C O N T R A C T D O C U M E N T S

TOWN OF PELHAM

SUNSET DRIVE WATERMAIN

Project
EO 80436 November 1980

THE PROCTOR AND REDFERN GROUP
Consulting Engineers and Planners
110 James Street,
St. Catharines, Ontario.
L2R 7E8

GKS:WJS
:tp

PROCTOR & REDFERN LIMITED
TENDERER'S CHECK LIST

Before submitting your tender, check the following points:

1. Has your tender been signed, sealed and witnessed? ☐

2. Have you enclosed the Tender Deposit, i.e. certified cheque or bid bond? (whichever is required by the Contract Documents) ☐

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

4. Have you completed all schedules and prices in the Form of Tender? ☐

5. Have you indicated and included the Contingency Allowance in the Form of Tender? (if you are required to do so) ☐

6. Have you indicated the number of addenda included in the tender price? ☐

7. Have you shown the time for completion of the work? (if applicable) ☐

8. Have you listed your Sub-Contractors? (if applicable) ☐

9. Have you listed your Experience in Similar Work? (if applicable) ☐

10. Have you listed your Senior Staff? (if applicable) ☐

11. Have you listed the Tenderer's Plant? (if applicable) ☐

12. Are the documents complete? ☐

Note: Items 13 and 14 are for Ministry of Transportation and Communication projects only.

13. Have you completed the Qualification Rating and forwarded to the Ministry of the Transportation and Communications? (if applicable) ☐

14. Have you enclosed the Form of Tender stamped "For Tendering Purposes Only" (if applicable) ☐

Note: 1. Your tender will be informal and may be disqualified if ANY of the foregoing points (if applicable) have not been complied with.

MAKE SURE THAT YOU SEAL THE TENDER IN AN ENVELOPE AND MARK THEREON THE CONTRACT NAME AND E.O. NUMBER.

Proctor and Redfern Limited
Form CD-30 - February 1973

LIST OF CONTRACT DOCUMENTS

The following shall form the Contract Documents:

	Paper Colour	Pages
Addenda Numbered Ø to Ø	Green	
Tenderer's Check List	Bright Pink	1
List of Contract Documents	Pink	1
Tendering Information	Blue	3
Form of Tender	Yellow	4
Agreement	White	1
Agreement to Bond (CD-22)	White	1
Bid Bond (CCA Document (S)20)	White	1
Performance Bond (CSA Document (S)21)	White	1
Labour and Materials Payment Bond (CCA Document (S)22)	White	1
List of Sub-Contractors (CD-3)	White	1
Tenderer's Experience (CD-4)	White	1
Tenderer's Senior Staff (CD-5)	White	1
Tenderer's Plant (CD-6)	White	1
Schedule of Equivalents (CD-7)	White	1
Supplementary General Conditions	Blue	1
Certificate of Insurance (CD-23)	White	1
General Conditions of the Contract	Blue	8
Project Specifications		
Section 01010 - General	White	3
Section 02550 - Site Clearing, Excavation, Backfilling and Restoration of Trenches	White	6
Section 02570 - Watermains	White	6

LIST OF DRAWINGS

Drawing No.	
A1-80436-P1	Sunset Drive Watermain (Sta. 0+000 to Sta. 0+200)
A1-80436-P2	Sunset Drive Watermain (Sta. 0+200 to Sta. 0+494.4)

LIST OF STANDARDS

E-80436-L1M	Bedding and Backfill Details for Watermain
E-80436-L2M	Typical Details for Supporting Utilities
E-80436-L3M	Removal and Treatment of Tree Branches and Roots
E-80436-L4M	Hydrant Installation
E-80436-L5M	Valve Box Installation
E-80436-L6M	Water Service
E-80436-L7M	Concrete Thrust Blocks

SECTION 00100 - TENDERING INFORMATION

TI.01 DELIVERY AND OPENING OF TENDERS

A. Sealed tenders, marked with the name of the project, will be received by -

Mr. M. Hackett, Clerk-Administrator, Town of Pelham, 43 South Pelham Street, Fonthill, Ontario. L0S 1E0.

up to 3:00 p.m., local time -

Thursday, November 20th, 1980.

B. The tenders will be opened publicly as soon after the closing time as possible.

C. Tenders shall be completed on the detachable Form of Tender included in the Contract Documents.

TI.02 DISCREPANCIES

A. If a Tenderer finds discrepancies in, or omissions from the Contract Documents, or if he is in doubt as to their meaning, he shall notify the Engineer, who may issue a written addendum. Neither the Owner nor the Engineer will make oral interpretations of the meaning of the Contract Documents.

B. Should the Tenderer not agree that the materials and methods specified, or designed on the Drawings, will provide an installation to meet the requirements of the project, he shall notify the Engineer in writing, stating his reason for objection and may submit a suggested alternative. In such an event, the Engineer may choose to issue an addendum.

C. Addenda issued during the tendering period shall be allowed for by the Tenderer.

TI.03 EXAMINATION OF SITE

A. The Tenderer shall visit the site of the Work before submitting his tender and shall by personal examination satisfy himself as to the local conditions that may be encountered during construction of the Work. He shall make his own estimate of the facilities and difficulties that may be encountered and the nature of the subsurface materials and conditions.

B. He shall not claim at any time after submission of his tender that there was any misunderstanding of the terms and conditions of the Contract relating to site conditions.

TI.04 SALES TAX

A. The Tenderer shall include or exclude sales tax in accordance with current sales tax legislation taking into account any changes that have been made known by the Government and that will occur during the life of the Contract.

B. If sales taxes are increased or decreased, or other amendments are made in the legislation, during the course of the Contract, that alter tax amounts carried in the Contract price, an adjustment will be made accordingly.

C. The Contractor shall keep records and invoices of accounts subject to Federal and Provincial Sales Tax for the purpose of establishing taxes paid and for substantiation in the event of changes to the tax legislation during the course of the Contract.

TI.04 SALES TAX (Cont'd)

D. The Tenderer shall contact the Sales Tax authorities and determine what the applicable taxes are and the procedures for tax exemption and/or refunding and include related administrative costs in the tender.

TI.05 PROOF OF ABILITY

A. The Tenderer shall be competent and capable of performing the various items of Work. The Tenderer shall complete the following statement sheets, which shall form a part of the Contract Documents -

1. Tenderer's Experience on Similar Work (CD-4) with list of specific examples completed within the last 5 yrs., with appropriate references

2. Tenderer's Senior Staff to be employed (CD-5)

3. Tenderer's Plant to be used (CD-6)

B. The Tenderer may be required to furnish additional statements covering other matters, including financial resources.

TI.06 TENDER DEPOSIT

A. Every tender shall be accompanied either by a Bid Bond or a tender deposit.

Tender deposit shall be a certified cheque payable to the Owner in the amount of $4,000.00. The Bid Bond shall be in an amount equal to $4,000.00 and shall be on C.C.A. Document (S) 20.

The Tenderer shall keep his tender open for acceptance for 60 days after the closing date. Withdrawal during this period will result in forfeiture or enforcement of the Bid Bond or tender deposit.

Upon being notified that his tender has been accepted, the Contractor shall execute copies of the Agreement, supply bonds and insurance documents as specified, and start Work as specified.

Failure to execute the copies of the Agreement, or to supply bonds and insurance documents, all within 2 weeks of the date of acceptance of the tender, or to start Work as specified, will automatically mean the forfeiture or enforcement of the Bid Bond or tender deposit.

Bid Bonds or tender deposits of unsuccessful Tenderers will be returned not later than 2 weeks following Contract award.

The Bid Bond or tender deposit of the successful Tenderer will be returned with the first progress certificate.

TI.07 AGREEMENT TO BOND

A. Every tender shall be accompanied by an 'Agreement to Bond' in the form attached, and shall be completed by a surety company lawfully doing business in the Province.

TI.08 SUB-CONTRACTORS

A. The Tenderer shall submit with his tender the names and addresses of Sub-contractors he proposes to use and the value for the subtrades listed in Form CD-3 'List of Sub-contractors'.

TI.09 ACCEPTANCE OF TENDERS

A. The lowest or any tender need not necessarily be accepted by the Owner.

TI.10 EQUIVALENTS

A. When an article is specified by its trade or other name (whether such name is followed by the phrase 'or approved equal' or not), the Tenderer shall base his tender price on the supply of the named article and no other.

B. The Tenderer may submit with his tender suggested equivalents to those articles specified by trade or other names. Such submissions shall be made on Form CD-7 attached and shall show the name of the article specified, the name and description of the suggested equivalent, and the total revision to the tender price that would result if the equivalent were accepted.

FORM OF TENDER

FT.01 TENDER PRICE

1. Offer by - Name - Frazer Zwierschke Construction and Trenching Limited

   Address - 1397 Station Street, Fonthill, Ontario

   Date - November 20th, 1980

2. To The Corporation of the Town of Pelham

A. We, the undersigned, having examined the site of the Work, having carefully investigated the conditions pertaining to the Work and having secured all the information necessary to enable us to submit a bona fide tender, and having inspected all the Contract Documents, hereby agree to enter into a contract and to perform all the Work in a good and Workmanlike manner in accordance with the Contract Documents to the satisfaction of the Engineer for the total tender price of

dollars ($ 38,965.00)

FT.02 CONTINGENCIES AND ALLOWANCES

A. We agree that the tender price includes the contingency sum of $3,000.00 and that no part of this sum shall be expended without the written direction of the Engineer, and any part not so expended shall be deducted from the tender price.

FT.03 QUANTITIES

A. The tender price is compiled from the Schedule Of Tender Prices included hereinafter. The quantities in the schedule being approximate, we agree that the final valuation will be made on the basis of actual quantities measured during and on completion of the Work at the prices in the schedule.

FT.04 ADDITIONS AND DEDUCTIONS

A. We agree that the valuation of additions to, and deductions from, the contract shall be made as follows -

   1. The prices in the Schedule Of Tender Prices shall apply where appropriate.

   2. If the prices in subsection 1 are not appropriate, valuation will be made by one of the following methods -

      (A) The Engineer may ask the Contractor for a quotation for the proposed Work.

      (B) If the quotation referred to in (A) above is not accepted by the Engineer, the actual cost of the Work will be determined as the total of only the following -

         (1) Actual cost of labour, including such items as Workmen's Compensation and Unemployment Insurance.

         (2) Actual cost of materials to be incorporated into the Work, including such items as freight and taxes.

         (3) For Work done by the Contractor, an amount equal to 15 percent of the totals from subsections (1) and (2) above, which shall constitute overhead and profit of the Contractor.

FT.04 ADDITIONS AND DEDUCTIONS (Cont'd)

A. (Cont'd)

2. (B) (Cont'd)

(4) For Work done by Sub-contractors, an amount equal to 20 percent of the totals from subsections (1) and (2) above, which shall constitute overhead and profit of the Contractor and Sub-contractors.

(5) Rental of equipment and plant having a new value greater than $300. Rental rates shall be as set out in the current edition of MTC form 527.

3. Whenever extra Work is being performed under subsection 2(B) above, we agree to submit daily reports in writing, indicating the total chargeable costs incurred for the day. Valuation of the extra Work being so performed will be made only on the basis of the approved daily reports.

FT.05 ADDENDA

A. We agree that we have received addenda Ø to Ø inclusive, and the tender price includes the provisions set out in such addenda.

FT.06 COMPLETION

A. We agree to commence Work as specified, to proceed continuously to the completion and to complete all Work within 25 working days from the date of issue of the written order to start Work.

B. Complete all work excluding final restoration within the Sunset Drive right-of-way by December 31st, 1980.

C. Complete final restoration within the Niagara Road 63 right-of-way by December 15th, 1980.

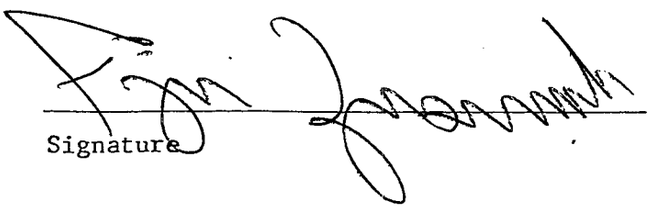
D. Complete final restoration of Sunset Drive by May 15th, 1981.

FT.07 SCHEDULE OF TENDER PRICES

Item No.	Description	Unit	Estimated Quantity	Unit Price	TOTAL
1.	200 mm dia. watermain	m	485	$ 45.00	$ 21,825.00
2.	25 mm dia. copper type 'K' water service pipe	m	200	$ 21.00	$ 4,200.00
3.	25 mm dia. curb stop valve	each	20	$ 50.00	$ 1,000.00
4.	25 mm dia. service main stop valve	each	20	$ 70.00	$ 1,400.00
5.	25 mm dia. service curb box	each	20	$ 35.00	$ 700.00
6.	Connection to existing watermain	each	1	$ 1500.00	$ 1,500.00
7.	200 mm dia. valve and box	each	2	$ 420.00	$ 840.00
8.	Hydrant set complete	each	3	$ 1500.00	$ 4,500.00
9.	Contingency Allowance			Lump Sum	$ 3,000.00
		TOTAL CONTRACT PRICE			$ 38,965.00

Please indicate type of pipe Class 150, P.V.C. Watermain

OFFERED ON BEHALF
OF THE CONTRACTOR



Signature

Signature

Contractor's Seal

Frazer Zwierschke Construction and
Trenching Limited

Company Name

Witness

1397 Station Street
Fonthill, Ontario

Address

November 20th, 1980

Date

Proctor & Redfern Limited
Project EO

AGREEMENT

This Agreement made in triplicate this 21st day of November 19 80 , between
Frazer Zwierschke Construction and Trenching Limited hereinafter called "The Contractor",

AND

The Town of Pelham hereinafter called "The Owner".

WITNESSETH, that the Contractor agrees with the Owner to perform all the Work in accordance with the Contract Documents referred to in the tender of the Contractor dated the 20th day of November , 19 80 , (which shall be deemed to form part of this Contract) to the satisfaction of the Engineer for the total contract price of $ 38,965.00 which Contract Documents are attached hereto and which are hereby expressly made part of this Contract.

The Owner hereby agrees with the Contractor, that in consideration of the Work being performed by the Contractor as specified, the Owner shall pay the Contractor for said Work in accordance with the prices set out in the Form of Tender attached hereto, and in accordance with the provisions set out in the attached Contract Documents.

Time shall be deemed the essence of this Contract.

IN WITNESS WHEREOF the parties hereto have executed this Agreement under their respective corporate seals and by the hands of their proper officers thereunto duly authorized.

SIGNED, SEALED AND DELIVERED
in the presence of:

OWNER

The Town of Pelham
Name

ERIC G. BERGENSTEIN, MAYOR
Signed E.G. Bergenstein

Name and Title

Murray Hackett
Signed

MURRAY HACKETT, CLERK
Name and Title

Witness

Name and Title

CONTRACTOR
Frazer Zwierschke Construction and Trenching Limited
Name

Signed

Name and Title

Signed

Name and Title

Witness

Name and Title

N.B. Where legal jurisdiction, local practice or Owner or Contractor requirement calls for proof of authority to execute this document, proof of such authority in the form of a certified copy of a resolution naming the person or persons in question as authorized to sign the Agreement for and on behalf of the Corporation or Partnership, parties to this Agreement, should be attached.

AGREEMENT TO BOND

Date _____ 1980

Project E.O. 80436

*

Gentlemen:

Construction of Sunset Drive Watermain
in the Town of Pelham, Ontario

In consideration of the Owner accepting the tender of and executing an Agreement with _____ (hereinafter referred to as 'the Tenderer') for the construction of Sunset Drive Watermain in the Town of Pelham, Ontario subject to the express condition that the Owner receive the Performance Bond and the 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 payment bond each in an amount equal to 100 percent of the tender price, in the standard forms of the Canadian Construction Association and in accordance with the said tender, and we agree to furnish the Owner with the said bonds within 7 days after notification of the acceptance of the tender has been mailed to us.

Yours very truly

Note: This Agreement must be executed on behalf of the surety company by its authorized officers under the company's corporate seal.

*Enter name and address of surety company at the top of the page.

Form CD-22
Revised August, 1977

BID BOND

No. ..... $ .....

KNOW ALL MEN BY THESE PRESENTS THAT .....

..... as Principal

hereinafter called the Principal, and .....

a corporation created and existing under the laws of .....

and duly authorized to transact the business of Suretyship in .....

as Surety, hereinafter called the Surety, are held and firmly bound unto .....

..... as Obligee

hereinafter called the Obligee, in the amount of .....

..... Dollars ($ .....)

lawful money of Canada, for the payment of which sum, well and truly to be made, the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a written tender to the Obligee, dated the .....

day of ..... 19 ..... , for .....

.....

.....

.....

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if the aforesaid Principal shall have the tender accepted within sixty (60) days from the closing date of tender and the said Principal will, within the time required, enter into a formal contract and give the specified security to secure the performance of the terms and conditions of the Contract, then his obligation shall be null and void; otherwise the Principal and the Surety will pay unto the Obligee the difference in money between the amount of the bid of the said Principal and the amount for which the Obligee legally contracts with another party to perform the work if the latter amount be in excess of the former.

The Principal and the Surety shall not be liable for a greater sum than the specified penalty of this Bond.

Any suit under this Bond must be instituted before the expiration of six months from the date of this Bond.

IN WITNESS WHEREOF, the Principal and the Surety have Signed and Sealed this Bond this .....

..... day of ..... 19 .....

SIGNED and SEALED
In the presence of

(.....
(Principal (Seal)

(.....
(Surety (Seal)

Endorsed by: R.A.I.C., A.C.E.C., C.C.A., E.I.C., S.W.A.C.

Approved by: INSURANCE BUREAU OF CANADA

C.C.A. Document No. (S) 21

PERFORMANCE BOND

No. ..... $ .....

KNOW ALL MEN BY THESE PRESENTS THAT .....

.....as Principal,

hereinafter called the Principal, and .....

a corporation created and existing under the laws of .....

and duly authorized to transact the business of Suretyship in .....

as Surety, hereinafter called the Surety, are held and firmly bound unto .....

..... as Obligee,

hereinafter called the Obligee, in the amount of .....

..... Dollars ($ .....)

lawful money of Canada, for the payment of which sum, well and truly to be made, the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a written contract with the Obligee, dated the .....

day of ..... 19 ....., for .....

.....

.....

.....

In accordance with the Specifications and Drawings submitted therefor which contract, Specifications and Drawings, are by reference made part hereof and are hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if the Principal shall promptly and faithfully perform the Contract then this obligation shall be null and void; otherwise it shall remain in full force and effect.

Whenever the Principal shall be, and declared by the Obligee to be, in default under the Contract, the Obligee having performed the Obligee's obligations thereunder, the Surety may promptly remedy the default, or shall promptly

(1) complete the Contract in accordance with its terms and conditions or

(2) obtain a bid or bids for submission to the Obligee for completing the Contract in accordance with its terms and conditions, and upon determination by the Obligee and the Surety of the lowest responsible bidder, arrange for a contract between such bidder and the Obligee and make available as work progresses (even though there should be a default, or a succession of defaults, under the contract or contracts of completion, arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the Contract price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of the Contract price," as used in this paragraph, shall mean the total amount payable by the Obligee to the Principal under the Contract, less the amount properly paid by the Obligee to the Principal.

Any suit under this Bond must be instituted before the expiration of two (2) years from the date on which final payment under the Contract falls due.

The Surety shall not be liable for a greater sum than the specified penalty of this Bond.

No right of action shall accrue on this Bond, to or for the use of, any person or corporation other than the Obligee named herein, or the heirs, executors, administrators or successors of the Obligee.

IN WITNESS WHEREOF, the Principal and the Surety have Signed and Sealed this Bond this .....

day of ..... 19 .....

SIGNED and SEALED
In the presence of:

(.....(Seal)
(Principal

(.....(Seal)
(Surety

LABOUR AND MATERIAL PAYMENT BOND
(TRUSTEE FORM)

No. ..... $ .....

Note: This Bond is issued simultaneously with another Bond in favour of the Obligee conditioned for the full and faithful performance of the Contract.

KNOW ALL MEN BY THESE PRESENTS THAT .....

..... as Principal,

hereinafter called the Principal, and .....

a corporation created and existing under the laws of .....

and duly authorized to transact the business of Suretyship in .....

as Surety, hereinafter called the Surety are, subject to the conditions hereinafter contained, held and firmly bound unto

..... as Trustee,

hereinafter called the Obligee, for the use and benefit of the Claimants, their and each of their heirs, executors,

administrators, successors and assigns, in the amount of .....

..... Dollars ($ .....)

of lawful money of Canada for the payment of which sum well and truly to be made the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a written contract with the Obligee, dated the .....

day of ..... 19 ..... , for .....

.....

.....

.....

which contract, Specifications & Drawings are by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if the Principal shall make payment to all Claimants for all labour and material used or reasonably required for use in the performance of the Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect, subject, however, to the following conditions:

1. A Claimant for the purpose of this Bond is defined as one having a direct contract with the Principal for labour, material, or both, used or reasonably required for use in the performance of the Contract, labour and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment directly applicable to the Contract provided that a person, firm or corporation who rents equipment to the Principal to be used in the performance of the Contract under a contract which provides that all or any part of the rent is to be applied towards the purchase price thereof, shall only be a Claimant to the extent of the prevailing industrial rental value of such equipment for the period during which the equipment was used in the performance of the Contract. The prevailing industrial value of equipment shall be determined, insofar as it is practical to do so, In accordance with and in the manner provided for in the latest revised edition of the publication of the Canadian Construction Association titled "Rental Rates on Contractors Equipment" published prior to the period during which the equipment was used in the performance of the Contract.

2. The Principal and the Surety, hereby jointly and severally agree with the Obligee, as Trustee, that every Claimant who has not been paid as provided for under the terms of his contract with the Principal, before the expiration of a period of ninety (90) days after the date on which the last of such Claimant's work or labour was done or performed or materials were furnished by such Claimant, may as a beneficiary of the trust herein provided for, sue on this Bond, prosecute the suit to final judgment for such sum or sums as may be justly due to such Claimant under the terms of his contract with the Principal and have execution thereon. Provided that the Obligee is not obliged to do or take any act, action or proceeding against the Surety on behalf of the Claimants, or any of them, to enforce the provisions of this Bond. If any act, action or proceeding is taken either in the name of the Obligee or by joining the Obligee as a party to such proceeding, then such act, action or proceeding, shall be taken on the understanding and basis that the Claimants; or any of them, who take such act, action or proceeding shall indemnify and save harmless the Obligee against all costs, charges and expenses or liabilities incurred thereon and any loss or damage resulting to the Obligee by reason thereof. Provided still further that, subject to the foregoing terms and conditions, the Claimants, or any of them, may use the name of the Obligee to sue on and enforce the provisions of this Bond.

3. No suit or action shall be commenced hereunder by any Claimant:

   (a) unless such Claimant shall have given written notice within the time limits hereinafter set forth to each of the Principal, the Surety and the Obligee, stating with substantial accuracy the amount claimed. Such notice shall be served by mailing the same by registered mail to the Principal, the Surety and the Obligee, at any place where an office is regularly maintained for the transaction of business by such persons or served in any manner in which legal process may be served in the Province or other part of Canada in which the subject matter of the Contract is located. Such notice shall be given

      (1) in respect of any claim for the amount or any portion thereof, required to be held back from the Claimant by the Principal, under either the terms of the Claimant's contract with the Principal, or under the Mechanics' Liens Legislation applicable to the Claimant's contract with the Principal, whichever is the greater, within one hundred and twenty (120) days after such Claimant should have been paid in full under the Claimant's contract with the Principal;

      (2) in respect of any claim other than for the holdback, or portion thereof, referred to above, within one hundred and twenty (120) days after the date upon which such Claimant did, or performed, the last of the work or labour or furnished the last of the materials for which such claim is made, under the Claimant's contract with the Principal;

   (b) after the expiration of one (1) year following the date on which the Principal ceased work on the Contract, including work performed under the guarantees provided in the Contract;

   (c) other than in a Court of competent jurisdiction in the Province or District of Canada in which the subject matter of the Contract, or any part thereof, is situated and not elsewhere, and the parties hereto agree to submit to the jurisdiction of such Court.

4. The Surety agrees not to take advantage of Article 1959 of the Civil Code of the Province of Quebec in the event that, by an act or an omission of a Claimant, the Surety can no longer be subrogated in the rights, hypothecs and privileges of Said Claimant.

5. The amount of this Bond shall be reduced by, and to the extent of any payment or payments made in good faith, and in accordance with the provisions hereof, inclusive of the payment by the Surety of Mechanics' Liens which may be filed of record against the subject matter of the Contract, whether or not claim for the amount of such lien be presented under and against this Bond.

6. The Surety shall not be liable for a greater sum than the specified penalty of this Bond.

IN WITNESS WHEREOF, the Principal and the Surety have Signed and Sealed this Bond this .....

day of ..... 19 .....

SIGNED and SEALED
In the presence of

(.....
Principal (Seal)

(.....
Surety (Seal)

Endorsed by: R.A.I.C., A.C.E.C., C.C.A., E.I.C., S.W.A.C.

Approved by: INSURANCE BUREAU OF CANADA

Statement Sheet
CD-3

LIST OF SUB-CONTRACTORS

SUB-TRADE	NAME OF SUB-CONTRACTOR	ADDRESS OF SUB-CONTRACTOR	VALUE OF SUB-CONTRACT

Note to Tenderer - Refer to Articles 3 of the General Conditions and TI.08 of Tendering Information.
- Names and addresses must be filled in and submitted with the tender. If a sub-contractor is not to be used for any work listed then show "by own forces."

Proctor & Redfern Limited
Consulting Engineers
November, 1977

Statement Sheet
CD-4

TENDERER'S EXPERIENCE IN SIMILAR WORK

YEAR COMPLETED	DESCRIPTION OF CONTRACT	FOR WHOM WORK PERFORMED	NAME OF CONSULTANT ENGINEER	VALUE

Note to Tenderer - Refer to article TI.05 of Tendering Information

Proctor & Redfern Limited
Consulting Engineers
November, 1977

Statement Sheet
CD-5

TENDERER'S SENIOR STAFF

NAME	APPOINTMENT	QUALIFICATIONS AND EXPERIENCE
Office		
Field		

Proctor & Redfern Limited
Consulting Engineers
November, 1977

Statement Sheet
CD-6

TENDERER'S PLANT

The Tenderer shall list the plant, machinery and equipment he proposes to use on the work.

PLANT OWNED:

PLANT TO BE RENTED OR LEASED:

PLANT TO BE PURCHASED:

Proctor & Redfern Limited
Consulting Engineers
November, 1977

Statement Sheet
CD-7

SCHEDULE OF EQUIVALENTS

SPECIFIED ARTICLE	NAME OF SUBMITTED EQUIVALENT	CATALOGUE NO. ETC. OF SUBMITTED EQUIVALENT	PROPOSED PRICE REVISION

Proctor & Redfern Limited
Consulting Engineers
November, 1977

SC.01 GUARANTEE PERIOD

A. The guarantee period for the Contract shall be twelve months, unless an extended guarantee period is called for in any specific Section.

SC.02 DEFINITION

A. 'Department of Highways' and 'DHO' means 'The Ministry of Transportation and Communications' and 'MTC'.

B. 'The Department of Transportation and Communications' and 'DTC' means 'The Ministry of Transportation and Communications' and 'MTC'.

C. The word 'provide' shall mean - supply labour, materials, equipment, handling and cartage required for complete installation of the item concerned.

D. The words 'work' or 'works' have the same meaning as for 'Work' as defined in the General Conditions.

SC.03 INSURANCE

A. Damage insurance

1. Notwithstanding the provisions of clause 28 of the General Conditions, no 'Damage Insurance' will be required on this Contract.

SC.04 LIQUIDATED DAMAGES

A. Should the Contractor fail to complete the Work in accordance with the Contract and to the satisfaction of the Engineer, within the time specified in the Form of Tender, or as amended on the written authority of the Engineer, the Contractor shall pay to the Owner the sum of $150.00 for each calendar day that the Work shall remain unfinished after such time.

B. Such payments are agreed upon and fixed as liquidated damages that the Owner will suffer by reason of delay and default, and not as a penalty. The Owner may deduct and retain the amounts of such liquidated damages out of the monies which may be due or become due to the Contractor under the Contract.

C. A working day is defined as any day:

(1) Except Saturdays, Sundays and Statutory Holidays.

(2) Except a day on which the Contractor is prevented by inclement weather or conditions resulting immediately therefrom adverse to controlling operation or operations, as determined by the Engineer, from proceeding with at least 60 percent of the normal labour and equipment force engaged on such operation for at least five (5) hours toward completion of such operation or operations. A controlling operation or operations is to be construed to include any feature of the work considered at the time by the Engineer and the Contractor, which, if delayed, will delay the time of completion of the contract.

SC.05 HOLDBACK FOR RECTIFICATION AFTER ACCEPTANCE OF THE WORK

A. To cover rectification costs during the guarantee period, the Owner will retain 5 percent of the value of Work done, such amount being held back in each progress certificate. This holdback will be retained for a period of 1 year from the 'Acceptance Date' which is described in article 35 of the General Conditions. Additional monies will be held back as required by provincial statutes.

SC.06 PAYMENT BOND

A. The Contractor, together with a surety company approved by the Owner and authorized by law to carry on business in the Province shall furnish 100 percent labour and materials payment bond to the Owner using C.C.A. Document (S) 22. The bond shall remain in effect until the issue by the Engineer of the final payment certificate.

SC.07 PERFORMANCE BOND

A. The provisions of the General Conditions shall apply except that CCA Document (S)21 shall be used.

SC.08 RELEASE OF HOLDBACK

A. Holdbacks held under the provisions of the Mechanics' Lien Act will be released upon application by the Contractor, and will be subject to the requirements of the Act.

B. The statutory 15-percent holdback will apply to the Contract.

C. Thirty-seven days after substantial completion, the holdback will be reduced from 15 percent to 5 percent of the value of the completed work. For the purpose of this Contract, substantial completion is defined as completion of all work except final restoration on Sunset Drive.

Form CD-23

FOR USE WITH PROCTOR & REDFERN LTD. GENERAL CONDITIONS (CD-1) AND SUPPLEMENTARY CONDITIONS

CERTIFICATE OF INSURANCE

- This is to certify that in connection with a contract between

_____ (Owner) and

_____ (Contractor)

for (name of project) _____

_____

Proctor & Redfern Limited Project No. E.O. _____ that:

Name of Assured (Contractor): _____

Address of Assured: _____

_____

is insured by _____

which insurance is listed below:

Coverage	Policy Number
Contractual Liability	
Cross Liability	
Contingent Employer's Liability	
Completed Operations Liability	
Non-Owned Automobile Liability	
Automobile Insurance	
* Damage Insurance	

- We certify that all Liability Insurance listed above complies with Clause 24 of the General Conditions of the Contract, a copy of which is attached hereto and is in the joint names of:

_____ (Owner) and;

_____ (Contractor) and;

All subcontractors

and;
Proctor & Redfern Limited (Engineer)

- We certify that all Automobile Insurance listed above complies with Clause 25 of the General Conditions of the Contract, a copy of which is attached hereto.

*- We certify all Damage Insurance listed above complies with Clause 28 of the General Conditions of the Contract, a copy of which is attached hereto and is in the joint names as listed above for Liability Insurance.

- We certify that all insurance policies listed above shall stay in force and not be amended, cancelled or allowed to lapse without thirty (30) days prior notice to all parties named in the policies listed above.

Date _____,19___

Name of Insurance Company

_____

_____
Address

_____
Authorized Signature

* If the Supplementary General Conditions cancels Damage Insurance, then delete these references.

GENERAL CONDITIONS OF THE CONTRACT

SUBJECT INDEX

PROCTOR & REDFERN LIMITED
CONSULTING ENGINEERS
75 EGLINTON AVENUE EAST, TORONTO, ONT. M4P 1H3

Form CD-1
(Revised May 1978)

GENERAL CONDITIONS OF THE CONTRACT

1. DEFINITIONS

1. Wherever used in the Contract Documents, or other documents forming part of the Contract:
   (a) the word "Contract" means: the Contract to do the Work, the Bonds or Securities, the Addenda (if any), the Specifications, the General and Supplementary General Conditions, the Tendering Information, the List of Contract Documents, the Drawings, and other documents referred to or connected with the Agreement.
   (b) the word "Owner" means the person or corporation accepting the Tender.
   (c) the word "Contractor" means the person or corporation to whom the Contract for the Work has been awarded.
   (d) the word "Subcontractor" means the person or corporation having a contract with the Contractor (or with another subcontractor) for the execution of a part or parts of the Work included in the Contract, or for the supplying of material for the Contract and worked to a special design according to the Drawings and Specifications.
   (e) the word "Engineer" means Proctor & Redfern Limited, Consulting Engineers, and their duly authorized agents.
   (f) the word "Work" means labour, materials and other things required to be done, that are shown, described or implied in the Contract Documents, and includes extra and additional Work that may be ordered by the Engineer.

2. DOCUMENTS

2. (a) The Contract Documents shall be signed and sealed, in triplicate, by the Owner and the Contractor.
   (b) The Contract Documents are complementary and what is called for by any one shall be as binding as if called for by all. The intention of the Documents is to include plant, labour and materials (except as specifically excepted) necessary for the complete and proper execution of the Work.
   (c) Drawings and Specifications shall be read and interpreted together. Work not specifically described, but obviously necessary for the satisfactory completion of the Work for the purpose intended shall be supplied and performed by the Contractor as though it had been described and shown in the Drawings and Specifications.
   (d) Reference to published standard specifications shall be to the edition current at the time of the signing of the Contract Documents.

3. SUB-CONTRACTORS

3. (a) Without the written approval of the Engineer, the Contractor shall not change the Subcontractors named in the Contract.
   (b) The Contractor shall be held as fully responsible to the Owner for the acts and omissions of his Subcontractors (and of persons directly and indirectly employed by them) as for the acts and omissions of persons directly employed by the Contractor.
   (c) The Contractor shall bind every Subcontractor to the terms of the Contract Documents, as far as applicable to the Subcontractor's Work.
   (d) Nothing in the Contract Documents shall create any contractual relation between Subcontractors and the Owner.
   (e) Divison of the Specifications into sections or subsections shall be only for clarity of reading and reference, and shall not be taken to be a division into trades, subtrades or sections of Work of any kind.

4. NOTICES

4. (a) Any notice or communication to the Contractor shall be deemed to be legally well and sufficiently given and served, if:
   (i) handed to the Contractor or his authorized representatives, or
   (ii) posted or sent to the address given in the Tender, or,
   (iii) posted or sent to the Contractor's domicile or usual place of business, or
   (iv) posted or sent to the place where the Work is, or is to be, carried on, or
   (v) posted to or left at his last known address.

(b) If the Work is closed, suspended or stopped for the winter (or for other approved reasons), the Contractor shall remove material from streets, sidewalks, boulevards and other public property.

(c) The Contractor shall ensure that the charges of explosives used, and the time at which they are exploded, shall be such as not to cause suffering, inconvenience or injury to persons nor damage to property.

(d) Explosives shall be properly housed and protected, and no explosives that have deteriorated shall be used. Approved methods of handling and thawing frozen explosives shall be followed. In blasting operations, the Contractor shall exercise the greatest care at all times.

(e) The Contractor shall provide, erect and maintain necessary barriers, fences and other proper protection, and shall provide and maintain watchmen and lights as may be necessary to ensure the safety of the public and others. Unless otherwise specified, the Contractor shall keep streets and sidewalks open for use by the public. The Contractor shall provide, erect and maintain a sufficient number of detour signs, and other proper notices, wherever the use of streets or sidewalks is dangerous due to the Contractor's operations.

(f) When Work is carried on at night, the Contractor shall provide, erect and operate a sufficient number of lights to enable the Work to be performed satisfactorily.

11. PROSECUTION OF THE WORK

11. (a) The Contractor shall complete the Work in accordance with a schedule set down in co-operation with the Engineer at the time of the award of the Contract. Amendments to this schedule may be made by the Engineer, on application by the Contractor.

(b) Should the Engineer be of the opinion that the quantity or quality of labour or plant supplied by the Contractor is not sufficient, or that the methods being employed are not such as will ensure that the Work will be completed within the specified time, the Contractor shall forthwith improve the quality and increase the number of men employed, shall make revisions to the plant, and shall employ Work methods satisfactory to the Engineer.

12. OPERATIONAL RISKS

12. (a) Damage, loss, expense and delay incurred or experienced by the Contractor in the prosecution of the Work, by reason of unanticipated difficulties, bad weather, strikes, wars, acts of God, or other mischances, shall be borne by the Contractor and shall not be the subject of a claim for additional compensation.

(b) The position of pole lines, conduits, watermains, sewers and other underground and overground utilities and structures is not necessarily shown on the Contract Drawings, and, where shown, the accuracy of the position of such utilities and structures is not guaranteed. Before starting Work, the Contractor shall inform himself of the exact location of such utilities and structures, and shall assume liability for damage to them. Unless otherwise specified, the Contractor shall support such utilities and structures, or temporarily remove them, and restore them, to the satisfaction of the owners of the utilities and structures.

13. WORKMANSHIP AND MATERIALS

13. (a) Workmanship shall be first-class and material new and of best quality. The Contractor shall pay due regard to the neat and attractive appearance of the finished Work.

(b) If ordered by the Engineer, the Contractor shall make such openings in the Work as are needed to re-examine the Work, and shall forthwith make the Work good again. Should the Engineer find the Work so opened up to be faulty, the whole of the expense of opening, checking and making good shall be borne by the Contractor. Should the Engineer find the Work opened up to be in an acceptable condition, such expense will be borne by the Owner.

(c) The Contractor shall remove and make good defective Work, and the entire cost of such removal and making good shall be borne by the Contractor.

14. COLD WEATHER

14. When Work is permitted or ordered by the Engineer to be done in cold weather, the Contractor shall provide suitable means for heating and protection, and the materials shall be heated and protected. All Work that may be injured by frost, and which cannot be satisfactorily completed, shall be put in a proper and satisfactory condition, and shall be protected from damage by frost. Unless otherwise specified, the cost of such protection shall be borne by the Contractor.

The Engineer's decision as to matters referred to in this clause shall be binding upon the parties concerned.

(b) When the Engineer makes a decision under this clause, the Contractor shall immediately proceed with Work affected by the decision. Additions to or deductions from the Contract price shall be made only as provided for in the Contract, and no revisions to the completion time shall be made, unless approved by the Engineer.

(c) The Engineer may at reasonable times visit, enter and check at buildings, factories, workshops, works or sites wherever materials are being prepared, made or treated, or where other Work is being done in connection with the Contract. The Engineer may also take such samples as he may consider necessary.

21. SHOP DRAWINGS

21. (a) Shop Drawings will be reviewed only to check general arrangement and conformance with the design concept of the project and compliance with the Contract Documents.

(b) Where the Engineer requires Shop and Setting Drawings, the Contractor shall submit them in sufficient time to allow for examination by the Engineer and for any corrections that he may require to be made. The Contractor shall not commence Work on items covered by Shop Drawings (where such drawings have been requested) before the Engineer's review.

(c) The Contractor shall make changes in Shop and Setting Drawings as the Engineer requires consistent with the Contract and shall submit revised prints to the Engineer. When submitting Shop and Setting Drawings, the Contractor shall notify the Engineer of every change made from the Contract Documents.

(d) Review of Shop Drawings by the Engineer shall not relieve the Contractor from compliance with requirements of the Contract Documents, nor relieve him of responsibility for errors made in the Shop Drawings.

(e) The Contractor shall be responsible for confirming and correlating quantities and dimensions; selecting fabrication processes and techniques of construction; and coordinating the Work of Subcontractors.

(f) Prior to submission to the Engineer the Contractor shall review Shop Drawings. By this review the Contractor represents that he has determined and verified field measurements, field construction criteria, materials, catalogue numbers and similar data or will do so and that he has checked and co-ordinated each Shop Drawing with the requirements of the Work and of the Contract Documents. The Contractor's review of each Shop Drawing shall be indicated by stamp, date and signature of a responsible person.

(g) Shop Drawings shall be properly identified by the name of the project, the E.O. number, the item and the area in which the item is to be used. Where options occur on the Shop Drawing, the option proposed to be used shall be marked. If applicable, the related Specification Section shall be indicated.

22. OWNERSHIP OF DOCUMENTS

22. Contract Documents, including Drawings, Specifications, models and similar items supplied by the Engineer are his property. Such Documents are not to be used on other work and, with the exception of the signed Contract Documents, shall be returned by the Contractor to the Engineer on the completion of the Work.

23. LIABILITY

23. The Contractor shall assume the defence of and shall indemnify and save harmless the Owner from claims:

(a) resulting from the prosecution of the Work, or

(b) resulting from any of the Contractor's operations, or

(c) caused by reason of the existence, location or condition of the Work, or

(d) caused by reason of any material, plant or labour used in the Work, or

(e) arising from an act of commission or omission on the part of the Contractor, or

(f) relating to inventions, copyrights, trademarks, patents (and rights to them) used in doing the Work, or in the use and operation of Work on completion, unless otherwise specified.

30. INSURANCE CLAIMS

30. (a) Claims or alleged claims received by the Contractor shall be dealt with immediately by the Contractor. If a claim is settled to the satisfaction of the claimant, the Contractor shall submit to the Engineer a copy of the claimant's release.

(b) If a claim or alleged claim is rejected by the Contractor and/or his insurance company, the Contractor shall report this fact in writing to the Engineer.

(c) Should 30 days elapse after the claim or alleged claim has been received by the Contractor, and the Contractor is not able to report settlement or rejection of the claim, he shall report to the Engineer the steps being taken with respect to the claim.

31. HOURS OF WORK

31. The Engineer may prohibit the Contractor from carrying on operations during hours of the day in which the Engineer, in his judgment, deems such operations to be a disturbance or nuisance to the public.

Such prohibition may be made notwithstanding prior consent, order, agreement or requirement in the Contract that stipulates maximum or minimum hours of Work.

32. VALUATION

32. (a) At monthly intervals, the Contractor and the Engineer shall make a valuation of the Work and materials supplied under the Contract. Should the Engineer wish to measure the Work or materials supplied, the Contractor shall assist in such measurements and furnish particulars required.

(b) The monthly valuations described in subsection (a) above shall not bind the Owner, the Contractor or the Engineer to final valuation of the Work to be done under the Contract, but shall be construed as approximations only for the purpose of Progress Certificates.

(c) The final valuation of the Work shall be prepared as soon as possible after the whole of the Work has been completed.

33. PROGRESS CERTIFICATES

33. The Contractor shall be entitled to receive partial payments upon the certificate of the Engineer of the value of Work done and materials supplied.

Unless otherwise specified, eighty-five per cent (85%) of the estimated value of the completed Work and material supplied will be certified, less amounts retained under Clause 36.

For Progress Certificates, the Engineer's decision as to the estimated value of completed Work and material supplied shall be final, but shall not be binding on him, the Contractor or the Owner in the establishing of the final value of the Work, nor shall it be taken as evidence as to ownership of, or payment for the Work.

34. SUBSTANTIAL COMPLETION AND HOLDBACK RELEASE

34. Holdbacks held under the provision of the Mechanics' Lien Act will be released upon application by the Contractor, and will be subject to the requirements of the Act. The Contractor's applications shall be made in the forms included as Appendices 1 and 2 to these General Conditions. When the Engineer is satisfied that the Work meets the requirements of Substantial Completion in the Mechanics' Lien Act he will issue a Substantial Completion Certificate to establish a date for commencement of the holdback period.

35. TOTAL COMPLETION CERTIFICATE

35. (a) When the Work required to be done under the Contract has been completed in every respect and is acceptable to the Engineer, a final valuation of the Contract will be prepared by the Contractor and the Engineer.

(b) The Contractor shall submit to the Engineer a statement indicating the Contractor's valuation of the Work according to records available to the Contractor. The Engineer will review this statement and either approve it or submit detail reasons for revisions that, in his opinion, should be made.

(c) Should the Engineer consider it advisable, the Engineer will prepare a final valuation of the Work and submit it to the Contractor who shall either approve it or submit detail reasons for revisions that, in his opinion, should be made.

(d) When the Engineer and Contractor have reached agreement as to the final value of the Work, the Engineer will issue a Total Completion Certificate, detailing the valuation of the Contract, and certifying its acceptance at a certain specific date, referred to as the "acceptance date."

(e) Should the Engineer and Contractor be unable to reach agreement as to the final value of the Work within a reasonable period, the Engineer will issue his Total Completion Certificate detailing his valuation of the Contract and certifying acceptance of the Work at a certain specific date, referred to as the "acceptance date."

APPENDIX 1 OF THE GENERAL CONDITIONS OF THE CONTRACT

APPLICATION FOR RELEASE OF SUBCONTRACTOR'S HOLDBACK

Owner:

Project:

EO: Contractor:

Subcontract:

Subcontractor:

1. We, the said Subcontractor hereby confirm that the Work under the said subcontract was completed on , that the subcontract price was $, and hereby request the issue of a certificate that such subcontract Work has been completed.

Date: _____ Signature: _____

SEAL:

2. We, the said Contractor hereby confirm that Work of the above subcontract has been complete in accordance with the Contract Documents and that the subcontract price was $, and hereby apply for a reduction in holdback with respect to the subcontract, in accordance with the provisions of the Mechanics' Lien Act.

Date: _____ Signature: _____

SEAL:

APPENDIX 2 OF THE GENERAL CONDITIONS OF THE CONTRACT

APPLICATION FOR RELEASE OF CONTRACTOR'S HOLDBACK

Owner:

Project:

EO: Contractor:

We, the said Contractor, hereby confirm:

(i) that the Work under the above Contract is "substantially complete" as defined in the Mechanics' Lien Act, and

(ii) that there are no outstanding liens, garnishees, attachments or other charges affecting the Work, and

(iii) that the value of Work done to the date of substantial completion is $ and

(iv) that the value of Work remaining to be done is $

and hereby apply for release of holdback monies in accordance with the provisions of the Mechanics' Lien Act.

Date: _____ Signature: _____

SEAL

SECTION 01010 - GENERAL

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. This Contract is for the construction of approximately 485 metres of 200 mm diameter watermain and associated appurtenances in the Town of Pelham, Ontario.

1.02 LIMITS OF SITE

A. The limits of the site are -

1. The road or street allowances on which Work is to be performed.

2. Such areas of private property adjacent to road or street allowances on which the Contractor is directed, in writing, to enter to carry out Work.

1.03 SETTING OUT OF THE WORK

A. The Engineer will set such stakes as are necessary to mark the location, alignment, elevation and grade of the Work. Give adequate notice of the need for such setting out.

Carefully protect and preserve stakes, lot pins, marks and reference points and replace if destroyed or removed.

Provide grade stakes, masts, scaffolds, batter boards, straight edges, templates and other equipment necessary for laying out, and inspecting the Work.

Wherever necessary suspend Work temporarily to permit the Engineer to inspect and check the line and grade of any portion of the Work.

1.04 CONSTRUCTION SCHEDULE

A. Within 2 weeks after being awarded the Contract, submit proposed construction schedule to the Engineer for approval. In the schedule show proposed progress in weekly stages for the main sections and subsections of the Work.

B. Comply with the dates of completion as specified.

PART 2 PRODUCTS

PART 2.01 TESTS

A. Where required by the Engineer, supply for testing, samples of materials to be used in the construction of the Work. Do not use materials until they have been so approved.

PART 2.02 CANADIAN MATERIALS

A. Unless otherwise specifically approved, use materials and equipment of Canadian manufacture in constructing the Work

PART 3 EXECUTION

PART 3.01 TRAFFIC

A. Do not perform Work on public right-of-ways without approval of the road authorities.

B. Perform traffic control on streets in accordance with the rules of the appropriate road authority. Ensure that flagmen wear fluorescent red or orange safety vests, arm bands and hats.

C. Streets may be closed to through traffic only with the written permission of the Road Authority.

Adequately mark detours on adjacent streets. Erect and maintain barricades on the closed streets and light at night. Inform the Road Authority when a road is re-opened to traffic.

D. Maintain one lane of traffic at all times on Niagara Road 63.

E. On streets that are not officially closed, always maintain one lane of traffic in each direction. Should temporary detours be constructed, comply with the requirements of the road authority as to location, dimensions, strength, road markings, signing and other relevant details. Remove detours when no longer needed, and restore surfaces to the original condition.

F. Whether streets are officially closed or not, maintain reasonable access to adjacent properties for pedestrians and vehicles.

G. Maintain traffic signs in their original positions. Be sure that the signs are not obscured.

PART 3.02 NOTIFICATIONS

A. When streets are to be closed, or traffic restricted, notify the appropriate fire and police departments, giving at least 7 days notice of the closing or restriction.

B. If bus routes are affected, notify the bus company, giving at least 7 days notice.

C. When streets are to be re-opened, or restrictions removed, notify the fire, police and bus authorities.

PART 3.03 MUNICIPAL INSPECTORS

A. Municipal inspectors may be present during the construction of the Work. They have the power to order the Contractor to stop Work if the Work, in their opinion, is not being done in accordance with the set lines and grades or to the Drawings and Specifications.

B. Unless otherwise specified, the cost of municipal inspectors will not be charged to the Contractor.

PART 3.04 USE OF HYDRANTS

A. Keep fire hydrants accessible and free of obstructions.

B. Fire hydrants may be used as a source of water only with the approval of the water authority, and subject to its rules and conditions.

PART 3.05 INCLEMENT WEATHER

A. Make adequate protection and take precautions at times of inclement weather.

B. Inclement weather or extra Work caused by such weather will not be accepted as reason for additional payment.

PART 3.06 MUD AND DUST

A. Keep streets and other construction areas clean. If it is necessary to haul wet material, use suitable watertight trucks.

B. Control dust by the use of water or calcium chloride, or both.

PART 3 EXECUTION (Cont'd)

PART 3.07 ADJACENT STRUCTURES AND UTILITIES

A. Perform temporary and permanent support and temporary relocation and replacement of underground or overhead utilities as detailed in the General Conditions.

B. Permanent relocation of underground or overhead utilities will be carried out by others, if necessitated by coincidence of lines or grades, or both.

PART 3.08 TEMPORARY ACCESS

A. Where necessary for access, provide and maintain suitable safe, temporary roads, walkways and bridges. Remove temporary access facilities and restore disturbed areas, after the Work of the Contract has been completed.

PART 3.09 CLEAN-UP

A. On a daily basis as the Work progresses and on completion of the Work, clean-up and remove the rubbish and debris from the site. Remove excess material that is not required to be left on the site by the conditions of the Contract.

SECTION 02550 - SITE CLEARING, EXCAVATING, BACKFILLING AND RESTORATION OF TRENCHES

PART I GENERAL

1.01 INTENT

A. This Section covers the Work for site clearing, excavating, backfilling and restoration for sewers and watermains from 600 mm beyond the exterior wall of structures. It also covers the site clearing, excavating, backfilling and restoration for valve chambers, manholes and catchbasins.

B. Work included is as follows -

1. Existing utilities
2. Site clearing
3. Stripping toposil
4. Excavating
5. Sheathing and shoring
6. Backfilling
7. Restoration

C. Related Work specified elsewhere is as follows -

1. Section 02570 - Watermains

1.02 EXISTING UTILITIES

A. Contact the various utility companies prior to commencing Work and become informed of the exact location of utilities and protect them during construction and assume liability for damage to utilities.

B. Utilities that require relocation will be the responsiblity of the Utility Company concerned at no expense to the Contractor. Cooperate with the the utility companies and always provide them free access to their plant.

C. Where existing pipes, ducts, or other underground services intersect the pipe trench support the pipe trench to the approval of the Engineer and the Utility Company.

D. Where existing overhead pole lines are adjacent to the excavation, temporarily support them to the approval of the Engineer and the Utility Company concerned.

1.03 MEASUREMENT FOR PAYMENT

A. The Engineer will -

1. Measure in place timber sheathing left in the trench on the written order of the Engineer prior to backfilling of the trench. The Engineer will not measure sheathing specified on the Drawings to be left in place.

2. Measure excavation for additional bedding on a cubic metre basis.

PART I GENERAL (Cont'd)

1.04 BASIS FOR PAYMENT

A. Conditions

1. Unless otherwise specified, include temporary access, site clearing, earth excavation, shoring, sheathing, support of existing utilities, dewatering, testing of material, backfilling, removal of surplus, excavation, restoration and other labour, equipment and materials necessary for the complete installation of the Work, in unit prices for watermain.

2. Where additional depth of bedding is ordered by the Engineer, additional payment will be made based on the unit prices in the Provisional Items for additional excavation and for the additional bedding material requested. Payments will be based on the actual additional depth requested and the maximum width of trench as specified in PART 3.03 of this Section.

PART 2 PRODUCTS

2.01 MATERIALS -

- Conform to latest edition of reference standards.

- Where MTC specifications are referred to comply also with supplements to those specifications.

A. Granular Materials

1. Granular 'A', 'B' and 'D' in accordance with MTC Form 1010.

2. Granular Bedding Material - Meet with the following gradation requirements.

(A) Sieve Designation (Conforming to CGSB 8-GP-1d) | Percent Passing by Weight

150 mm	-
100 mm	-
26.5 mm	-
22.4 mm	100
16 mm	-
13.2 mm	-
9.5 mm	-
4.75 mm	25 - 100
1.18 mm	10 - 85
300 um	4 - 40
150 um	-
75 um	0 - 8
53 um	-

um = 1 micron = 1/1000 millimetre (mm)

3. Crushed Slag - Do not use as bedding for cast iron pipe or fittings.

4. Crushed Stone - produce from bedded or massive rock formation and from boulders. Break into fragments to conform to the following gradation requirements.

(A) Sieve Size | Percentage Passing by Weight

26.5 mm	100
19 mm	90 - 95
4.75 mm	5 - 10

B. Hot Mix Asphalt

1. Hot mix asphaltic concrete - MTC Form 310.

C. Topsoil

1. Use existing topsoil wherever suitable and as approved by the Engineer. Before re-using the topsoil clean out foreign matter and stones over 50 mm in size.

2. Imported Topsoil - Medium loan from a meadow or farm area known to be free from weeds.

PART 2 PRODUCTS (Cont'd)
PART 2.01 MATERIALS (Cont'd)
C. (Cont'd)

3. Notify the Engineer at least 3 days before starting topsoil stripping operations. Sources of supply will require the Engineer's approval before being brought on the job.

D. Fertilizer

1. Use complete commercial fertilizers, in compliance with the Canadian Fertilizer Act, not less than 60 percent urea-formaldehyde and the following percentages by weight -

Nitrogen	Phosphoric Acid	Potash
10	10	10 or
0	20	10

2. Superphosphate

Commercial superphosphate finely ground with a minimum analysis of 20 percent P_{2O_5}.

E. Sod

1. Use No. 1 nursery grown, 50 percent Kentucky blue, 50 percent merion blue sod, fully root permeated in a close mat, uniform in texture.

2. Cut sod by approved methods in accordance with the Nursery Sod Growers Association of Ontario. Cut pieces 1 sq. metre in area with a minimum of 20 mm soil portion.

PART 3 EXECUTION

3.01 SITE CLEARING

A. Remove trees, shrubs, roots, vegetation, loose surface rock, fences, and other obstructions on the line of the Work.

B. Carefully protect trees, fences, shrubs and other vegetation designated by the Engineer and save from injury during the construction operation.

3.02 TOPSOIL

A. If suitable for sodding and seeding, strip the topsoil from within the limits of excavation and from fill areas in advance of construction and stockpile in areas completely separated from subsoil and as designated by the Engineer.

B. Strip topsoil in such a manner as to prevent damage to the roots of trees designated to be saved.

3.03 EXCAVATING

A. Dig the trench to the alignment and depth required and only so far in advance of pipe laying as the Engineer will permit.

B. Minimum and maximum trench widths up to a point 300 mm above top of pipe, for single pipe -

1. Minimum

(A) 300 mm greater than the external diameter of pipe or 750 mm for earth excavation or 1 m for rock excavation whichever is greater, excluding an allowance for shoring.

2. Maximum

(A) Not more than 400 mm greater than the external diameter of pipe or 750 mm whichever is greater for pipe up to and including 850 mm dia., excluding an allowance for shoring.

C. The width of the trench at ground level is not to be less than the width at any depth in the trench. Fill overbreak and slides that have occurred during excavation with approved materials.

D. Where trench excavations are not kept within the design limits of the pipe, the Engineer may order sheathing and shoring, and/or a heavier class of pipe, and/or use of a higher class of bedding.

E. Grade and shape the pipe trench and the specified bedding to give uniform and even bearing for the length of the pipe. Dig bell holes at each joint. Make corrections in the grade with compacted granular material acceptable to the Engineer, or with fill concrete.

F. Where the subgrade in its natural state is inadequate to support the pipe, the Engineer will give instructions as to the proper procedure, and such additional Work as ordered will be paid for as described in the Form of Tender.

G. Remove the subgrade where it has been adversely changed by construction operations and is not adequate to support the pipe. Replace with crushed stone or other approved material as directed by the Engineer.

H. Trench in existing roadways in a manner to prevent overbreak. Saw cut pavement in clean straight lines prior to the start of excavation.

3.04 SHEATHING AND SHORING

A. Supply, install and remove temporary sheathing and shoring where directed by the Engineer and in accordance with applicable safety regulations.

B. Drive sheathing to a sufficient penetration to effectively cut off any seepage of water into the base of the excavation which could create an upward seepage of water or a 'quick' condition at the base of the excavation. Leave sheathing in place until the trench has been backfilled to a minimum depth of 600 mm above the pipe. If there is danger of cave-in completely backfill the trench before removing sheathing.

C. Take special care to ensure that voids left by the sheathing and shoring are refilled with approved material.

D. Withdraw sheathing and shoring as the trenches are being backfilled, except where the Contractor, at his own request and expense, is permitted to leave the same in place. Sheathing left in place on written order of the Engineer will be an addition to the Contract.

E. Cut off sheathing left in place at least 1 m below the surface of the ground.

3.05 DEWATERING

A. Always maintain the excavation free of water.

B. Do not use sanitary sewers for the discharge of water from the trenches.

3.06 BACKFILLING

A. Backfill trenches from the top of the pipe bedding to the underside of surface restoration with site selected excavated material. Use backfill material free of roots, organic material and stone larger than 250 mm. Place backfill material ir lifts not exceeding 150 mm. Compact to 95 percent Standard Proctor Density. Place backfill to 600 mm above top of pipe by hand.

B. If the Engineer decides that the site selected excavation material either wholly or partially is not suitable for backfill, then provide imported material of a type approved by the Engineer. Compact to 95 percent Standard Proctor Density.

PART 3 EXECUTION (Cont'd)
3.06 BACKFILLING (Cont'd)

C. Backfill from the top of bedding to the underside of restoration with Granular 'A' placed in lifts not exceeding 150 mm and compact to 95 percent Standard Proctor Density in trenches under Niagara Road 63.

3.07 COMPACTION TESTS

A. Where compaction of backfill is called for, the Engineer may order compaction tests by an independent testing company. Tests will be arranged for by the Engineer and paid for by the Owner.

1. Where tests show that the compaction does not meet the specified requirement, carry out further compaction in a manner directed by the Engineer, and pay for further testing to establish proof of the specified compaction.

2. For backfill compaction, tests will be made at every 0.5 max. depth, after each three 150 mm lifts have been placed.

3. Co-operate with the Engineer and Testing Company by scheduling the placing and compaction of backfill so that tests can be progressively taken.

3.08 DISPOSAL OF SURPLUS EXCAVATED MATERIAL

A. Remove surplus excavated material from the site.

3.09 RESTORATION

A. Roadways and Driveways excluding Niagara Road 63

1. Restore roadways and driveways as follows unless shown otherwise on the Drawings -

(A) Paved or surface treated roadways and driveways

(1) H.L. 3 38 mm

(2) H.L. 6 38 mm

(3) Granular 'A' 300 mm

(B) Gravel Roadways and Driveways

(1) Granular 'A' 300 mm

2. Carry out asphalt work in accordance with MTC Specification Form 310.

3. Carry out placing of Granular 'A' and 'B' in accordance with MTC Specification Form 314.

B. Niagara Road 63 (Canboro Road)

1. Temporary Restoration of Niagara Road 63 as follows:

(A) Supply, place and compact Granular 'A' in 150 mm maximum thick layers to 95 percent Standard Proctor Density the top 350 mm. Place 100 mm cold mix cold laid asphalt.

2. Final Restoration of Niagara Road 63 as follows:

(A) Remove top 50 mm of Granular 'A' material and 100 mm cold mix asphalt and place 100 mm of HL 6 and 50 mm of HL 3. Prior to placing of HL 6, saw cut along the limits of the disturbed asphalt or surface treated area in a straight line parallel to the centreline of trench.

3. Carry out asphalt work in accorance with MTC Specification Form 310.

4. Carry out placing of Granular 'A' and 'B' in accordance with MTC Specification Form 314.

5. Final restoration to be completed by December 15th, 1980.

6. No additional payment will be made for this temporary road restoration, maintenance, or for its removal prior to the placing of the final restoration.

PART 3 EXECUTION (Cont'd)
3.09 RESTORATION (Cont'd)

C. Preparation of Subgrade for Sodding

1. Verify the subgrade and if required make adjustments to allow for topsoil and seeding or sodding to finish level with adjacent surfaces.

2. Scarify the backfill and disturbed areas to a minimum depth of 75 mm to produce an even, loose textured surface, free of stones, roots, branches larger than 75 mm in dia., and live weeds.

3. Have the finished subgrade approved by the Engineer prior to placing the topsoil.

D. Preparation of Finish Grade

1. Spread the topsoil evenly over the approved subgrade to a minimum of 100 mm. Compact to 80-95 percent Standard Proctor Density.

2. Work the fertilizer into the top 25 mm of the topsoil by discing, raking or harrowing to provide a smooth, fine textured finish surface, and firm against footprints.

3. Base quantities of fertilizer on the following minimum rates -

(A) 10 - 10 - 10 at 11 kg/100 sq. m. or

0 - 20 - 10 at 6.5 kg/100 sq. m with

(B) Superphosphate at 13.5 kg/100 sq. m.

4. Lay sod within 48 hours of working the fertilizer into the topsoil.

E. Laying sod

1. Lay sod as soon as possible after delivery.

2. Lay sods together so that there are no open joints or pieces overlapping. Lay sod smooth and flush with existing grade.

3. Immediately after laying sod spread sufficient water to saturate the sod and the upper 100 mm of topsoil.

4. After sod and soil has dried sufficiently to prevent damage, roll the area with a roller providing 72 kPa pressure to ensure a good bond between sod and soil and to remove minor depressions and irregularities.

5. Water with sufficient amounts to ensure continued healthy and vigorous growth.

SECTION 02570 - WATERMAINS

PART I GENERAL

1.01 INTENT

A. This section covers watermain Work including -

1. Pipe
2. Fittings, specials and joints
3. Hydrants
4. Valves, valve boxes
5. Service connections
6. Line and grade
7. Bedding
8. Testing
9. Disinfecting

B. Related Work specified elsewhere is as follows -

1. Section 02550 - Site Clearing, Excavating, Backfilling and Restoration of Trenches

1.02 CERTIFICATES OF TESTING

A. Provide test certificates in accordance with the appropriate specification for the following materials -

1. Pipe
2. Fittings
3. Valves
4. Hydrants

1.03 AFFIDAVIT OF COMPLIANCE

A. Provide the Owner with an affidavit stating that the following material is in accordance with the appropriate specification. Provide this affidavit prior to the delivery of the material to the site.

1. Pipe
2. Fittings, specials and gaskets
3. Valves
4. Hydrants

1.04 DELIVERY, STORAGE AND HANDLING

A. Delivery

1. Replace materials found to be defective in manufacture or damaged in handling after delivery including the furnishing of material and labour required for the replacement of installed material found to be defective.

PART I GENERAL (Cont'd)
1.04 DELIVERY, STORAGE AND HANDLING (Cont'd)

B. Handling

1. Load and unload materials so as to avoid shock or damage.

2. Handle pipe and fittings so that the coating and lining will not be damaged. If, however, the coating or lining is damaged, then repair in a satisfactory manner.

C. Storage

1. Place materials in safe storage. Keep interiors of pipes, fittings, and other accessories clean. Store valves and hydrants so as to protect them from damage by freezing.

1.05 MEASUREMENT FOR PAYMENT

A. The Engineer will -

1. Measure watermains along the centreline of construction, straight-through bands, fittings, specials, valve and valve chambers.

2. Measure service connections in the horizontal plane along the centreline of the pipe from the centre of watermains to the street line.

3. Count complete hydrant sets.

4. Count complete valves and valve boxes.

5. Count complete connections to existing mains.

1.06 BASIS FOR PAYMENT

A. Conditions

1. Unless otherwise specified, include testing of materials, thrust blocks, anchor blocks, bedding, insulation, testing and disinfecting the pipes after installation and the requirements of Section 02550 Site Clearing, Excavating, Backfilling and Restoration of Trenches,

2. The Engineer will measure the Work when completed and the Contract price will be increased or decreased in accordance with the final measurement.

B. Items

1. Include in the unit price per lineal metre for watermains the complete supply and installation of the pipe and necessary fittings.

2. Include in the unit price for each hydrant the complete supply and installation of the pipe from the main, connection to the main, secondary valve and valve box, hydrant, crushed stone backfill and blocking of the hydrant as shown on the Drawings.

3. Include in the unit price for each valve and valve box the complete supply and installation of the valve and valve box as shown on the Drawings.

4. Include in the unit price per lineal metre of pipe, complete supply and installation of the service pipes as specified including connections to main and curb stops.

5. Include in the unit price for main stops the complete supply and installation of the main stop including connection to watermain and service pipe.

6. Include in the unit price for curb stops the complete supply and installation of curb stops including connections to service pipe.

7. Include in the unit price for curb boxes the complete supply and installation of box.

PART 2 PRODUCTS

2.01 GENERAL

A. Tender on the basis of the type of pipe specified in this section. Indicate the material in the Form of Tender.

2.02 MATERIALS

A. Ductile Iron Pipe

1. Pipe - AWWA C151 (ANSI A21.51)

2. Pipe Diameter and Class - 200 mm, Class 52

3. Supply pipe in standard lengths with mechanical or push-on joints - AWWA C111 (ANSI A21.11). Provide rubber gaskets for mechanical joints with lead tips. Provide copper straps across push-on joints to provide electrical continuity.

4. Pipe - cement-lined - AWWA C104 (ANSI A21.4).

B. Asbestos Cement Pipe

1. Pipe - AWWA C400

2. Pipe diameter and class - 200 mm, Class 150

3. Supply pipe in standard lengths. Supply short lengths machined as required to install fittings and valves in the correct locations.

4. Joints - 'Ring-Tite', 'Fluid-Tite', or approved equal.

5. Rubber rings used to seal the joints of the pipe - ASTM D1869

6. The uncombined calcium hydroxide content - not to exceed 3.0 percent.

C. Polyvinyl Chloride Pipe

1. Pipe AWWA C900

2. Pipe diameter and class - 200 mm, Class 150

3. Joints - 'RING-TITE' or approved equal.

D. Cast Iron Fittings and Specials

1. Cast Iron Fittings - AWWA C110 (ANSI A21.10).

2. Fittings - cement lined - AWWA C104(ANSI A21.10).

3. Pressure Rating of Fittings - 0.862 MPa

4. Fittings - 'Ring-Tite' or 'Fluid-Tite' ends

5. Rubber gaskets for fittings - AWWA C111 (ANSI A21.11)

E. Gate Valves

1. Gate Valves - AWWA C500

2. Gate Valves - non-rising spindle, double disc parallel seat, mechanical joint ends. Valves - open counter clockwise unless specified otherwise and be equipped with 'O' rings.

F. Valve Boxes

1. Valve Boxes - See E-80436-L5M Emco or approved equal.

2. Depth of trench from top of pipe to finish grade - 1.7 m

G. Hydrants

1. Hydrants - AWWA C502

2. Hydrants - Crane "McAvity M-67" or Darling Century

3. Bury Depth - 6'0"

4. Hydrants - slide gate, shutt off, two piece barrel with flange at ground line, 6 in. main valve, two 2 1/2 in. dia. hose nozzles - CSA B89.2 (Ontario thread), 6 in. inlet connection with mechanical joints, 1 in. square operating and cap nut. Paint yellow and open counter clockwise.

H. Corporation Service Fittings

1. Corporation Main Stops, Curb Stops, and Curb Boxes - AWWA C800.

Corporation Main Stops -

(A) 25 mm, 32 mm, 38 mm and 50 mm water service -

(1) Emco 56-73850-1, Canadian Brass CC102 or approved equal

2. Curb Stops

(A) 25 mm, 32 mm, 38 mm and 50 mm -

(1) Ford B44 Series, Mueller Mark II Oriseal H10283 with 110 Compression adapters, Mueller H15209, or approved equal

3. Curb Boxes - minimum and maximum extension of the curb box is 1.5 m to 1.8 m

4. Copper Pipe - seamless soft copper water tube - ASTM B-88, type 'K'.

5. Service Boxes - to suit valve or curb stop, with No. 304 stainless steel road and 6 mm x 63 mm cotter pins.

PART 3 EXECUTION

3.01 LINE AND GRADE

A. Supply, erect and maintain batter boards and site rails to ensure accurate line and grade of pipes. Always have at least 3 batter boards in use, placed not more than 15 m apart. Obtain Engineer's approval for alternative methods.

B. On straight lines, lateral deviation in excess of 150 mm will not be tolerated. On straight grades, grade deviation in excess of 80 mm will not be tolerated.

C. For vertical or horizontal bends do not deviate the pipe lines more than 300 mm from line or more than 150 mm from grade as the case may be.

3.02 FROZEN GROUND

A. Do not place Work on frozen ground. Should the bottom of the trench become frozen, remove and replace the frozen material with bedding material compacted to 95 percent Standard Proctor Density.

3.03 BEDDING

A. Watermain Bedding - as specified on E-80416-L7M

B. Granular Material - 'A'. conform to Section 02550

C. Compact granular bedding material to 95 percent Standard Proctor Density.

D. Compact the material around the pipe with hand tampers properly shaped to ensure full compaction below the haunches. Do not use mechanical tampers over the top of the pipe where cover is less 300 mm.

E. Do not use crushed slag produced from iron blas furnace slag for cast iron pipe fittings or valves.

3.04 CONNECTION TO EXISTING WATERMAIN ON NIAGARA ROAD 63

A. Notify the Engineer 10 days in advance of connecting to existing watermain so that the interruption to water service to local residents can be publicized.

B. Obtain permission from the Engineer and the authority responsible for the existing mains prior to making connections to an existing main. Valves on the existing system will be operated only by the watermain authority.

C. Obtain necessary permit from Regional Niagara prior to commencing construction on Niagara Road 63.

D. Connect new main to existing main as shown on the Drawings.

E. Complete connection within one working day.

F. Do not interrupt water service for longer than four hours.

G. Refer to Clause 3.09 B. for temporary and final restoration.

PART 3 EXECUTION (Cont'd)

3.05 PIPE LAYING

A. Lay, joint and test pipes and accessories in accordance with the manufacturers instructions and in the manner hereinafter specified, in the presence of and subject to the Engineer's approval.

B. Use temporary water tight bulkheads to prevent the flow of trench water, storm water, silt and sand within the pipe.

C. Carefully lower pipe into the trench. Beford lowering and while suspended, inspect the pipe for defects. Remove foreign material from the inside of the pipe.

D. Support bends, tees and dead ends by 20 MPa concrete thrust blocks to undisturbed ground as detailed on E-80436-L7M. Arrange thrust blocks to transfer the full thrust of the deflection at test pressure without exceeding the gearing capacity of the ground.

E. Construct anchor blocks of 20 MPa concrete a shown on the Drawings.

3.06 VALVE AND VALVE BOXES

A. Install valves and valve boxes plumb, centered over the operating nut and supported in place during backfilling with the cover flush with the finished grade.

B. Do not backfill until valves or valve boxes have been inspected by the Engineer, or the inspector having jurisdiction.

3.07 HYDRANTS

A. Install hydrants plumb with the nozzles parallel with the watermains, and with the pumper nozzles (if any) facing the curb. Ensure that no portion of the hydrant or nozzle cap is within 150 mm of the back of the curb or the edge of the sidewalk.

B. Set hydrants to the established grade with nozzles at least 150 mm above the ground.

C. Do not backfil until hydrants have been inspected by the Engineer.

3.08 WATER SERVICE CONNECTION

A. Use standard waterworks equipment for installing corporation main stops. Do not cross threads of corporation main stops during insertion and apply a maximum torsion of 360 N. Leave corporation main stops in the open position. On thinner wall pipe use full circle saddle. Use a cutting and tapping tool of a type recommended by the pipe manufacturers and insert the stop. Take care that no undue stress is applied to the pipe when tapping the main and inserting the main stop, that may result in a fracture. Tap for service connection while the main is under pressure.

B. Install service boxes and curb stops at the street line with the box in the centre of the sliding adjustment and the top set to the finished grade. Set curb stop on blocking.

C. Install service connections in a trench separate from the sewer connection and clear of other utilities.

D. Lay service connections from the watermain to the curb stop in an evenly graded trench with Class 'B' bedding as detailed in standard Drawing E-80436-L6M. Do not splice service connections.

E. Install a 50 mm x 100 mm timber marker beside each service box. Drive marker 1.0 m into the ground and let it project 1.0 m above the ground with the top 300 mm painted orange.

3.09 TESTING

A. Clean out valved Section of pipe or part thereof by flushing at scouring velocities prior to testing. Operate valves and hydrants during flushing under the supervision of the operating authority.

B. Subject the section of pipe under test to a pressure of 1 MPa. By means of pumping out of a suitable container of known volume maintain the pressure at 1 MPa for one hour and record the amount of water used in this period.

PART 3 EXECUTION (Cont'd)
3.09 TESTING (Cont'd)

C. Determine the allowable leakage from A.W.W.A. C 603, Table 1. The data for Table 1 are based on 150 psi and represent a leakage of approximately 30 U.S. gpd per mile per inch of pipe diameter for pipe in 13 ft. lengths.

1. For metric convert to litres/hr.

3.11 STERILIZING WATERMAINS

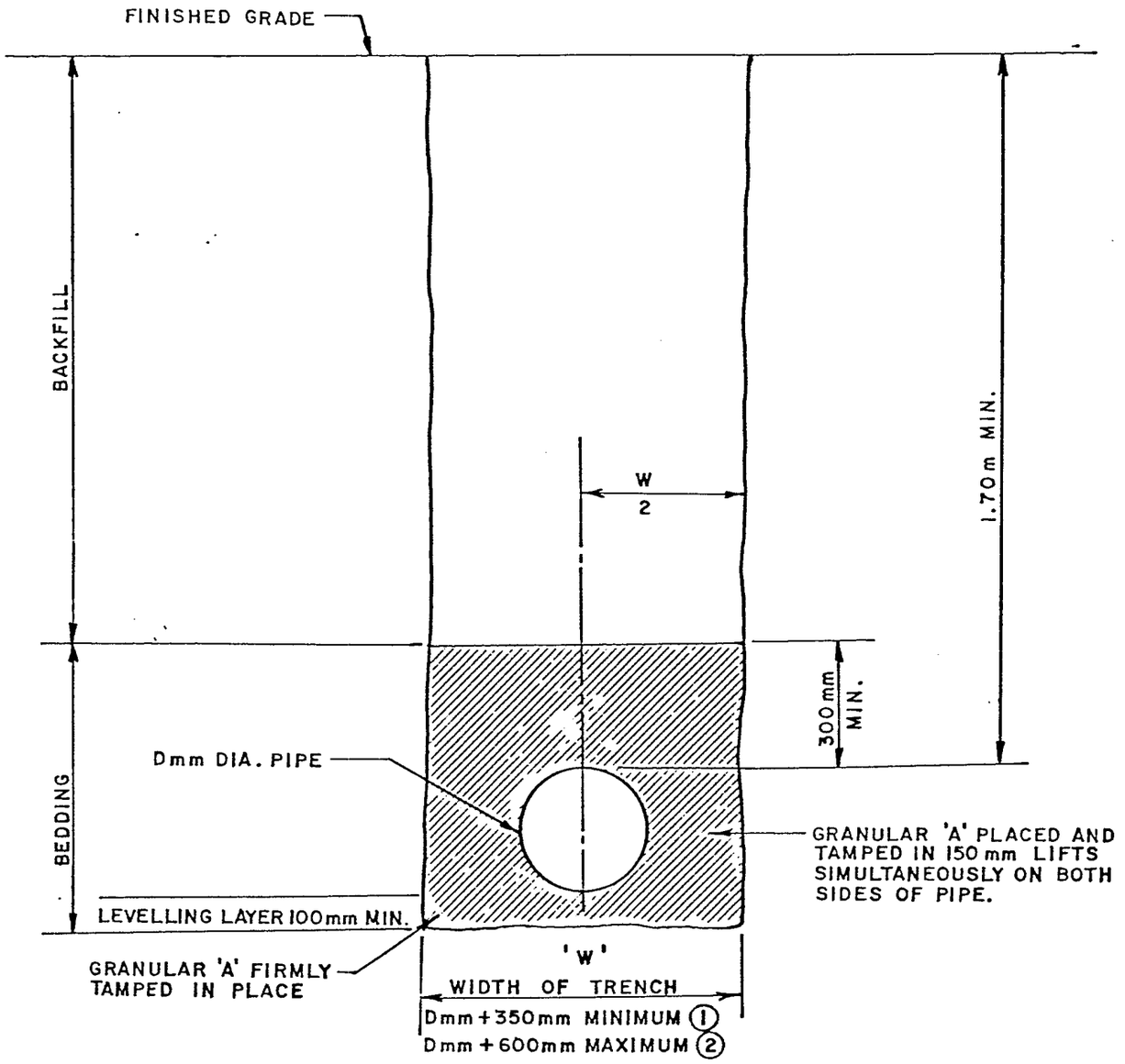
A. Flush the main prior to chlorination with sufficient volumes to produce scouring velocities in the mains. Operate all valves and hydrants during this flushing under the supervision of the operating authority.

B. Dissolve chlorinous compounds such as 'pittchlor' or 'hth' in water to produce a solution.

C. Introduce the solution at one end of the system being sterilized until water taken off at the remote end(s) tests at a level of 50 mg/litre.

D. Allow the chlorinous solution to remain in the mains for 24 hr. at which point flush the system clean of the chemical.

Give the Engineer at least 2 days notice of the date when disinfection of the system is to start so that the arrangements can be made for others to take samples and test the chlorine residual.



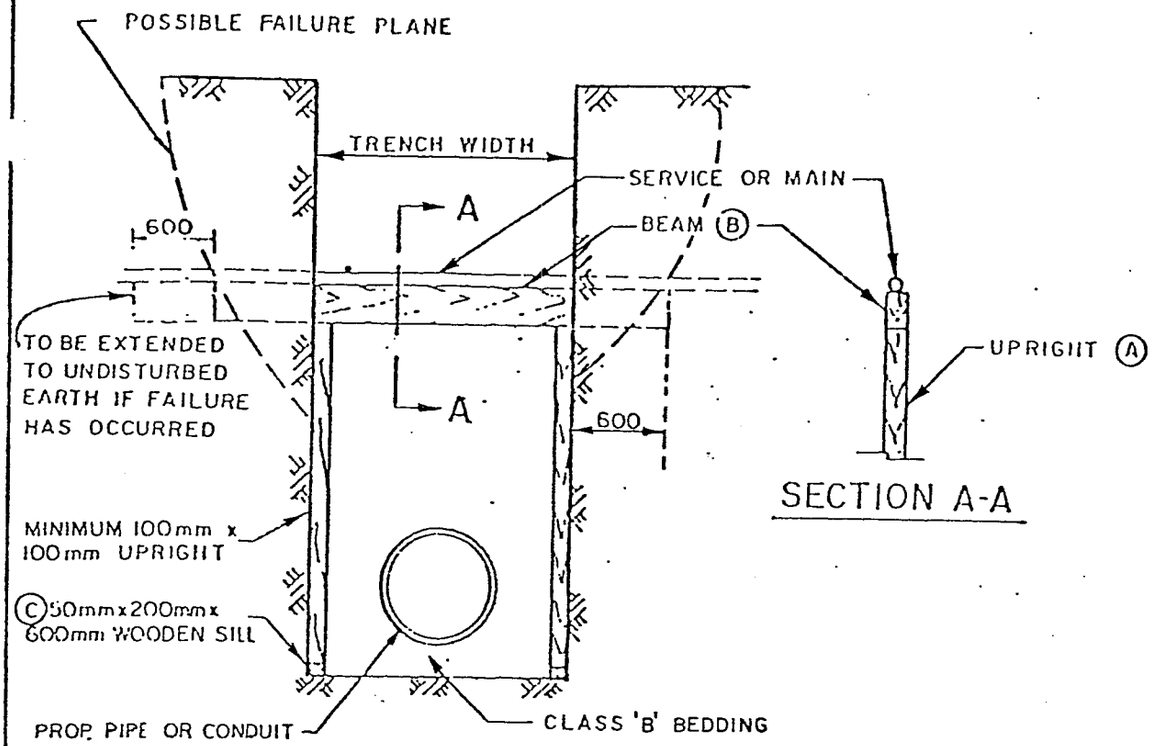
NOTES:

(1) Granular material shall meet contract granular 'A' specifications (fine traffic bound or screenings) throughout except where water is encountered 19 mm clear crushed stone shall be substituted.

(2) Where the bottom of the trench is found to be unstable or otherwise unacceptable it shall be excavated to the width and depth ordered by the Inspector and refilled and compacted to the bottom of the pipe with 50 mm Crusher run Crushed.

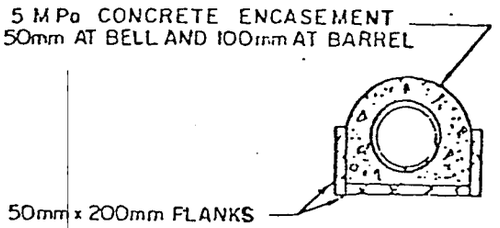
(3) In no case shall frozen material be used for bedding or backfilling.

Revisions		
	BEDDING AND BACKFILL DETAILS FOR WATERMAIN	Proctor & Redfern Limited Consulting Engineers and Planners St. Catharines
		Drawing No. E-80436-LIM Rev. 0



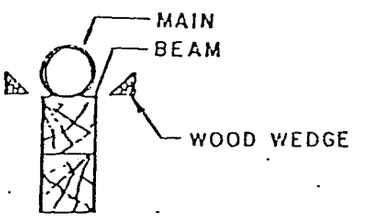
SECTION A-A

CROSS SECTION



DRAIN

CONC. ENCASED WHERE REQUIRED



SERVICES & MAINS

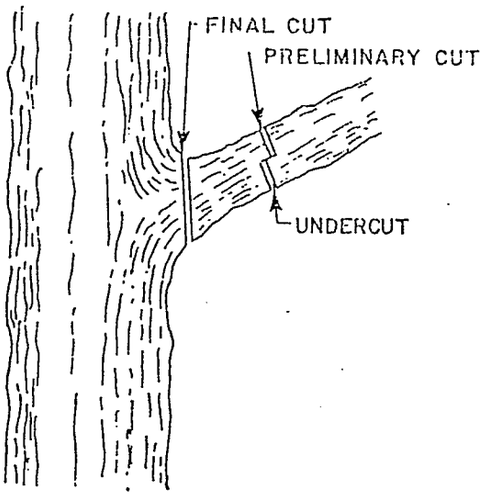
SIZE OF PIPE SUPPORTED	(A) UPRIGHT	(B) BEAM	(C) SILL
38, 50 & 75	100 x 100	1/150 x 150	50 x 200 x 600
100 & 125	150 x 150	2/150 x 150	50 x 200 x 600
150 & 200	200 x 200	2/200 x 200	50 x 200 x 600
250 & 300	300 x 300	2/300 x 300	50 x 200 x 600

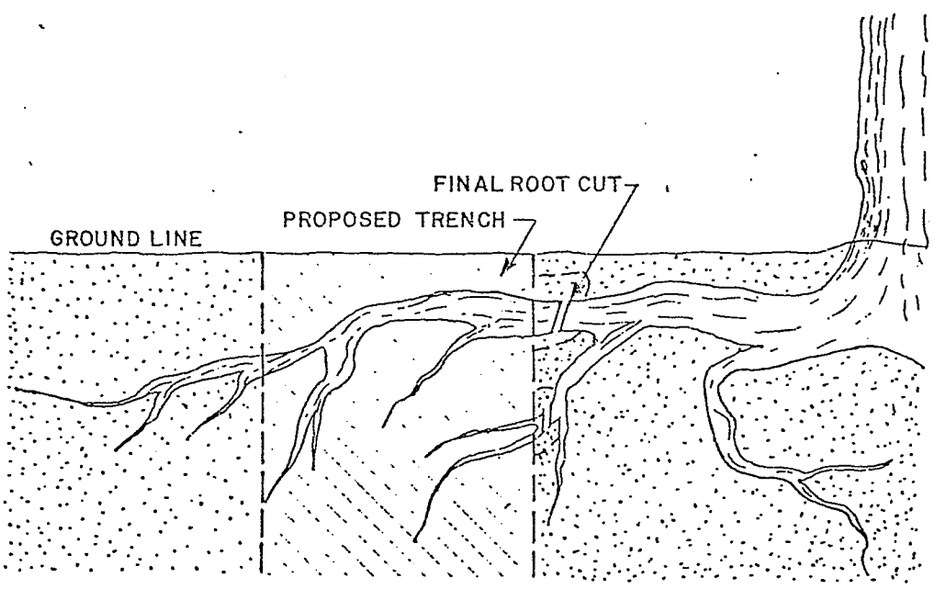
NOTES:

1. WHERE THE WIDTH OF TRENCH EXCEEDS 2 m METHOD OF CONSTRUCTION IS TO BE SPECIFIED BY THE SUPERVISING ENGINEER.
2. THE CONTRACTOR IS REQUIRED TO MAINTAIN ALL SERVICES & MAINS ENCOUNTERED DURING CONSTRUCTION AND SUPPORT THEM AFTER CONSTRUCTION OF THE PIPE.

DIMENSIONS IN mm EXCEPT AS NOTED

REVISIONS			
APPROVED BY	TYPICAL DETAILS FOR SUPPORTING UTILITIES.	Proctor & Redfern Limited Consulting Engineers and Planners Toronto St. Catharines	
		DRAWING NO. E - 80436 - L 2M.	REV. 0





NOTES:

1. ALL FINAL CUTS SHALL BE MADE FLUSH WITH THE REMAINING LIMB OR TRUNK.
2. ALL CUTS SHALL BE PAINTED WITH A SUITABLE WOUND DRESSING.
3. FINAL CUTS ON LIMBS WHICH ARE TOO LARGE TO HOLD WITH THE HAND SHALL BE PRECEDED BY PRELIMINARY CUT FROM 300 mm TO 600 mm BEYOND THE FINAL CUT SUCH PRELIMINARY CUTS SHALL INCLUDE AN UNDERCUT TO PREVENT STRIPPING OF THE BARK.
4. ALL ROOTS 40 mm AND OVER SHOULD HAVE ANY SHATTERED ENDS CUT BACK TO SOUND WOOD AND TREE WOUND DRESSING APPLIED TO THE WOUND.

REMOVAL AND TREATMENT OF TREE BRANCHES AND ROOTS

Proctor & Redfern Limited
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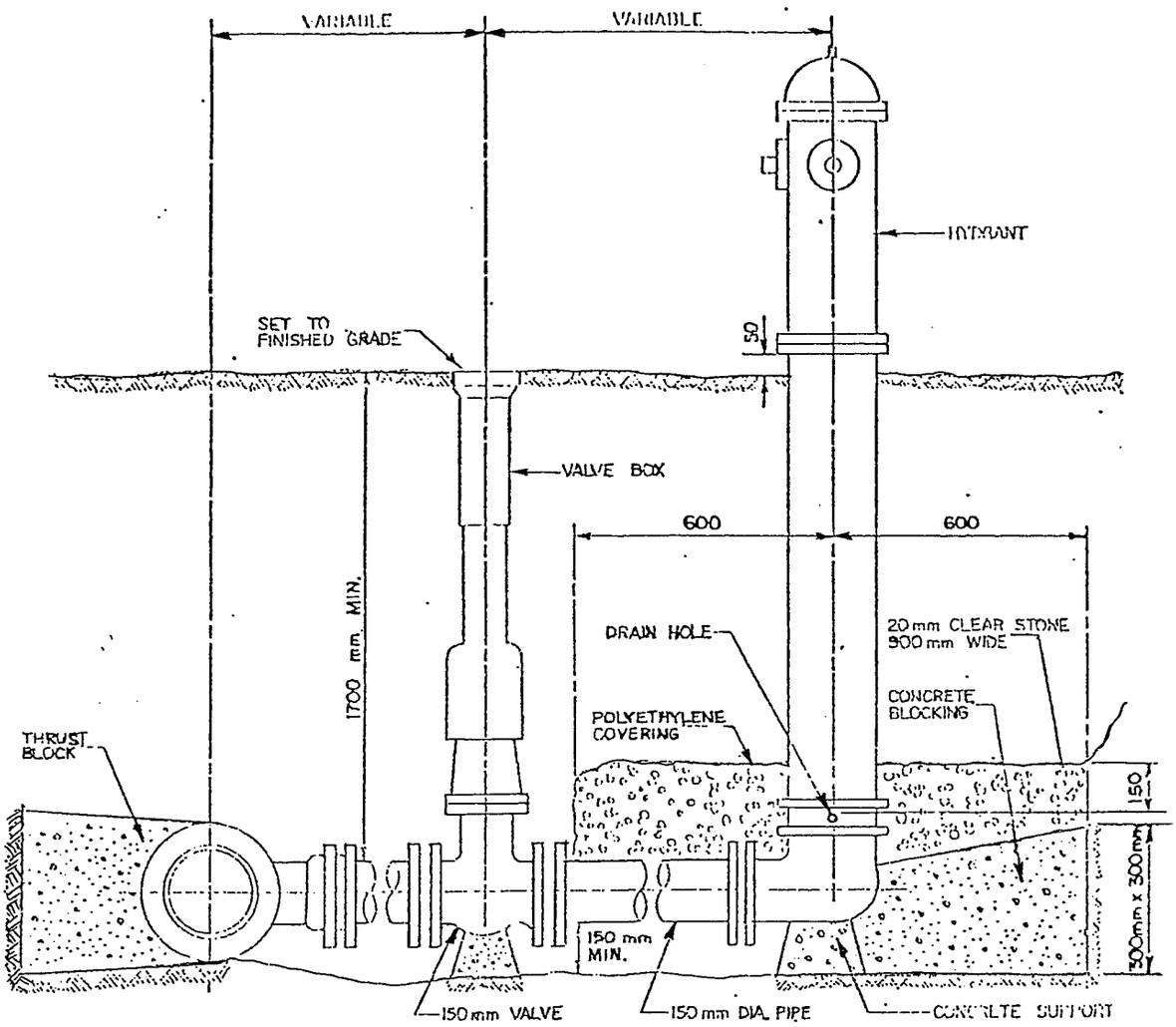
DRAWING NO. E-80436-L3M



NOTES

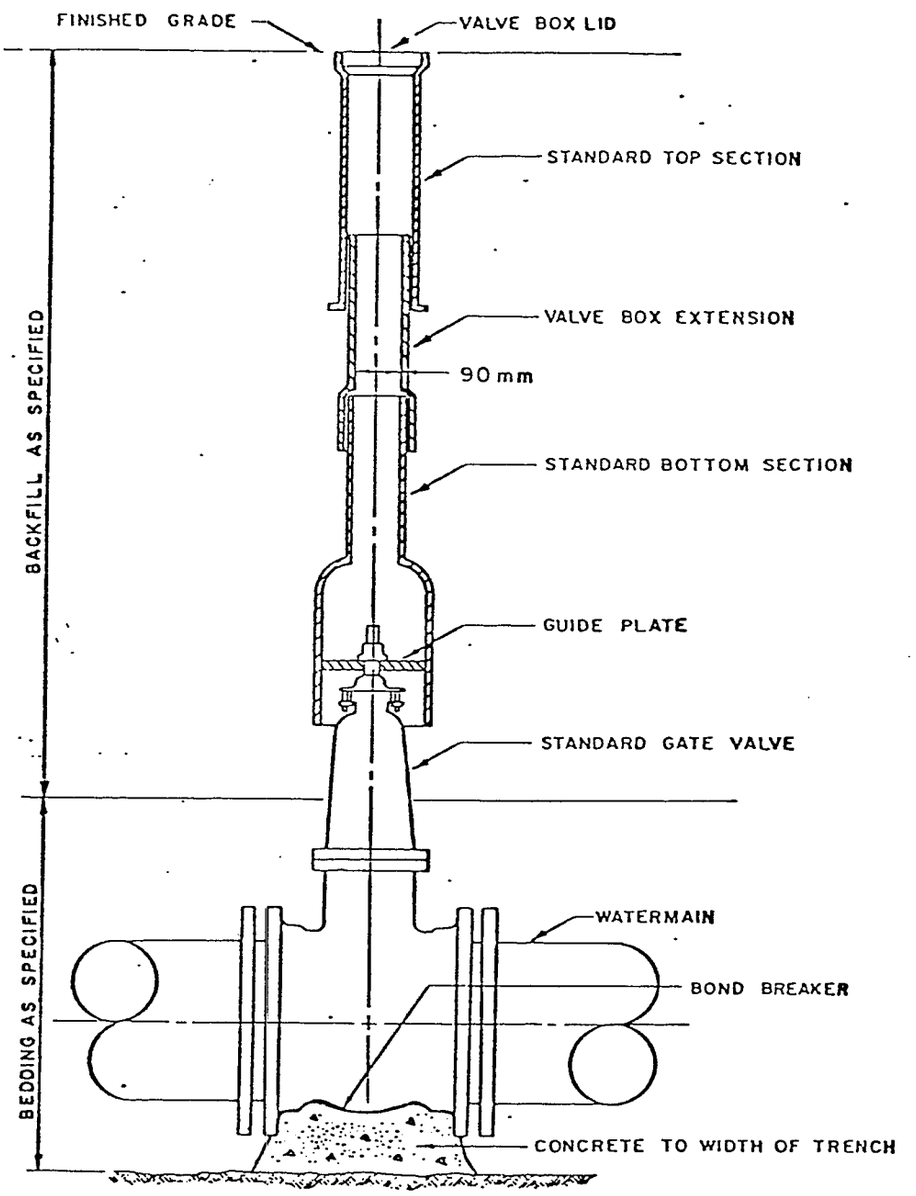
1. ALL CONCRETE TO BE 20 MPa.
2. ALL CONCRETE BLOCKING TO BE POURED AGAINST UNDISTURBED TRENCH WALL.
3. POLYETHYLENE BOND BREAKER TO BE USED BETWEEN CONCRETE AND FITTINGS.
4. STEEL TIE ROD TO BE USED WHEN SPECIFIED BY ENGINEER. CORROSION PROTECTION SHALL BE BRUSH APPLIED QUALITY MASTIC COATING EQUAL IN PERFORMANCE TO TC. MASTIC AS MANUFACTURED BY THE TAPECOAT CO. OF CANADA LTD.

HYDRANT INSTALLATION

N.T.S.

E-80436-L4M

SOURCE: M.E.A. MODEL No. 405



NOTES:

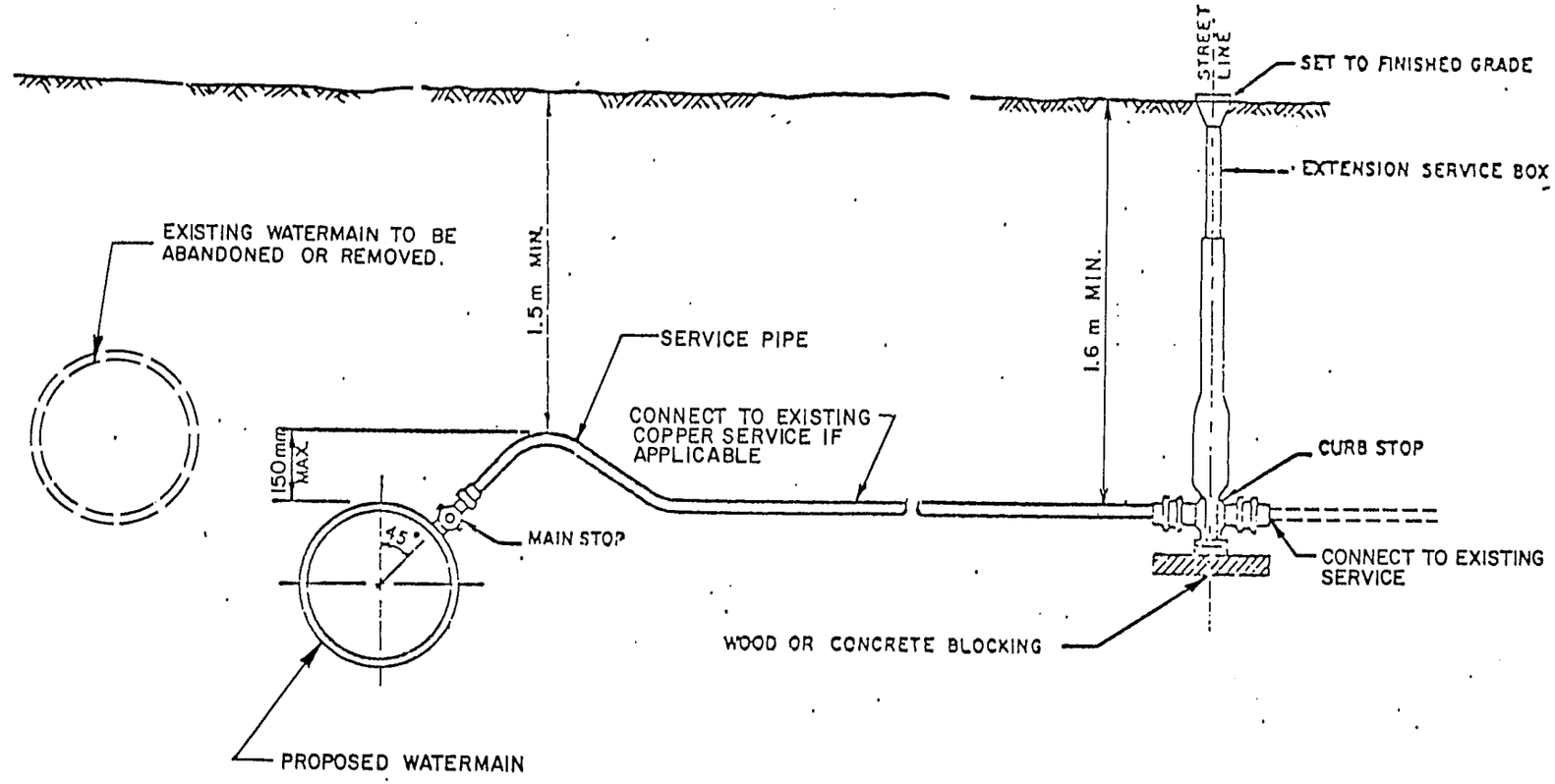
(1) VALVE BOX TO BE ADEQUATELY BRACED WHILE BACKFILLING AND MUST REMAIN PLUMB.
(2) VALVE BOX EXTENSION TO BE USED ONLY IF REQUIRED.
(3) BOND BREAKER TO BE USED BETWEEN CONCRETE AND VALVE.
(4) ALL CONCRETE TO BE 20 MPa AT 28 DAYS.

VALVE BOX INSTALLATION
100mm D TO 300mm D WATERMAINS

Proctor & Redfern Limited
Consulting Engineers and Planners
Toronto

Drawn By / Ckd. By		Drawing No. E-80436-L5M	Rev. 0

WATER SERVICE



NOTES:

1.) CONNECT MAIN STOP TO WATERMAIN AS PER MANUFACTURER'S RECOMMENDATIONS.

2.) CONNECT ALL EXISTING 19mm D AND LARGER COPPER SERVICES TO THE LOWERED OR RELOCATED WATERMAIN.

3.) WHERE EXISTING WATER SERVICE IS LESS THAN 19 mm D COPPER, INSTALL COMPLETE SERVICE AND CONNECT AT PROPERTY LINE.

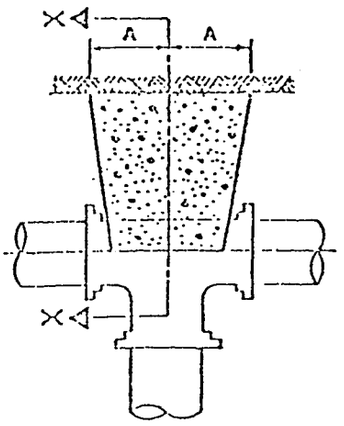
Proctor & Redfern Limited
Consulting Engineers and Planners
Toronto St. Catharines

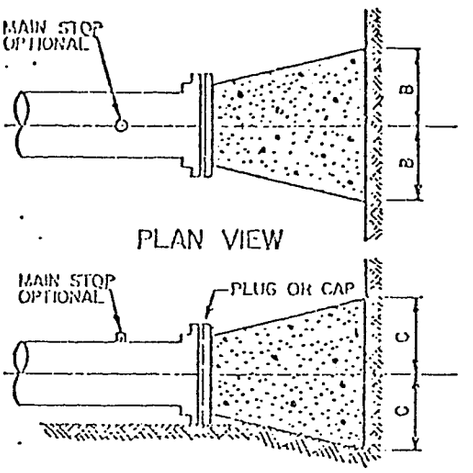
Drawn By
Chkd. By

Drawing No. E-80436-L6M

Date: May 1980

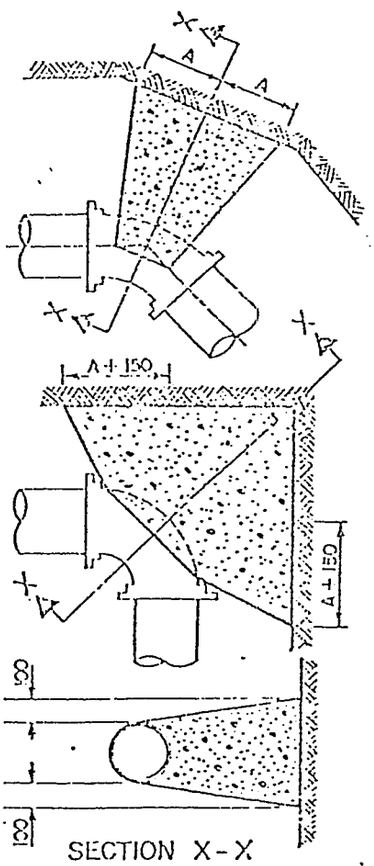
Rev. 1.





PLAN VIEW

ELEVATION VIEW



SECTION X-X

MINIMUM DIMENSIONS			
SIZE OF PIPE	A	B	C
100	150	150	150
150	230	230	200
200	250	300	200
250	300	380	250
300	380	450	300
350	450	550	300
400	500	600	450

NOTES:

1. ALL CONCRETE TO BE 20 MPa.
2. ALL CONCRETE BLOCKING TO BE POURED AGAINST UNDISTURBED GROUND.
3. CLEARANCE OF 50mm TO BE MAINTAINED FROM FACE OF BELL TO CONCRETE.
4. POLYETHYLENE BOND BREAKER TO BE USED BETWEEN CONCRETE AND FITTINGS.
5. THIS BLOCKING DESIGN APPLIES ONLY WHERE 1030kPa PRESSURE IS NOT EXCEEDED.

ALL DIMENSIONS ARE EXPRESSED IN mm UNLESS OTHERWISE NOTED.

	APPROVED	SCALE: N.T.S.
		REVISION
CONCRETE THRUST BLOCKS TEES, PLUGS & HORIZONTAL BENDS 400 mm DIAMETER WATERMAINS & SMALLER		DATE:
		DRAWING NO. E-80436-L7M