APPENDIX G to SECTION 08:
SPECIAL PROVISIONS - SUPPLEMENTARY SPECIAL PROVISIONS

1. PROJECT SCOPE

This contract encompasses the provision of all labour, materials and equipment necessary for the following:

Parking Lot Reconstruction, Niagara College

The work involves the installation of a storm sewer, watermain, sanitary sewer, parking lot excavation, placement of granular material, base asphalt, top asphalt, concrete curbs, concrete sidewalk, illumination and restoration of all appurtenances.

The above description is general only and shall not be construed as limiting the scope of the contract.

2. CONTRACT EXECUTION

All tenderers are reminded of the provisions and requirements for Contract Execution and Failure to Execute as detailed in the Niagara Peninsula Standard Contract Documents - Special Provisions General, Items G1 and G2 with the following exception:

Niagara Peninsula Standard Contract Documents - Special Provisions General, Item G1

In G1b) the sentence “The insurance coverage must meet the requirements of General Condition GC6.0, “Insurance, Protection and Damage” with the following addition:” is deleted and replaced with “The insurance coverage must meet the requirements of Niagara College Insurance Requirements found in the Instruction to Bidders.”

3. OCCUPATIONAL HEALTH AND SAFETY

The contractor is reminded that the terms of the contract are to be executed in strict compliance with the requirements of the ***Occupational Health and Safety Act, R.S.O. 1990***, latest edition. Attention is drawn to the General Conditions of Contract, Section GC 7.01.06, and GC 7.01.07. Ontario Regulation 213/91 (Construction Projects) and the following regulations under the Act may also affect execution of the terms of the contract:

- Confined Spaces (Reg 632/05)
- Control of Exposure to Biological or Chemical Agents (Reg 833)
- Critical Injury - Defined (Reg 834)
- Designated Substance - Asbestos on Construction Projects (Reg 278/05)
- Designated Substance - Vinyl Chloride (Reg 846)
- Roll-Over Protective Structures (Reg 856)
- Workplace Hazardous Materials Information System - WHMIS (Reg 860)

- First Aid Requirements (Reg 1101)
- In accordance with the Provisions of Section 9 of the Act, if:
- The Project is over 3 months in duration, the contractor is required to undertake monthly site inspections of the workplace.
- The College will require copies of all monthly site inspection forms.
- The Contractor is required to maintain a Joint Health and Safety Committee, the College will require copies of the agenda and minutes of any Committee meeting where discussions will be related to the College work site.

The College will also require copies of any Incident or Accident Reports related to the Project.

In accordance with the General Conditions of Contract, Section GC 7.01.08, the Contractor is hereby requested to submit a copy of its Health and Safety Policy and Program to the Contract Administrator prior to the Pre-Construction Review Meeting (see Section 4).

All procedures in the "Safe Work Procedures for Excavating in the Vicinity of Underground Electrical Plant" guide book must be adhered to. Any associated costs are deemed to be included in the tender items.

4. SAFE DRINKING WATER ACT

The Safe Drinking Water Act, 2002 (SDWA) requires Owners and Operating Authorities of drinking water systems to have an accredited Operating Authority. In order to become accredited, an Operating Authority must establish and maintain a Drinking Water Quality Management System (DWQMS). Bidders shall make themselves aware of the SDWA and DWQMS in place. If requested by owner of the drinking water system, bidders shall participate in relevant awareness/information sessions either before or after closing of the tenders. The successful bidder and its sub-contractors working on a drinking water system shall comply with all applicable regulations under the SDWA and also meet all the requirements of the DWQMS.

5. PRE-CONSTRUCTION REVIEW MEETING

Prior to the start of construction, the College and the successful contractor will coordinate and attend a pre-construction review meeting. In order to allow for a relevant review and discussion, the contractor is required to have all submittals necessary, as per the contract requirements, delivered to the Contract Administrator two (2) working days prior to the pre-construction meeting, including but not limited to the following:

- All documentation required for contract execution, if not already submitted, as per Special Provisions - General Item G1 of the Niagara Peninsula Standard Contract Documents including the necessary bonding, requested Certificate of Insurance and Workplace Safety and Insurance Board

certification of good standing

- A copy of the Ministry of Labour Notification as per Special Provisions - General Item G6
- A listing of all products controlled under WHMIS expected to be used on the project and related Material Safety Data Sheets as per Special Provisions - General Item G7
- A detailed construction schedule for construction on the project for review and approval by the College. The schedule shall be in the form of a bar chart showing the sequencing of intended construction works indicating proposed start and finish dates and duration in working days of the broken down tasks or activities. The construction schedule should identify the critical path and will need to be updated by the Contractor for any subsequent site progress meetings. Once approved by the Contract Administrator, the College will provide the contractor with the required notice to commence construction based upon the approved start date as per the requirements in the Special Provisions - General Item G3. The contractor is to note the requirements of the noted provision regarding the charging of working days. Following issuance of the notice to commence construction, any revisions to the construction schedule must be made in the form of a written request by the contractor, to be reviewed and approved by the Contract Administrator.
- A list of proposed recycling facilities and disposal sites, including written authorizations as required, to be utilized on this contract
- A copy of the proposed Traffic Control and Management Plan, in accordance with all the provisions of Contract Item A8, for review by the College.
- A listing of the Contractor's proposed supervisory personnel for this project, including contact information.
- A listing of all the Contractor's staff that are planned to take part in the project, complete with a list of training received and copies of all their applicable certificates and **labour rates validated by the firm's accountant**.
- A list of the proposed sub-contractors and material suppliers intended to be utilized on this contract, for review by the College.
- A listing of all equipment proposed to be used on this project, with rental rates, where applicable.
- Written notification if the contractor intends to use recycled concrete or asphalt in place of Granular "A" on part or all of the project. Included with the notification will be the location of the proposed recycled material stockpile(s). Reference is to be made to Supplementary Special Provisions Item B3 regarding QA/QC and measurement for payment provisions.
- A copy of the proposed chlorine residual and bacteriological sampling plan, if applicable.
- A copy of the Contractor's Health and Safety Policy and Program.
- Any other necessary submittals required by provisions elsewhere in this contract that are needed for review by the College such as shop drawings or sampling and testing plans.

Please note that the information submission requirements noted above will be

strictly enforced.

The College, at its sole discretion, may opt not to proceed with the pre-construction review meeting until such time as the complete list of applicable submittals, as noted above, have been satisfactorily submitted to the Contract Administrator for review. Please also note that any proposed changes, revisions, additions or deletions to the information, lists, plans and schedules noted above must be submitted, in advance and in writing, to the Contract Administrator for review and approval.

6. EXISTING CONDITIONS

6.1 Access

Vehicular and pedestrian access must be maintained at all times. Co-ordination and co-operation from the contractor will be required to ensure minimum disruption during all phases of the construction. In the case that there is closure, 24 hours notice shall be given to the College.

6.2 Damages

Any unreasonable damage, as determined by the College, to sodded areas, etc., shall be repaired or replaced immediately by the contractor at their expense.

6.3 Drainage

The contractor shall schedule their construction operations in such a manner that a storm drainage outlet will always be available. This is to ensure that the exposed sub-grade or granular base will not be subjected to flooding and ponding problems. The unit price bid under the appropriate items shall allow for this requirement and no extra payment shall be made for the excavation and replacement of soft, wet areas caused by inadequate drainage.

6.4 Tree Protection

The unit price bid shall make due allowance to include root and tree limb protection to existing trees. This work will consist of cutting all tree roots/limbs of any size to sound wood by lopping shears or sawn cut. Should backfilling not take place immediately, the tree root system shall be covered to protect against root system dying out immediately.

6.5 Utilities

The contractor is advised that existing utilities are in very close proximity to the proposed construction. Extra care is required by the contractor to not disturb or undermine these utilities. Any associated cost for this work is deemed to be

included in the tender items.

Existing utility locations and depths of utilities, whether indicated on the drawings or not, shall be confirmed by the contractor prior to construction.

Preservation of existing utilities shall be as per OPSS 491. For utilities greater than 300mm diameter the contractor shall submit shop drawings, stamped by a professional engineer licensed to practice in Ontario, to the Contract Administrator detailing the temporary and permanent support. The contractor shall also advise the Utility owner when he will be working in the vicinity of their plant. No special payment will be made for this item. The cost of utility supports shall be included in the unit price bid for sewers and watermain, etc.

7. OPERATIONS

The Contractor shall be responsible to obtain all required inspections and permits before commencing construction operations, including any associated application fees.

7.1 Excavation and Trenching

Under this contract, the contractor shall solely be responsible for all costs of supplying, installing, maintaining and removing whatever dewatering equipment, sheathing, shoring and other materials and methods that may be required to cope with the ground conditions in order to complete the work. The contractor shall be responsible for the reinstatement of the area disturbed by their operations to a condition equal to or better than the original condition. The unit prices bid under the appropriate items **for restoration** shall be deemed to have made due allowance for this contingency.

7.2 Disposal Site for Excavated Materials and Recycled Concrete and Asphalt Rubble Material

The contractor will provide the Contract Administrator with written authorization for use of any private dump site, including a brief description of the terms of authorization.

The contractor must submit copies of all approvals for the disposal site location(s) from all government agencies

The unit or lump sum prices bid for the applicable contract items shall be deemed to have made full allowance for these requirements.

7.3 Trench Backfill and Compaction

Trench backfill under the travelled portion of the road, shoulders, sidewalks and

driveways shall be Granular 'A' compacted to 100% Standard Proctor Density. Select native material will be allowed for all other areas and shall be compacted to 95% Standard Proctor Density. Backfill around all maintenance holes and catchbasins shall be Granular 'A' compacted in 300mm layers to 100% Standard Proctor Density.

The required compaction shall be carried out using the type of equipment suited to the material to be compacted, the degree of compaction required and the space available. Jetting will not be accepted as a suitable means of compacting trench backfill material.

Trenching, backfilling and compacting shall also be in accordance with OPSS 401.

Tenderers shall note that payment for all granular backfill materials shall be by the tonne. To control granular costs, supervisory staff will be strictly controlling the vertical trench requirement.

No roadway granular is to be placed until the subgrade elevation has been checked. Payment for all material quantities shall be determined by net weight as recorded by a Government certified weigh scale. The supplier will be responsible for supplying suitable scales for all materials to be weighed. Triplicate numbered weigh bills shall be provided by the representative for each load of material as soon as delivery has been accepted. Tenderers shall note that weigh bills for granular materials will only be accepted for payment when delivery is made in the presence of a College inspector. Tenderers are advised to familiarize themselves with the inspector's normal work hours.

All weigh tickets pertaining to all materials paid for by weight must show either "Tare and Net" or "Gross and Net" weights, if printimatic tickets are used. If printimatic tickets are not used, then the "Gross", "Net" and "Tare" must be given, otherwise the tickets will not be considered for payment.

The onus shall be on the **contractor** to ensure that the Contract Administrator's representative is furnished with all delivery slips **on a daily basis, since** these will form the method of measurement. **No payment** will be made for delivery slips not signed by the Contract Administrator's representative.

The Contract Administrator shall have the right to verify the weight of any load of material. If the actual weights are less than that indicated on the delivery tickets, the total weight delivered on that day will be reduced by a percentage equal to the percentage deficiency in loads checked, and no payment will be made for the extra haul described above.

8. OPERATIONAL CONSTRAINTS

8.1 Safety

Niagara College functions as a post-secondary school 24 hours a day, 7 days a week, all year. Vehicles and pedestrians (students) may be expected at all times at every location. Each phase of the work must be separated from pedestrians and vehicles by construction fencing where possible. The only exceptions are the agri-business yard and the new entrance road. The construction fencing must be closed and the site made safe before leaving each night. The construction fencing item will be full compensation for these requirements.

8.2 Parking

Niagara College will be open and operating as a post-secondary school during construction. 800 parking spaces must be maintained at all times on the Niagara–On-The-Lake campus. The Contractor must maintain a minimum of 358 spaces (800 - 320 Taylor Road parking lot - 12 Winery Parking Lot -110 Leased Parking Area at the adjacent Niagara Corporate Business Centre) in the construction area. Temporary parking may be on a granular surface but temporary parking rows must be clearly marked to avoid confusion and safe access for pedestrians from the parking lot to the school must always be maintained. If construction is not complete by the completion date of September 1, 2019, 1,200 parking spaces must be made available by the Contractor, campus wide (758 parking spaces in the construction area), after September 1, 2019.

8.3 Access

Pedestrian and vehicular traffic must be maintained at all times to the leased parking area at the adjacent Niagara Corporate Business Centre. The Residence Building will also be open as a Motel during construction and must be accessible at all times. Designated fire routes must remain clear at all times. Access to the college's loading docks must be maintained for deliveries.

8.4 Niagara Escarpment Commission

The Contractor shall abide by the conditions in the Niagara Escarpment Commission, Notice of Decision found in appendix B.

CONTRACT ITEMS

A5. CLEARING AND GRUBBING - ITEM 1.4

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract

Document, the following shall also apply:

This item shall include the complete removal and disposal of all trees, vegetation, and shrubs, including stumps, as specified on the contract drawings, or as directed by the Contract Administrator to complete the work. All stumps shall be removed to 300 mm below the finished boulevard grade or, in the case where existing tree roots may interfere with the installation of works in the contract, remove the entire stump and dispose of offsite. Payment shall be as per the units indicated in the Schedule of Quantities for each item noted.

A8. CONSTRUCTION SIGNS, TRAFFIC CONTROL & TRAFFIC MANAGEMENT PLAN - ITEM 1.7

Interference with normal flow of traffic shall be kept to a minimum. The contractor shall be prepared to supply and erect any barricades and signs which may be required for complete control of both pedestrians and vehicular traffic including competent flag persons in accordance with Ontario Manual of Uniform Traffic Control Devices. The contractor shall further provide a traffic control plan in accordance with amendment to OHSA, August 2007. The lump sum price shall be deemed to have included this provision.

The contractor shall also be responsible for supplying their hired help with any necessary safety and/or protective equipment required to perform the work safely.

A minimum of one lane of traffic shall be maintained at all times during construction. Two lanes of traffic shall be maintained at all other times. The Contractor's proposed sequencing and staging of works and operations is to make due allowance for this requirement. Work within intersections is to be staged such that a minimum of one lane of traffic is maintained on the cross street as well.

One lane of traffic may be closed to traffic during construction, in accordance with the "Traffic Control Manual for Roadway Work Operations". At all other times, all lanes of traffic shall be maintained. Road closures of any kind will only be allowed on an exception basis, and only upon approval of either the Contract Administrator or the Owner's Project Manager. These operations will need to be requested by the contractor, in writing, at least one week prior to implementation, to the College for review and approval. These operations are to be allowed for in the Contractor's Traffic control and Management plan, and any associated costs will be the Contractor's responsibility.

It is of critical importance that all planned construction activities be coordinated with the College. Notification on at least a weekly basis of planned works (schedule) will be required to ensure that the necessary detour signage, parking accommodations, bus routing and maintenance activities account for the active work zones within the project area. The contractor will also be required to work closely with the College's Construction Inspector, Contract Administrator or the Project Manager to keep the College informed of potential impacts in order to minimize disruption to access and servicing.

Pedestrian access is to be maintained at all times whenever possible. Access closures are to be scheduled at least 2 business days in advance between the College and the contractor, including the type and form of any temporary access provisions. Any disruption to pedestrian access is to be kept to a minimum duration.

The contractor shall advise the Police Department, Fire Department and Niagara Emergency Medical Service on a daily basis, with current status of the construction as it pertains to the passage of traffic within the contract limits.

The contractor shall also maintain/provide existing pedestrian access during all phases of construction in an acceptable manner.

The traffic control signage requirements shall include the following:

Supply, locate, erect, operate, maintain, relocate as necessary and remove all necessary traffic signs, construction signs, including delineators, barricades and flashing lights, in accordance with the Ontario Traffic Manual (OTM) Book 7 and the "Traffic Control Manual for Roadway Work Operations - Field Edition (March 2001)" or latest edition thereof.

The contractor is responsible for the installation and removal of all construction signage. The contractor is also responsible for daily maintenance of all signs throughout the contract.

Regulatory signs and information signs cannot be removed without approval of the College.

Any existing signs removed by the contractor to accommodate construction shall be kept operational by placement on a temporary support.

A9. CONTINGENCY ALLOWANCE – ITEM 1.8

Bidders are provided a Contingency Allowance of $150,000.00.

B2. EARTH EXCAVATION & REMOVALS - ITEM 2.1

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Document, the following shall also apply:

OPSS 206 and OPSS 510 applies to this item.

The unit price bid for these items shall include sawcutting. Thickness of the concrete and asphalt will vary. No additional compensation will be made for the various depths of asphalt or concrete. All asphalt and concrete is to be sawcut. Sawcut limits are as shown on the construction drawings or as directed by the Contract Administrator.

The excavation quantity includes the asphalt pavement and the granular material that is to be recycled.

B3. GRANULAR MATERIAL - ITEM 2.2

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Document, the following shall also apply:

The price bid shall be complete compensation for the supply, hauling, and all placement, grading and compaction to the specified Proctor Density. **This item to be read in conjunction with Sub-sections 7.1 Excavation and Trenching and 7.3 Trench Backfill and Compaction**

This item will be utilized for the Granular 'A' material for bedding, cover and backfill (granular backfill is only required under roads, parking lots and sidewalks) of all items for the water distribution system, sanitary sewer and storm sewer system.

Granular “A” and granular “B” placed for roads, parking lots, and sidewalks will be included in this item and placed at a depth as specified in the contract or as indicated on the drawings.

Granular “A” or recycled granular “B” (from Niagara College site only) must be installed on all road, parking lot and sidewalk trenches to the existing grade to provide safe access. The contractor will be responsible for maintaining the granular until the restoration work is carried out. The contractor must include in this unit price bid all labour and equipment to remove the excess Granular “A” from the trenches prior to final restoration, and delivery of the Granular “A” to a location specified by the contract administrator. The contractor is responsible to remove the Granular “A” in a manner that avoids contamination of the Granular “A” with asphalt, concrete or native material. Any contaminated material is to be removed at the Contractor’s expense. Any cost for these requirements must be included in the unit price bid for Granular “A”.

The unit price bid for this item shall include the fine grading and compaction of the sub-base immediately preceding the placement of granular road base material.

B5. ON-SITE RECYCLING OF ASPHALT AND GRANULAR - ITEM 2.3

A milling machine shall be used to pulverize and mix the asphalt coated material with the underlying granular. The final mixture shall contain no more than 30% asphalt coated particles. Payment shall be based on the plan area and periodic measurements of the depth of the undisturbed in-situ material being recycled and a density of 2.45 tonnes/m3.

B7. INSTALLATION OF NEW CULVERT - ITEM 2.5

Restoration of asphalt, curb and landscaping will be paid under the appropriate tender items. No special payment will be made for small quantities.

Traffic must be able to enter and exit the college at all times during the installation of the new culvert including restoration.

B8. CONCRETE CURB & GUTTER - ITEM 2.6

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Documents, the following shall also apply:

The unit prices bid shall also include the following:

- Required excavation to accommodate new installation, if not already paid under an item for Roadway Excavation.

The contractor shall take due precaution to protect green concrete from being damaged, marred or defaced. In the event that the green concrete is marred or damaged in any way, the contractor shall break out and replace the damaged sections. Patching or grinding of damaged, marred or defaced concrete will not be accepted. The unit prices bid shall be deemed to have made due allowance for this requirement.

A total tolerance (or elevation variance) of 5mm will be accepted as a reasonable variance from the specified curb and gutter elevations. If curb and gutter is not constructed within the allowable elevation variance of 5mm, the contractor shall, at their own expense, rectify such error, remove and replace defective works and assume the associated extra costs of all related and affected items to the satisfaction of the College.

The exact location of dropped curbs as shown on the construction drawings will be deemed to be included in Item A4 Construction Layout. Adjustments in the field will be conducted by the Contract Administrator or his representative.

B9. CONCRETE SIDEWALKS - ITEM 2.7

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Document the following shall also apply:

The contractor shall take due precaution to protect the finished surface of freshly laid concrete sidewalk from being damaged, marred or defaced. In the event that the freshly placed concrete is marred or damaged in any way, the contractor shall break out and replace the damaged sections. Patching or grinding of damaged, marred or defaced concrete will not be accepted. The unit prices bid shall be deemed to have allowed for this contingency.

The unit prices bid shall include excavation to sub grade, forming, finishing and curing of 30 Mpa concrete sidewalks 150mm thick or 200mm thick on 100mm granular base including all necessary materials and labour, all in accordance with OPSS. Tenderers shall note the Granular “A” base for sidewalk construction shall be paid for under the Granular

“A” item and that the required excavation is only included if not already paid under an item for roadway excavation.

Sidewalk joints shall be as per OPSS 351.07.10. Expansion joints shall be set in place prior to pouring and shall be full depth, spaced 30.0m c/c maximum. Contraction joints shall be spaced 2.5m c/c maximum and are to be saw cut 1/4 thickness of the slab. No trowelling at any joints, broom finish only. The College will not accept any variance in the joint spacing beyond a 50 mm tolerance from the specified spacing. Any panels with a greater variance will be removed and replaced at the Contractor’s expense.

The unit price bid shall include sidewalk ramp installation for the handicapped at all corners, as per OPSD 310.030.

Private concrete sidewalks will be constructed to match the existing depth and paid for under this item.

The contractor is to adjust the sidewalk crossfall where required to allow for positive drainage. Where the new sidewalk has caused ponding, the contractor shall remove and replace the sidewalk at no additional cost to the contract. The contractor shall include the supply and installation of a bond breaker (either plastic or tar paper) when a new sidewalk is installed adjacent to the concrete curb. An expansion joint at this location is not required.

B10. ADDITIONAL SAWCUTTING - ITEM 2.8

There may be situations where additional sawcutting is required beyond what is indicated on the Contract Drawings due to changes made during construction. This unit price bid shall include all cost to mobilize, demobilize and to complete the sawcutting to a maximum depth of 250 mm. All other sawcutting cost are to be included in the appropriate item as specified in the Special Provisions General - Item G13.

B13. ADJUSTMENT OF APPURTENANCES - ITEM 2.11

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Documents, the following shall also apply:

No payment will be made under this item for newly constructed appurtenances.

B14. SUPPLY AND PLACE HOT MIX ASPHALT - ITEM 2.12

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Documents, the following shall also apply:

Clause 14.09 for price adjustment provisions is not applicable under this contract.

B21. TOPSOIL AND SOD - ITEM 2.14

In addition to the conditions stipulated in the Niagara Peninsula Contract Document, OPSS 802 and OPSS 803, the following shall also apply:
All areas to be sodded shall be graded to provide proper drainage. All unnecessary damage caused by the Contractor's carelessness shall be reinstated at his/her own expense.

Topsoil

Topsoil shall be a PREMIUM BLEND, weed free, and naturally sterilized through composting.
The blend shall consist of:

- 50% Triple Mix (30% mixture of topsoil, sands, and shredded wood mulch/30% mixture of black organic compost and manure/30% mixture of peat loam); and
- 50% Premium Topsoil (50% mixture of topsoil, sands, and shredded wood mulch/ 25% mixture of black organic compost/ 25% mixture of composted cow manure).

In general, the resulting topsoil mix should meet the following parameters:

pH:	6.5 – 7.5
Potassium:	100 – 120 ppm
Phosphorous:	15 – 30 ppm
Magnesium:	100 – 120 ppm
Organic Matter:	≥ 3%

Unless otherwise specified, the minimum depth of applied Premium Blend Topsoil shall be 100 mm.

Basis for Payment

Measurement for payment shall be square metre of area topsoiled and sodded.
The unit price bid shall include all materials, equipment and labour necessary to complete the work and shall include grading and the supply and application of fertilizer and water necessary to ensure growth within the one year maintenance period.

B22. TOPSOIL, SEED AND MULCH - ITEM 2.15

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Document, Special Provisions – Contract Items Supplementary, Item B21, OPSS 802 and OPSS.MUNI 804, the following shall also apply:

All areas to be seeded shall be graded to provide proper drainage. All unnecessary damage caused by the Contractor's carelessness shall be reinstated at his/her own expense.

Topsoil

Topsoil shall be a PREMIUM BLEND, weed free, and naturally sterilized through composting.
The blend shall consist of:

- 50% Triple Mix (30% mixture of topsoil, sands, and shredded wood mulch/30% mixture of black organic compost and manure/30% mixture of peat loam); and
- 50% Premium Topsoil (50% mixture of topsoil, sands, and shredded wood mulch/ 25% mixture of black organic compost/ 25% mixture of composted cow manure).

In general, the resulting topsoil mix should meet the following parameters:

pH:	6.5 – 7.5
Potassium:	100 – 120 ppm
Phosphorous:	15 – 30 ppm
Magnesium:	100 – 120 ppm
Organic Matter:	≥ 3%

Unless otherwise specified, the minimum depth of applied Premium Blend Topsoil shall be 100mm.

Hydraulic Seed & Mulch

Hydraulic seed and mulch shall be placed in accordance with OPSS.MUNI 804.

The seed mix outside of the pond shall meet the requirements of the "Standard Roadside Mix" outlined in Appendix Table A-1 of OPSS.MUNI 804 or as specified.

The pond seed mix shall be as described in the Schedule of Quantities.

Quality Assurance and specifically Performance Measures will be per OPSS.MUNI 804.08.01.

Basis for Payment

Measurement for payment shall be square metre of area topsoiled and seeded.

The unit price bid shall include all materials, equipment and labour necessary to complete the work and shall include grading and the supply and application of fertilizer and water necessary to ensure growth within the one year maintenance period.

B36. LINE PAINTING - ITEM 2.19

In addition to the conditions stipulated in OPSS 710 the following shall also apply:
This specification covers the requirements for the application of pavement markings onto the top course asphalt and shall include surface preparation, pre-marking and placement of markings.
Only traffic paint approved by the Ministry of Transportation of Ontario shall be used.

- Organic Solvent Based Traffic Paint shall be in accordance with OPSS 1712;
- Water-Borne Traffic Paint shall be in accordance with OPSS 1716; and
- Traffic Paint Reflectorizing Glass Beads shall be in accordance with OPSS 1750.

Spray equipment shall be used for the application of the both the solvent based or water-borne traffic paint, specifically a self-propelled lane line marking machine capable of producing top quality marking with true edges free from waviness or variations and conforming to the MUTCD. The equipment shall also be provided with a glass bead dispenser to apply overlay glass beads at the recommended rate.

The pavement surface must be at least 5^{o}C (for solvent based paint) or 10^{o}C (for water borne paint) and the paint temperature shall be between 40^{o}C and 70^{o}C at the time of application.
The rate of application for overlay glass beads per litre of traffic paint shall be:

% Volume Solids of Traffic Paint	Glass Beads Required (kg)
40-56	0.7
57-70	0.8

Only traffic markings containing 150g/l of VOC's or less will be permitted between May 1, through to October 15. Therefore, the type of paint used will be determined by the date of application.

Pavement pre-marking shall be undertaken by the Contractor and approved by the Owner prior to the application of permanent markings. The unit price bid shall be deemed to have made allowance for these processes.

Basis for Payment

The unit price bid shall be full compensation for all necessary labour, materials and equipment to complete the work in accordance with the specifications.

B37. INSPECT AND REPAIR SWM POND OUTLET - ITEM 2.20

The unit price bid for this item shall be for all labour, material and equipment to carefully remove the stone and geotextile around the existing pond outlet structure (Hickenbottom outlet), inspect and repair (if necessary the pipe structure), replace the filter cloth (terrafix 270R) and replace the stone (50mm landfill washed stone) as per the original detail.

B38. REGRADE AND COMPACT EXISTING STONE BASE - ITEM 2.23

The unit price bid for this item shall be for all labour, material and equipment to regrade and compact the existing stone base to the new design grades after the existing asphalt pavement has been removed. The unit price bid shall include adding or removing granular material as required. Granular ‘A’ and asphalt pavement removal shall be paid separately under their respective items.

B39. BIKE SHELTER - ITEM 2.24

The unit price bid for this item shall be for all labour, material and equipment to supply and install a 5.5m (18’) bike shelter by Urban Racks including 6 Urban Staple Racks with clear poly carbonate. All equipment shall be installed as per the manufacturers recommendation. The concrete slab shall be paid for separately.

B40. TEMPORARY CONSTRUCTION FENCING - ITEM 2.25

Niagara College functions as a post-secondary school 24 hours a day, 7 days a week, all year. Vehicles and pedestrians (students) may be expected at all times at every location. Each phase of the work must be separated from pedestrians and vehicles by construction fencing. The only exceptions are the agri-business yard and the new entrance road. The construction fencing must be closed and the site made safe before leaving each night. The construction fencing item will be full compensation for these requirements.

The unit price bid for this item shall be for all labour, material and equipment to supply, set up, move as required and remove 1.8m high metal construction fencing.

B41. PERMEABLE PAVERS - ITEM 2.27

The unit price bid shall include all labour, materials and equipment to construct permeable interlocking concrete pavement.

Concrete Pavers shall be Enviro Midori by Oaks Landscape Products or Aquapave pavers by Permacon.

Concrete Pavers shall conform to the requirements of ASTM C-936, including:

- Compressive Strength: Average of three units not less than 55 MPa (8,000 psi), with no individual unit less than 50 MPa (7,200 psi), when tested in accordance with ASTM C-140 as adjusted based on the paver thickness;
- Absorption: the average absorption of the test samples shall not be less than 5% with no individual unit greater than 7%, when tested in accordance with ASTM C-140.
- Freeze-Thaw Durability: Where freeze-thaw testing is required, the average mass loss of all specimens tested shall not be greater than (A) 225 g/m2 when subject to 28 freeze thaw cycles, or (b) 500 g/m2 when subject to 49 freeze thaw cycles. Testing shall be conducted using a 3% saline solution in according to ASTM C-1645.
- Dimensional tolerances: Measured length or width of test specimens shall not differ by more than +/- 1.6mm (0.063”), while measured thickness shall not differ by more than +/- 3.2mm (0.125”).
- Appearance: All units shall be sound and free of defects that would interfere with the proper placing of the units or impair the strength or performance of the construction. Minor cracks incidental to the usual methods of manufacture or minor chipping resulting from customary methods of handling in shipment and delivery shall not be grounds for rejection. Efflorescence shall not be a cause for rejection.
- Pigment in Concrete Pavers shall conform to ASTM C-979.
- General Contractor shall verify approval of submitted technical specifications, product data, samples and test results with the Owner prior to the installation.

Joint Material and Bedding Course

- Clean, non-plastic aggregate, free from deleterious or foreign matter, manufactured from crushed rock.
- Where pavers are subject to vehicular traffic, Micro Deval Degradation of less than 8% as per ASTM D-6928.
- Percent of angular and sub-angular particles greater than 90%% as per ASTM D-2488. Do not use rounded river gravel.
- LA Abrasion <40 as per ASTM C-131, minimum CBR of 80% as per ASTM D-1883.
- Gradation of Joint Material and Bedding Course to conform to Table 1 as tested in accordance to CSA A23.2A [ASTM C136]. All aggregates shall have equal to or less than 2% passing the No. 200 (0.075 mm) sieve.

- Table 1 – Joint Material and Bedding Course

	ASTM No. 8
12.5mm (1/2 in)	100
9.5mm (3/8 in)	85 to 100
4.75mm (No. 4)	10 to 30
2.36 mm (No. 8)	0 to 10
1.18 mm (No. 16)	0 to 5

- Concrete Paver and Joint Material to have a minimum initial infiltration rate of 150 inches per hour per ASTM C1781, as verified by an independent testing laboratory
- General Contractor shall verify approval of submitted samples and test results prior to the installation.

<u>Bedding Course, Concrete Pavers and Joint Material</u>

- Moisten, spread and screed the Bedding Course evenly over the Base Course to a nominal 50mm (2") thickness. Do not use the bedding material to fill depressions in the Base Course surface.
- The Contractor shall screed the Bedding Course using either an approved mechanical spreader (e.g.: an asphalt paver) or by the use of screed rails and boards.
- Surface tolerances shall be 10mm (3/8") over a 3m (10-foot) straight edge.
- Ensure that Concrete Pavers are free of foreign material before installation. Concrete Pavers shall be inspected for color distribution and all chipped, damaged or discolored Concrete Pavers shall be replaced. Initiation of Concrete Paver placement shall be deemed to represent acceptance of the pavers.
- Lay the Concrete Pavers in the pattern(s) as shown on the drawings. Maintain straight pattern lines. For mechanical installations, follow the stitching details submittal as verified during the Mock Up.
- Concrete Pavers shall be installed from a minimum of 3 bundles for hand installations, 6 bundles for mechanical installations, simultaneously to ensure colour blending.
- Joints between the Concrete Pavers shall be maintained according to the spacer bars.
- Fill gaps at the edges of the paved area with cut pavers or edge units. Do not install cut pavers smaller than one-third of a whole paver along edges subject to vehicular traffic – trim two pavers to fit.
- Cut pavers using a masonry saw. Upon completion of cutting, the area must be swept clean of all debris to facilitate inspection and to ensure the Concrete Pavers are not damaged during compaction.

- Using a low amplitude plate compactor capable of at least 5,000 lbs. (22 kN) compaction at a frequency of 75 hz –100 hz, compact and seat the Concrete Pavers into the Bedding Course.
- The pavers shall be compacted to achieve consolidation of the Bedding Course and brought to level and profile by not less than three passes. Initial compaction should proceed as closely as possible following the installation of the paving units and prior to the acceptance of any traffic or application of Joint Material.
- Any units that are structurally damaged during compaction shall be immediately removed and replaced.
- Apply a dressing of Joint Material to the surface and sweep into the joints. Fill joints, then sweep off excess material before vibrating the material down into the joints using a plate compactor. This will require at least two or three passes with the compactor.
- Do not compact within 2 m (6 feet) of the unrestrained edges of the paving units.
- All work to within 2 m (6 feet) of the Laying Face must be left fully compacted at the end of each day. Cover the Laying Face with plastic sheets overnight if not closed with cut and compacted pavers.
- Sweep off excess aggregate when the job is complete.
- Once the Paver Installer's work is complete, and the area approved by the Inspection Engineer, the General Contractor shall be responsible for protecting the work from sediment deposition and damage due to subsequent construction activity on the site.

<u>As-built Construction Tolerances</u>

- Final inspection shall be conducted to verify conformance to the drawings and compliance to the conditions of the Mock Up.
- All pavements shall be finished to lines and levels to ensure positive drainage at all drainage outlets and channels.
- The final surface elevations shall not deviate more than +/- 10mm (3/8") under a 3m (10 ft) long straight edge.
- Concrete Pavers to be 3 to 6mm (1/8 to ¼") above curbs, inlets, concrete collars and channels.
- Lippage shall be no greater than 3mm (1/8") difference in height between adjacent pavers.
- Bond lines for the pavers shall be +/- 12.5mm (½") over a 15m (50 foot) string line.
- Check filling of joints with a putty knife. Maximum 6mm (1/4") below chamfer edge at completion.
- Infiltration rate of the PICP surface to exceed 150 inches per hour as determined using ASTM C-1781,

B42. HOOP HOUSE INSTALLATION - ITEM 2.28

The unit price bid for this item shall include all labour, materials and equipment to supply and install hoop houses. Each hoop house shall consist of the following as supplied by GGS Structures Inc.:

- 20 ft. wide gothic coldframe on 36 inch posts x 100 ft. long. Arches every 4 ft., 3 straight rows of purlins.
- 2 – coldframe gables for 20 ft. Gothic 36 inch post with framing and parts for poly glazing provided.
- 2 – wirelock at each arch
- 2 – roll – up parts for coldframe side
- 1 – roll of Klerks K50 clear 4 year 6 mil 36 ft. wide x 150 ft. long (sheet)
- 2 – SLC Manual Roll-up unit with guide tube kit. *** 2 roll-up units for each structure
- 2 – Single sliding door, 48 in. wide x 96 in. high, 8mm PCSS shop glazed, door opening glazing kit for poly (for an opening size of 46 in. wide x 96 in. high), located in a CF Gable. *** 2 doors for each structure. One at each end.

The hoop houses shall be constructed as per the Manufacturer's recommendations by qualified personnel.

The College's hoop house operation must be continuous at all times. The new hoop houses must be constructed 2 weeks before the old hoop houses are demolished. Niagara College forces will move the plants and equipment to the new hoop houses during this time. Safe access must be maintained to the hoop houses while they are in operation.

The frames and gable ends of the existing hoop houses shall be carefully salvaged and stored on site as directed by the Engineer for re-use by Niagara College. The remainder of the existing hoop houses shall be demolished and disposed.

C1. SANITARY SEWERS, STORM SEWERS & CATCHBASIN LEADS - ITEM 3.1

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Document, the following shall apply:

The unit prices bid shall include excavation of all types of soil including asphalt, road base for a vertical trench, any required dewatering, sheathing, shoring and bracing for the vertical trench, temporary and permanent supports of all utilities and services within the trench, placement of bedding, pipe installation, connections to existing or new maintenance holes and existing or new service laterals, placement or removal of manufactured plugs, placement of cover and backfill material, compaction, disposal of surplus excavated material, **removal and disposal of existing sewers.**

During the sewer installations, the contractor shall be responsible to maintain the proper functioning of each sanitary, storm and water service lateral located in the field or shown on the construction drawings, at no additional cost to the contract.

The price bid for the sewer shall include using manufactured tees at all sewer to sewer connections where a manhole is not specified.

Where the new pipe installation crosses or is adjacent to an existing pipe or structure, the contractor shall support the existing pipe or structure. In the event the existing pipe or structure becomes disturbed, the contractor shall replace or repair the pipe or structure regardless of the material and at no additional cost to the contract.

Where the new pipe or lateral installation crosses a pipe which is abandoned, or is to be abandoned and requires removal, the abandoned pipe sections remaining shall be plugged and sealed on either side of the new pipe at no additional cost to the contract.

The contractor shall note that the removal and disposal of the roadway asphalt in the sewer trench and road reconstruction areas will be paid under a separate item.

The unit price bid for this item shall include all sawcutting required.

Payment for these items is at the unit prices bid in the Form of Tender and will include all items in the "Basis of Payment", as specified in OPSS 410.

C6. PRECAST CONCRETE MAINTENANCE HOLES, CATCHBASINS & DITCH INLETS - ITEMS – 3.2, 3.3, 3.4, 3.5, 3.6, 3.7

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Document, the following shall apply:

All structures shall be founded on a 300mm (min.) thick layer of compacted Granular ‘A’. All Granular material shall be placed in maximum 300mm loose lifts and compacted to 100% of Standard Proctor Maximum Dry Density (SPMDD) at optimum moisture content.

Excavation, removal and disposal of surplus excavated materials shall be included in the unit price. The removal and disposal of any existing structure shall be paid under the appropriate item.

The Contractor shall make due allowance in the unit prices tendered for any bypass pumping, dewatering, sheathing, shoring and bracing to complete the work.

Kor’n Seal adapters or an approved equivalent shall be used in all cases where PVC pipe is to be connected to concrete structures (excluding catchbasin connections). Where concrete pipe is used, a concrete cradle shall be required at each structure connection in addition to Fernco large diameter manhole connectors.

Structure rim elevation shall be set to blend with the surrounding **top** asphalt grade.

Under no circumstance shall HDPE adjustment units be used.

Maintenance Holes (MH)

Materials and installation shall be in accordance with OPSS 407 and any other specifications referenced therein and include benching, aluminium safety rungs, bulkheads, adjustment units and MH frame and covers.

A 20MPa concrete cradle shall be provided from and around the MH to the first joint of rigid inlet and outlet pipes (OPSD 708.020).

All new MHs within the travelled portion of the parking lot shall be fitted with a self-adjusting frame and covers from either East Jordan Iron Works (Product No. 00302201) or Bibby-Ste-Croix (Auto Stable C-50MONT.) Follow manufacturer's installation recommendations. MH top elevation shall be set to blend with the surrounding grades.

Catchbasins (CB)

The frame and grating shall be in accordance with OPSD 400.020.

The CB shall provide for the placement of a minimum 100mm to a maximum 300mm of concrete adjustment units, per OPSD 704.010.

Basis for Payment

The unit price bid for this item shall be complete compensation for all labour, equipment and material (including frame, covers and/or grates) to do the work as specified in OPSS 407.10.01.
The supply and placement of Granular 'A' shall be made separately under the appropriate item in the Schedule of Quantities and Unit Prices.

C8. QUICK HEAD WALL - ITEM 3.8

The unit price bid shall include all labour, material and equipment to supply and install a Quick Head Wall by Hanson for a 900mm diameter outlet including a grate and handrails in a random stone pattern. Installation shall be as per the manufacturer's recommendation.

D1. WATERMAINS – ITEM 4.1

In addition to the conditions stipulated in the Niagara Peninsula Standard Documents and OPSS 441, the following shall also apply:

General

Watermain and water services shall be installed to a minimum depth of 1.8m throughout.

All watermain installation shall be by open cut trench excavation method except when specified elsewhere in the contract documents and drawings.

Materials

All Waterworks materials must meet AWWA current quality criteria standards and American National Standard ANSI/NSF Standard 61.

All brass curb stops, corporation stops, service line valves, fittings and all other brass products used that come into contact with potable water must meet the requirements of ANSI/AWWA C800 Standard.

Watermain shall be DR18 PVC conforming to AWWA C900 or approved equivalent, unless otherwise specified.

Joints and fittings shall be compatible with pipe material and class and shall be in accordance with OPSS 441.

Mechanical Joint Fittings shall be ductile (cast) iron, or grey (cast) iron per AWWA 110/A21.10 with cement lining to AWWA C104/A21.4 and fastened with stainless steel nuts and bolts.

PVC Fabricated Fittings per AWWA C900 and CSA B137 Series-13.

All couplings and adaptors shall be bronze with one piece combination nut and tail, compression type stainless steel insert (heat flaring of tubing is not allowed) and conform to AWWA C800 and ANSI/NSF Standard 61.

Bedding and Cover

Bedding and cover shall always be Granular ‘A’ material; recycled materials will not be accepted for this purpose.

Backfill

The Contractor is to note that full Granular ‘A’ will be used for backfill in shoulders, driveways, sidewalks and travelled roadways unless otherwise specified within the contract documents or as directed by the Contract Administrator.

Native material may be used in all other areas with written approval by the Contract Administrator. Where native material is used, the Contractor is to include in their price for all handling, hauling, stockpiling, placement and compaction.

General Construction

Care shall be taken during construction to minimize any contamination of the pipe from soil or water during installation; only clean pipe shall be installed. Contractors should be reminded of this prior to commencing construction.

If in the opinion of the Contract Administrator, trench water or an excessive amount of dirt or debris has entered the new pipe during construction, additional sampling may be requested in accordance with Section 5.1.2 of ANSI/AWWA C651, at the discretion of the Contract Administrator or designate.

Cathodic Protection

Cathodic protection must be provided at all metallic pipe, fittings, valves, water services and hydrants etc., installed underground in accordance with the NPSCD Contract Item D10. All costs for cathodic protection shall be included in the watermain item, specifically D1 in the Schedule of Quantities and Unit Prices.

Tracer Wire

Tracer wire will be required on all new non-metallic watermains and services installed as part of this contract. Tracer wire shall be supplied and installed in accordance with the NPSCD Contract Item D14. All costs for tracer wire shall be included in the watermain item, specifically D1 in the Schedule of Quantities and Unit Prices.

Conductivity Testing

The Contractor will be required to conduct all tracer wire conductivity testing to ensure that the tracer wire is installed correctly and intact. Testing shall be conducted by a *Certified* Damage Prevention Technician (DPT) using approved testing equipment and shall be supervised by the Contract Administrator or designate. All costs for conductivity tests shall be included in the watermain item. **Fifteen percent (15%) of the full watermain payment (Item D1 on the Schedule of Quantities and Unit Prices) will be withheld until the Conductivity Testing has been completed and passed.**

If the tracer wire is not electrically continuous from valve to valve, the Contractor shall at his/her own expense, replace or repair the wire as required.

Watermain Disinfection and Testing

Watermain Disinfection and Testing shall be at the lump sum price bid and in accordance with SPCS D13.

Existing Mains and Utilities

Known utilities shall be exposed in advance of construction in that location. A minimum of three (3) pipe lengths, and a maximum of five (5) lengths of open trench shall be maintained to allow for adjustment to grade to avoid utilities and sewer service laterals. No extra payment will be considered for removal and re-excavation to avoid obstructions.

Certified Water Operators (CWO)

All operation of the live water system shall be performed or supervised by a Certified Water Operator (holding a valid certificate) according to O. Reg. 128/04.

Operation of the water system includes disconnection of any service from a live water system, reconnecting of any service to a live water system and any works performed on a live water system (ex. maintenance, repairs, and/or connections).

Noncompliance of this requirement is a contravention of the Safe Drinking Water Act. Failure to comply with this Act will subject the Contractor to any penalties, fines or consequences as deemed applicable by the Ministry of the Environment and Climate Change.

Water Service Interruptions

The existing watermain and water services must remain in operation until all water services have been connected to the new main(s), except during transfer periods.

The Contractor must advise the Contract Administrator of any proposed service interruption, in writing, a minimum of 48 hours in advance.

When shutting down watermains for any reasons, all affected properties are to be notified in writing, a minimum of 24 hours in advance of the water service interruption.

The Contract Administrator or designate shall prepare the notice and the Contractor will be responsible for door-to-door delivery to the affected customers. If there is no response at the door, the notice shall be left at the premises (mailbox).

The following Municipal departments must also be notified when watermains, services or fire hydrants are shut down or used in any way:

- Niagara-on-the-Lake Water: 905-468-3266, and after hours: 905-468-3278

THE CONTRACTOR SHALL ALSO PAY SPECIAL ATTENTION TO AND MAKE ALL NECESSARY ALLOWANCES FOR THE FOLLOWING ITEMS:

i. The existing watermain and water services must remain in operation until all water services have been connected to the new main(s), except during transfer periods.

ii. In many cases the existing watermain has exceeded its expected service life. The Contractor is advised to take all precautions and provide any support necessary to protect the existing main from damage.

iii. **During the watermain installation, the Contractor shall be responsible to maintain the proper functioning of each sanitary, storm and water service lateral located in the field or shown on the construction drawings, at no additional cost to the contract.**

iv. The Tenderer shall note that where it is necessary to install the new watermain deeper than the depth specified to avoid elevation confliction with certain utilities, the unit price bid shall be deemed to include due allowance for this contingency. This may include deflecting a new main or service by up to 600mm.

v. The unit price bid shall also include the removal and disposal of all abandoned underground services/pipes (of any material and/or diameter) in conflict with the new alignment of the watermain. Any abandoned services shall be capped and sealed on both sides of the remaining sections.

<u>Basis for Payment</u>

Measurement for payment will be made horizontally over the centreline of the watermain as installed.

Payment will be made at the unit price bid in the Schedule of Quantities and Unit Prices and shall be full compensation for all work required including cathodic protection, tracer wire, and conductivity testing.

Fifteen percent (15%) of the final payment, at the unit price bid in the Schedule of Quantities and Unit Prices, shall be withheld until the conductivity test has been passed in accordance with this specification.

The unit price shall also include payment for supply and installation of pipe, reducers, bends, fittings, tracer wire, conductivity testing, restraints, thrust blocks and temporary and permanent support of all utilities encountered in the trench.

The supply and placement of Granular ‘A’ shall be paid separately under the appropriate item in the Schedule of Quantities and Unit Prices.

D2. VALVES - ITEM 4.2

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Document and OPSS 441, the following shall also apply:

Materials

All gate valves shall have stainless steel stem or cast bronze, resilient seat, interior epoxy coating and polyurethane outside coating. Gate valves shall be manufactured in accordance with AWWA Standard C509 with protective epoxy interior coating to AWWA C550.

Installation

Gate valves and valve boxes shall be installed level and plumb and supported by concrete blocking. The anchor block shall secure the valve or tee or cross and shall be sized as for bulkhead thrust blocks.

Backfilling shall be conducted so the valve box will not be knocked off plumb. Backfill material will be the same as that used for backfilling the watermain pipe in the immediate area.

The valves shall be subjected to pressure test of 1035kPa (150 psi), at the same time as the watermain is tested.

Prior to acceptance, the Contractor must demonstrate the operation of all valves to the Contract Administrator or designate.

Basis for Payment

The unit price tendered shall include all necessary labour, materials and equipment to complete the work in accordance with the specifications referenced within this contract.

The supply and placement of Granular ‘A’ shall be paid separately under the appropriate item in the Schedule of Quantities and Unit Prices.

The supply of Type DZP-550-12 zinc anodes shall be included at no additional cost to the contract (See SPCS D1).

D3. HYDRANT SETS - ITEM 4.3

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Document and OPSS 441, the following shall also apply:

Fire hydrants shall conform to AWWA C502 for dry barrel hydrants and be ANSI/NSF Standard 61 compliant. All Hydrants containing bronze or brass material must conform to

AWWA C800. Protective epoxy interior and exterior coating must conform to AWWA C550.

Materials

Hydrants shall be Canada Valve Century, McAvity M-67 Brigadier or American AVK 2780. All hydrants shall be three-way with STORTZ quick connect nozzles, specifically one 114mm (4-1/2") pumper nozzle and two 65mm (2-1/2") hose nozzles.

Hydrants shall be match the Town of NOTL standard hydrant colour and shall be ordered with a minimum 1.5 m riser. Hydrants shall also be supplied with both stainless steel upper and lower stems with epoxy coating, pipe, thrust blocks, grip rings, extensions etc.. Hydrant valve and valve box to conform to SPCS D3.

THE CONTRACTOR SHALL ALSO PAY SPECIAL ATTENTION TO AND MAKE ALL NECESSARY ALLOWANCES FOR THE FOLLOWING ADDITIONAL REQUIREMENTS:

i. Existing utilities (i.e. gas mains, etc.) must be exposed to ensure hydrant can be installed in designated location. The final location of all hydrants shall be determined in the field and must be approved by the Contract Administrator or designate.

ii. All hydrant valves must be directly connected to a mainline anchor tee unless otherwise indicated on the contract drawings or directed by the Contract Administrator.

iii. **All hydrants shall be bagged when not in service and the Fire Department immediately notified.** Covers only to be removed upon approval from Contract Administrator.

iv. Hydrant leads shall be installed with **minimum 1.8m cover**. Where leads cross under ditches, other obstructions are encountered, or minimum cover would be otherwise reduced the Contract Administrator must be notified. Proposed resolutions shall require Contract Administrator's written approval.

v. Hydrants on leads less than 1.5m long shall be restrained by the use of tie rods. The tie rods including nuts shall be coated with TC Mastic.

vi. Hydrant extensions shall be provided in 150mm or 300 mm lengths to ensure flange is a maximum 100mm above finished grade. Where more than 300mm extension is required, adjustment may be directed with 45-degree bends.

a. **The unit price bid is to include all hydrant extensions required to properly install the hydrant to proposed grade**.

vii. Cathodic protection: Zinc Anode DZP-1100-24 anodes to be used at each hydrant. Tie rods shall be made electrically continuous with other metallic components for cathodic protection.

viii. **Hydrants shall be tested with the watermain**; the hydrant-isolating valve must be open. The isolating valves shall also be tested at 1035 kPa (150 psi) with the hydrants in the open position. Hydrants and valves shall be flushed and disinfected to the approval of the Contract Administrator.

Fire Flow Testing, Colour Coding & Numbering of Hydrants

All flow testing and colour coding shall be done in accordance with the Ontario Fire Code, Section 6.6.6.1.

Flow Testing Hydrants

All new or refurbished hydrants are to be fire flow tested by a qualified professional within **one (1) week** of the connection of the new/replaced watermain to the municipal water distribution system. The Contractor shall keep a written record of all testing procedures and results and this information will be immediately provided to the Contract Administrator for review and approval.

De-chlorination

An approved neutralizing chemical shall be applied to all chlorinated water used for disinfection, testing and flushing, before being discharged into the environment. Refer to Table C.1 - Appendix C of ANSI/AWWA C651 for the appropriate amount of chemicals required to neutralize chlorine.

A Certified Water Operator shall verify using an approved field test kit that the chlorine residual concentration of the water discharged to the environment shall not exceed 0.02mg/L.

Colour Coding Hydrants

Following the City's review of the fire flow testing results, and upon approval by the Contract Administrator, the Contractor shall colour code the new hydrants with an oil base, gloss finish in accordance with the National Fire Protection Association (NFPA) 291, "Fire Flow Testing and Marking of Hydrants", as summarized in the following table.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) 291				
Class	**Rated Capacity**		**Capacity Indicating Colour Scheme**	**Paint Colour Code Benjamin Moore** (or Equivalent)
	GPM	**(L/min)**		
AA	≥ 1500	≥ 5680	Light Blue	2065-50
A	1000-1499	3785-5675	Green	2036-20
B	500-999	1900-3780	Orange	2015-20
C	< 500	< 1900	Red	2001-20

Hydrant Numbering

The Contractor shall be responsible for applying the hydrant identification numbers to all new hydrants at no additional cost to the contract. The Contract Administrator shall provide black, peel and stick numbers that shall be placed in the centre front of the hydrant barrel.

Basis of Payment

The unit price tendered shall include all necessary labour, materials and equipment to complete the work in accordance with the specifications of this contract including, cathodic protection, connection to the watermain, flow testing and painting and all necessary adjustments to ensure flange is a maximum 100mm above finished grade.

The supply and placement of Granular 'A' shall be paid separately under the appropriate item in the Schedule of Quantities and Unit Prices.

The supply of Type DZP-550-12 zinc anodes shall be included at no additional cost to the contract (See SPCS D1).

D4. WATER SERVICES - ITEM 4.4

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Document and OPSS 441, the following shall also apply:

Materials

Where plastic service pipe is specified, cross-linked polyethylene (PEX) pressure pipe conforming to AWWA C904 and certified to CSA B137.5 shall be used (MUNICIPEX® or approved equivalent).
The PEX pipe shall include continuous tracer wire connected to the PVC watermain. Water service connections shall be made with a brass tee fitting. The unit price bid shall be deemed to include due allowance for this requirement.

All couplings and adaptors shall be bronze one piece combination nut and tail, compression type stainless steel insert and must conform to AWWA Standard C800 and ANSI/NSF Standard 61 compliant LXI water works brass. Heat flaring of tubing is not allowed.

All water services shall have Type DZP-550-12 zinc anodes installed and attached to the curb stop with an electrical tail nut.

Installation

All water services shall be **laid in one continuous length** (i.e.: no joints) between the main stop and the curb stop.

Water services must have a minimum of 1.8m cover at property line and throughout the length between the watermain and curbstop. Any proposed variance to this depth must be submitted to and approved by the Contract Administrator, in writing. The Contractor shall make due allowance in his/her unit price bid for this requirement.

Basis of Payment

The unit price bid shall represent the Contractor's complete costs to supply and install the water service in accordance with these specifications. All unit prices bid must allow for the requirements stipulated above and all components of the work including excavation, removal and disposal of the existing service (including curb stop and box), backfilling and compaction in addition to supply and placement of all necessary materials, fittings and couplings.

Water services will be measured horizontally from the centre line of the watermain to the curb stop or the connection to the private service if greater than a metre beyond the curb stop, for payment. No allowance will be made for the goose-neck at the corporation stop or additional appurtenances or fittings necessary to carry out this work.

Separate items have been provided in the Schedule of Quantities and Unit Prices for main stops, curb stops and boxes.

D6. CURB STOPS - ITEM 4.4

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Documents, the following shall apply:

Curb stops shall be in accordance with AWWA C800. Curb stops shall be brass ball valves with both inlet and outlet flared or compression to operate at 1035 KPa (150 psi). Curb stops are to be CSA Classified to NSF Standard 61.

All curb stops will use stainless steel stems to operate the valves.

Water services must have a minimum of 1.8m cover throughout the length between the watermain and curbstop.

Basis of Payment

As stipulated in the Niagara Peninsula Standard Contract Document.

The costs for the extended service and connection will be paid under the appropriate item in the Schedule of Quantities and Unit Prices, specifically Contract Item D4 - Water Services.

D7. CURB BOX - ITEM 4.4

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Document, the following shall apply:

Curb boxes shall be cast iron, slide-type and adjustable to suit depth of service.

Service rods shall be **stainless steel** with a minimum 13mm diameter and include **stainless steel cotter pin retainer clips**.

The cap shall be a ribbed cover with bronze cap and 25mm I.P.S. tapping. The service box shall be installed and adjusted such that the telescopic portion of the box does not rest on the curb stop.

Basis for Payment

As stipulated in the Niagara Peninsula Standard Contract Document.

P1. TRENCH OR PARKING LOT SUB-EXCAVATION - ITEM 6.1

The provision of OPSS 314 shall apply as amended or extended herein.

The unit price indicated in the Form of Tender shall include all sub-excavation below the required trench bottom or unsuitable sub-grade material, any additional sheathing and shoring required, disposal of excavated material as specified in Clause 2 of Special Provisions Items. The supply and placement of 50mm crusher-run stone in the trench or sub-grade compacted to 100% Proctor Density is also included in the price indicated.

Payment shall be made by the cubic metre measurement based on the calculated volume of the theoretical trench width, the average depth and length of sub-excavation.