the Contract Drawings), and shall be full compensation for all labour, materials and equipment to complete the work as specified in the Contract Documents.

Remove and Dispose of Existing Electrical Aerial Service and Equipment – Item No. E24

The Contractor shall be required to completely remove and dispose of existing electrical aerial service and equipment in locations as specified on the Contract Drawings.

All materials removed under this item shall be disposed of at the approved dump site outside the limits of the Contract.

Payment shall be made at the Contract lump sum price for the removal and disposal of existing electrical aerial service and equipment and shall be full compensation for all labour, materials and equipment required to complete the Work as specified.

Installation of New Underground Services (Including Trenching, Conduit, Wiring, Meter Bases and all associated Equipment) – Item No. E25

The unit price bid for this Item shall be full compensation for the supply of all labour, equipment, and material required to install new underground residential services in accordance with the Contract Drawings and L.U.S.I. standards, or as directed by the Contract Administrator.

For the unit price bid the Contractor shall:

- Provide all necessary wiring, cable guards and hardware to install secondary dips for the six residential services indicated on the Contract Drawings.
- Install two concrete encased road crossings for LUI and Cogeco servicing, at minimum 1.0m depth, including spare ducts to be capped behind the proposed curb. Concrete encasement and duct installation as per Item E3
- Supply and install service runs aluminum triplex cable in rigid HDPE conduit.
- Supply and install new meter bases with bottom entry, complete with conduit and hardware necessary for a proper installation, as indicated on the Contract Drawings. #93 Albert Street will require two new meter bases.
- Temporary power supply, if required, to accommodate switch over from aerial to underground hydro servicing.

This shall also include coordination with the Town of Cobourg, homeowners and Lakefront Utilities in regards to disconnections/connections, sequencing of operations, ESA inspections and all additional items required to facilitate the completion of the intended work as described on Drawing E4.

Payment shall be made at the Contract lump sum price for the installation based on the quantities indicated on the Contract Drawings.

Coordination with Cogeco – Item No. E26

The Contractor shall coordinate with Cogeco for the relocation and installation of the underground residential services crossing Albert Street to the south side of the road. This work is intended to be completed concurrently with the proposed hydro services and share a common trench for the road crossings and separate services. Concrete encased duct crossings to be completed under Item E27

Payment shall be made at the Contract lump sum price for the coordination with Cogeco to facilitate the installation of the underground services.

Cogeco contact: Barry Cunningham, barry.cunningham@cogeco.com

No claims for delays due to Cogeco will be considered for compensation.

Remove and Replace Existing Signal Pole at Albert and Third Street – Item No. E27

The Contractor shall be required to remove an existing signal pole at the Northwest corner of Albert and Third Street and replace it with a signal pole provided by the Town of Cobourg as specified on the Contract Drawings.

The Contractor shall return to the Town of Cobourg the existing signal pole upon removal.

Payment shall be made at the Contract lump sum price for the temporary disconnection, removal of the existing signal pole and installation and activation of the new signal pole. Payment shall be full compensation for all labour, materials and equipment required to complete the Work as specified.

Corporation of the Town of Cobourg

Albert Street Reconstruction

Contract No. CO-21-01 PWD

General Conditions

The OPSS.MUNI 100 November 2019 General Conditions have not been reproduced as part
of these Contract Documents.

It will be the Contractor’s responsibility to obtain current copies of these Documents.

Corporation of the Town of Cobourg

Albert Street Reconstruction

Contract No. CO-21-01 PWD

Contract Administration Forms

Corporation of the Town of Cobourg

Albert Street Reconstruction

Contract No. 21-01 PWD

Contract Administration Forms

Letter of Consent

General Release in Respect to Landfilling

Property Owner's Release

Substantial Performance Release of Claims Letter

Completion Release of Claims Letter

Final Release of Claims Letter

Contractor's Letterhead

Letter of Consent

Re: Corporation of the Town of Cobourg
Albert Street Reconstruction

This is to confirm that The Corporation of the Town of Cobourg and its' Contractor, _____ _____, have my authority to enter and use designated areas of my property for material storage and/or access to facilitate construction activities.

_____ agrees to restore the area used to original condition plus any special conditions listed below.

The Corporation of the Town of Cobourg and CIMA Canada Inc. will at no time be held responsible for any damages and/or restoration.

Name of Property Owner: _____

Address of Property Used: _____

_____

Material to be Stored: _____

_____

Special Conditions: _____

_____

_____

Date Letter of Consent Expires: _____

_____ _____
(Witness) (Signature of Owner)

_____
(Date)

Corporation of the Town of Cobourg

Albert Street Reconstruction

General Release of
The Corporation of the Town of Cobourg
Its Servants and
CIMA Canada Inc.
In Respect of Landfilling

Know all persons by these presents that I,_____ the owner, remise and forever discharge The Corporation of the Town of Cobourg (Owner), its servants and CIMA Canada Inc. (Contract Administrator) and _____ (Contractor), their successors in title and administrators, of and from all manner of actions, causes of actions, suits, debts, dues, accounts, bonds, covenants, contracts, claims and demands whatsoever which against the said Owner, its servants and Contract Administrator, I have, ever had, now have a or which my heirs, executors, administrators or assigns or any of them hereafter can, shall, or may have for or by reason of any cause, matter to thing whatsoever arising or which may arise as a result of my granting permission to have the said Contractor to place, deposit or dump any soils, gravel, rock, stumps or trees whatsoever in, on or over my said lands.

In Witness Whereof I have hereto set my hand this_____

day of _____A.D. 20_____.

_____ _____

Witness Signature

Final Payment will not be paid to the Contractor until all the applicable Forms of Release have been signed by each of the property owners and have been received by the Owner and checked.

The Corporation of the Town of Cobourg

Albert Street Reconstruction

Property Owner's Release of Privately Owned Land
Used by the Contractor

Upon completion of the contract, the Contractor shall provide the Corporation of the Town of Cobourg with two (2) copies of a Form of Release signed by each property owner upon whose land he has entered for any reason in conjunction with the contract as follows:

Date:_____

To: The Corporation of the Town of Cobourg

RE: Albert Street Reconstruction, Contract No. CO-21-01 PWD

I hereby certify that

_____
(Name of Contractor)

has fulfilled the terms of our Agreement attached herewith and has left my property in a satisfactory condition.

I have accepted their final payment and release the Contractor, the Corporation of the Town of Cobourg, its servants, and CIMA Canada Inc., from further obligations.

Yours truly,

_____
Signature

_____
Property owner's name (Please Print)

Lot_____ Concession_____ Town_____

Final Payment will not be paid to the Contractor until all the applicable Forms of Release have been signed by each of the property owners and have been received by the Owner and checked.

Substantial Performance Release of Claims Letter

Before the release of any portion of the 10% Statutory Holdback, the Contractor must provide a Substantial Performance Release Letter to the Contract Administrator using the following wording and format:

(Contractor's letterhead)

Date:_____

To: The Corporation of the Town of Cobourg
55 King Street West
Cobourg, ON K9A 2M2

RE: Albert Street Reconstruction
Contract No. CO-21-20 PWD, Substantial Performance Release

In the matter of Contract CO-21-20 PWD, being a contract between (Contractor's name) and the Town of Cobourg, I (first & last name), being the (position) of the above named company, hereby certify that (company name) agrees that the amount of $xxxx.xx (including HST) represents the total value of work completed under this contract up to (cut-off of next payment).

(xxx being the date of Substantial Performance.)

I further certify that (company name) has no further claims related to work performed on this Contract on or before the date of Substantial Performance except as noted below.

I further certify that (company name) will expeditiously complete any and all outstanding work and to discharge all unfulfilled obligations under the Contract.

Outstanding issues previously submitted in accordance with GC 3.13.03:

1.

2.

3.

_____ _____
Signature Date

_____ _____
Name Position

Completion Release of Claims Letter

Before the release of the Completion Payment Certificate or Invoice, the Contractor must provide a Completion Release Letter to the Contract Administrator using the following wording and format:

(Contractor's letterhead)

Date:_____

To: The Corporation of the Town of Cobourg
55 King Street West
Cobourg, ON K9A 2M2

RE: Albert Street Reconstruction, Contract No. CO-21-01 PWD, Town of Cobourg, Completion Release of Claims

In the matter of Contract CO-21-01 PWD, being a contract between (Contractor's name) and the Town of Cobourg, I (first & last name), being the (position) of the above named company, hereby certify that (company name) agrees that the amount of $xxxx.xx (including HST) as shown on your proposed Completion Payment Certificate No. #, represents the total final value of work completed under this Contract, subject to the resolution of the following outstanding claims:

Outstanding issues previously submitted in accordance with GC 3.13.03:

1.

2.

3.

_____ _____
Signature Date

_____ _____
Name Position

Final Release of Claims Letter

Before the release of the Final Payment Certificate or Invoice, the Contractor must provide a Final Release Letter to the Contract Administrator using the following wording and format with no alterations, qualifications or limitations:

(Contractor's letterhead)

Date:_____

To: The Corporation of the Town of Cobourg
55 King Street West
Cobourg, ON K9A 2M2

RE: Albert Street Reconstruction, Contract No. CO-21-01 PWD
Town of Cobourg, Final Release of Claims

In the matter of Contract CO-21-01 PWD, being a contract between (Contractor's name) and the Town of Cobourg, I (first & last name), being the (position) of the above named company, hereby certify that (company name) agrees that the amount of $xxxx.xx (including HST) represents the total final value of work completed under this Contract and that (Contractor's name) has no further claims related to this Contract.

Signature	Date
Name	Position

Corporation of the Town of Cobourg

Albert Street Reconstruction

Contract No. CO-21-01 PWD

Standard Drawings

Corporation of the Town of Cobourg

Albert Street Reconstruction

Contract No. 21-01 PWD

Index To Standard Drawings

Standard	**Description**
OPSD-	
216.010	Boulevard Treatments, Urban Section
216.020	Asphalt, Concrete and Composite Pavement on Granular Base, Urban Section
216.021	Subdrain Pipe, Connection and Outlet, Urban
220.010	Barrier for Tree Protection
310.010	Concrete Sidewalk
310.020	Concrete Sidewalk, Adjacent to Curb and Gutter
310.031	Concrete Sidewalk Ramps at Signalized Intersections with Intersecting Crosswalks
310.039	Concrete Sidewalk Ramps Tactile Walking Surface Indicators Component
310.040	Utility Isolation in Concrete Sidewalks
310.050	Concrete Sidewalk, Driveway Entrance Details
351.010	Urban Residential Entrance
401.010	Cast Iron, Square Frame with Circular Closed or Open Cover for Maintenance Holes
401.081	Cast Iron, Square Frame Fish Type Cover
405.010	Maintenance Hole Steps, Hollow
561.010	Interlocking Concrete Pavers on Granular Base
561.020	Interlocking Concrete Pavers on Concrete and Asphalt Base
600.040	Concrete Barrier Curb with Standard Gutter
600.110	Concrete Barrier Curb
610.010	Catchbasin Frame with Grate Installation at Curb with Gutter
701.010	Precast Concrete Maintenance Hole – 1200 mm
701.011	Precast Concrete Maintenance Hole – 1500 mm
701.021	Maintenance Hole Benching and Pipe Opening Alternatives
703.021	Precast Concrete Twin Inlet Flat Cap – 1500 mm
704.010	Precast Concrete Adjustment Units for Maintenance Holes, Catchbasins and Valve Chambers
705.010	Precast Concrete Catch Basin – 600 x 600 mm
705.020	Precast Concrete Twin Inlet Catchbasin – 600 x 1450 mm
802.010	Flexible Pipe Embedment and Backfill, Earth Excavation
802.013	Flexible Pipe Embedment and Backfill, Rock Excavation
802.030	Rigid Pipe Bedding, Cover and Backfill, Type 1 or 2 Soil – Earth Excavation

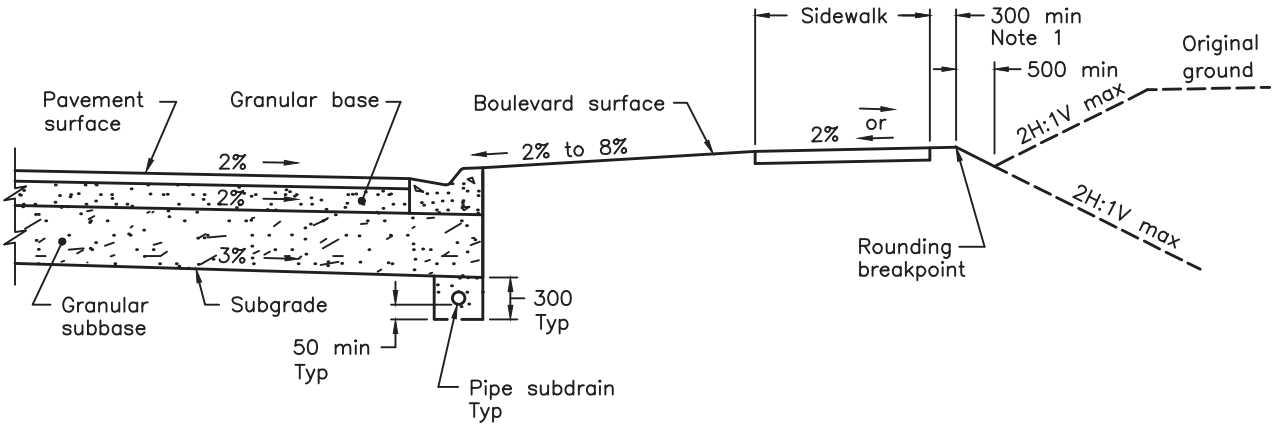
2540.010	Aerial Traffic Signal, installation
2547.010	Traffic Signal and Illumination Grounding System
2552.010	Traffic Signal System Equipment on Wooden or Concrete Poles, overhead Wiring Installation

S-

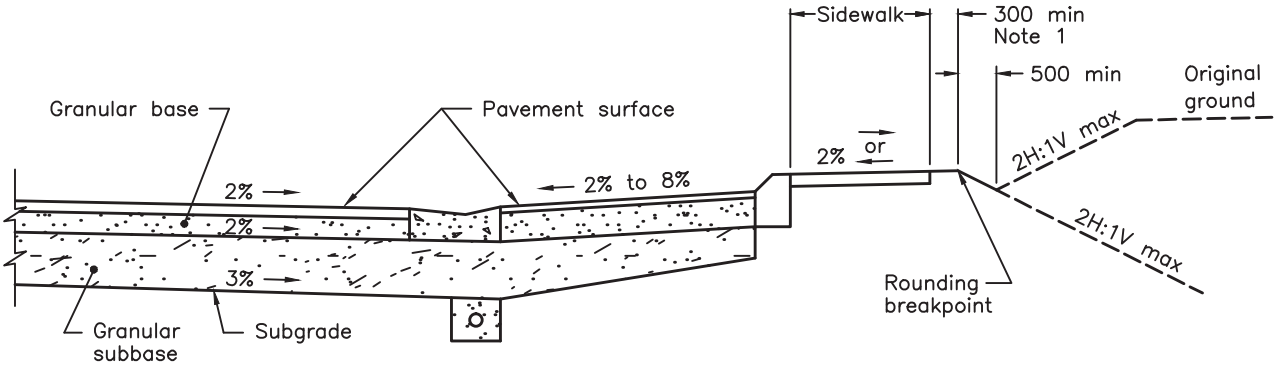
100.010	Sanitary Sewer House Connections and Saddles
100.020	Sanitary Sewer Riser Connections
100.030	Valve Box for PVC Sanitary Sewer Cleanouts
100.050	Method of Insulating Sanitary Sewers and Watermains
101.020	Maintenance Hole and Catch Basin Setback for Curb and Gutter
200.030	Supports for Watermain, Sewers, Piping and Conduits Crossing Trenches
200.050	Joint Restraining Length for PVC Pipe (In Combination with Granular Thrust Block)
200.060	Thrust Block for PVC Watermains for Hydrant Runouts, Tees and Dead Ends
201.030	Cathodic Protection/Bonding Cable/Tracer Wire for PVC and CPP Watermain Systems
210.010	Hydrant Set with Mechanically Restrained Joints
210.040	19mm Test Point By-Pass Less Than 400mm
210.060	50mm Blow Off
220.010	100mm To 400mm Gate Valve, Valve Box and Tracer Wire Arrangement for PVC or CPP Watermain
230.030	Water Service Box Cap
230.031	Water Service Box

*Contractors attention is called to the following website to review and agree to the Regional Municipality of Durham's Design and Construction Specifications for Regional Services disclaimer prior to referencing the Region Standard Drawings listed above.

http://www.durham.ca/dcspecs/Disclaimer.aspx



CUT AND FILL SECTION WITH BARRIER CURB



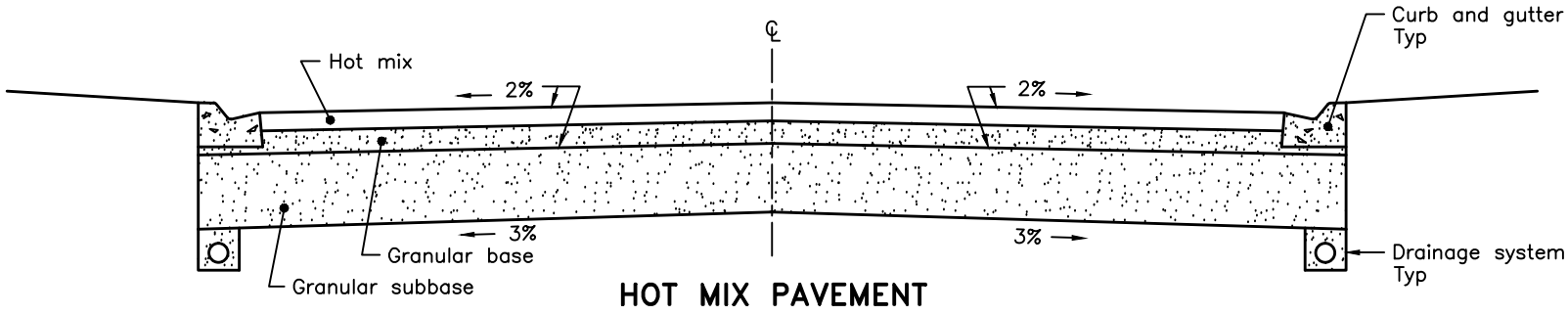
CUT AND FILL SECTION WITH MOUNTABLE CURB

NOTES:

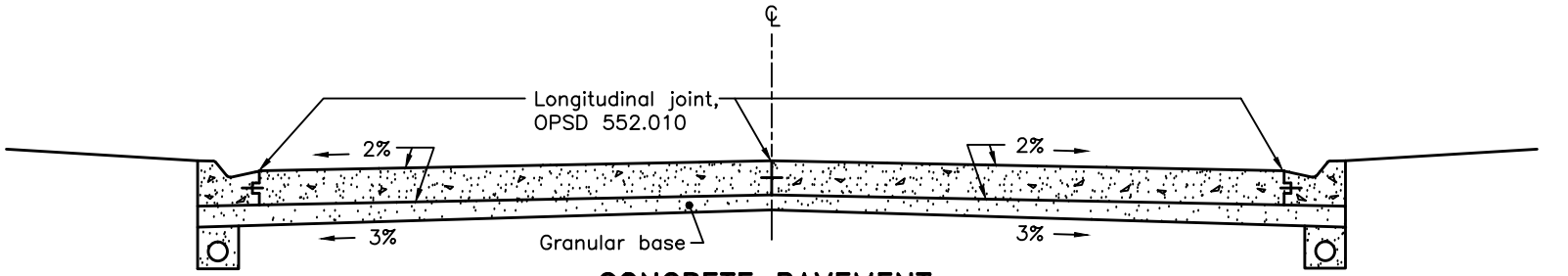
1 Where steel beam guide rail is indicated, the minimum rounding shall be 1.0m, with 0.5m required from edge of sidewalk to rounding breakpoint.

A All dimensions are in millimetres unless otherwise shown.

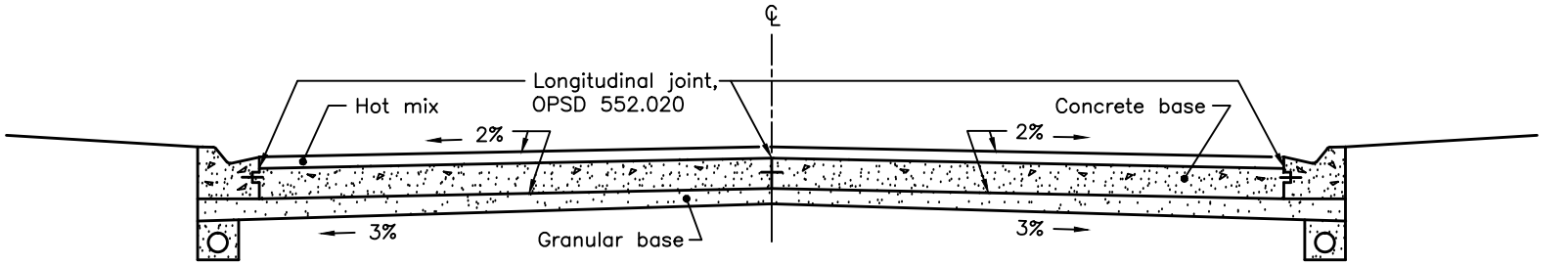
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2017	Rev	2
BOULEVARD TREATMENTS URBAN SECTION			
	OPSD 216.010		



HOT MIX PAVEMENT



CONCRETE PAVEMENT



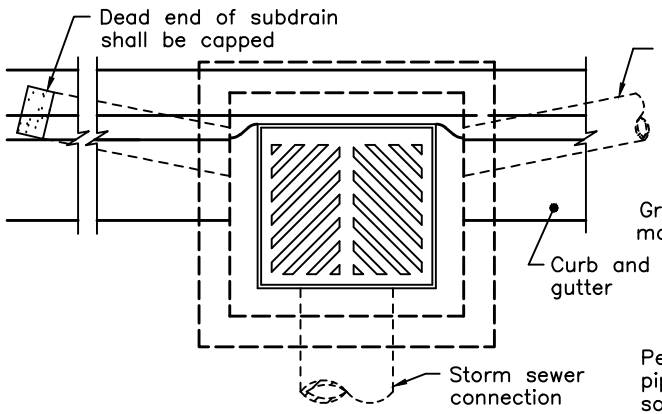
COMPOSITE PAVEMENT

NOTES:

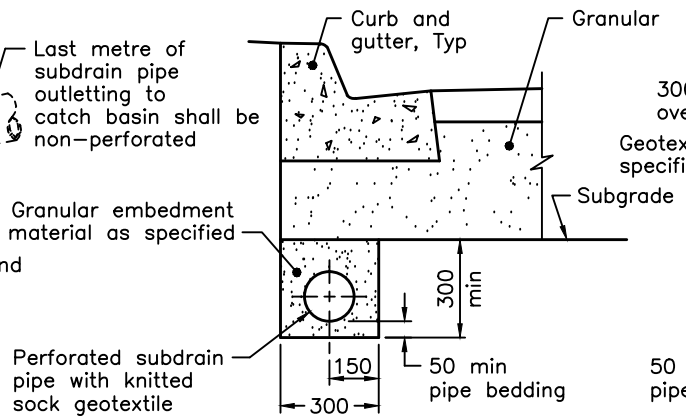
A Drainage system connection at every catch basin.

B Tie bars at all longitudinal joints.

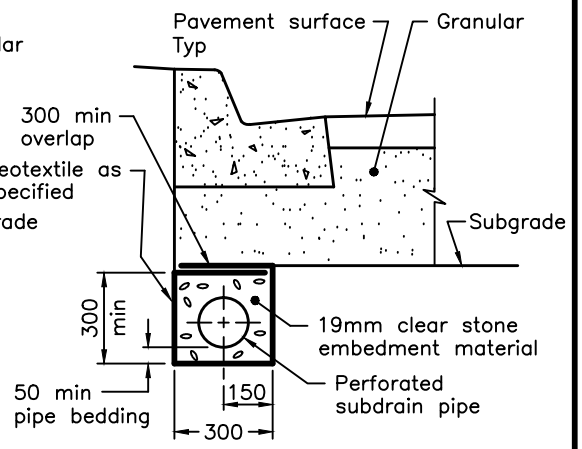
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2017	Rev	2
HOT MIX, CONCRETE, AND COMPOSITE PAVEMENT ON GRANULAR BASE URBAN SECTION			
	OPSD 216.020		



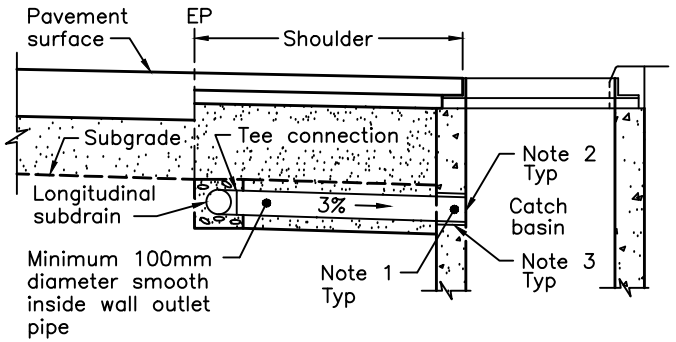
LONGITUDINAL SUBDRAIN CONNECTION TO CATCH BASIN



UNWRAPPED TRENCH



WRAPPED TRENCH



LATERAL SUBDRAIN OUTLET PIPE CONNECTION TO CATCH BASIN

NOTES:

1 Core hole diameter to allow outlet pipe into structure.

2 Install outlet pipe flush with inside face of catch basin.

3 Annular space around pipe shall be filled with non–shrink grout.

A Use compatible manufactured fittings for all connectors, couplings, and caps.

B Trench dimensions shown to accommodate 100 or 150mm diameter subdrain pipe.

C Longitudinal subdrain pipe shall be installed parallel to the grade of the gutter.

D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

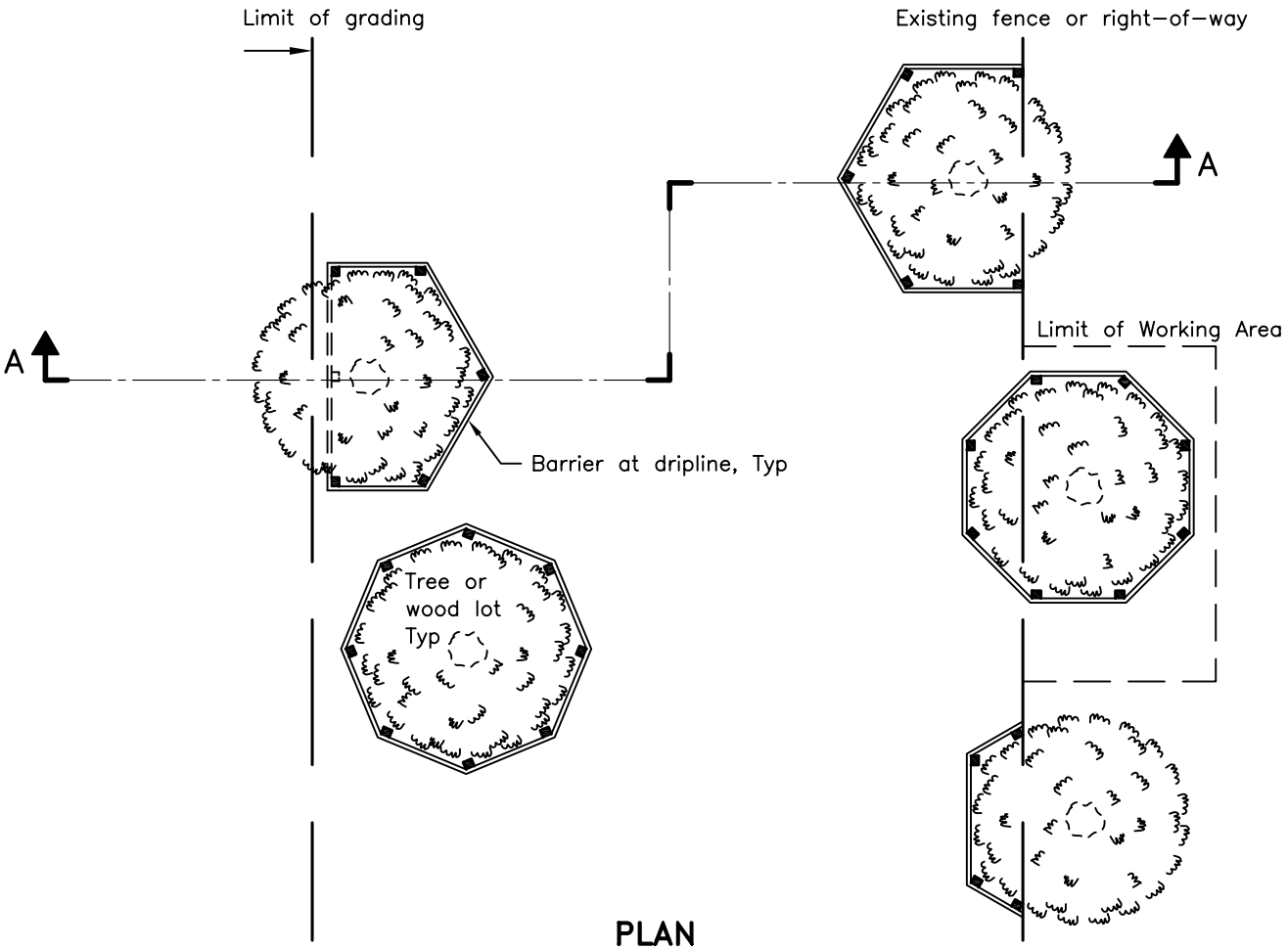
SUBDRAIN PIPE CONNECTION AND OUTLET

URBAN SECTION

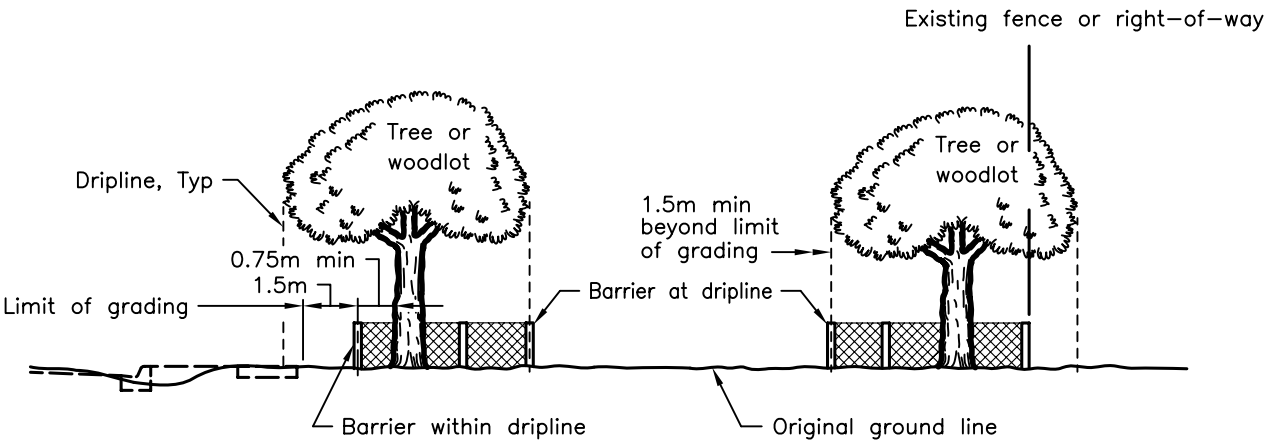
Nov 2017 | Rev 3

ONTARIO STANDARDS • MUNICIPAL – PROVINCIAL • O P S

OPSD 216.021

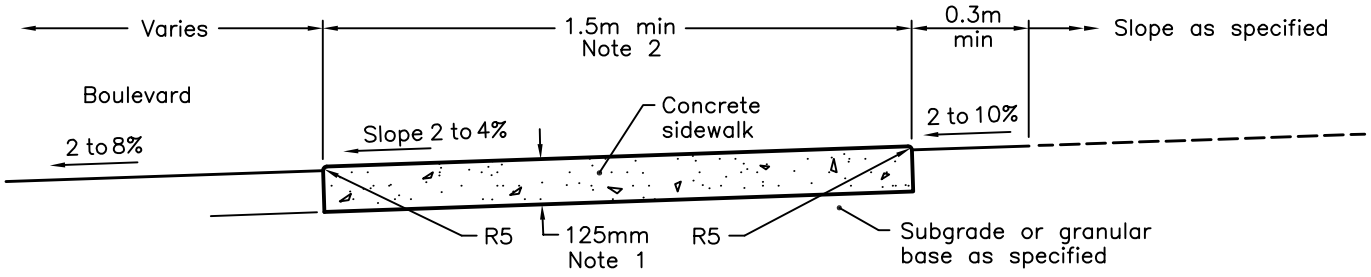


PLAN

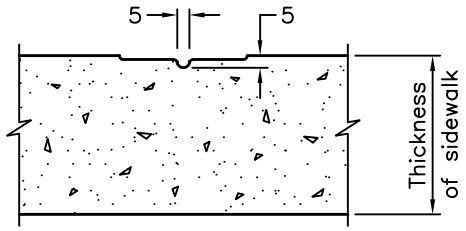


SECTION A–A

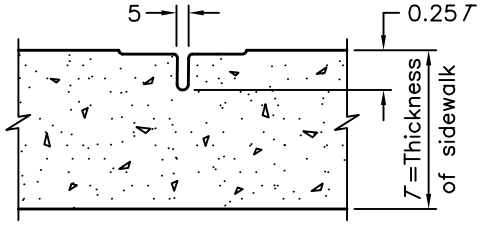
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2007	Rev	0
BARRIER FOR TREE PROTECTION			
	OPSD 220.010		



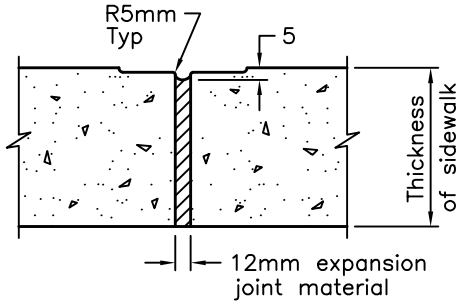
TYPICAL SECTION



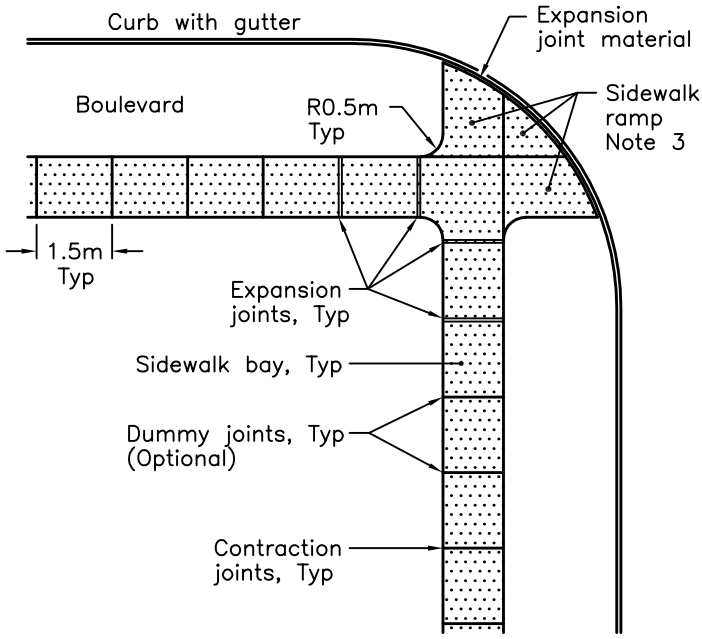
DUMMY JOINT (OPTIONAL)



CONTRACTION JOINT (Note 4)



EXPANSION JOINT



JOINT LAYOUT

NOTES:

1 Sidewalk thickness at residential driveways and adjacent to curb shall be 150mm. At commercial and industrial driveways, the thickness shall be 200mm.

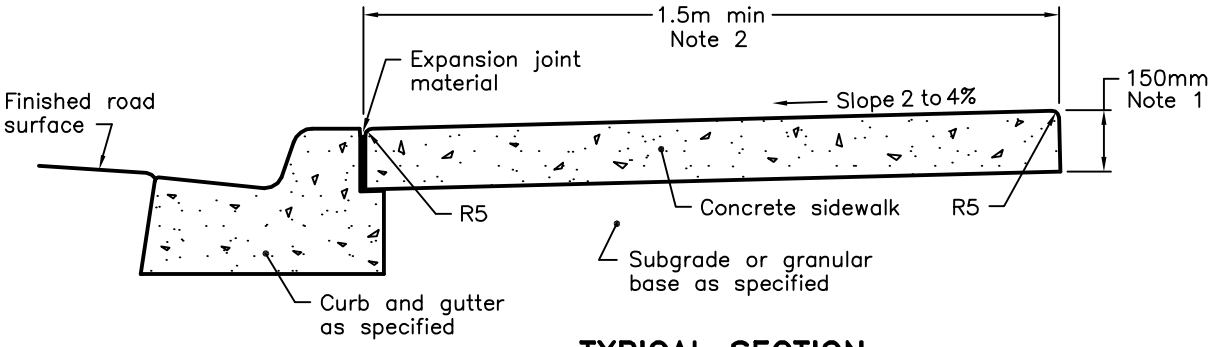
2 Sidewalk width shall be wider when specified.

3 This OPSD shall be read in conjunction with OPSD 310.030, 310.031, 310.033, and 310.039.

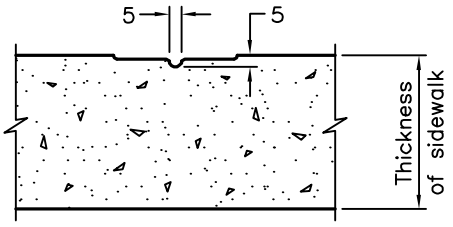
4 Contraction Joint may be tooled or sawcut.

A All dimensions are in millimetres unless otherwise shown.

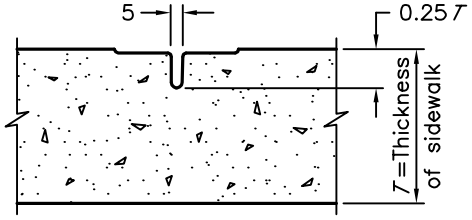
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2019	Rev	3
CONCRETE SIDEWALK			
		OPSD 310.010	



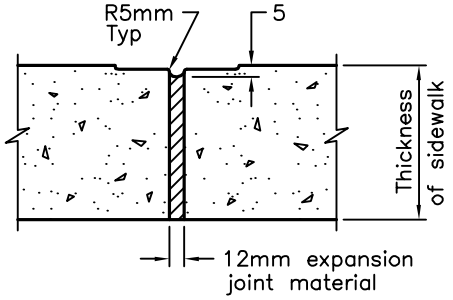
TYPICAL SECTION



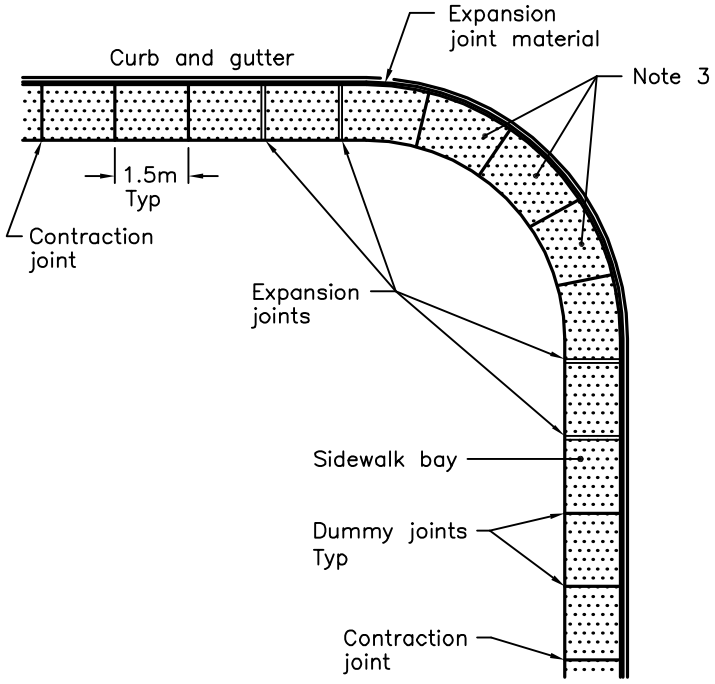
DUMMY JOINT



CONTRACTION JOINT



EXPANSION JOINT



JOINT LAYOUT

NOTES:

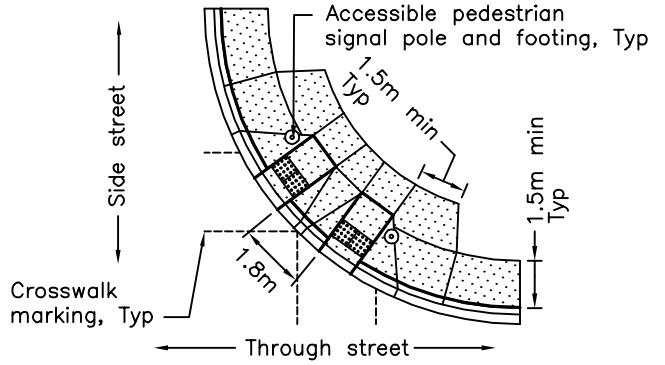
1 At commercial and industrial driveways, the thickness shall be 200mm.

2 Sidewalk width shall be wider when specified.

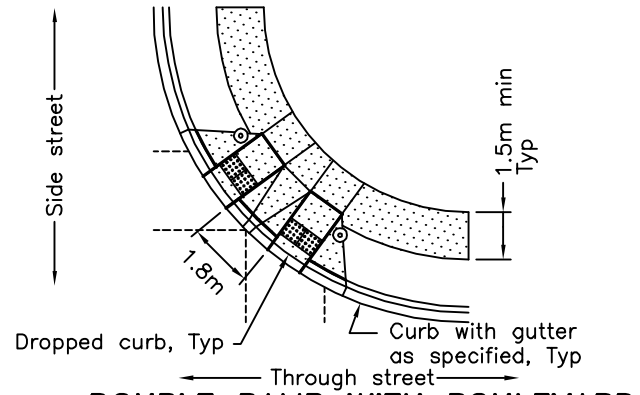
3 This OPSD shall be read in conjunction with OPSD 310.030, 310.031, 310.032, 310.033 and 310.039.

A All dimensions are in millimetres unless otherwise shown.

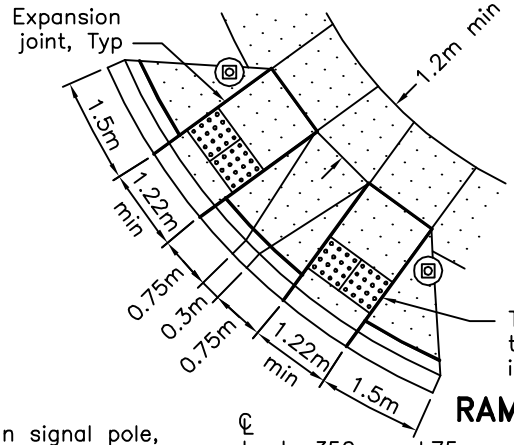
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev	2
CONCRETE SIDEWALK ADJACENT TO CURB AND GUTTER			
			OPSD 310.020



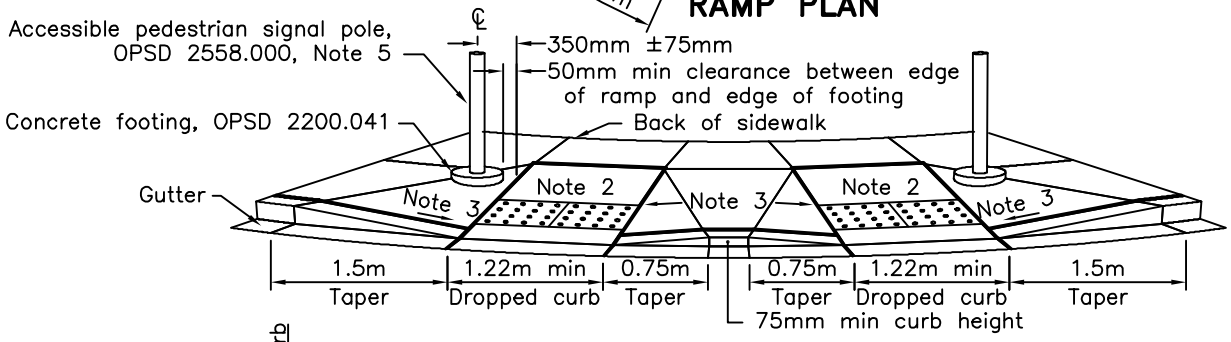
DOUBLE RAMP WITHOUT BOULEVARD



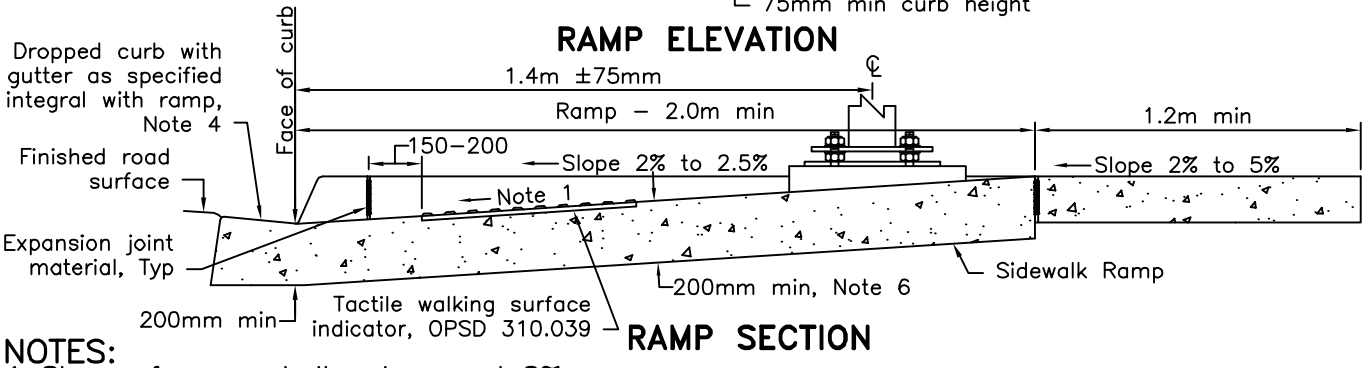
DOUBLE RAMP WITH BOULEVARD



RAMP PLAN



RAMP ELEVATION



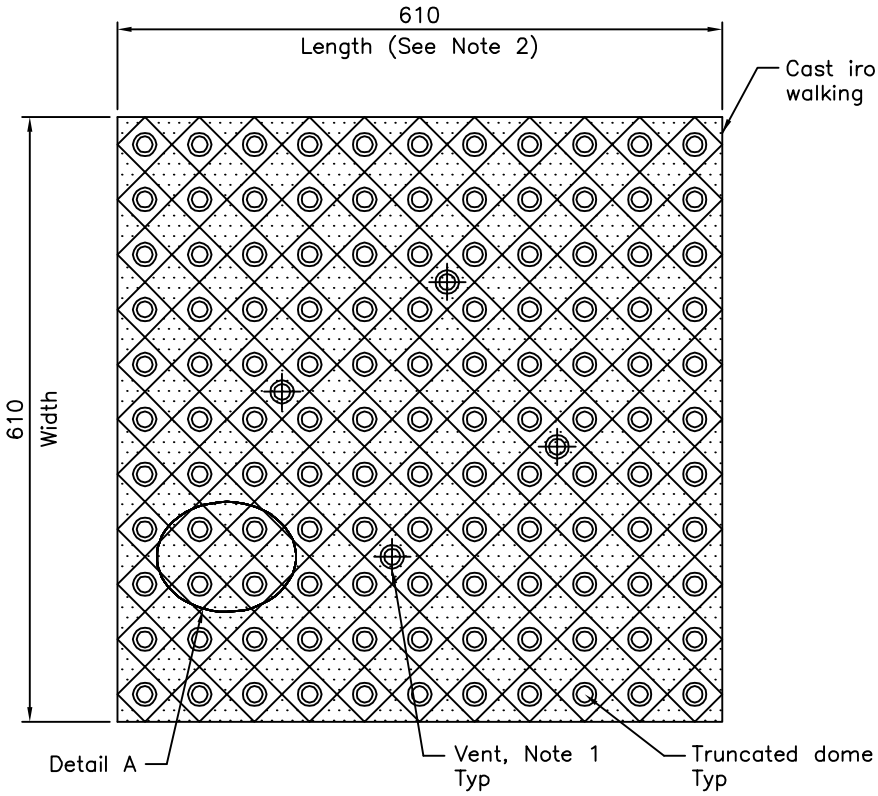
RAMP SECTION

NOTES:

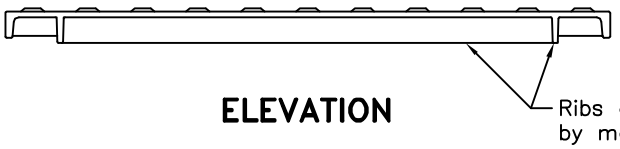
1 Slope of ramp shall not exceed 8%.
2 Cross slope of ramp shall not exceed 2% in either direction.
3 Cross slope of flared side of ramp shall not exceed 8%.
4 Dropped curb at ramp shall be modified to eliminate 30 mm step at gutter line.
5 Accessible pedestrian signal to have tactile arrow that aligns with direction of crosswalk.
6 Minimum thickness of ramp is 200mm. Minimum thickness of sidewalk and flared sides adjacent to ramp is 150mm.

A All dimensions are in millimetres unless otherwise shown.

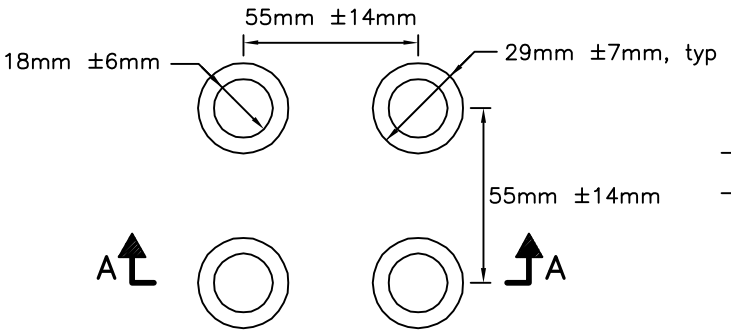
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev	0
# CONCRETE SIDEWALK RAMPS AT SIGNALIZED INTERSECTIONS WITH INTERSECTING CROSSWALKS			
	OPSD 310.031		



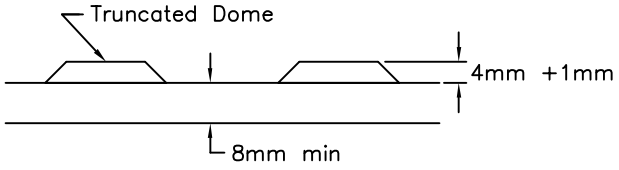
PLAN



ELEVATION



DETAIL A
TRUNCATED DOMES PLAN

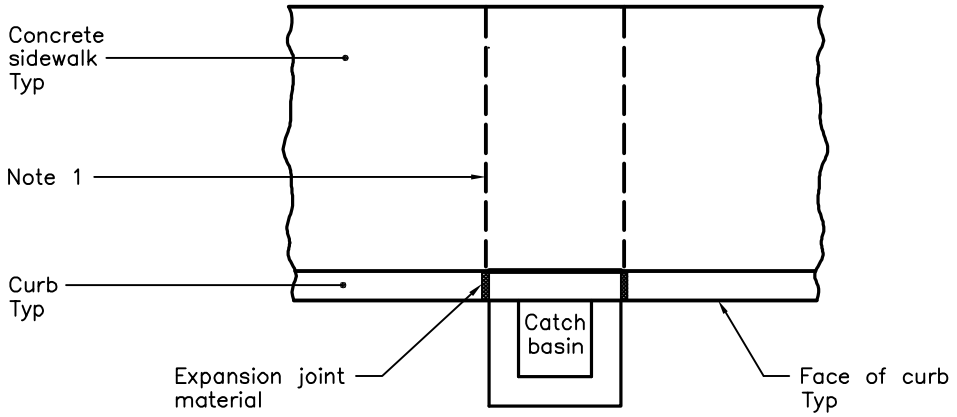


SECTION A–A

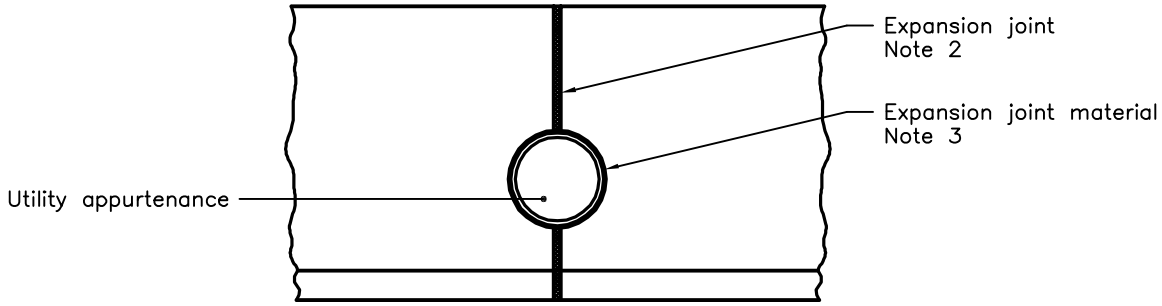
NOTES:

1 Vents shall be as specified by the manufacturer.
2 Length of plate may be increased to suit the curb depression width.
A Adjacent cast iron plates shall be permanently connected using a locking mechanism and any hardware shall be hot dipped galvanized.
B All dimensions are in millimetres unless otherwise shown.

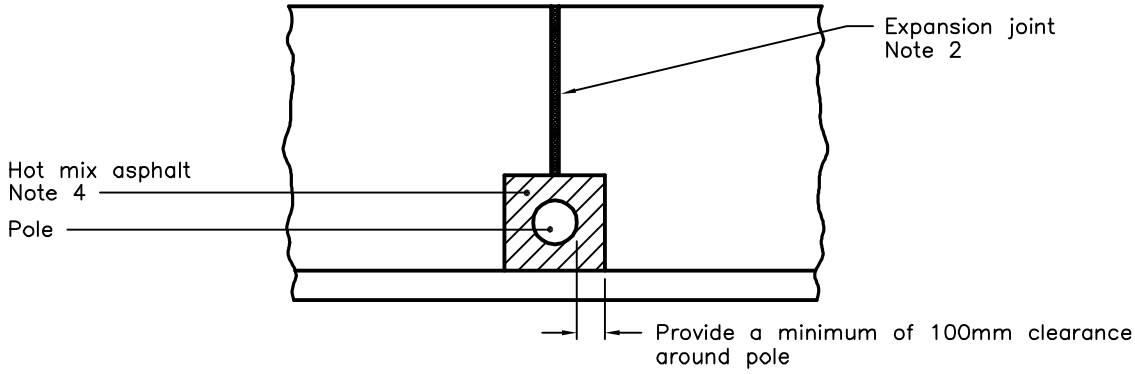
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev	0
CONCRETE SIDEWALK RAMPS TACTILE WALKING SURFACE INDICATORS COMPONENT			
	OPSD 310.039		



CATCH BASIN



UTILITY APPURTENANCE



UTILITY POLE

NOTES:

1 Expansion joint through sidewalk is required when curb and gutter is poured integral with sidewalk.

2 Adjust joints to coincide with centre of utility, with minimum slab length of 1m.

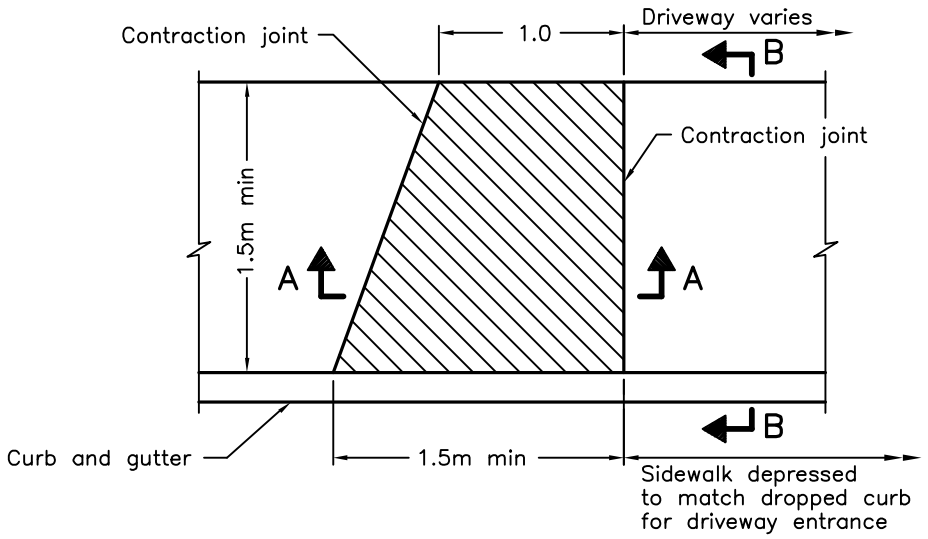
3 Expansion joint material shall be placed around Utility appurtenance flush with concrete surface.

4 For concrete alternative use expansion joint material around boxout.

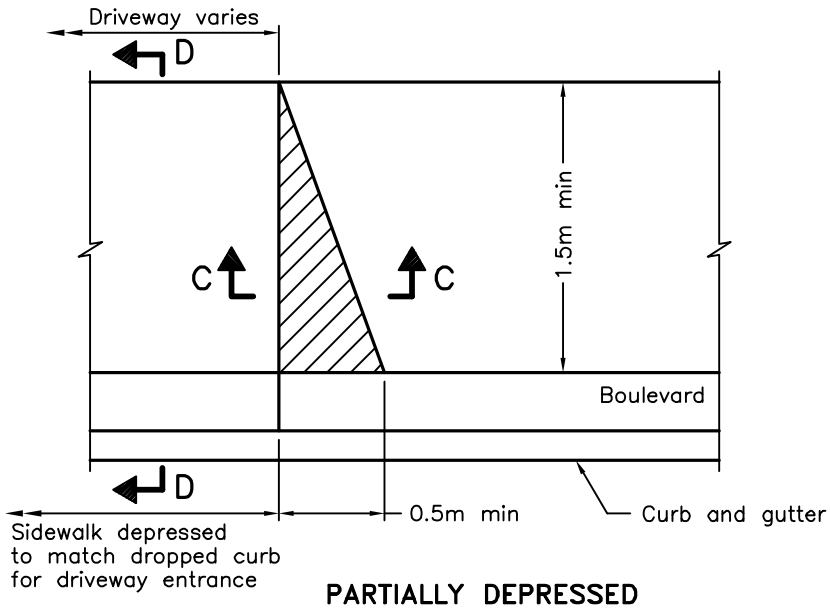
A For expansion joint detail, see OPSD 310.010.

B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev	2
UTILITY ISOLATION IN CONCRETE SIDEWALKS			
	OPSD 310.040		

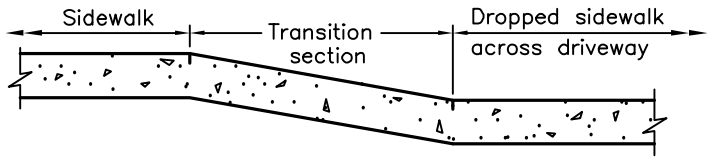


FULLY DEPRESSED

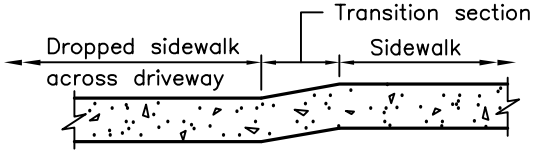


PARTIALLY DEPRESSED

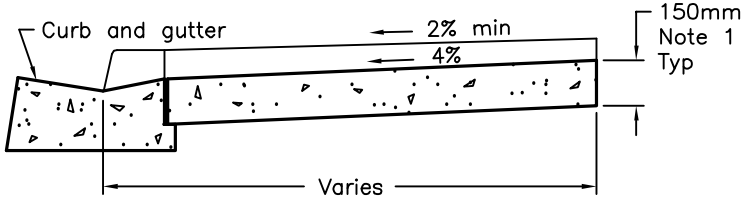
PLAN



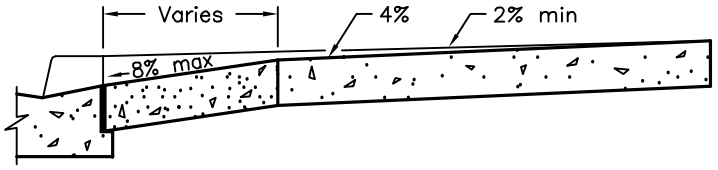
SIDEWALK WITHOUT BOULEVARD
SECTION A–A



SIDEWALK WITH BOULEVARD
SECTION C–C



SECTION B–B



SECTION D–D

NOTES:

1 At commercial and industrial driveways, the thickness shall be 200mm.

A For contraction joint detail, see OPSD 310.010.

B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

CONCRETE SIDEWALK DRIVEWAY ENTRANCE DETAILS

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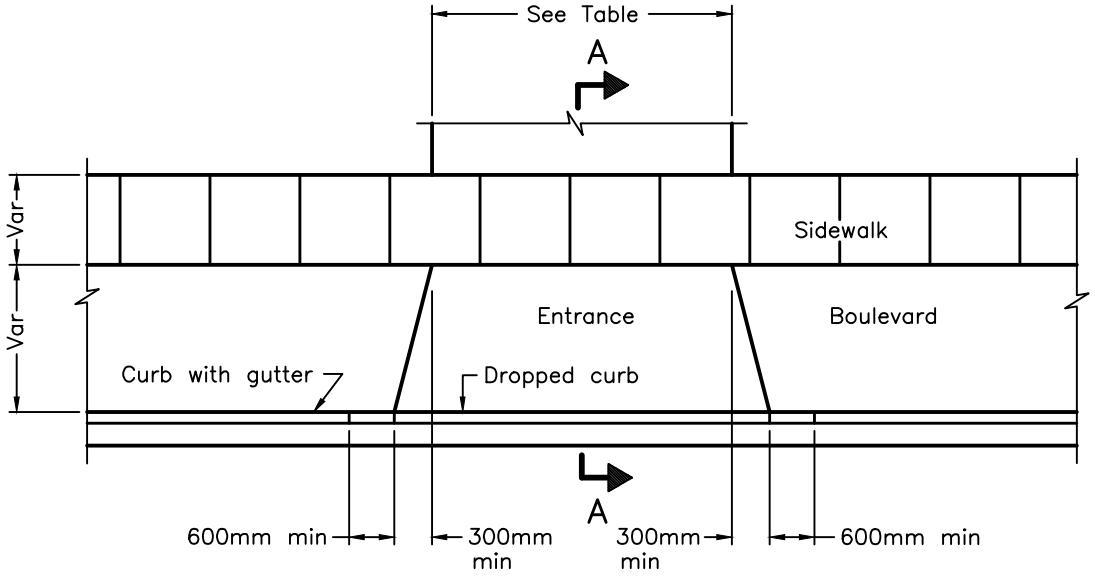
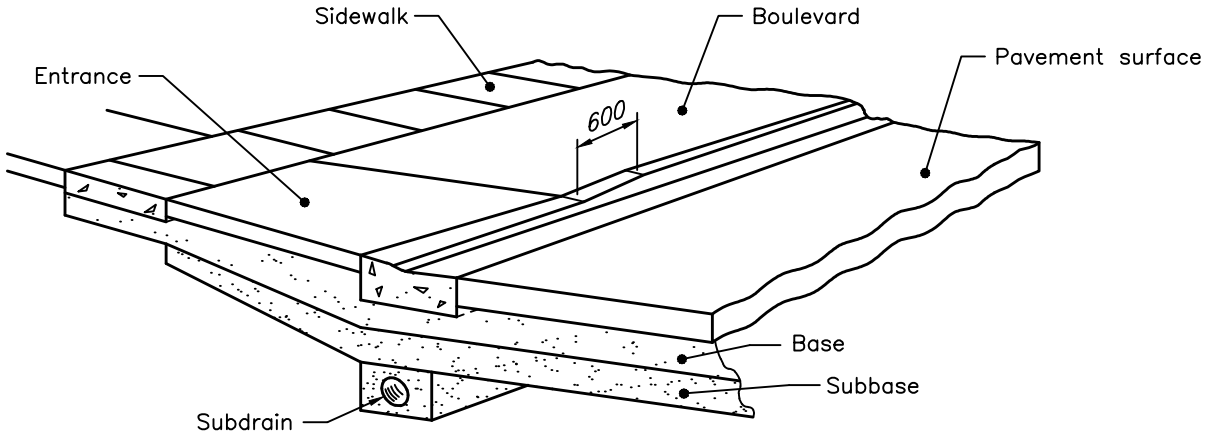
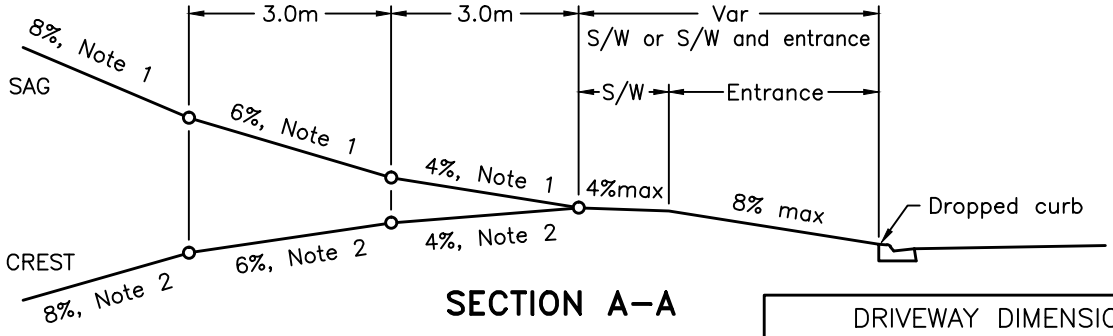
OPSD 310.050



PLAN



ISOMETRIC VIEW



SECTION A–A

DRIVEWAY DIMENSIONS				
LAND USE	WIDTH m			
	Single		Double	
	min	max	min	max
Residential	3.0	4.3	6.0	7.3

NOTES:

1 Maximum upgrade shall be 10%.

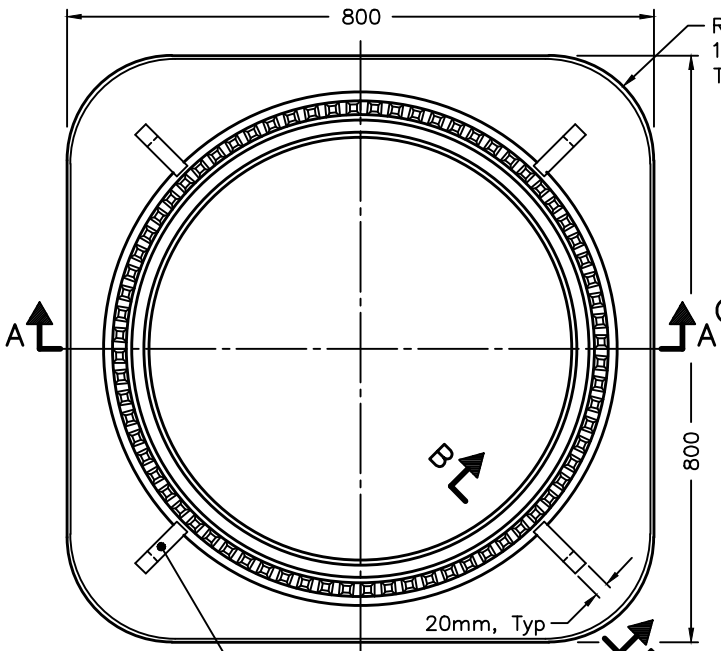
2 Maximum downgrade shall be 8%.

A All dimensions are in millimetres unless otherwise shown.

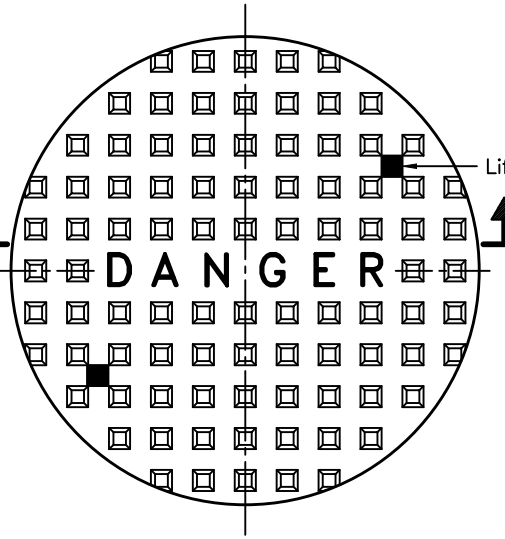
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev	2

URBAN RESIDENTIAL ENTRANCE

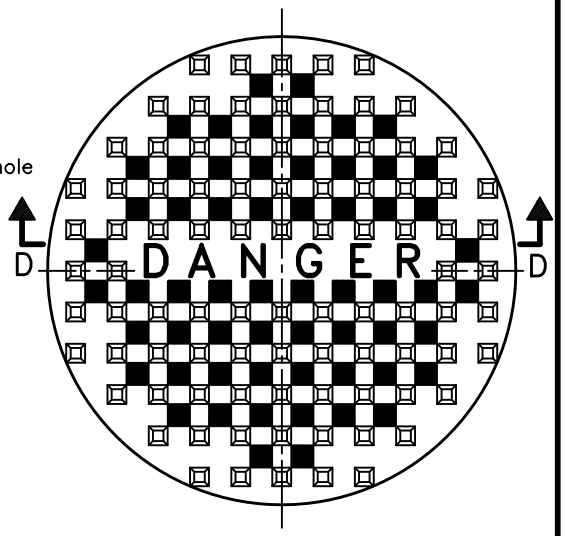
OPSD 351.010



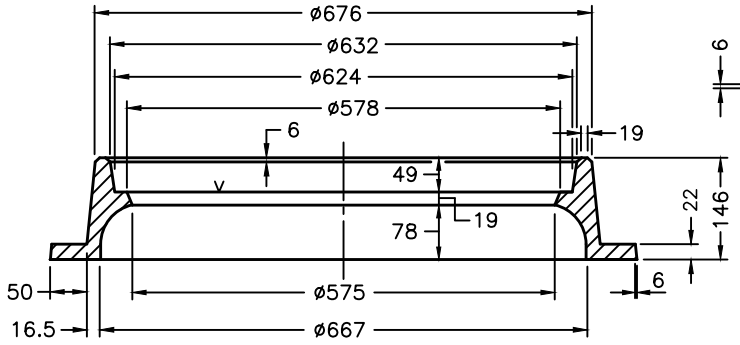
FRAME PLAN



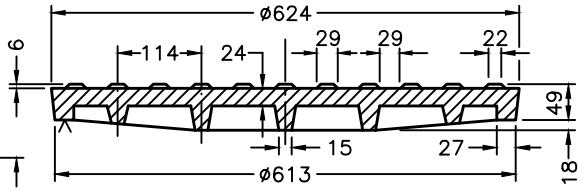
TYPE A
CLOSED COVER



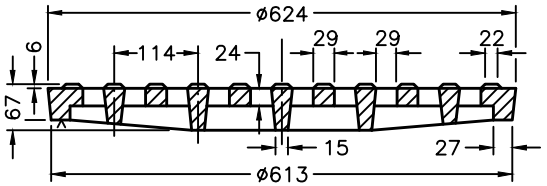
TYPE B
OPEN COVER



SECTION A–A



SECTION C–C

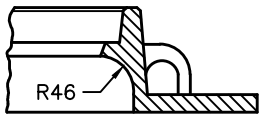


SECTION D–D

NOTES:

A Covers shall be Type A or Type B, as specified.

B All dimensions are in millimetres unless otherwise shown.



SECTION B–B

ONTARIO PROVINCIAL STANDARD DRAWING

CAST IRON, SQUARE FRAME WITH CIRCULAR CLOSED OR OPEN COVER FOR MAINTENANCE HOLES

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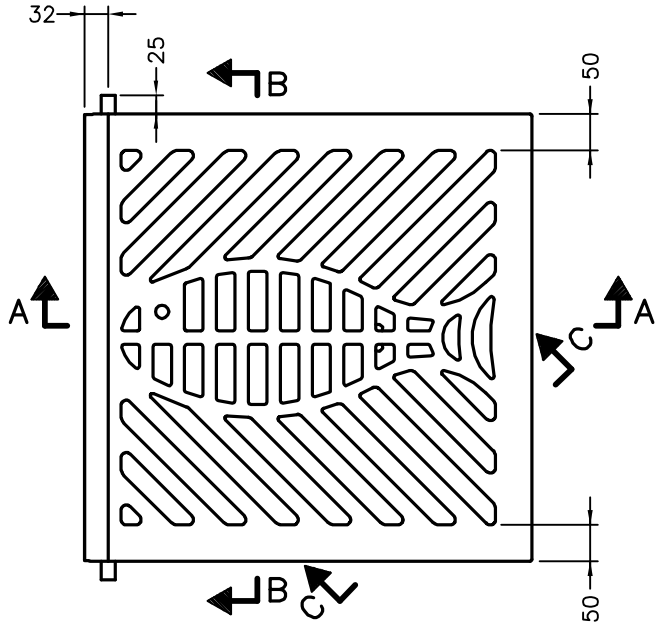
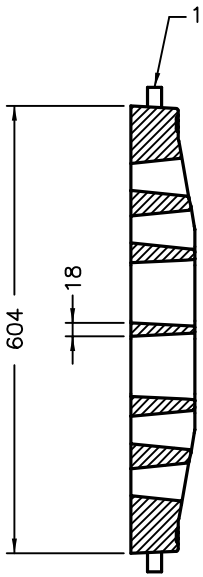
ONTARIO STANDARDS • MUNICIPAL – PROVINCIAL •

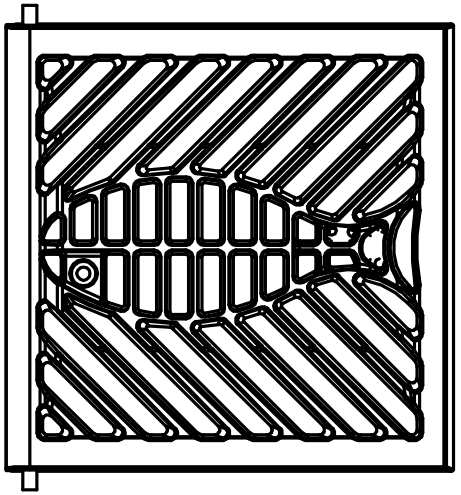
OPSD 401.010



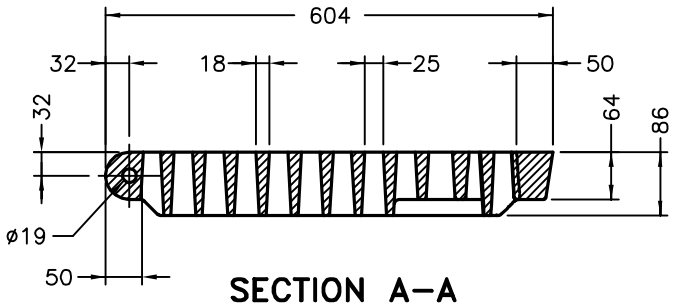
PLAN



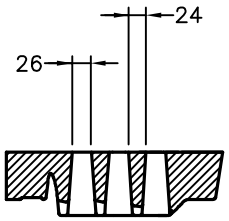
SECTION B–B



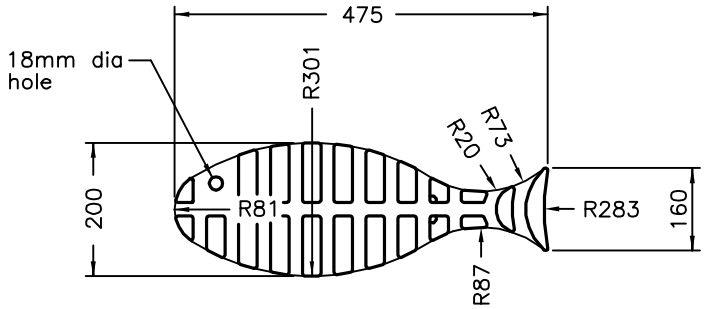
BOTTOM VIEW



SECTION A–A



SECTION C–C



FISH DETAIL

NOTE:

A This OPSD shall be read in conjunction with OPSD 400.020.

B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

CAST IRON, SQUARE FRAME FISH TYPE COVER

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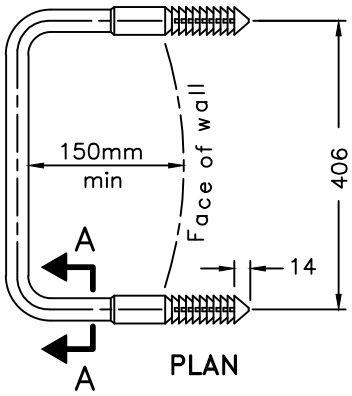
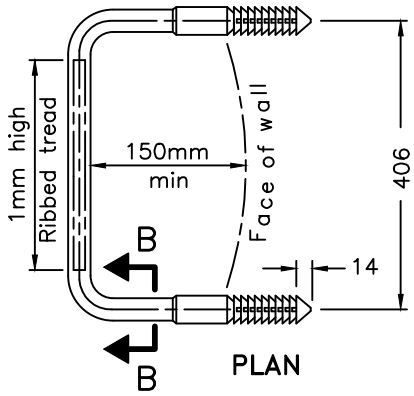
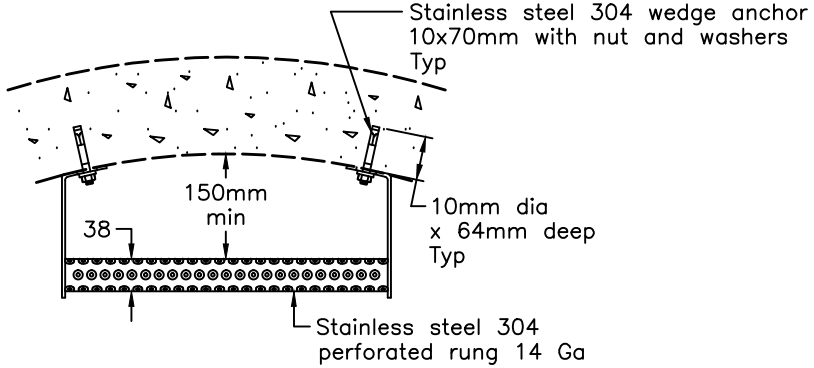
OPSD 401.081



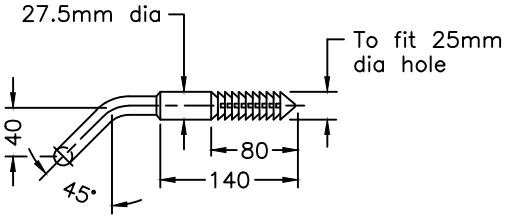
PLAN



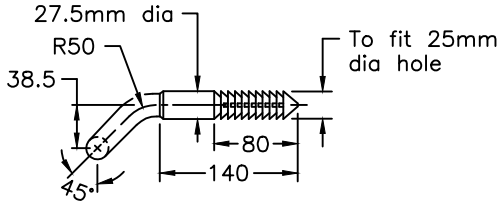
PLAN



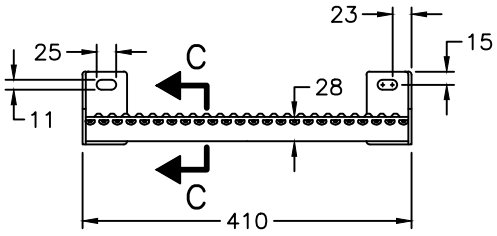
PLAN



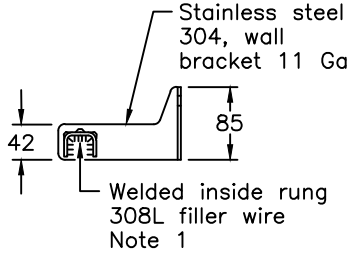
SIDE VIEW



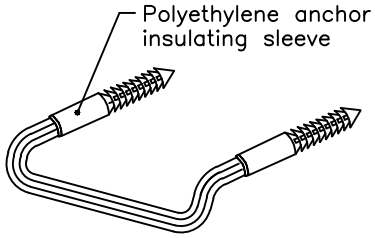
SIDE VIEW



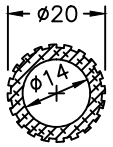
FRONT VIEW



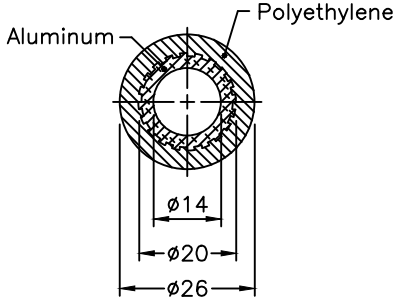
SECTION C–C



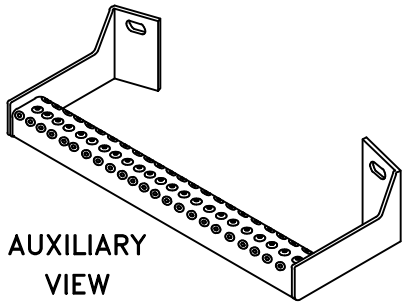
AUXILIARY
VIEW



EXTRUDED
CIRCULAR SECTION A–A



SECTION B–B



AUXILIARY
VIEW

CIRCULAR ALUMINUM

CIRCULAR ALUMINUM WITH POLYETHYLENE ENCASEMENT

RECTANGULAR STAINLESS STEEL

NOTE:

1 The company undertaking welded fabrication shall be certified according to CSA W47.1. All welding shall be according to CSA W59.

A All aluminum components shall be 6000 series structural aluminum.

B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

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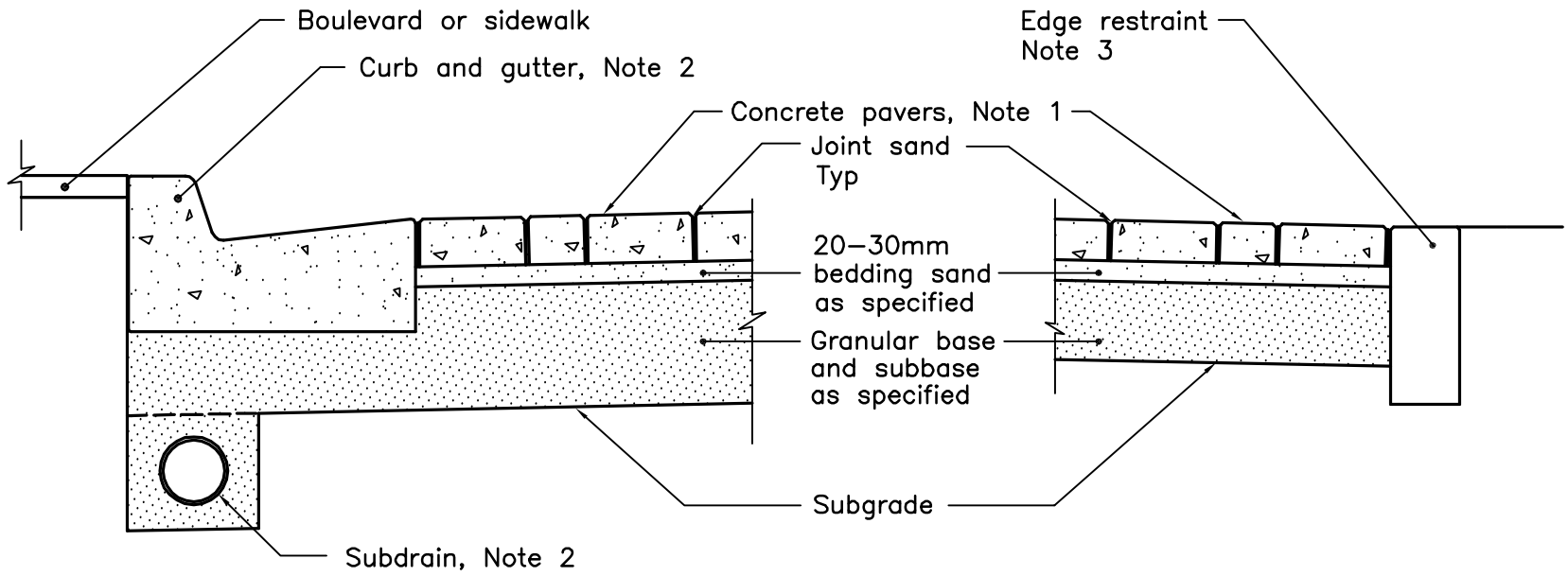
MAINTENANCE HOLE STEPS

HOLLOW

OPSD 405.010



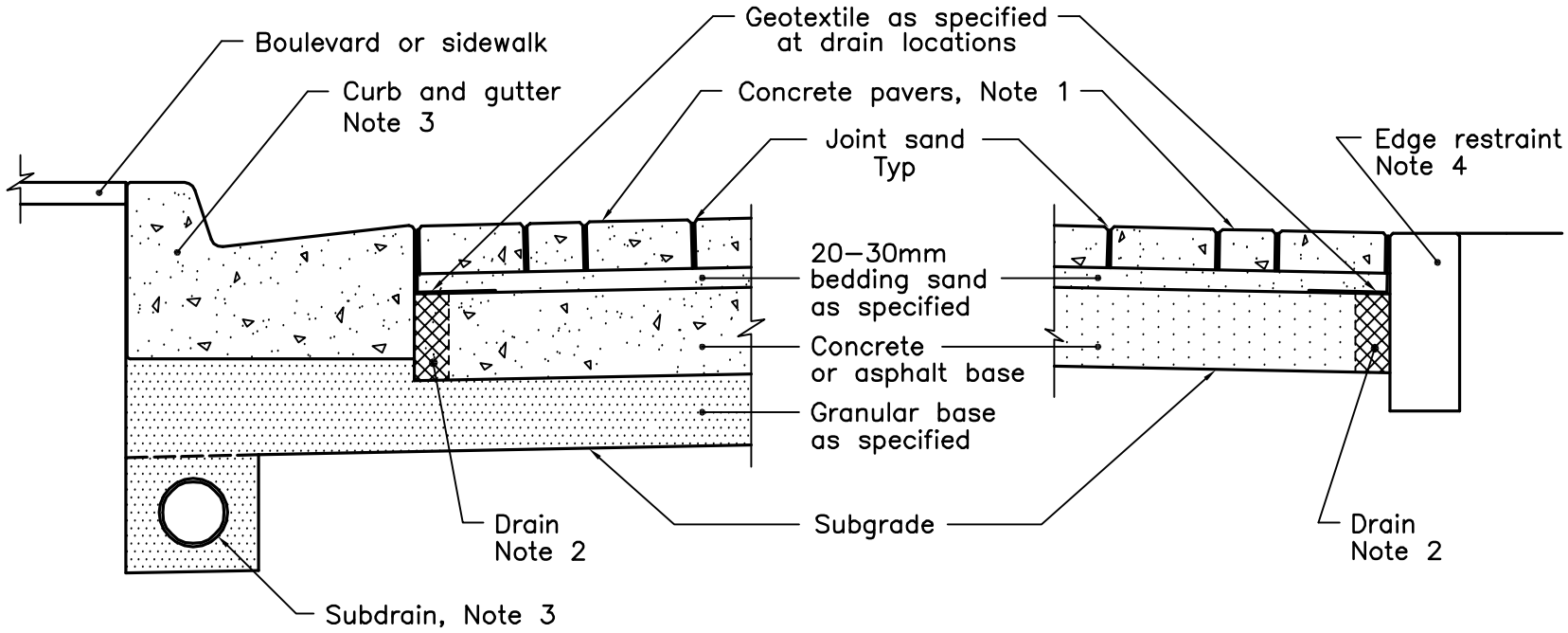
VEHICULAR **NON–VEHICULAR**

NOTES:

1 Concrete paver thickness:
  – for vehicular traffic – 80mm minimum.
  – for non–vehicular traffic – 60mm minimum.
2 This OPSD shall be read in conjunction with OPSD 200 and 600 series drawings.
3 Edge restraint according to manufacturer's requirements.

A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2016	Rev	2
INTERLOCKING CONCRETE PAVERS ON GRANULAR BASE			
	OPSD 561.010		



NOTES:

1 Concrete paver thickness:
  – for vehicular traffic – 80mm minimum.
  – for non–vehicular traffic – 60mm minimum.

2 Drains shall be installed at low points and selected intervals through concrete or asphalt base to suit subgrade conditions.

3 This OPSD shall be read in conjunction with OPSD 200 and 600 Series drawings.

4 Edge restraint according to manufacturer's requirements.

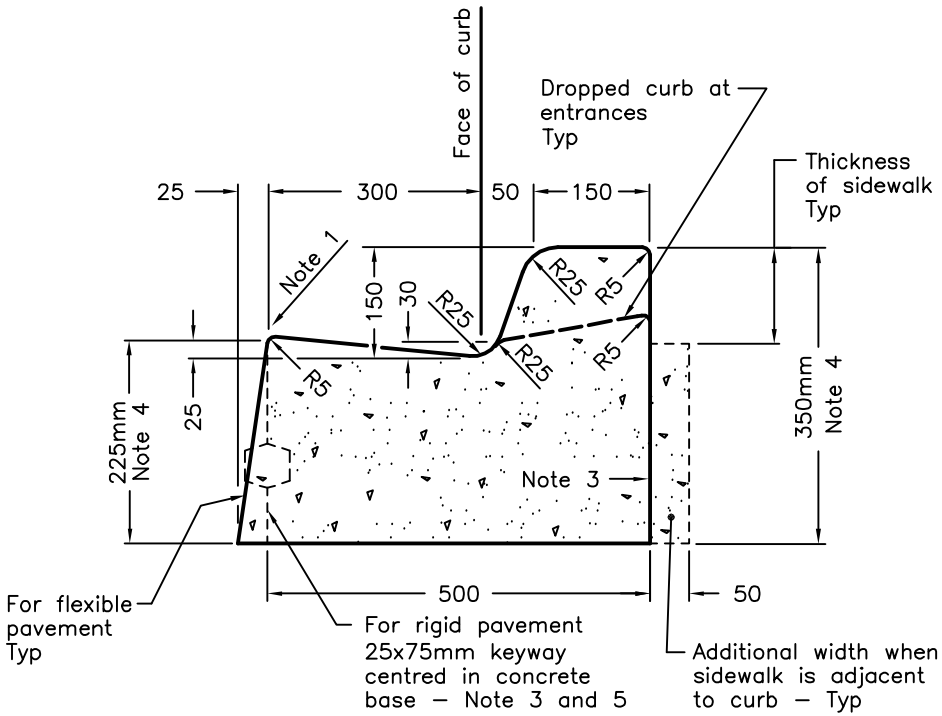
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

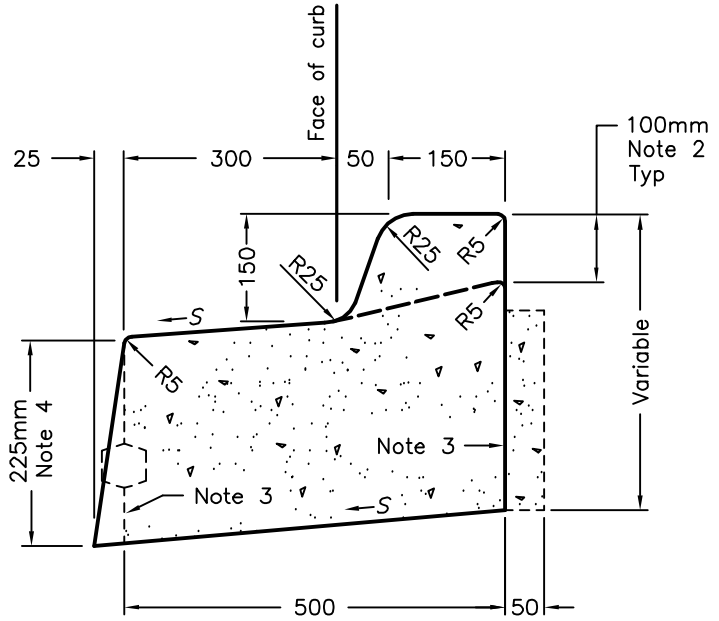
INTERLOCKING CONCRETE PAVERS ON CONCRETE OR ASPHALT BASE

Nov 2016 | Rev 2

OPSD 561.020



TANGENT



SUPERELEVATED

LEGEND:

S – Rate of pavement superelevation in percent, %.

NOTES:

1 Flexible and composite pavement shall be placed 5mm above the adjacent edge of gutter.
2 When sidewalk is continuously adjacent, the dropped curb at entrances shall be reduced to 75mm.
3 For slipforming procedure a 5% batter is acceptable.
4 For composite pavement the depth of concrete curb shall be adjusted to depth of concrete pavement.
5 When tie bars are specified, refer to OPSD 552.010 and 552.020 for details.

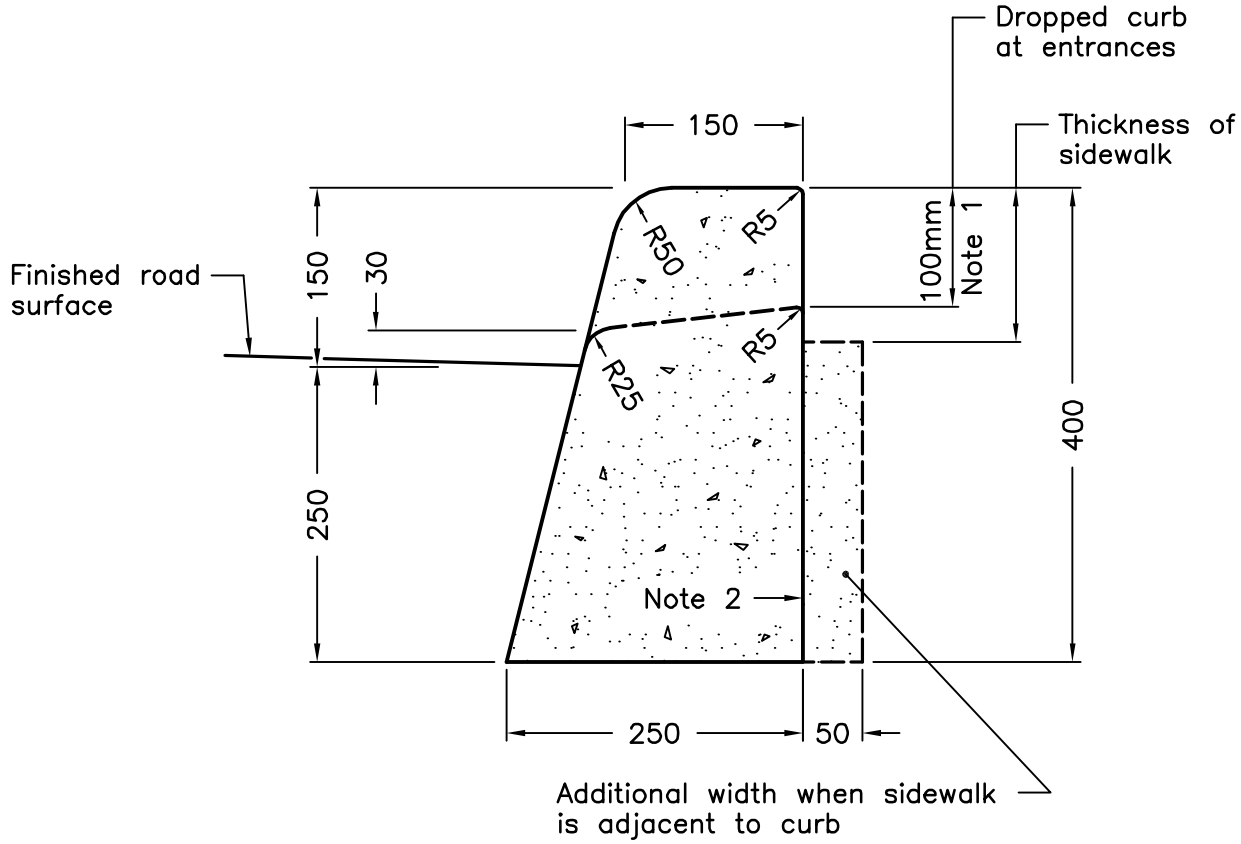
A Treatment at entrances shall be according to OPSD 351.010.
B Outlet treatment shall be according to the OPSD 610 Series.
C The transition from one curb type to another shall be a minimum length of 3.0m, except in conjunction with guide rail where it shall be according to the OPSD 900 Series.
D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

CONCRETE BARRIER CURB WITH STANDARD GUTTER

Nov 2012 | Rev 2

OPSD 600.040



NOTES:

1 When sidewalk is continuously adjacent, the dropped curb at entrances shall be reduced to 75mm.

2 For slipforming procedure a 5% batter is acceptable.

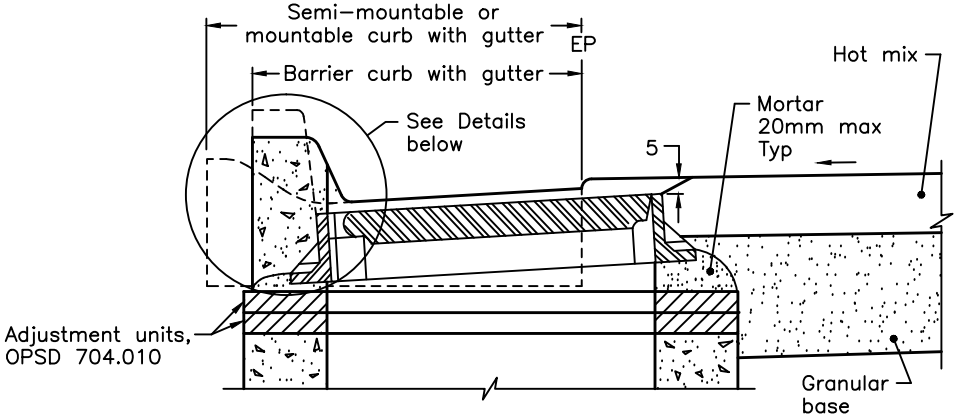
A Treatment at entrances shall be according to OPSD 351.010.

B Outlet treatment shall be according to the OPSD 610 Series.

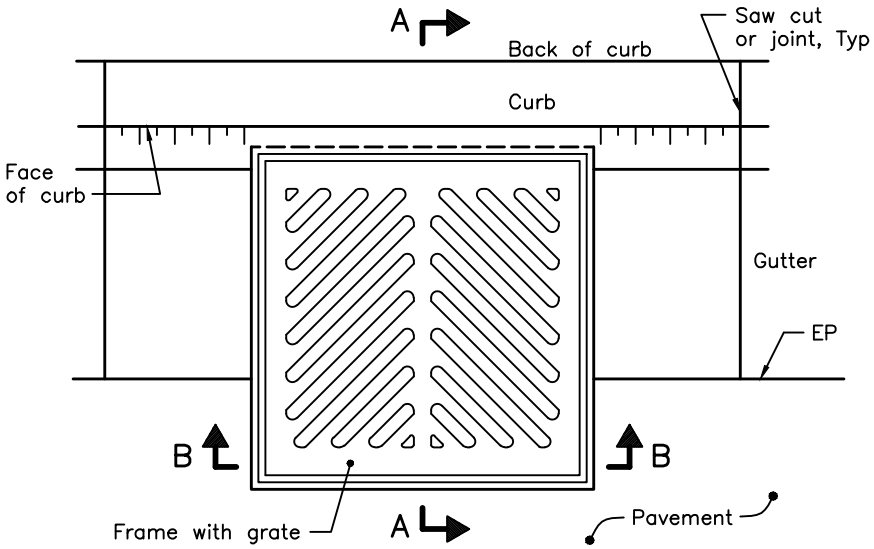
C The transition from one curb type to another shall be a minimum length of 3.0m, except in conjunction with guide rail where it shall be according to the OPSD 900 Series.

D All dimensions are in millimetres unless otherwise shown.

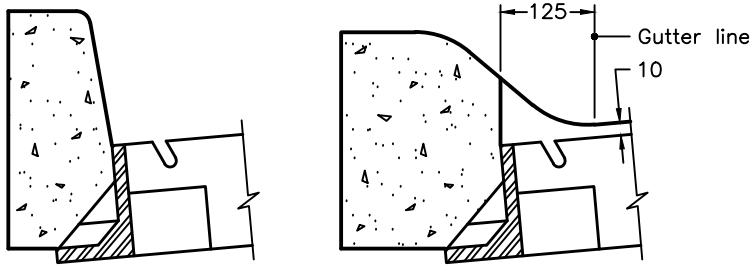
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2012	Rev	2
CONCRETE BARRIER CURB			
	OPSD 600.110		



SECTION A–A



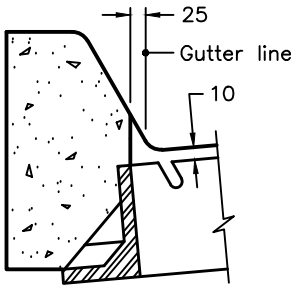
PLAN



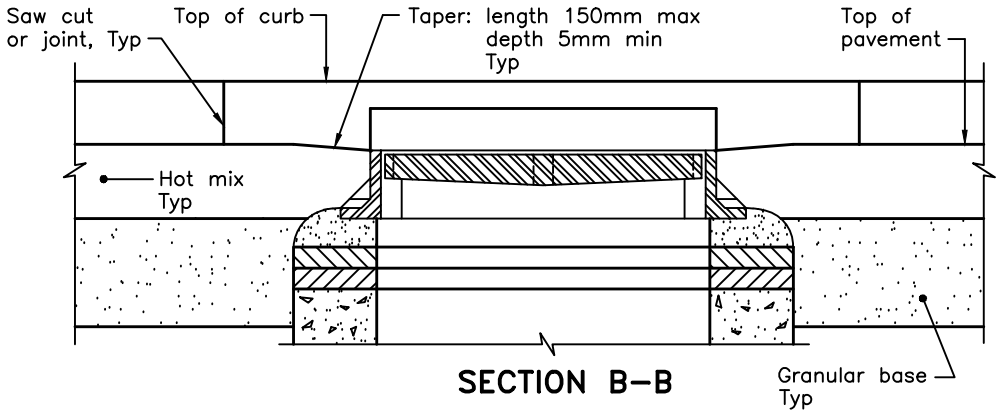
BARRIER CURB

SEMI–MOUNTABLE or MOUNTABLE
CURB WITH GUTTER

DETAILS



BARRIER
CURB WITH GUTTER

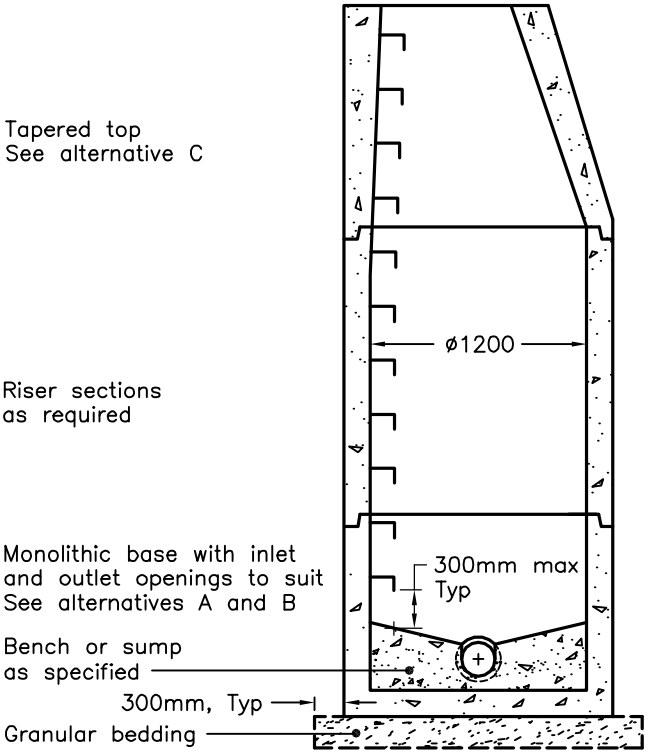


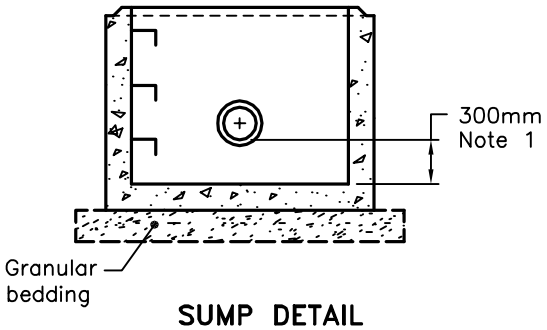
SECTION B–B

NOTE:

A All dimensions are in millimetres unless otherwise shown.

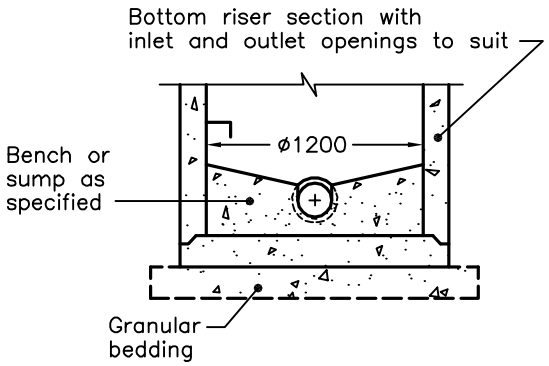
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev	2
CATCH BASIN FRAME WITH GRATE INSTALLATION AT CURB WITH GUTTER			
			OPSD 610.010



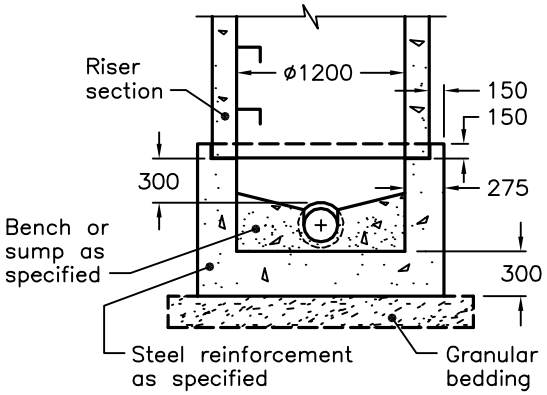


SUMP DETAIL

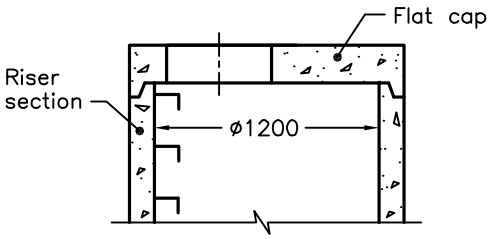
ALTERNATIVES



A PRECAST SLAB BASE



B CAST-IN-PLACE BASE



C PRECAST FLAT CAP

NOTES:

1 The sump is measured from the lowest invert.

A Granular backfill shall be placed to a minimum thickness of 300mm all around the maintenance hole.

B Precast concrete components shall be according to OPSD 701.030, 701.031, or 701.032.

C Structure exceeding 5.0m in depth shall include safety platform according to OPSD 404.020.

D Pipe support according to OPSD 708.020.

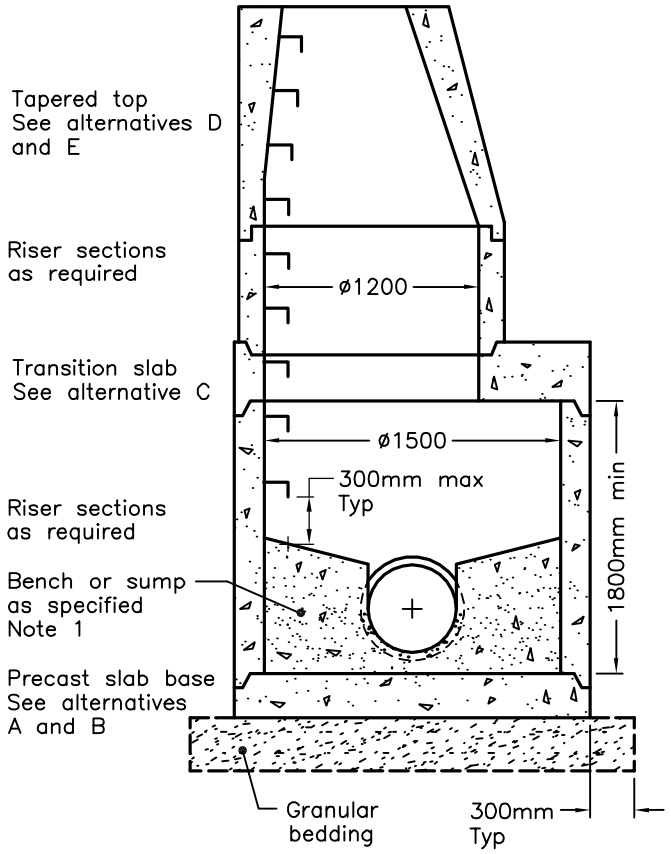
E For benching and pipe opening details, see OPSD 701.021.

F For adjustment unit and frame installation, see OPSD 704.010.

G All dimensions are nominal.

H All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev	5
PRECAST CONCRETE MAINTENANCE HOLE 1200mm DIAMETER			
			OPSD 701.010



NOTES:

1 For sump detail, see OPSD 701.010.

A Granular backfill shall be placed to a minimum thickness of 300mm all around the maintenance hole.

B Precast concrete components shall be according to OPSD 701.030, 701.031, 701.040, 701.041, 703.011, 703.021, and 706.010.

C Structures exceeding 5.0m in depth shall include safety platform according to OPSD 404.020 or 404.021.

D Pipe support shall be according to OPSD 708.020.

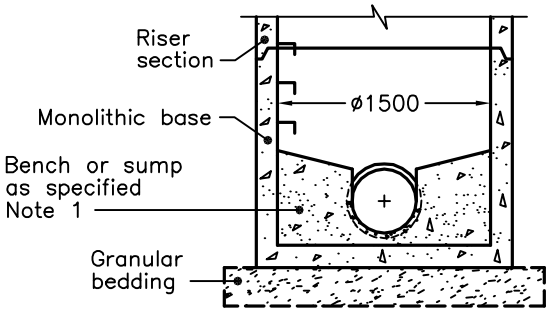
E For benching and pipe opening details, see OPSD 701.021.

F For adjustment unit and frame installation, see OPSD 704.010.

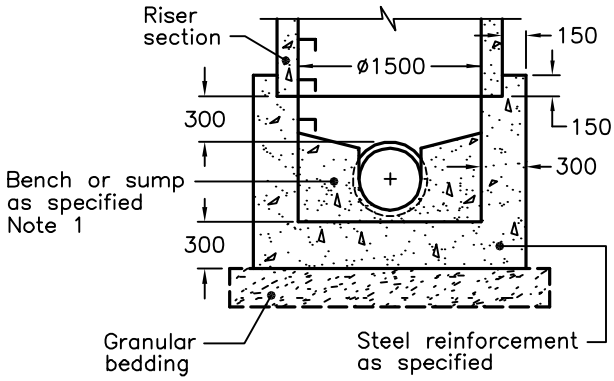
G All dimensions are nominal.

H All dimensions are in millimetres unless otherwise shown.

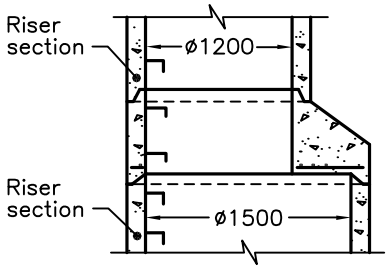
ALTERNATIVES



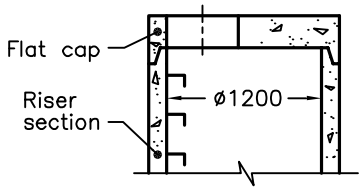
A PRECAST MONOLITHIC BASE



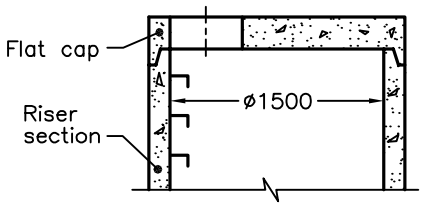
B CAST–IN–PLACE BASE



C TAPERED TRANSITION SLAB



D 1200mm PRECAST FLAT CAP



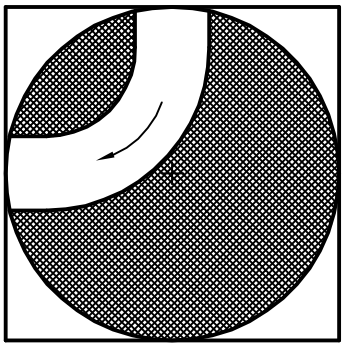
E 1500mm PRECAST FLAT CAP

ONTARIO PROVINCIAL STANDARD DRAWING | Nov 2014 | Rev 5

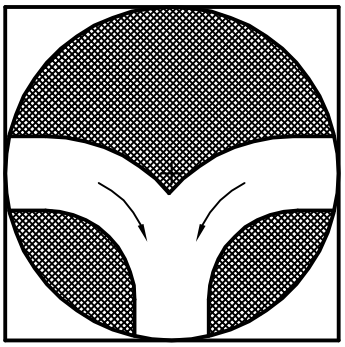
PRECAST CONCRETE MAINTENANCE HOLE

1500mm DIAMETER

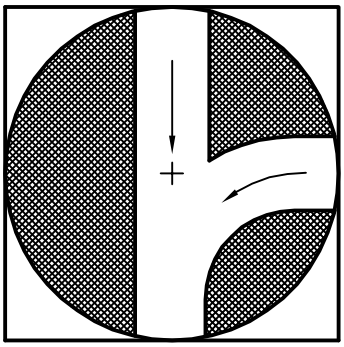
OPSD 701.011



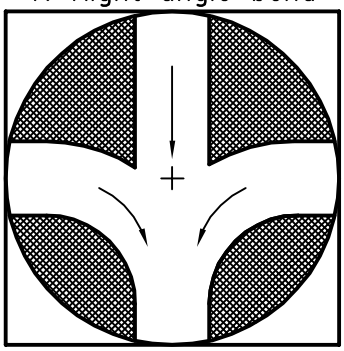
1. Right angle bend



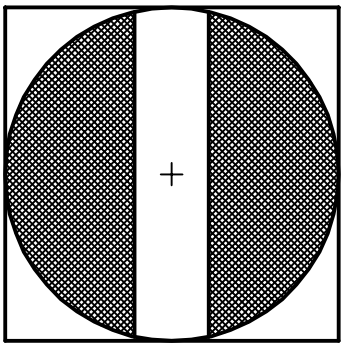
2. Tee connection



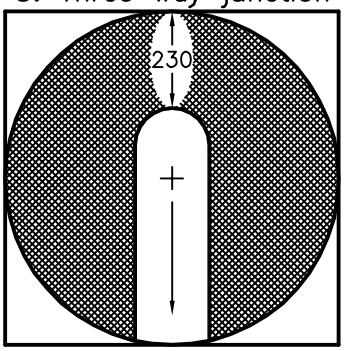
3. Three way junction



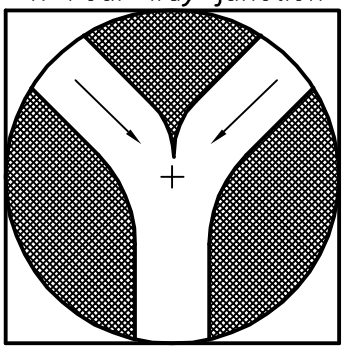
4. Four way junction



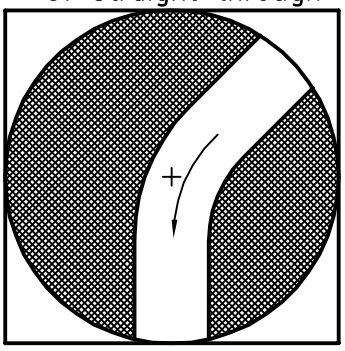
5. Straight through



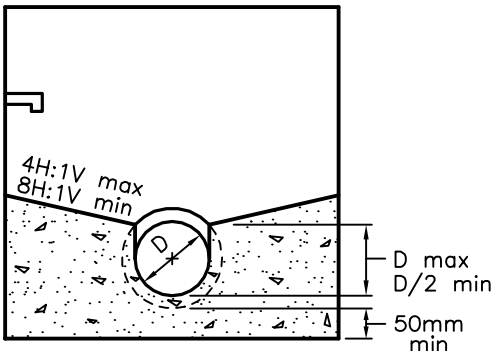
6. Dead end



7. Wye connection



8. 45° bend



Section

MAXIMUM SIZE HOLE IN THE WALL IN PRECAST RISER SECTIONS					
Maintenance Hole Diameter	No. 1–4	No. 5 and 6	No. 8	No.7	
				Inlet Hole	Outlet Hole
1200	700	860	780	700	860
1500	860	1220	960	860	1170
1800	1220	1485	1220	1220	1485
2400	1485	2020	1760	1485	2020
3000	1930	2450	2300	1930	2450
3600	2470	3085	2730	2470	3085

NOTES:

1 Slopes shall be maintained from the outlet hole opening for top of benching.

A Concrete for benching shall be 30MPa.

B When benching is hand–finshed, it shall be given wood float finish, channel shall be given steel trowel finish.

C Benching slope and height shall be as specified.

D When specified, maintenance holes that are 1200mm in diameter with a uniform channel for 200 or 250mm pipe may be prebenched at the manufacturer with standardized benching slope and channel orientation.

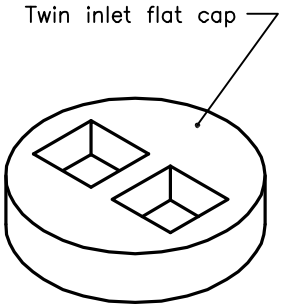
E All dimensions are nominal.

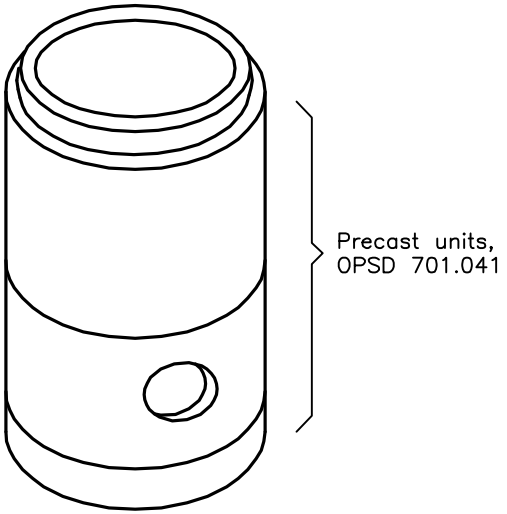
F All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING | Nov 2014 | Rev 4

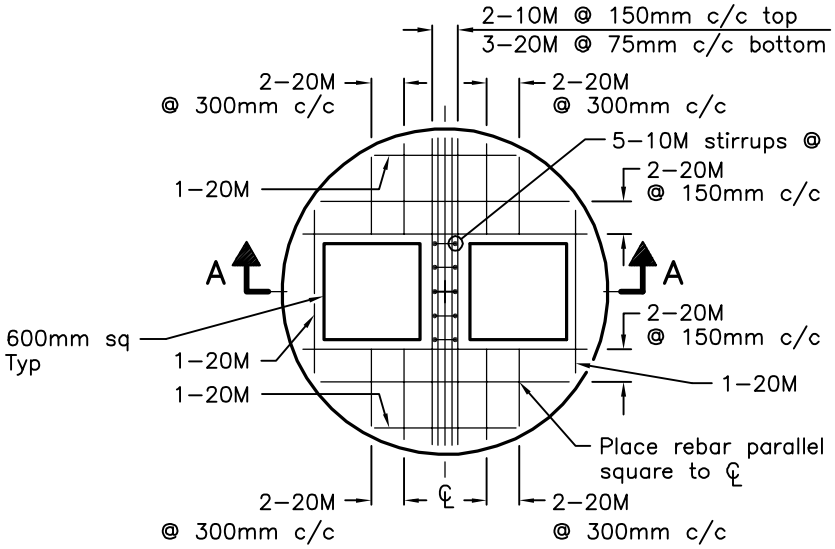
MAINTENANCE HOLE BENCHING AND PIPE OPENING ALTERNATIVES

OPSD 701.021

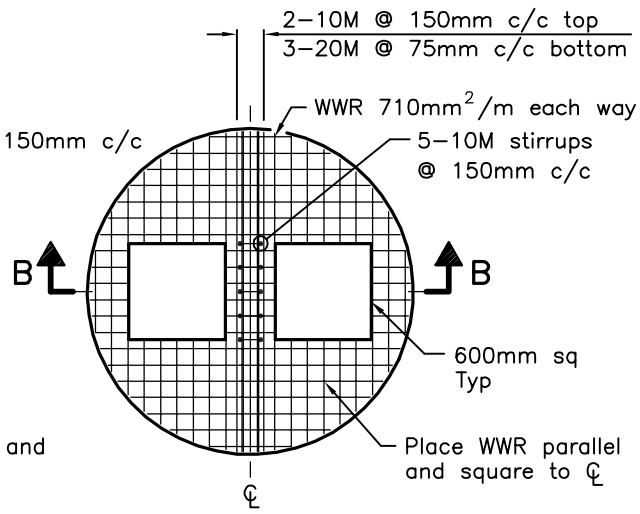




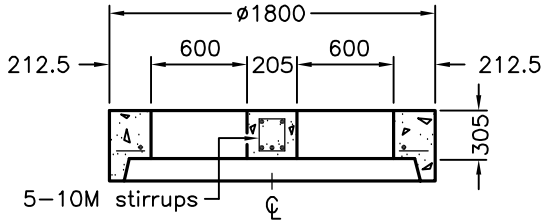
1500mm DIAMETER MAINTENANCE HOLE



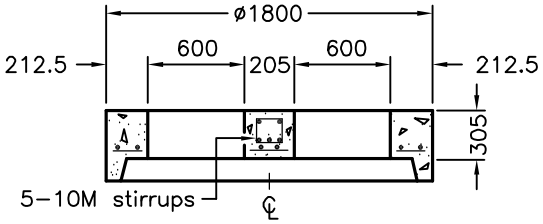
PLAN OF TWIN INLET FLAT CAP WITH REINFORCING STEEL BARS



PLAN OF TWIN INLET FLAT CAP WITH WWR



SECTION A–A

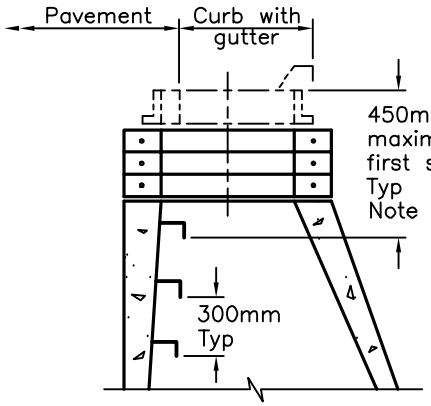


SECTION B–B

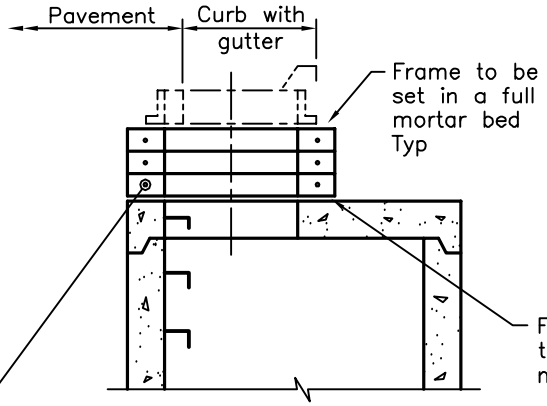
NOTES:

A All reinforcing steel shall have 25mm minimum cover.
B All dimensions are nominal.
C All dimensions are in millimetres unless otherwise shown.

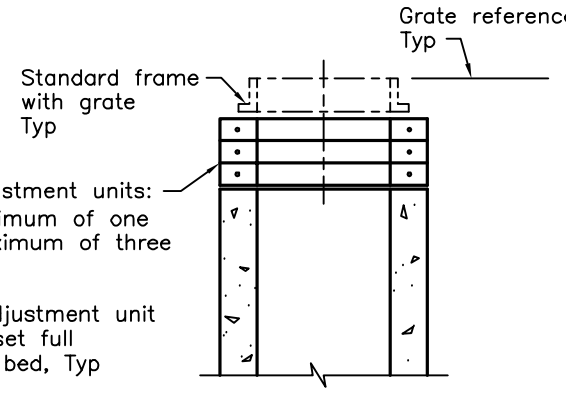
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev	2
PRECAST CONCRETE TWIN INLET FLAT CAP 1500mm DIAMETER			
			OPSD 703.021



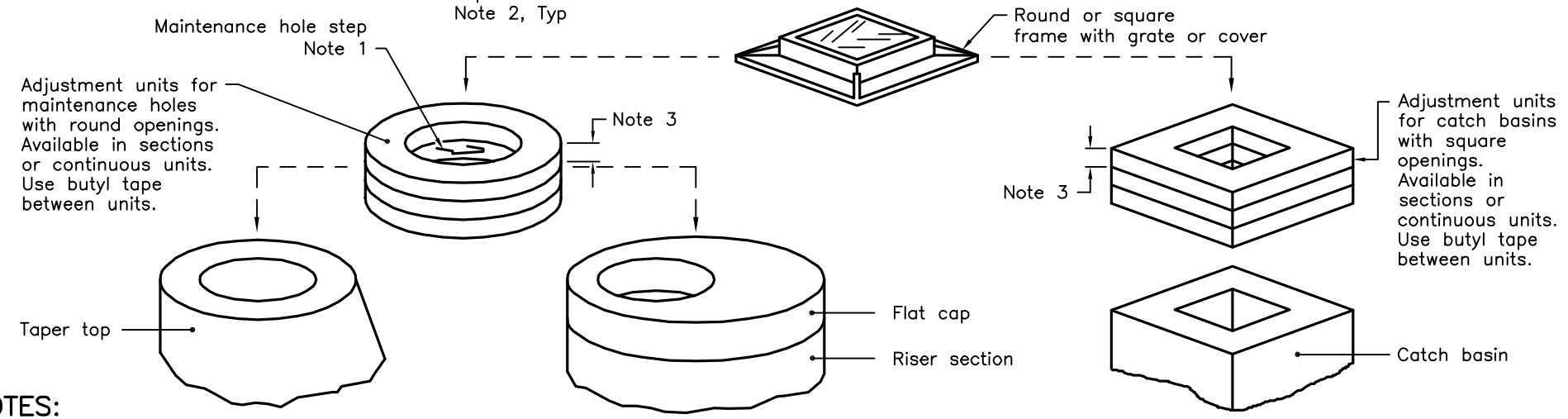
SECTION THROUGH TAPER TOP



SECTION THROUGH FLAT CAP



SECTION THROUGH CATCH BASIN



NOTES:

1 If first step is in an adjustment unit, the adjustment unit shall be of the type manufactured with a step in place.

2 Centre reinforcing in adjustment unit ±10mm.

3 Round and square adjustment units are available in sizes of 50, 75, 100, 150, and 300mm.

A Adjustment units shall not extend beyond the outside edge of the structure.

B All dimensions are in millimetres unless otherwise shown.

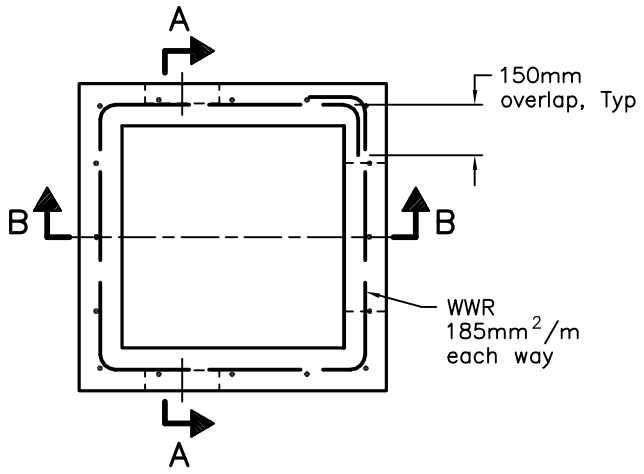
ONTARIO PROVINCIAL STANDARD DRAWING

PRECAST CONCRETE ADJUSTMENT UNITS FOR MAINTENANCE HOLES, CATCH BASINS, AND VALVE CHAMBERS

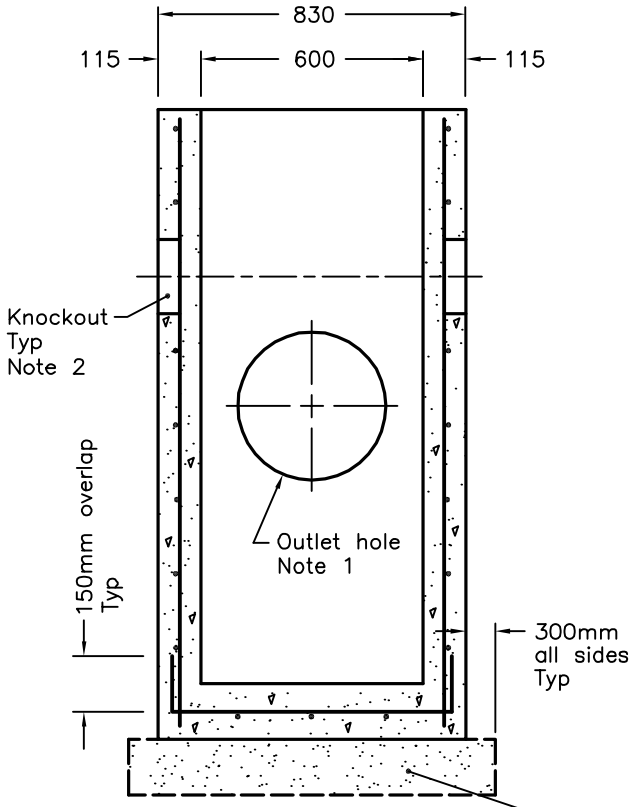
Nov 2014 | Rev 3

OPSD 704.010

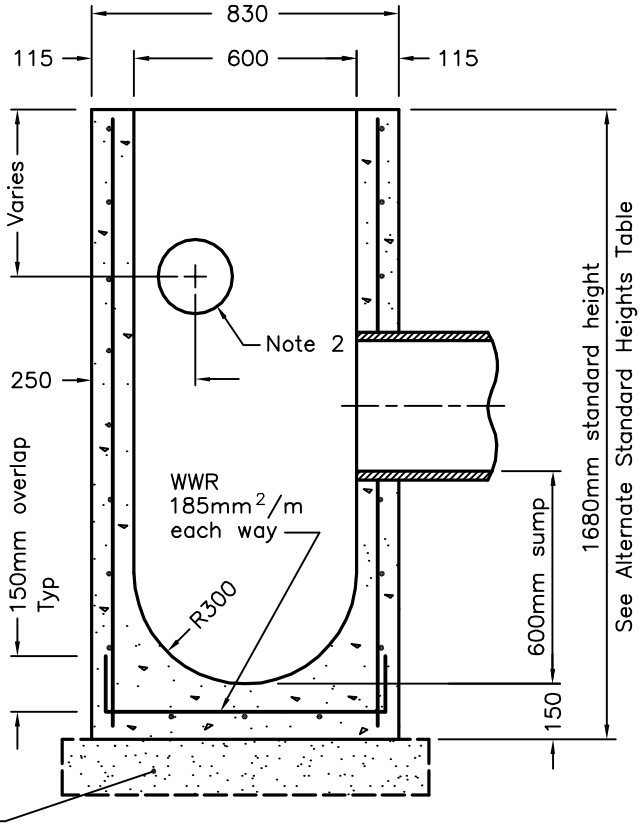
ALTERNATE STANDARD HEIGHTS	
ALTERNATIVE	DIMENSION
A	1980
B	1830
C	1520
D	1380



PLAN



SECTION A–A



SECTION B–B

NOTES:

1 Outlet hole size 525mm diameter maximum, location as required.

2 200mm diameter knockout to accommodate subdrain. Knockout shall be 60mm deep.

A Centre reinforcing in base slab and walls ±20mm.

B Granular backfill shall be placed to a minimum thickness of 300mm all around the catch basin.

C Frame, grate, and adjustment units shall be installed according to OPSD 704.010.

D Pipe support shall be according to OPSD 708.020.

E All dimensions are nominal.

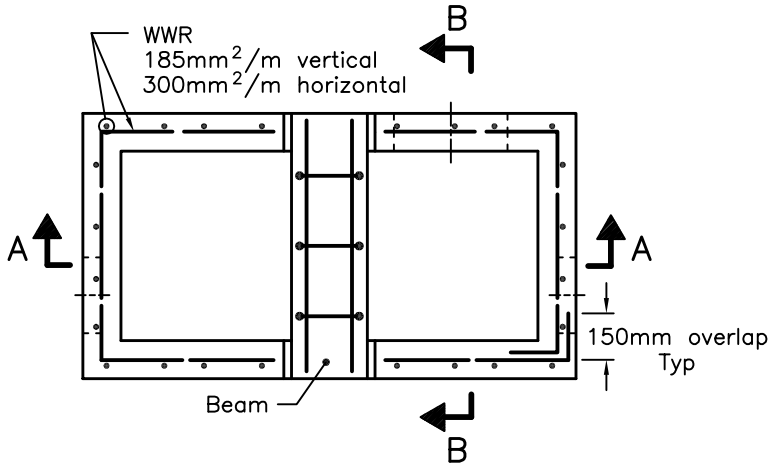
F All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING | Nov 2014 | Rev 3

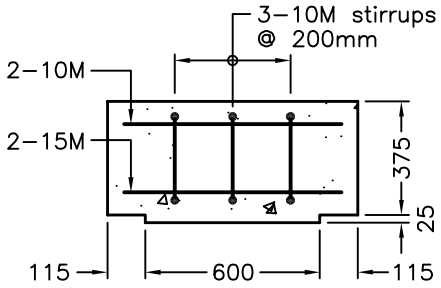
PRECAST CONCRETE CATCH BASIN

600x600mm

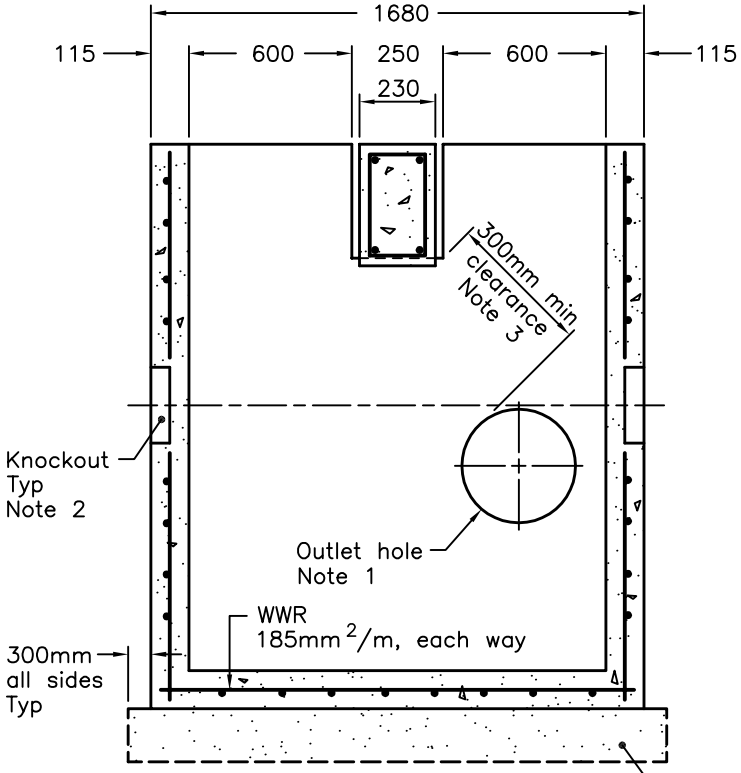
OPSD 705.010



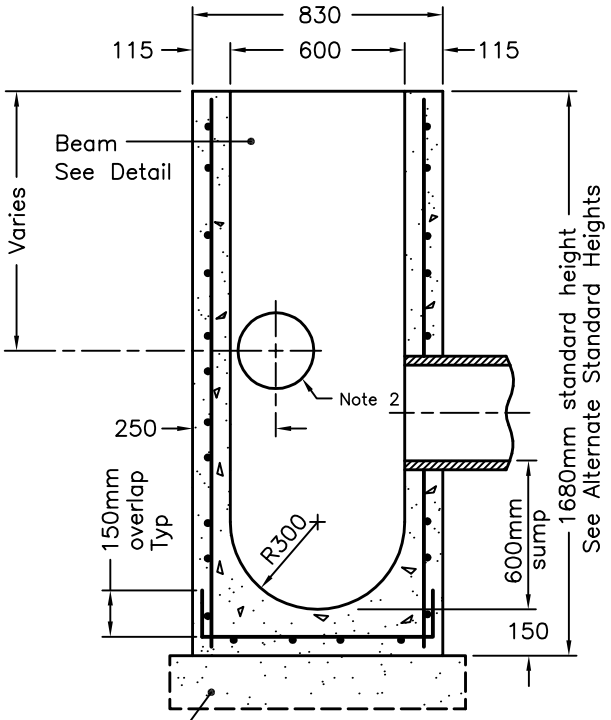
PLAN



BEAM DETAIL



SECTION A–A



SECTION B–B

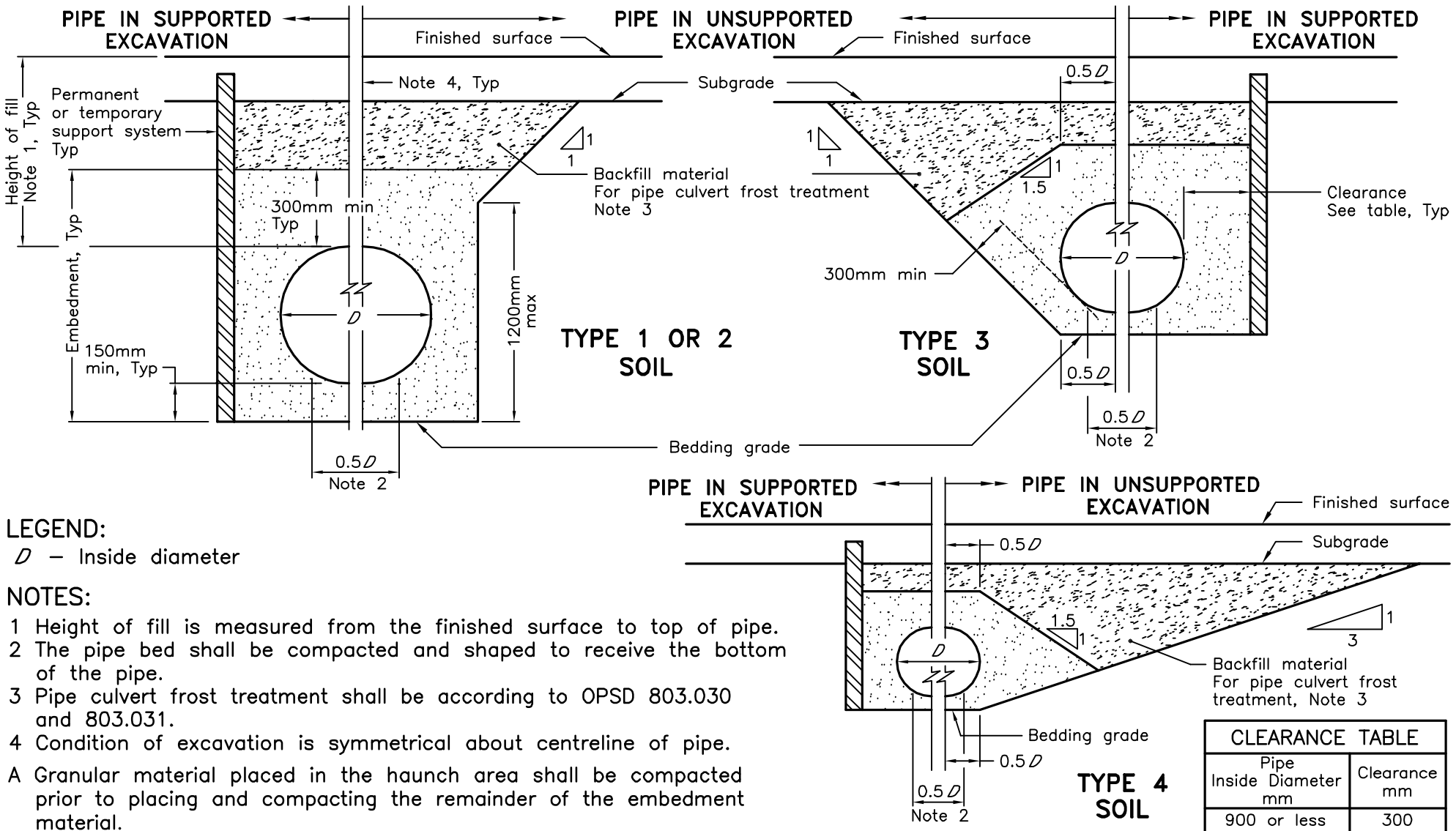
Granular bedding

NOTES:

1 Outlet hole size 525mm diameter maximum, location as required.
2 200mm diameter knockout to accommodate subdrain. Knockout shall be 60mm deep.
3 Minimum clearance between beam recess and hole for pipe shall be 300mm or minimum clearance can be 150mm with addition of two 15M size rebar on 45 degree diagonal.
A Centre reinforcing in base slab and walls ±20mm.
B Granular backfill shall be placed to a minimum thickness of 300mm all around the catch basin.
C Frame, grate, and adjustment units shall be installed according to OPSD 704.010.
D Pipe support shall be according to OPSD 708.020.
E All dimensions are nominal.
F All dimensions are in millimetres unless otherwise shown.

ALTERNATE STANDARD HEIGHTS	
ALTERNATIVE	DIMENSION
A	1980
B	1830
C	1680

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2019	Rev	4
PRECAST CONCRETE TWIN INLET CATCH BASIN 600 x 1450mm			
		OPSD 705.020	



LEGEND:

D – Inside diameter

NOTES:

1 Height of fill is measured from the finished surface to top of pipe.
2 The pipe bed shall be compacted and shaped to receive the bottom of the pipe.
3 Pipe culvert frost treatment shall be according to OPSD 803.030 and 803.031.
4 Condition of excavation is symmetrical about centreline of pipe.

A Granular material placed in the haunch area shall be compacted prior to placing and compacting the remainder of the embedment material.

B Soil types as defined in the Occupational Health and Safety Act and Regulations for Construction Projects.

C All dimensions are in metres unless otherwise shown.

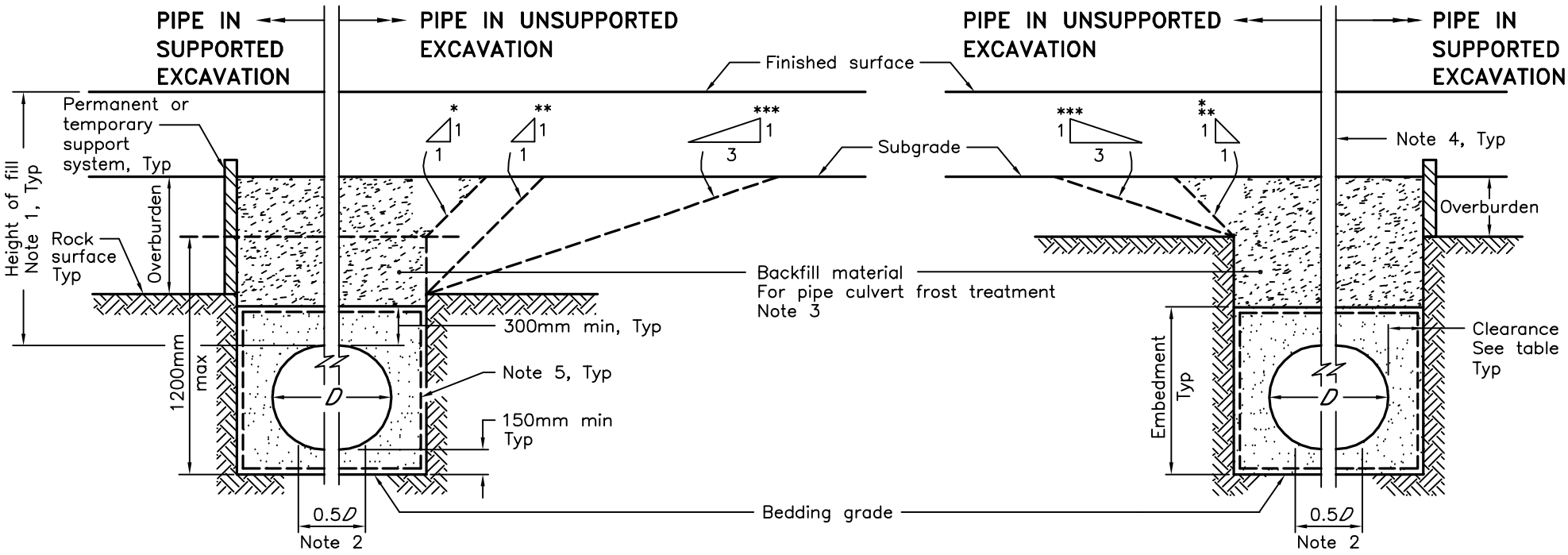
CLEARANCE TABLE	
Pipe Inside Diameter mm	Clearance mm
900 or less	300
Over 900	500

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2014 | Rev 3

FLEXIBLE PIPE EMBEDMENT AND BACKFILL EARTH EXCAVATION

OPSD 802.010



ORIGINAL ROCK < 1200mm ABOVE TRENCH BOTTOM

ORIGINAL ROCK ≥ 1200mm ABOVE TRENCH BOTTOM

NOTES:

1 Height of fill is measured from the finished surface to top of pipe.
2 The pipe bed shall be compacted and shaped to receive the bottom of the pipe.
3 Pipe culvert frost treatment shall be according to OPSD 803.030 and 803.031.
4 Condition of excavation is symmetrical about centreline of pipe.
5 Embedment material shall be wrapped in non–woven geotextile when specified.

A Granular material placed in the haunch area shall be compacted prior to placing and compacting the remainder of the embedment material.
B Soil types as defined in the Occupational Health and Safety Act and Regulations for Construction Projects.
C Fractured rock shall be treated as Type 1 soil.
D All dimensions are in metres unless otherwise shown.

LEGEND:

D – Inside diameter
* – Type 1 or 2 soil
** – Type 3 soil
*** – Type 4 soil

CLEARANCE TABLE	
Pipe Inside Diameter mm	Clearance mm
900 or less	300
Over 900	500

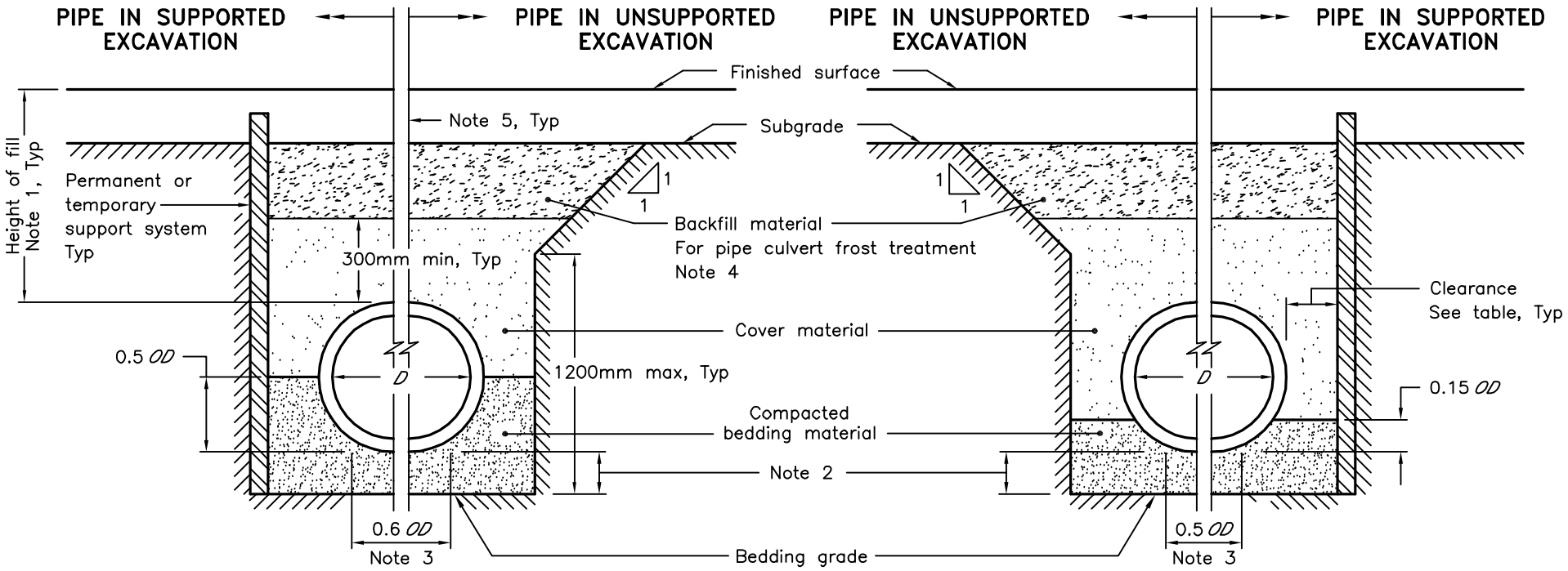
ONTARIO PROVINCIAL STANDARD DRAWING

FLEXIBLE PIPE EMBEDMENT AND BACKFILL ROCK EXCAVATION

Nov 2014 | Rev 3

ONTARIO STANDARDS · MUNICIPAL – PROVINCIAL · OPS

OPSD 802.013



CLASS B BEDDING **CLASS C BEDDING**

NOTES:

1 Height of fill is measured from the finished surface to top of pipe.
2 The minimum bedding depth below the pipe shall be 0.15*D*. In no case shall this dimension be less than 150mm or greater than 300mm.
3 The pipe bed shall be compacted and shaped to receive the bottom of the pipe.
4 Pipe culvert frost treatment shall be according to OPSD 803.030 and 803.031.
5 Condition of excavation is symmetrical about centreline of pipe.

A Soil types as defined in the Occupational Health and Safety Act and Regulations for Construction Projects.

B All dimensions are in metres unless otherwise shown.

LEGEND:

D – Inside diameter
OD – Outside diameter

CLEARANCE TABLE	
Pipe Inside Diameter mm	Clearance mm
900 or less	300
Over 900	500

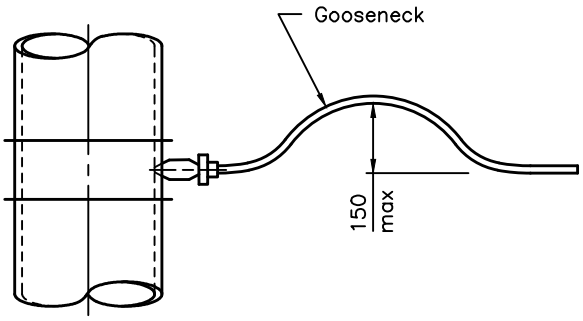
ONTARIO PROVINCIAL STANDARD DRAWING

RIGID PIPE BEDDING, COVER, AND BACKFILL TYPE 1 OR 2 SOIL – EARTH EXCAVATION

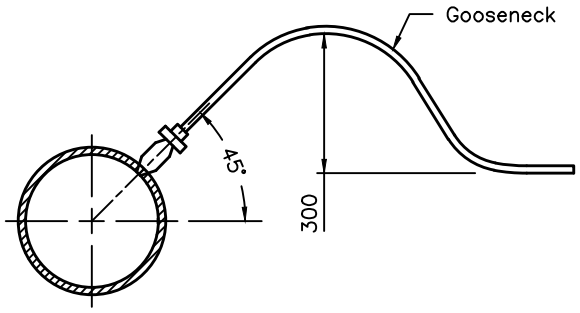
Nov 2015 | Rev 3

ONTARIO STANDARDS MUNICIPAL – PROVINCIAL

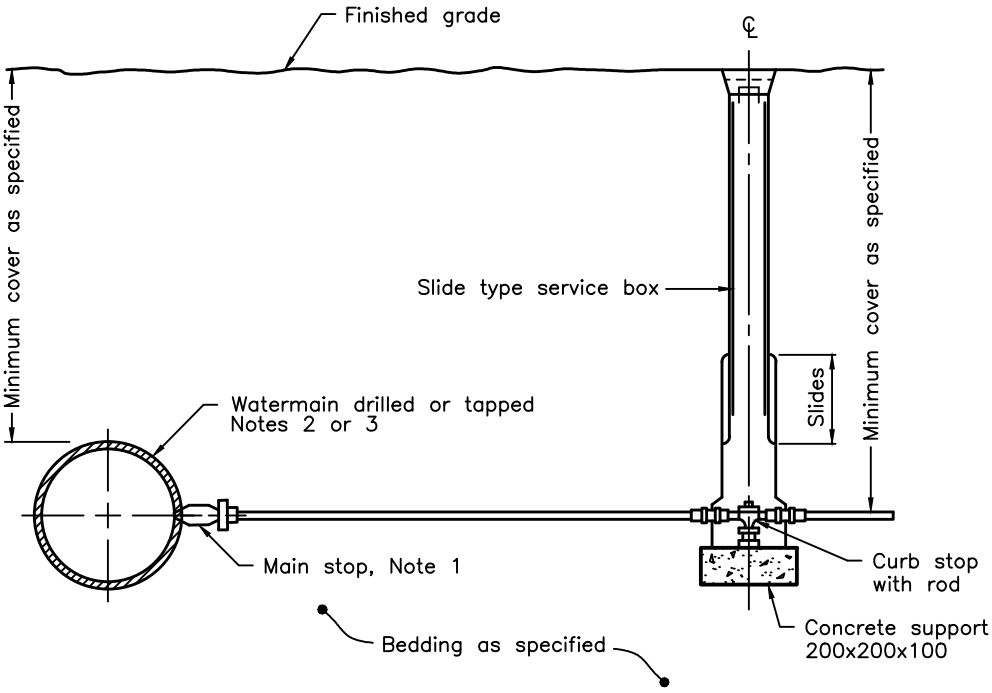
OPSD 802.030



HORIZONTAL GOOSENECK



VERTICAL GOOSENECK OPTION



VERTICAL SECTION

NOTES:

1 For plastic service pipes, install main stop at 15° above horizontal with a minimum 1.2m long gooseneck.

2 Direct tap ductile iron pipe with approved tool with standard AWWA inlet thread.

3 Service connections to plastic watermains shall be made using service saddles or factory made tees.

A When specified, the vertical gooseneck option shall be used.

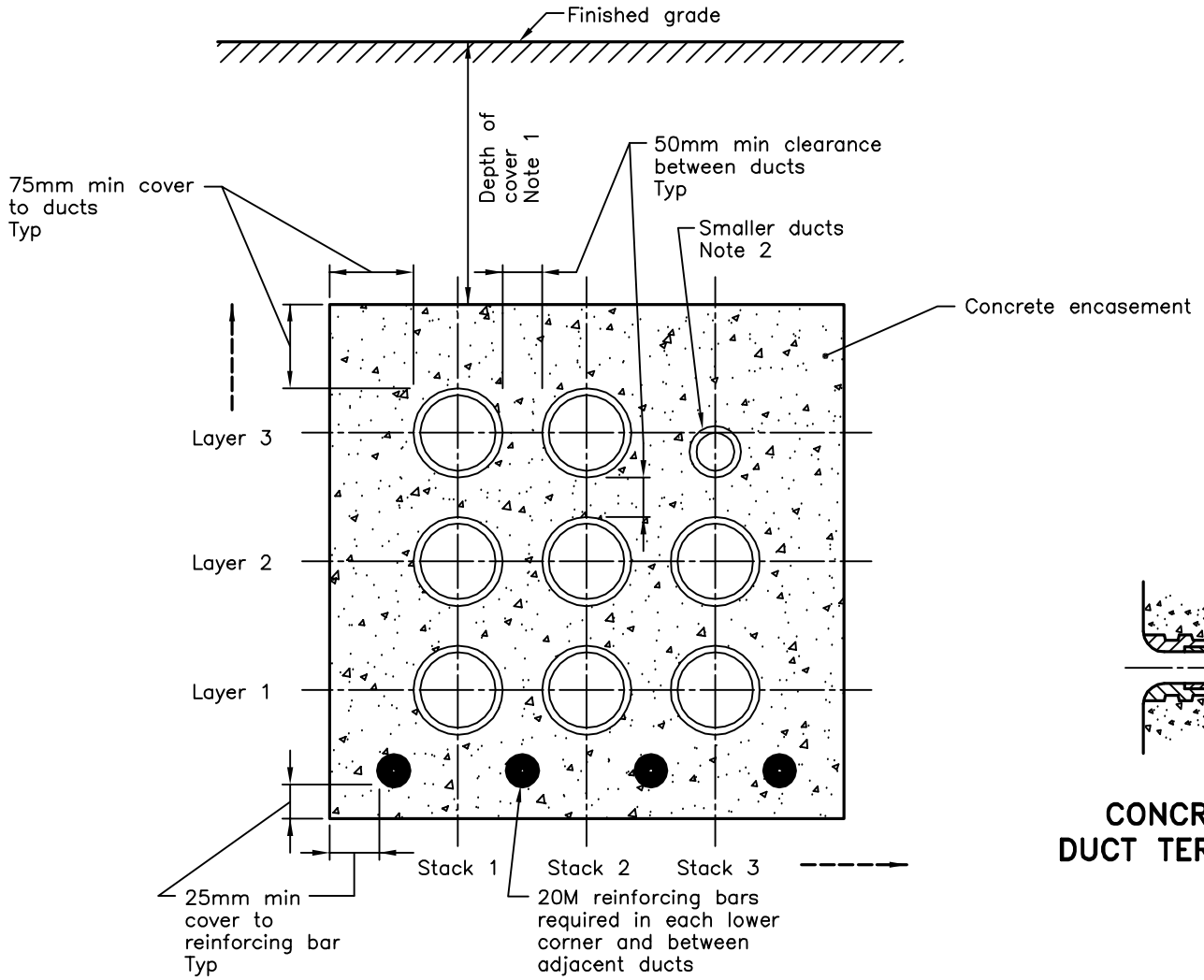
B Couplings shall not be permitted unless the service length exceeds 20m between the main stop and curb stop.

C All water services shall be installed 90° to the longitudinal axis of the watermain.

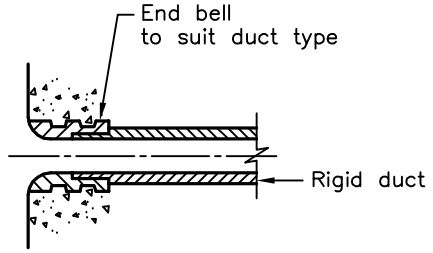
D Backfill material within 500mm of service box shall be native or imported, as specified.

E All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev	4
WATER SERVICE CONNECTION 19 and 25mm DIAMETER SIZES			
	OPSD 1104.010		



SECTION



CONCRETE ENCASED DUCT TERMINATION DETAIL

NOTES:

1 For depth of cover see OPSD 2103.02.

2 Smaller ducts shall be installed in uppermost layers.

A Maximum number of layers shall be 4, maximum number of stacks shall be 4.

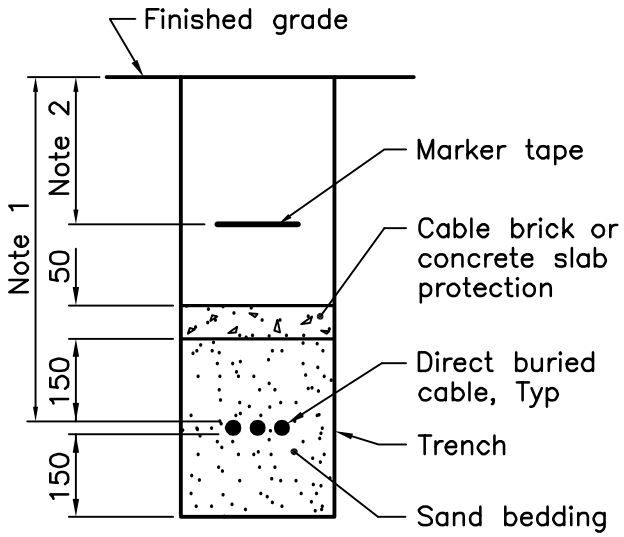
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

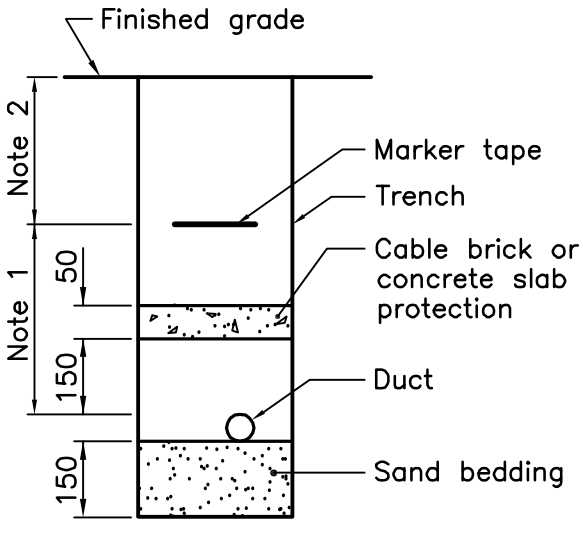
RIGID DUCTS ENCASED IN CONCRETE

Nov 2015 | Rev 2

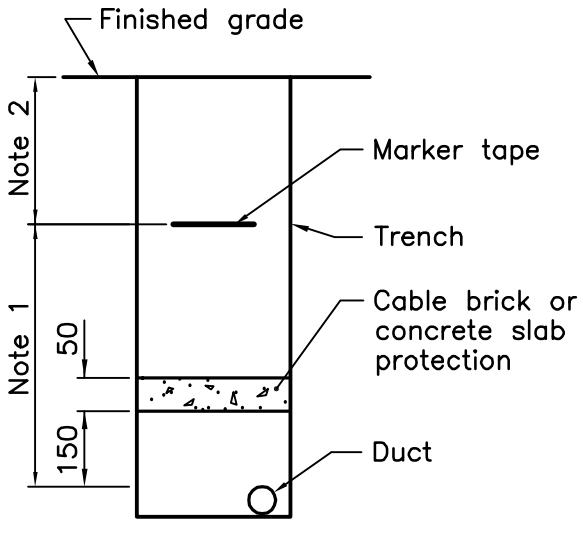
OPSD 2100.06



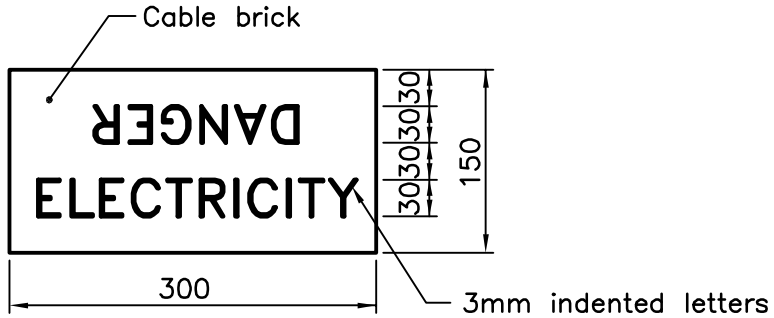
DIRECT BURIED CABLE IN ROCK OR IN EARTH



DUCT IN ROCK



DUCT IN EARTH



CABLE BRICK

NOTES:

1 Depth of cable or duct shall be as specified in the Ontario Electrical Safety Code.
2 Depth of marker tape shall be as specified in the Ontario Electrical Safety Code.

A This OPSD shall be read in conjunction with OPSD 2100.010 and 2101.01.
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

CABLE AND DUCT PROTECTION AND MARKING

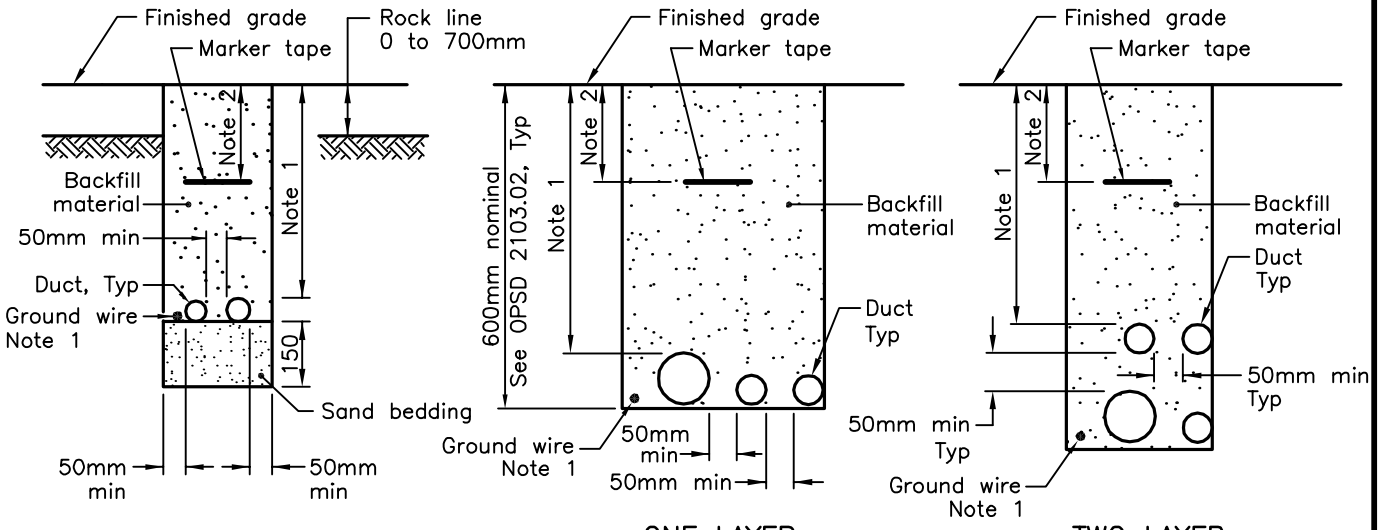
Nov 2013	Rev	0

ONTARIO STANDARDS MUNICIPAL – PROVINCIAL

OPSD 2100.050

MINIMUM TRENCH WIDTH FOR ONE LAYER AND TWO LAYER DUCT ARRANGEMENT

No. OF 100 mm DUCTS	No. OF LAYERS	NUMBER OF 50 mm DUCTS										
		0	1	2	3	4	5	6	7	8	9	10
0	1	N/A	150	205	300	460	610	N/A	N/A	N/A	N/A	N/A
	2	N/A	N/A	N/A	N/A	205	300	350	460	460	610	610
1	1	150	255	460	610	610	N/A	N/A	N/A	N/A	N/A	N/A
	2	N/A	N/A	205	255	300	460	460	610	610	610	N/A
2	1	300	460	610	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	2	150	255	255	460	460	610	610	610	N/A	N/A	N/A
3	1	460	610	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	2	300	300	460	460	610	610	610	N/A	N/A	N/A	N/A
4	1	610	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	2	300	460	460	610	610	N/A	N/A	N/A	N/A	N/A	N/A



IN ROCK

ONE LAYER ARRANGEMENT **IN EARTH**

TWO LAYER ARRANGEMENT **IN EARTH**

NOTES:

1 Ground wire shall be installed in the duct or trench as specified in the Contract Documents.
2 Depth of marker tape shall be as specified in the Ontario Electrical Safety Code.

A Cable brick or concrete slab shall be installed where specified in the Contract Documents. See OPSD 2100.050.

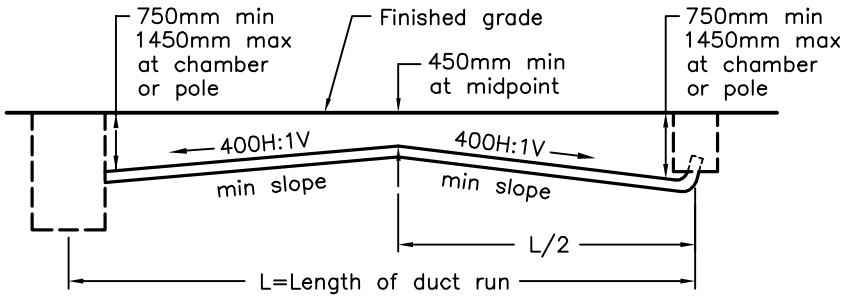
B This OPSD shall be read in conjunction with OPSD 2103.02.

C Contractor has the option of installing one or two layer duct arrangement.

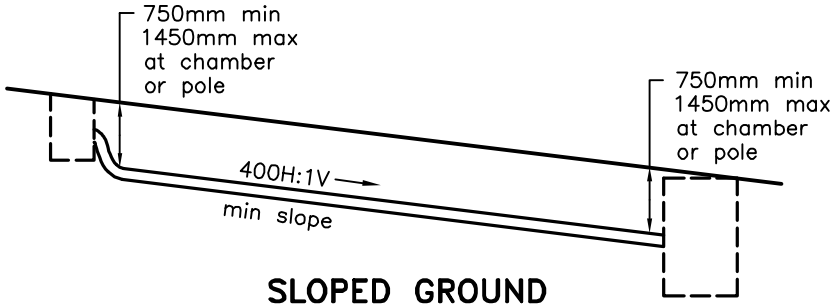
D N/A – Not Applicable, undesirable or exceeding equipment limits.

E All dimensions are in millimetres unless otherwise shown.

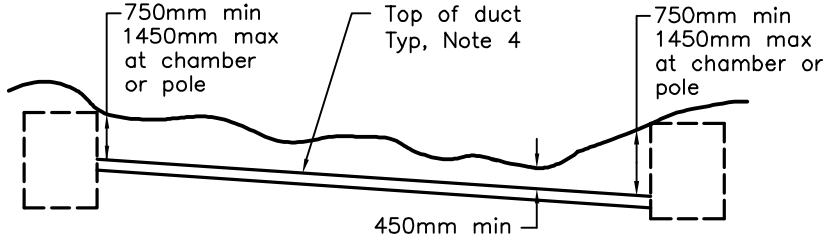
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2013	Rev	1
DUCT INSTALLATION IN TRENCHES			
			OPSD 2101.01



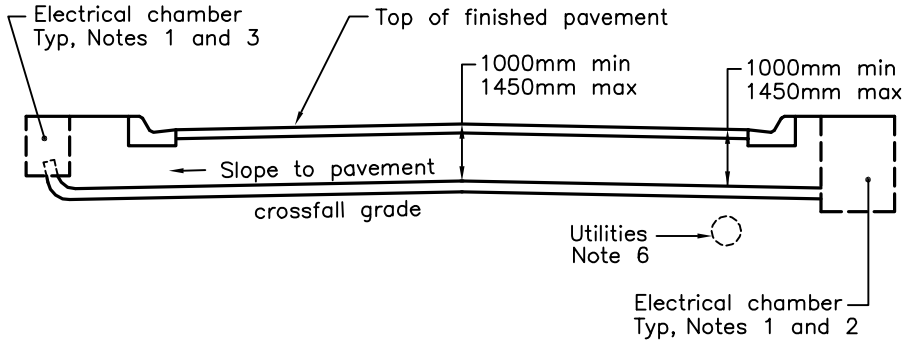
FLAT GROUND



SLOPED GROUND



UNEVEN GROUND



OPEN TRENCH METHOD ACROSS ROADWAYS
NOTE 5

NOTES:

1 Type and size of electrical chambers shall be as specified.

2 For duct connection to electrical maintenance hole see OPSD 2123.01 and 2123.02.

3 For duct connection to electrical handholes see OPSD 2123.03.

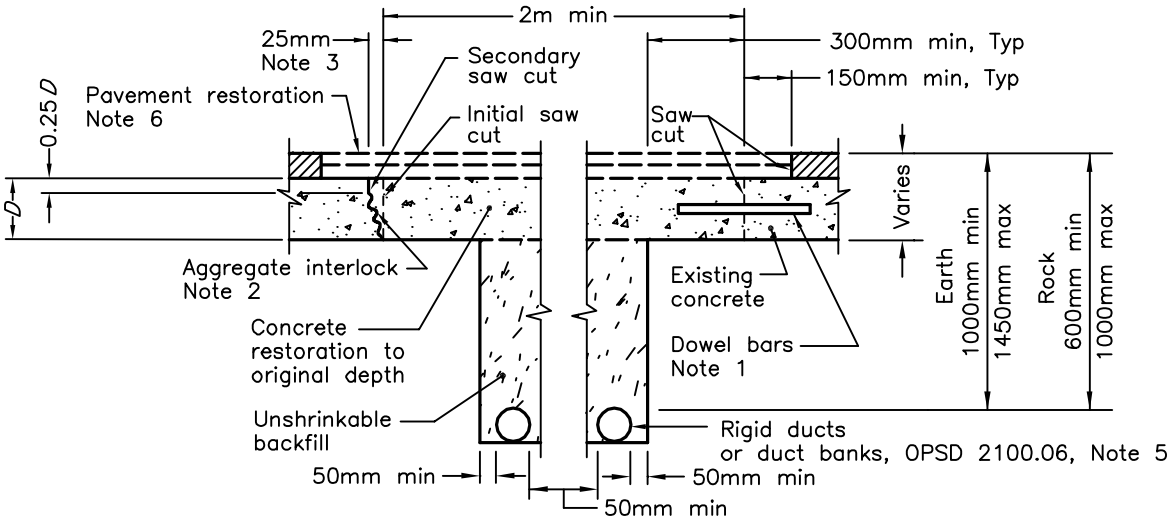
4 Depth of cover specified shall be to top of direct buried ducts or to top of concrete encasement.

5 For subsurface and underpavement installation, the cover shall be 1000mm minimum and 1450mm maximum measured from the top of steel encasement or duct to the finished grade.

6 For treatment at utility crossings see OPSD 2103.050.

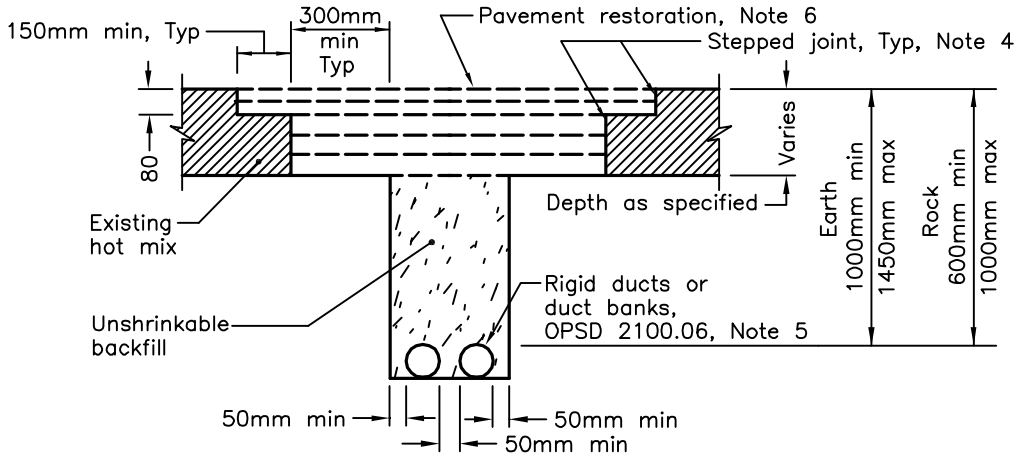
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev	1
DUCT INSTALLATION PROFILES			
		OPSD 2103.02	



UNDOWELLED TREATMENT, NOTE 2 **DOWELLED TREATMENT, NOTE 1**

COMPOSITE OR CONCRETE PAVEMENT



BITUMINOUS PAVEMENT

NOTES:

1 Dowelled treatment is only required in existing concrete pavement or concrete base that contains load transfer devices. Dowels shall be 32mm diameter, 450mm long, epoxy coated, installed at 300mm intervals at mid depth of the concrete slab, in plane to the pavement surface, parallel to the centre line of the road, and set 225mm in 35mm holes with epoxy grout.

2 Undowelled treatment is only required in existing concrete pavement or concrete base that is constructed without load transfer devices at joints. Aggregate interlock is created by chipping the vertical concrete face with a light 15kg maximum pneumatic hammer.

3 The initial saw cut shall be full depth. The secondary saw cut shall be 1/4 of existing pavement depth with 25mm of chipping for aggregate interlock.

4 Where existing pavement depth is between 80 and 120mm, the 150mm wide stepped joint shall be 40mm deep.

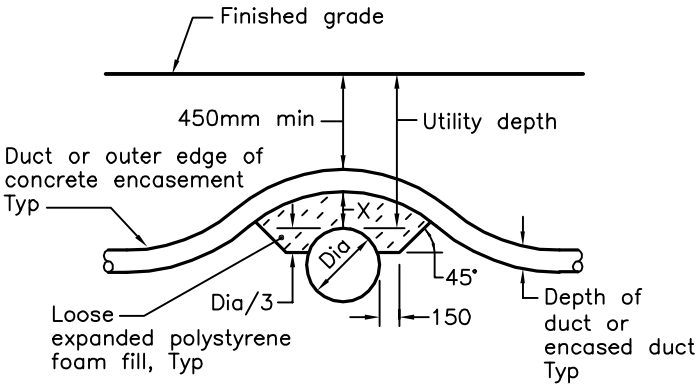
5 In rock, the ducts shall be placed on 150mm sand bedding.

6 Bituminous pavement restoration shall match existing type unless otherwise specified. The surface and top binder courses shall be placed in 40mm lifts with other lifts placed at 80mm maximum.

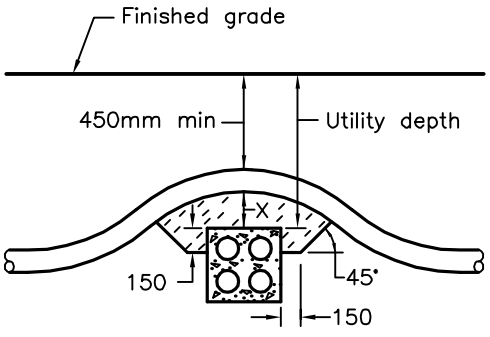
A All voids below the pavement shall be filled with unshrinkable backfill.

B All dimensions are in millimetres unless otherwise shown.

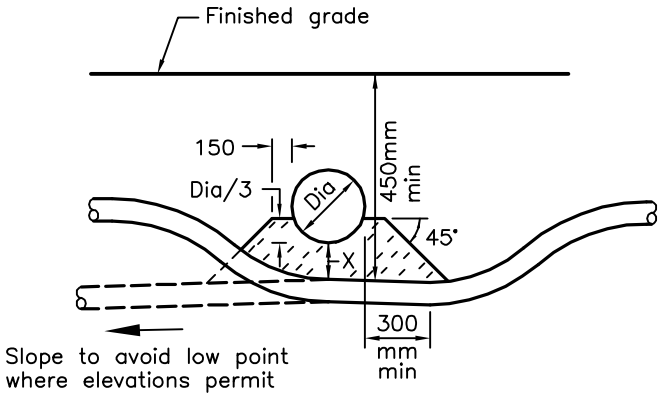
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev	1
RIGID DUCT INSTALLATION IN EXISTING PAVED AREA UNSHRINKABLE BACKFILL METHOD			
	OPSD 2103.030		



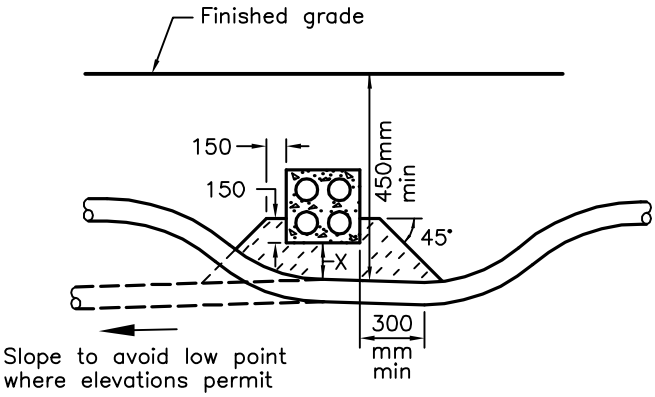
CROSSING OVER UTILITY



CROSSING OVER CONCRETE ENCASED UTILITY



CROSSING UNDER UTILITY



CROSSING UNDER CONCRETE ENCASED UTILITY

NOTES:

A The required clearance between the utility and the ducts or concrete encasement shall be as follows:

UTILITY	X mm min
Ducts, direct buried or encased	100
All other pipes	300
High voltage cables	300
All other cables	300

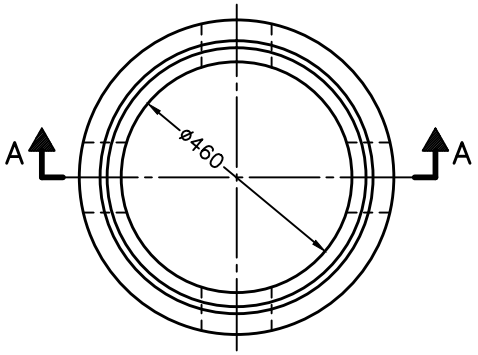
B Trench widths shall be kept to the minimum required for working space. Manual excavation and backfill methods shall be used with the utility supported in place, when required, when crossing under a utility is necessary.

C All dimensions are in millimetres unless otherwise shown.

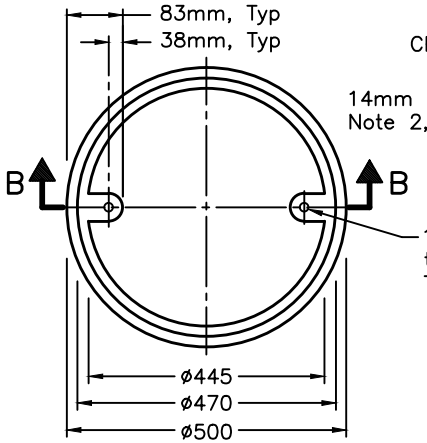
ONTARIO PROVINCIAL STANDARD DRAWING | Nov 2015 | Rev 0

DUCT INSTALLATION AT UTILITY CROSSINGS

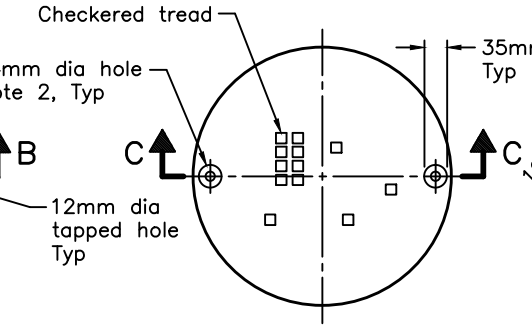
OPSD 2103.050



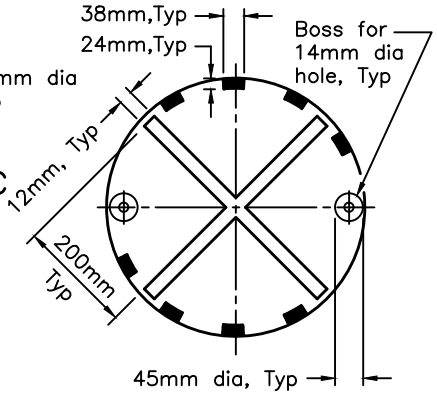
PLAN
HANDHOLE



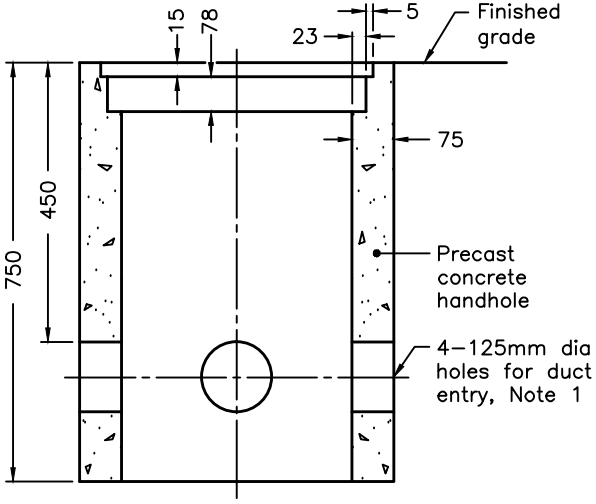
PLAN
FRAME



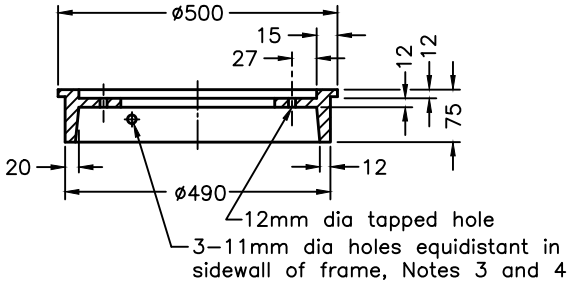
PLAN
COVER



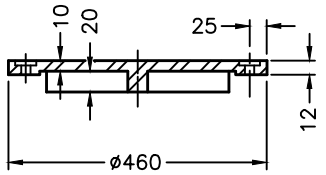
UNDERSIDE OF COVER



SECTION A–A



SECTION B–B



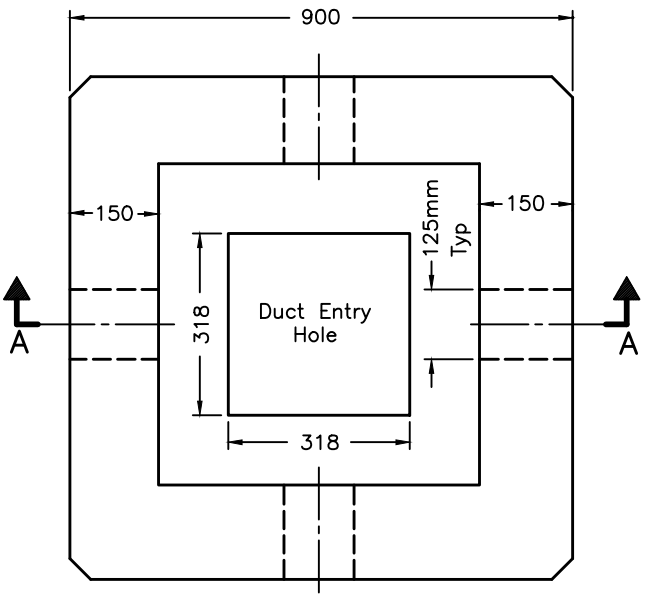
SECTION C–C

NOTES:

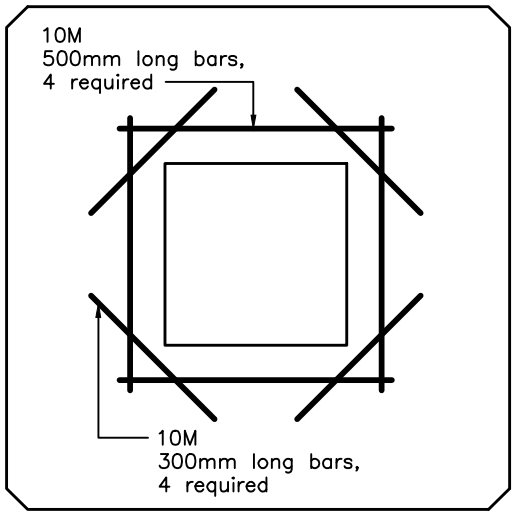
1 For installation of ducts see OPSD 2123.030.
2 Cover shall be retained with 2–12mm dia x 20mm long stainless steel hex head machine bolts that shall be flush with top of cover when fastened.
3 Frame shall be attached using 3–10mm dia x 38mm long machine bolts anchored in concrete wall.
4 One ground lug for #6 AWG stranded copper shall be attached to one frame bolt.

A For general installation see OPSD 2117.020.
B All dimensions are in millimetres unless otherwise shown.

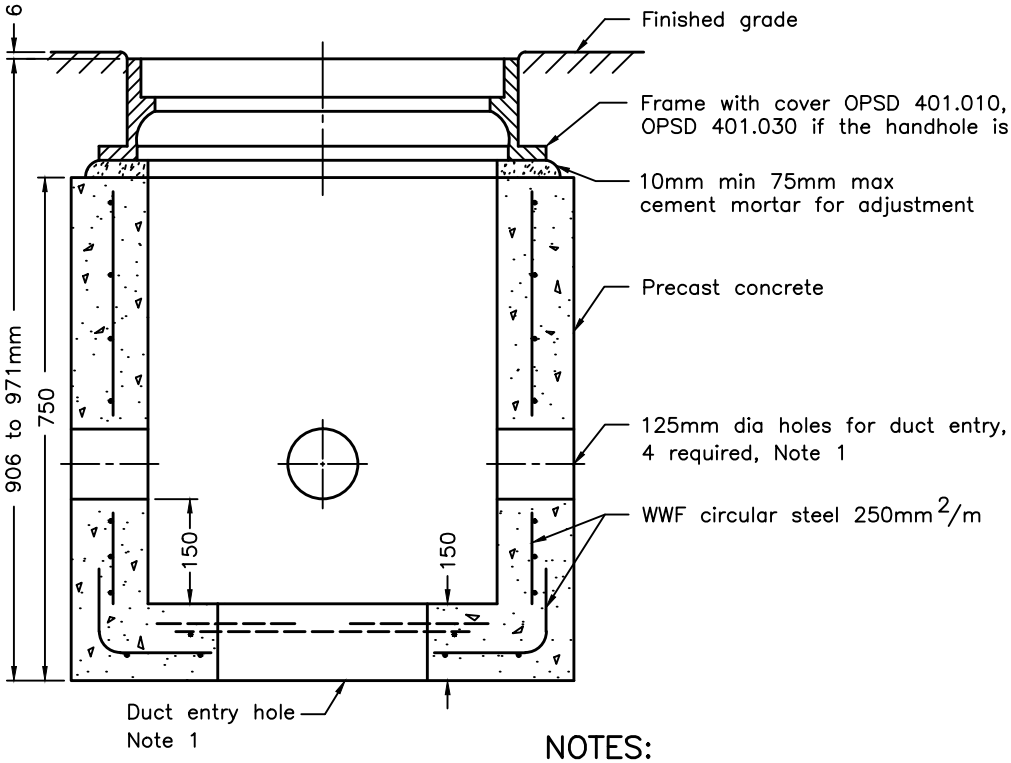
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2017	Rev	0
ELECTRICAL HANDHOLE PRECAST CONCRETE WITH COVER 460mm DIAMETER			
	OPSD 2112.020		



PLAN



BOTTOM–DUCT ENTRY REINFORCING



SECTION A–A

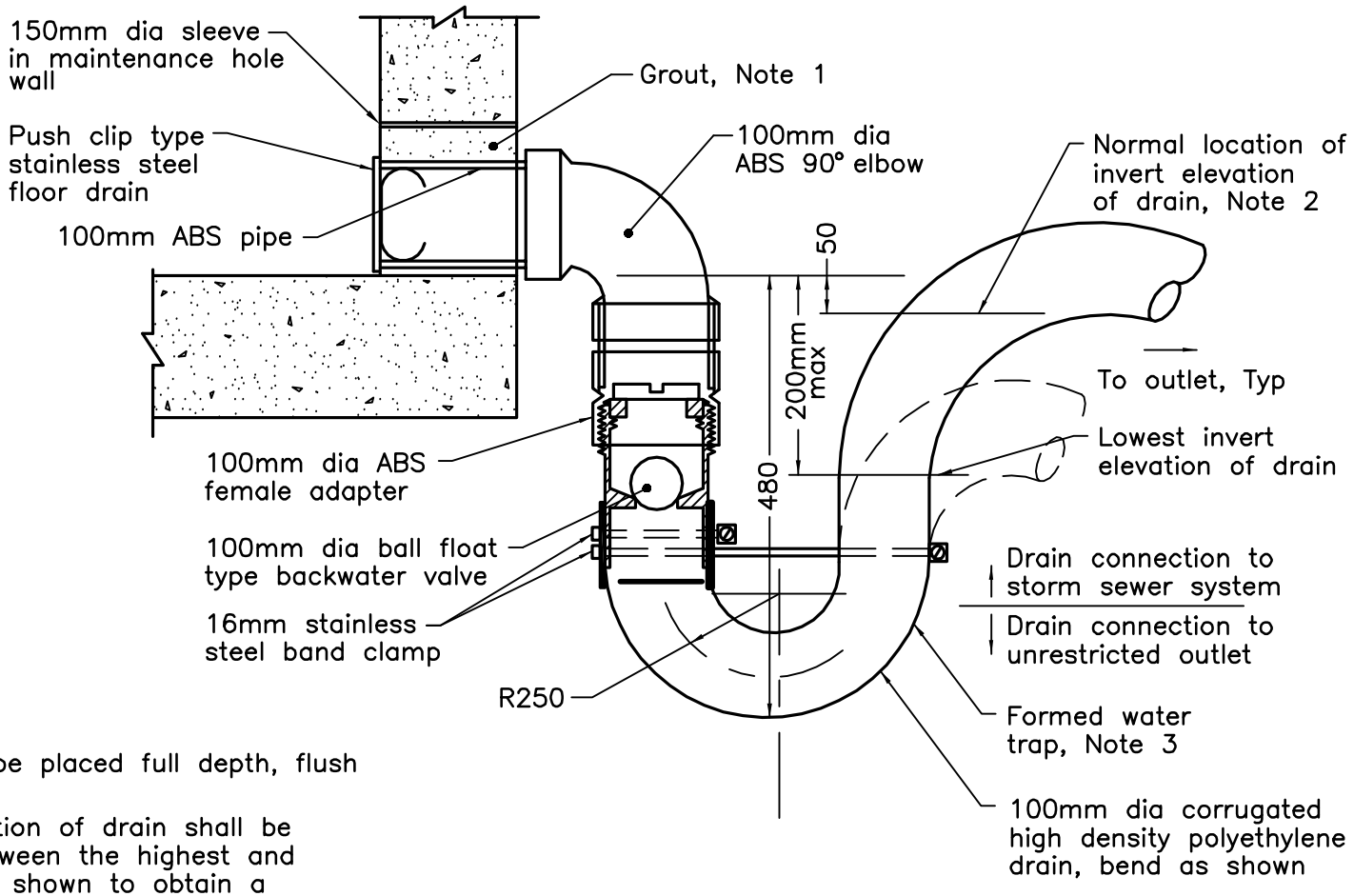
NOTES:

1 For duct installation details see OPSD 2123.030.

A For general installation details see OPSD 2117.020.

B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2017	Rev	1
ELECTRICAL HANDHOLE PRECAST CONCRETE 600 x 600mm			
			OPSD 2112.040



NOTES:

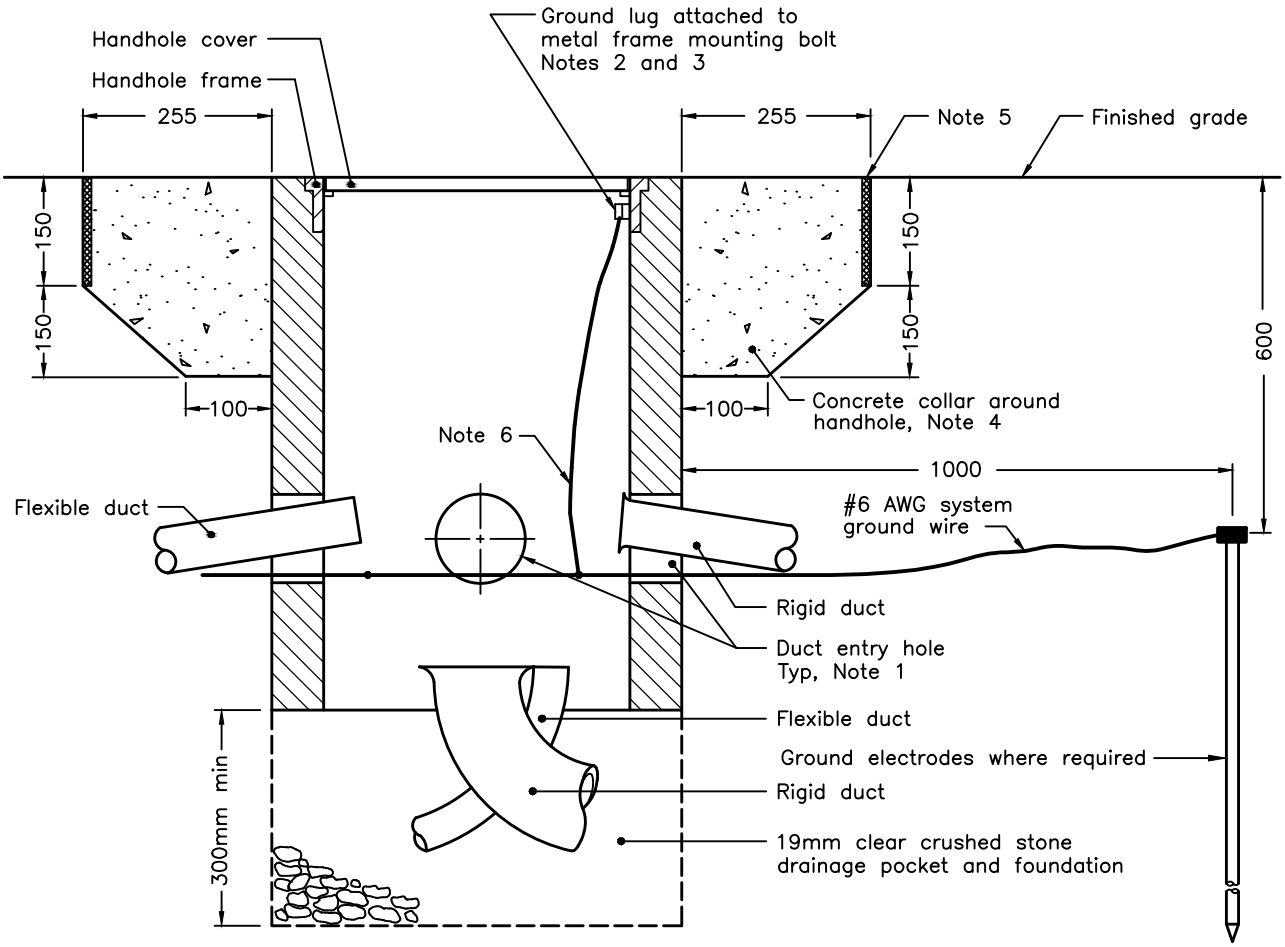
1 Grout shall be placed full depth, flush both walls.

2 Vertical location of drain shall be adjusted between the highest and lowest limits shown to obtain a minimum grade on the drain as set by the outlet elevation.

3 Water trap shall be formed in all cases when the outlet is part of the storm sewer system.

A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2013	Rev	1
DRAINAGE FACILITIES FOR ELECTRICAL MAINTENANCE HOLES			
	OPSD 2116.01		



NOTES:

1 For duct entry details see OPSD 2123.030.

2 For handholes with metal frames, ground wire shall be attached to frame using a ground lug suitable for #6 AWG stranded copper wire.

3 For handholes with metal covers and non–metallic frames or handholes with metal covers not bolted to the metal frame, the ground wire shall be attached to the handhole cover using a ground lug suitable for #6 AWG flat braided copper wire with 1m of slack above finished grade.

4 Concrete collar is required around the complete perimeter of all electrical handholes except:
   a) concrete electrical handholes, or
   b) handholes installed in concrete pavement or sidewalk.

5 In raised traffic islands, install 12mm expansion board at back of curb and install concrete collar to suit.

6 For handholes with only extra low–voltage cables with metal frames and covers, grounding and bonding is not required.

A For specific handhole details see OPSD 2112.010, 2112.020, 2112.030, 2112.040, 2112.050, and 2113.010.

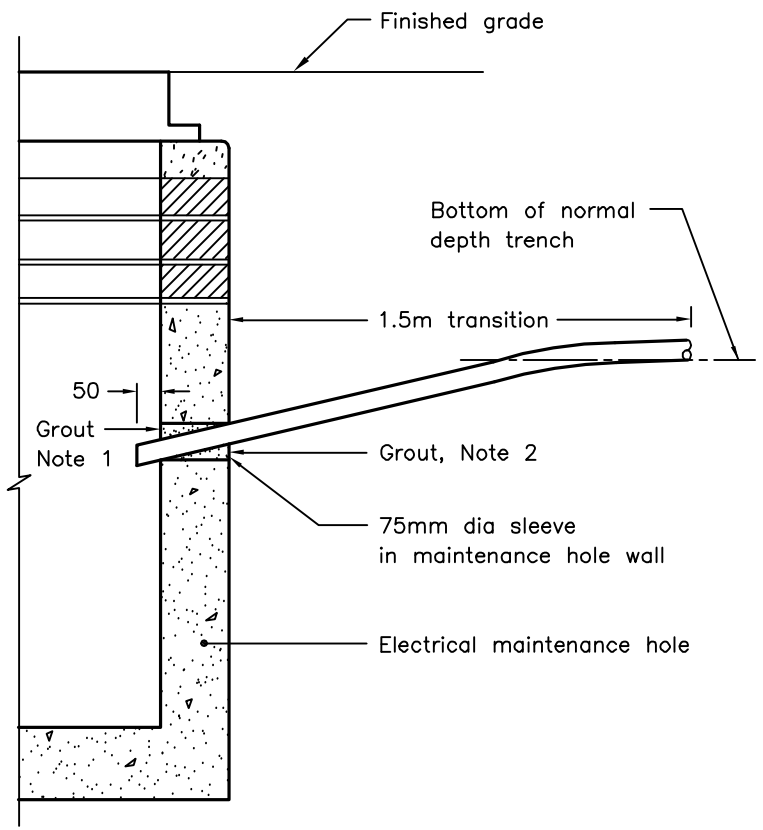
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2017	Rev	0

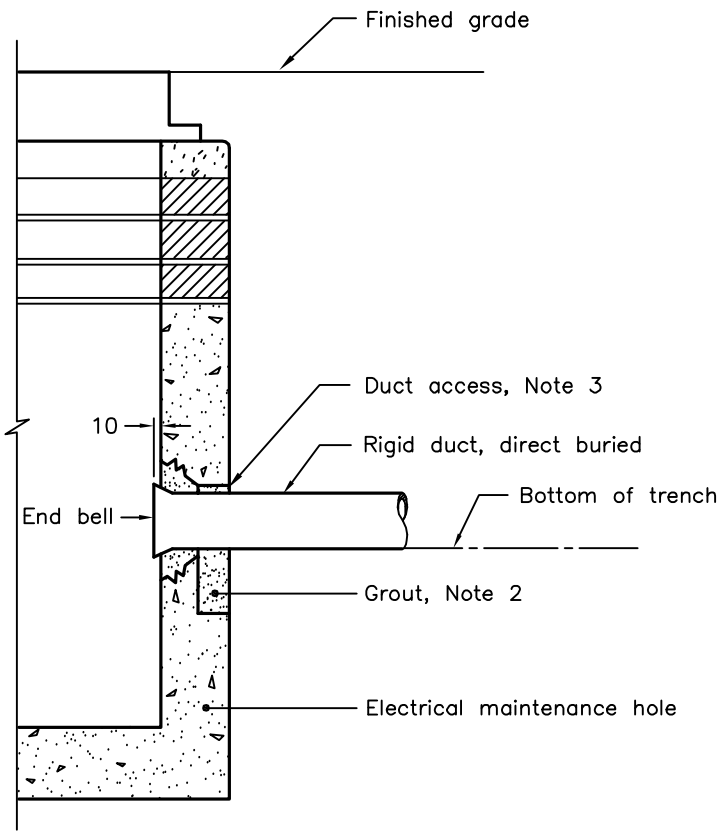
ELECTRICAL HANDHOLES

GENERAL INSTALLATION REQUIREMENTS

OPSD 2117.020



FLEXIBLE DUCTS, DIRECT BURIED

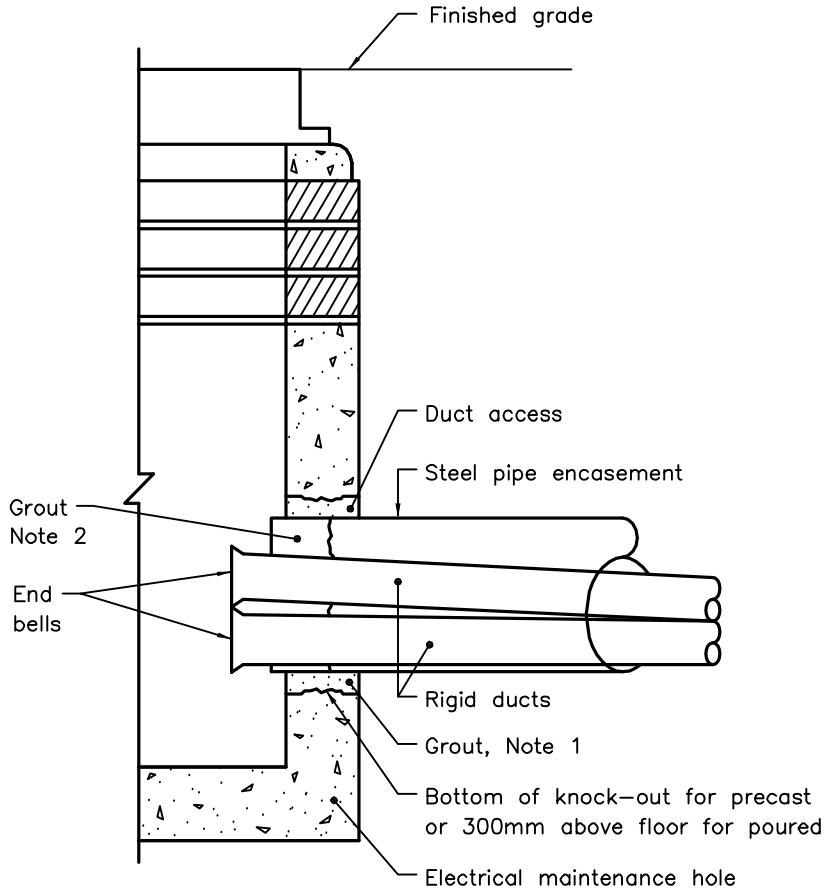


RIGID DUCTS, DIRECT BURIED
OR BY SUB–SURFACE INSTALLATION

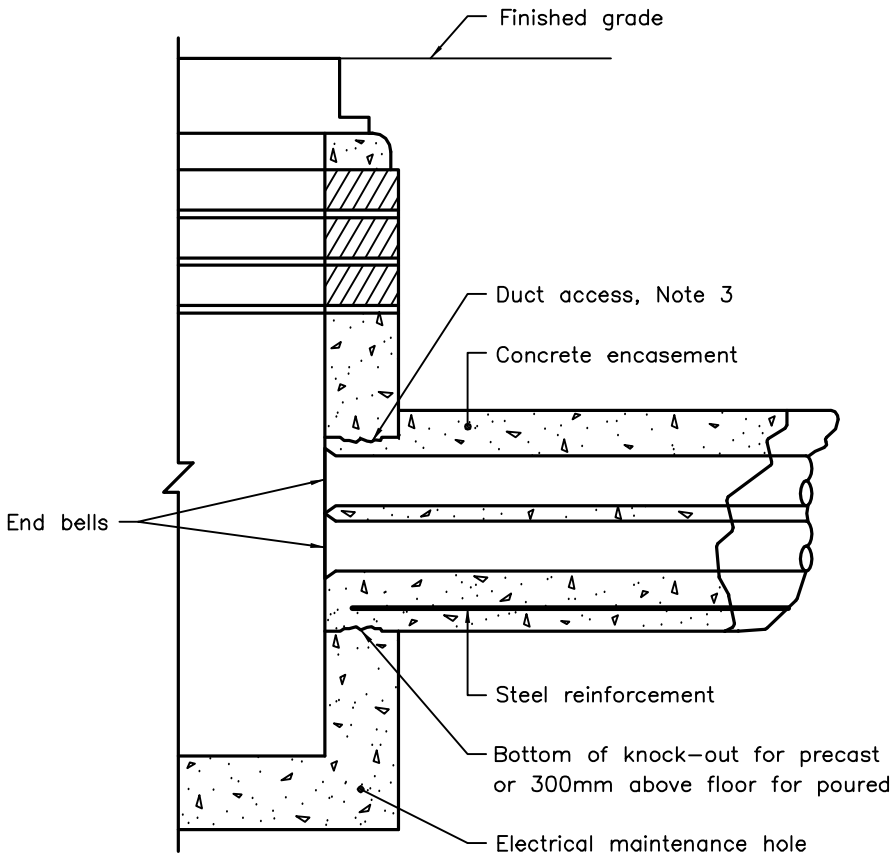
NOTES:

1 Grout shall be placed flush with inside wall to a minimum thickness of 75mm.
2 Grout shall be placed flush with outside wall and full depth, including knock–out cavity in precast maintenance holes.
3 For precast maintenance holes, knock–out holes shall be the minimum size required.
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2013	Rev	1
ELECTRICAL MAINTENANCE HOLES ENTRY OF DIRECT BURIED DUCTS			
	OPSD 2123.01		



RIGID DUCTS, STEEL ENCASED



RIGID DUCTS, CONCRETE ENCASED

NOTES:

1 Grout shall be placed full depth and flush with both walls.

2 Grout shall be placed within steel pipe, around all ducts, to a minimum depth of 75mm.

3 Concrete shall be placed flush with inside wall.

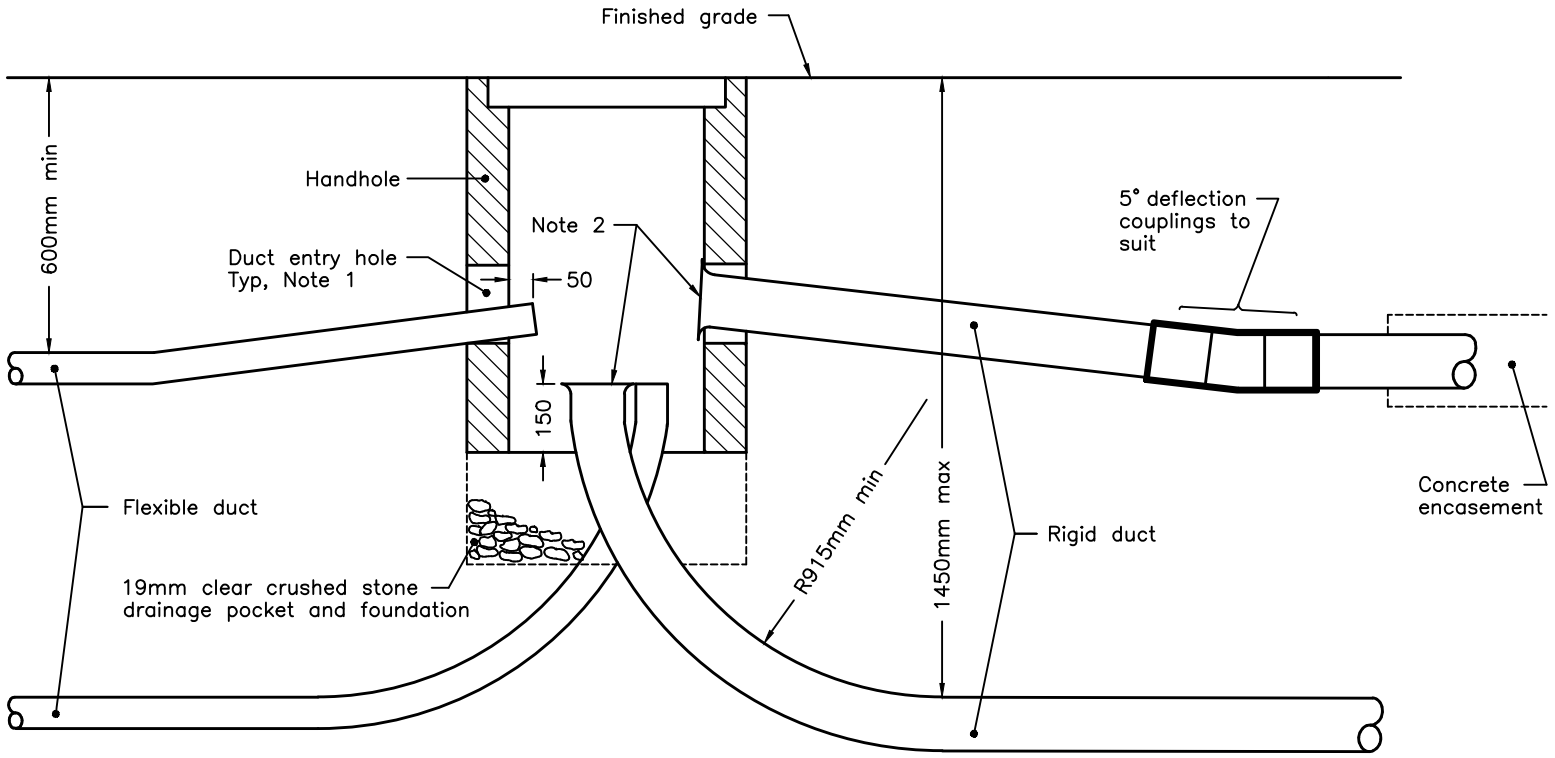
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

ELECTRICAL MAINTENANCE HOLES ENTRY OF ENCASED DUCTS

Nov 2013 | Rev 1

OPSD 2123.02



NOTES:

1 Duct entry holes shall be filled with expandable foam.

2 Rigid ducts terminating in maintenance holes, handholes, or other permanent openings of underground systems shall be provided with an end bell.

A For installation details see OPSD 2117.020.

B All dimensions are in millimetres unless otherwise shown.

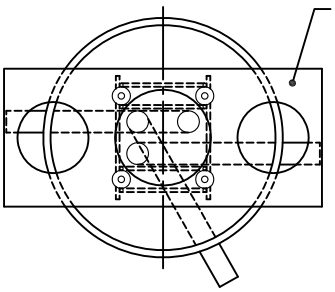
ONTARIO PROVINCIAL STANDARD DRAWING

ELECTRICAL HANDHOLES

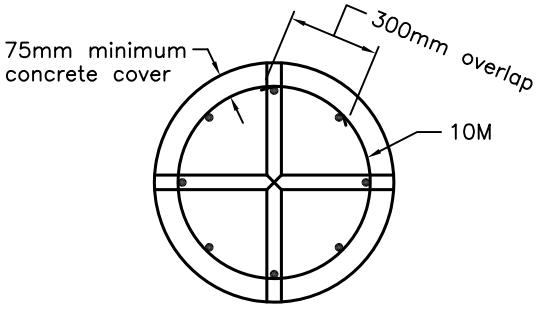
ENTRY OF DIRECT BURIED AND ENCASED DUCTS

Nov 2017	Rev	0

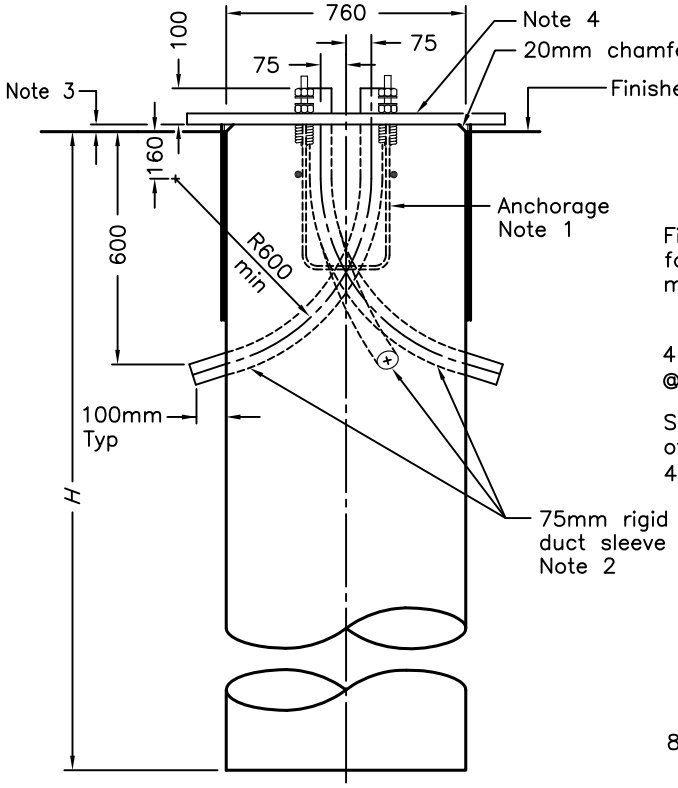
OPSD 2123.030



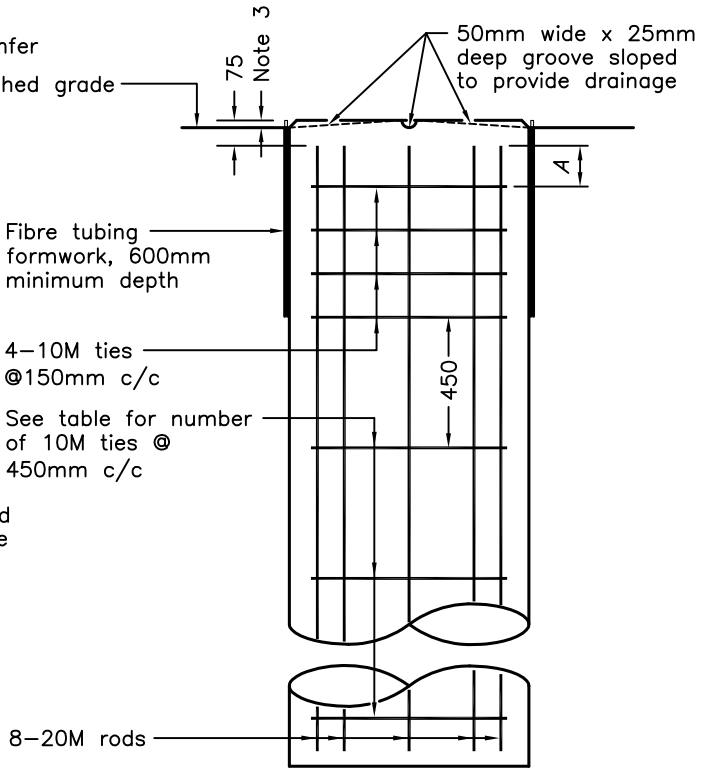
PLAN



PLAN



ELEVATION
LAYOUT



ELEVATION
REINFORCEMENT

NOTES:

1 For anchorage assembly see OPSD 2215.02.
2 Minimum of two sleeves required for each concrete footing. Three sleeves as specified.
3 Top of footing shall be installed at 40mm ±15mm above finished grade in paved or concrete areas and 75mm ±25mm above finished grade in earth or granular areas.
4 Plywood template set level. Remove to finish concrete after initial set.

A For pole mounting details see OPSD 2215.03.
B All dimensions are in millimetres unless otherwise shown.

POLE LENGTH m	BURIAL DEPTH *H* m	ROD LENGTH m	*A* mm	NO. OF 10M TIES @ 450 c/c	BOLT CIRCLE DIA FOR METAL POLES		
					Aluminum	Steel	Sectional Steel
5.6	2.15	2.00	100	3	N/A	N/A	449
7.0	2.15	2.00	100	3	N/A	N/A	449
7.5	2.15	2.00	100	3	406	406	N/A
8.7	2.45	2.30	250	3	N/A	N/A	449
9.0	2.45	2.30	0	4	406	406	N/A
10.5	2.60	2.45	100	4	406	406	449
12.0	2.75	2.60	150	4	406	406	N/A
13.6	2.90	2.75	0	5	406	406	N/A
15.1	3.05	2.90	100	5	406	406	N/A

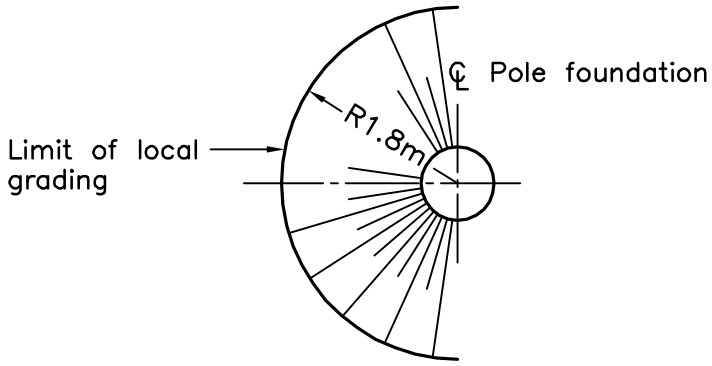
N/A – Not applicable

ONTARIO PROVINCIAL STANDARD DRAWING | Nov 2012 | Rev 2

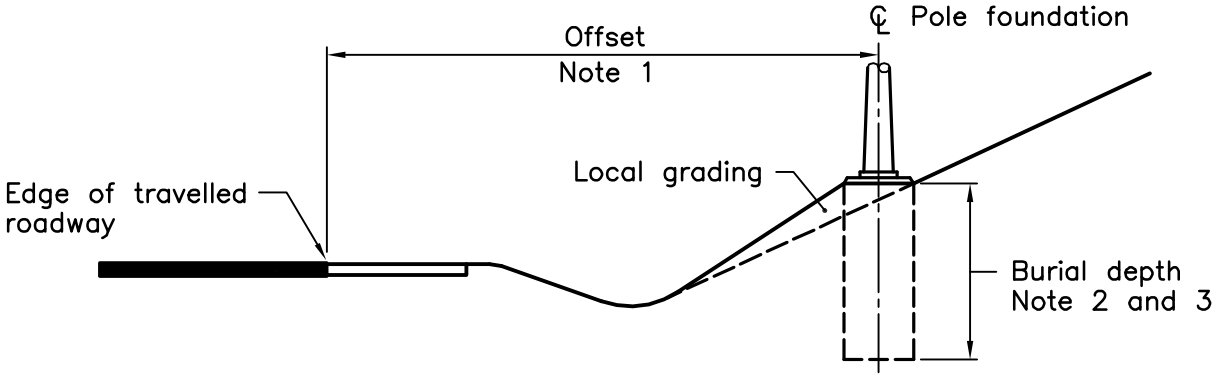
CONCRETE FOOTING FOR BASE MOUNTED LIGHTING AND SIGNAL POLES

ONTARIO STANDARDS · MUNICIPAL – PROVINCIAL ·

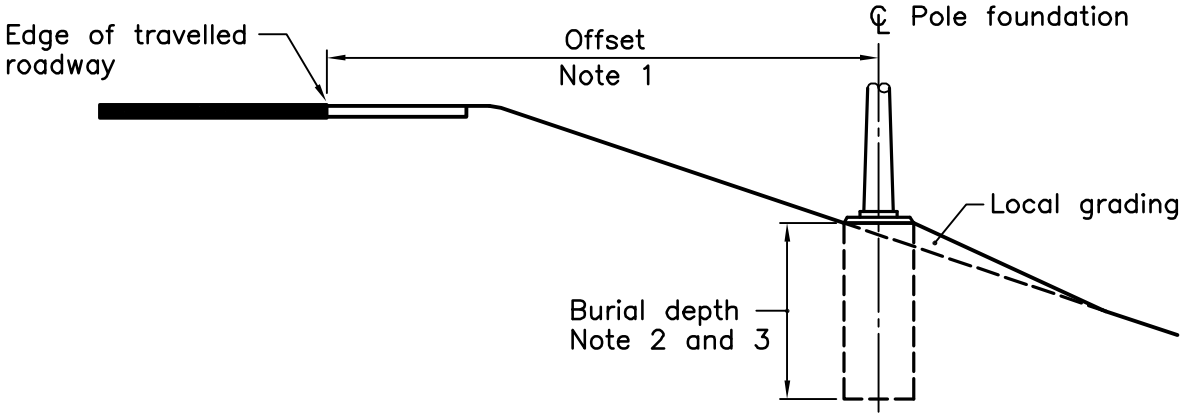
OPSD 2200.01



TYPICAL PLAN



POLE FOUNDATION IN CUT



POLE FOUNDATION IN FILL

NOTES:

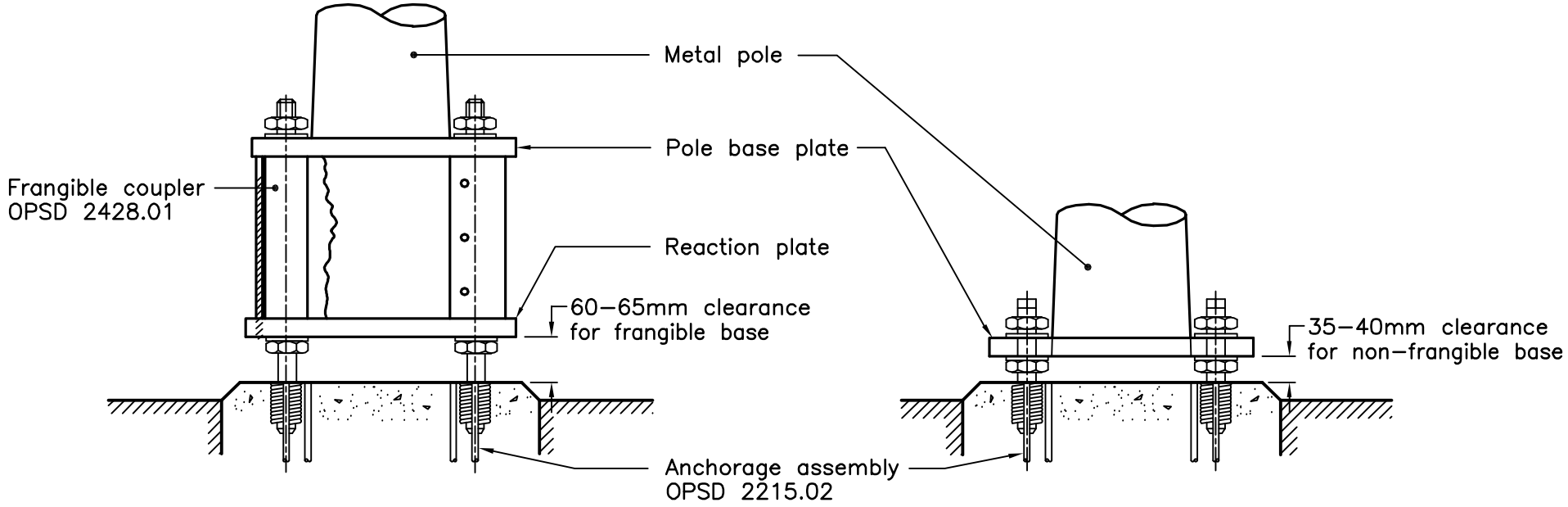
1 Offset dimension as specified in the Contract Documents.

2 Burial depth shall be measured from the highest grade elevation at pole foundation.

3 For burial depths see OPSD 2200.01.

A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2013	Rev	0
LOCAL GRADING AT POLE FOUNDATIONS			
	OPSD 2210.010		



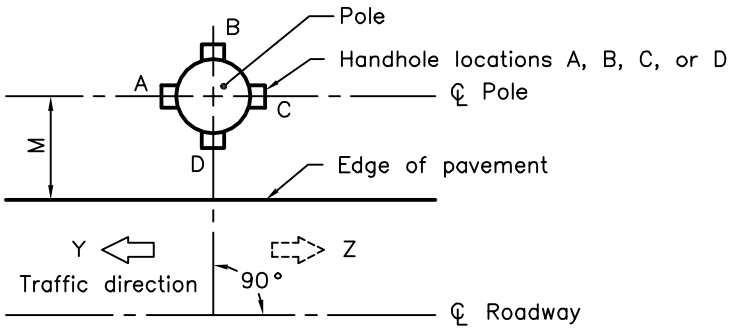
FRANGIBLE BASE – FRANGIBLE COUPLER

NON–FRANGIBLE BASE

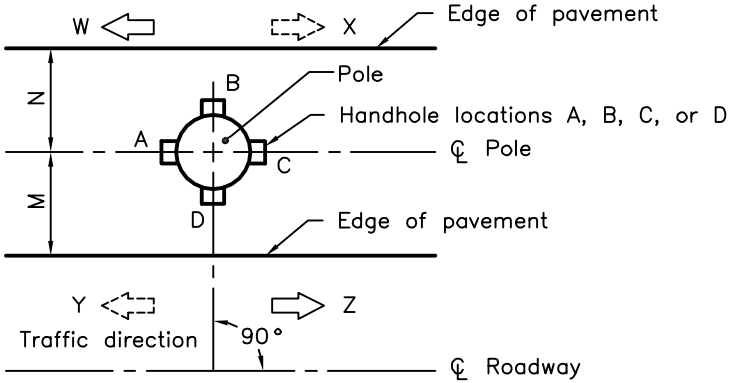
NOTE:

A All dimensions are in millimetres unless otherwise shown.

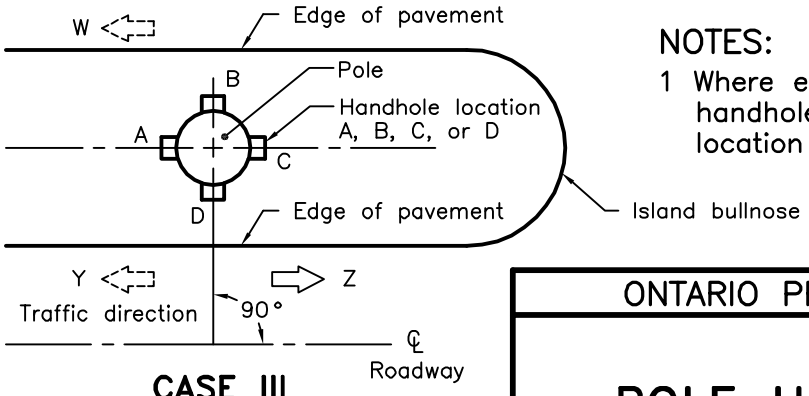
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev	4
POLE MOUNTING DETAILS FOR BASE MOUNTED METAL POLE			
	OPSD 2215.03		



CASE I
ALONG ROADWAYS



CASE II
CONTINUOUS MEDIANS



CASE III
ISLANDS AND BULLNOSES

TYPE OF POLE	POLE USE	CASE	TRAFFIC DIRECTION	HANDHOLE LOCATION
Concrete	Lighting	I	Y	A
		I	Z	C
		II	X and Y or W and Z	A or C
		II	W and Y	A
		II	X and Z	C
Steel or aluminum	Lighting (along roadway)	I	Y	B
		I	Z	B
		II	X and Y or W and Z W and Y or X and Z	B or D for M=N B for N > M D for M > N
	Lighting (on structures)	I	Y	D
		I	Z	D
		II	X and Y or W and Z W and Y or X and Z	B or D for M=N B for N > M D for M > N
Sectional steel, heavy class sectional steel, or heavy class steel	Lighting and traffic signals	I	Y	A or (B Note 1)
		I	Z	C or (B Note 1)
		II	W and Z or X and Y	A or C
		II	W and Y	A
		II	X and Z	C
		III	W and Z	A
		III	W and Y	A

NOTES:

1 Where externally mounted traffic signal equipment interferes with the preferred handhole location, the pole shall be rotated 90° to give the alternative handhole location as indicated.

ONTARIO PROVINCIAL STANDARD DRAWING

POLE HANDHOLE LOCATIONS

Nov 2010 | Rev 1

OPSD 2220.01

MINIMUM VERTICAL CLEARANCES

	LOCATION OF WIRES OR CABLES	MINIMUM VERTICAL CLEARANCES ABOVE FINISHED GRADE									
		COMMUNICATIONS CABLE AND SPAN WIRE	LOW VOLTAGE CABLE 0–750V	HIGH VOLTAGE CABLE							
				>750V ≤22kV	>22kV ≤50kV	>50kV ≤90kV	>90kV ≤120kV	>120kV ≤150kV	>150kV ≤200kV	220kV (360kV)	318kV (500kV)	442kV (735kV)
1	OVER FREEWAYS, EXPRESSWAYS, AND RAMPS	6.0	6.0	6.0	6.0	6.0	6.1	6.4	6.9	10.5	15.7	20.7
2	OVER KING'S HIGHWAYS AND OTHER ROADWAYS	4.7	4.7	5.1	5.5	5.8	6.1	6.4	6.9	10.5	15.7	20.7
3	OVER AREAS LIKELY TO BE TRAVELLED BY VEHICLES (OTHER THAN RESIDENTIAL DRIVEWAYS)	4.7	4.7	5.1	5.5	5.8	6.1	6.4	6.9	10.5	15.7	20.7
4	ALONGSIDE ROADS IN DENSELY POPULATED AREAS	4.7	4.7	5.1	5.5	5.8	6.1	6.4	6.9	10.5	15.7	20.7
5	ALONGSIDE ROADS OR OVER AREAS UNLIKELY TO BE TRAVELLED BY VEHICLES	3.3	3.7	4.5	4.9	5.2	5.5	5.8	6.3	6.5	7.5	8.7
6	OVER RESIDENTIAL DRIVEWAYS	4.0	4.0	5.1	5.5	5.8	6.1	6.4	6.9	10.5	15.7	20.7
7	OVER AREAS ACCESSIBLE TO PEDESTRIANS ONLY	2.8	3.4	3.7	4.0	4.3	4.6	4.9	5.4	5.6	6.6	7.8
8	ABOVE TOP OF RAIL AT RAILWAY CROSSINGS	7.6	7.6	7.9	8.4	8.7	9.0	9.3	9.8	10.0	11.0	12.2

NOTES:

A Clearances shown are under maximum sag conditions as defined in in CSA C22.3 No.1–15.

B Voltages are rms line to ground. Voltages in brackets are phase to phase.

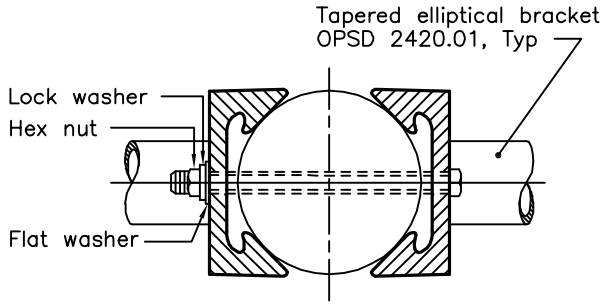
C All dimensions are in metres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

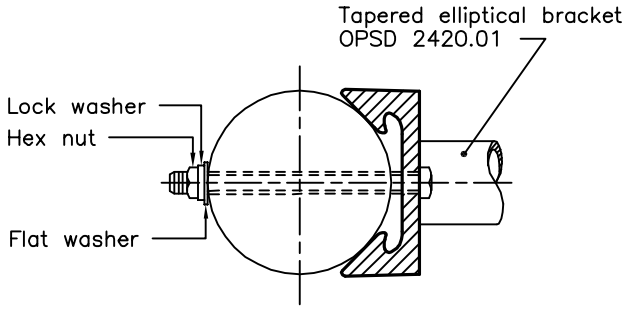
MINIMUM VERTICAL CLEARANCES FOR AERIAL CABLE SYSTEMS

Nov 2017 | Rev 2

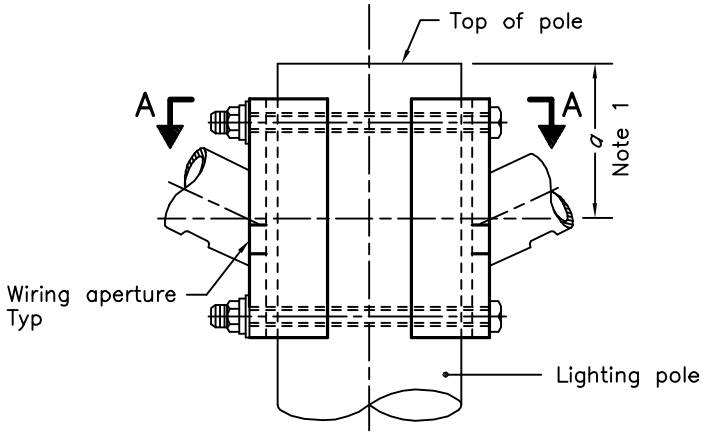
OPSD 2245.020



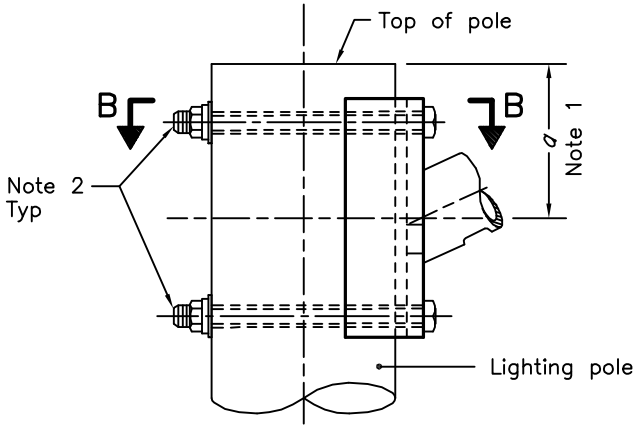
SECTION A–A



SECTION B–B



DOUBLE BRACKET



SINGLE BRACKET

NOTES:

1 For sectional steel poles, dimension σ=300mm.
For all other metal poles and concrete poles, dimension σ=230mm.

2 16mm diameter galvanized steel square head bolt. Bolt length to suit pole.

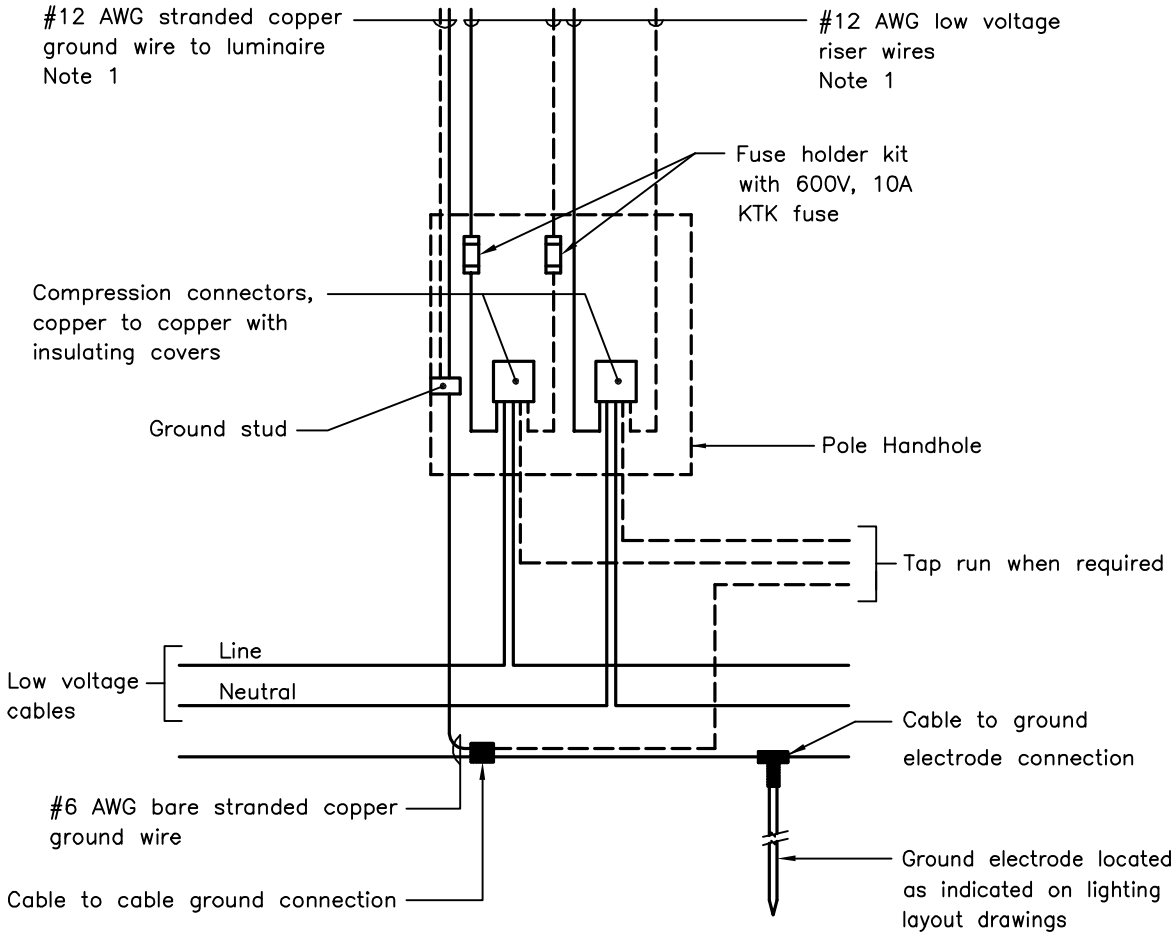
ONTARIO PROVINCIAL STANDARD DRAWING

ALUMINUM TAPERED ELLIPTICAL BRACKETS ON METAL AND CONCRETE POLES

MOUNTING DETAILS

Nov 2016 | Rev 0

OPSD 2250.010



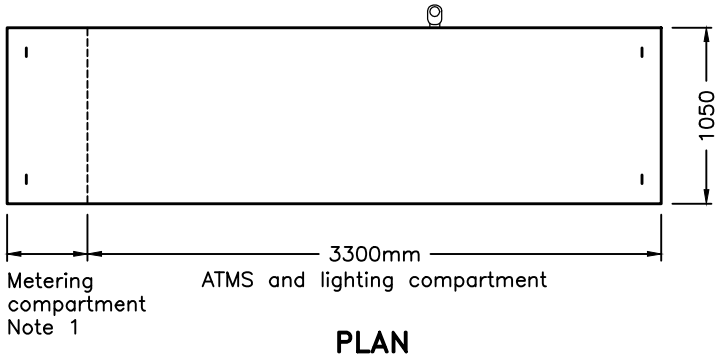
NOTE:

1 Broken lines indicate additional conductors for double luminaire installation.

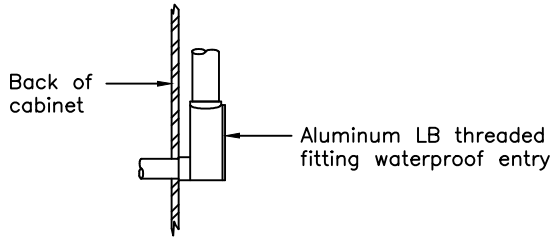
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2013	Rev	1
POLE WIRING DIAGRAM 120V SYSTEM			
	OPSD 2255.010		

1. Service entrance disconnect with nameplate: SERVICE ENTRANCE DISCONNECT
2. Metering socket as specified by power supply authority
3. Main feed switch, 400A, with nameplate: MAIN FEED SWITCH
4. Main splitter, 400A
5. Combination panelboard, 347/600V, 225A, for Advanced Traffic Management Systems, with nameplate: 347/600V ATMS PANEL
6. Relamp switch with nameplate: RELAMP SWITCH
7. Lighting system disconnect with nameplate: 347/600V LIGHTING DISCONNECT
8. Lighting contactor with nameplate: LIGHTING CONTACTOR
9. Secondary lightning arrestor, thyrite type, 650V, 3–pole
10. Panelboard, 347/600V, 225A, lighting system, with nameplate: 347/600V LIGHTING PANEL
11. Utility panel, 120/240V service, with nameplate: 120/240V UTILITY PANEL
12. Utility disconnect, 600V, with nameplate: 600V UTILITY DISCONNECT
13. Dry–type transformer, single phase
14. Light switch with nameplate: CABINET LIGHT SWITCH
15. Photoelectric controller
16. Junction box, 150x150x150mm, complete with terminals for photoelectric controller connection. Terminals shall be identified as Neutral, Line, and Load
17. Enclosed and gasketed luminaire with incandescent lamp and clear glass globe
18. GFCI receptacle, 125V, 15A
19. #2/0 AWG ground wire
20. Copper ground bus
21. Field control circuit wiring, min #12AWG
22. ATMS 225A system feed cable
23. Lighting system feed cable
24. Service cable
25. Service transformer primary feeder, #8AWG
26. Circuit wireway
27. Control circuit wiring, min #12AWG

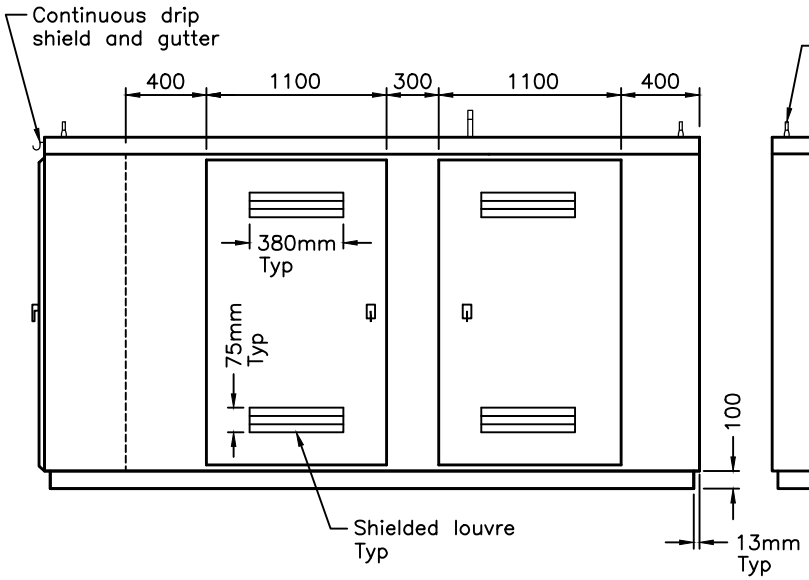
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev	3
DISTRIBUTION ASSEMBLY LEGEND			
	OPSD 2400.000		



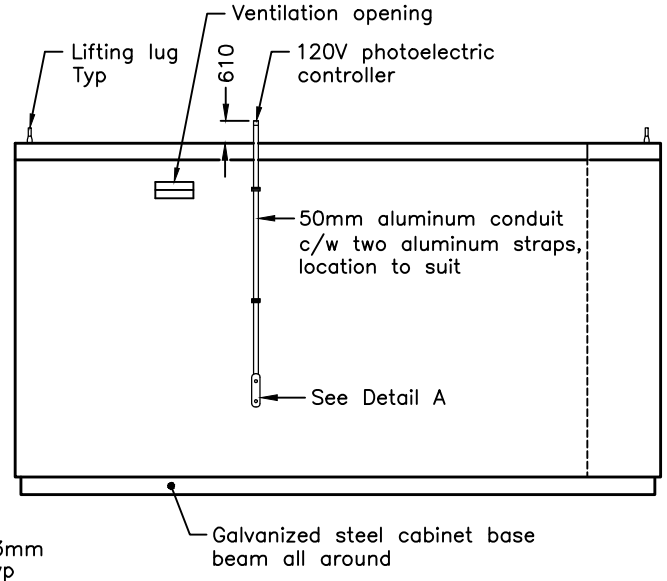
PLAN



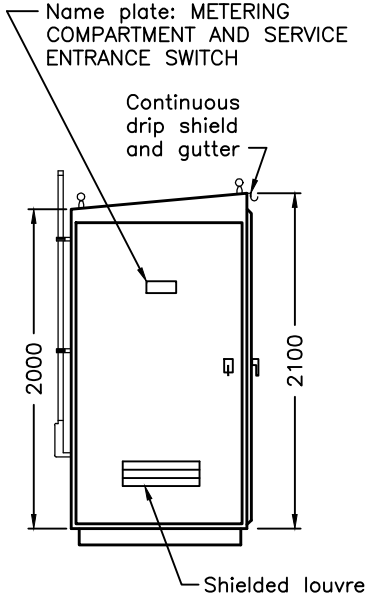
DETAIL A



FRONT ELEVATION



REAR ELEVATION



SIDE ELEVATION

NOTES:

1 Metering compartment as specified by power supply authority. Metering compartment may be a separate stand–alone enclosure.

A This OPSD shall be read in conjunction with OPSD 2400.000 and 2400.020.

B All wiring shall be run in conduit or metal wireway between items of equipment.

C All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

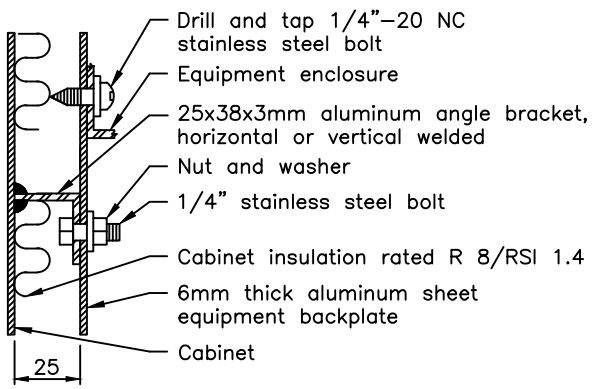
DISTRIBUTION ASSEMBLY

CABINET

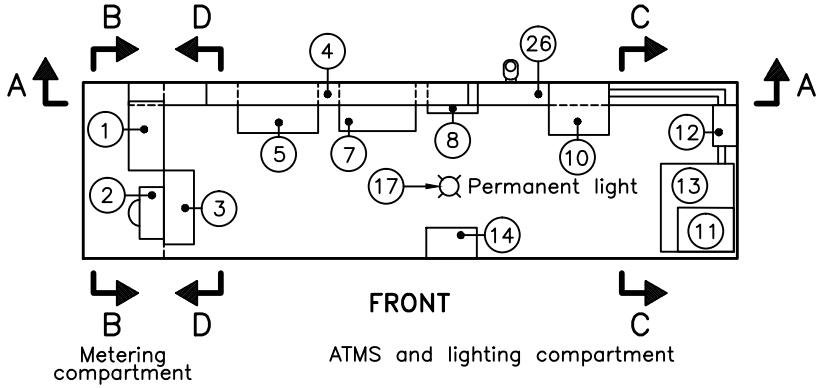
Nov 2018 | Rev 3

ONTARIO STANDARDS • MUNICIPAL – PROVINCIAL •

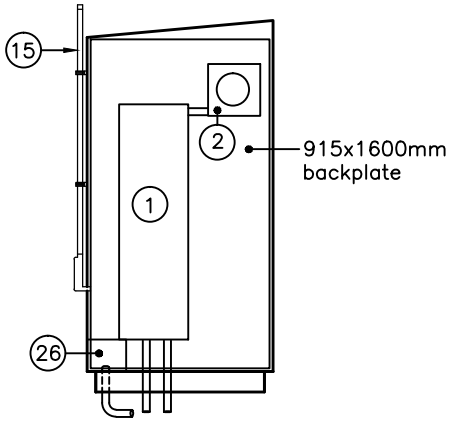
OPSD 2400.010



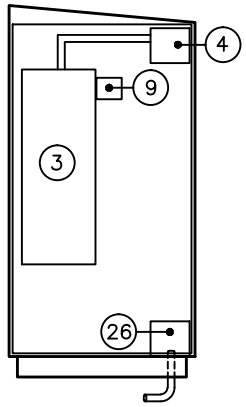
EQUIPMENT MOUNTING DETAIL



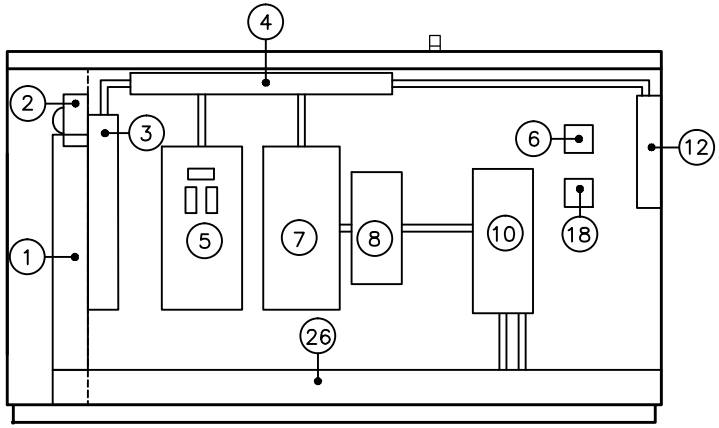
PLAN



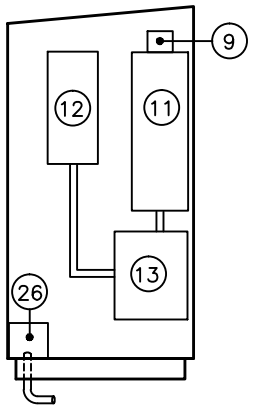
SECTION B–B



SECTION D–D



SECTION A–A



SECTION C–C

NOTES:

A This OPSD shall be read in conjunction with OPSD 2400.000 and 2400.010.

B All dimensions are in millimetres unless otherwise shown.

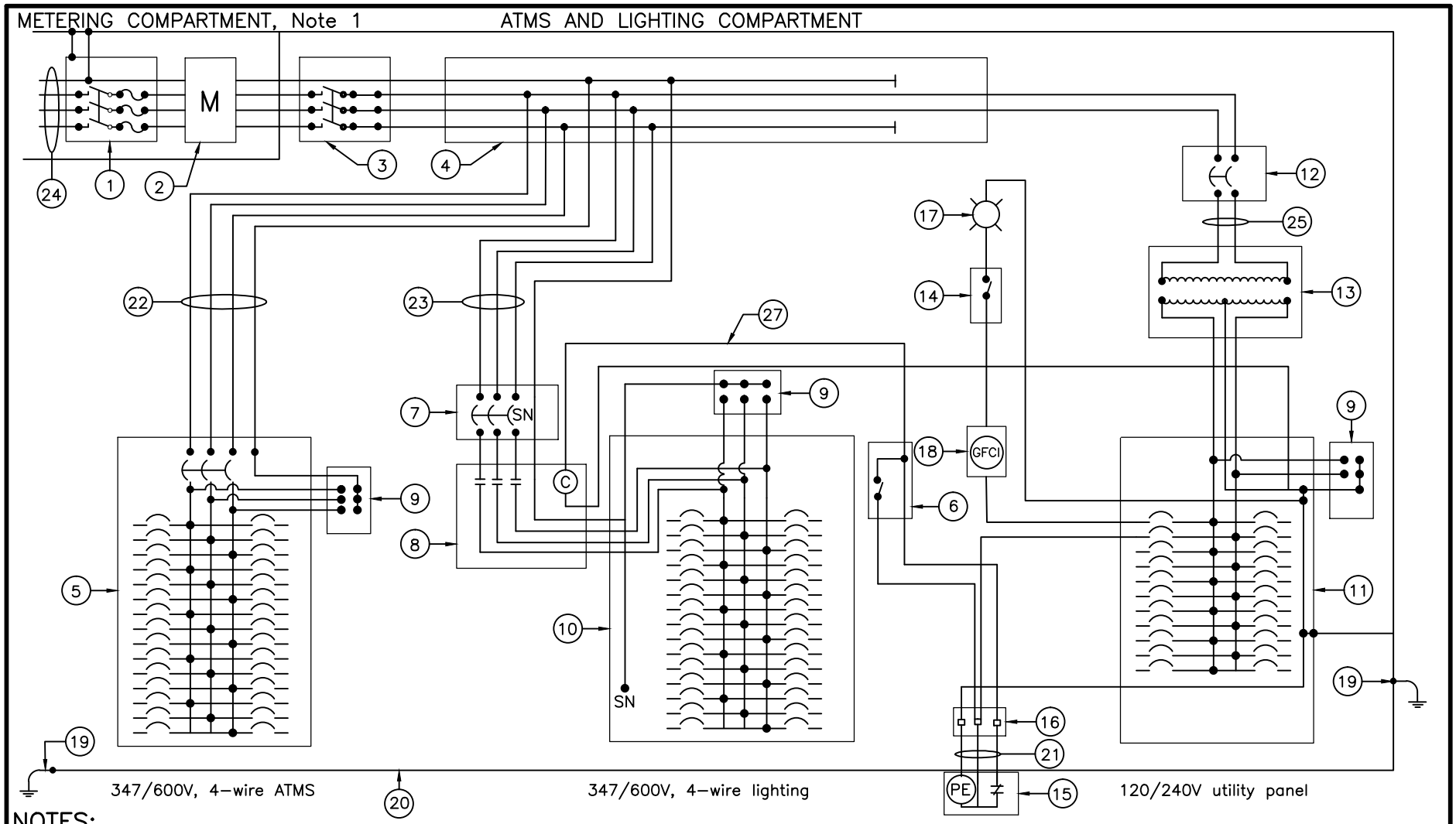
ONTARIO PROVINCIAL STANDARD DRAWING

DISTRIBUTION ASSEMBLY

EQUIPMENT LAYOUT

Nov 2018 | Rev 2

OPSD 2400.020



NOTES:

1 Power supply authority shall provide current taps and voltage transformers for metering during construction.

A Size dependent equipment rating as specified.

B This OPSD shall be read in conjunctionwith OPSD 2400.000.

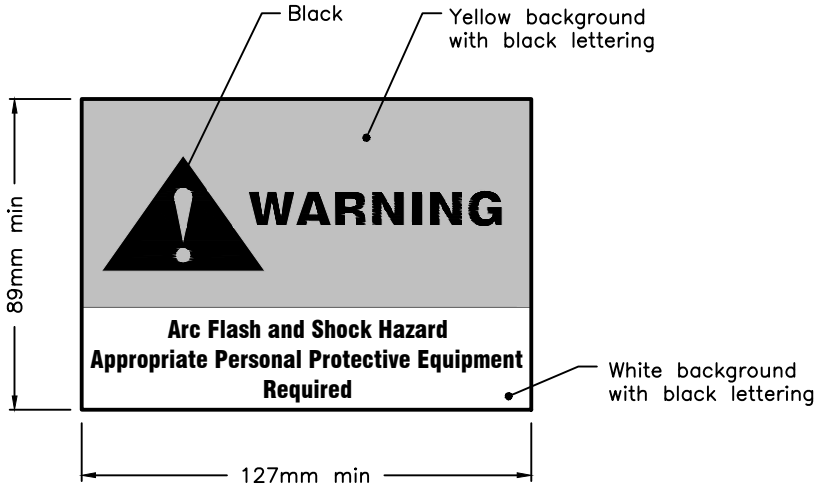
C All dimensions are in millimetres unless otherwise shown.

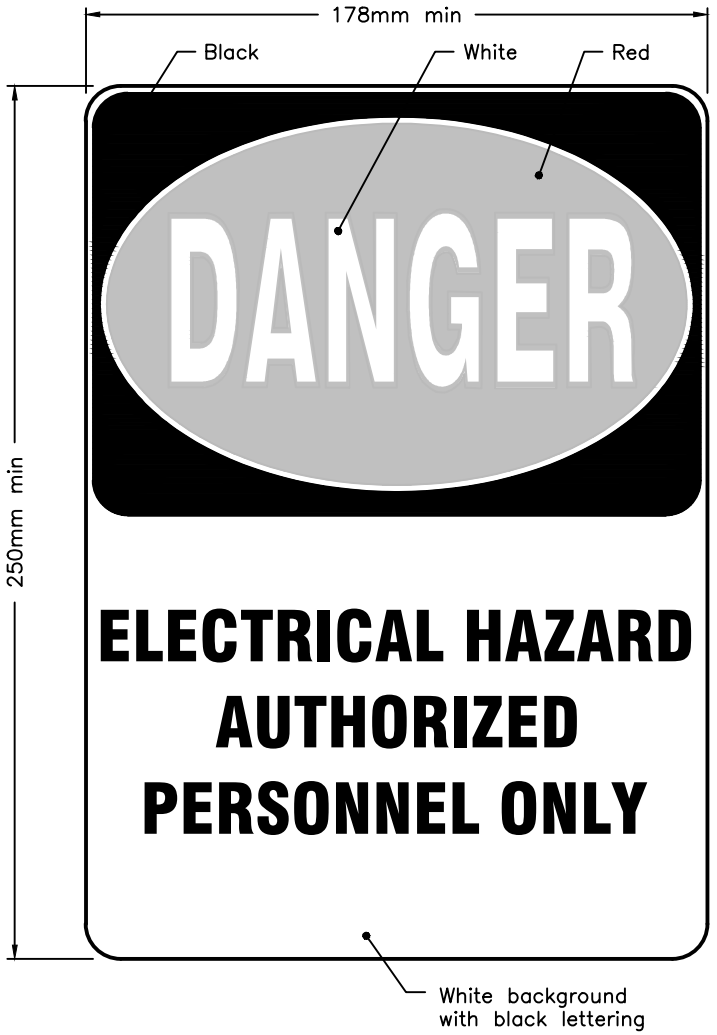
ONTARIO PROVINCIAL STANDARD DRAWING

DISTRIBUTION ASSEMBLY WIRING SCHEMATIC

Nov 2018 | Rev 3

OPSD 2400.030





NOTES:

A Signs shall be fabricated with permanent and weatherproof material.

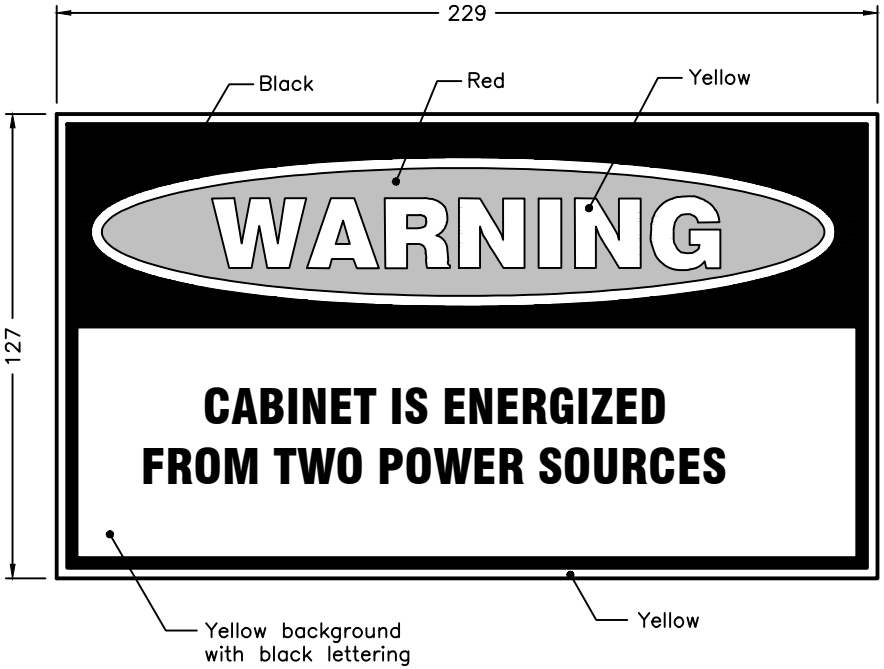
B All dimensions are in millimetres unless otherwise shown.

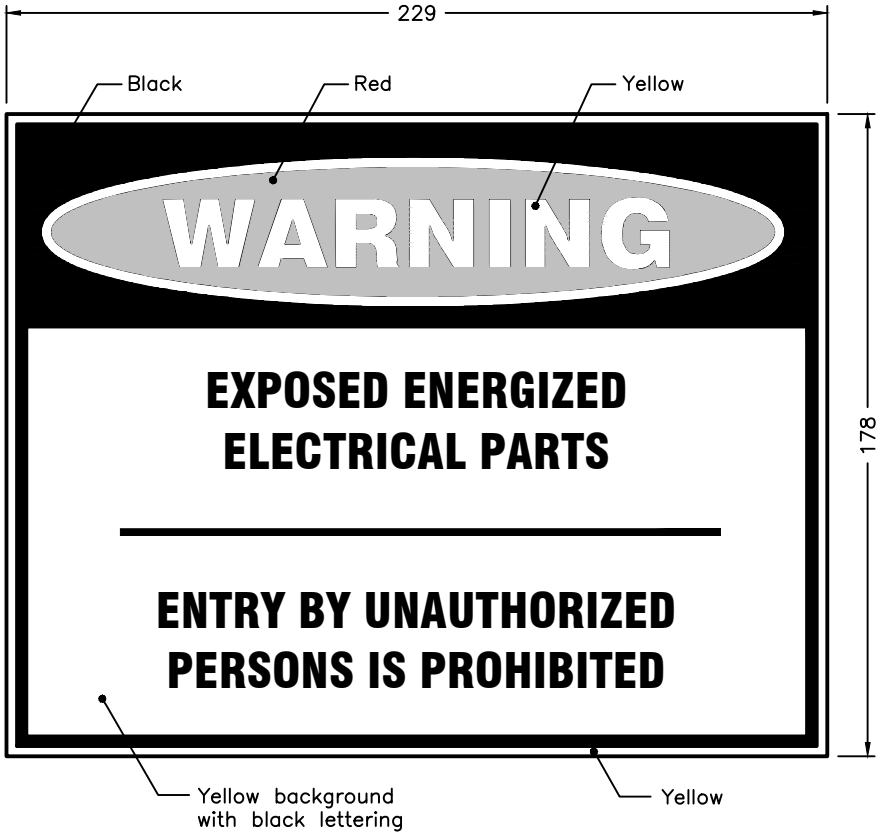
ONTARIO PROVINCIAL STANDARD DRAWING

WARNING SIGNS FOR ELECTRICAL EQUIPMENT

Nov 2018 | Rev 1

OPSD 2400.100





NOTES:

A Signs shall be fabricated with permanent and weatherproof material.

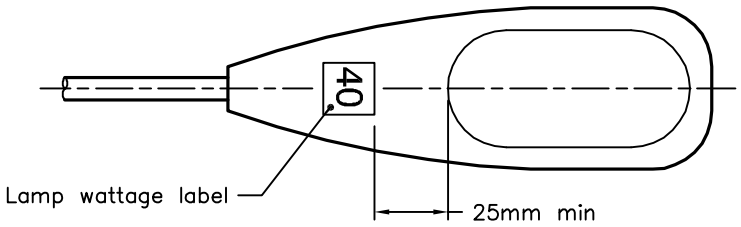
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

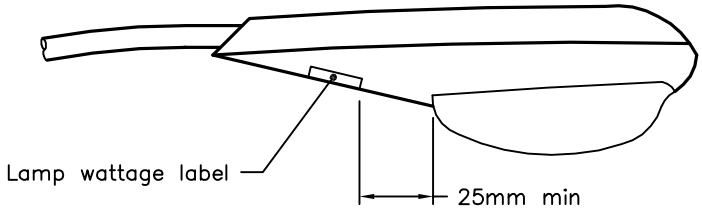
WARNING SIGNS OUTSIDE ELECTRICAL EQUIPMENT

Nov 2018 | Rev 1

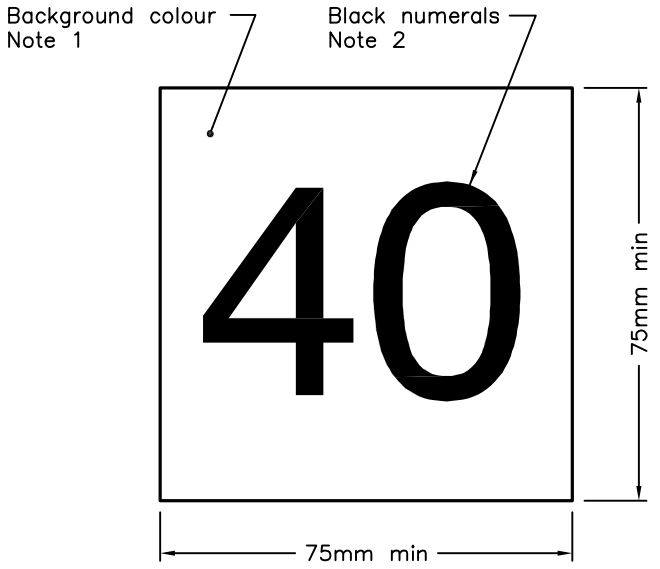
OPSD 2400.101



BOTTOM VIEW



SIDE VIEW



LABEL DIMENSIONS

TYPICAL LAMP WATTAGE CODES	
IDENTIFYING NUMERAL	LAMP WATTAGE
7	70 W
10	100 W
15	150 W
25	250 W
35	350 W
40	400 W

NOTES:

1 A gold background shall be used for high pressure sodium and fluorescent red background for the metal halide labels. Labels shall be made using high visibility reflective sheeting.

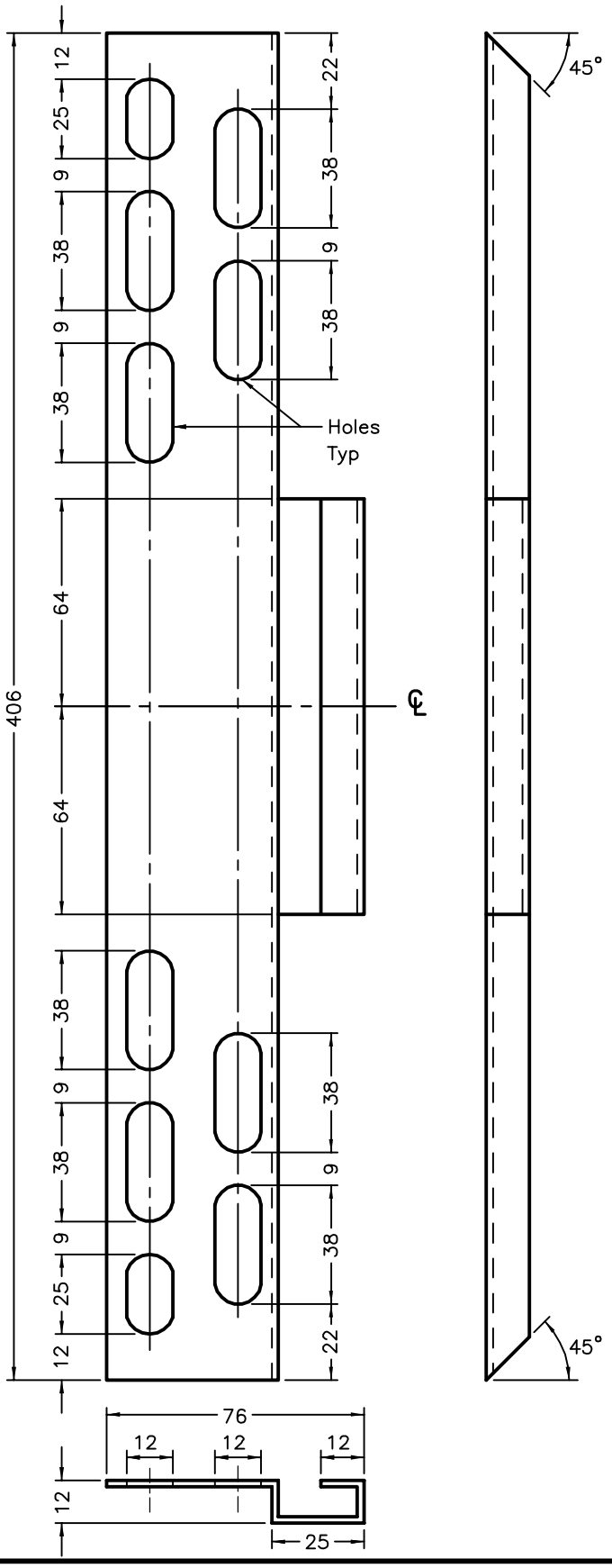
2 All numerals on the labels shall be black and made from 9mm wide line and numerals shall be minimum of 50mm high.

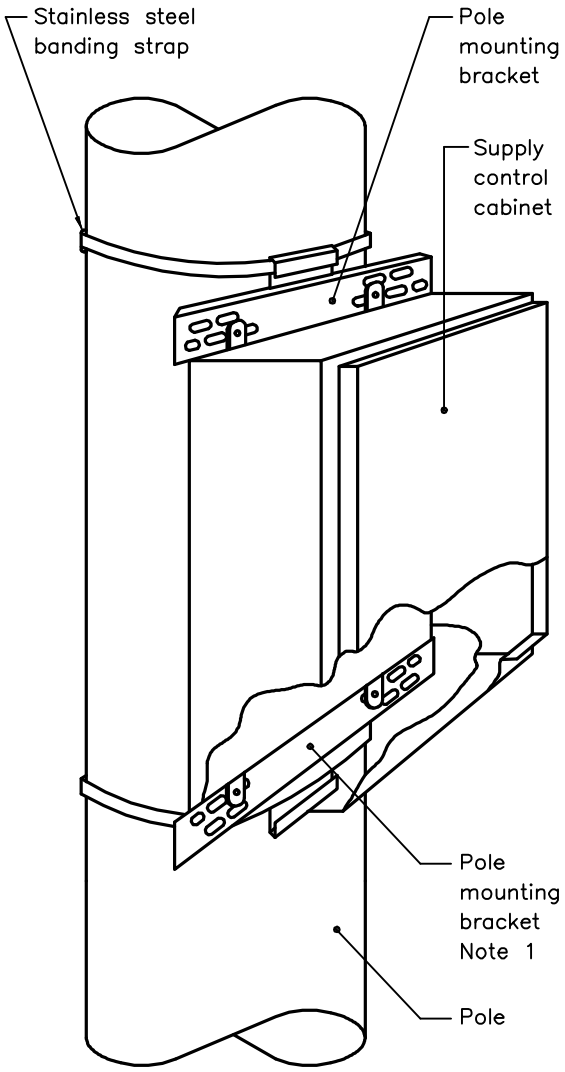
A Do not cover manufacturer's label.

B Labels shall be the peel and stick type.

C All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2016	Rev	1
LAMP WATTAGE LABEL FOR LUMINAIRE			
	OPSD 2421.010		





NOTES:

1 The pole mounting bracket for supply control cabinet assembly shall be #11 gauge stainless steel.

A All burrs and sharp corners shall be removed.

B Pole mounting bracket is required only when the supply cabinet does not have built–in pole mounting provision.

C All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2014 | Rev 1

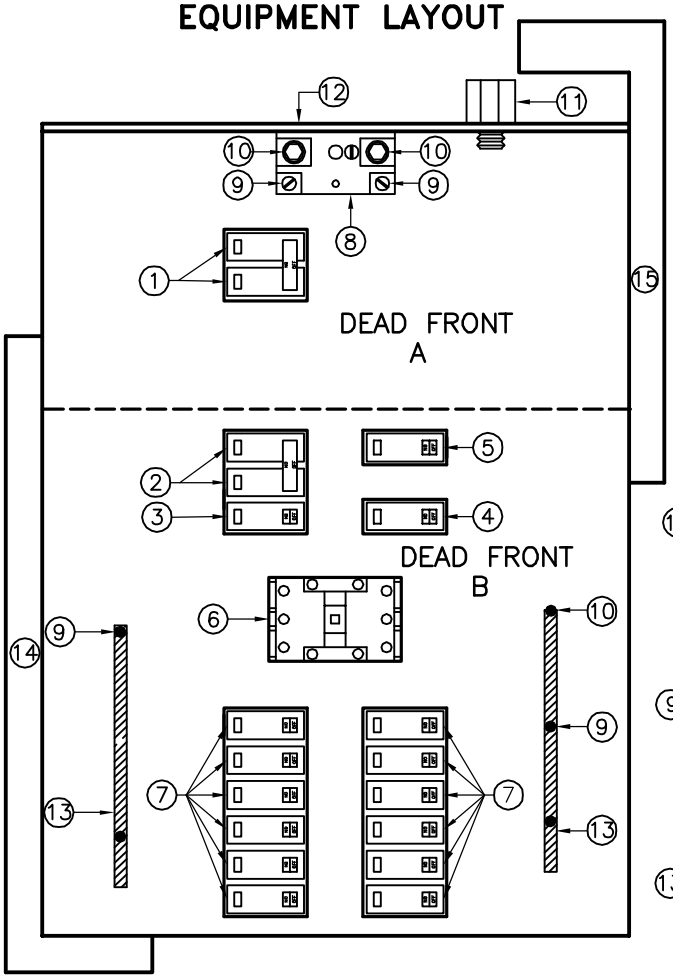
POLE MOUNTING BRACKET

FOR SUPPLY CONTROL CABINET ASSEMBLY

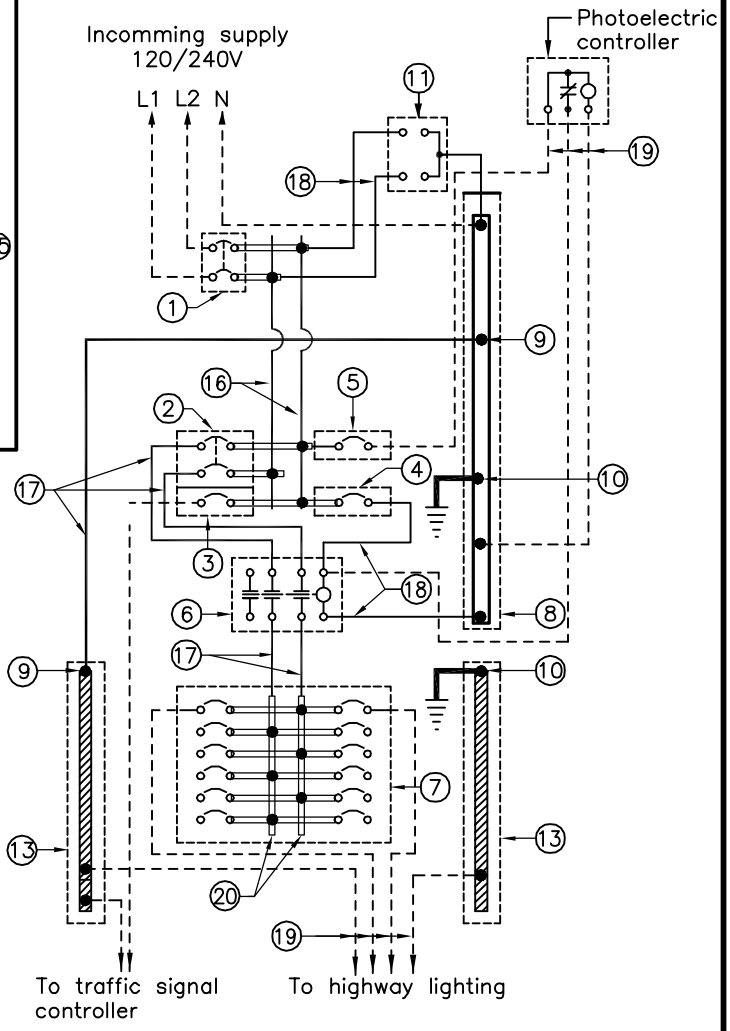
ONTARIO STANDARDS · MUNICIPAL – PROVINCIAL

OPSD 2440.04

EQUIPMENT LAYOUT



SCHEMATIC WIRING DIAGRAM



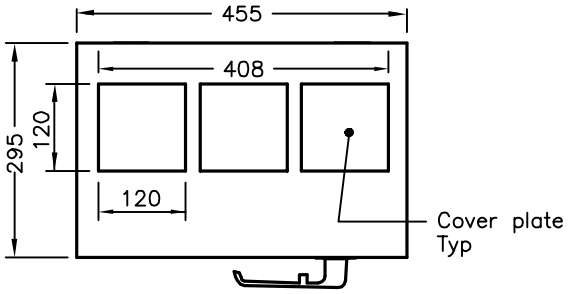
ELECTRICAL EQUIPMENT LIST

1. Main circuit breaker – 100A, 2–pole
2. Lighting circuit breaker – 60A, 2–pole
3. Traffic signal circuit breaker – 1–pole, ampacity as specified
4. Circuit breaker used for relamping – 15A, 1–pole
5. Circuit breaker for photoelectric controller – 15A, 1–pole
6. Lighting contactor – 60A, 2–pole, 120V coil
7. Branch circuit breakers – 30A, 1–pole, number of breakers as specified
8. Solid neutral assembly – 100A minimum, copper
9. Ground lug for No. 6 AWG stranded copper ground wire
10. Ground lug for No. 2/0 AWG stranded copper ground wire
11. Secondary lightning arrester, 650V, 2–pole
12. Drip shield
13. Secondary neutral and ground bus according to CSA and as specified
14. Primary barrier
15. Secondary barrier
16. No. 3 AWG RWU90 wire or copper bus bar
17. No. 6 AWG RWU90 wire
18. No. 12 AWG RWU90 wire
19. Field wiring
20. Copper bus bar

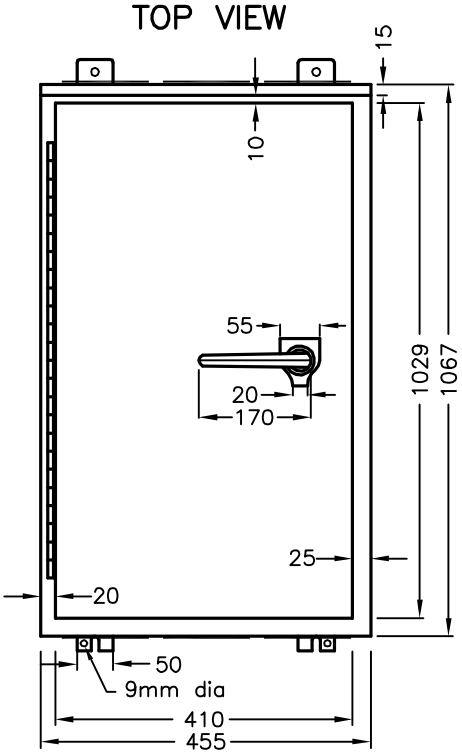
NOTE:

A This OPSD shall be read in conjunction with OPSD 2440.030, 2440.050, and 2440.060.

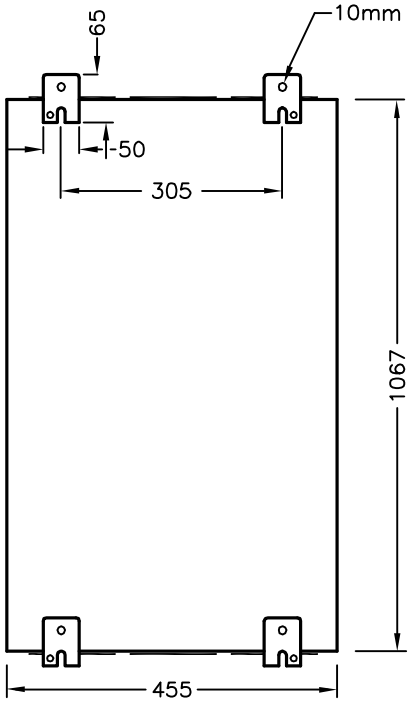
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev	1
SUPPLY CONTROL CABINET ASSEMBLY TYPE 1 **120/240V, 100A, 1–PHASE, 3–WIRE**	_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _		
	OPSD 2440.010		



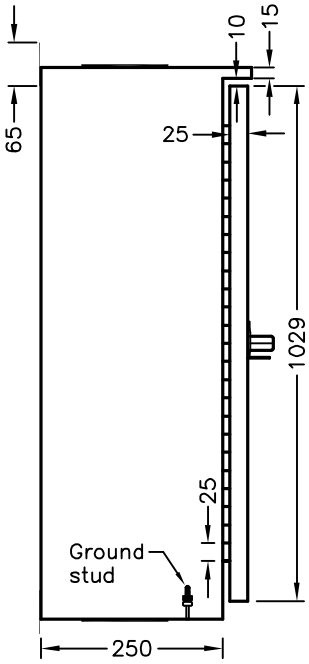
TOP VIEW



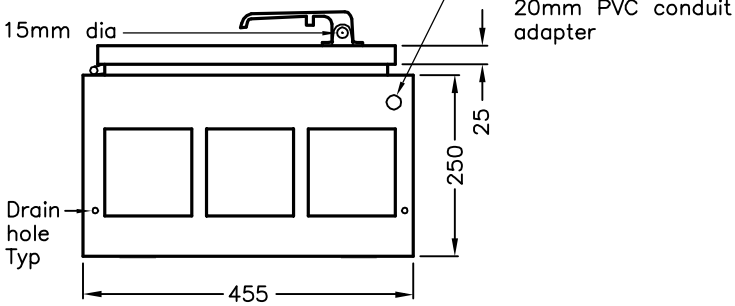
FRONT VIEW



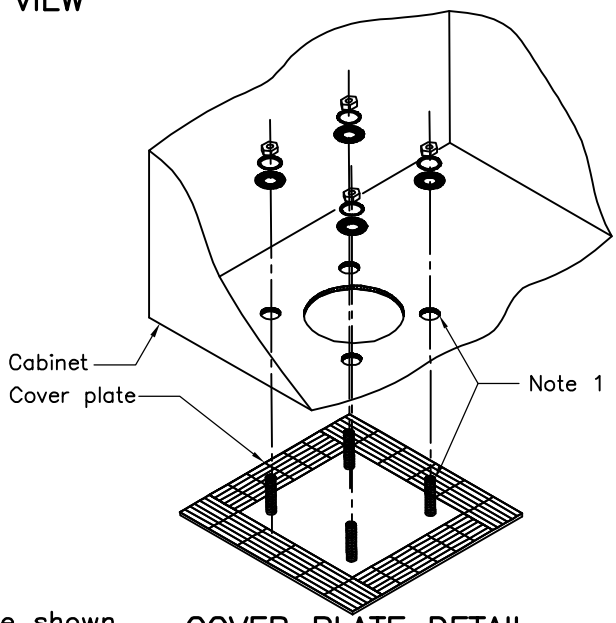
BACK VIEW



SIDE VIEW



BOTTOM VIEW



COVER PLATE DETAIL

NOTES:

1 Bolt and hole pattern shall suit meter hub.

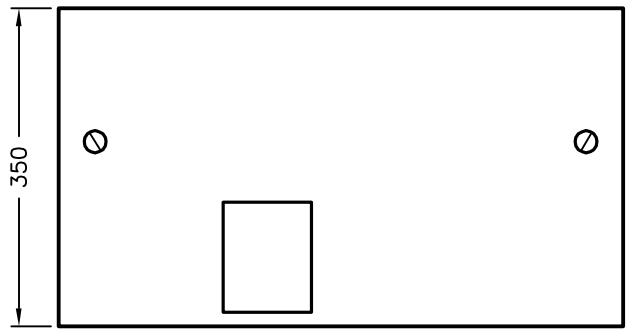
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

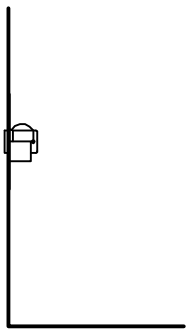
Nov 2014 | Rev 1

SUPPLY CONTROL CABINET ASSEMBLY TYPE 1 AND 2 ENCLOSURE

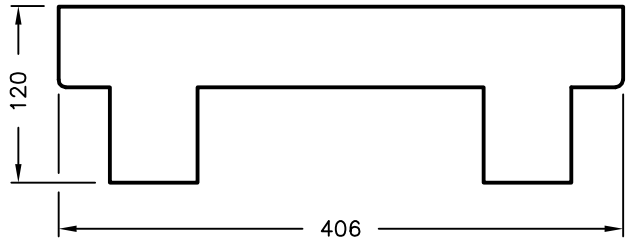
OPSD 2440.030



FRONT VIEW

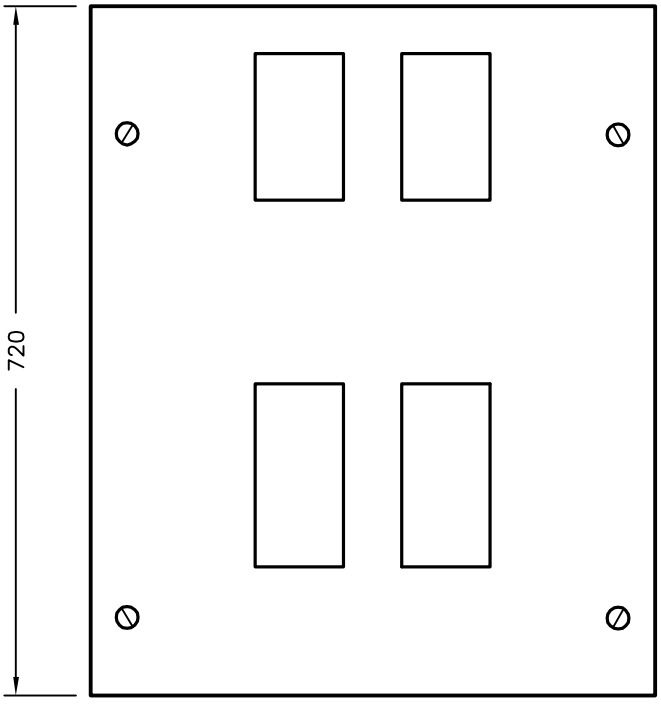


SIDE VIEW

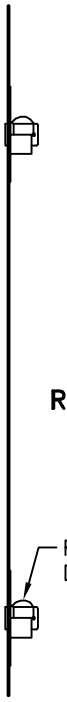


BOTTOM VIEW, Note 1

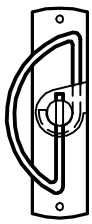
DEAD FRONT A



FRONT VIEW



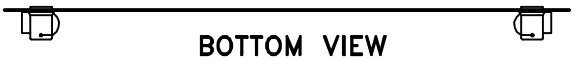
SIDE VIEW



BACK VIEW OF
RETAINING SCREW

DETAIL A

Retaining screw
Detail A



BOTTOM VIEW

DEAD FRONT B

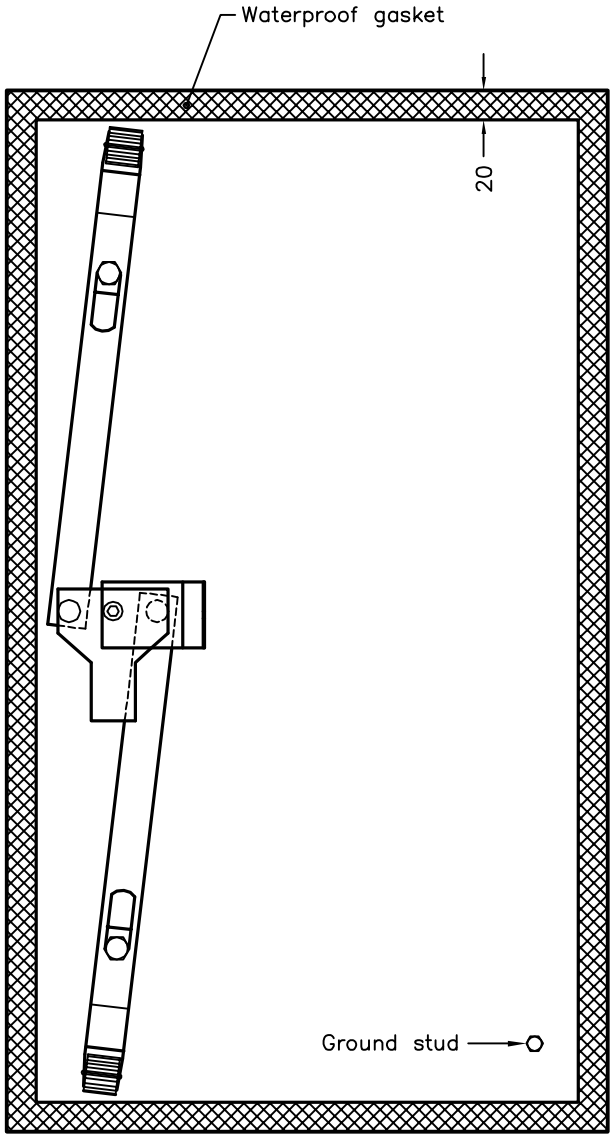
NOTES:

1 Size and position of openings to suit main and branch circuit breakers.

A Tolerances shall be within ±3mm unless otherwise shown.

B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev	1
SUPPLY CONTROL CABINET ASSEMBLY TYPE 1 AND 2 DEAD FRONT PANELS			
	OPSD 2440.050		



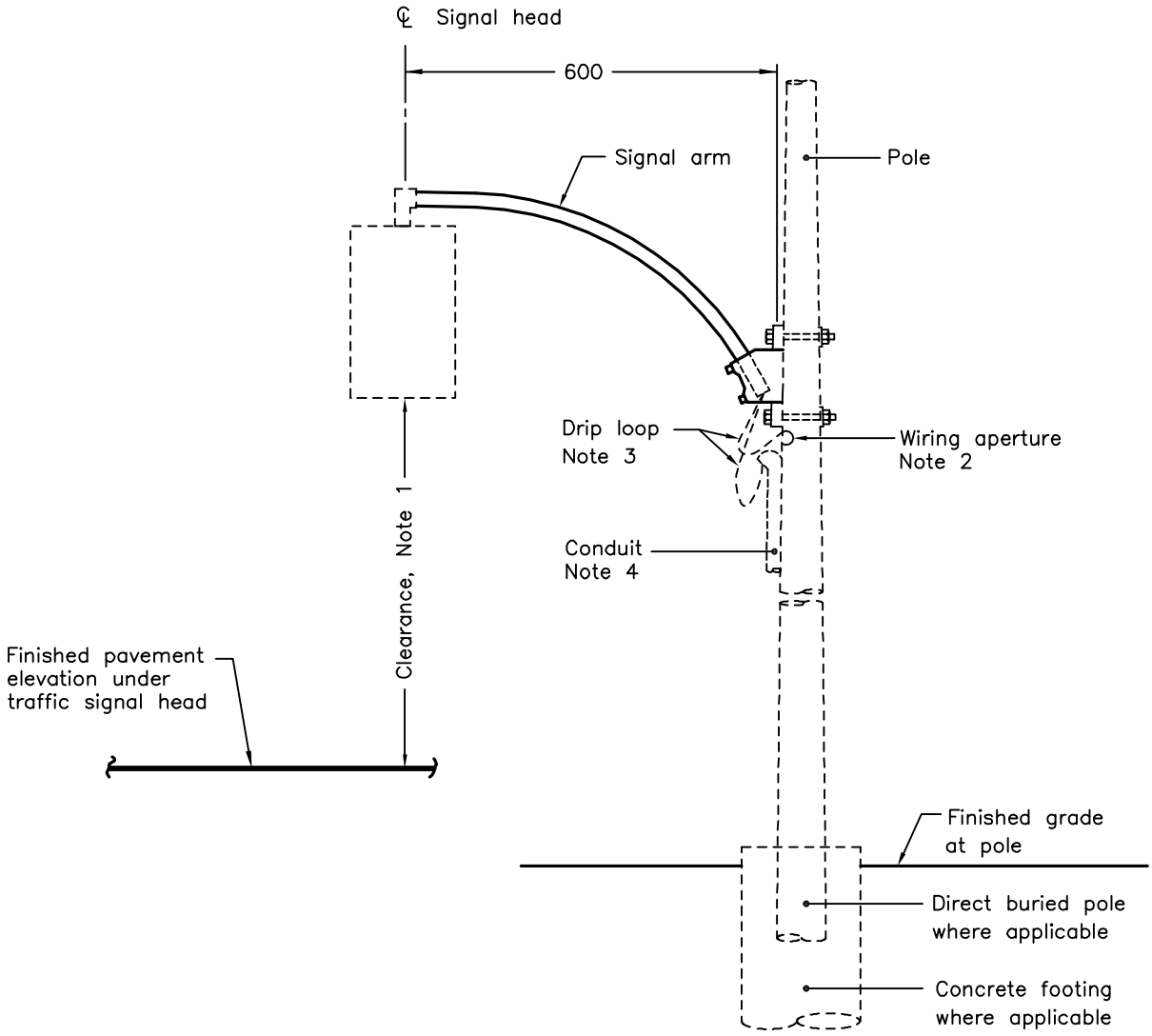
INSIDE DOOR VIEW

NOTES:

A Tolerances shall be within ±3mm unless otherwise shown.

B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev	1
SUPPLY CONTROL CABINET ASSEMBLY TYPE 1 AND 2 3–POINT DOOR LATCH			
	OPSD 2440.060		



NOTES:

1 The bottom of the signal head shall be a minimum of 5.0m above the highest point on the roadway, regardless of whether the signal head is above the pavement or not.

2 Wiring aperture shall be 25mm diameter field drilled complete with rubber grommet, 25mm below arm attachment or 25mm below overlapping sectional steel joints, deburred, and protected with zinc rich paint.

3 Drip loops shall be provided.

4 For external conduit system on wooden or concrete poles refer to OPSD 2552.010 or OPSD 2554.010.

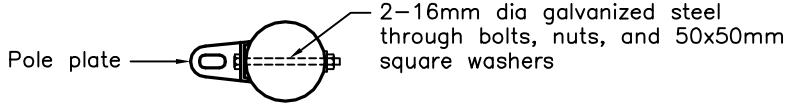
A For arm attachment details refer to OPSD 2500.020.

B For traffic signal head wiring details refer to OPSD 2528.010.

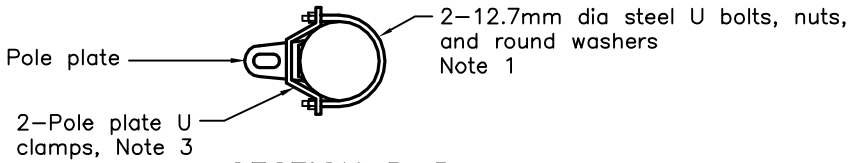
C Traffic signal hanger details shall be as specified.

D All dimensions are in millimetres unless otherwise shown.

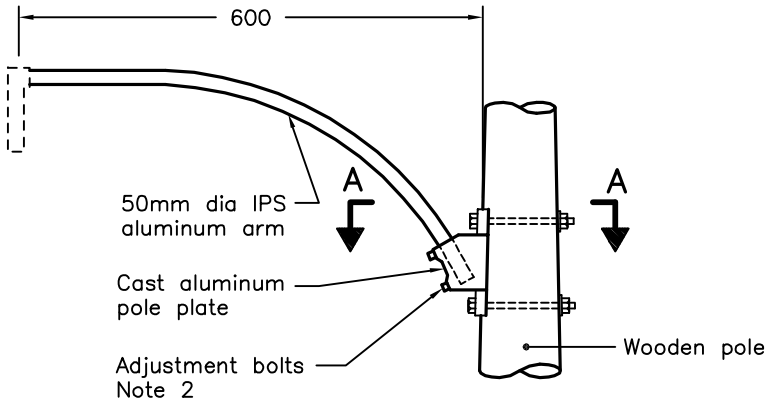
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2017	Rev	2
600mm SIGNAL ARM AND SIGNAL HEAD			
	OPSD 2500.010		



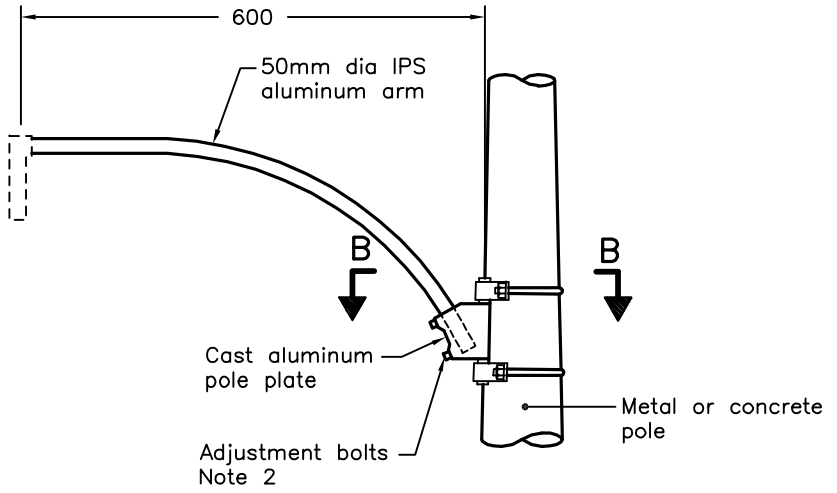
SECTION A–A



SECTION B–B



ATTACHMENT TYPE 2
WOODEN POLE



ATTACHMENT TYPE 1
METAL AND CONCRETE POLE

NOTES:

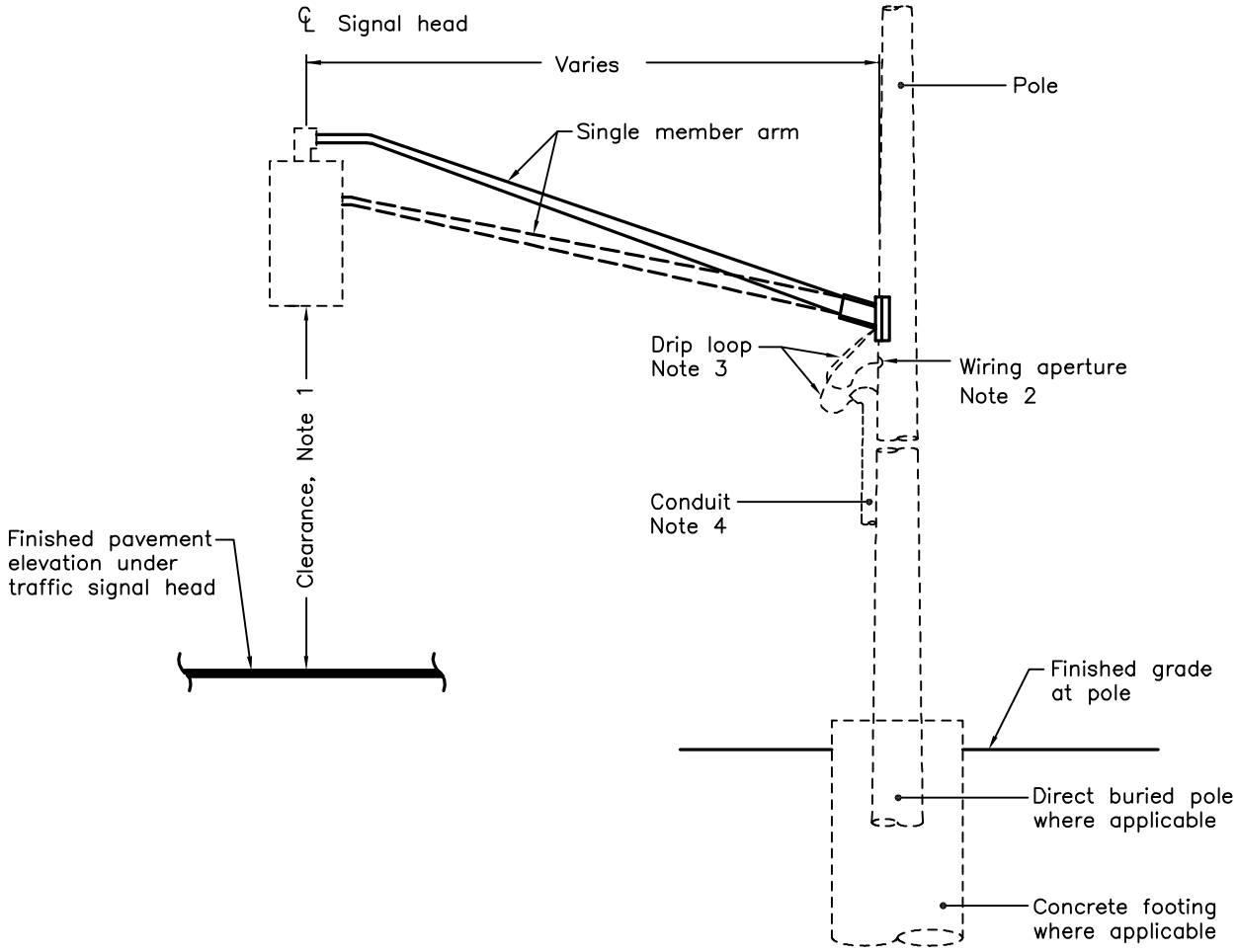
1 12.7mm diameter U bolts shall be no more than 25mm larger in diameter than the diameter of the pole at the point of attachment.
2 Adjustment bolts shall be adjusted so the straight portion of the arm is level.
3 Pole plate U clamps shall be 8mm hot dip galvanized steel plate and suit the pole diameter.
A This OPSD shall be read in conjunction with OPSD 2500.010.
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

600mm SIGNAL ARM ATTACHMENT TO POLES

Nov 2017 | Rev 2

OPSD 2500.020



NOTES:

1 The bottom of the signal head shall be a minimum of 5.0m above the highest point on the roadway, regardless of whether the signal head is above the pavement or not.

2 Wiring aperture shall be 25mm diameter field drilled complete with rubber grommet, 25mm below arm attachment or 25mm below overlapping sectional steel joints, deburred, and protected with zinc rich paint.

3 Drip loops shall be provided.

4 For external conduit system on wooden or concrete poles refer to OPSD 2552.010 or OPSD 2554.010.

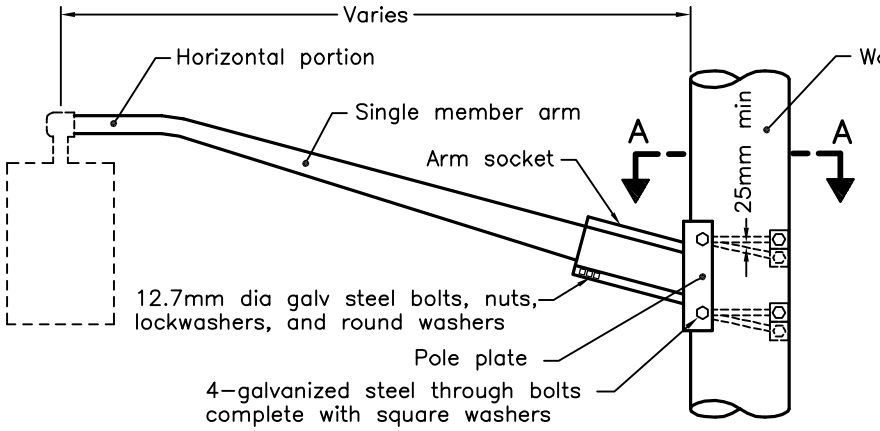
A For arm attachment details refer to OPSD 2500.020.

B For traffic signal head wiring details refer to OPSD 2528.010.

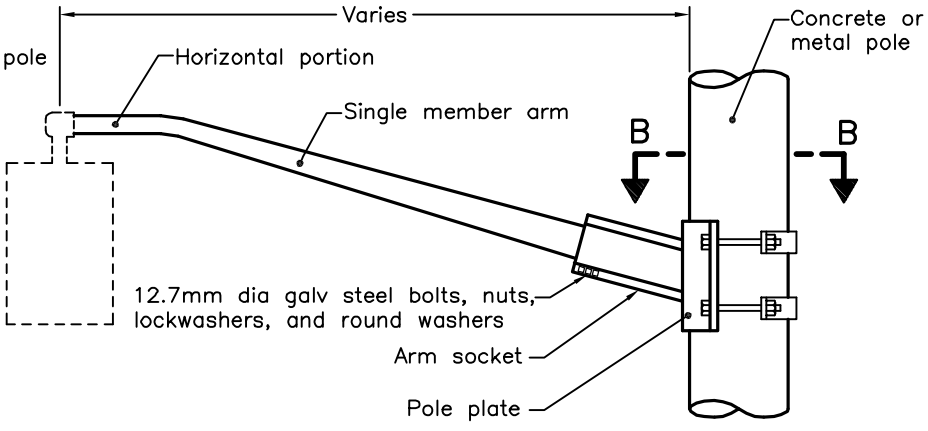
C Traffic signal hanger details shall be as specified.

D All dimensions are in millimetres unless otherwise shown.

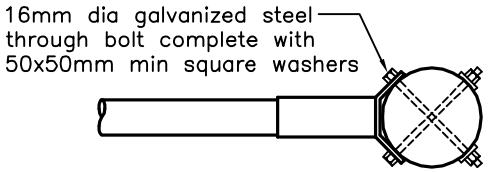
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2017	Rev	0
SINGLE MEMBER ARM AND SIGNAL HEAD			
	OPSD 2501.010		



GENERAL ARRANGEMENT



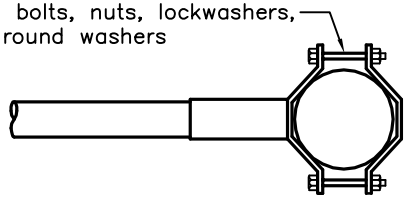
GENERAL ARRANGEMENT



SECTION A–A

WOODEN POLE ATTACHMENT

NOTE1



SECTION B–B

CONCRETE AND METAL POLE ATTACHMENT

NOTE 2

NOTES:

1 For 1.2 to 2.4m arms, use 3.2mm thick arm sockets and 6.3mm thick pole plates.
For 3.0 to 6.7m arms, use 4.7mm thick arm sockets and 9.5mm thick pole plates.

2 For 1.2 to 2.4m arms, use 3.2mm thick arm sockets, 6.3mm thick pole plates, and 15mm dia bolts.
For 3.0 to 6.7m arms, use 4.7mm thick arm sockets, 9.5mm thick pole plates, and 19mm dia bolts.

A For pole attachment locations refer to OPSD 2501.010.

B Traffic signal hanger details as specified.

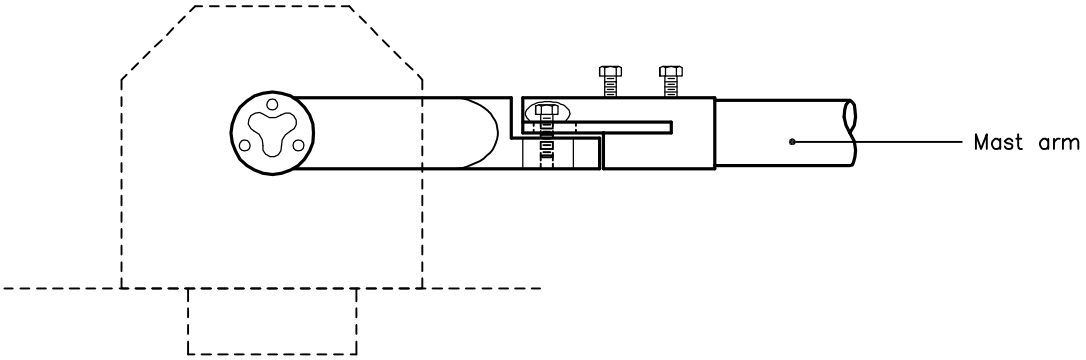
C All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

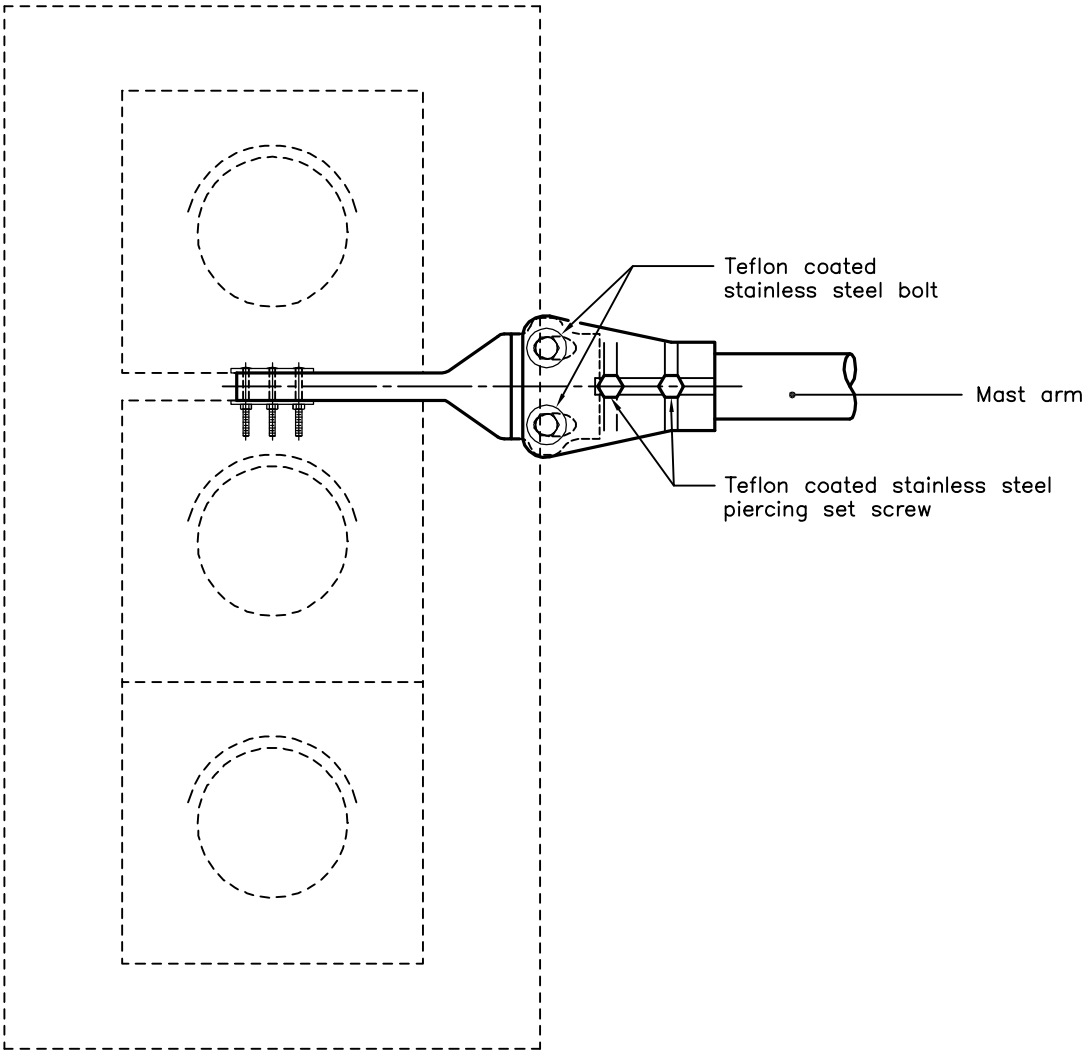
ALUMINUM SINGLE MEMBER ARM ATTACHMENT DETAILS

Nov 2017 | Rev 0

OPSD 2501.020



PLAN

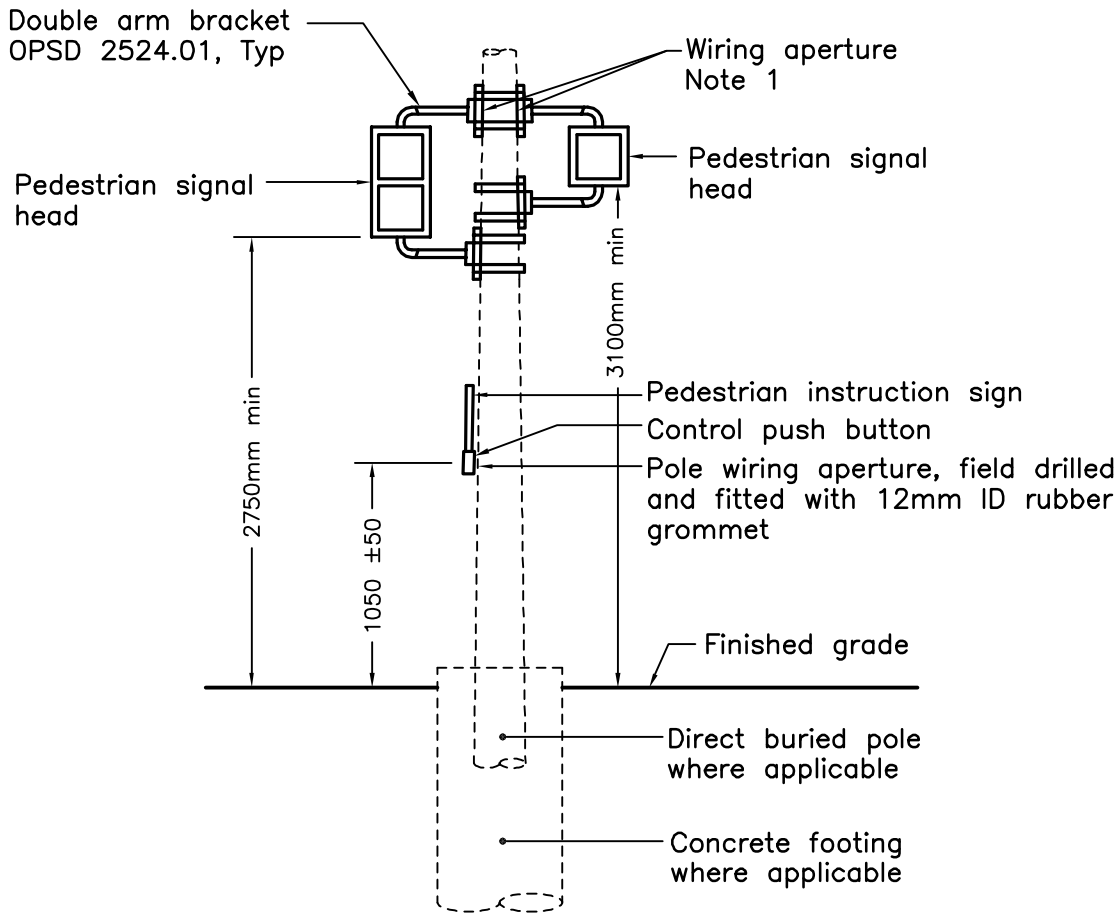


ELEVATION

NOTE:

A This OPSD shall be read in conjunction with OPSD 2501.010 and 2501.020.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2017	Rev	1
TRAFFIC SIGNAL ADJUSTABLE MID–SECTION HANGER			
	OPSD 2502.010		



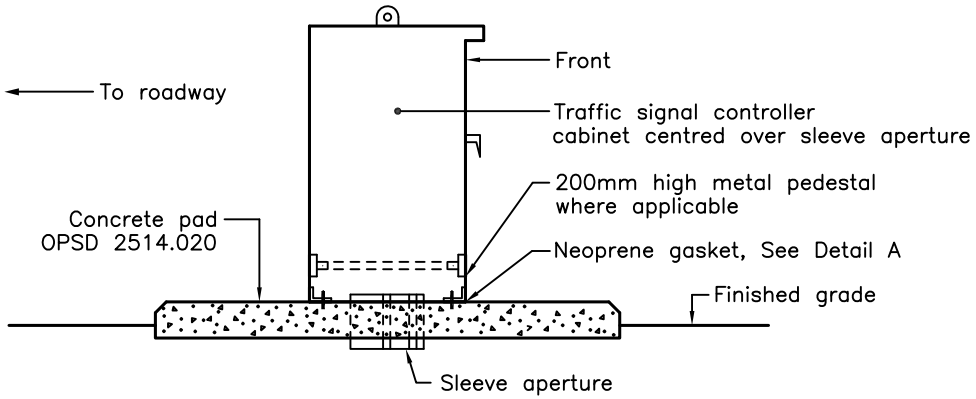
NOTES:

1 Wiring aperture shall be 25mm diameter field drilled complete with rubber grommet, de–burred, and protected with zinc rich paint.

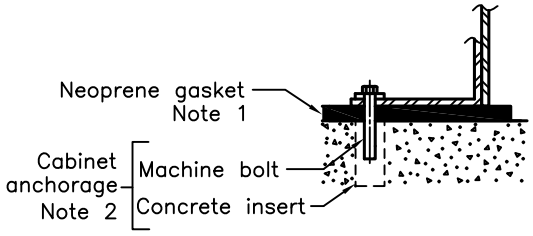
A For external conduit system on wooden or concrete poles refer to OPSD 2552.01 or OPSD 2554.010.

B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev	1
TRAFFIC SIGNAL **PEDESTRIAN HEAD AND** **PUSH BUTTON MOUNTED ON POLE**			
	OPSD 2505.010		



SIDE VIEW



DETAIL A

NOTES:

1 Cabinet shall be sealed around bottom perimeter with a 10mm thick by 65mm wide neoprene gasket. Gasket shall have a durometer hardness of 45 and shall be provided with adhesive backing for attachment to the cabinet.

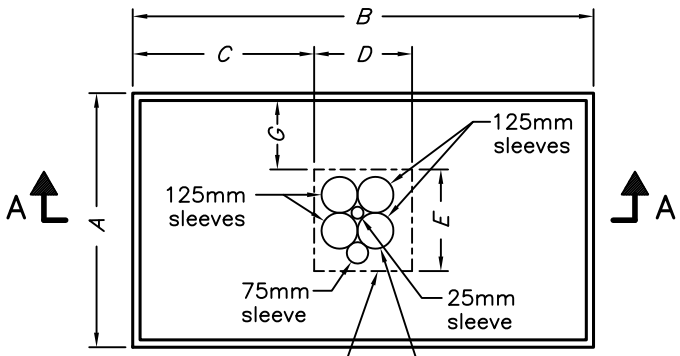
2 Cabinet shall be secured to the pad, accurately aligned, with chuck end concrete anchors and 16mm dia x 38mm long stainless steel hexagonal head machine bolts and lockwashers. Location of anchors shall be according to manufacturer's instructions.

A For numbers, sizes, and orientation of conduits entering sleeves in concrete pad, refer to Contract Drawings.

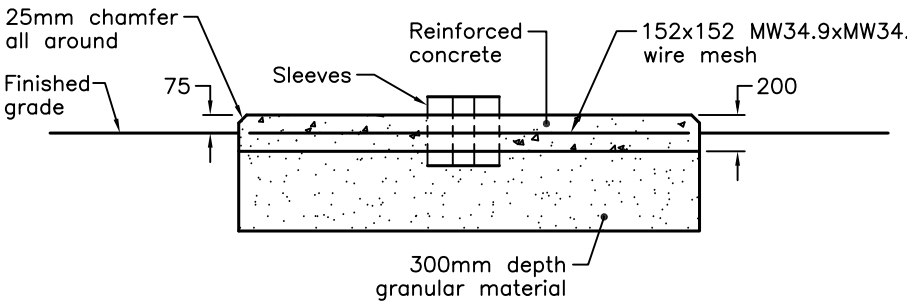
B For location and orientation of cabinet and concrete pad, refer to Contract Drawings.

C All dimensions are in millimetres unless otherwise shown.

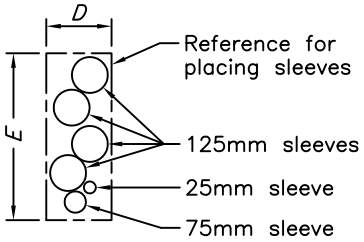
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2012	Rev 0
CONTROLLER CABINET ON PAD		
	OPSD 2514.010	



PLAN



SECTION A–A



DETAIL A

PAD DIMENSIONS						
Cabinet Type	Dimensions mm					
	A	*B*	*C*	*D*	*E*	*G*
332	1000	2000	725	380	380	310
M	1000	1650	400	250	660	170
P	1250	1950	400	250	660	295
R	1500	1950	400	250	660	420

NOTES:

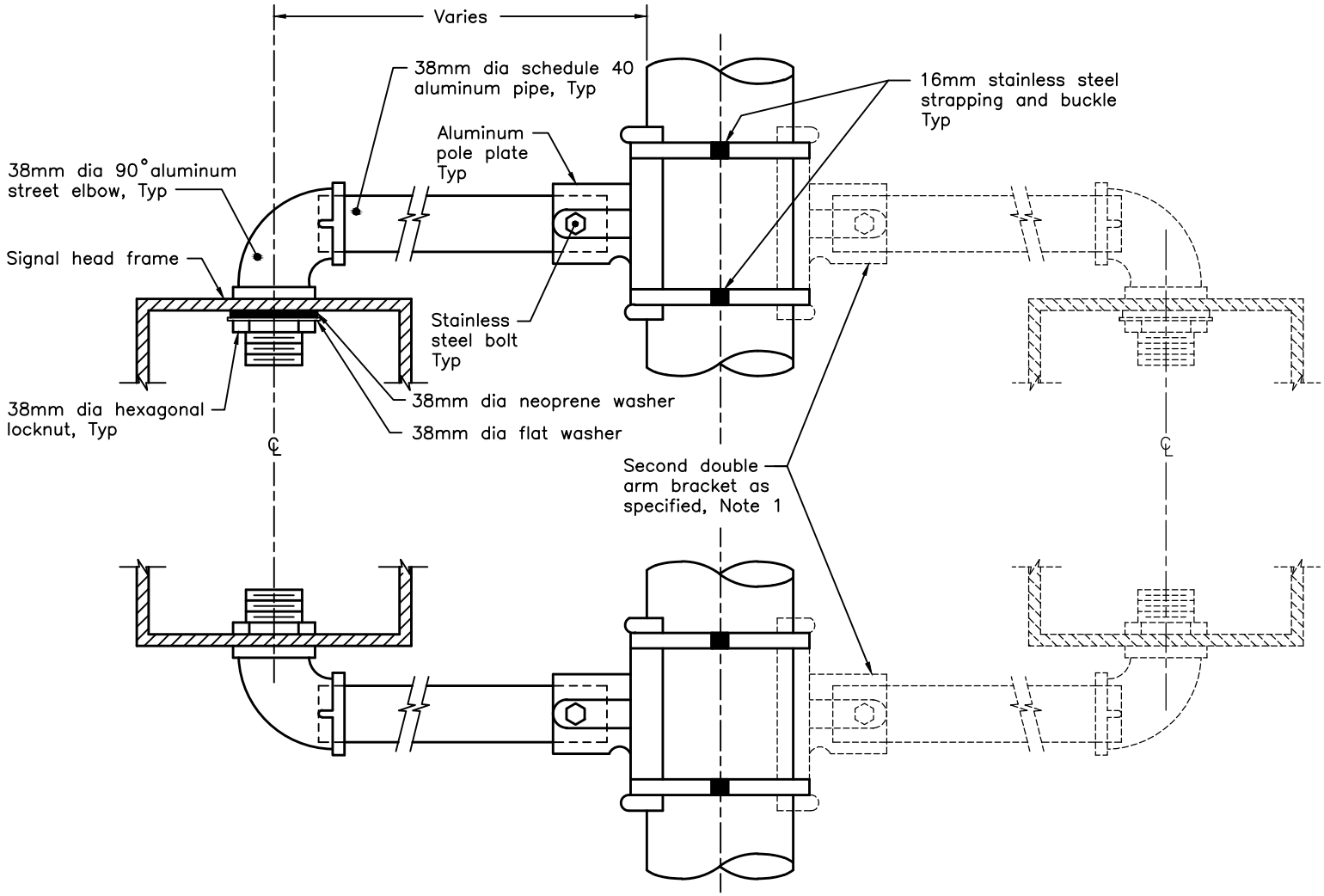
A This OPSD shall be read in conjunction with OPSD 2514.010.
B Maintain 75mm minimum cover over reinforcing steel.
C Aperture for sleeves shall be filled with expandable foam.
D Sleeves in concrete pad shall protrude 50mm above top of pad.
E All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2012 | Rev 0

CONCRETE PAD FOR CONTROLLER CABINET

OPSD 2514.020



NOTES:

1 The orientation of the second double arm bracket varies.

A All dimensions are in millimetres unless otherwise shown.

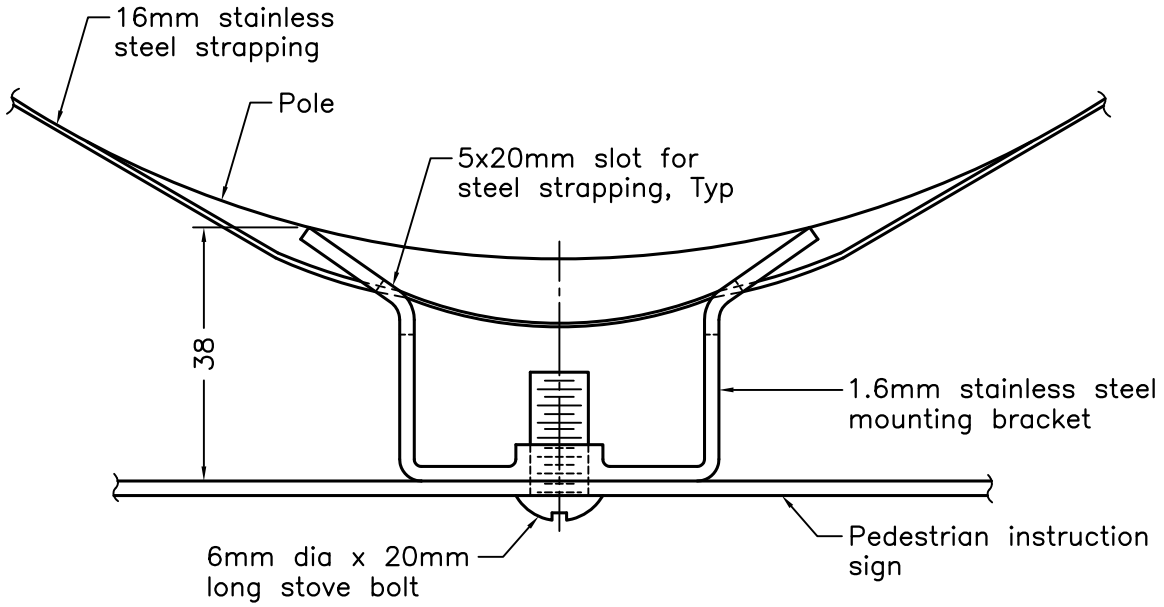
ONTARIO PROVINCIAL STANDARD DRAWING

TRAFFIC SIGNAL

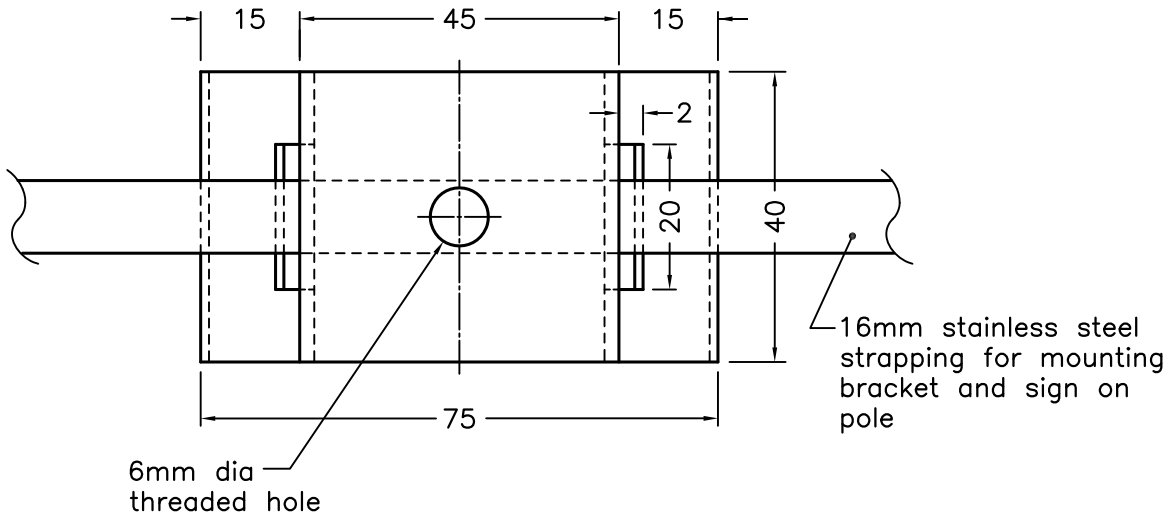
DOUBLE ARM BRACKET

Nov 2018 | Rev 0

OPSD 2524.010



PLAN



ELEVATION

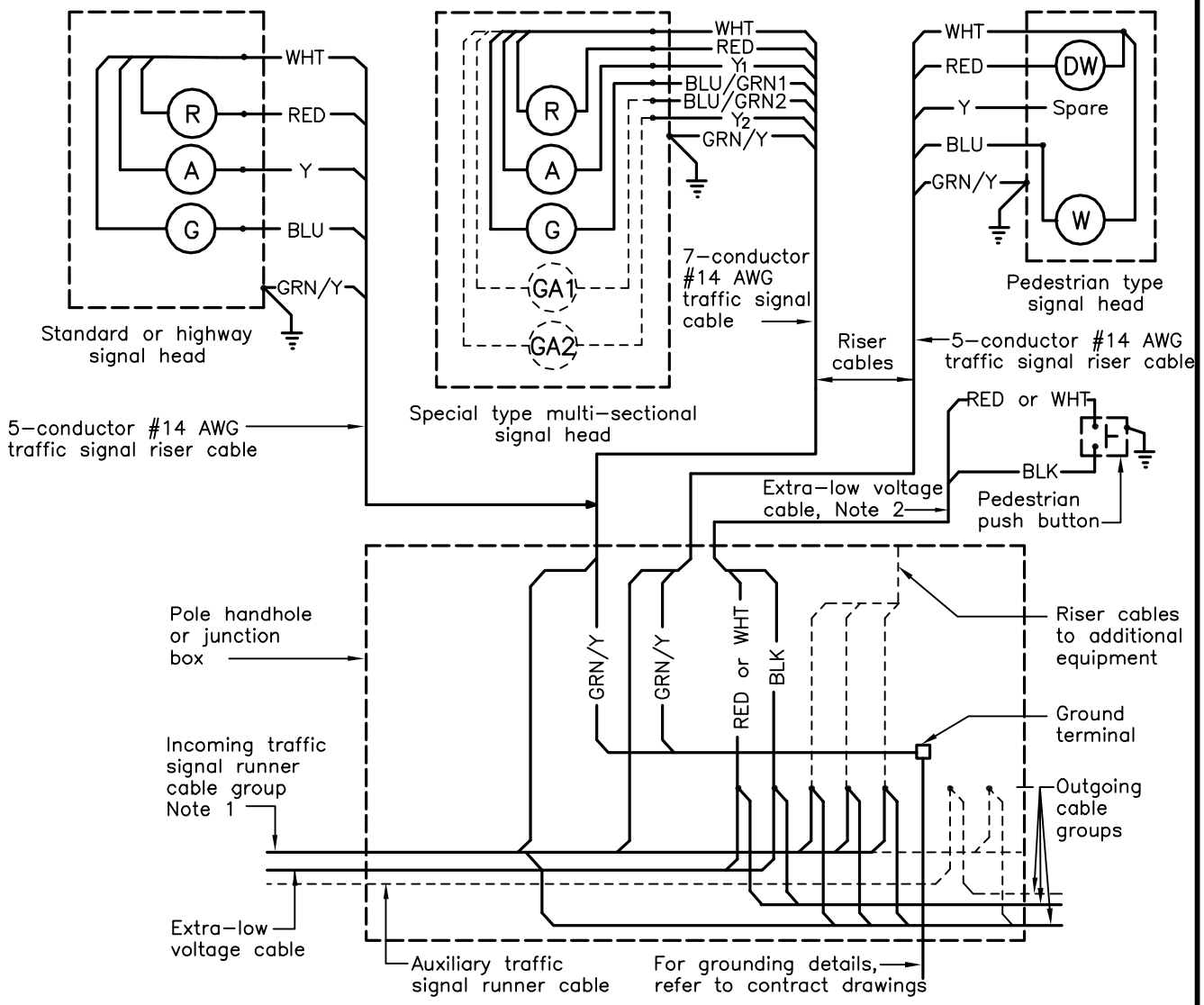
NOTE:

A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2012	Rev	1
TRAFFIC SIGNAL BRACKET FOR MOUNTING PEDESTRIAN INSTRUCTION SIGN ON POLE			
	OPSD 2526.01		

CABLE COLOUR ABBREVIATIONS
Colour/Marker

ABBREV.	DESCRIPTION
BLU/GRN 1	– Blue with 'green one' marker
BLU/GRN 2	– Blue with 'green two' marker
Y_1	– Yellow with marker – Y_1
Y_2	– Yellow with marker – Y_2
RED	– Red
BLU	– Blue
GRN/Y	– Green with yellow tracer
BLK	– Black
WHT	– White
GRN	– Green



NOTES:

1 Riser cable connection shall be made to the designated conductor in the cable group as specified, together with connection to the outgoing conductor.

2 Number of conductors as specified.

A For traffic signal cable groups, abbreviations and colour coding as specified.

B Details shown are typical only. For multiple equipment installations on the same pole, maintain riser cable type and colour coding and connect to the designated conductors as specified.

C Green conductors with yellow tracer used as ground shall be tagged Ground in the pole handhole or junction box.

ONTARIO PROVINCIAL STANDARD DRAWING

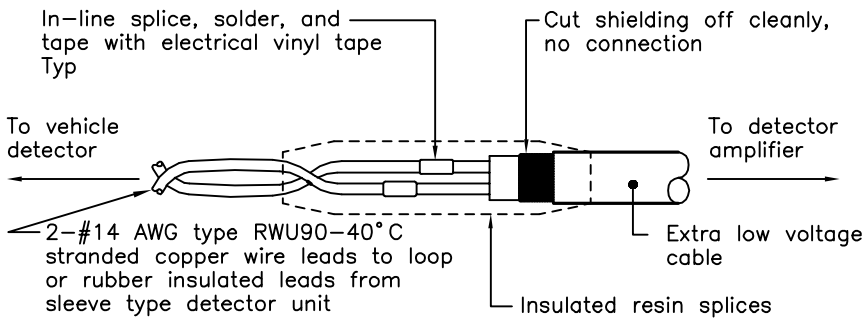
TRAFFIC SIGNAL EQUIPMENT

POLE WIRING DIAGRAM

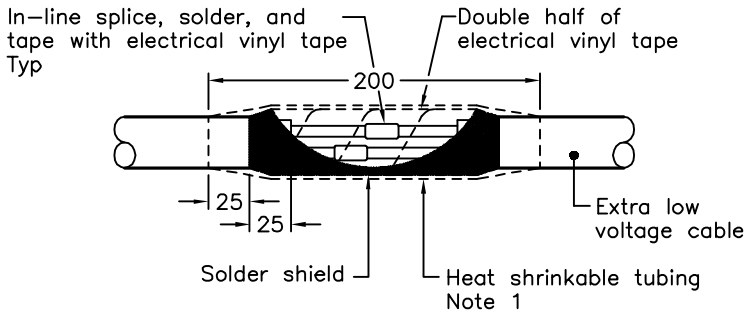
Nov 2017 | Rev 0

ONTARIO STANDARDS – MUNICIPAL – PROVINCIAL

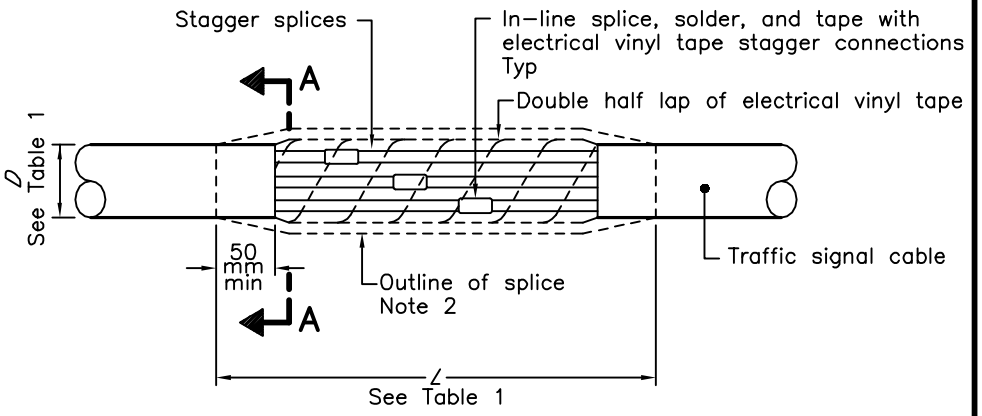
OPSD 2528.010



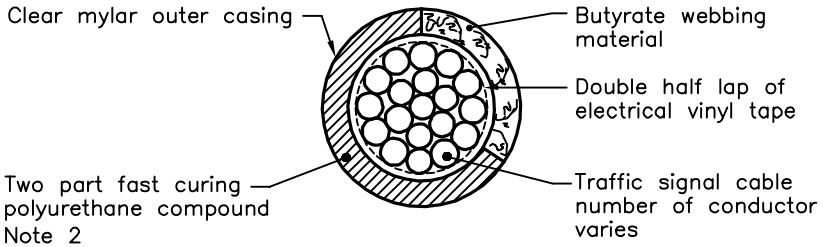
EXTRA LOW VOLTAGE CABLE TO DETECTOR CABLE SPLICING DETAIL



EXTRA LOW VOLTAGE CABLE SPLICING DETAIL



TRAFFIC SIGNAL CABLE SPLICING DETAIL



SECTION A–A

TABLE 1

TRAFFIC SIGNAL CABLE	D	L
4 Conductor	12	300
7 Conductor	16	450
12 Conductor	21	450
19 Conductor	25	500

NOTES:

1 Heat shrinkable tubing shall be 2.4mm wall thickness, 19mm diameter, and 600 volt.

2 Splices shall be of suitable diameter and length as shown in Table 1 and installed according to manufacturer's instructions.

A Splices shall not be used unless shown on the wiring diagrams, quantity sheets, or layout drawings, unless otherwise approved by the Engineer.

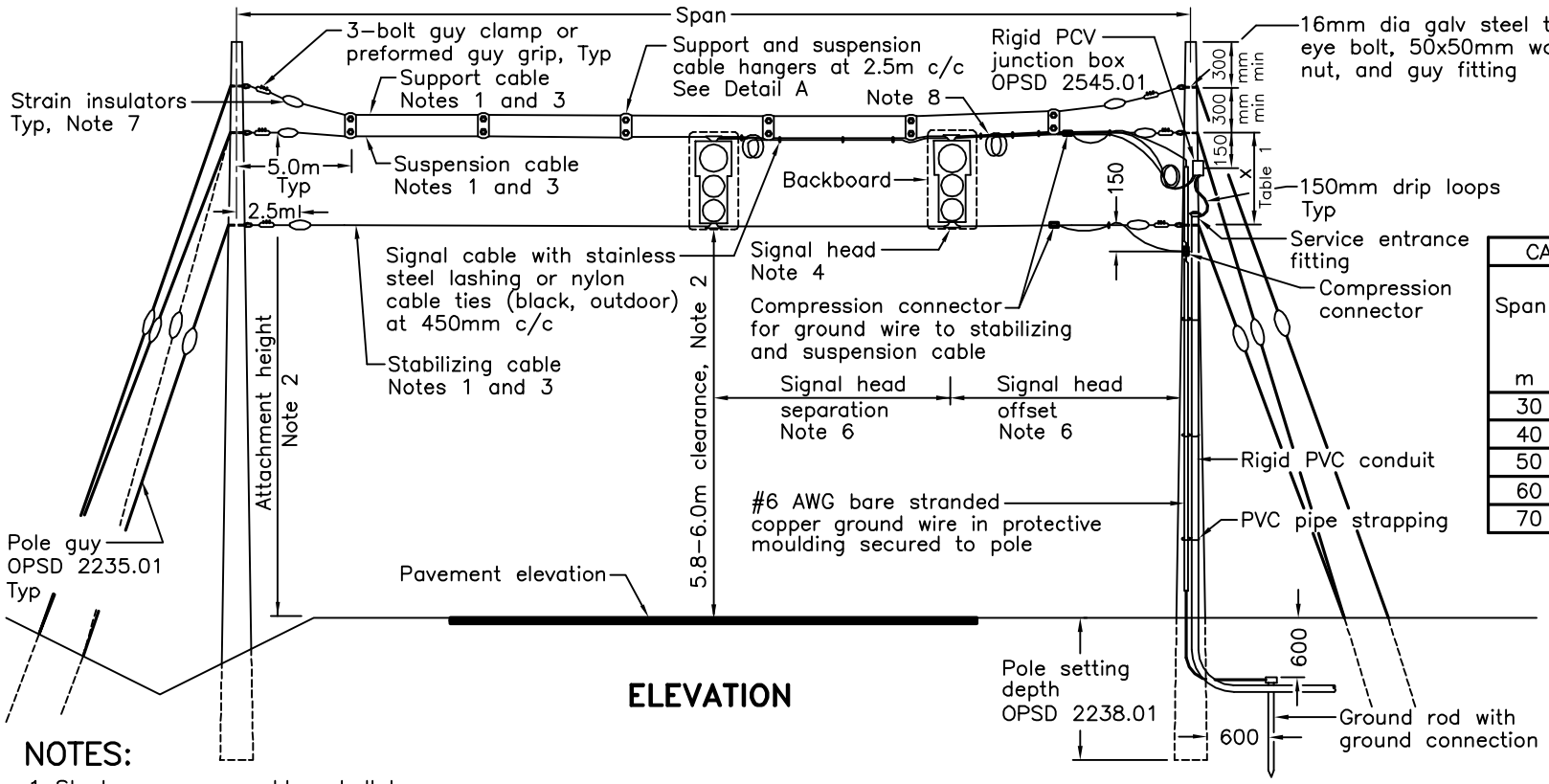
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

SPLICES FOR TRAFFIC SIGNAL CABLE AND EXTRA LOW VOLTAGE CABLE

Nov 2013 | Rev 1

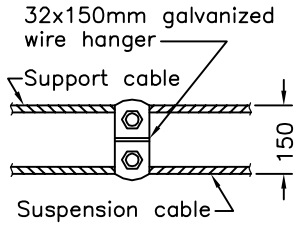
OPSD 2530.01



ELEVATION

TABLE 1
Note 5

CABLE ATTACHMENT HEIGHT		
Span m	Attachment Height Suspension Cable m	x Cable Separation m
30	7.55	1.75
40	7.80	2.00
50	8.10	2.30
60	8.40	2.60
70	8.80	3.00



DETAIL A

NOTES:

1 Steel messenger cables shall be:
  a) 9mm diameter Grade 160 support cable (required only on spans greater than 60m)
  b) 9mm diameter Grade 160 suspension cable
  c) 7mm diameter Grade 110 (minimum) stabilizing cable

2 Attachment height shall be set to obtain the clearance height shown under CSA heavy loading conditions. Install suspension cable attachment height according to Table 1 and allow for deviations between pavement elevation and finished grade elevation at the pole. Install stabilizing cable at cable separation height according to Table 1.

3 Cable shall be installed using the tension corresponding to the installation temperature as shown in OPSD 2245.01.

4 Details shown are for Highway type signal heads, for larger signal heads increase the cable separation and suspension cable attachment height accordingly.

5 Values shown in Table 1 shall be interpolated to obtain intermediate values.

6 For orientation and location of signal heads and poles, refer to layout drawings.

7 Strain insulators shall be used only for attachment to utility poles or poles with live cables installed above the suspension cable.

8 When required, provide sufficient length of cable coils to allow signal head movement to suit construction stages.

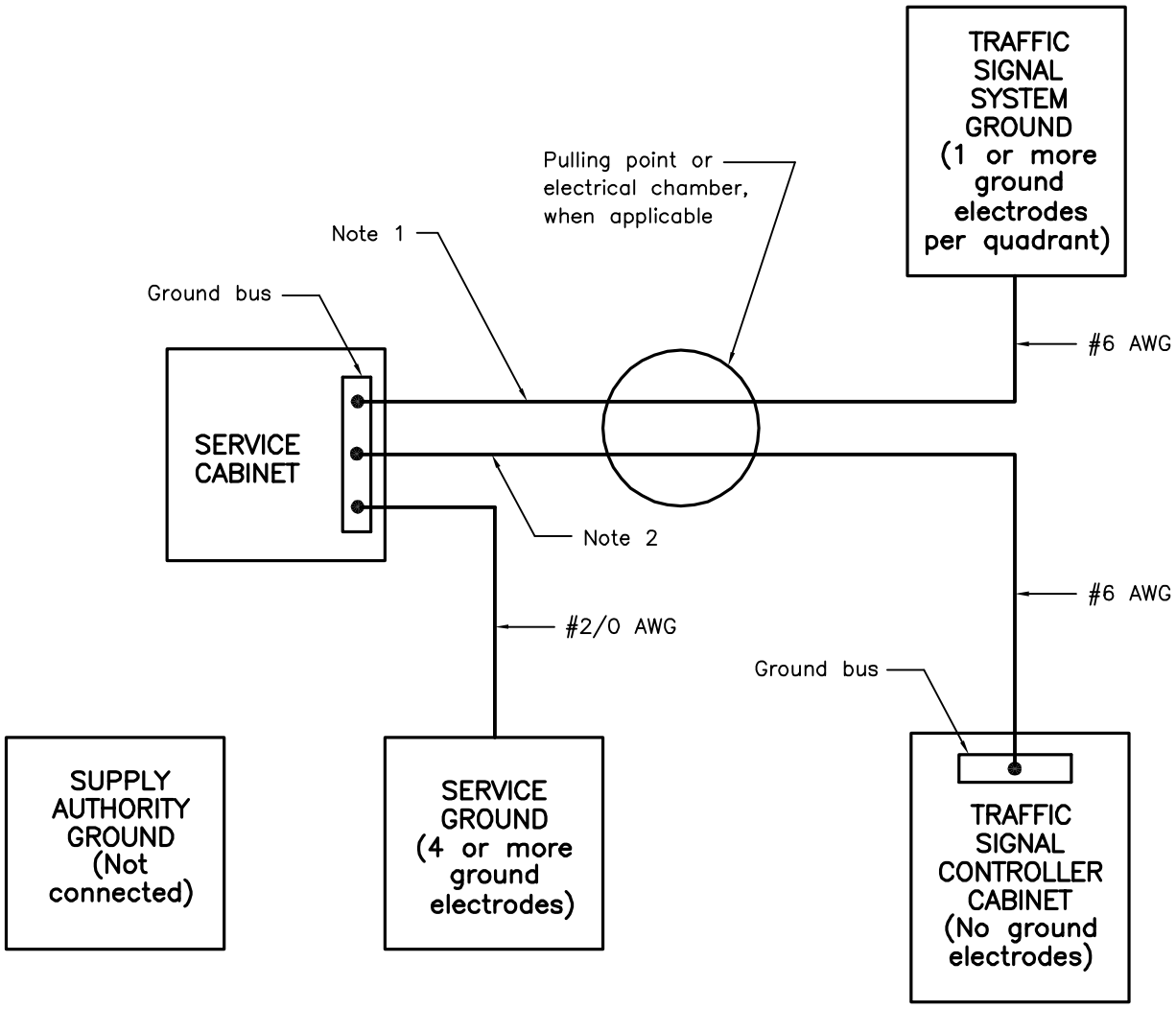
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

AERIAL TRAFFIC SIGNAL INSTALLATION

Nov 2013 | Rev 4

OPSD 2540.01

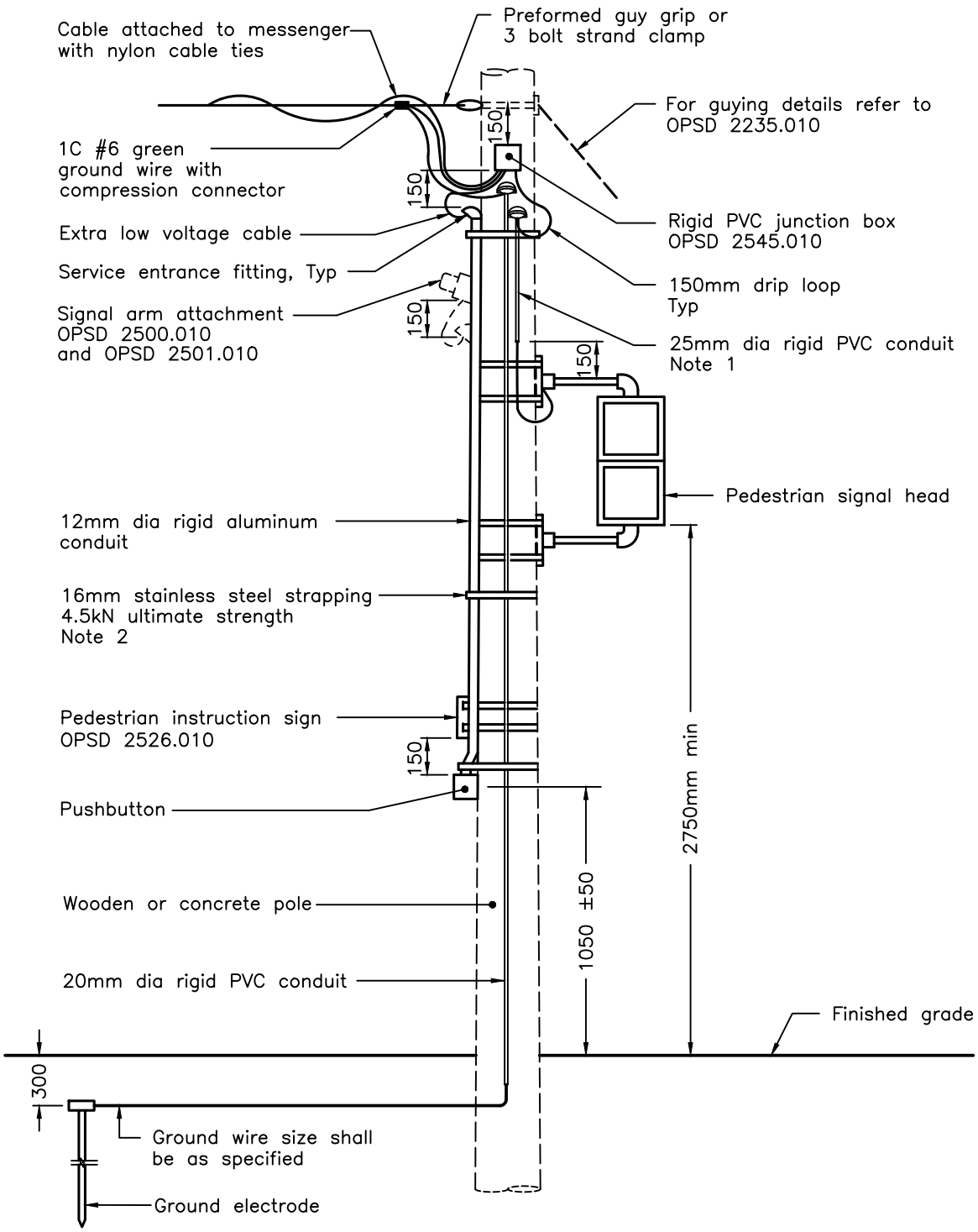


NOTES:

1 The #6 AWG pole system ground, with or without lighting, may connect to the #2/0 grid of the service ground or to the ground bus of the service cabinet.

2 The #6 AWG traffic controller cabinet ground shall not be bonded to any ground system, except at the ground bus of the service cabinet.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev	1
TRAFFIC SIGNAL AND ILLUMINATION GROUNDING SYSTEM			
	OPSD 2547.010		



NOTES:

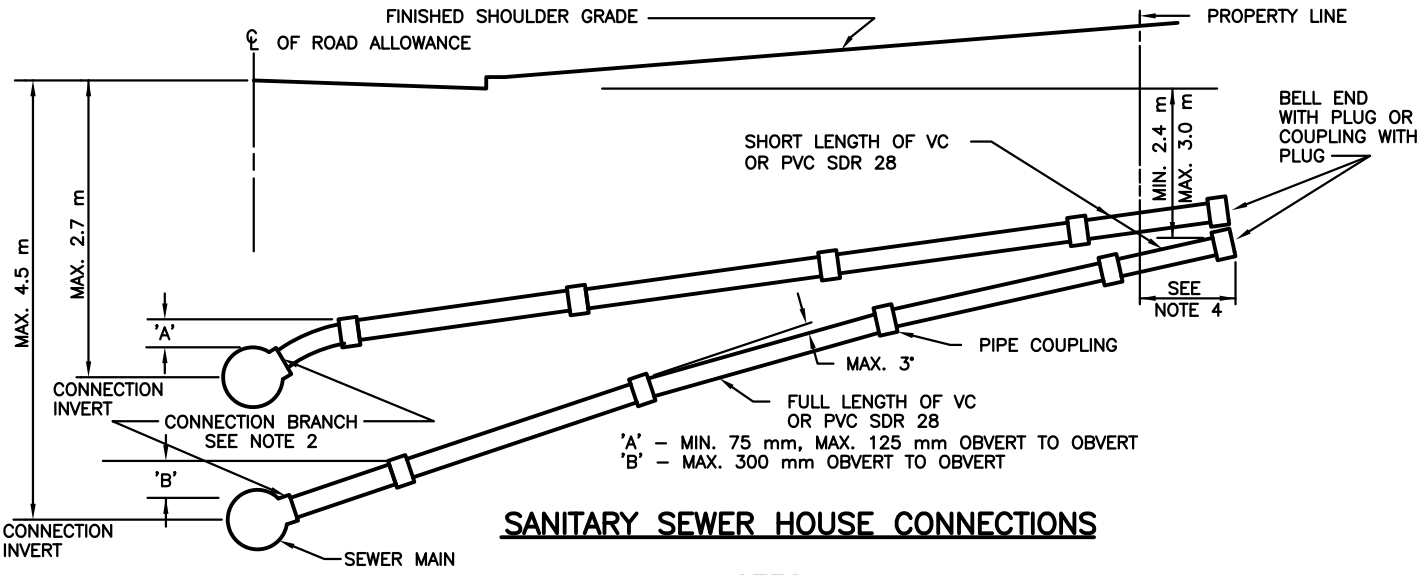
1 One 25mm diameter rigid PVC conduit required for each signal head. Install all signal heads prior to installing conduit. Install conduit system to obtain a neat and straight installation.

2 On concrete poles, mount conduits using 16mm stainless steel strapping and buckles. On wooden poles, mount conduits using PVC coated steel or galvanized pipe straps with 6x38mm lag screws.

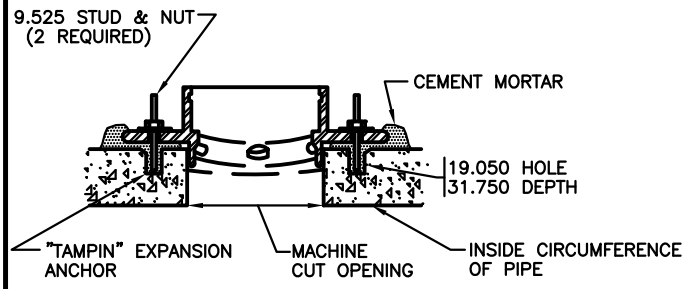
A For orientation and location of poles and equipment refer to layout drawings.

B All dimensions are in millimetres unless otherwise shown.

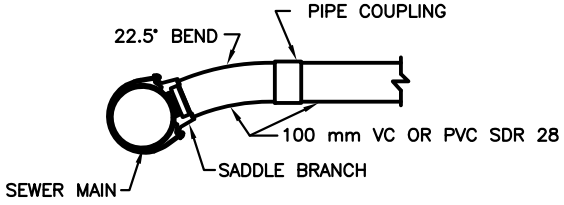
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2019	Rev	3
TRAFFIC SIGNAL SYSTEM EQUIPMENT ON WOODEN OR CONCRETE POLES OVERHEAD WIRING INSTALLATION			
	OPSD 2552.010		

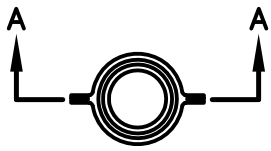


SANITARY SEWER HOUSE CONNECTIONS

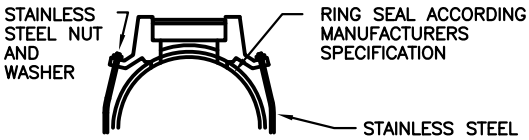


MORTAR–ON SADDLES FOR CONCRETE MAINS OVER 450 mm DIAMETER





TOP VIEW

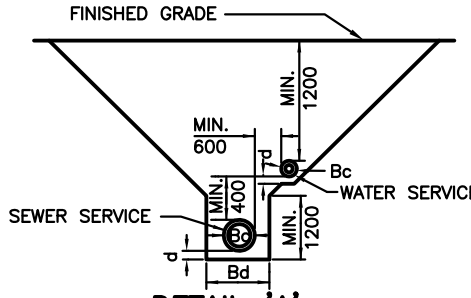


SECTION 'A–A'

CAST–IRON SADDLE BRANCH FOR CONNECTION TO EXISTING MAINS OTHER THAN PVC

NOTES:

1. IN NEW SUBDIVISIONS THE SANITARY SEWER AND WATER SERVICE CONNECTIONS SHALL BE INSTALLED IN SEPARATE TRENCHES. IN CASES WHERE THE SEPARATE TRENCH INSTALLATION IS NOT PRACTICAL, SANITARY SEWER AND WATER SERVICE CONNECTIONS MAY BE INSTALLED IN A COMMON TRENCH AS PER DETAIL 'A'.
2. IN NEW SUBDIVISIONS ALL CONNECTIONS TO THE SEWERS ARE TO BE MADE WITH A FACTORY MANUFACTURED 'T'. FOR CONNECTIONS TO EXISTING SANITARY SEWERS, OTHER THAN PVC A SADDLE CONNECTION MAY BE USED. MORTAR–ON SADDLES SHALL BE USED ON CONCRETE PIPE GREATER THAN 450 mm DIAMETER. CONNECTIONS TO EXISTING PVC SEWERS SHALL BE MADE WITH A FACTORY MANUFACTURED TEE OR AN APPROVED SADDLE. CONNECTIONS TO EXISTING A.B.S. TRUSS PIPE SHALL BE MADE WITH A SOLVENT WELDED SADDLE. A FACTORY MANUFACTURED WYE SHALL BE USED IN THE FIRST UPSTREAM LEG FOR ALL SEWER CONNECTIONS.
3. 45° STRAP ON SADDLE SHALL BE USED ON SEWERS OTHER THAN PVC PIPE, WHEN LATERAL INTERSECTS SEWER MAIN AT AN ACUTE ANGLE.
4. THE SEWER CONNECTION SHALL BE LAID FROM THE MAIN TO 1.5 m BEYOND THE PROPERTY LINE IN NEW SUBDIVISIONS ONLY.
5. THE END OF ALL SEWER PIPE SHALL BE MACHINED. ALL CUTTING AND MACHINE SHALL BE DONE BY CONTRACTOR.
6. A COUPLING SHALL BE INSTALLED AT DEAD END AND SHALL BE PLUGGED USING A WATER TIGHT PLUG.
7. DEFLECTIONS OF PIPE AT JOINTS IS NOT TO EXCEED 75 mm
   I.E.: 150 mm MAXIMUM DEFLECTION FOR A 3 m LENGTH OF ASBESTOS CEMENT PIPE
   75 mm MAXIMUM DEFLECTION FOR 1.8 m LENGTH OF VETRIFIED CLAY PIPE
8. PIPE COUPLING SHALL BE 'RING–TITE' OR EQUIVALENT. PVC SHALL BE BELL AND SPIGOT JOINT.
9. REFER TO STD. S–200.010 FOR BEDDING REQUIREMENTS.
10. WHEN MORTAR–ON SADDLES ARE USED, A MACHINE CUT OPENING SHALL BE MADE IN THE SANITARY SEWER WITH A CORING MACHINE.
11. 2% MIN. GRADE TO 10% MAX. GRADE FOR 100 mm DIA. PIPE.
12. 1% MIN. GRADE TO 10% MAX. GRADE FOR 150 mm DIA. PIPE.



DETAIL 'A'
COMMON TRENCH DETAIL

d = MIN. 75 mm, DEPTH OF BEDDING BELOW PIPE.
Bc = OUTSIDE DIAMETER
Bd = MINIMUM WIDTH OF TRENCH
= Bc + 600 mm WITH MIN. OF 900 mm OR Bc + WIDTH OF SHORING + 600 mm

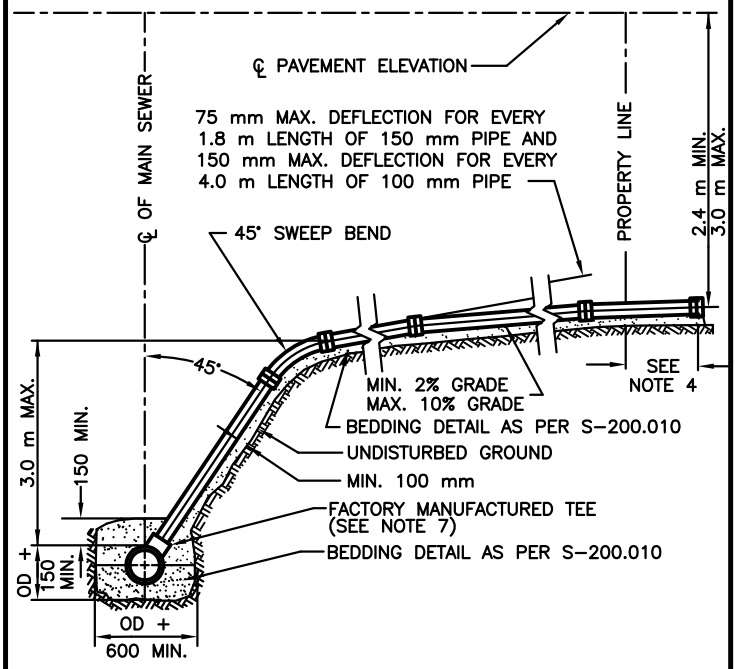
ALL DIMENSIONS IN MILLIMETRES EXCEPT WHERE NOTED.

DURHAM REGION
WORKS DEPARTMENT

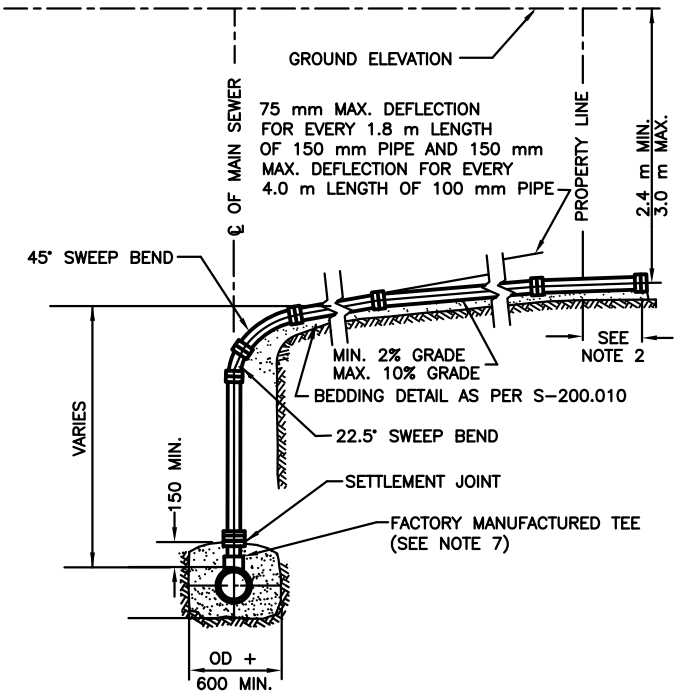
SANITARY SEWER HOUSE CONNECTIONS AND SADDLES (100 mm & 150 mm PIPE)

DWG. DATE:	1981 04
REVISION NO.:	12
REV. DATE:	2013 04
SCALE:	N.T.S.

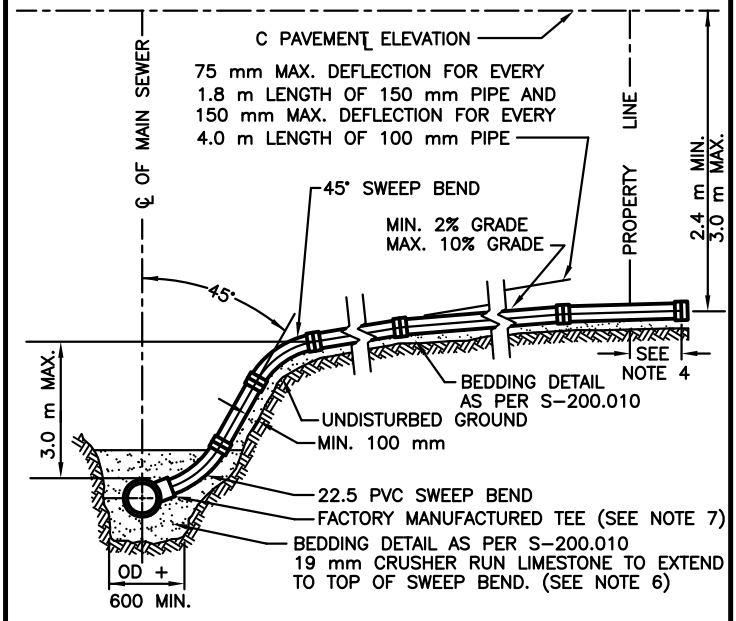
S-100.010



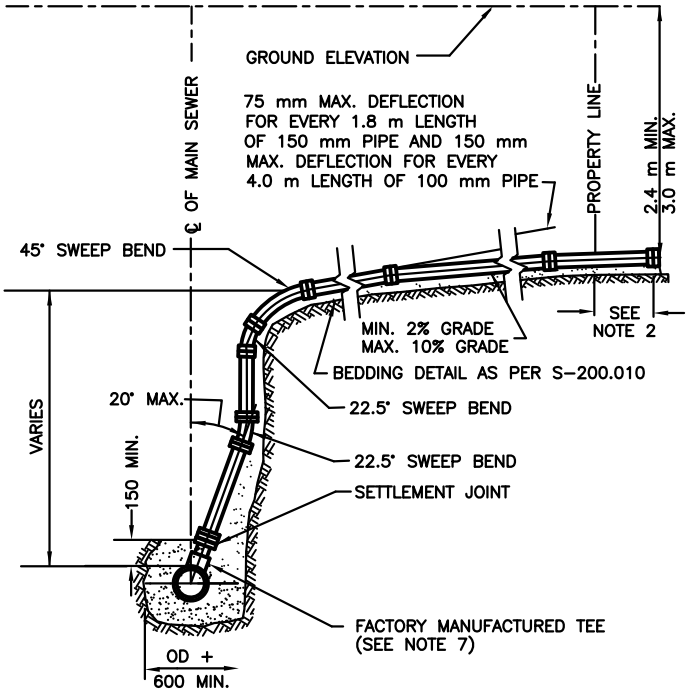
TYPE 1



VERTICAL TRENCH



TYPE 2



OPEN FIELD

NOTES:

1. RISER CONNECTIONS SHALL BE USED WHEN MAIN SEWER DEPTH IS GREATER THAN 4.5 m. FROM ℄ PAVEMENT ELEVATION TO THE OBV. OF MAIN SEWER.
2. RISER CONNECTION TYPE 1 AND 2 SHALL BE USED WHEN WALLS OF EXCAVATION ARE 35° – 45° FROM VERTICAL.
3. IN NEW SUBDIVISIONS, THE SEWER CONNECTION SHALL BE LAID FROM THE MAIN TO 1.5 m BEYOND THE PROPERTY LINE AND PLUGGED WITH WATERTIGHT PLUG.
4. ALL CUTTING AND MACHINING SHALL BE DONE BY THE CONTRACTOR.
5. APPROVED COUPLING SHALL BE USED WHEN CONNECTION IS MADE TO AN EXISTING LATERAL.
6. WHEN CONNECTING TO AN EXISTING SANITARY SEWER, CRUSHER RUN LIMESTONE IS TO EXTEND FROM SPRINGLINE OF SEWER TO TOP OF SWEEP BEND.
7. INSTALLATION MUST CONFORM TO MANUFACTURERS SPECIFICATIONS.

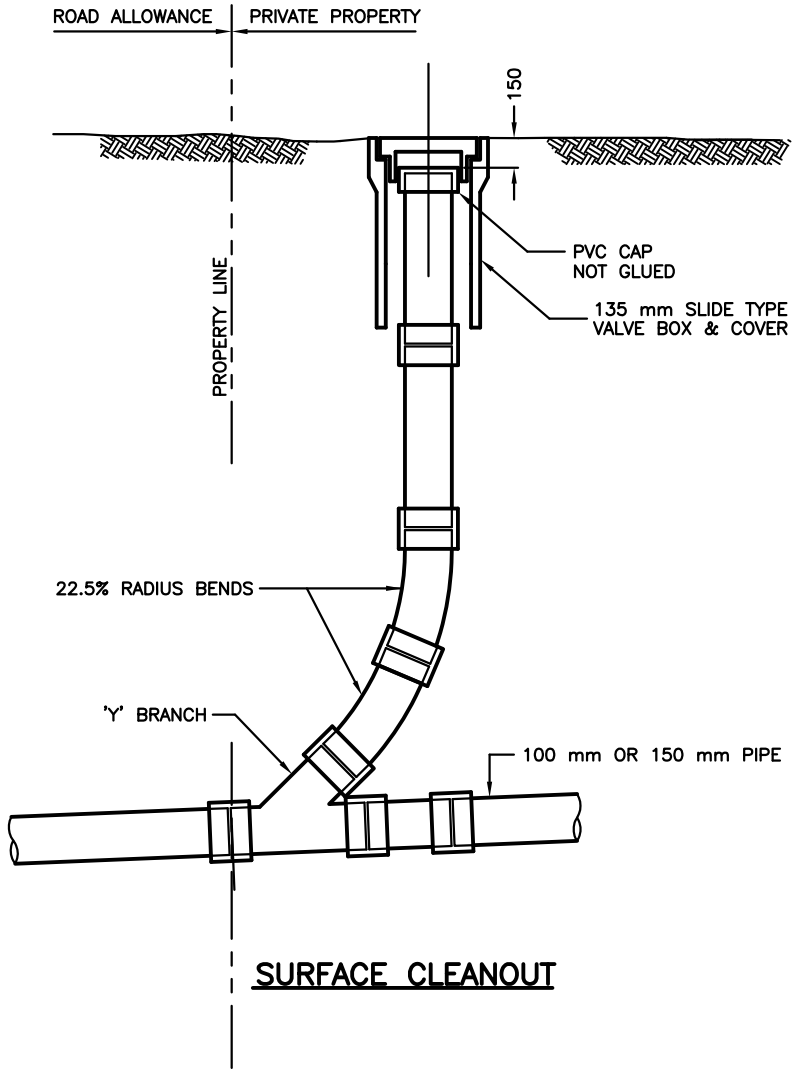
ALL DIMENSIONS IN MILLIMETRES EXCEPT WHERE NOTED.

DURHAM REGION
WORKS DEPARTMENT

SANITARY SEWER RISER CONNECTIONS FOR RESIDENTIAL DEVELOPMENTS (100 mm AND 150 mm PIPE)

DWG. DATE:	1980 03
REVISION NO.:	16
REV. DATE:	2015 04
SCALE:	N.T.S.

S-100.020



SURFACE CLEANOUT

NOTES:

1. WHEN THE CLEANOUT IS LOCATED IN A DRIVEWAY, A STANDARD VALVE BOX IS REQUIRED.
2. BEDDING DETAIL AS PER S-200.010.

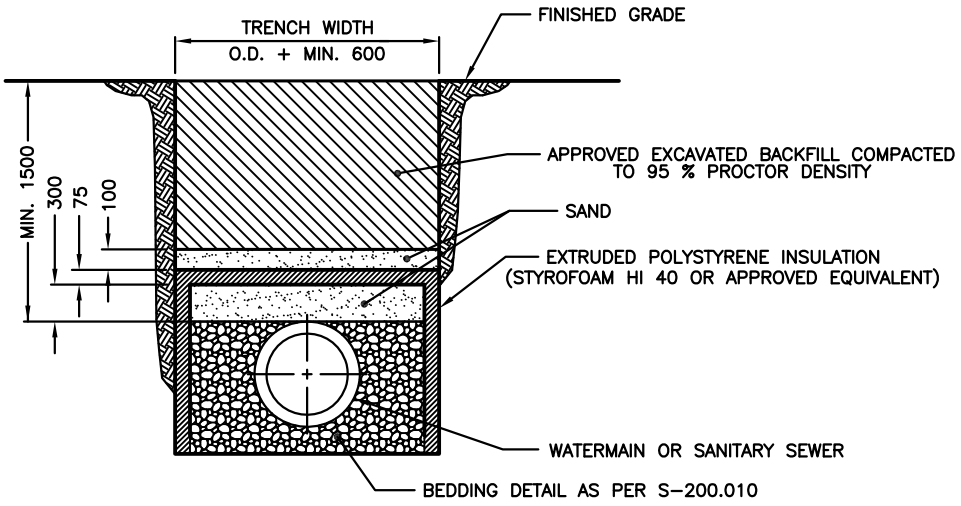
ALL DIMENSIONS IN MILLIMETRES EXCEPT WHERE NOTED.

DURHAM REGION
WORKS DEPARTMENT

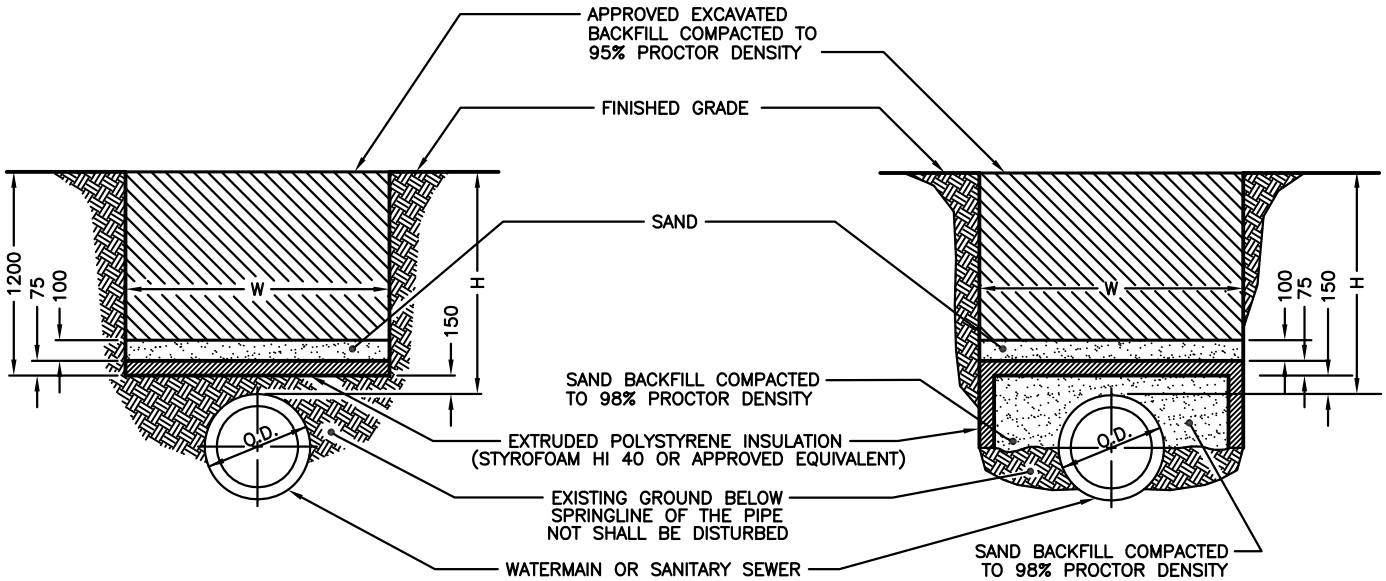
VALVE BOX FOR PVC SANITARY SEWER CLEANOUTS

DWG. DATE:	1978 03
REVISION NO.:	8
REV. DATE:	2013 04
SCALE:	N.T.S.

S-100.030



NEW PIPE



H >= 1350

H < 1350

EXISTING PIPE

NOTES

W = O.D. + 2 (1500 − H) OR O.D. + 600 mm WHICHEVER IS GREATER.
WHERE W = INSULATION WIDTH
O.D. = OUTSIDE DIAMETER OF PIPE SHALL BE INSULATED
H = DEPTH OF PIPE SHALL BE INSULATED
(MINIMUM = 1200 mm)

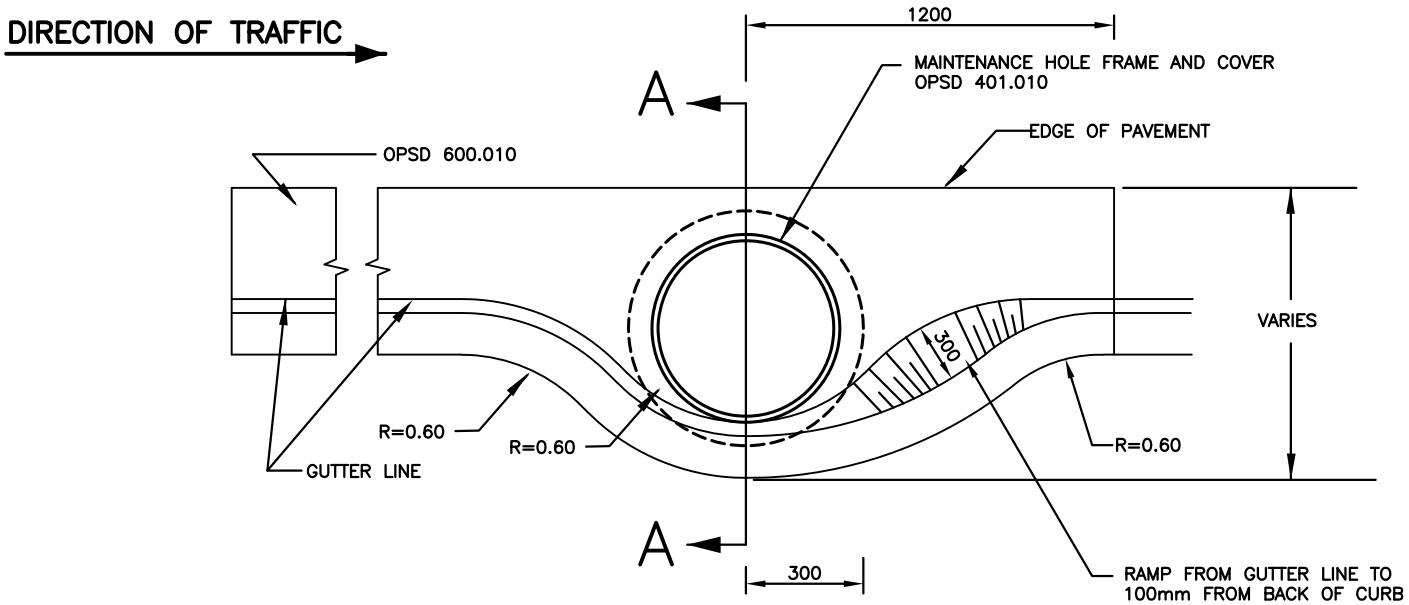
ALL DIMENSIONS IN MILLIMETRES EXCEPT WHERE NOTED.

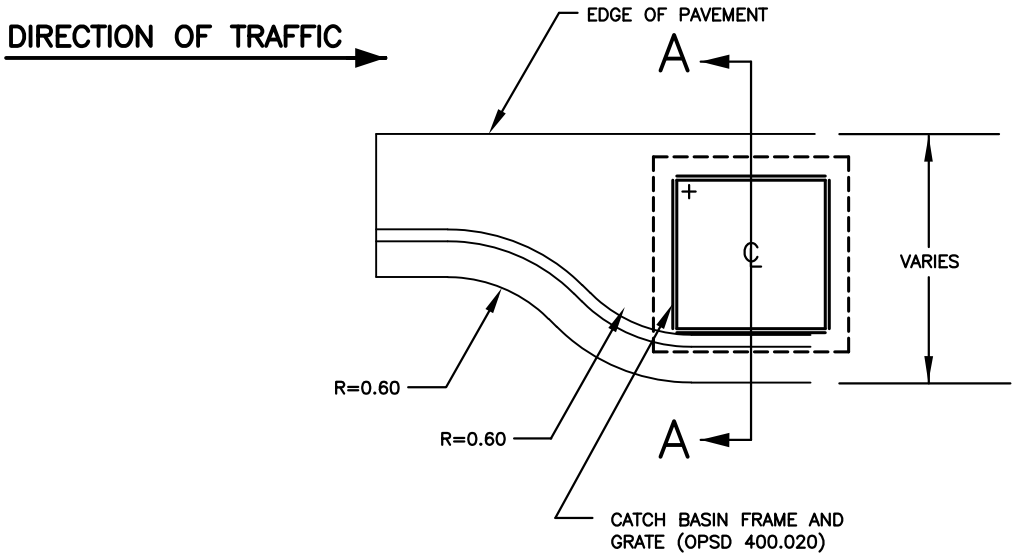
DURHAM REGION
WORKS DEPARTMENT

METHODS OF INSULATING SANITARY SEWERS AND WATERMAINS

DWG. DATE:	1980 02
REVISION NO.:	9
REV. DATE:	2013 04
SCALE:	N.T.S.

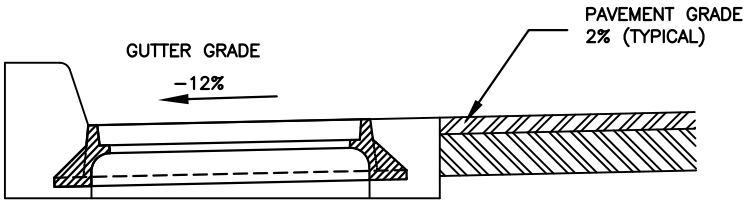
S-100.050





NOTES:

1. CATCH BASIN FRAME INSTALLATION AS PER OPSD 610.010
2. USE SIDE INLET CATCH BASIN OPSD 400.082 WHERE FEASIBLE



SECTION A–A

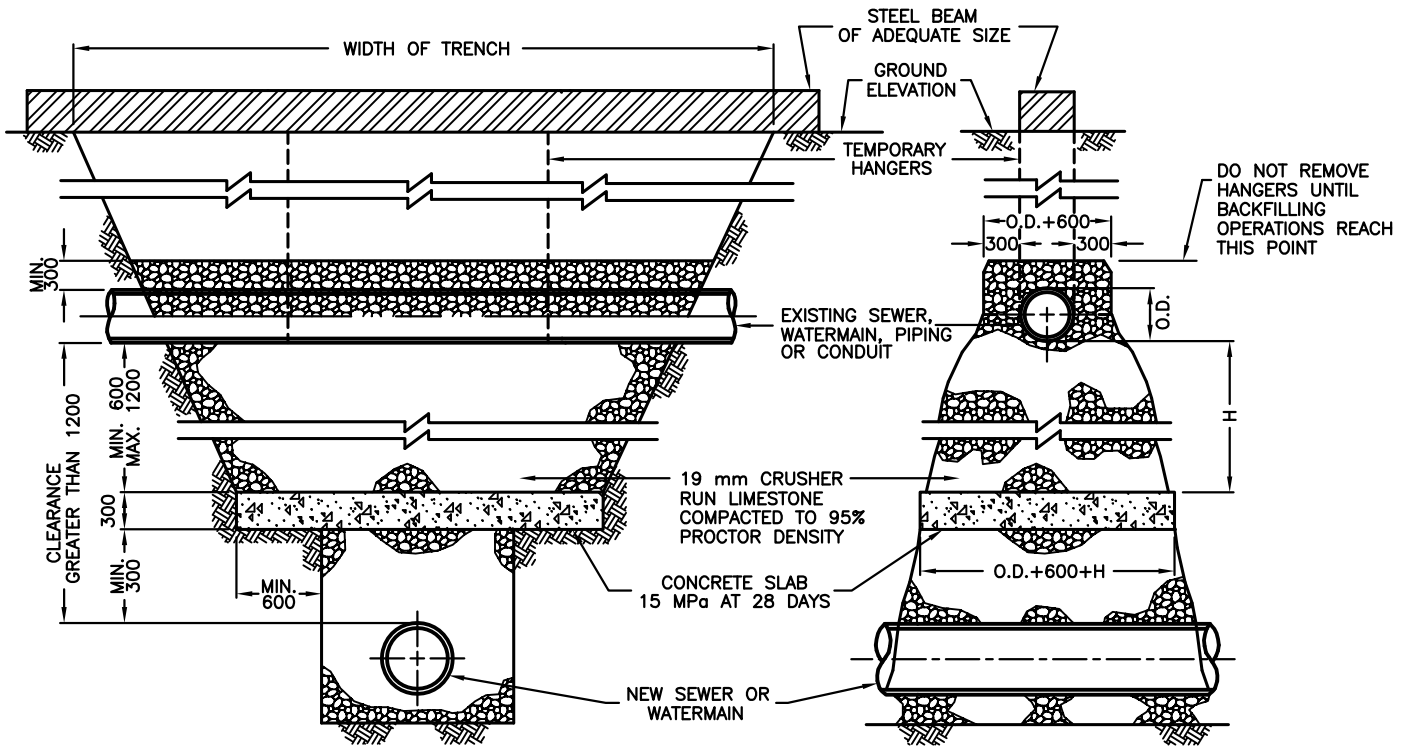
ALL DIMENSIONS IN METRES EXCEPT WHERE NOTED.

DURHAM REGION
WORKS DEPARTMENT

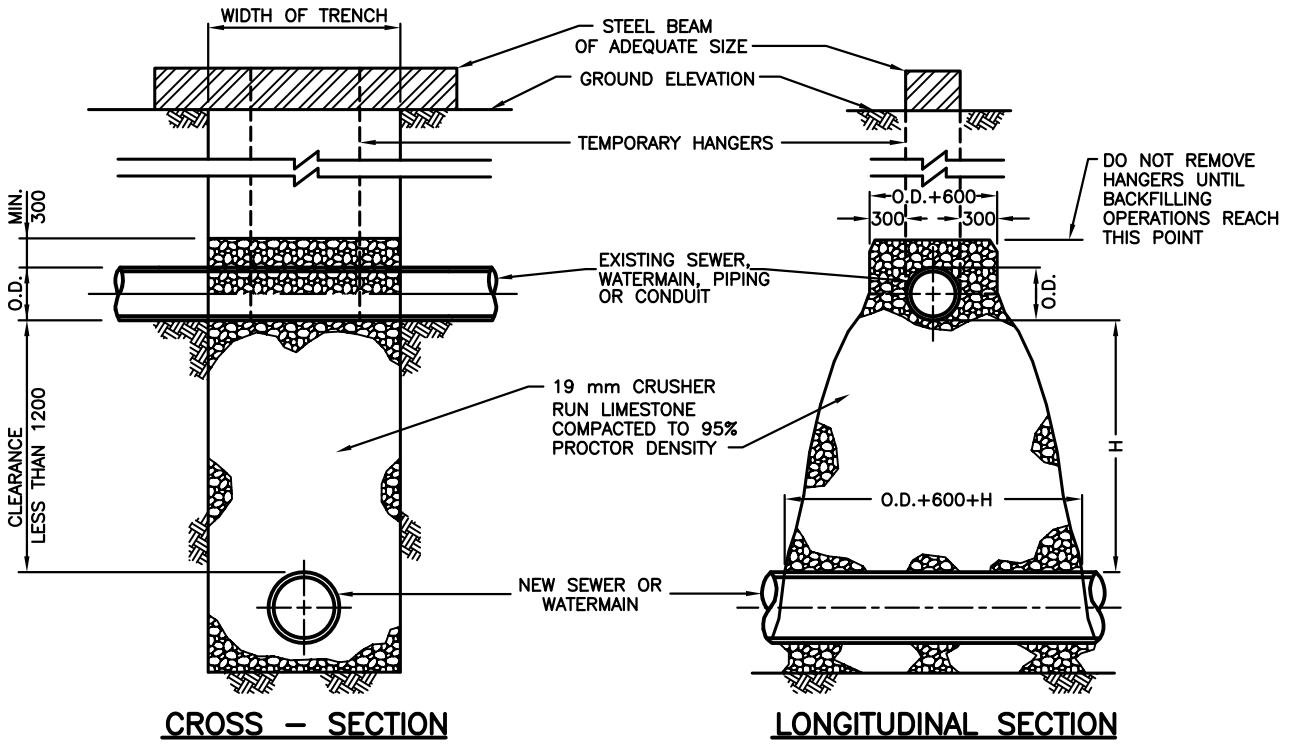
MAINTENANCE HOLE AND CATCH BASIN SETBACK FOR CURB AND GUTTER

DWG. DATE:	2002 10
REVISION NO.:	3
REV. DATE:	2017 04
SCALE:	N.T.S.

S-101.020



CLEARANCE GREATER THAN 1200



CLEARANCE LESS THAN 1200

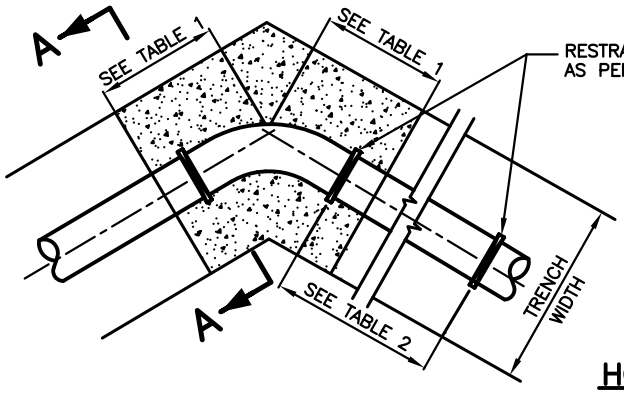
ALL DIMENSIONS IN MILLIMETRES EXCEPT WHERE NOTED.

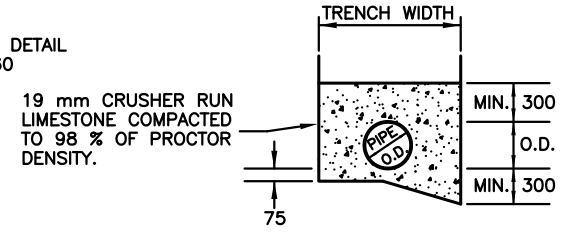
DURHAM REGION
WORKS DEPARTMENT

SUPPORTS FOR WATERMAIN, SEWERS, PIPING AND CONDUITS CROSSING TRENCHES

DWG. DATE:	1983 04
REVISION NO.:	6
REV. DATE:	2013 04
SCALE:	N.T.S.

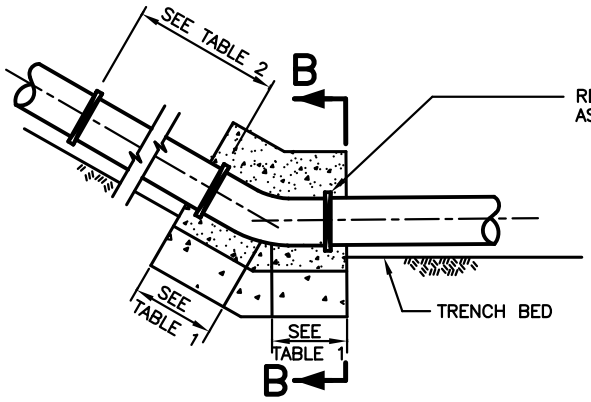
S-200.030

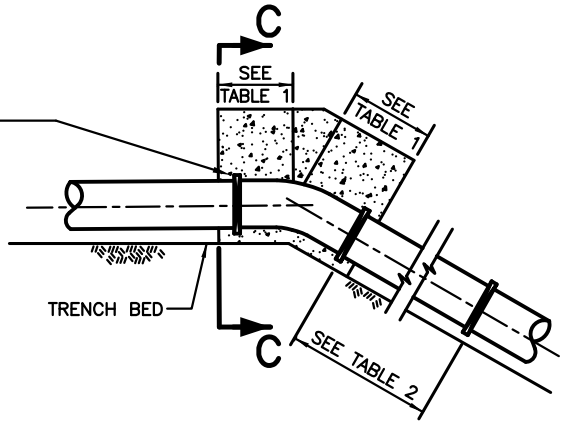


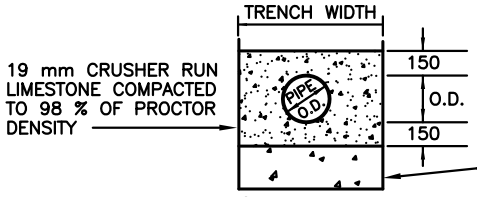


SECTION A–A

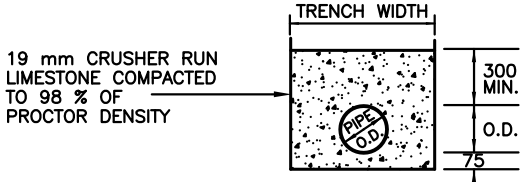
HORIZONTAL DEFLECTION







SECTION B–B
DOWNWARD THRUST



SECTION C–C
UPWARD THRUST

VERTICAL DEFLECTION

NOTES

1. ALL JOINTS ENCOUNTERED WITHIN THE SPECIFIED RESTRAINING LENGTH "L" SHALL BE RESTRAINED ON EACH SIDE OF THE FITTING.
2. GRANULAR THRUST BLOCKS SHALL BE FULLY EXTENDED AND COMPACTED AGAINST TRENCH WALLS.
3. IF THE BEARING CAPACITY OF TRENCH BED RESISTING DOWNWARD THRUST IS LESS THAN 100 KN/m2, CLEAR STONE FOUNDATION SHALL BE PROVIDED AS DIRECTED BY THE ENGINEER.
4. WHEN FITTINGS ARE PARTIALLY OR FULLY EXPOSED UNDER PRESSURE, ALL JOINTS MUST BE RESTRAINED.
5. ALL FITTING JOINTS SHALL BE RESTRAINED IN EARTH FILL APPLICATIONS. JOINT RESTRAINTS ARE NOT REQUIRED FOR STRAIGHT RUNS IN ENGINEERED FILL APPLICATIONS.
6. CATHODIC PROTECTION, BONDING CABLE AND TRACER WIRE SHALL BE AS PER S-201.030, S-201.031.

TABLE NO. 1

MINIMUM DIMENSION FOR GRANULAR THRUST BLOCKS				
DEFL. ANGLE	PIPE DIAMETER (mm)			
	100&150	200	300	400
11.25°	400	500	600	700
22.5°	400	500	600	700
45°	450	550	650	750
90°	600	700	850	950

TABLE NO. 2

"L" MINIMUM RESTRAINING LENGTH (m) * ON EACH SIDE OF FITTING										
PIPE DIA. (mm)	VERTICAL DEFLECTION						HORIZONTAL DEFLECTION			
	DOWNWARD THRUST			UPWARD THRUST						
	11.25°	22.5°	45°	11.25°	22.5°	45°	11.25°	22.5°	45°	90°
100&150	1.5	2.8	4.9	4.9	7.5	10.1	1.5	2.8	4.9	8.1
200	2.0	3.7	6.3	6.3	9.6	13.1	2.0	3.7	6.3	10.5
300	2.8	5.2	9.0	8.8	13.4	18.3	2.8	5.2	9.0	14.9
400	3.6	6.7	11.6	11.2	17.2	23.7	3.6	6.7	11.6	19.3

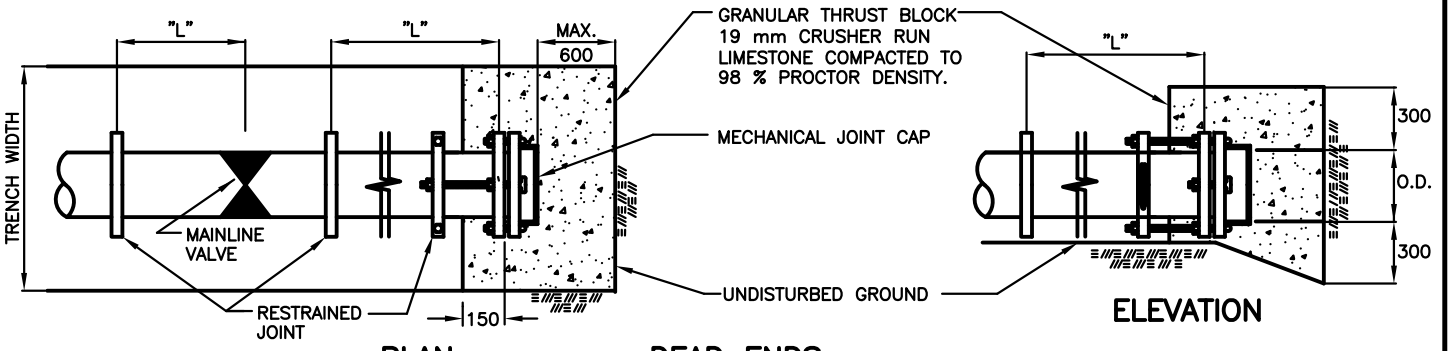
ALL DIMENSIONS IN MILLIMETRES EXCEPT WHERE NOTED

DURHAM REGION
WORKS DEPARTMENT

JOINT RESTRAINING LENGTH FOR PVC PIPE (IN COMBINATION WITH GRANULAR THRUST BLOCK)

DWG. DATE: 1991 11
REVISION NO.: 6
REV. DATE: 2013 04
SCALE: N.T.S.

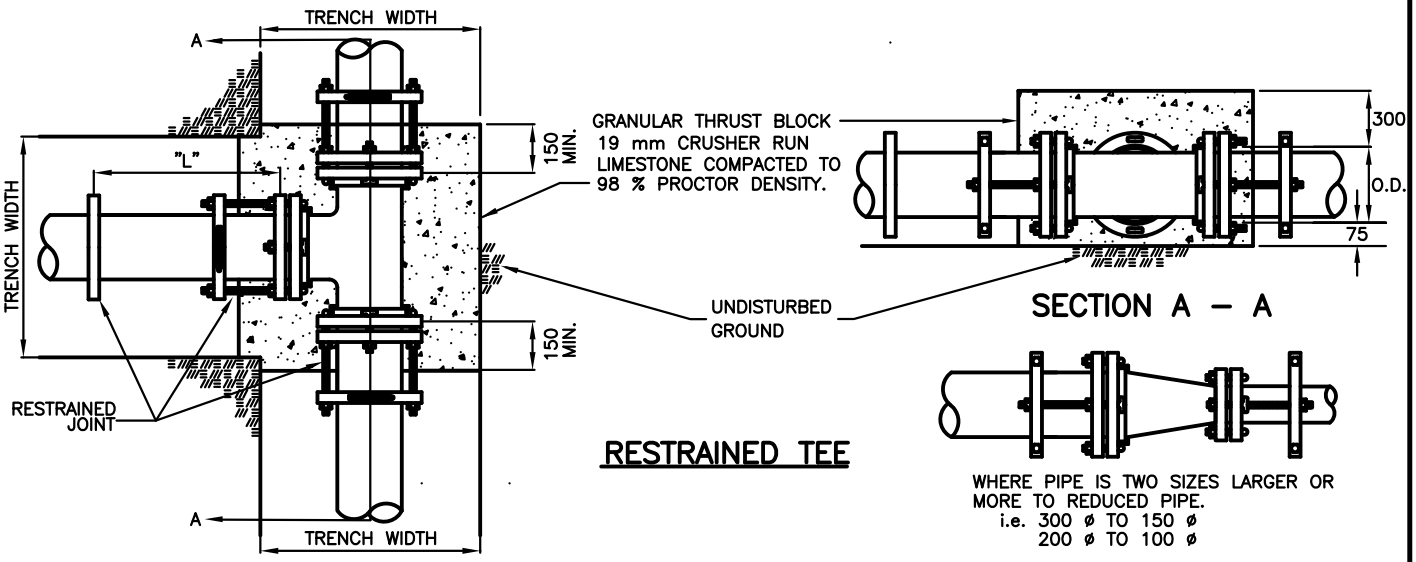
S-200.050



PLAN

ELEVATION

DEAD ENDS



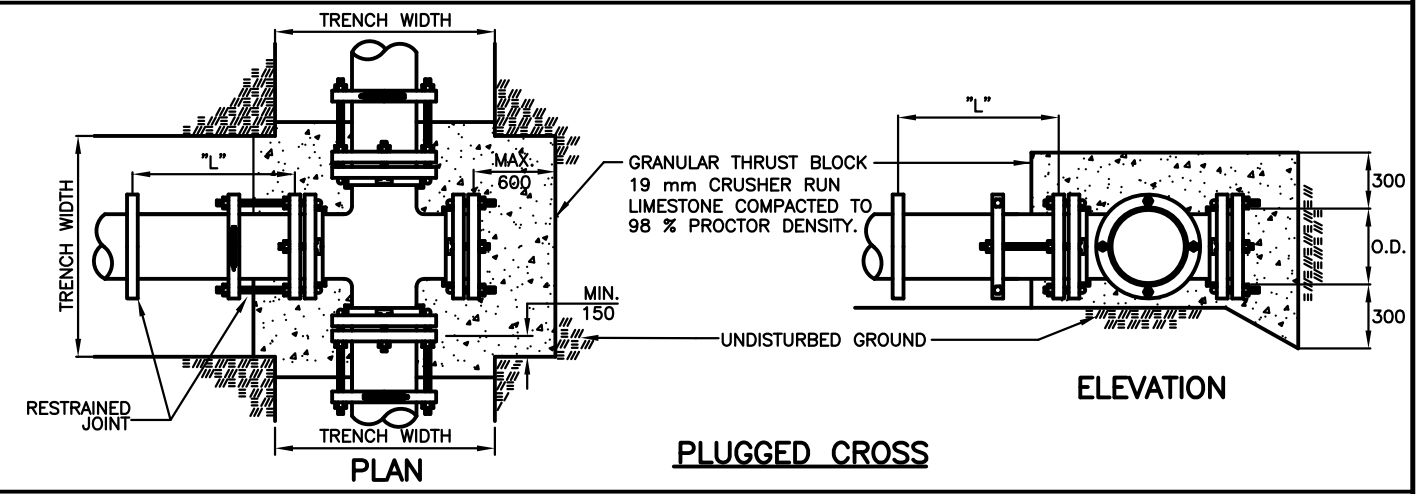
PLAN

SECTION A – A

RESTRAINED TEE

WHERE PIPE IS TWO SIZES LARGER OR MORE TO REDUCED PIPE.
i.e. 300 ø TO 150 ø
200 ø TO 100 ø

RESTRAINED REDUCER



PLAN

ELEVATION

PLUGGED CROSS

NOTES

1. ALL JOINTS ENCOUNTERED WITHIN THE SPECIFIED RESTRAINING LENGTH "L" SHALL BE RESTRAINED FROM THE FIRST JOINT ON FITTING.
2. GRANULAR THRUST BLOCKS SHALL BE FULLY EXTENDED AND COMPACTED AGAINST TRENCH WALLS. IF TRENCH WALL ARE SATURATED OR DISTURBED, SPECIAL DESIGN DETAILS OF THRUST RESTRAINT SHALL BE PROVIDED BY THE ENGINEER FOR REVIEW BY THE REGION.
3. GRANULAR THRUST BLOCKS SHALL BE ENCLOSED WITH FILTER FABRIC IF GROUND WATER TABLE IS ABOVE THE TRENCH BED OR IF GROUND WATER IS SEEPING THROUGH TRENCH WALLS.
4. WHEN FITTINGS ARE PARTIALLY OR FULLY EXPOSED UNDER PRESSURE, ALL JOINTS MUST BE RESTRAINED.
5. ALL FITTING JOINTS SHALL BE RESTRAINED IN EARTH FILL APPLICATIONS.
6. CATHODIC PROTECTION, BONDING CABLE AND TRACER WIRE SHALL BE AS PER S–201.030, S–201.031.
7. ALL SIDES SHALL BE RESTRAINED FOR IN LINE TEES.
8. JOINT RESTRAINTS ARE NOT REQUIRED FOR STRAIGHT RUNS IN ENGINEERED FILL APPLICATIONS.

PIPE DIA.	"L" MIN. RESTRAINING LENGTH (m)
100&150	15.2
200	19.6
300	27.7
400	36.3

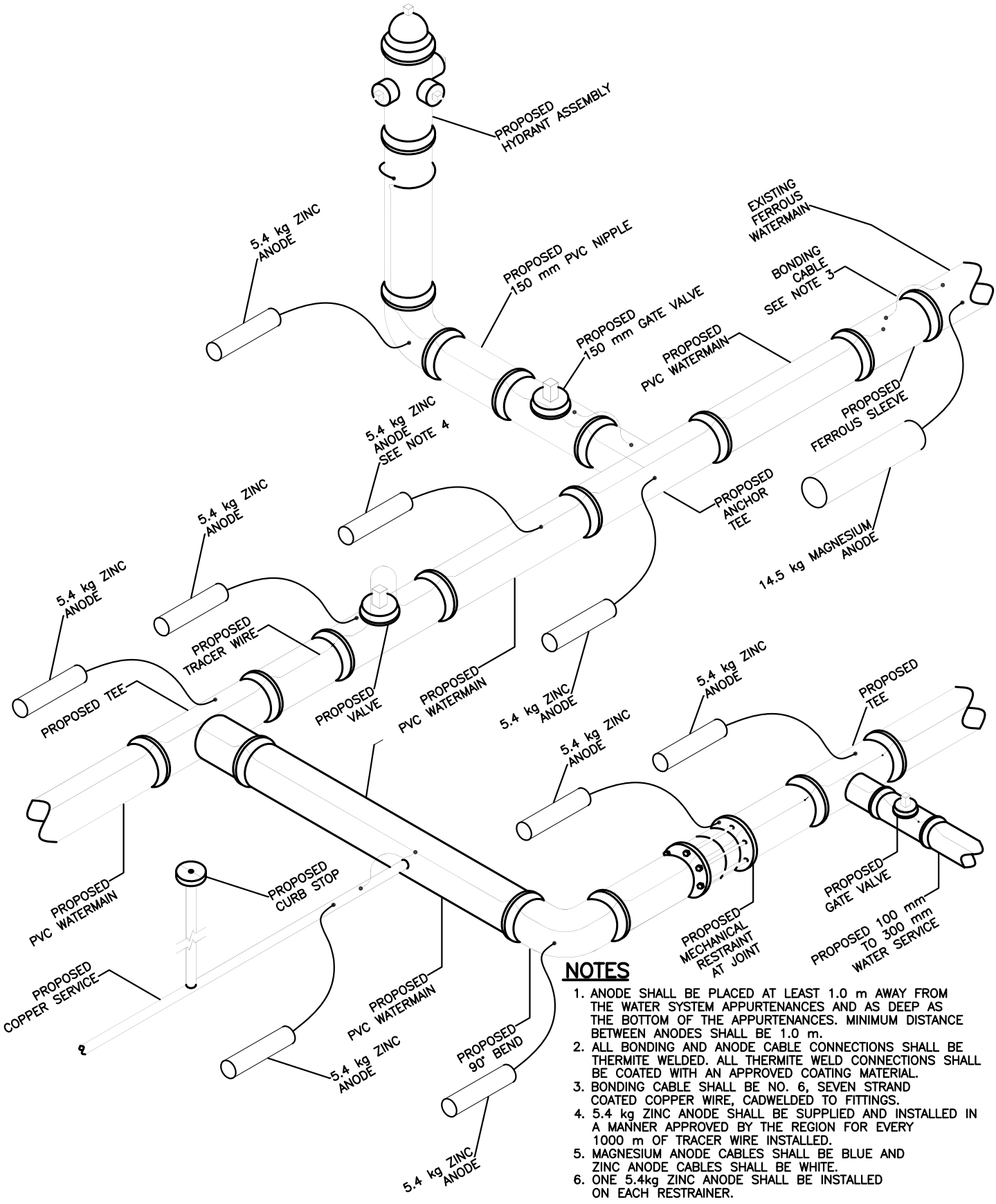
ALL DIMENSIONS IN MILLIMETRES EXCEPT WHERE NOTED.

DURHAM REGION
WORKS DEPARTMENT

THRUST BLOCK FOR PVC WATERMAINS FOR HYDRANT RUNOUTS, TEES AND DEAD ENDS

DWG. DATE:	1991 11
REVISION NO.:	11
REV. DATE:	2013 04
SCALE:	N.T.S.

S-200.060



NOTES

1. ANODE SHALL BE PLACED AT LEAST 1.0 m AWAY FROM THE WATER SYSTEM APPURTENANCES AND AS DEEP AS THE BOTTOM OF THE APPURTENANCES. MINIMUM DISTANCE BETWEEN ANODES SHALL BE 1.0 m.
2. ALL BONDING AND ANODE CABLE CONNECTIONS SHALL BE THERMITE WELDED. ALL THERMITE WELD CONNECTIONS SHALL BE COATED WITH AN APPROVED COATING MATERIAL.
3. BONDING CABLE SHALL BE NO. 6, SEVEN STRAND COATED COPPER WIRE, CADWELDED TO FITTINGS.
4. 5.4 kg ZINC ANODE SHALL BE SUPPLIED AND INSTALLED IN A MANNER APPROVED BY THE REGION FOR EVERY 1000 m OF TRACER WIRE INSTALLED.
5. MAGNESIUM ANODE CABLES SHALL BE BLUE AND ZINC ANODE CABLES SHALL BE WHITE.
6. ONE 5.4kg ZINC ANODE SHALL BE INSTALLED ON EACH RESTRAINER.

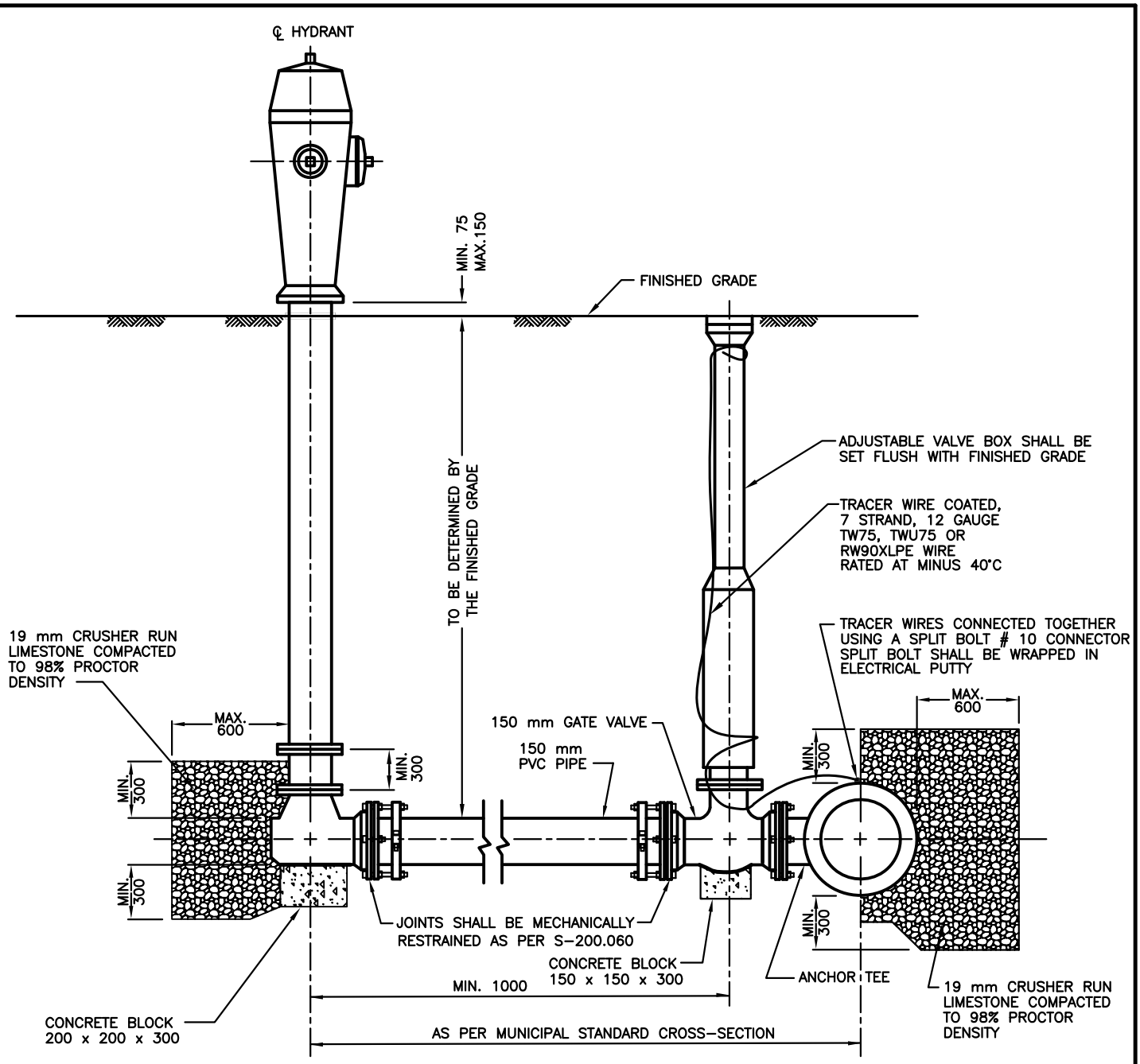
ALL DIMENSIONS IN MILLIMETRES EXCEPT WHERE NOTED.

DURHAM REGION
WORKS DEPARTMENT

CATHODIC PROTECTION / BONDING CABLE / TRACER WIRE FOR PVC AND CPP WATERMAIN SYSTEMS

DWG. DATE:	1981 04
REVISION NO.:	7
REV. DATE:	2013 04
SCALE:	N.T.S.

S-201.030



NOTES

1. JOINTS SHALL BE MECHANICALLY RESTRAINED.
2. BEDDING AS PER S–200.010.
3. HYDRANT EXTENSIONS SHALL BE INSTALLED AT BOTTOM OF BARREL.
4. ANCHOR TEE, VALVE & HYDRANT SHALL BE COMPLETELY BACKFILLED WITH 19 mm CRUSHER RUN LIMESTONE.
5. IF HYDRANT REQUIRES ACCESS ACROSS DITCH, INSTALLATION SHALL BE AS PER S–210.030.
6. TRACER WIRE COATED, AS PER AMPL.
7. TRACER WIRE SHALL BE INSTALLED AT ALL HYDRANT LOCATIONS.
8. CATHODIC PROTECTION, BONDING CABLE AND TRACER WIRE SHALL BE AS PER S–201.030, S–201.031.

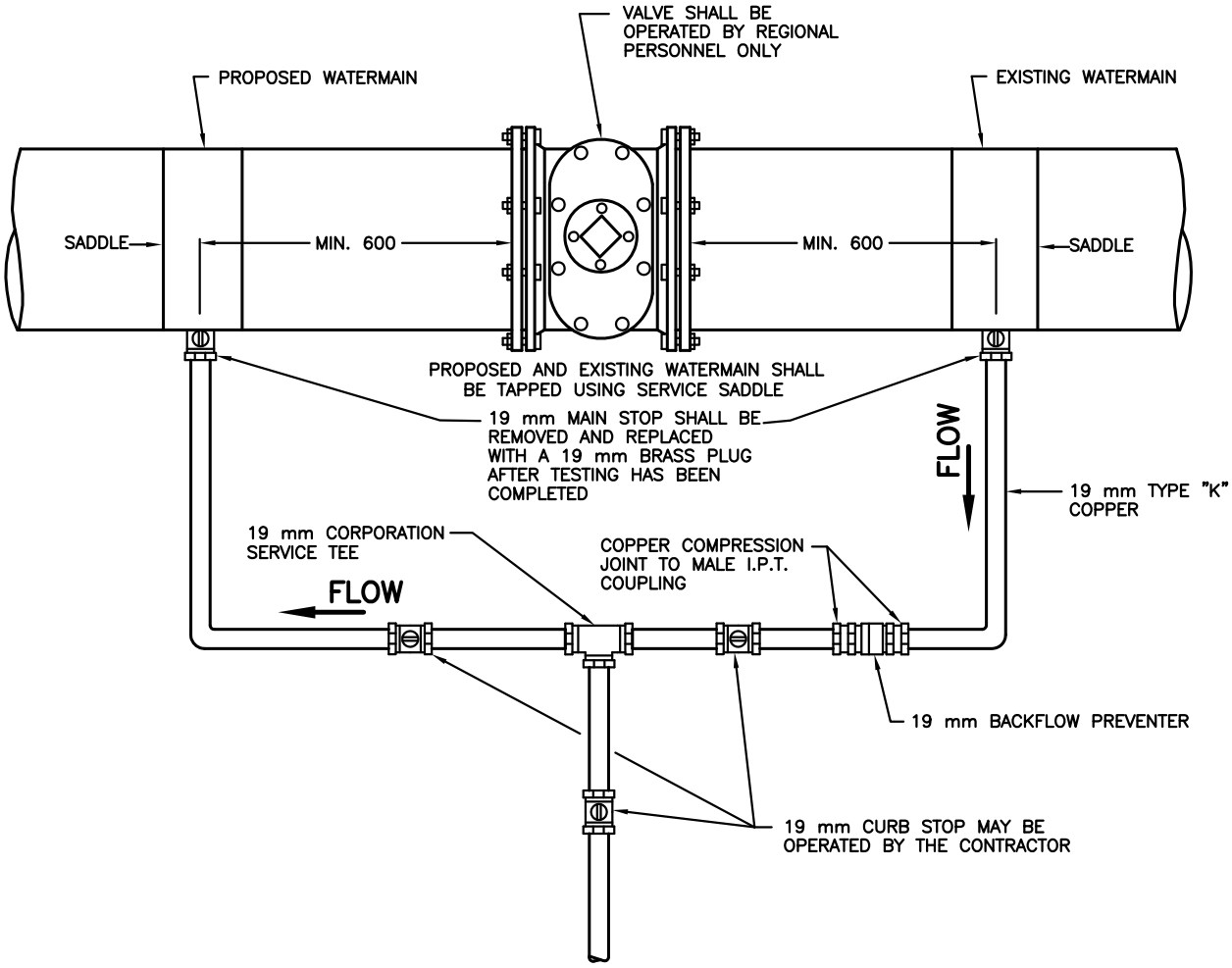
ALL DIMENSIONS IN MILLIMETRES EXCEPT WHERE NOTED.

DURHAM REGION
WORKS DEPARTMENT

HYDRANT SET WITH MECHANICALLY RESTRAINED JOINTS

DWG. DATE:	1978 03
REVISION NO.:	18
REV. DATE:	2014 04
SCALE:	N.T.S.

S-210.010



NOTES

1. TRENCH SHALL BE LEFT OPEN AND FENCED IN ACCORDANCE WITH SAFETY REGULATIONS.
2. INSULATION OF WATERMAIN BY–PASS REQUIRED DURING FREEZING CONDITIONS.
3. THIS STANDARD IS APPLICAPLE FOR 400 mm PVC WATERMAIN.

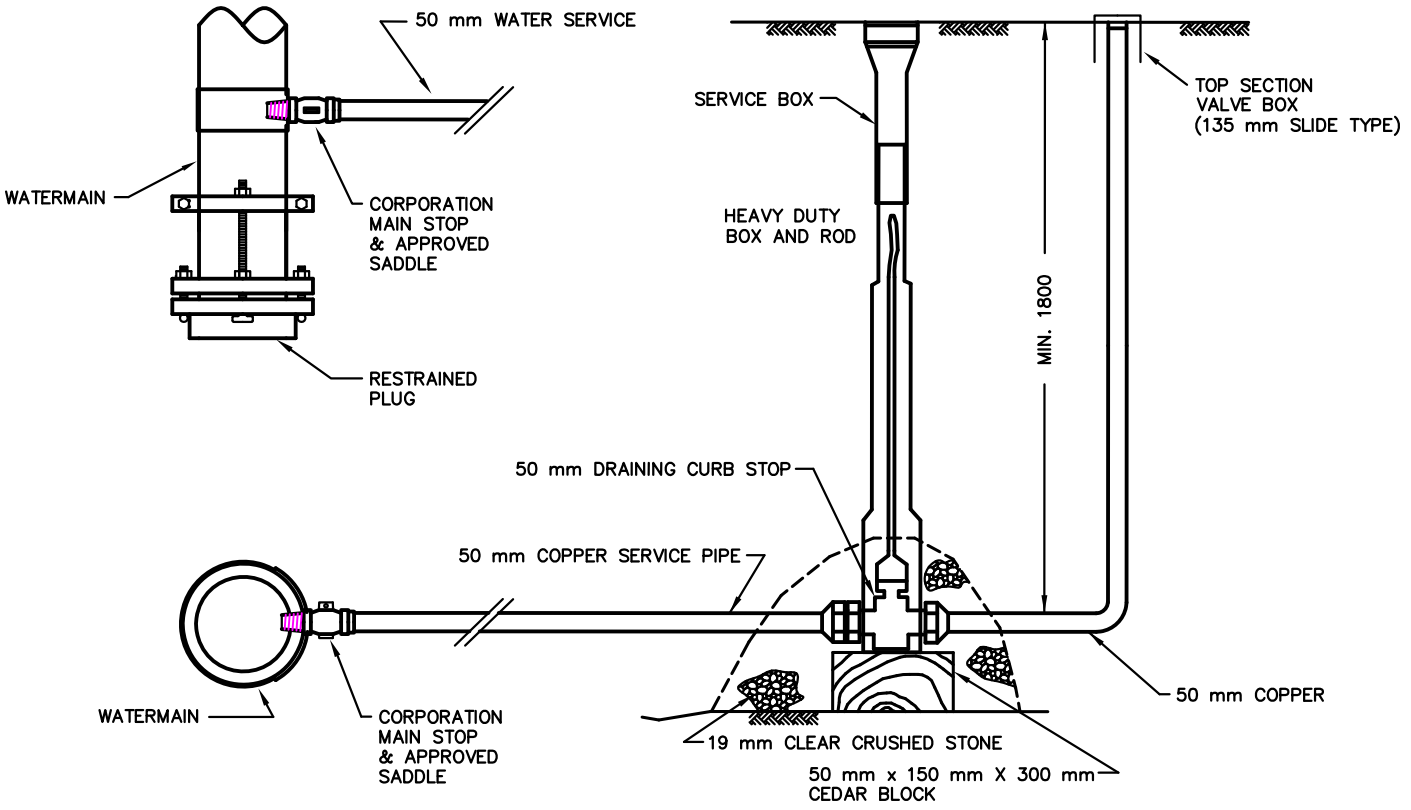
ALL DIMENSIONS IN MILLIMETRES EXCEPT WHERE NOTED.

DURHAM REGION
WORKS DEPARTMENT

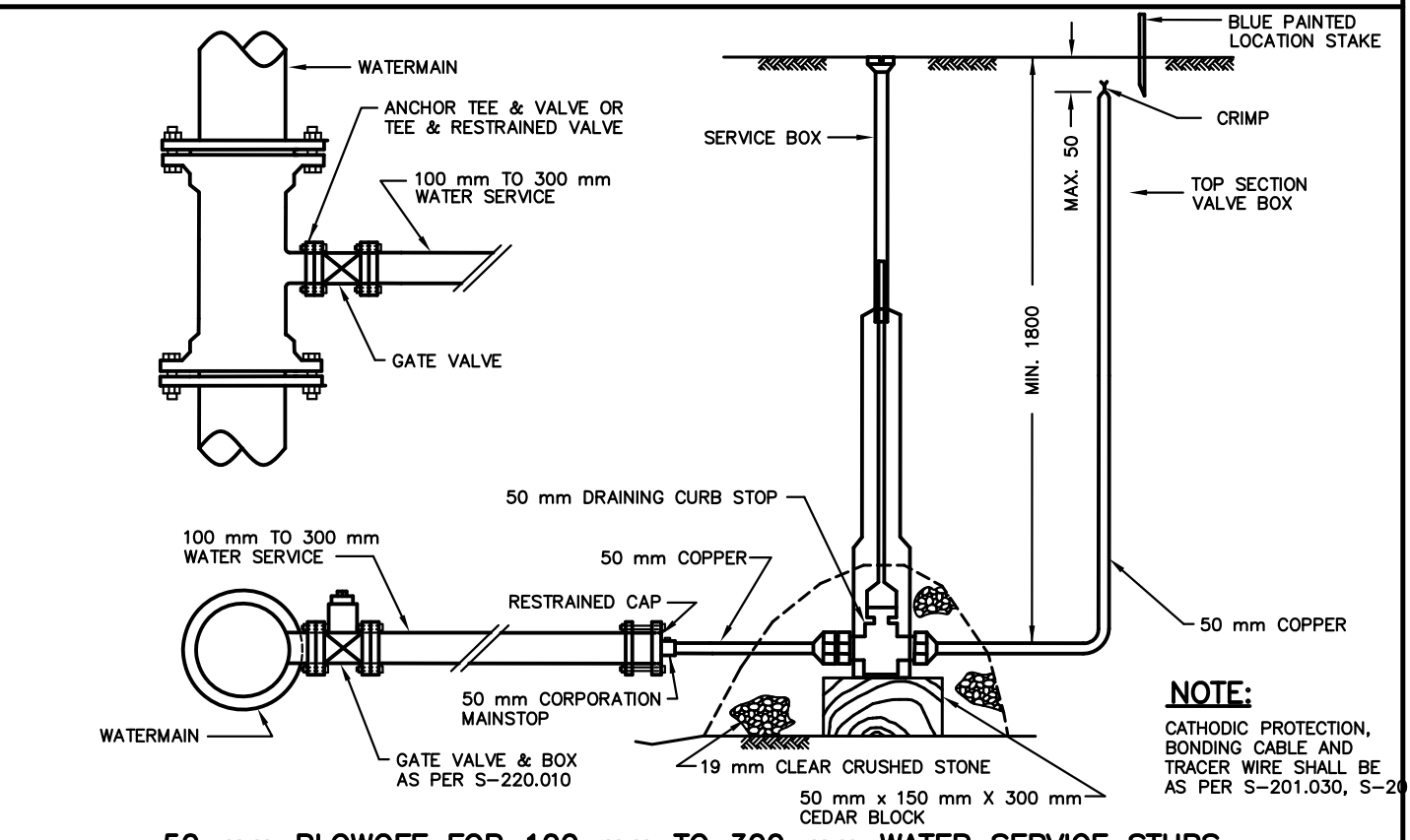
19 mm TEST POINT BY–PASS LESS THAN 400 mm

DWG. DATE:	1982 03
REVISION NO.:	7
REV. DATE:	2013 04
SCALE:	N.T.S.

S-210.040



50 mm BLOWOFF



NOTE:

CATHODIC PROTECTION, BONDING CABLE AND TRACER WIRE SHALL BE AS PER S-201.030, S-201.0

50 mm BLOWOFF FOR 100 mm TO 300 mm WATER SERVICE STUBS

ALL DIMENSIONS IN MILLIMETRES EXCEPT WHERE NOTED.

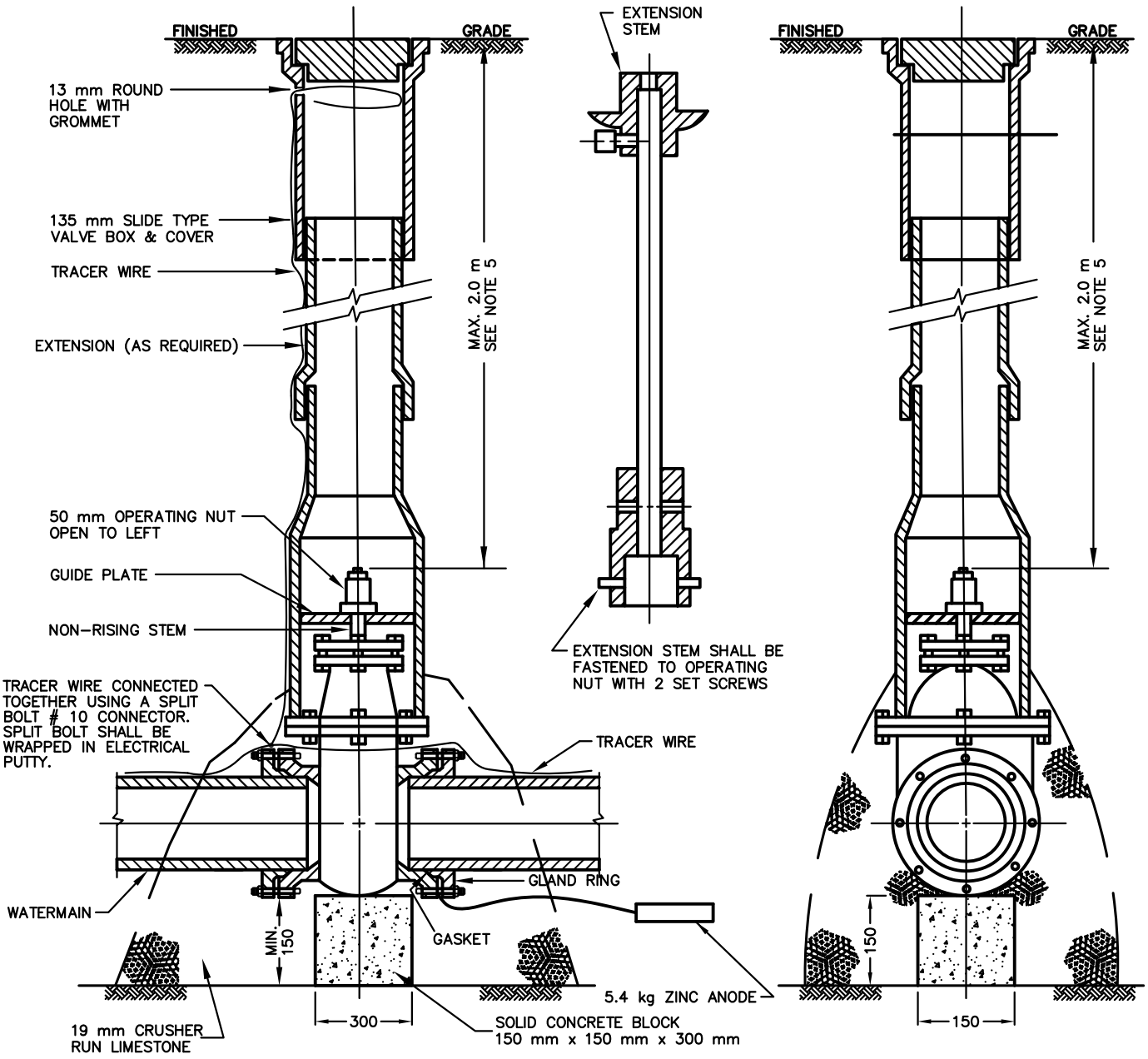
DURHAM REGION
WORKS DEPARTMENT

50 mm BLOWOFF

DWG. DATE:	1993 11
REVISION NO.:	5
REV. DATE:	2013 04
SCALE:	N.T.S.

S-210.060

SLIDE TYPE



NOTES

1. VALVE BOX SHALL BE ADEQUATELY BRACED WHILE BACKFILLING AND MUST REMAIN PLUMB.
2. VALVE BOX EXTENSION SHALL BE USED ONLY IF REQUIRED.
3. REFER TO "STANDARD SPECIFICATIONS FOR THE CONSTRUCTION OF WATERMAINS" FOR PLACEMENT OF MARKER STAKES.
4. VALVE SHALL BE COMPLETELY BACKFILLED WITH 19 mm CRUSHER RUN LIMESTONE.
5. WHEN THE DEPTH OF THE OPERATING NUT IS GREATER THAN 2.0 m BELOW FINISHED GRADE AN EXTENSION STEM SHALL BE USED.
6. ALL INLINE VALVES INSTALLED ON PVC WATERMAIN SHALL BE RESTRAINED AS PER S-200.060, UNLESS OTHERWISE NOTED.
7. IF VALVE BOX IS LOCATED IN A GRAVEL AREA, A 1.0 m x 1.0 m x 50 mm ASPHALT COLLAR SHALL BE INSTALLED.
8. TRACER WIRE COATED, 7 STRAND, 12 GAUGE TW75, TWU75 OR RW90 XLPE WIRE RATED AT MINUS 40° C.
9. TRACER WIRE SHALL BE INSTALLED OUTSIDE VALVE BOX AND BROUGHT INTO UPPER SECTION THROUGH 13 mm ROUND HOLE. LENGTH OF TRACER WIRE INSIDE VALVE BOX TO BE 450 mm MIN.
10. TRACER WIRE SHALL BE INSTALLED IN ALL P.V.C. AND C.P.P. MAIN LINE VALVE BOXES.
11. CATHODIC PROTECTION, BONDING CABLE AND TRACER WIRE SHALL BE AS PER S-201.030, S-201.031.

ALL DIMENSIONS IN MILLIMETRES EXCEPT WHERE NOTED.

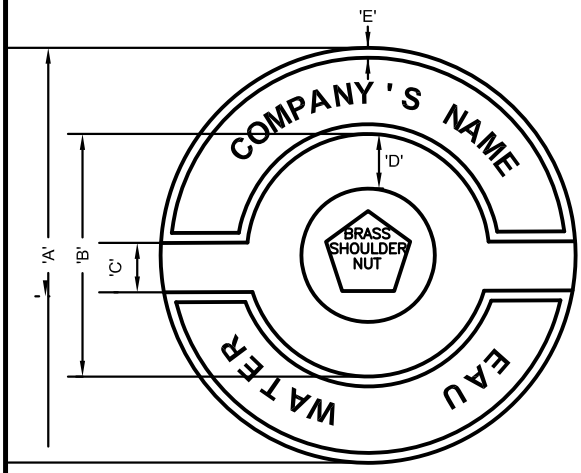
DURHAM REGION
WORKS DEPARTMENT

100 mm TO 400 mm GATE VALVE, VALVE BOX AND TRACER WIRE ARRANGEMENT FOR PVC OR CPP WATERMAIN

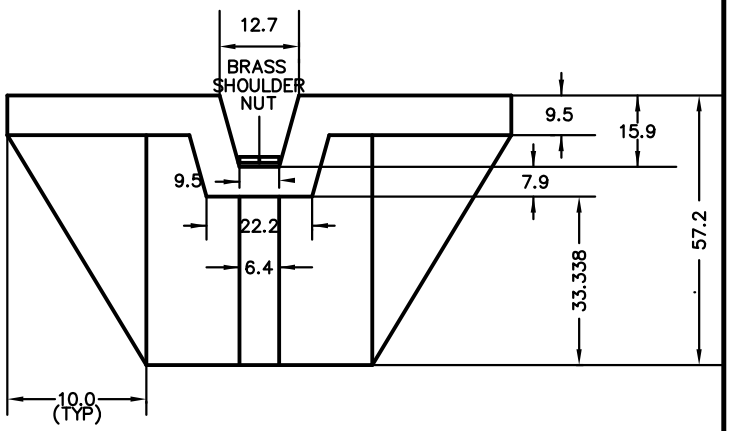
DWG. DATE:	1991 11
REVISION NO.:	19
REV. DATE:	2013 04
SCALE:	N.T.S.

S-220.010

TOP OF CAP



SIDE VIEW OF CAP

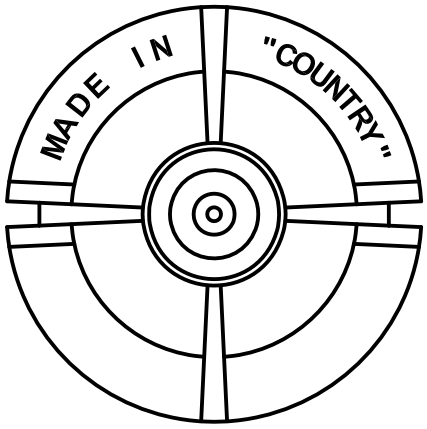


CAP DIMENSIONS:

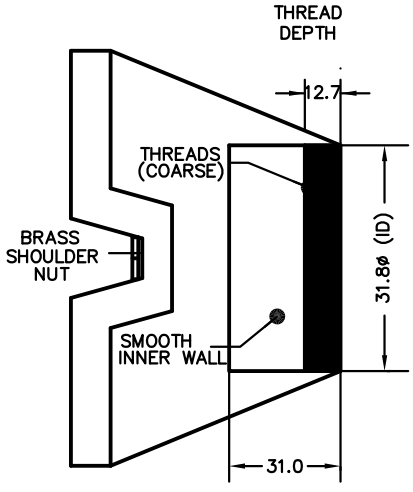
'A' = 95.3
'B' = 41.3
'C' = 12.7
'D' = 3.2
'E' = 3.2

COATED BRASS NUT & WASHER COMBINATION:
A) COATED BRASS NUT = 19.1
B) COATED BRASS WASHER = 31.8ø

BOTTOM OF CAP



THREAD DETAILS



NOTES

1. REFER TO S-230.031 FOR WATER SERVICE BOX DETAILS

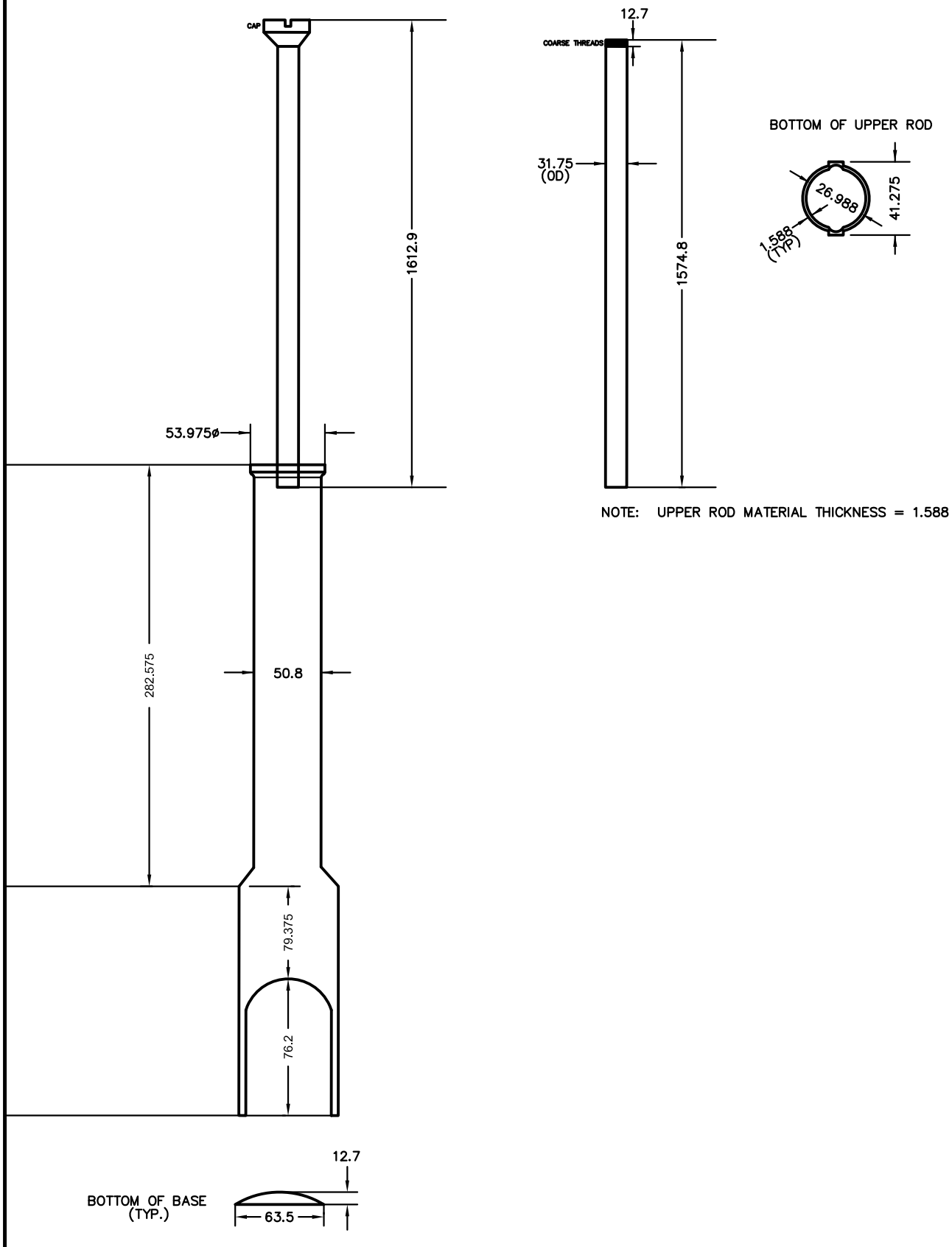
ALL DIMENSIONS IN MILLIMETRES EXCEPT WHERE NOTED.

DURHAM REGION
WORKS DEPARTMENT

WATER SERVICE BOX CAP

DWG. DATE:	2012 05
REVISION NO.:	1
REV. DATE:	2013 04
SCALE:	N.T.S.

S-230.030



ALL DIMENSIONS IN MILLIMETRES EXCEPT WHERE NOTED.

DURHAM REGION
WORKS DEPARTMENT

WATER SERVICE BOX

DWG. DATE:	2012 05
REVISION NO.:	1
REV. DATE:	2013 04
SCALE:	N.T.S.

S-230.031

Corporation of the Town of Cobourg

Albert Street Reconstruction

Contract No. CO-21-01 PWD

Geotechnical Investigation

December 2020

Corporation of the Town of Cobourg

Albert Street Reconstruction

Contract No. 21-01 PWD

Geotechnical Investigation

Geotechnical Investigation and Pavement Design Report by Golder Associates Ltd., December 13, 2018

REPORT

Geotechnical Investigation and Pavement Design Report

Reconstruction of Albert Street (from Third Street to Hibernia Street) and Spencer Street West (from Division Street to George Street), Cobourg, Ontario

Submitted to:

Town of Cobourg

c/o CIMA+
55 King Street East
Bowmanville, Ontario
L1C 1N4
Attention: Mr. Steve May, C.E.T.

Submitted by:

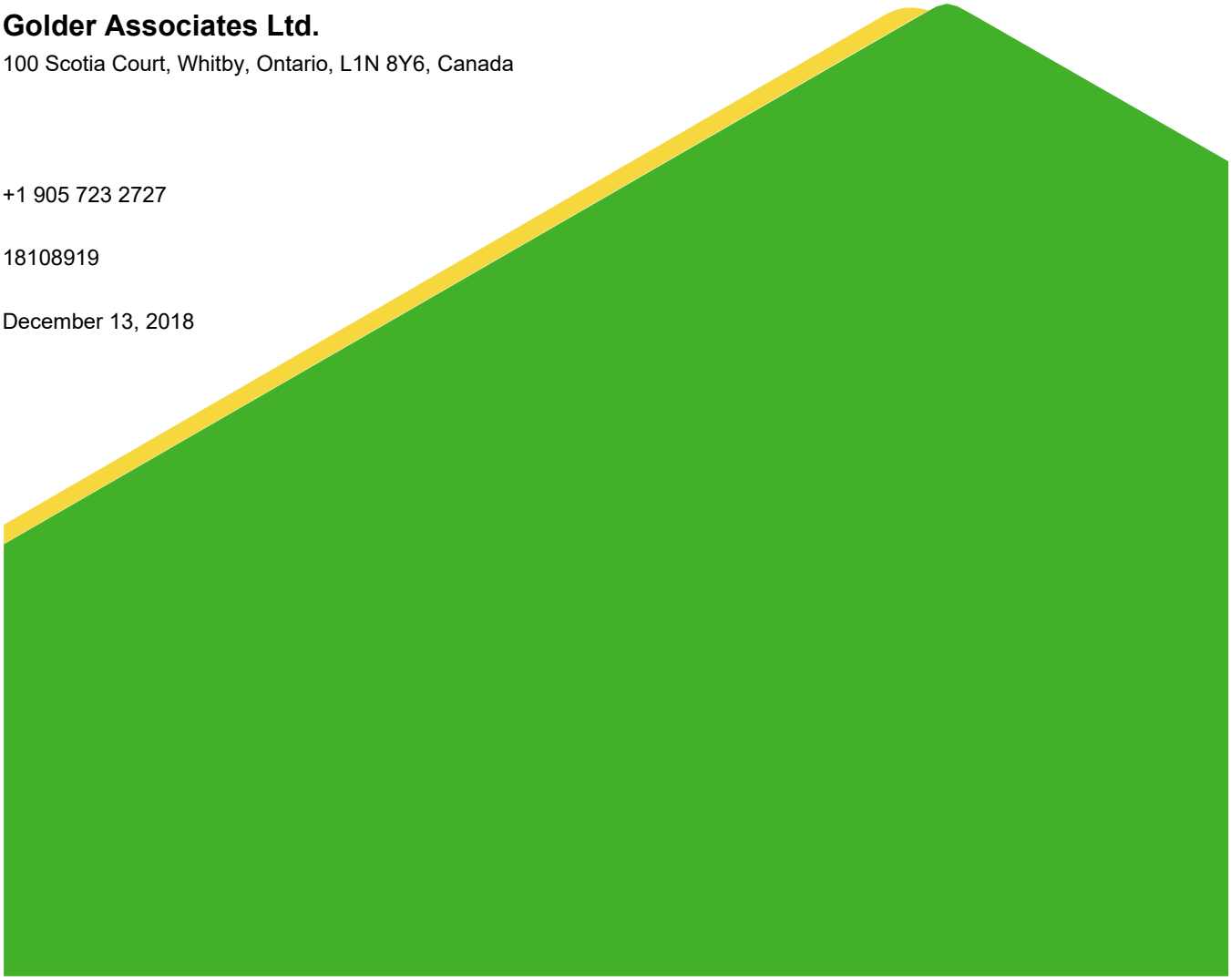
Golder Associates Ltd.

100 Scotia Court, Whitby, Ontario, L1N 8Y6, Canada

+1 905 723 2727

18108919

December 13, 2018



Distribution List

1 e-Copy - CIMA+

1 e-Copy - Golder Associates Ltd.

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TABLES

ATTACHMENTS

APPENDICES

APPENDIX A
Important Information and Limitations of This Report

APPENDIX B
AGAT Laboratories Certificate of Analysis 18T400648

1.0 INTRODUCTION

Golder Associates Ltd. (Golder) has been retained by CIMA+, on behalf of the Town of Cobourg (the Town) to carry out a geotechnical investigation and limited environmental excess soil characterization for the proposed reconstruction of Albert Street (from Third Street to Hibernia Street) and Spencer Street West (from Division Street to George Street) in the Town of Cobourg, Ontario (the site) as shown on Key Plan, Figure 1.

The purpose of the investigation is to obtain information on the general subsurface soil and groundwater conditions at the site by means of a limited number of boreholes and laboratory tests. Based on our interpretation of the factual information available for this site, this report provides engineering comments, recommendations and parameters for the geotechnical design aspects of the project.

This report provides the results of the geotechnical investigation and should be read in conjunction with the *"Important Information and Limitations of This Report"* in Appendix A which forms an integral part of this document. The reader's attention is specifically drawn to this information, as it is essential for the proper use and interpretation of this report. The factual data, interpretations and recommendations contained in this report pertain to a specific project as described in the report and are not applicable to any other project or site location. If the project is modified in concept, location or elevation, or if the project is not initiated within eighteen months of the date of the report, Golder should be given an opportunity to confirm that the recommendations in this report are still valid.

2.0 SITE AND PROJECT DESCRIPTION

The Albert Street site extends from Hibernia Street easterly to Third Street. Albert Street slopes slightly from west to east. The Spencer Street West site extends from George Street easterly to Division Street. Spencer Street West slopes slightly downward from the east and west limits towards the creek crossing about 50 m east of George Street.

It is understood that both sites will include reconstruction of the existing roadways including new watermain and sanitary sewers, full depth granular replacement and hot mix asphalt, new concrete curbs and sidewalks. It is understood that there are no existing storm sewers and installation of new storm sewers is not being proposed for either of these streets.

3.0 INVESTIGATION PROCEDURES

The geotechnical field investigation for this assignment was carried out on October 17 and 19, 2018, during which time four boreholes (numbered1 to 4) were advanced at the sites. Two boreholes were advanced on Albert Street (Boreholes 1 and 2) and two boreholes on Spencer Street West (Boreholes 3 and 4). The boreholes were advanced using a truck-mounted drill rig supplied and operated by Tri-Phase Group of Mississauga, Ontario. The approximate borehole locations are shown on the attached Borehole Location Plan, Figure 2.

Borehole soil samples were obtained at regular intervals of depth using a 50 mm outer diameter split-spoon sampler driven using an automatic hammer in accordance with Standard Penetration Testing (SPT; ASTM D1586). The split-spoon samplers used in the investigation limit the maximum particle size that can be sampled and tested to about 40 mm. Therefore, particles or objects that may exist within the soils that are larger than this dimension would not be sampled or represented in the grain size distributions. The results of the in-situ field tests (i.e. SPT 'N'-values) as presented on the borehole records and in Section 4 of this report are uncorrected.

The groundwater conditions were noted in the open boreholes during and upon completion of drilling. One piezometer was installed in a borehole on each street, following the completion of drilling, to allow for further groundwater measurements. The piezometers consisted of a 19 mm diameter PVC pipe, with a slotted screen sealed at a selected depth within the borehole. A sand filter pack surrounded the screen, and above the screen and the annulus was backfilled to the surface with bentonite. The piezometer installation details are presented on the Record of Borehole sheets appended to this report.

The field work was observed by a member of our technical staff, who located the boreholes in the field, arranged for the clearance of underground utility services, observed the drilling, sampling and in situ testing operations, logged the boreholes and examined and took custody of the recovered soil samples. The samples were identified in the field, placed in appropriate containers, labelled and transported to our Whitby geotechnical laboratory for further visual examination and selected laboratory testing. Index and classification testing, consisting of water content determinations as well as gradation analyses and Atterberg limit testing were carried out on the selected soil samples.

It should be noted that the existing ground surface geodetic elevations and coordinates at borehole locations were provided to Golder by CIMA+.

4.0 REGIONAL GEOLOGY AND STRATIGRAPHY

4.1 Regional Geology

Both sites are located within the physiographic region of Southern Ontario known as the Iroquois Plain (Chapman, L.J. and Putnam, D.F., 1984, “The Physiography of Southern Ontario”, 3rd Edition). Clay plains are identified as the physiographic landform present at the site.

4.2 Subsoil Conditions

The subsurface soil and shallow groundwater conditions encountered in the boreholes, as well as the results of the field and laboratory testing are shown on the attached Record of Borehole sheets. Golder’s *“Methods of Soil Classification*”, “*Abbreviations and Terms Used on Records of Boreholes and Test Pits”* and *“List of Symbols”* are attached to assist in the interpretation of the borehole records. It should be noted that the boundaries between the soil strata have been inferred from drilling observations and non-continuous samples. They generally represent a transition from one soil type to another and should not be inferred to represent an exact plane of geological change. Further, conditions will vary between and beyond the boreholes. The following provides an overview of the subsurface conditions encountered in the boreholes followed by more detailed descriptions of the major soil strata and groundwater conditions.

In general, the subsurface conditions on Albert Street consist of existing pavement structure and fill subgrade underlain by a deposit of silty clay (at one location) and/or silty clay till-like material further underlain by a deposit of silty clay till at the bottom of one borehole.

In general, the subsurface conditions on Spencer Street West consist of existing pavement structure and subgrade fill underlain by a deposit of silty sand till which is further underlain by sandy silt deposit at one location.

4.2.1 Pavement Structure

The existing pavement structures encountered on Albert Street and Spencer Street West are summarized as follows:

Table 1: Existing Pavement Structure

LOCATION		THICKNESS OF PAVEMENT STRUCTURE			
Street	Borehole	Ground Surface Elevation (m)	Asphalt (mm)	Granular Base /Subbase (mm)	Subgrade Type
Albert Street	1	79.08	75	150	Sandy Silt (Fill)
	2	79.37	75	200	Sandy Silt (Fill)
Spencer Street West	3	86.50	50	130	Clayey Silt and Sand (Fill)
	4	84.81	50	640	Silty Clay (Fill)

4.2.2 Granular Base Materials

Granular base materials ranging in gradation from gravel and sand to gravelly sand were encountered below asphalt at all borehole locations. The SPT 'N'-values measured within the granular base range from 11 to 33 blows per 0.3 m of penetration indicating compact to dense compactness condition. A grain size distribution curve for one granular base material sample is shown on Figure 3. The in-situ water contents measured on the samples of the granular base are between about 1 per cent and 7 per cent.

4.2.3 Fill Materials

Fill materials forming the subgrade, and likely comprising the existing services trench backfill, range in gradation from sand to sandy silt to clayey silt and sand to silty clay. The fill extends to a depth of 0.7 m to 3.0 m below the existing ground surface (mbgs) on Albert Street and about 1.5 mbgs on Spencer Street West.

The SPT 'N'-values measured within the non-cohesive fill range from 9 blows to 33 blows per 0.3 m of penetration indicating a loose to dense compactness condition. The SPT 'N'-values measured within the cohesive fill range from 4 blows to 11 blows per 0.3 m of penetration indicating a firm to stiff consistency.

The in-situ water contents measured on samples of the fill range from about 5 per cent to 29 per cent, with the higher water contents associated with the cohesive fill.

A grain size distribution test result for a sample of the sandy silty clay fill encountered in Borehole 1 is shown on Figure 4. A grain size distribution test result for a sample of the clayey silt fill encountered in Borehole 3 is shown on Figure 5.

Atterberg Limits testing carried out on one sample of the silty clay fill measured a liquid limit of about 24 per cent, a plastic limit of about 15 per cent and a corresponding plasticity index of about 10 per cent. These results, which are plotted on the plasticity chart on Figure 7, classify this sample as a silty clay of low plasticity.

4.2.4 Silt and Sand

A localized near surface deposit of non-cohesive silt and sand was encountered in Borehole 2 (Albert Street). The deposit extends to a depth of 1.5 mbgs. One SPT 'N'-value measured within silt and sand is 16 blows per 0.3 m of penetration indicating a compact compactness condition. The natural water content measured on the one sample of silt and sand is about 20 per cent.

4.2.5 Silty Clay

A deposit of cohesive silty clay was encountered in Borehole 2 (Albert Street) and extends to a depth of 2.2 mbgs. One SPT 'N'-value measured within silty clay is 11 blows per 0.3 m of penetration indicating a stiff consistency. The natural water content measured on one sample of the silty clay is about 29 per cent.

4.2.6 Silty Clay Till-Like

A cohesive deposit of silty clay till-like soil was encountered in Boreholes 1 and 2 (Albert Street). The till-like deposit extended to a depth of 5.8 mbgs in Borehole 1 and to the borehole termination depth of 4.2 m in Borehole 2.

The SPT 'N'-values measured within the silty clay till-like deposit range from 5 blows to 11 blows per 0.3 m of penetration. In situ field vane testing in Borehole1 measured an undrained shear strength ranging from approximately 62 to 96 kPa. The SPT 'N'-values together with the results of the shear strength testing indicate a stiff consistency. The natural water contents measured on samples of the till-like silty clay range from about 6 per cent to 13 per cent.

4.2.7 Silty Clay (Till)

A cohesive deposit of sandy silty clay till, trace gravel was encountered below the till-like deposit in Borehole 1 (Albert Street) and extended to the borehole termination depth of 6.4 mbgs.

One SPT 'N'-value measured within the silty clay till deposit is 21 blows per 0.3 m of penetration indicating a very stiff consistency. The natural water content measured on one sample of the silty clay till is about 9 per cent.

4.2.8 Silty Sand (Till)

A deposit of silty sand till was encountered below the fill in Boreholes 3 and 4 (Spencer Street West). The till deposit extended to a depth of 3.7 mbgs in Borehole 4 and to the borehole termination depth of 4.4 m in Borehole 3.

The SPT 'N'-values measured within the silty sand till range from 9 to 69 blows per 0.3 m of penetration indicating a loose to very dense compactness condition. A grain size distribution curve for one sample of the silty sand till is shown on Figure 6. One Atterberg limit test carried out on a sample of the silty sand till returned a non-plastic result. The natural water contents measured on samples of silty sand till range from about 6 per cent to 10 per cent.

4.2.9 Sandy Silt

A deposit of non-cohesive sandy silt was recovered in Borehole 4 (Spencer Street West) below the sandy silt till and extends to the borehole termination depth of 4.4 mbgs. One SPT 'N'-value measured within the sandy silt is 82 blows per 0.3 m of penetration indicating a very dense compactness condition. The natural water content measured on one sample of sandy silt is about 8 per cent.

4.3 Groundwater Conditions

Groundwater observations during and upon completion of drilling are presented in detail in the Record of Boreholes sheets. The groundwater level measurements in open boreholes and in the piezometers are summarized in Table 1.

Table 2: Groundwater Level Measurements

Borehole (Street)	October 17 and 19, 2018		November 1, 2018		November 13, 2018	
	Groundwater Depth/Elevation Upon Borehole Completion		Groundwater Depth /Elevation		Groundwater Depth /Elevation	
	Depth (m)	Elevation (m)	Depth (m)	Elevation (m)	Depth (m)	Elevation (m)
1 (Albert Street)	4.3	74.8	-	-	-	-
2 (Albert Street) Piezometer	3.5	75.9	2.5	76.9	2	77.4
3 (Spencer Street West)	Dry	-	-	-	-	-
4 (Spencer Street West) Piezometer	3.5	81.3	1.4	83.4	1.45	83.4

It should be noted that these observations and measurements reflect the shallow groundwater conditions encountered in the boreholes during the time of the field investigation (October and November 2018) and that groundwater level is expected to fluctuate seasonally in response to changes in precipitation and snow melt.

4.4 Limited Excess Soil Characterization

To provide preliminary information regarding the chemical quality of the subsurface soils at the site for future management, selected soil samples were collected as part of the geotechnical investigation and submitted to AGAT Laboratories (AGAT) for analytical testing. Specifically, four soil samples (BH1-SA1, BH2-SA1, BH3-SA1 and BH4-SA1) were submitted for analysis of metals and inorganics, petroleum hydrocarbon fractions F1 to F4 (PHC F1 to F4) and benzene, toluene ethylbenzene and xylenes (BTEX).

At the time of the sampling, no obvious visual or olfactory evidence of environmental impact (i.e., debris, staining or odour) was observed at the sampling locations.

4.4.1 Soil Analytical Results

The soil sample analytical results were compared to the Table 2 Full Depth Generic Site Condition Standards in a Potable Ground Water Condition for Industrial / Commercial / Community Property Use and coarse textured soil, as set out in the Ontario Ministry of Environment, Conservation and Parks (MECP) document titled *"Soil, Ground*

Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", dated April 15, 2011 (i.e. "MECP Table 2 Standards").

A summary of the soil analytical results and the MECP Table 2 Standards are provided on the Laboratory Certificates of Analysis included in Appendix B.

Based on the results of the soil sample analyses and comparison to the MECP Table 2 Standards, Sample BH3-SA1 did not meet the applicable standards for Sodium Adsorption Ratio (SAR) (i.e. value of 12.8 compared to the Table 2 Standard of 12). This SAR value also exceeds the MECP Table 3 Full Depth Generic Site Condition Standards in a Non-potable Ground Water Condition for Industrial / Commercial / Community Property Use (i.e. the SAR standard is the same for both Table 2 and Table 3). The tested parameters from all other samples met applicable standards.

4.4.2 Discussion of Analytical Results

Based on the above, the soil in the vicinity of BH3-SA1 is characterized by elevated SAR which is likely the result of the use of de-icing salt along the existing roadway. Based on the analytical results, soil in the vicinity of BH3-SA1 and at the other test locations is suitable for reuse on-site. However, excess soil generated in the vicinity of BH3-SA1 is not suitable for off-site reuse given the identified elevated SAR value.

At the time of construction, it is recommended that further testing of excess soil requiring off-site management be conducted to better assess the quality of the soil. Specifically, the SAR value for soil at BH3-SA1 only marginally exceeded the MECP Table 2 and Table 3 standards and it is possible that once excavated and stockpiled the excess soil may be suitable for reuse. Off-site reuse would need to be at a similarly classified site (i.e. Table 2 or 3 Industrial / Commercial / Community land use) and subject to acknowledgement and approval of the receiver. Given the common practice of de-icing salt application on roadways, the environmental quality of all excess soil generated at the site should be assessed prior to off-site reuse to confirm its suitability. Soil that is not suitable for off-site reuse would need to be disposed of at a MECP approved waste management facility. Characterization of excess soil in accordance with Regulation 347 would be required prior to off-site disposal.

Note that the excess soil reuse options as discussed herein are limited to the environmental quality of the soil and does not refer to the geotechnical quality of the excess fill.

5.0 DISCUSSION

This section of the report provides engineering information and recommendations for the geotechnical and pavement design aspects of the project based on our interpretation of the borehole information, the laboratory test data and our understanding of the project requirements. The information in this portion of the report is provided for planning and design purposes for the design guidance of the design engineers and architects. Where comments are made on construction, they are provided only in order to highlight those aspects of construction which could affect the design of the project. Contractors bidding on or undertaking any work at the site should examine the factual results of the investigation, satisfy themselves as to the adequacy of the information for construction and make their own interpretation of the factual data as it affects their proposed construction techniques, schedule, equipment capabilities, costs, sequencing and the like.

5.1 Project Description

It is our understanding that both streets will be reconstructed with new pavement structures and replacement of the watermain and sanitary sewers on Albert Street and Spencer Street West. The design invert of the services is not finalized at this time, however, the approximate elevations of the watermain and sanitary sewers are provided in Table 2, as provided to Golder by CIMA+.

Table 3: Approximate Watermain and Sanitary Sewer Invert Depths and Elevations

Street (Boreholes)	Watermain Depth / Elevation (m)		Sanitary Sewer Depth / Elevation (m)	
	Depth	Elevation	Depth	Elevation
Albert Street (Boreholes 1 and 2)	2.0	77.1 to 77.4	3.5	75.6 to 75.9
Spencer Street West (Boreholes 3 and 4)	2.2	84.3 to 82.6	4.5	82.0 to 80.3

5.2 Trench Excavations and Groundwater Control

The proposed new watermain and sanitary sewer installations will require trench excavations between 2.0 m and 3.5 m depth below the existing road surface on Albert Street and between 2.2 m and 4.5 m depth below the existing road surface on Spencer Street West.

Based on the results of the geotechnical investigation, the founding soils for the pipes on Albert Street will consist primarily of stiff silty clay or silty clay till-like material. The watermain invert in the vicinity of Borehole 1 will coincide with the firm sandy silty clay fill assumed to be disturbed native material likely due to previous excavation in the vicinity of the borehole for the existing watermain repair. In this regard, the fill material should be fully removed from below the pipe invert to expose native and undisturbed soils as inspected and recommended by Golder during the construction. The sub-excavated fill may be replaced with approved engineered fill compacted to minimum 98 per cent of the materials Standard Proctor Maximum Dry Density (SPMDD).

The native stiff subsoils or compacted engineered fill, if required, are considered to be suitable for supporting the pipes on Albert Street, provided the integrity of the base can be maintained during construction. This will require inspection during construction by Golder, to determine the suitability of existing subgrade soils for supporting the pipes.

The founding soils for the pipes on Spencer Street West will consist of primarily of compact to very dense silty sand till or sandy silt. The invert of the proposed sanitary sewer coincides with the bottom of the boreholes advanced on this site. As such, it is essential that the subgrade soil conditions of the base of the trench excavations be inspected by Golder to confirm that the subgrade soils are capable of supporting the pipes. Remedial work, removal and replacement of soft soils or thickening of granular bedding may be required as recommended by Golder during trench excavations should soft founding soils be encountered during excavations.

Based on the groundwater conditions encountered in the boreholes and considering the trench excavation depths anticipated (i.e. up to about 3.5 m in depth on Albert Street and up to about 4.5 m in depth on Spencer Street

West), the pipes will generally be at or below the local groundwater level. Groundwater control during excavation within the predominant silty clay, silty clay till-like soil or silty sand till soils can likely be handled by pumping from properly constructed and filtered sumps located within the excavations and just below the bedding level. The sumps should be installed prior to excavating to the base level to ensure the base remains intact once the excavation reaches that level.

It should be noted that some seasonal fluctuation of the groundwater table is anticipated and that the actual groundwater levels may differ somewhat from those measured. Groundwater fluctuation would not be expected to result in a significant impact on construction where mostly fine-grained soils and glacial tills are present.

Water takings in excess of 50,000 L/day are regulated by the MECP. Certain takings of groundwater and stormwater for construction dewatering purposes with a combined total less than 400,000 L/day qualify for self-registration on the MECP's Environmental Activity and Sector Registry (EASR). Registry on the EASR replaces the need to obtain a Permit to take Water (PTTW) for water taking and a Section 53 approval for discharge of water to the environment. A "Water Taking Plan" and a "Discharge Plan" are required by the MECP if water is taken in accordance with an EASR. In all cases, discharge under the EASR must be in accordance with a Discharge Plan (to be developed by a qualified professional). A Category 3 PTTW would be required for water takings in excess of 400,000 L/day.

An accurate prediction of the groundwater pumping volumes cannot be made at this time, as the flow rate would be dependent on construction methods adopted by the contractor and the final inverts. A hydrogeological study may be warranted in support of an EASR or PTTW depending on construction methods and equipment used. Pumping discharges should also conform to any requirements from the local municipalities and conservation agencies. It is unlikely that an EASR or PTTW would be required at this site for the shallow excavations, but this need should be confirmed after the final grading plans are made available.

All excavations should be carried out in accordance with the Occupational Health and Safety Act and Regulations for Construction Projects (OHSA). According to the OHSA, the fill and the native stiff silty clay loose to very dense silty sand till and very dens sandy silt may be considered Type 3 soils above the groundwater level and Type 4 soils below the groundwater level. Temporary excavation side slopes may be formed at 1 horizontal to 1 vertical (1H:1V) in Type 3 soils and at 3H:1V in Type 4 soils. However, depending upon the construction procedures adopted by the contractor, the success of the contractor's groundwater control methods and weather conditions at the time of construction, some flattening and/or blanketing of the slopes may be required.

Given the space constraints within an active roadway, it is anticipated that the majority of the construction of the pipe installations will be carried out using a vertically excavated, unsupported excavations (using a properly engineered trench liner box for protection, certified by an experienced engineer); or by a supported (sheeted) excavation if conditions warrant in close proximity to adjacent underground services or adjacent structures. It must be emphasized that a trench liner box provides protection for construction personnel but does not provide any lateral support for adjacent excavation walls, underground services or existing structures. It is imperative that underground services and existing structures adjacent to the trench excavations be accurately located prior to construction and adequate support provided where required, as per current municipal and provincial design standards.

Where trench boxes are utilized, it is anticipated that in the non-cohesive soils, the unsupported soils on the trench sides will relax, filling the void between the trench walls and trench box. This may lead to loss of ground below the pavement and potentially undermine and reduce the stability of the pavement structure adjacent to the

open traffic lanes. To minimize this effect, the gap between the trench walls and trench box should be minimized during the excavation and trench box installation.

Excavated materials should be placed away from the edge of the excavation a distance equal to the depth of the excavation or greater. In addition, stockpiling of the material should be prohibited adjacent to the excavation to minimize surcharge loading near the excavation crest. Failure to comply with this item may result in trenched wall failures. Where sufficient space is not available to stockpile the excavated material at the site, off-site disposal of the excavated material intended for reuse would need to be arranged.

If a shored excavation is required to support adjacent utilities or structures, the shoring should be designed and constructed in accordance with Ontario Provincial Standard Specification (OPSS) 539 (Temporary Protection Systems), including an evaluation of base stability, soil squeezing stability and the hydraulic uplift stability as defined in the Canadian Foundation Engineering Manual (2006).

Design of temporary works, including dewatering, will be entirely the responsibility of the contractor.

The trench excavation on Spencer Street West will be carried out in glacially derived materials and as such, cobbles and boulders should be expected to be encountered within the excavations.

5.3 Pipe Bedding and Cover

The bedding for the underground services should be compatible with the type and class of pipe, the surrounding subsoil and anticipated loading conditions and should be designed in accordance with the Regional and Municipal standards. Where granular bedding is deemed to be acceptable, it should consist of at least 150 mm of OPSS 1010 Granular A' or 19 mm crusher run limestone material. Clear stone bedding material should not be used in any case for pipe bedding or to stabilize the base. From the springline to 300 mm above the obvert of the pipe, sand cover may be used. All bedding and cover materials should be placed in maximum 150 mm loose lifts and should be uniformly compacted to at least 98 per cent of the material's SPMDD.

5.4 Trench Backfill

The excavated materials on the Albert Street site will be variable, ranging from sandy silty clay/till-like native soils to sandy/silty/clayey/granular native/fill. On Spencer Street West, the majority of the excavated soils will consist of native silty sand till soil and silty clay/clayey silt/granular fill.

The excavated soils at suitable water contents may be reused as trench backfill provided that they are free of significant amounts of topsoil (if any), organics or any other deleterious material, and are placed and compacted as outlined below. It should be noted that due to the fine-grained nature of the majority of the native subsoils/fill, and particularly on Albert Street, some difficulty would be expected in achieving adequate compaction during wet weather. All organic materials should be wasted, as appropriate. All oversized cobbles and boulders (i.e. greater than 150 mm in size) should be removed from the backfill.

All trench backfill should be placed in maximum 300 mm loose lifts and uniformly compacted to at least 98 percent of the material's SPMDD.

Alternatively, if water contents of the soil at the time of construction are too high and there is insufficient space and/or time available to adequately dry the trench backfill material, or if there is a shortage of suitable in-situ material, then an approved imported OPSS 1010 Select Subgrade Material (SSM) could be used. It should be

placed in loose lift thicknesses as indicated above and uniformly compacted to at least 98 per cent of the SPMDD. Backfilling operations during cold weather should avoid inclusions of frozen lumps of material, snow and ice.

Normal post-construction settlement of the compacted trench backfill should be anticipated, with the majority of such settlement taking place within about 6 months following the completion of trench backfilling operations. This settlement, which will be reflected at the ground surface, may be compensated for where necessary by placing additional granular material prior to asphalt paving. However, since it is anticipated that the asphalt binder course will be placed shortly following the completion of trench backfilling operations, any settlement that may be reflected by subsidence of the surface of the binder asphalt should be compensated for by placing additional asphalt thickness.

In some cases, even though the compaction requirements have been met, the subgrade strength in the trench backfill areas may not be adequate to support heavy construction loading, especially during wet weather or where backfill materials wet of optimum have been placed. In any event, the subgrade should be proofrolled and inspected by qualified geotechnical personnel prior to placing the Granular 'B', subbase and additional granular material placed, as required, consistent with the prevailing weather conditions and anticipated use by construction traffic.

6.0 PAVEMENT DESIGN AND ANALYSIS

This section of the report provides engineering information for the geotechnical/pavement design aspects of the project, based on our interpretation of the information obtained during this investigation, and our understanding of the project requirements. The information in this portion of the report is provided for the guidance of the design engineers. Where comments are made on construction, they are provided only in order to highlight aspects of construction which could affect the design of the project. Contractors bidding on or undertaking any work at the site should examine the factual results of the investigation, satisfy themselves as to the adequacy of the information for construction and make their own interpretation of the factual data as it affects their proposed construction techniques, schedule, equipment capabilities, costs, sequencing and the like.

6.1 Traffic Data

Traffic load calculations have been carried out in accordance with MTO's "*Procedures for Estimating Traffic Loads for Pavement Design, 1995*". The estimated Equivalent Single Axle Loads (ESALs) over a design period of 19 years using the AADT data provided to Golder by the Town of Coburg in an email dated October 31, 2017 (%Trucks and Traffic Growth Rate assumed by Golder) are 475,000 for Albert Street and 30,000 for Spencer Street. The traffic data and design ESALs are summarized in Table 3.

Table 4: Traffic Data and ESALs

ROAD SECTION	DESIGN FEATURE	PARAMETERS
Albert Street (Hibernia Street to Third Street)	AADT (and Year)	AADT: 3,000 (2018)
	% Heavy Trucks	5%
	Traffic Growth	2% per year
	Estimated ESALs for the Design Period	475,000 (19 year design from 2019 to 2038)

ROAD SECTION	DESIGN FEATURE	PARAMETERS
Spencer Street (George Street to Division Street)	AADT (and Year)	AADT: 300 (2018)
	% Heavy Trucks	3%
	Traffic Growth	2% per year
	Estimated ESALs for the Design Period	30,000 (19 year design from 2019 to 2038)

The AADT values used for estimating ESALs were provided to Golder by the Town of Coburg in an email dated October 31, 2018. The %Heavy Trucks and Traffic Growth Rate were assumed by Golder.

6.2 AASHTO Design Analysis

The design for the reconstruction of the pavements within the project limits have been developed using the *"1993 AASHTO Guide for the Design of Pavement Structures" (*AASHTO design method). AASHTO pavement design parameters have been selected from MTO's Materials Information Report *"Adaptation and Verification of AASHTO Pavement Design Parameters for Ontario Conditions"* dated March 19, 2008 (MI-183).

The resilient modulus of the subgrade soil was estimated based on visual classification, results of laboratory classification testing of the subgrade soils and the in-situ water content of the soils encountered in the boreholes. Based on Table 8-6 of MI-183, the suggested modulus values for clayey silt/ silty clay soils (the predominant soil types) range between 15 MPa and 35 MPa. A resilient modulus of 20 MPa was selected for the design analysis for both roads.

6.2.1 Design Parameters

The AASHTO design method was used to select the appropriate designs for Albert Street and Spencer Street within the project limits. In accordance with MI-183, the design parameters used for the pavement design analysis are summarized in Table 4.

Table 5: Pavement Design Parameters

Design Criteria	Parameters Selected
Initial Serviceability	4.2
Terminal Serviceability	2.0
Reliability Level (%)	90
Overall Standard Deviation	0.49
Roadbed Soil Resilient Modulus	20 MPa (Moist to Wet Silty Clay)

6.3 Pavement Design

It is understood that both sites will include reconstruction of the existing roadways including new subdrains, watermain and sanitary sewers, full depth granular replacement and hot mix asphalt, new concrete curbs, gutters and sidewalks.

6.3.1 Albert Street - Full Depth Reconstruction

The recommended reconstruction design for Albert Street is as follows:

- In areas where the existing pavement structure is in place after the watermain/sewer construction, remove the existing hot-mix asphalt (HMA), granular materials and subgrade soils to 1.2 m below proposed finished pavement grade;
- The subgrade below the road platform should be brought up to subgrade elevation using engineered fill (non-frost susceptible materials compacted to a minimum of 95 percent of the material's Standard Proctor Maximum Dry Density (SPMDD)). The subgrade should be graded to the required crossfall;
- Place 500 mm of new Granular ‘B’ Type I in lifts not exceeding 300 mm, and compact to 100 percent of the material’s SPMDD;
- Place 150 mm of new Granular ‘A’ and compact to 100 percent of the material’s SPMDD;
- Place and compact one 50 mm lift of HL 8 binder course asphalt; and
- Place and compact one 50 mm lift of HL 3 surface course asphalt.

The granular materials should daylight into the subdrain system under the curb and gutter (refer to Section 6.5).

6.3.2 Spencer Street - Full Depth Reconstruction

The recommended reconstruction design for Spencer Street is as follows:

- In areas where the existing pavement structure is in place after the watermain/sewer construction, remove the existing HMA, granular materials and subgrade soils to 1.2 m below proposed finished pavement grade;
- The subgrade below the road platform should be brought up to subgrade elevation using engineered fill (non-frost susceptible materials compacted to a minimum of 95 percent of the material's SPMDD). The subgrade should be graded to the required crossfall;
- Place 300 mm of new Granular ‘B’ Type I and compact to 100 percent of the material’s SPMDD;
- Place 150 mm of new Granular ‘A’ and compact to 100 percent of the material’s SPMDD;
- Place and compact one 50 mm lift of HL 8 binder course asphalt; and
- Place and compact one 40 mm lift of HL 3 surface course asphalt.

The granular materials should daylight into the subdrain system under the curb and gutter (refer to Section 6.5).

6.4 Organic Matter

Subgrade soil containing organic matter, where encountered, should be stripped from the footprint of the road regardless of depth from finished grade.

6.5 Drainage

Some of the subgrade soils encountered in the boreholes within the frost depth are likely susceptible to frost heave. Additionally, it is understood that both sites will have urban cross sections. As a result, it is critical that subdrains are installed to facilitate drainage. The drainage system should consist of a 100 or 150 mm diameter perforated pipe, placed inside a trench 300 mm in width and surrounded by concrete sand. The subdrain invert should be at least 300 mm below the bottom of the granular subbase. The trench should be lined with a suitable geotextile prior to placing the concrete sand. At the top of the trench, the geotextile should overlap a minimum of 300 mm. The geotextile should conform to *OPSS 1860*, Class 1 and be non-woven with a F.O.S. in the range of 75 to 150 micron. The subdrain should be installed in general accordance with OPSD 207.041, November 2016 (Hot Mix Asphalt Pavement, assuming no Open Graded Drainage Layer).

6.6 Frost Penetration Depth

A frost penetration depth of 1.4 m (based on OPSD 3400.011) can be assumed for design purposes.

6.7 Asphalt Cement

It is recommended that PG 58-28 asphalt cement be used for the surface and binder course mixes.

6.8 Tack Coat

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

6.9 Subgrade Preparation

The subgrade should be proofrolled prior to placement of any granular materials. Loose or soft areas identified by proofrolling should be sub-excavated and replaced with Select Subgrade Material (SSM) or Granular 'B' Type I, compacted to provide a stable uniform subgrade to meet the requirements of OPSS.MUNI 501 (November 2014). Remedial work (subexcavation and replacement) should be supervised by a geotechnical engineer.

6.10 Compaction

The granular materials (granular base and subbase) should be compacted to 100 percent of the material's SPMDD. The HL 3 asphalt surface course and HL 8 asphalt binder course should be compacted to a minimum of 92.0 percent of the material's Maximum Relative Density (MRD).

7.0 MONITORING AND TESTING

During construction, sufficient inspections and in-situ materials testing should be carried out by Golder to confirm that the conditions exposed are consistent with those encountered in the boreholes and to monitor conformance to the pertinent project specifications. Asphalt testing and concrete testing should be carried out in a CCIL certified laboratory.

8.0 CLOSURE

We trust that this report provides sufficient geotechnical engineering and environmental information to facilitate the detailed 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.

Signature Page

Yours truly,

Golder Associates Ltd.

Reza Vahdani, E.I.T.
Geotechnical Engineer in Training

Sarah E.M. Poot, P.Eng.
Associate, Senior Geotechnical Engineer

RV/SEMP/KF/rv/sv

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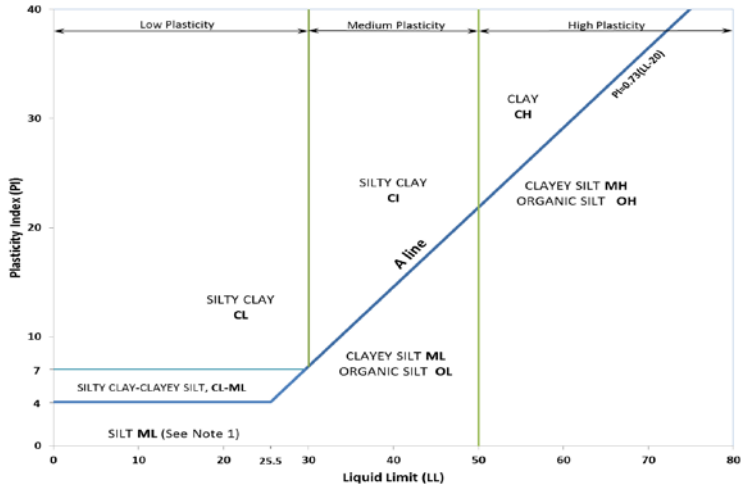
METHOD OF SOIL CLASSIFICATION

The Golder Associates Ltd. Soil Classification System is based on the Unified Soil Classification System (USCS)

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	USCS Group Symbol	Group Name
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)	Gravels with ≤12% fines (by mass)	Poorly Graded	<4	≤1 or ≥3	≤30%	GP	GRAVEL
				Well Graded	≥4	1 to 3		GW	GRAVEL
			Gravels with >12% fines (by mass)	Below A Line	n/a			GM	SILTY GRAVEL
				Above A Line	n/a			GC	CLAYEY GRAVEL
		SANDS (≥50% by mass of coarse fraction is smaller than 4.75 mm)	Sands with ≤12% fines (by mass)	Poorly Graded	<6	≤1 or ≥3		SP	SAND
				Well Graded	≥6	1 to 3		SW	SAND
			Sands with >12% fines (by mass)	Below A Line	n/a			SM	SILTY SAND
				Above A Line	n/a			SC	CLAYEY SAND

Organic or Inorganic	Soil Group	Type of Soil	Laboratory Tests	Field Indicators					Organic Content	USCS Group Symbol	Primary Name
				Dilatancy	Dry Strength	Shine Test	Thread Diameter	Toughness (of 3 mm thread)			
INORGANIC (Organic Content ≤30% by mass)	FINE-GRAINED SOILS (≥50% by mass is smaller than 0.075 mm)	SILTS (Non-Plastic or PI and LL plot below A-Line on Plasticity Chart below)	Liquid Limit <50	Rapid	None	None	>6 mm	N/A (can't roll 3 mm thread)	<5%	ML	SILT
				Slow	None to Low	Dull	3mm to 6 mm	None to low	<5%	ML	CLAYEY SILT
				Slow to very slow	Low to medium	Dull to slight	3mm to 6 mm	Low	5% to 30%	OL	ORGANIC SILT
			Liquid Limit ≥50	Slow to very slow	Low to medium	Slight	3mm to 6 mm	Low to medium	<5%	MH	CLAYEY SILT
				None	Medium to high	Dull to slight	1 mm to 3 mm	Medium to high	5% to 30%	OH	ORGANIC SILT
		CLAYS (PI and LL plot above A-Line on Plasticity Chart below)	Liquid Limit <30	None	Low to medium	Slight to shiny	~ 3 mm	Low to medium	0% to 30% **(see Note 2)**	CL	SILTY CLAY
			Liquid Limit 30 to 50	None	Medium to high	Slight to shiny	1 mm to 3 mm	Medium		CI	SILTY CLAY
			Liquid Limit ≥50	None	High	Shiny	<1 mm	High		CH	CLAY
HIGHLY ORGANIC SOILS (Organic Content >30% by mass)		Peat and mineral soil mixtures							30% to 75%	PT	SILTY PEAT, SANDY PEAT
		Predominantly peat, may contain some mineral soil, fibrous or amorphous peat							75% to 100%		PEAT



Note 1 – Fine grained materials with PI and LL that plot in this area are named (ML) SILT with slight plasticity. Fine-grained materials which are non-plastic (i.e. a PL cannot be measured) are named SILT.
Note 2 – For soils with <5% organic content, include the descriptor "trace organics" for soils with between 5% and 30% organic content include the prefix "organic" before the Primary name.

Dual Symbol — A dual symbol is two symbols separated by a hyphen, for example, GP-GM, SW-SC and CL-ML.
For non-cohesive soils, the dual symbols must be used when the soil has between 5% and 12% fines (i.e. to identify transitional material between "clean" and "dirty" sand or gravel.
For cohesive soils, the dual symbol must be used when the liquid limit and plasticity index values plot in the CL-ML area of the plasticity chart (see Plasticity Chart at left).

Borderline Symbol — A borderline symbol is two symbols separated by a slash, for example, CL/CI, GM/SM, CL/ML.
A borderline symbol should be used to indicate that the soil has been identified as having properties that are on the transition between similar materials. In addition, a borderline symbol may be used to indicate a range of similar soil types within a stratum.

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)

MODIFIERS FOR SECONDARY AND MINOR CONSTITUENTS

Percentage by Mass	Modifier
>35	Use 'and' to combine major constituents (*i.e.,* SAND and GRAVEL)
> 12 to 35	Primary soil name prefixed with "gravelly, sandy, SILTY, CLAYEY" as applicable
> 5 to 12	some
≤ 5	trace

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); N_d:

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 or pushed tube sampler – note size
DS	Denison type sample
GS	Grab Sample
MC	Modified California Samples
MS	Modified Shelby (for frozen soil)
RC	Rock core
SC	Soil core
SS	Split spoon sampler – note size
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 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 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	non-plastic
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

PROJECT: 18108919

LOCATION: N 4871157.95; E 727160.77

RECORD OF BOREHOLE: 1

BORING DATE: October 19, 2018

SHEET 1 OF 1

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		79.08							
0	CME 55 Track Mount - Power Auger 102 mm Solid Stem Auger	ASPHALT (75 mm)		0.00							
		GRANULAR BASE - (GP) GRAVEL and SAND, trace non-plastic fines; brown; non-cohesive, moist, dense		0.08	1A	SS					
				0.23	1B	SS	33				
		FILL - (ML) sandy SILT; trace plastic fines; dark brown, organic inclusions; non-cohesive, moist, dense		78.39							
				0.69							
1		FILL - (SP) SAND; trace non-plastic fines; brown; non-cohesive, moist, loose			2	SS	9				
				77.63							
		FILL - (CL) sandy SILTY CLAY; brown to grey; cohesive, w>PL, stiff to firm (disturbed native)		1.45	3	SS	9			MH	
2					4	SS	5				
				76.11							
3		(CL) sandy SILTY CLAY, trace gravel; grey (TILL-LIKE); cohesive, w~PL to w<PL, stiff		2.97	5	SS	6				
4											
					6	SS	5				
5											
				73.29							
		(CL) sandy SILTY CLAY, trace gravel; grey (TILL); cohesive, w<PL, very stiff		5.79	7	SS	21				
6											
				72.68							
		END OF BOREHOLE		6.40							
7		Notes:									
		1. Borehole caved to 5.8 m depth below ground surface (Elev. 73.3 m) upon completion of drilling on October 19, 2018.									
8		2. Groundwater measured at 4.3 m depth below ground surface (Elev. 74.8 m) upon completion of drilling on October 19, 2018.									
		3. No headspace combustible or organic vapour concentrations were detected in soil samples during drilling on October 19, 2018.									
9											
10											

DEPTH SCALE

1 : 50

GOLDER

LOGGED: RV

CHECKED: MN

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PROJECT: 18108919

LOCATION: N 4871151.06; E 727117.86

RECORD OF BOREHOLE: 2

BORING DATE: October 19, 2018

SHEET 1 OF 1

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected) 100 200 300 400	HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected) 100 200 300 400	HYDRAULIC CONDUCTIVITY, k, cm/s 10^{-6} 10^{-5} 10^{-4} 10^{-3}	WATER CONTENT PERCENT Wp W Wl 10 20 30 40	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		79.37									
0	CME 55 Track Mount - Power Auger 102 mm Solid Stem Auger	ASPHALT (75 mm)		0.00									
		GRANULAR BASE - (GP) GRAVEL and SAND, trace non-plastic fines; brown; non-cohesive, moist, compact		0.08 / 79.09	1A	SS	13	ND				M	19 mm Piezometer
				0.28	1B	SS							
		FILL - (ML) sandy SILT; brown, organic inclusions; non-cohesive, moist, compact		78.68 / 0.69									
1		(ML) SILT and SAND; brown; non-cohesive, moist, compact			2	SS	16	ND					Bentonite Seal
				77.92									
		(CL) SILTY CLAY; grey; cohesive, w>PL, stiff		1.45	3	SS	11	ND					
2				77.16									
		(CL) sandy SILTY CLAY, trace to some gravel; grey (TILL-LIKE); cohesive, w<PL, stiff		2.21	4	SS	11	ND					
3					5	SS	9	ND					Silica Sand Filter
4		- Spoon bouncing at 4.2 m depth		75.18	6	SS	53/0.23	ND					
		END OF BOREHOLE		4.19									
5		Notes:											
		1. Borehole open upon completion of drilling on October 19, 2018.											
		2. Groundwater measured at 3.5 m depth below ground surface (Elev. 75.9 m) upon completion of drilling on October 19, 2018.											
6		3. Groundwater measured in piezometer at 2.5 m depth below ground surface (Elev. 76.9 m) on November 1, 2018.											
		4. Groundwater measured in piezometer at 2.0 m depth below ground surface (Elev. 77.4 m) on November 13, 2018.											
7													
8													
9													
10													

DEPTH SCALE

1 : 50

GOLDER

LOGGED: RV

CHECKED: MN

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PROJECT: 18108919

LOCATION: N 4871897.99; E 727140.69

RECORD OF BOREHOLE: 3

BORING DATE: October 17, 2018

SHEET 1 OF 1

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected) 100 200 300 400 / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected) 100 200 300 400	HYDRAULIC CONDUCTIVITY, k, cm/s 10^{-6} 10^{-5} 10^{-4} 10^{-3} / WATER CONTENT PERCENT Wp W Wl 10 20 30 40	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		GROUND SURFACE		86.50						
	CME 55 Track Mount - Power Auger 102 mm Solid Stem Auger	ASPHALT (50 mm)		0.00 / 0.05	1A					
		GRANULAR BASE - (SP) gravelly SAND; dark brown; non-cohesive, moist, compact		0.18	1B	SS	11	ND		MH
		FILL - (CL-ML) CLAYEY SILT and SAND; brown; cohesive, w~PL, stiff		85.74						
1		FILL - (ML) sandy SILT; brown to dark brown; non-cohesive, moist, compact		0.76	2	SS	14	ND		
				85.05						
		(SM) SILTY SAND, some gravel; brown (TILL); non-cohesive, moist, loose to very dense		1.45	3	SS	9	ND		
2					4	SS	22	ND		MH, NP
3		- Grey at 2.9 m								
		- Rock in tip at sample 5			5	SS	69	ND		
4					6	SS	30	ND		
				82.08						
		END OF BOREHOLE		4.42						
5		Notes:								
		1. Borehole open and dry upon completion of drilling on October 17, 2018.								
6		2. NP = Non-Plastic.								
7										
8										
9										
10										

DEPTH SCALE

1 : 50

GOLDER

LOGGED: RV

CHECKED: MN

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PROJECT: 18108919

LOCATION: N 4871868.62; E 727061.12

RECORD OF BOREHOLE: 4

BORING DATE: October 17, 2018

SHEET 1 OF 1

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ ND = Not Detected (100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ ND = Not Detected (100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		GROUND SURFACE		84.81							
	CME 55 Track Mount - Power Auger 102 mm Solid Stem Auger	ASPHALT (50 mm)		0.00 / 0.05	1A	SS		ND			19 mm Piezometer
		GRANULAR BASE - (SP) gravelly SAND; brown; non-cohesive, moist, compact			1B	SS	28				
				84.12							
1		FILL - (CL) SILTY CLAY; dark grey, organic stains; cohesive, w~PL, firm		0.69	2	SS	4	ND			Bentonite Seal
				83.36							
2		(SM) SILTY SAND, some gravel; brown (TILL); non-cohesive, moist, compact to very dense		1.45	3	SS	13	ND			
					4	SS	59	ND			
3		- Grey at 2.9 m			5	SS	45	ND			Silica Sand Filter
				81.08							
		(ML) sandy SILT, trace plastic fines, trace gravel; grey; non-cohesive, moist, very dense		3.73	6	SS	82	ND			
4				80.39							
		END OF BOREHOLE		4.42							
5		Notes:									
		1. Groundwater was measured in open borehole at 3.5 m depth below ground surface (Elev. 81.3 m) upon completion of drilling on October 17, 2018.									
6		2. Groundwater was measured in piezometer at 1.4 m depth below ground surface (Elev. 83.4 m) on November 1, 2018.									
		3. Groundwater was measured in piezometer at 1.45 m depth below ground surface (Elev. 83.4 m) on November 13, 2018.									
7											
8											
9											
10											

DEPTH SCALE

1 : 50

GOLDER

LOGGED: RV

CHECKED: MN

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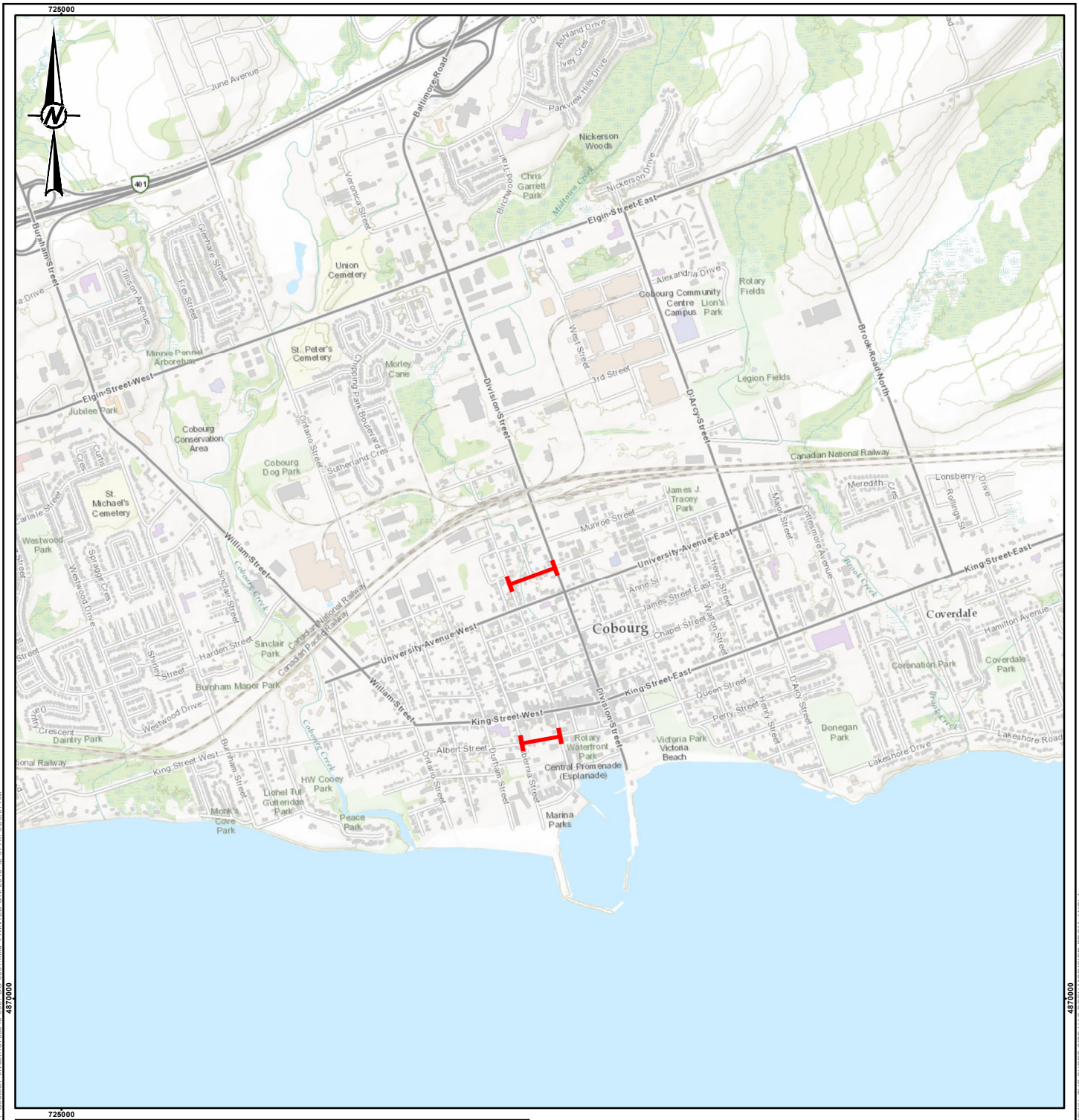


LEGEND

APPROXIMATE SITE LIMITS

0 500 1,000

1:25,000 METRES

REFERENCE(S)

BASE MAP SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY

PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 17N

CLIENT

TOWN OF COBOURG C/O CIMA+

CONSULTANT

GOLDER

YYYY-MM-DD	2018-12-07
DESIGNED	JT
PREPARED	JT
REVIEWED	RV
APPROVED	SEMP

PROJECT

GEOTECHNICAL INVESTIGATION
ALBERT STREET AND SPENCER STREET, COBOURG, ONTARIO

TITLE

KEY PLAN

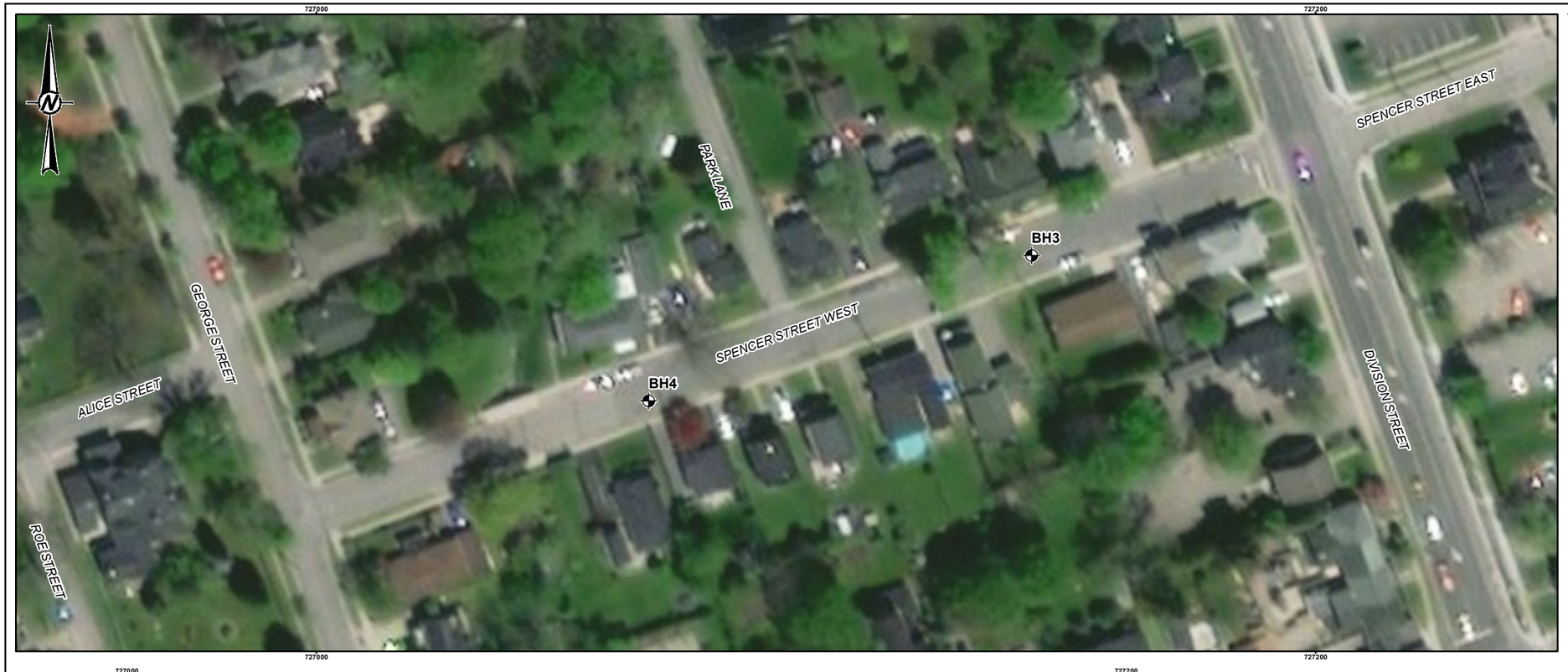
PROJECT NO.	CONTROL	REV.	FIGURE
18108919	0001		1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

25mm

0

PATH: S:\Clients\Town of Cobourg\Albert and Spencer St\99 PROJ\18108919 CIMA\40 PROD\0001 Geotech Invest\18108919-0001-BS-0001.mxd PRINTED ON: 2018-12-07 AT: 9:50:01 AM



LEGEND

APPROXIMATE BOREHOLE LOCATION

0 25 50

1:1,000 METRES

REFERENCE(S)

BASE DATA - MNR LIO, OBTAINED 2018
PRODUCED BY GOLDER ASSOCIATES LTD UNDER LICENCE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2018
BASE IMAGERY SOURCE: ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEROGRID, IGN, AND THE GIS USER COMMUNITY
PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 17N

CLIENT
TOWN OF COBOURG C/O CIMA+

PROJECT
GEOTECHNICAL INVESTIGATION
ALBERT STREET AND SPENCER STREET, COBOURG, ONTARIO

TITLE
BOREHOLE LOCATION PLAN

CONSULTANT
GOLDER

YYYY-MM-DD	2018-12-07
DESIGNED	JT
PREPARED	JT
REVIEWED	RV
APPROVED	SEMP

PROJECT NO.	CONTROL	REV.	FIGURE
18108919	0001		2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

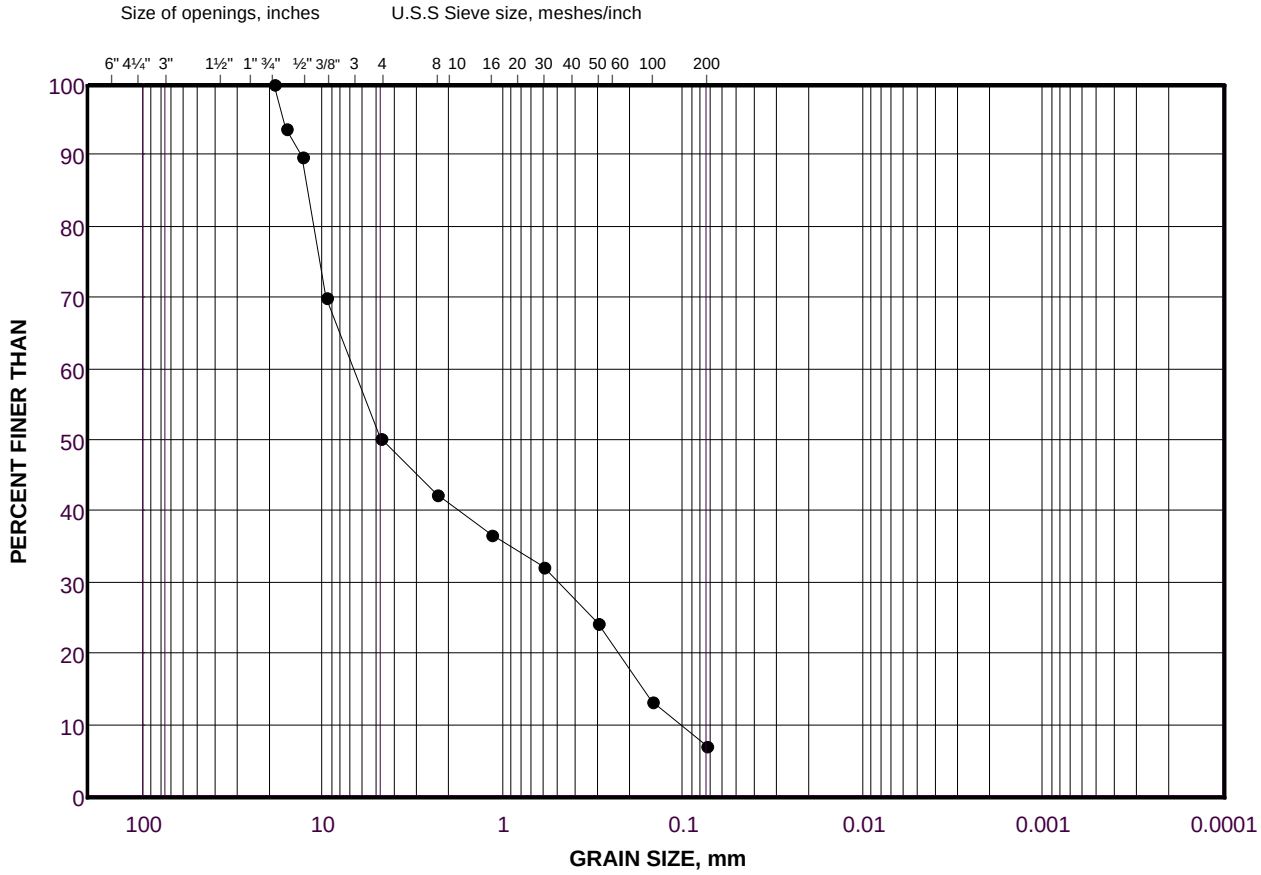
0 25mm

PATH: S:\Clients\Town_of_Cobourg\Albert_and_Spencer_St\99_PRO\18108919_CIMA\40_PROD\0001_Geotech_Invest\18108919-0001-BG-0002.mxd PRINTED ON: 2018-12-07 AT: 9:52:50 AM

GRAIN SIZE DISTRIBUTION

GRAVEL and SAND (FILL)

FIGURE 3



LEGEND

SYMBOL	BOREHOLE	SAMPLE	DEPTH(m)
●	2	1A	0.20

Project Number: 18108919

Checked By: RV

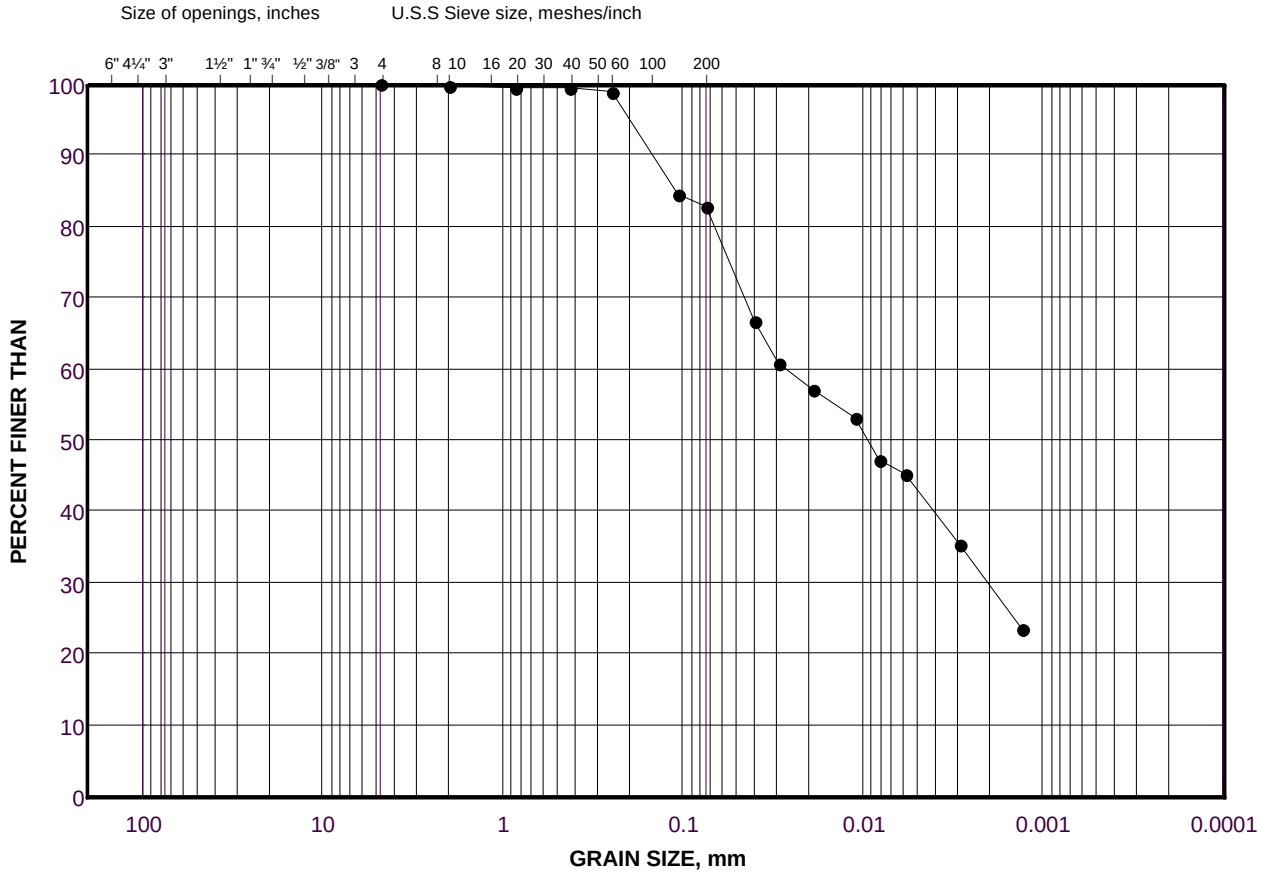
Golder Associates

Date: 02-Nov-18

GRAIN SIZE DISTRIBUTION

SILTY CLAY (FILL)

FIGURE 4



LEGEND

SYMBOL	BOREHOLE	SAMPLE	DEPTH(m)
●	1	3	1.80

Project Number: 18108919

Checked By: RV

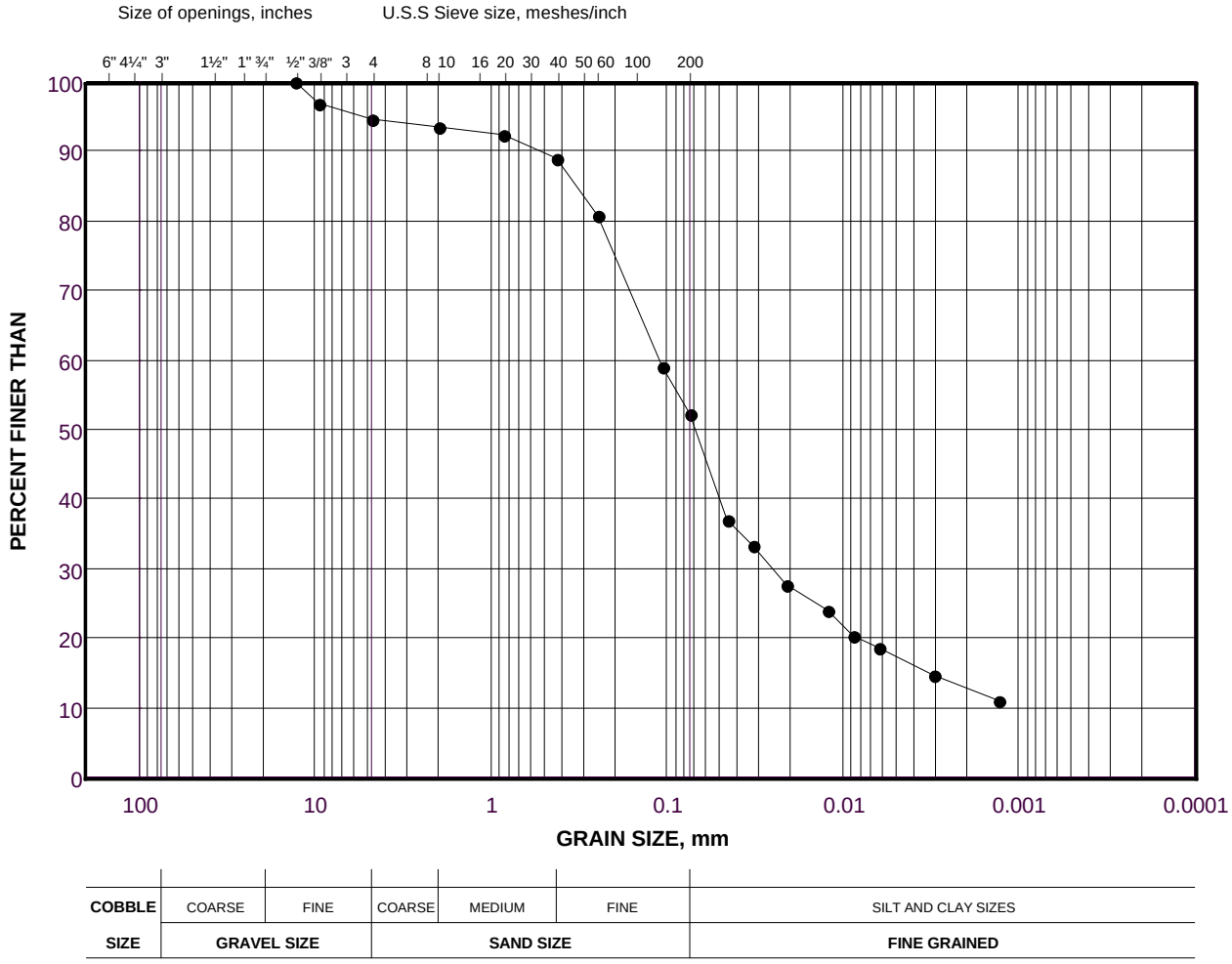
Golder Associates

Date: 02-Nov-18

GRAIN SIZE DISTRIBUTION

CLAYEY SILT and SAND (FILL)

FIGURE 5



LEGEND

SYMBOL	BOREHOLE	SAMPLE	DEPTH(m)
●	3	1B	0.40

Project Number: 18108919

Checked By: RV

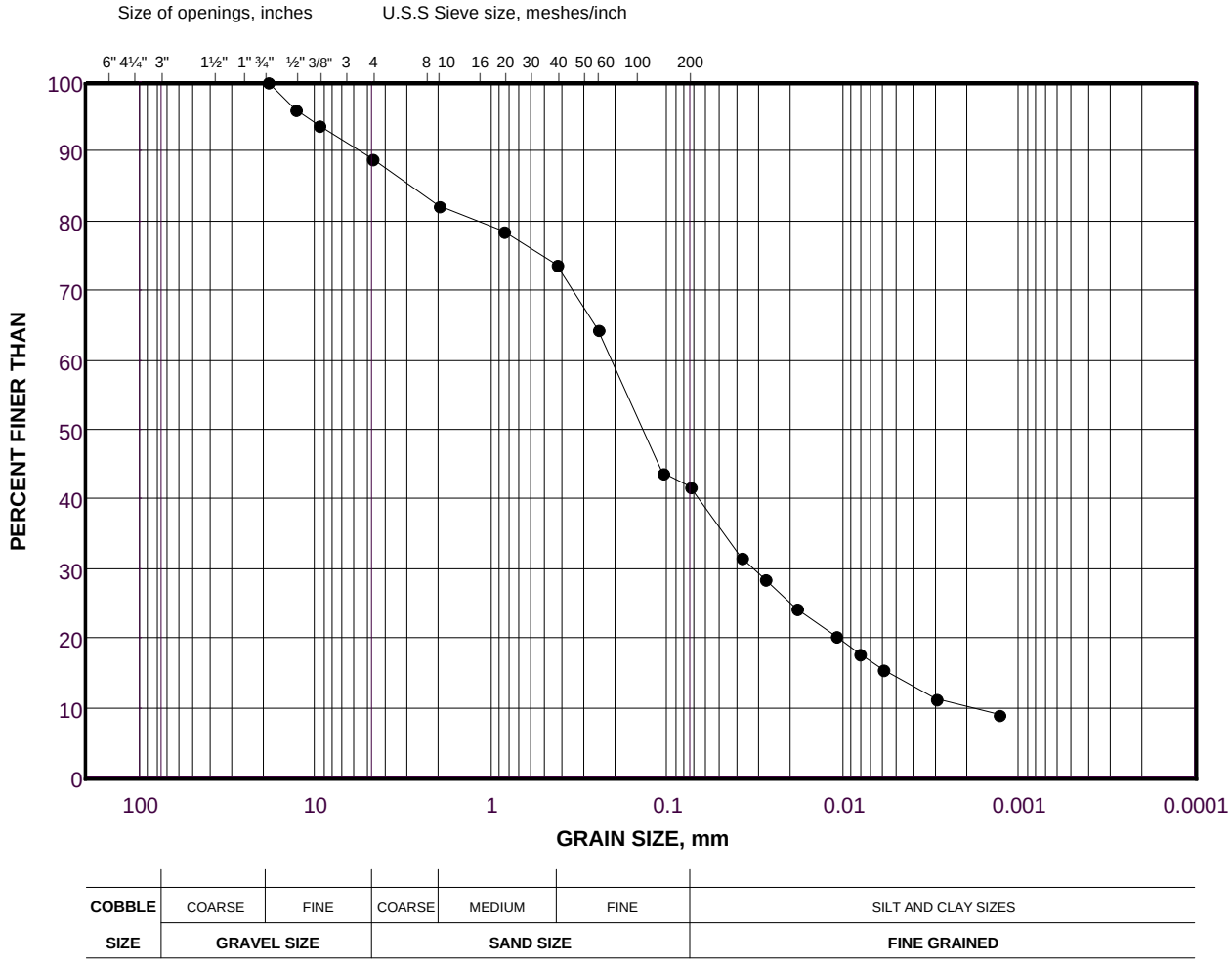
Golder Associates

Date: 02-Nov-18

GRAIN SIZE DISTRIBUTION

SILTY SAND (TILL)

FIGURE 6



LEGEND

SYMBOL	BOREHOLE	SAMPLE	DEPTH(m)
●	3	4	2.60

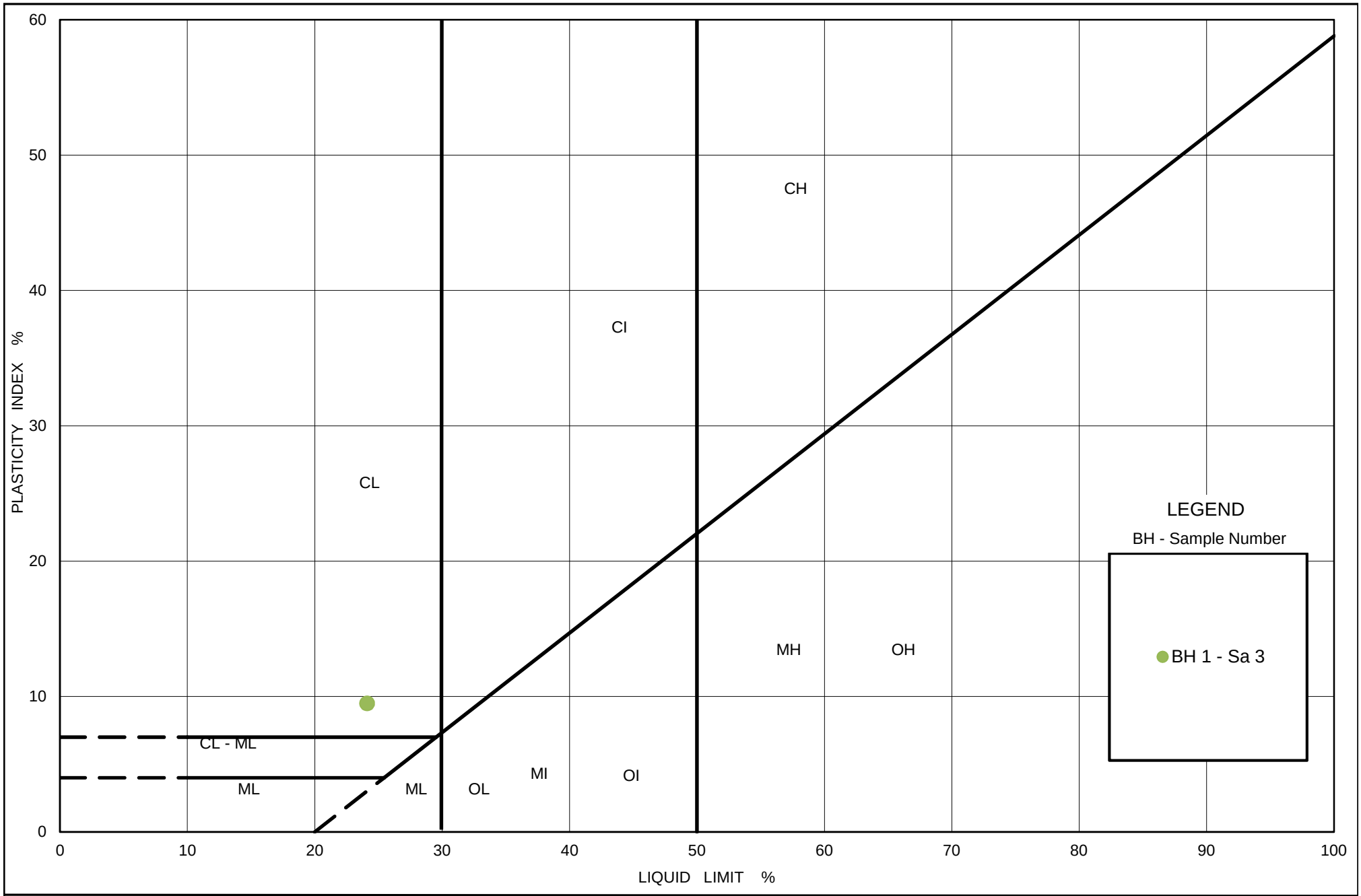
Project Number: 18108919

Checked By: RV

Golder Associates

Date: 02-Nov-18

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS (MTO LS-703/704)



GOLDER

PLASTICITY CHART

SILTY CLAY (FILL)

Figure No.: 7

Project No.: 18108919

Checked By: RV

APPENDIX A

Important Information and Limitations of This Report

IMPORTANT INFORMATION AND LIMITATIONS OF THIS REPORT

Standard of Care: Golder Associates Ltd. (Golder) has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering and science professions currently practising under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this report. No other warranty, expressed or implied is made.

Basis and Use of the Report: This report has been prepared for the specific site, design objective, development and purpose described to Golder by the Client. The factual data, interpretations and recommendations pertain to a specific project as described in this report and are not applicable to any other project or site location. Any change of site conditions, purpose, development plans or if the project is not initiated within eighteen months of the date of the report may alter the validity of the report. Golder cannot be responsible for use of this report, or portions thereof, unless Golder is requested to review and, if necessary, revise the report.

The information, recommendations and opinions expressed in this report are for the sole benefit of the Client. No other party may use or rely on this report or any portion thereof without Golder's express written consent. If the report was prepared to be included for a specific permit application process, then upon the reasonable request of the client, Golder may authorize in writing the use of this report by the regulatory agency as an Approved User for the specific and identified purpose of the applicable permit review process. Any other use of this report by others is prohibited and is without responsibility to Golder. The report, all plans, data, drawings and other documents as well as all electronic media prepared by Golder are considered its professional work product and shall remain the copyright property of Golder, who authorizes only the Client and Approved Users to make copies of the report, but only in such quantities as are reasonably necessary for the use of the report by those parties. The Client and Approved Users may not give, lend, sell, or otherwise make available the report or any portion thereof to any other party without the express written permission of Golder. The Client acknowledges that electronic media is susceptible to unauthorized modification, deterioration and incompatibility and therefore the Client can not rely upon the electronic media versions of Golder's report or other work products.

The report is of a summary nature and is not intended to stand alone without reference to the instructions given to Golder by the Client, communications between Golder and the Client, and to any other reports prepared by Golder for the Client relative to the specific site described in the report. In order to properly understand the suggestions, recommendations and opinions expressed in this report, reference must be made to the whole of the report. Golder can not be responsible for use of portions of the report without reference to the entire report.

Unless otherwise stated, the suggestions, recommendations and opinions given in this report are intended only for the guidance of the Client in the design of the specific project. The extent and detail of investigations, including the number of test holes, necessary to determine all of the relevant conditions which may affect construction costs would normally be greater than has been carried out for design purposes. Contractors bidding on, or undertaking the work, should rely on their own investigations, as well as their own interpretations of the factual data presented in the report, as to how subsurface conditions may affect their work, including but not limited to proposed construction techniques, schedule, safety and equipment capabilities.

Soil, Rock and Ground Water Conditions: Classification and identification of soils, rocks, and geologic units have been based on commonly accepted methods employed in the practice of geotechnical engineering and related disciplines. Classification and identification of the type and condition of these materials or units involves judgment, and boundaries between different soil, rock or geologic types or units may be transitional rather than abrupt. Accordingly, Golder does not warrant or guarantee the exactness of the descriptions.

Special risks occur whenever engineering or related disciplines are applied to identify subsurface conditions and even a comprehensive investigation, sampling and testing program may fail to detect all or certain subsurface conditions. The environmental, geologic, geotechnical, geochemical and hydrogeologic conditions that Golder interprets to exist between and beyond sampling points may differ from those that actually exist. In addition to soil variability, fill of variable physical and chemical composition can be present over portions of the site or on adjacent properties. The professional services retained for this project include only the geotechnical aspects of the subsurface conditions at the site, unless otherwise specifically stated and identified in the report. The presence or implication(s) of possible surface and/or subsurface contamination resulting from previous activities or uses of the site and/or resulting from the introduction onto the site of materials from off-site sources are outside the terms of reference for this project and have not been investigated or addressed.

Soil and groundwater conditions shown in the factual data and described in the report are the observed conditions at the time of their determination or measurement. Unless otherwise noted, those conditions form the basis of the recommendations in the report. Groundwater conditions may vary between and beyond reported locations and can be affected by annual, seasonal and meteorological conditions. The condition of the soil, rock and groundwater may be significantly altered by construction activities (traffic, excavation, groundwater level lowering, pile driving, blasting, etc.) on the site or on adjacent sites. Excavation may expose the soils to changes due to wetting, drying or frost. Unless otherwise indicated the soil must be protected from these changes during construction.

Sample Disposal: Golder will dispose of all uncontaminated soil and/or rock samples 90 days following issue of this report or, upon written request of the Client, will store uncontaminated samples and materials at the Client's expense. In the event that actual contaminated soils, fills or groundwater are encountered or are inferred to be present, all contaminated samples shall remain the property and responsibility of the Client for proper disposal.

Follow-Up and Construction Services: All details of the design were not known at the time of submission of Golder's report. Golder should be retained to review the final design, project plans and documents prior to construction, to confirm that they are consistent with the intent of Golder's report.

During construction, Golder should be retained to perform sufficient and timely observations of encountered conditions to confirm and document that the subsurface conditions do not materially differ from those interpreted conditions considered in the preparation of Golder's report and to confirm and document that construction activities do not adversely affect the suggestions, recommendations and opinions contained in Golder's report. Adequate field review, observation and testing during construction are necessary for Golder to be able to provide letters of assurance, in accordance with the requirements of many regulatory authorities. In cases where this recommendation is not followed, Golder's responsibility is limited to interpreting accurately the information encountered at the borehole locations, at the time of their initial determination or measurement during the preparation of the Report.

Changed Conditions and Drainage: Where conditions encountered at the site differ significantly from those anticipated in this report, either due to natural variability of subsurface conditions or construction activities, it is a condition of this report that Golder be notified of any changes and be provided with an opportunity to review or revise the recommendations within this report. Recognition of changed soil and rock conditions requires experience and it is recommended that Golder be employed to visit the site with sufficient frequency to detect if conditions have changed significantly.

Drainage of subsurface water is commonly required either for temporary or permanent installations for the project. Improper design or construction of drainage or dewatering can have serious consequences. Golder takes no responsibility for the effects of drainage unless specifically involved in the detailed design and construction monitoring of the system.

APPENDIX B

AGAT Laboratories Certificate of Analysis 18T400648

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: GOLDER ASSOCIATES LTD.
100 SCOTIA COURT
WHITBY, ON L1N8Y6
(905) 723-2727

ATTENTION TO: Keith Fleming

PROJECT: 18108919 (Spencer and Albert St.)

AGAT WORK ORDER: 18T400648

SOIL ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Supervisor

TRACE ORGANICS REVIEWED BY: Pinkal Patel, Report Reviewer

DATE REPORTED: Oct 30, 2018

PAGES (INCLUDING COVER): 13

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

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CANADA L4Z 1Y2
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FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 18T400648

PROJECT: 18108919 (Spencer and Albert St.)

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Keith Fleming

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153(511) - Metals & Inorganics (Soil)

DATE RECEIVED: 2018-10-23

DATE REPORTED: 2018-10-30

		SAMPLE DESCRIPTION:		BH1-SA1	BH2-SA1	BH3-SA1	BH4-SA2
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		2018-10-19	2018-10-19	2018-10-19	2018-10-19
Parameter	Unit	G / S	RDL	9646119	9646120	9646121	9646122
Antimony	µg/g	40	0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	18	1	1	2	2	2
Barium	µg/g	670	2	7	222	37	52
Beryllium	µg/g	8	0.5	<0.5	<0.5	<0.5	<0.5
Boron	µg/g	120	5	<5	8	<5	7
Boron (Hot Water Soluble)	µg/g	2	0.10	<0.10	0.20	<0.10	0.18
Cadmium	µg/g	1.9	0.5	<0.5	<0.5	<0.5	<0.5
Chromium	µg/g	160	2	3	32	9	10
Cobalt	µg/g	80	0.5	1.2	10.7	3.6	3.0
Copper	µg/g	230	1	1	21	6	4
Lead	µg/g	120	1	1	5	3	4
Molybdenum	µg/g	40	0.5	<0.5	<0.5	<0.5	<0.5
Nickel	µg/g	270	1	2	19	4	4
Selenium	µg/g	5.5	0.4	0.4	<0.4	<0.4	<0.4
Silver	µg/g	40	0.2	<0.2	<0.2	<0.2	<0.2
Thallium	µg/g	3.3	0.4	<0.4	<0.4	<0.4	<0.4
Uranium	µg/g	33	0.5	<0.5	0.7	<0.5	<0.5
Vanadium	µg/g	86	1	7	49	17	16
Zinc	µg/g	340	5	6	63	16	20
Chromium VI	µg/g	8	0.2	<0.2	<0.2	<0.2	<0.2
Cyanide	µg/g	0.051	0.040	<0.040	<0.040	<0.040	<0.040
Mercury	µg/g	3.9	0.10	<0.10	<0.10	<0.10	<0.10
Electrical Conductivity	mS/cm	1.4	0.005	0.255	0.253	0.547	0.205
Sodium Adsorption Ratio	NA	12	NA	5.58	0.953	**12.8**	1.72
pH, 2:1 CaCl2 Extraction	pH Units		NA	8.00	7.61	7.78	7.79

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition - Soil - Industrial/Commercial/Community Property Use - Coarse Textured Soils
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

9646119-9646122 EC & SAR were determined on the DI water extract obtained from the 2:1 leaching procedure (2 parts DI water:1 part soil). pH was determined on the 0.01M CaCl2 extract prepared at 2:1 ratio.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 18T400648

PROJECT: 18108919 (Spencer and Albert St.)

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Keith Fleming

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153(511) - PHCs F1 - F4 (-BTEX) (Soil)

DATE RECEIVED: 2018-10-23

DATE REPORTED: 2018-10-30

		SAMPLE DESCRIPTION:		BH1-SA1	BH2-SA1	BH3-SA1	BH4-SA2
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		2018-10-19	2018-10-19	2018-10-19	2018-10-19
Parameter	**Unit**	**G / S**	**RDL**	**9646119**	**9646120**	**9646121**	**9646122**
F1 (C6 to C10)	µg/g	55	5	<5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	55	5	<5	<5	<5	<5
F2 (C10 to C16)	µg/g	230	10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g	1700	50	<50	<50	<50	<50
F4 (C34 to C50)	µg/g	3300	50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g	3300	50	NA	NA	NA	NA
Moisture Content	%		0.1	3.8	16.4	7.3	8.7
Surrogate	**Unit**	**Acceptable Limits**					
Terphenyl	%	60-140		87	79	70	63

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition - Soil - Industrial/Commercial/Community Property Use - Coarse Textured Soils
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

9646119-9646122 Results are based on sample dry weight.
The C6-C10 fraction is calculated using toluene response factor.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6 - C50 results are corrected for BTEX contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.
Fractions 1-4 are quantified without the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Pinkal Patel

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 18T400648

PROJECT: 18108919 (Spencer and Albert St.)

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Keith Fleming

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153(511) - VOCs (Soil)

DATE RECEIVED: 2018-10-23

DATE REPORTED: 2018-10-30

		SAMPLE DESCRIPTION:		BH1-SA1	BH2-SA1	BH3-SA1	BH4-SA2
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		2018-10-19	2018-10-19	2018-10-19	2018-10-19
Parameter	Unit	G / S	RDL	9646119	9646120	9646121	9646122
Dichlorodifluoromethane	µg/g	16	0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	ug/g	0.032	0.02	<0.02	<0.02	<0.02	<0.02
Bromomethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	ug/g	4	0.05	<0.05	<0.05	<0.05	<0.05
Acetone	ug/g	16	0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	ug/g	0.064	0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	ug/g	1.6	0.05	<0.05	<0.05	<0.05	<0.05
Trans- 1,2-Dichloroethylene	ug/g	1.3	0.05	<0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	ug/g	1.6	0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	ug/g	0.47	0.02	<0.02	<0.02	<0.02	<0.02
Methyl Ethyl Ketone	ug/g	70	0.50	<0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g	1.9	0.02	<0.02	<0.02	<0.02	<0.02
Chloroform	ug/g	0.47	0.04	<0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	ug/g	6.1	0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	ug/g	0.21	0.05	<0.05	<0.05	<0.05	<0.05
Benzene	ug/g	0.32	0.02	<0.02	<0.02	<0.02	<0.02
1,2-Dichloropropane	ug/g	0.16	0.03	<0.03	<0.03	<0.03	<0.03
Trichloroethylene	ug/g	0.55	0.03	<0.03	<0.03	<0.03	<0.03
Bromodichloromethane	ug/g	1.5	0.05	<0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	ug/g	31	0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04
Toluene	ug/g	6.4	0.05	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	ug/g	2.3	0.05	<0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	ug/g	1.9	0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g	0.087	0.04	<0.04	<0.04	<0.04	<0.04
Chlorobenzene	ug/g	2.4	0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	ug/g	1.1	0.05	<0.05	<0.05	<0.05	<0.05
m & p-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05

Certified By: Jinkal Patel

AGAT Laboratories

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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 18T400648

PROJECT: 18108919 (Spencer and Albert St.)

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Keith Fleming

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153(511) - VOCs (Soil)

DATE RECEIVED: 2018-10-23

DATE REPORTED: 2018-10-30

		SAMPLE DESCRIPTION:		BH1-SA1	BH2-SA1	BH3-SA1	BH4-SA2
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		2018-10-19	2018-10-19	2018-10-19	2018-10-19
Parameter	**Unit**	**G / S**	**RDL**	**9646119**	**9646120**	**9646121**	**9646122**
Bromoform	ug/g	0.61	0.05	<0.05	<0.05	<0.05	<0.05
Styrene	ug/g	34	0.05	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	ug/g	9.6	0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	ug/g	0.2	0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	ug/g	1.2	0.05	<0.05	<0.05	<0.05	<0.05
Xylene Mixture	ug/g	26	0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene	µg/g	0.059	0.04	<0.04	<0.04	<0.04	<0.04
n-Hexane	µg/g	46	0.05	<0.05	<0.05	<0.05	<0.05
Surrogate	**Unit**	**Acceptable Limits**					
Toluene-d8	% Recovery	50-140		86	90	87	87
4-Bromofluorobenzene	% Recovery	50-140		78	84	79	82

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition - Soil - Industrial/Commercial/Community Property Use - Coarse Textured Soils
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

9646119-9646122 The sample was analysed using the high level technique. The sample was extracted using methanol, a small amount of the methanol extract was diluted in water and the purge & trap GC/MS analysis was performed. Results are based on the dry weight of the soil.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Guideline Violation

AGAT WORK ORDER: 18T400648

PROJECT: 18108919 (Spencer and Albert St.)

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Keith Fleming

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
9646121	BH3-SA1	ON T2 S ICC CT	O. Reg. 153(511) - Metals & Inorganics (Soil)	Sodium Adsorption Ratio	NA	12	12.8

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5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
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http://www.agatlabs.com

Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD.

AGAT WORK ORDER: 18T400648

PROJECT: 18108919 (Spencer and Albert St.)

ATTENTION TO: Keith Fleming

SAMPLING SITE:

SAMPLED BY:

Soil Analysis

RPT Date: Oct 30, 2018			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - Metals & Inorganics (Soil)															
Antimony	9645010		<0.8	<0.8	NA	< 0.8	111%	70%	130%	100%	80%	120%	79%	70%	130%
Arsenic	9645010		5	5	0.0%	< 1	108%	70%	130%	99%	80%	120%	103%	70%	130%
Barium	9645010		100	100	0.0%	< 2	101%	70%	130%	100%	80%	120%	102%	70%	130%
Beryllium	9645010		0.6	0.7	NA	< 0.5	91%	70%	130%	119%	80%	120%	89%	70%	130%
Boron	9645010		14	14	NA	< 5	75%	70%	130%	117%	80%	120%	86%	70%	130%
Boron (Hot Water Soluble)	9646122	9646122	0.18	0.18	NA	< 0.10	117%	60%	140%	99%	70%	130%	99%	60%	140%
Cadmium	9645010		<0.5	<0.5	NA	< 0.5	110%	70%	130%	98%	80%	120%	104%	70%	130%
Chromium	9645010		30	31	3.3%	< 2	87%	70%	130%	105%	80%	120%	109%	70%	130%
Cobalt	9645010		14.1	14.0	0.7%	< 0.5	106%	70%	130%	114%	80%	120%	108%	70%	130%
Copper	9645010		22	22	0.0%	< 1	98%	70%	130%	117%	80%	120%	98%	70%	130%
Lead	9645010		11	11	0.0%	< 1	104%	70%	130%	104%	80%	120%	99%	70%	130%
Molybdenum	9645010		0.6	0.6	NA	< 0.5	109%	70%	130%	106%	80%	120%	111%	70%	130%
Nickel	9645010		30	30	0.0%	< 1	101%	70%	130%	109%	80%	120%	99%	70%	130%
Selenium	9645010		<0.4	<0.4	NA	< 0.4	95%	70%	130%	101%	80%	120%	102%	70%	130%
Silver	9645010		<0.2	<0.2	NA	< 0.2	101%	70%	130%	97%	80%	120%	96%	70%	130%
Thallium	9645010		<0.4	<0.4	NA	< 0.4	94%	70%	130%	98%	80%	120%	96%	70%	130%
Uranium	9645010		0.8	0.8	NA	< 0.5	101%	70%	130%	104%	80%	120%	103%	70%	130%
Vanadium	9645010		34	34	0.0%	< 1	92%	70%	130%	101%	80%	120%	103%	70%	130%
Zinc	9645010		62	61	1.6%	< 5	102%	70%	130%	114%	80%	120%	116%	70%	130%
Chromium VI	9649326		<0.2	<0.2	NA	< 0.2	71%	70%	130%	99%	80%	120%	98%	70%	130%
Cyanide	9648733		<0.040	<0.040	NA	< 0.040	99%	70%	130%	94%	80%	120%	85%	70%	130%
Mercury	9645010		<0.10	<0.10	NA	< 0.10	102%	70%	130%	95%	80%	120%	92%	70%	130%
Electrical Conductivity	9646122	9646122	0.205	0.214	4.3%	< 0.005	96%	90%	110%	NA			NA		
Sodium Adsorption Ratio	9646122	9646122	1.72	1.76	2.3%	NA	NA			NA			NA		
pH, 2:1 CaCl2 Extraction	9646119	9646119	8.00	7.94	0.8%	NA	101%	80%	120%	NA			NA		

Comments: NA signifies Not Applicable.
Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL

Certified By:

Amanjot Bhela

ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO
CHARTERED
AMANJOT BHELA
CHEMIST

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD.

AGAT WORK ORDER: 18T400648

PROJECT: 18108919 (Spencer and Albert St.)

ATTENTION TO: Keith Fleming

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: Oct 30, 2018			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - VOCs (Soil)															
Dichlorodifluoromethane	9644349		< 0.05	< 0.05	NA	< 0.05	80%	50%	140%	103%	50%	140%	83%	50%	140%
Vinyl Chloride	9644349		< 0.02	< 0.02	NA	< 0.02	91%	50%	140%	119%	50%	140%	94%	50%	140%
Bromomethane	9644349		< 0.05	< 0.05	NA	< 0.05	95%	50%	140%	104%	50%	140%	95%	50%	140%
Trichlorofluoromethane	9644349		< 0.05	< 0.05	NA	< 0.05	105%	50%	140%	108%	50%	140%	99%	50%	140%
Acetone	9644349		< 0.50	< 0.50	NA	< 0.50	101%	50%	140%	110%	50%	140%	97%	50%	140%
1,1-Dichloroethylene	9644349		< 0.05	< 0.05	NA	< 0.05	75%	50%	140%	97%	60%	130%	85%	50%	140%
Methylene Chloride	9644349		< 0.05	< 0.05	NA	< 0.05	95%	50%	140%	101%	60%	130%	118%	50%	140%
Trans- 1,2-Dichloroethylene	9644349		< 0.05	< 0.05	NA	< 0.05	76%	50%	140%	87%	60%	130%	102%	50%	140%
Methyl tert-butyl Ether	9644349		< 0.05	< 0.05	NA	< 0.05	115%	50%	140%	78%	60%	130%	111%	50%	140%
1,1-Dichloroethane	9644349		< 0.02	< 0.02	NA	< 0.02	81%	50%	140%	110%	60%	130%	105%	50%	140%
Methyl Ethyl Ketone	9644349		< 0.50	< 0.50	NA	< 0.50	97%	50%	140%	105%	50%	140%	90%	50%	140%
Cis- 1,2-Dichloroethylene	9644349		< 0.02	< 0.02	NA	< 0.02	74%	50%	140%	118%	60%	130%	94%	50%	140%
Chloroform	9644349		< 0.04	< 0.04	NA	< 0.04	82%	50%	140%	118%	60%	130%	107%	50%	140%
1,2-Dichloroethane	9644349		< 0.03	< 0.03	NA	< 0.03	79%	50%	140%	104%	60%	130%	115%	50%	140%
1,1,1-Trichloroethane	9644349		< 0.05	< 0.05	NA	< 0.05	75%	50%	140%	94%	60%	130%	78%	50%	140%
Carbon Tetrachloride	9644349		< 0.05	< 0.05	NA	< 0.05	83%	50%	140%	101%	60%	130%	87%	50%	140%
Benzene	9644349		< 0.02	< 0.02	NA	< 0.02	81%	50%	140%	108%	60%	130%	104%	50%	140%
1,2-Dichloropropane	9644349		< 0.03	< 0.03	NA	< 0.03	96%	50%	140%	89%	60%	130%	89%	50%	140%
Trichloroethylene	9644349		< 0.03	< 0.03	NA	< 0.03	80%	50%	140%	114%	60%	130%	92%	50%	140%
Bromodichloromethane	9644349		< 0.05	< 0.05	NA	< 0.05	106%	50%	140%	91%	60%	130%	90%	50%	140%
Methyl Isobutyl Ketone	9644349		< 0.50	< 0.50	NA	< 0.50	95%	50%	140%	79%	50%	140%	90%	50%	140%
1,1,2-Trichloroethane	9644349		< 0.04	< 0.04	NA	< 0.04	113%	50%	140%	107%	60%	130%	113%	50%	140%
Toluene	9644349		< 0.05	< 0.05	NA	< 0.05	101%	50%	140%	109%	60%	130%	104%	50%	140%
Dibromochloromethane	9644349		< 0.05	< 0.05	NA	< 0.05	84%	50%	140%	88%	60%	130%	118%	50%	140%
Ethylene Dibromide	9644349		< 0.04	< 0.04	NA	< 0.04	89%	50%	140%	94%	60%	130%	104%	50%	140%
Tetrachloroethylene	9644349		< 0.05	< 0.05	NA	< 0.05	105%	50%	140%	117%	60%	130%	112%	50%	140%
1,1,1,2-Tetrachloroethane	9644349		< 0.04	< 0.04	NA	< 0.04	90%	50%	140%	81%	60%	130%	91%	50%	140%
Chlorobenzene	9644349		< 0.05	< 0.05	NA	< 0.05	102%	50%	140%	112%	60%	130%	115%	50%	140%
Ethylbenzene	9644349		< 0.05	< 0.05	NA	< 0.05	96%	50%	140%	113%	60%	130%	114%	50%	140%
m & p-Xylene	9644349		< 0.05	< 0.05	NA	< 0.05	103%	50%	140%	119%	60%	130%	121%	50%	140%
Bromoform	9644349		< 0.05	< 0.05	NA	< 0.05	95%	50%	140%	86%	60%	130%	109%	50%	140%
Styrene	9644349		< 0.05	< 0.05	NA	< 0.05	81%	50%	140%	83%	60%	130%	105%	50%	140%
1,1,2,2-Tetrachloroethane	9644349		< 0.05	< 0.05	NA	< 0.05	118%	50%	140%	98%	60%	130%	107%	50%	140%
o-Xylene	9644349		< 0.05	< 0.05	NA	< 0.05	109%	50%	140%	118%	60%	130%	94%	50%	140%
1,3-Dichlorobenzene	9644349		< 0.05	< 0.05	NA	< 0.05	92%	50%	140%	93%	60%	130%	91%	50%	140%
1,4-Dichlorobenzene	9644349		< 0.05	< 0.05	NA	< 0.05	102%	50%	140%	100%	60%	130%	114%	50%	140%
1,2-Dichlorobenzene	9644349		< 0.05	< 0.05	NA	< 0.05	98%	50%	140%	95%	60%	130%	116%	50%	140%
1,3-Dichloropropene	9644349		< 0.04	< 0.04	NA	< 0.04	92%	50%	140%	95%	60%	130%	89%	50%	140%
n-Hexane	9644349		< 0.05	< 0.05	NA	< 0.05	116%	50%	140%	117%	60%	130%	109%	50%	140%

AGAT Laboratories
5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD.
AGAT WORK ORDER: 18T400648
PROJECT: 18108919 (Spencer and Albert St.)
ATTENTION TO: Keith Fleming
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Oct 30, 2018			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - PHCs F1 - F4 (-BTEX) (Soil)															
F1 (C6 to C10)	9648232		< 5	< 5	NA	< 5	91%	60%	130%	87%	85%	115%	76%	70%	130%
F2 (C10 to C16)	9648232		< 10	< 10	NA	< 10	104%	60%	130%	94%	80%	120%	88%	70%	130%
F3 (C16 to C34)	9648232		< 50	< 50	NA	< 50	104%	60%	130%	94%	80%	120%	82%	70%	130%
F4 (C34 to C50)	9648232		< 50	< 50	NA	< 50	88%	60%	130%	99%	80%	120%	86%	70%	130%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

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AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
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Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD.

AGAT WORK ORDER: 18T400648

PROJECT: 18108919 (Spencer and Albert St.)

ATTENTION TO: Keith Fleming

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Antimony	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Arsenic	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Barium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Beryllium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Boron	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Boron (Hot Water Soluble)	MET-93-6104	EPA SW 846 6010C; MSA, Part 3, Ch.21	ICP/OES
Cadmium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Chromium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Copper	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Lead	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Molybdenum	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Nickel	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Selenium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Silver	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Thallium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Uranium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Zinc	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Chromium VI	INOR-93-6029	SM 3500 B; MSA Part 3, Ch. 25	SPECTROPHOTOMETER
Cyanide	INOR-93-6052	MOE CN-3015 & E 3009 A;SM 4500 CN	TECHNICON AUTO ANALYZER
Mercury	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Electrical Conductivity	INOR-93-6036	McKeague 4.12, SM 2510 B	EC METER
Sodium Adsorption Ratio	INOR-93-6007	McKeague 4.12 & 3.26 & EPA SW-846 6010C	ICP/OES
pH, 2:1 CaCl2 Extraction	INOR-93-6031	MSA part 3 & SM 4500-H+ B	PH METER

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
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Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD.

AGAT WORK ORDER: 18T400648

PROJECT: 18108919 (Spencer and Albert St.)

ATTENTION TO: Keith Fleming

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
F1 (C6 to C10)	VOL-91-5009	CCME Tier 1 Method, SW846 5035	P &T GC / FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	CCME Tier 1 Method, SW846 5035	P & T GC / FID
F2 (C10 to C16)	VOL-91-5009	CCME Tier 1 Method	GC / FID
F3 (C16 to C34)	VOL-91-5009	CCME Tier 1 Method	GC / FID
F4 (C34 to C50)	VOL-91-5009	CCME Tier 1 Method	GC / FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	CCME Tier 1 Method	Balance
Moisture Content	VOL-91-5009	CCME Tier 1 Method, SW846 5035,8015	BALANCE
Terphenyl	VOL-91-5009	CCME Tier 1 Method	GC/FID
Dichlorodifluoromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Vinyl Chloride	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Bromomethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Acetone	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Methylene Chloride	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Trans- 1,2-Dichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Methyl tert-butyl Ether	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Cis- 1,2-Dichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Chloroform	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Benzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Trichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Bromodichloromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Toluene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Dibromochloromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Chlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Ethylbenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
m & p-Xylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Bromoform	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Styrene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
o-Xylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Xylene Mixture	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,3-Dichloropropene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
n-Hexane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD.

AGAT WORK ORDER: 18T400648

PROJECT: 18108919 (Spencer and Albert St.)

ATTENTION TO: Keith Fleming

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Toluene-d8	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS

AGAT Laboratories

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Laboratory Use Only

Work Order #: 18T400648

Cooler Quantity: 1 cm

Arrival Temperatures: 4 | 0.38 | 3.5
3 | 2.8 | 2.5

Custody Seal Intact: ☐ Yes ☐ No ☐ N/A

Notes:

Report Information:

Company: Golder Associates Ltd.
Contact: Keith Fleming
Address: 100 Scotia Ct, Whitby ON L1N 8Y6
Phone: 9057232727 Fax: 9057232182
Reports to be sent to:
1. Email: Keith_Fleming@golder.com
2. Email: Susan_Vodden@golder.com

Regulatory Requirements:

☐ No Regulatory Requirement
(Please check all applicable boxes)

☑ Regulation 153/04
Table 1 *Indicate One*
☐ Ind/Com ☐ Res/Park ☐ Agriculture
Soil Texture *(Check One)* ☐ Coarse ☐ Fine

☐ Sewer Use
☐ Sanitary ☐ Storm
Region _____ *Indicate One*
☐ MISA

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
_____ *Indicate One*

Is this submission for a **Record of Site Condition?** ☐ Yes ☑ No

Report Guideline on *Certificate of Analysis* ☑ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Project Information:

Project: 18108919 (Spencer and Albert St.)
Site Location: Cobourg, ON
Sampled By: Reza Vahdani
AGAT Quote #: _____ PO: _____
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☐ No ☐
Company:
Contact:
Address:
Email:

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI (Y/N)	O. Reg 153: Metals and Inorganics	O. Reg 153: All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals ☐ 153 Metals (incl. Hydrides)	O. Reg 153: ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ Cr^{6+} ☐ EC ☐ FOC ☐ Hg ☐ pH ☐ SAR	O. Reg 153: Full Metals Scan	O. Reg 153: Regulation/Custom Metals	O. Reg 153: Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3+NO_2	O. Reg 153: Volatiles: ☑ VOC ☐ BTEX ☐ THM	O. Reg 153: PHCs F1 - F4	O. Reg 153: ABNs	O. Reg 153: PAHs	O. Reg 153: PCBs: ☐ Total ☐ Aroclors	O. Reg 153: Organochlorine Pesticides	O. Reg 153: TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	O. Reg 153: Sewer Use
BH1-SA1	Oct 19/18	10:30AM	3	Soil	Albert St. (0.75m - 1.35m)	N	X						X	X						
BH2-SA1	Oct 19/18	1:40PM	3	Soil	Albert St. (1.5m - 2.10m)		X						X	X						
BH3-SA1	Oct 17/18	11:30AM	3	Soil	Spencer St. (0.75m - 1.35m)		X						X	X						
BH4-SA2	Oct 17/18	1:30PM	3	Soil	Spencer St. (2.3m - 2.90m)		X						X	X						

Samples Relinquished By (Print Name and Sign): REZA VAHDANI	Date: Oct 22, 18	Time: 10AM	Samples Received By (Print Name and Sign):	Date: 2018/10/23	Time: 12:12
Samples Relinquished By (Print Name and Sign):	Date: 2018/10/23	Time: 3:23	Samples Received By (Print Name and Sign):	Date:	Time:
Samples Relinquished By (Print Name and Sign):	Date:	Time:	Samples Received By (Print Name and Sign):	Date:	Time:

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N°: T 061696

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