

VOC – Products & Materials Identification – Schedule A

Item No.	Specification Section	Assembly /Material	Product	VOC [g/L]	Amount Used [L]	Documentation Included
Example	09 25 00	Gypsum Compound	Drywall Compound	2	15	<input type="checkbox"/> MSDS <input type="checkbox"/> Datasheet <input type="checkbox"/> Letter
1						<input type="checkbox"/> MSDS <input type="checkbox"/> Datasheet <input type="checkbox"/> Letter
2						<input type="checkbox"/> MSDS <input type="checkbox"/> Datasheet <input type="checkbox"/> Letter
3						<input type="checkbox"/> MSDS <input type="checkbox"/> Datasheet <input type="checkbox"/> Letter
4						<input type="checkbox"/> MSDS <input type="checkbox"/> Datasheet <input type="checkbox"/> Letter
5						<input type="checkbox"/> MSDS <input type="checkbox"/> Datasheet <input type="checkbox"/> Letter
6						<input type="checkbox"/> MSDS <input type="checkbox"/> Datasheet <input type="checkbox"/> Letter
7						<input type="checkbox"/> MSDS <input type="checkbox"/> Datasheet <input type="checkbox"/> Letter
8						<input type="checkbox"/> MSDS <input type="checkbox"/> Datasheet <input type="checkbox"/> Letter
9						<input type="checkbox"/> MSDS <input type="checkbox"/> Datasheet <input type="checkbox"/> Letter
10						<input type="checkbox"/> MSDS <input type="checkbox"/> Datasheet <input type="checkbox"/> Letter
Authorized Official:			Signature:			
Organization:			Date:			
Role in Project:			Telephone No:			
Project Name:			Project Location:			

Source of Pollutants - Schedule B

Y GENERAL

- ☐ I have read and understand the intent and requirements of Section 01 35 90 – Indoor Air Quality Management as they relate to Source Control.
- ☐ I have reviewed the scope of *Work* for this *Project* and has identified the following as potential sources of indoor air pollutants during construction (provide separate tables for additional sources):

Source	Dust	Odour, VOC's	Spill Potential	Moisture Damage Potential	Gas Emissions	Smoke
Concrete						
Drywall						
Wood						
Insulation						
Paints						
Adhesives						
Duct Sealant						
Sealants						
Carpet						
Smoking						
Construction Heaters						
Vehicles						

Y N/A

- ☐ ☐ LOW EMITTING PRODUCTS (low VOC - Volatile Organic Compounds) shall be used as specified. *Provide Product Literature* listing VOC's [g/L] (MSDS/Datasheet/Manufacturer Letter)
- ☐ ☐ Tobacco smoking shall not be permitted inside the building. (*Provide photos of signage*)
- ☐ ☐ Garbage shall not be burned on-*Site*.
- ☐ ☐ Equipment shall not be fueled-up inside the building.
- ☐ ☐ Gasoline and solvents shall not be stored inside the building. (*Provide photos of correct storage*)
- ☐ ☐ Spills shall be cleaned promptly.
- ☐ ☐ Outdoor traffic shall be restricted where emissions can be drawn into building. (*Provide photos of signage*)
- ☐ ☐ On-*Site* emissions shall be reduced by using equipment that uses propane/natural gas instead of gasoline. Electric equipment shall be used wherever possible. (*Provide photos*)
- ☐ ☐ Pollution sources shall be exhausted to the outside using temporary or permanent ventilation equipment. If HVAC systems are used, they shall be operated using 100% outdoor air to exhaust pollution. (*Provide photos*)
- ☐ ☐ Where exhaust is not feasible and ventilation is required, a portable air cleaner shall be used. (*Provide photos*)
- ☐ ☐ Sawdust from woodworking tools shall be collected and bagged regularly. (*Provide photos*)
- ☐ ☐ Indoor sources of odour and dust shall be covered/sealed. (*Provide 3 photos*)

- ☐ ☐ Painting techniques that minimize odour shall be used (rolling instead of spraying). (Provide photos)
- ☐ ☐ Cleaning practices that minimize dust shall be used (vacuuming instead of sweeping, use of wet rags). (Provide photos)
- ☐ ☐ Low toxicity cleaning solutions shall be used.

Y PHOTOGRAPHS AND DOCUMENTATION

- ☐ I shall provide three photographs of each applicable Source Control Measure. These photographs shall be taken on three different occasions during construction. Each photograph shall have a date and a description of the control measure depicted.

Authorized Official:	Signature:
Organization:	Date:
Role in Project:	Telephone No:
Project Name:	Project Location:

IAQ Pollutant Containment Plan - Schedule C

Y N/A GENERAL

- ☐ ☐ I have read and understand the intent and requirements of Section 01 35 90 – Indoor Air Quality Management as they relate to Pathway Interruption.
- ☐ ☐ Temporary dust barriers shall be installed in the following areas: (Provide photos)

Location / Room	Location / Room	Location / Room	Location / Room

- ☐ ☐ Portable fans shall be used to exhaust pollutants to exterior through windows, doors, etc.
- ☐ ☐ Exterior openings (windows & doors) shall be sealed/closed to exterior work.
- ☐ ☐ Polluting equipment and work shall be moved to locations where IAQ impact is minimized as follows: (Provide photos)

Equipment / Work	Designated Location / Room

- ☐ ☐ Work areas shall be depressurized using temporary or permanent ventilation equipment.
- ☐ ☐ Occupied/completed areas shall be pressurized using temporary or permanent ventilation equipment.

Y Photographs And Documentation

- ☐ I shall provide three photographs of each applicable Pathway Interruption Measure. These photographs shall be taken on three different occasions during construction. Each photograph shall have a date and a description of the control measure depicted.

Authorized Official:	Signature:
Organization:	Date:
Role in Project:	Telephone No:
Project Name:	Project Location:

Housekeeping Plan - Schedule D

Y N/A General

- ☐ ☐ I have read and understand the intent and requirements of Section 01 35 90 – Indoor Air Quality Management as they relate to Housekeeping.
- ☐ ☐ Cleaning Frequency: Cleaning shall be conducted every _____ Days.
- ☐ ☐ Wetting agents, sweeping compounds, damp rags, and wet mops shall be used to minimize dust creation during cleaning. (Provide photos)
- ☐ ☐ Vacuum equipment with HEPA filtration and/or a wet scrubber shall be used. (Provide photos)
- ☐ ☐ Spills shall be cleaned promptly.
- ☐ ☐ Excess application of solvent-containing products (adhesives, sealants, caulks, etc.) shall be cleaned/removed.
- ☐ ☐ Accumulated water shall be removed.
- ☐ ☐ Ventilation/dehumidification shall be used in high-humidity areas to remove moisture. (Provide photos)
- ☐ ☐ Materials stored and installed on-*Site* shall be covered, sealed and protected from moisture, dust and dirt accumulation. (Provide photos)
- ☐ ☐ Materials with evidence of moisture damage or excessive moisture content shall not be installed.
- ☐ ☐ Stored materials shall be elevated off the ground to protect from moisture and dirt. (Provide photos)

Y Photographs And Documentation

- ☐ I shall provide three photographs of each applicable Housekeeping Measure. These photographs shall be taken on three different occasions during construction. Each photograph shall have a date and a description of the control measure depicted.

Authorized Official:	Signature:
Organization:	Date:
Role in Project:	Telephone No:
Project Name:	Project Location:

IAQ Source Scheduling - Schedule E

Y N/A General

- ☐ ☐ I have read and understand the intent and requirements of Section 01 35 90 – Indoor Air Quality Management as they relate to Scheduling.
- ☐ ☐ Construction activities shall be scheduled to reduce absorption of VOC's, odours and fumes by porous materials.
- ☐ ☐ Wet and odorous materials such as paints, sealants, and coatings shall be applied before absorbent materials such as ceiling tiles, carpets, insulation, gypsum products, and fabric-covered furnishings are installed.
- ☐ ☐ Testing, Adjusting and Balancing shall commence after construction is complete and before occupancy.
- ☐ ☐ Commissioning shall commence after construction is complete and before occupancy.
- ☐ ☐ Corrective work related to general deficiencies, Testing, Adjusting and Balancing, and Commissioning shall be completed before occupancy.
- ☐ ☐ Building occupancy shall not be permitted until all work is complete and final cleaning has eliminated dust and odour.

Y Documentation

- ☐ A copy of the construction schedule shall be provided with the IAQ Scheduling Plan.

Authorized Official:	Signature:
Organization:	Date:
Role in Project:	Telephone No:
Project Name:	Project Location:

HVAC Protection - Schedule F

Y N/A General

- ☐ ☐ I have read and understand the intent and requirements of the Indoor Air Quality Management Specification as they relate to HVAC Protection.
- ☐ ☐ Acoustic lining, and insulation as well as pre-lined and pre-insulated ductwork shall be protected from dust accumulation, moisture and damage. This applies both to stored and installed materials. (Provide photos)
- ☐ ☐ All equipment and stockpiled ducts and fittings shall be covered with plastic. (Provide photos)
- ☐ ☐ All hatches and access doors shall be closed/covered when the equipment is not being worked on. (Provide photos)
- ☐ ☐ The mechanical room shall not be used to store or collect construction waste materials. (Provide photos)
- ☐ ☐ Ceiling tiles shall be installed prior to final cleaning to prevent dust accumulation in ceiling plenum. (Provide photos)
- ☐ ☐ HVAC protection deficiencies shall be corrected within 48 hours of notification.
- ☐ ☐ Any equipment or materials that is soiled or damaged from incorrect storage or improper protection shall be cleaned or replaced at no extra cost to the *Owner*.

Y N/A Ventilation Equipment NOT Used During Construction (RECOMMENDED)

- ☐ ☐ I shall NOT operate the following ventilation equipment during construction (provide a separate table for additional equipment):

Equipment (Tag)	Location	Area Served

- ☐ ☐ All openings into the HVAC systems shall be sealed with plastic. (Provide photos)
- ☐ ☐ All duct openings (open ends) that are not under immediate work shall be sealed. (Provide photos)
- ☐ ☐ As ductwork installation is completed, all supply, return and exhaust openings shall be sealed. (Provide photos)
- ☐ ☐ All equipment openings (inlets and outlets on air handlers, fans, etc.) shall be sealed with plastic until ductwork is connected. (Provide photos)
- ☐ ☐ Ceiling plenums openings shall be sealed with plastic. (Provide three photos) Failure to comply with this Section of the *Specification* shall result in duct cleaning and all associated expenses be provided at no extra cost to the *Owner*.
- ☐ ☐ When construction is complete, plastic shall be removed from all system openings.
- ☐ ☐ When construction is complete, system start-up shall be conducted, and systems shall be prepared for the Testing, Adjusting and Balancing *Subcontractor* and the Commissioning Agent.
- ☐ ☐ When construction is complete, air filters with a minimum efficiency reporting value (MERV) = 13 (or higher) shall be installed in all air handling equipment as follows (provide a separate table for additional equipment):

Equipment (Tag)	Filter Manufacturer	Filter Model	Filter MERV

Y PHOTOGRAPHS and DOCUMENTATION

- Issued by Addendum 1

- ☐ I shall provide three photographs of each applicable HVAC Protection Control Measure.
- ☐ These photographs shall be taken on three different occasions during construction. Each photograph shall have a date and a description of the control measure depicted.

Authorized Official:	Signature:
Organization:	Date:
Role in Project:	Telephone No:
Project Name:	Project Location:

END OF SECTION

HARDWARE SCHEDULE FOR

YORK REGION PRS STATION #32

53 JACOB KEFFER PARKWAY

Architect

THOMAS BROWN ARCHITECTS INC.
197 SPADINA AVE
SUITE 200
TORONTO, ONTARIO
M5T 2C8
Tel: 416-364-5710

Consultant: **SHAUN CRAIG, DHC**

Plan Revision: **1**, Dated: **NOV 30, 2020**
Submittal Date: **JAN 26, 2022**

Elite
Door & Hardware Inc

YORK REGION PRS STATION #32
53 JACOB KEFFER PARKWAY

Submittal Date: JAN 26, 2022

HOLLOW METAL - GENERAL NOTES

- MATERIAL SHOWN ON THESE DRAWINGS WILL BE FABRICATED ONLY AFTER FORMAL APPROVAL BY THE ARCHITECT AND CONTRACTOR, RECEIPT OF APPROVED FINISH HARDWARE SCHEDULE AND ALL NECESSARY TEMPLATES.
- DOORS AND FRAMES WILL BE REINFORCED FOR SURFACE MOUNTED HARDWARE AS REQUIRED. DRILLING AND TAPPING FOR ATTACHING OF HARDWARE BY OTHERS.
- ALL WELDED FRAMES WILL BE SUPPLIED WITH TWO TEMPORARY SHIPPING BARS TO MAINTAIN PROPER ALIGNMENT DURING SHIPPING AND MUST BE REMOVED PRIOR TO INSTALLATION.
- SUPPLY AND INSTALLATION OF GLASS AND GLAZING MATERIALS BY OTHERS.
- ALL DOORS AND FRAMES WILL BE MARKED WITH ARCHITECTS OPENING NUMBERS.
- ALL PLANT ON TYPE MOULDINGS BY OTHERS.
- ALL FRAME INSULATION BY OTHERS.
- PAINT BY OTHERS.

HARDWARE - GENERAL NOTES

- GENERAL CONTRACTOR TO INSURE ALL WOOD DOORS , FRAMES AND WALLS WHERE REQUIRED TO HAVE FULL WOOD BLOCKING FOR HARDWARE ITEMS SUCH DOOR CLOSERS , OPERATORS, EXIT DEVICES , TRACK HARDWARE ETC.
- ALL HOLD OPEN DOOR CLOSERS TO BE INSTALLED TO THE MAXIMUM OPENING DEGREE POSSIBLE WITHOUT HITTING THE WALL .
- DOOR CLOSERS TO BE MOUNTED OUT OF THE CORRIDOR WHERE EVER POSSIBLE.

WOOD DOORS - GENERAL NOTES

- IF DOORS ARE UNFINISHED, ALL EDGES MUST BE SEALED WITHIN 24 HOURS OF DELIVERY TO SITE TO MAINTAIN WARRANTY.
- DOORS MUST BE STORED FLAT ON A SKID INSIDE FOR 24 HOURS TO ACCLIMATIZE, AVOID WARPAGE AND MAINTAIN WARRANTY.
- NO GLASS OR LOUVRES ARE INCLUDED, ALL BY OTHERS.
- DOORS ARE PREPARED FOR STANDARD HARDWARE ONLY, ANY HARDWARE PREPS OTHER THAN ON HARDWARE LIST AT TIME OF TENDER ARE EXTRA.
- SHOP DRAWINGS RETURNED WITH "REVIEWED" OR "REVIEWED AS NOTED" INDICATES ACCEPTANCE OF MATERIALS AS LISTED.
- ELITE DOOR & HARDWARE WILL NOT TAKE RESPONSIBILITY FOR AN INCOMPLETE REVIEW THAT RESULTS IN UNWANTED MATERIALS ON SITE.
- ANY CHANGES WILL RESULT IN ADDITIONAL CHARGES.

PLEASE NOTE

SCHEDULES (HARDWARE, HOLLOW METAL & WOOD) MUST BE REVIEWED IN DETAIL FOR DESIGN, FUNCTION AND MANUFACTURER, JAMB DEPTH, GAUGE AND ALL OTHER INFORMATION LISTED IN SCHEDULE.

SCHEDULES RETURNED WITH REVIEWED OR REVIEWED AS NOTED INDICATES ACCEPTANCE OF ALL HARDWARE AND MATERIALS AS INDICATED.

IF SCHEDULES ARE NOT REVIEWED IN COMPLETE DETAIL ELITE DOOR & HARDWARE INC WILL NOT TAKE ANY RESPONSIBILITY.

ANY CHANGES COULD RESULT IN ADDITIONAL CHARGES.

SIGNED BY _____ PRINT _____ DATE _____

Elite
Door & Hardware Inc

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Submittal Date: JAN 26, 2022

Manufacturers & Finishes

Manufacturers

Cal-Royal Products
Camden Door Controls
Corbin-Russwin
HES
K.N. Crowder
McKinney
Norton Door Control Products
Pemko
Rixson Specialty Door Control
Rockwood Manufacturing
Sargent
Securitron
User Hardware
Von Duprin

Finishes

630 - Satin stainless steel
689 - Aluminum painted
US26D - Satin chromium plated
 over nickel
US32D - Satin stainless steel

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OPENINGS

Opening Number(s)	Qty	Heading Num.	Location 1	To/ From	Location 2	Nominal Width	Nominal Height	Door Thickness	Hand	Label	Frame Mat'l	Door Mat'l	Remarks
100A	1	1	EXTERIOR	From	VESTIBULE 100	1111	2167	51	LHR		ALUM	ALUM	
100B	1	2	ACCESS CORRIDOR 101	From	VESTIBULE 100	1098	2160	51	RHR		ALUM	ALUM	DOOR OPERATOR MUST BE INTEGRATED IWTH ACCESS CONTROL BY USE OF CX 12 PROVIDED BY OPERATOR SUPPLIER.
102	1	3	ACCESS CORRIDOR 101	To	I.T. ROOM	965	2150	44	RH		PGS	PGS	
104	1	4	EXTERIOR	From	ACCESS CORRIDOR 101	1058	2142	51	RHR		ALUM	ALUM	
105	1	5	ACCESS CORRIDOR 101	To	WRITE-UP ROOM	1300	2760	44	SLIDING		GYP	P/G	
107	1	6	LOCKER ROOM 106	To	UNIVERSAL WASHROOM 107	965	2150	44	LH		PGS	PGS	TO COMPLY WITH AODA UNIVERSAL WASHROOM. DOOR OPERATOR SHALL BE INTEGRATED WITH ACCESS CONTROLB Y USE OF CX-12 PROVIDED BY OPERATOR SUPPLIER.
109	1	7	LOCKER ROOM 106	To	UNIVERSAL WASHROOM 109	965	2150	44	RH		PGS	PGS	TO COMPLY WITH AODA UNIVERSAL WASHROOM. DOOR OPERATOR SHALL BE INTEGRATED WITH ACCESS CONTROLB Y USE OF CX-12 PROVIDED BY OPERATOR SUPPLIER.
111A	1	8	VEHICLE BAY	From	ACCESS CORRIDOR	965	2150	44	RHR	WHIX.75	PGS	PGS	FIRE RATED GLASS AS PER SPECIFICATIONS.
111B	1	9	EXTERIOR	To/From	VEHICLE BAYS 111	3600	3600	50	FFD		N/A	ALUM	FOUR - FOLD DOOR GC TO PROVIDE REPLAY FOR CARD ACCESS INTEGRATION TO BE WIRED AND TESTED BY SECURITY CONTRACTOR.
111C	1	9	EXTERIOR	To/From	VEHICLE BAYS 111	3600	3600	50	FFD		N/A	ALUM	FOUR - FOLD DOOR GC TO PROVIDE REPLAY FOR CARD ACCESS INTEGRATION TO BE WIRED AND TESTED BY SECURITY CONTRACTOR.
111D	1	10	EXTERIOR	From	VEHICLE BAYS 111	965	2150	44	LHR		PGS	PGS	
111E	1	11	EXTERIOR	To/From	VEHICLE BAYS 111	3600	3600	50	OHD		N/A	ALUM	OVERHEAD SECTIONAL, GC TO PROVIDE REPLAY FOR CARD ACCESS INTEGRATION TO BE WIRED AND TESTED BY SECURITY CONTRACTOR
111F	1	11	EXTERIOR	To/From	VEHICLE BAYS 111	3600	3600	50	OHD		N/A	ALUM	OVERHEAD SECTIONAL, GC TO PROVIDE REPLAY FOR CARD ACCESS INTEGRATION TO BE WIRED AND TESTED BY SECURITY CONTRACTOR
111G	1	12	EXTERIOR	From	VEHICLE BAYS 111	965	2150	44	LHR		PGS	PGS	
112	1	13	VEHICLE BAYS 111	From	OXYGEN STORAGE 112	965	2150	44	LHR		PGS	PGS	

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Opening Number(s)	Qty	Heading Num.	Location 1	To/ From	Location 2	Nominal Width	Nominal Height	Door Thickness	Hand	Label	Frame Mat'l	Door Mat'l	Remarks
113	1	14	VEHICLE BAYS 111	To	MEDICAL STORAGE 113	965	2150	44	LH	WHIX.75	PGS	PGS	
114	1	12	EXTERIOR	From	MECHANICAL/ELECTRIC ROOM	965	2150	44	RHR		PGS	PGS	
115	1	15	VEHICLE BAYS 111	From	JANITORS CLOSET 115	762	2150	44	RHR		PGS	PGS	

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Hardware Schedule

Heading #1

Item #1 1 Single door 100A, EXTERIOR From VESTIBULE 100 LHR

1111 x 2167 x 51 - ALUM DR x ALUM FR

1	Continuous Hinge	CFM85SLFHD1(Cut to 0)	C
1	Exit Device	33A-NL US26D 388 US26D LHR 1111 x 2167 Door	US26D/US26D
1	Cylinder	8000ICRIM US26D	US26D
1	Cylinder	2000ICC	
1	Cylinder	1000ICC US26D GMK	US26D
1	Electric Strike	9400-630 (BY SECURITY CONTRACTOR)	630
1	Door Pull	BF158 US32D Type 12 HD Mounting	US32D
1	Auto Door Operator	Besam SW200i x FWH	
2	Push Button	CM-60/2	
2	Surface Mounted Box	CM-69S	
1	Relay Switch	CX-12	
1	Overhead Door Stop	6-436 689	689
1	Threshold	252X2AFG44 x 1111mm	AFG
1	Door Sweep	29326CNB 44 x 1111mm	C
1	Door Contact	3287 - OR SIMILAR (BY SECURITY CONTACTOR)	
1	Card Reader	Card Reader (BY SECURITY CONTRACTOR)	
1	REX Switch	REX (BY SECURITY CONTRACTOR)	
1	Door Buzzer	DOOR BUZZER (BY OTHERS)	

- Balance of gasketing by Door Supplier.
- Pressing actuators button cycles the operator. Manual operation with exit device from inside. REX inside , shunts the door contact When door is locked, valid card read Releases the Electric strike and makes push button active, inside push button to unlock strike and open the door.
- Keyed exterior of exit device is STOREROOM Function .
- All wiring high and low voltage, conduit and back boxes by Electrical Contractor.

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Heading #2

Item #2 1 Single door 100B, ACCESS CORRIDOR 101 From VESTIBULE 100 RHR

1098 x 2160 x 51 - ALUM DR x ALUM FR

1	Continuous Hinge	CFM85SLFHD1(Cut to 0)	C
1	Exit Device	33A-NL US26D 388 US26D RHR 1098 x 2160 Door	US26D/US26D
1	Cylinder	8000ICRIM US26D	US26D
1	Cylinder	2000ICC	
1	Cylinder	1000ICC US26D GMK	US26D
1	Door Pull	BF158 US32D Type 12 HD Mounting	US32D
1	Auto Door Operator	Besam SW100 x FWH x EXU-SI	
2	Push Button	CM-60/2	
1	Relay Switch	CX-12	
1	Overhead Door Stop	6-436 689	689

- Balance of gasketing by Door Supplier.
- Exit device to be dogged down during normal use to make it unlocked / PASSAGE function/ Push Pull .
- Pushing inside or out side buttons will open door. When door is locked / Undogged operator must be shut off.
- All wiring high and low voltage, conduit and back boxes by Electrical Contractor.

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Heading #3

Item #3 1 Single door 102, ACCESS CORRIDOR 101 To I.T. ROOM RH

965 x 2150 x 44 - HM DR x HM FR

3	Standard Hinge	T4A3786 5" x 4 1/2" (127mm x 114mm) US26D	US26D
1	Lockset	ML2057 LWA/LWA 626/626 RH LC	626/626
1	Electric Strike	1006CLB-630 (BY SECURITY CONTRACTOR)	630
1	Cylinder	7000ICMC US26D	US26D
1	Cylinder	2000ICC	
1	Cylinder	1000ICC US26D GMK	US26D
1	Surface Closer	7500-REG 689 77860H	689
		MTD@PULL SIDE	
1	Overhead Door Stop	1-336 689	689
1	Kick Plate	K1050 8 x 36.5 US32D (200mm x 927mm) 4BE SA	US32D
1	Card Reader	Card Reader (BY SECURITY CONTRACTOR)	
1	Door Contact	3287 - OR SIMILAR (BY SECURITY CONTACTOR)	
1	REX Switch	REX (BY SECURITY CONTRACTOR)	

-Valid card read releases the electric strike and door can be pulled open. Door closes and locks. REX inside the lockset shunts the door contact.

Storeroom lockset

-All wiring high and low voltage, conduit and back boxes by Electrical.

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Heading #4

Item #4 1 Single door 104, EXTERIOR From ACCESS CORRIDOR 101 RHR

1058 x 2142 x 51 - ALUM DR x ALUM FR

1	Continuous Hinge	CFM85SLFHD1(Cut to 0)	C
1	Exit Device	33A-NL US26D 388 US26D RHR 1058 x 2142 Door	US26D/US26D
1	Cylinder	8000ICRIM US26D	US26D
1	Cylinder	2000ICC	
1	Cylinder	1000ICC US26D GMK	US26D
1	Electric Strike	9400-630 (BY SECURITY CONTRACTOR)	630
1	Door Pull	BF158 US32D Type 12 HD Mounting	US32D
1	Surface Closer	CPS7500 689 7788	689
1	Miscellaneous Item	6891 689	689
1	Threshold	252X2AFG42 (1058mm)	AFG
1	Door Sweep	29326CNB 42 (1058mm)	C
1	Door Contact	3287 - OR SIMILAR (BY SECURITY CONTACTOR)	
1	Card Reader	Card Reader (BY SECURITY CONTRACTOR)	
1	REX Switch	REX (BY SECURITY CONTRACTOR)	

-Balance of gasketing by Door Supplier.

-Manual operation with exit device from inside. REX inside , shunts the door contact When door is locked, valid card read Releases the Electric strike,

- keyed exterior of exit device is STOREROOM Function .

-All wiring high and low voltage, conduit and back boxes by Electrical.

Heading #5

Item #5 1 Single door 105, ACCESS CORRIDOR 101 To WRITE-UP ROOM SLIDING

1300 x 2760 x 44 - WD DR x GYP FR

1	Sliding Door Track Kit	C-818HD x 108" 1DR KIT (103")	
1	Aluminum Fascia	C-110-BLA x 103	BLA
1	Handle Pulls	C-90DP x 626	x 626

KIT INCLUDES STOP AND FLOOR GUIDE.

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Heading #6

Item #6 1 Single door 107, LOCKER ROOM 106 To UNIVERSAL WASHROOM 107 LH

965 x 2150 x 44 - HM DR x HM FR

3	Standard Hinge	T4A3786 5" x 4 1/2" (127mm x 114mm) US26D	US26D
1	Lockset	ML2057 LWA/LWA 626/626 LH LC	626/626
1	Cylinder	7000ICMC US26D	US26D
1	Cylinder	1000ICC US26D GMK	US26D
1	Electric Strike	1006F-630-LBM HM-630 2005M3	630-LBM
1	Auto Door Operator	Besam SW100 x FWH x EXU-SI	
1	Push Plate Switch	CM-45/4	
1	Mounting Box	CM-43CBL	
1	Washroom Control Kit	CX-WC13XSM	
1	Emergency Call Kit	CX-WEC10	
1	Kick Plate	K1050 8 x 36.5 US32D (200mm x 927mm) 4BE SA	US32D
1	Wall Stop	406 US32D	US32D
1	Power Supply	BPS-12/24-1	
1	Electrolynx Harness	QC-C1500P	
1	Key Switch	MKA	
1	Coat Hook	RM821 US32D	US32D

-Operator mounted inside washroom. Entry by pushing door or by pressing corridor wall mounted operator button. Upon entry and door closing, pressing of interior "push to lock" switch. Egress by using lever trim or by pressing wall mounted operator button. System automatically resets when door opens. Pressing emergency switch unlocks electric strike and illuminates interior and exterior assistance required indicators and sound local alerts, until help arrives and opens door. System can be configured to open door upon alarm. For maintenance purposes, corridor side keyswitch secures washroom door and turns corridor side operator actuator off. Relay to be used to latch wall mount momentary tape switches to maintain assistance required status. Free egress at all times. Door is unlocked in a power fail condition.

-All wiring high and low voltage, conduit and back boxes by Electrical Contractor.

- RELAY INCLUDED IN RESTROOM KIT

Elite
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Submittal Date: JAN 26, 2022

Heading #7

Item #7 1 Single door 109, LOCKER ROOM 106 To UNIVERSAL WASHROOM 109 RH

965 x 2150 x 44 - HM DR x HM FR

3	Standard Hinge	T4A3786 5" x 4 1/2" (127mm x 114mm) US26D	US26D
1	Lockset	ML2057 LWA/LWA 626/626 RH LC	626/626
1	Cylinder	7000ICMC US26D	US26D
1	Cylinder	1000ICC US26D GMK	US26D
1	Electric Strike	1006F-630-LBM HM-630 2005M3	630-LBM
1	Auto Door Operator	Besam SW100 x FWH x EXU-SI	
1	Push Plate Switch	CM-45/4	
1	Mounting Box	CM-43CBL	
1	Washroom Control Kit	CX-WC13XSM	
1	Emergency Call Kit	CX-WEC10	
1	Kick Plate	K1050 8 x 36.5 US32D (200mm x 927mm) 4BE SA	US32D
1	Wall Stop	406 US32D	US32D
1	Power Supply	BPS-12/24-1	
1	Electrolynx Harness	QC-C1500P	
1	Key Switch	MKA	
1	Coat Hook	RM821 US32D	US32D
1	Key Box	Smash Box - mounted between 2 washrooms - HPC511	

-Operator mounted inside washroom. Entry by pushing door or by pressing corridor wall mounted operator button. Upon entry and door closing, pressing of interior "push to lock" switch. Egress by using lever trim or by pressing wall mounted operator button. System automatically resets when door opens. Pressing emergency switch unlocks electric strike and illuminates interior and exterior assistance required indicators and sound local alerts, until help arrives and opens door. System can be configured to open door upon alarm. For maintenance purposes, corridor side keyswitch secures washroom door and turns corridor side operator actuator off. Relay to be used to latch wall mount momentary tape switches to maintain assistance required status. Free egress at all times. Door is unlocked in a power fail condition.

-All wiring high and low voltage, conduit and back boxes by Electrical Contractor.

- RELAY INCLUDED IN RESTROOM KIT

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Submittal Date: JAN 26, 2022

Heading #8

Item #8 1 Single door 111A, VEHICLE BAY From ACCESS CORRIDOR RHR

965 x 2150 x 44 - HM DR x HM FR - WHIX.75

3	Standard Hinge	T4A3786 5" x 4 1/2" (127mm x 114mm) US26D NRP	US26D
1	Exit Device	99-L-BE-F US26D 996L-BE-R US26D RHR 965 x 2150 Door	US26D/US26D
1	Surface Closer	CPS7500 689	689
		MTD@PUSH SIDE	
1	Kick Plate	K1050 8 x 36.5 US32D (200mm x 927mm) 4BE SA	US32D
1	Door Sweep	29326CNB 38 (965mm)	C
1	Gasketing	S88 BL18 (5265mm)	BL
1	Threshold	252X3AFG38 (965mm)	AFG

Exit Device is Passage Function

Heading #9

Item #9 1 Single door 111B, EXTERIOR To/From VEHICLE BAYS 111 FFD

Item #10 1 Single door 111C, EXTERIOR To/From VEHICLE BAYS 111 FFD

3600 x 3600 x 50 - ALUM DR x N/A FR

2	Card Reader	Card Reader (BY SECURITY CONTRACTOR)
2	OH Door Contact	OH DOOR CONTACT (BY SECURITY CONTRACTOR)

- * FOUR FOLD DOORS COMPLETE BY DOOR MANUFACTURER.
- * WEATHERSTIPPING & DOOR SWEEP BY DOOR MANUFACTURER.

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Heading #10

Item #11 1 Single door 111D, EXTERIOR From VEHICLE BAYS 111 LHR

965 x 2150 x 44 - HM DR x HM FR

1	Continuous Hinge	CFM85SLFHD1(Cut to 0)	C
1	Exit Device	99-L-NL US26D 996L-NL-R US26D LHR 965 x 2150 Door	US26D/US26D
1	Electric Strike	9400-630 (BY SECURITY CONTRACTOR)	630
1	Cylinder	8000ICRIM US26D	US26D
1	Cylinder	2000ICC	
1	Cylinder	1000ICC US26D GMK	US26D
1	Surface Closer	CPS7500 689	689
		MTD@PUSH SIDE	
1	Kick Plate	K1050 8 x 36.5 US32D (200mm x 927mm) 4BE SA	US32D
1	Weatherstripping	2891AS-38 x 85	A
1	Threshold	252X3AFG38	AFG
1	Door Sweep	29326CNB 38 (965mm)	C
1	Door Contact	3287 - OR SIMILAR (BY SECURITY CONTRACTOR)	
1	Card Reader	Card Reader (BY SECURITY CONTRACTOR)	
1	REX Switch	REX (BY SECURITY CONTRACTOR)	
1	Keypad	DK-26SS	SS

. Manual operation with exit device from inside. REX inside shunts the door contact. When door is locked, valid card read releases the electric strike and door can be pulled open.
- Exterior keyed side is Storeroom function.

-All wiring high and low voltage, conduit and back boxes by Electrical Contractor.

Heading #11

Item #12 1 Single door 111E, EXTERIOR To/From VEHICLE BAYS 111 OHD

Item #13 1 Single door 111F, EXTERIOR To/From VEHICLE BAYS 111 OHD

3600 x 3600 x 50 - ALUM DR x N/A FR

2	REX Switch	REX (BY SECURITY CONTRACTOR)	
2	Card Reader	Card Reader (BY SECURITY CONTRACTOR)	
2	OH Door Contact	OH DOOR CONTACT (BY SECURITY CONTRACTOR)	

* OVER HEAD DOOR COMPLETE BY MANUFACTURER.
* WEATHERSTRIPPING & DOOR SWEEP BY DOOR MANUFACTURER.

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Submittal Date: JAN 26, 2022

Heading #12

Item #14	1 Single door 111G, EXTERIOR From VEHICLE BAYS 111	LHR
Item #15	1 Single door 114, EXTERIOR From MECHANICAL/ELECTRICAL ROOM	RHR

965 x 2150 x 44 - HM DR x HM FR

2	Continuous Hinge	CFM85SLFHD1(Cut to 0)	C
1	Exit Device	99-L-NL US26D 996L-NL-R US26D LHR 965 x 2150 Door	US26D/US26D
1	Exit Device	99-L-NL US26D 996L-NL-R US26D RHR 965 x 2150 Door	US26D/US26D
2	Electric Strike	9400-630 (BY SECURITY CONTRACTOR)	630
2	Cylinder	8000ICRIM US26D	US26D
2	Cylinder	2000ICC	
2	Cylinder	1000ICC US26D GMK	US26D
2	Surface Closer	CPS7500 689	689
		MTD@PUSH SIDE	
2	Kick Plate	K1050 8 x 36.5 US32D (200mm x 927mm) 4BE SA	US32D
2	Weatherstripping	2891AS-38 x 85	A
2	Threshold	252X3AFG38	AFG
2	Door Sweep	29326CNB 38 (965mm)	C
2	Door Contact	3287 - OR SIMILAR (BY SECURITY CONTRACTOR)	
2	Card Reader	Card Reader (BY SECURITY CONTRACTOR)	
2	REX Switch	REX (BY SECURITY CONTRACTOR)	

. Manual operation with exit device from inside. REX inside shunts the door contact. When door is locked, valid card read releases the electric strike and door can be pulled open.

- Extreior keyed side is Storeroom function.

-All wiring high and low voltage, conduit and back boxes by Electrical Contractor.

Heading #13

Item #16	1 Single door 112, VEHICLE BAYS 111 From OXYGEN STORAGE 112	LHR
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965 x 2150 x 44 - HM DR x HM FR

3	Standard Hinge	T4A3786 5" x 4 1/2" (127mm x 114mm) US26D	US26D
1	Latchset	ML2010 LWA/LWA 626/626 LHR	626/626
1	Surface Closer	CPS7500 689	689
		MTD@PUSH SIDE	
1	Kick Plate	K1050 8 x 36.5 US32D (200mm x 927mm) 4BE SA	US32D
1	Door Sweep	29326CNB 38 (965mm)	C
1	Weatherstripping	S88 BL18	BL

Passage Function

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Submittal Date: JAN 26, 2022

Heading #14

Item #17 1 Single door 113, VEHICLE BAYS 111 To MEDICAL STORAGE 113 LH

965 x 2150 x 44 - HM DR x HM FR - WHIX.75

3	Standard Hinge	T4A3786 5" x 4 1/2" (127mm x 114mm) US26D	US26D
1	Lockset	ML2057 LWA/LWA 626/626 LH LC	626/626
1	Electric Strike	1006CLB-630 (BY SECURITY CONTRACTOR)	630
1	Cylinder	7000ICMC US26D	US26D
1	Cylinder	2000ICC	
1	Cylinder	1000ICC US26D GMK	US26D
1	Surface Closer	CPS7500 689	689
		MTD@PUSH SIDE	
1	Kick Plate	K1050 8 x 36.5 US32D (200mm x 927mm) 4BE SA	US32D
1	Card Reader	Card Reader (BY SECURITY CONTRACTOR)	
1	Door Contact	3287 - OR SIMILAR (BY SECURITY CONTRACTOR)	
1	REX Switch	REX (BY SECURITY CONTRACTOR)	

-Valid card read releases the electric strike and door can be pulled open. Door closes and locks. REX inside the lockset shunts the door contact.

Storeroom lockset

-All wiring high and low voltage, conduit and back boxes by Electrical.

Heading #15

Item #18 1 Single door 115, VEHICLE BAYS 111 From JANITORS CLOSET 115 RHR

762 x 2150 x 44 - HM DR x HM FR

3	Standard Hinge	T4A3786 4 1/2" x 4" (114mm x 102 mm) US26D NRP	US26D
1	Lockset	ML2057 LWA/LWA 626/626 RHR LC	626/626
1	Electric Strike	1006CLB-630 (BY SECURITY CONTRACTOR)	630
1	Cylinder	7000ICMC US26D	US26D
1	Cylinder	2000ICC	
1	Cylinder	1000ICC US26D GMK	US26D
1	Surface Closer	CPS7500 689	689
		MTD@PUSH SIDE	
1	Kick Plate	K1050 8 x 36.5 US32D (200mm x 927mm) 4BE SA	US32D
1	Door Sweep	29326CNB 38 (965mm)	C
1	Weatherstripping	S88 BL18	BL
1	Card Reader	Card Reader (BY SECURITY CONTRACTOR)	

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YORK REGION PRS STATION #32
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Submittal Date: JAN 26, 2022

1. GENERAL

1.1. General Requirements

1. Read and be governed by conditions of the *Contract Documents*, including sections of Division 01.
2. Conform to the requirements stated in the General Conditions, Supplementary General Conditions of this Specification and all addenda for all work, including work outside the property line including work within Regional and Municipal right of way unless otherwise noted.

1.2. Related Work

- | | |
|--|------------------|
| 1. Site Grading | Section 31 23 13 |
| 2. Excavation, Trenching and Backfilling | Section 31 23 10 |
| 3. Granular Base | Section 32 11 23 |
| 4. Granular Sub-Base | Section 32 11 19 |
| 5. Asphalt Paving | Section 32 12 16 |

1.3. References

1. ASTM D4791-10, Test Method for Flat or Elongated Particles in Coarse Aggregate.
2. Ontario Provincial Standard Specification 1001.

1.4. Samples

1. Submit samples in accordance with Section 01 33 00.
2. Allow continual sampling by Consultant during production.
3. Provide Consultant with access to source and processed material for sampling.
4. Install sampling facilities at discharge end of production conveyor, to allow Consultant to obtain representative samples of items being produced. Stop conveyor belt when requested by Consultant to permit full cross section sampling.

2. PRODUCTS

2.1. Materials

1. Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, or other substances that would act in deleterious manner for use intended.
2. Flat and elongated particles of coarse aggregate: to ASTM D4791.
 1. Greatest dimension to exceed five times least dimension.
3. Fine aggregates satisfying requirements of applicable section to be one, or blend of following.
 1. Natural sand.
 2. Manufactured sand.
 3. Screenings produced in crushing of quarried rock, boulders or gravel.
4. Coarse aggregates satisfying requirements of applicable section to be one of or blend of the following:

1. Crushed rock.
2. Gravel and crushed gravel composed of naturally formed particles of stone.

2.2. Source Quality Control

1. Inform Consultant of proposed source of aggregates and provide access for sampling at least four weeks prior to commencing production.
2. If, in opinion of Consultant, materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate an alternative source or demonstrate that material from source in question can be processed to meet specified requirements.
3. Advise Consultant four weeks in advance of proposed change of material source.
4. Acceptance of material at source does not preclude future rejection if it fails to conform to requirements specified, lacks uniformity, or if its field performance is found to be unsatisfactory.

3. EXECUTION

3.1. Preparation

1. Aggregate source preparation
 1. Prior to excavating materials for aggregate production, clear and grub area to be worked, and strip unsuitable surface materials. Dispose of cleared, grubbed and unsuitable materials as directed by Consultant.
 2. Where clearing is required, leave screen of trees between cleared area and roadways as directed.
 3. Clear, grub and strip area ahead of quarrying or excavating operation sufficient to prevent contamination of aggregate by deleterious materials.
 4. When excavation is completed, dress sides of excavation to nominal 1.5:1 slope, and provide drains or ditches as required to prevent surface standing water.
 5. Trim and dress slopes and leave site in neat condition.
2. Processing
 1. Process aggregate uniformly using methods that prevent contamination, segregation and degradation.
 2. Blend aggregates, if required, to obtain gradation requirements, percentage of crushed particles, or particle shapes, as specified. Use methods and equipment approved by Consultant.
 3. Wash aggregates to meet specifications. Use only approved equipment.
 4. When operating in stratified deposits use excavation equipment and methods that produce uniform, homogeneous aggregate.
3. Handling
 1. Handle aggregates to avoid segregation, contamination and degradation.
4. Stockpiling
 1. Stockpile aggregates on site in locations as indicated unless directed otherwise by Consultant. Do not stockpile on completed surfaces.

2. Stockpile aggregates in sufficient quantities to meet project schedules.
3. Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support materials and handling equipment.
4. Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 300 mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground but do not incorporate bottom 300 mm of pile into work.
5. Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.
6. Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by Consultant within 48 h of rejection.
7. Stockpile materials in uniform layers of thickness as follows:
 1. Max. 1.5 m for coarse aggregate and base course materials.
 2. Max. 1.5 m for fine aggregate and sub-base materials.
 3. Max. 1.5 m for other materials.
8. Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.
9. Do not cone piles or spill material over edges of piles.
10. Do not use conveying stackers.
11. During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

3.2. Cleaning

1. Leave aggregate stockpile site in tidy, well drained conditions, free of standing surface water.
2. Leave any unused aggregates in neat stockpiles as directed by Consultant.

END OF SECTION

1. **GENERAL**

1.1. **General Requirements**

1. Read and be governed by conditions of the *Contract Documents*, including sections of Division 01.
2. Conform to the requirements stated in the General Conditions, Supplementary General Conditions of this Specification and all addenda for all work, including work outside the property line including work within Regional and Municipal right of way unless otherwise noted.

1.2. **Related Work**

- | | |
|------------------------|------------------|
| 1. Site Grading | Section 31 23 13 |
| 2. Water System | Section 33 11 17 |
| 3. Storm Sewers | Section 33 44 00 |
| 4. Aggregates: General | Section 31 05 17 |

1.3. **Definitions**

1. Common excavation: excavation of materials of whatever nature, including dense tills, hardpan, frozen materials and partially cemented materials which can be ripped and excavated with heavy hydraulic excavating equipment.
2. Topsoil: material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
3. Waste material: excavated material unsuitable for use in work or surplus to requirements.
4. Borrow material: Sub-soil material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of work. This material shall be of residential/agricultural origin and shall meet or exceed the confined fill material criteria as per MOE "Fill Quality Guidelines for Lake Filling in Ontario" of June 1992. Contractor shall provide consultant with one chemical test per source prior to hauling material to the site.
5. Unsuitable materials:
 1. Weak and compressible materials under excavated areas.
 2. Frost susceptible materials under excavated areas.
 3. Frost susceptible materials:
 1. Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422 and ASTM C136: Sieve sizes to CAN/CGSB-8.1
 2. Coarse grained soils containing more than 20% by mass passing 0.075 mm sieve.
6. Un-shrinkable fill: very weak mixture of Portland cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

1.4. **Samples**

1. Submit samples of bedding or other granular backfill materials in accordance with Section 01 33 00.
2. Inform Consultant prior to commencing work, of proposed source of fill materials and provide access for sampling.

1.5. **Protection Of Existing Features**

1. Existing buried utilities and structures:
 1. Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
 2. Prior to commencing excavation work, notify Consultant or authorities having jurisdiction, establish location and state of use of buried utilities and structures. Consultant or authorities having jurisdiction shall clearly mark such locations to prevent disturbance during work.
 3. Confirm locations of buried utilities by careful test excavations.
 4. Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered. Obtain direction of Consultant before moving or otherwise disturbing utilities or structures.
 5. Record location of maintained, re-routed and abandoned underground lines.

2. **PRODUCTS**

2.1. **Materials**

1. Granular Base: to Section 32 11 23.
2. Granular Sub-Base: to Section 32 11 19.
3. Fill concrete: to Section 03 30 00 and following requirements:
 1. Minimum compressive strength at 28 days: 15 MPa.
 2. Maximum slump at time and point of discharge: 100 mm.
4. Unshrinkable fill: to the following requirements.
 1. Maximum compression strength at 28 days: 0.4 MPa.
 2. Maximum cement content: 25 kg/m³ of concrete mix.
 3. Slump at time and point of discharge: 150 to 200 mm.
 4. Air content: 4 to 6%
5. Sewer pipe embedment shall be mortar sand conforming to OPSS 1004 Granular D extending 150mm or ¼ of the pipe diameter, whichever is greater, around all sides of pipe.
6. Granular Backfill: Imported granular material conforming to a Granular 'B' Type I, as specified in OPSS 1010, or approved reclaimed granular materials free of organics.
7. Borrow material: See Part 1 – General, Definitions.

3. **EXECUTION**

- 3.1. All trenching, backfilling and compacting is to be completed in accordance with OPSS 514.

3.2. **Site Preparation**

1. Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.
2. Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly.

3.3. **Stockpiling**

1. Stockpile fill materials in areas designated by Consultant. Stockpile granular materials in manner to prevent segregation.
2. Protect fill materials from contamination.

3.4. **Dewatering**

1. Keep excavations free of water while work is in progress.
2. Protect open excavations against flooding and damage due to surface run-off.
3. Dispose of water in a manner not detrimental to public and private property, or any portion of work completed or under construction.
4. Continuously dewater the excavations to control surface runoff or perched water table seepage for concreting and other work to be carried out in the dry condition.
5. Discharging into a geotextile bag should be placed on a relatively flat surface and at least 30m away from any natural water feature.
6. Submit for Consultant's review details of proposed dewatering methods, such as dikes or well points.

3.5. **Trench Excavation**

1. Excavate to lines, grades, locations, elevations and dimensions as indicated or directed by Consultant.
2. Remove excavated material and other obstructions encountered during excavation. Excavated trench material may be used as fill material on-site provided it is free from deleterious materials,
3. Excavation must not interfere with normal 45° splay of bearing from bottom of any footing.
4. Do not disturb soil within branch spread of trees or shrubs that are to remain. If excavating through roots, excavate by hand and cut roots with sharp axe or saw.
5. Unless otherwise authorized by Consultant in writing, do not excavate more than 30 m of trench in advance of installation operations and do not leave open more than 15 m at end of day's operation.
6. Do not obstruct flow of surface drainage or natural watercourses.
7. Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
8. Notify Consultant when bottom of trench excavation is reached.
9. Obtain Consultant approval of completed excavation.
10. Remove unsuitable material from trench bottom to extent and depth as directed by Consultant.
11. Correct unauthorized over-excavation as follows:

1. Fill under bearing surfaces and footings with concrete specified for footings.
2. Fill under other areas with Granular 'B' material specified in Section 32 11 19.
12. Hand trim, make firm and remove loose material and debris from excavations. Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil. Clean out rock seams and fill with concrete mortar or grout to approval of Consultant.

3.6. **Surplus Excavated Material and Removals**

1. The Contractor is to make his own arrangements for the disposal of all excavated materials, removals, grindings and all other debris not suitable for re-use in the construction. If the Contractor enters into an agreement with an individual for the use of land for the disposal of excavated materials or for any other reason, a copy of the said Agreement clearly stating the obligation of all concerned and signed by all parties shall be submitted to the Consultant. The Contractor shall comply with the requirements of all Federal, Provincial and Municipal Laws, Acts, Ordinances, Regulations, Orders-in-Council and By-Laws, which could in any way pertain to the work outlined in the Contract. The items in the Form of Tender include all costs for disposal of unsuitable or excess material off the site and the Contractor shall make the arrangements for the disposal of the materials removed in accordance with MOE Reg. 558.

3.7. **Bedding And Surround Of Underground Services**

1. Place and compact granular material for bedding and surround of underground services as indicated and as specified.
2. Place bedding and surround material in unfrozen condition.

3.8. **Backfilling**

1. Do not proceed with backfilling operations until Consultant has inspected and approved installation.
2. Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
3. Trench backfill is to consist of Granular B Type I as specified in OPSS 1010 or reclaimed granular materials free of organics.
4. Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer to 98% SPMDD.
5. Backfill around installations.
 1. Place bedding and surround material as specified elsewhere.
 2. Do not backfill around or over cast-in-place concrete within 24 hr. after placing of concrete.
 3. Place layers simultaneously on both sides of installed work to equalize loading. Difference not to exceed 0.3 m.
 4. Where temporary unbalanced earth pressures are liable to develop on walls or other structures:
 1. Permit concrete to cure for minimum 14 days or until it has sufficient strength to withstand earth and compaction pressure and approval obtained from Consultant or;
 2. If approved by Consultant, erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Consultant.

6. Backfill within municipal right of way:

1. Trench backfill for the storm, sanitary and water servicing connections to municipal servicing shall be un-shrinkable fill.

3.9. **Inspection And Testing**

1. Testing of materials and compaction will be carried out by testing laboratory designated by Consultant. Frequency of tests will be determined by Consultant.
2. The Owner will pay costs for inspection and testing.

3.10. **Restoration**

1. Upon completion of work, remove waste materials and debris, trim slopes, and correct defects as directed by Consultant. Any disturbed grassed areas are to be restored to original condition or better with 150 mm depth of topsoil, and sod. Damaged concrete or asphalt areas are to be restored to original condition or better. Repaired asphalt areas are to be matched with adjacent asphalt and include a lab joint as per the drawing detail provided.

END OF SECTION

1. **GENERAL**

1.1. **General Requirements**

1. Read and be governed by conditions of the *Contract Documents*, including sections of Division 01.
2. Conform to the requirements stated in the General Conditions, Supplementary General Conditions of this Specification and all addenda for all work, including work outside the property line including work within Regional and Municipal right of way unless otherwise noted.

1.2. **Description**

1. Provide all labour, materials, tools and equipment necessary for all excavation and backfill to the full extent of work shown on the plans and this specification, including but not limited to the following:
 1. Grading (cutting and filling) to subgrade elevations including compaction and fine grading of existing earth materials to +/- 25 mm of design subgrade elevations (not uniformly high or low) in accordance with OPSS 206.
 2. Proof rolling of subgrade with Geotechnical consultant present
 3. Excavation and disposal of all excess unsuitable materials off site.
 4. Supply and installation of earth borrow material as required to establish design subgrade elevations.

1.3. **Related Work**

- | | |
|--|------------------|
| 1. Excavating, Trenching and Backfilling | Section 31 23 10 |
| 2. Aggregates: General | Section 31 05 17 |

1.4. **Site Conditions**

1. Protection:
 1. Provide protection (i.e. shoring, cribbing, bracing and planking) to ensure no damage occurs to existing facilities and equipment situated on site. In certain areas only hand tools may be used.
 2. Provide adequate protection around bench marks, layout markers, survey markers, and geodetic monuments.
 3. Protect bottom of excavations from freezing.
 4. Protect bottoms of excavations from softening. Should softening occur, remove softened soil and replace with lean concrete. Keep bottoms of excavations dry at all times.
 5. Direct discharge from pumps, when draining excavations, so that damage to site and adjacent property does not occur.
 6. Do not stockpile excavated material to interfere with site operation or drainage.
 7. Effect approved measures to minimize dust as a result of all grading work and all other construction activities related to this contract.
 8. Protect legal iron bars, bench marks, surface or underground utility lines which are to remain. If damaged, restore to original or better condition unless directed

otherwise.

9. Ensure sufficient quantities of wood sheeting, timbers, steel members and other materials are available at all times in order to support, brace or protect utilities, structure and properties near to or occurring within excavations.
2. The Contractor shall take all the necessary precautions to protect all utilities against damage. The Contractor shall carry out his work in a safe manner with due regard for roadway traffic to the satisfaction of the Consultant, and any authority having jurisdiction.
3. The Contractor shall have full and sole responsibility for the safety of all excavation performed under this Contract until final acceptance of the work.
4. Utility Lines:
 1. Before beginning work, establish location and extent of underground utility lines in area of excavation. Notify Consultant of all existing located services encountered, and do not continue with excavation without the Consultant's instructions. Repair and pay for damages to existing utility lines resulting from the work.
 2. Relocate existing lines in area of excavation which must remain active as indicated on the drawings.
 3. Remove abandoned utility lines, if any, to distance of 2 m from foundations. Cap lines at cut-off points.
 4. Record locations, if any, of maintained, re-routed and abandoned underground utility lines.
 5. Repair and pay for damage to existing underground lines as may result from this work.
5. Examination:
 1. Ensure in examination of the site that all possible factors concerning earthwork are investigated, and that the following are known in particular:
 1. Methods and means available for material handling, disposal, storage, and transportation.
 2. Physical conditions of site, including ground water table and drainage course, extent of removals and grading completed under a previous contract (demolition and site demolition).
 2. Unsatisfactory Soil Conditions:
 2. Any unsatisfactory or questionable soil conditions revealed during excavation shall be reported immediately to the Owner's Consultant and Geotechnical Engineer.
 3. All foundation and sub-structural work shall cease until the condition has been examined and approval to proceed has been issued.
6. Material Unsuitable for Backfill:
 1. The Contractor shall be responsible for all costs associated with the excavation and removal, off site, of all materials unsuitable for backfill or re-use.
7. Water:
 1. Keep excavation free from water at all times. Provide drainage trenches and sumps as necessary and pump water well away from excavation. Do not discharge water onto private property.

8. Inspection and Testing:

1. Testing of materials and compaction will be carried out by testing laboratory designated by the Consultant.

1.5. **Environmental Requirements**

1. Protect and repair exposed excavations where required to prevent adverse effects of rain, freezing weather and other weather conditions on subgrade of subsequent work.
2. Suspend construction operation at times when satisfactory results cannot be obtained on account of rain, snow, freezing weather or other unsatisfactory conditions.
3. Do not carry out filling or backfilling in freezing weather unless authorized by Consultant. Do not use frozen material nor place material where the material in place is already frozen.
4. Dispose of excess or unsuitable earth materials generated from the site grading in accordance with Ontario Reg. 558. The items in the Form of Tender include all costs for disposal of excess or unsuitable material off the site and the Contractor shall make the arrangements for the disposal of the materials removed in accordance with MOE Reg. 558.

2. **PRODUCTS**

2.1. **Materials**

1. Earth Borrow
 1. Earth borrow shall be earth material obtained from outside the project limits that meets the requirements of Ontario Provincial Standard Specification (OPSS) MUNI 212.
2. Backfill
 1. Site or imported material containing no organic or foreign matter, and which the subcontractor can demonstrate is compactable to a density of 98% SPMDD.

2.2. **Stockpiling**

1. Fill Materials
 1. Temporarily Stockpile fill materials in areas designated by Owner. Stockpile granular materials to prevent segregation.
2. Protection
 1. Protect fill materials from contamination and freezing.

3. **EXECUTION**

3.1. **Stripping of Topsoil**

1. Do stripping of topsoil in accordance with this Section and Geotechnical Consultant requirements.
2. Do not handle topsoil while in wet or frozen condition or in any manner in which soil structure is adversely affected as determined by Consultant.
3. Commence topsoil stripping of areas as indicated after area has been cleared of brush, weeds and grasses and removed from site.
4. Strip all topsoil. Avoid mixing topsoil with subsoil.
5. Stockpile sufficient topsoil for restoration of all grassed areas impacted by the construction.

6. Remove and dispose of surplus topsoil, off site.
7. All silt fence and erosion control measures to be in place before start of topsoil stripping operation.

3.2. **Excavation/Grading**

1. Grade to subgrade levels (to a tolerance +/- 25 mm but not consistently high or low) allowing for surface treatment as indicated.
2. Do not place material which is frozen nor place material on frozen surfaces.
3. Prior to placing fill over existing ground, scarify surface to depth of 150 mm. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.
4. Excavation, placing and compacting of fill materials are to be carried out in accordance with Ontario Provincial Standard Specification (OPSS) MUNI 206.
5. Do not disturb soil within branch spread of trees or shrubs to remain.
6. If any soft areas are detected during the proof rolling process, and with the Consultant's direction, sub-excavate as per Geotechnical Consultant's recommendations. Sub-excavated areas are to be backfilled with suitable native material, or imported approved granular material.

3.3. **Proof Rolling**

1. Proof rolling shall be carried out on completed subgrade prior to installing granular sub-base materials.
2. Proof rolling shall be carried out using a roller with a minimum static weight of 5 tonnes, and shall consist of a minimum of four passes per unit area. Wet areas or deleterious materials identified during proof rolling shall be sub-excavated and be replaced with engineered fill, consisting of Granular B, Type I as per OPSS PROV 1010 or select native material, compacted to 98% SPMDD in maximum 200 mm lifts.

3.4. **Field Quality Control**

1. Inspection and testing of materials and compaction will be carried out by the Geotechnical Consultant engaged by the Owner for this project. Costs of tests will be paid by Owner.
2. Sieve Analysis
 1. Proposed fill materials will be tested to confirm suitability for intended use and conformity with specifications.
3. Reinstatement
 1. All disturbed areas must be reinstated to Consultant's and Owner's satisfaction.
 2. Any damage to the existing rail right-of-way, due to the Contractor's operations, shall be made good at the Contractor's expense.

END OF SECTION

1. **GENERAL**

1.1. **General Requirements**

1. Read and be governed by conditions of the *Contract Documents*, including sections of Division 01.
2. Conform to the requirements stated in the General Conditions, Supplementary General Conditions of this Specification and all addenda for all work, including work outside the property line including work within Regional and Municipal right of way unless otherwise noted.

1.2. **Related Work**

- | | |
|--|------------------|
| 1. Site Grading | Section 31 23 13 |
| 2. Excavation, Trenching and Backfilling | Section 31 23 10 |
| 3. Aggregates: General | Section 31 05 17 |
| 4. Granular Base | Section 32 11 23 |

1.3. **References**

1. ASTM C 117-17, Test Method for Material Finer than 0.075 mm Sieve in Mineral Aggregates by Washing.
2. ASTM C 131/C131M-14, Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
3. C 136/C136M-14, Method for Sieve Analysis of Fine and Coarse Aggregates.
4. ASTM D 422 (1990), Method for Particle-Size Analysis of Soils.
5. ASTM D698-12e2, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort 12,400 ft-lbf/ft³ 600 kN-m/m³.
6. CAN/CGSB-81.-88, Sieves Testing, Woven Wire, Inch Series.
7. CAN/CGSB-8.2-M88, Sieves Testing, Woven Wire, Metric.
8. Ontario Provincial Standard Specification 1010.

1.4. **Delivery, Storage and Handling**

1. Refer to Section 32 11 23.

2. **PRODUCTS**

2.1. **Materials**

1. Granular sub-base material: Granular 'B', Type I or Type II, OPSS 1010, Section 31 05 17 and following requirements.
 1. Crushed, pit run or screened stone, gravel or sand consisting of hard durable angular particles free from clay lumps, cementation, organic material, frozen material and other deleterious materials.
 2. Gradations to be within limits specified when tested to ASTM C 136 and ASTM C 117. Sieve sizes to CAN/CGSB-8.1.

<u>Sieve Designation</u>	<u>% Passing</u> <u>Type I</u>
150 mm	100
26.5 mm	50-100
4.75 mm	20-100
1.18 mm	10-100
0.300 mm	2-65
0.075 mm	0-8

2. Other Properties as follows.

1. Plasticity Index ASTM D4318-84.0.
2. Crushed particles: at least 100% of particles by mass within each of the following sieve designation ranges to have at least 1 freshly fractured face for Type II. Not applicable for Type I material to be divided into ranges using methods of ASTM C135-84a.
3. Petrographic Number MTO LS609 Maximum 250.

<u>Passing</u>	<u>Retained on</u>
26.5	4.75 MM
4. Particles smaller than 0.02 mm AASHTO T88-78 maximum 3%.
5. Soaked CBR AASHTO T193-72 Min 40 when compacted to 100% of AASHTO T180.74 Method D.

Where indicated, **structural soil** is to be installed in lieu of granular sub-base. Structural soil as detailed later in this specification.

3. **EXECUTION**

3.1. **Placing**

1. Compact subgrade to 95% of SPMDD. Excavate all weak and soft spots as required and replace with granular sub-base compacted uniformly to 100% of SPMDD.
2. Place granular sub-base after subgrade is inspected and approved by Consultant.
3. Construct granular sub-base to depth and grade in areas indicated.
4. Ensure no frozen material is placed.
5. Place material only on clean unfrozen surface, free from snow or ice.
6. Place granular sub-base materials using methods which do not lead to segregation or degradation.
7. For spreading and shaping materials, use spreader boxes having adjustable templates or screens which will place material in uniform layers of required thickness.
8. Place material to full width in uniform layers not exceeding 150 mm compacted thickness.
9. Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
10. Remove and replace portion of layer in which material has become segregated during spreading.

3.2. **Compaction**

1. Compaction equipment to be capable of obtaining required material densities.

2. Efficiency of equipment not specified to proved at least as efficient as specified equipment at no extra cost and written approval must be received from Consultant before use.
 3. Equipped with device that records hours of actual work, not motor running hours.
 4. Compaction in accordance with ASTM D698 and ASTM D1577.
 1. Pavement Sub-base: Compact to density of not less than 100% SPMDD.
 2. Backfill of subgrade weak or soft spots: Compact to density of not less than 98% of SPMDD.
 5. Shape and roll alternately to obtain smooth, even and uniformly compacted sub-base.
 6. Apply water as necessary during compaction to obtain specified density.
 7. In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Consultant.
 8. Correct surface irregularities by loosening and adding or removing material unit surface is within specified tolerance.
- 3.3. **Site Tolerances**
1. Finished sub-base surface to be within 10 mm of elevation as indicated but not uniformly high or low.
- 3.4. **Inspection and Testing**
1. Testing of materials and compaction will be carried out by testing laboratory designated by Owner. Frequency of tests will be determined by Consultant.
 2. Owner will pay costs for inspection and testing.
- 3.5. **Protection**
1. Maintain finished sub-base in condition conforming to this section until succeeding base is constructed, or until granular sub-base is accepted by Consultant.

SAMPLES AND SUBMITTALS

A. At least 30 days prior to ordering materials, the Contractor shall submit to the Engineer's representative samples, certificates, manufacturers literature and certified tests for materials specified below. No materials shall be ordered until the required samples, certificates, manufacturer's literature and test results have been reviewed and approved by the Engineer. Delivered materials shall closely match the approved samples. Approval shall not constitute final acceptance. The Engineer reserves the right to reject, on or after delivery, any material that does not meet these specifications.

1.02 DELIVERY, STORAGE AND HANDLING

A. Do not deliver or place soil in frozen, wet, or muddy conditions. Material shall be delivered at or near optimum compaction moisture content as determined by AASHTO T 99 (ASTM D 698). Do not deliver or place materials in an excessively moist condition (beyond 2 percent above optimum compaction moisture content as determined by AASHTO T 99 (ASTM D 698).

B. Protect soils and mixes from absorbing excess water and form erosion at all times. Do not store materials unprotected from large rainfall events. Do not allow excess water to enter site prior to compaction. If water is introduced into the material after grading, allow material to drain or aerate to optimum compaction moisture content.

END OF SECTION

1. **GENERAL**

1.1. **General Requirements**

1. Read and be governed by conditions of the *Contract Documents*, including sections of Division 01.
2. Conform to the requirements stated in the General Conditions, Supplementary General Conditions of this Specification and all addenda for all work, including work outside the property line including work within Regional and Municipal right of way unless otherwise noted.

1.2. **Related Work**

- | | |
|--|------------------|
| 1. Site Grading | Section 31 23 13 |
| 2. Excavation, Trenching and Backfilling | Section 31 23 10 |
| 3. Aggregates: General | Section 31 05 17 |
| 4. Granular Sub-base | Section 32 11 19 |

1.3. **References**

1. ASTM C 117-17, Test Method for Material Finer than 0.075 mm Sieve in Mineral Aggregates by Washing.
2. ASTM C 131/C131M-14, Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
3. C 136/C136M-14, Method for Sieve Analysis of Fine and Coarse Aggregates.
4. ASTM D698-12e2, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort 12,400 ft-lbf/ft³ 600 kN-m/m³.
5. CAN/CGSB-81.-88, Sieves Testing, Woven Wire, Inch Series.
6. CAN/CGSB-8.2-M88, Sieves Testing, Woven Wire, Metric.
7. Ontario Provincial Standard Specification 1010.

1.4. **Delivery, Storage and Handling**

1. Deliver and stockpile aggregates in accordance with Section 31 05 17 – Aggregates General. Stockpile minimum 50% of total aggregate required prior to commencing operation.
2. Store cement in weathertight bins or silos that provide protection from dampness and easy access for inspection and identification of each.

2. **PRODUCTS**

2.1. **Materials**

1. Granular base material: Granular 'A' Type I or Type II OPSS 1010, Section 31 05 17 and following requirements:

1. Crushed pit-run or screened stone, gravel or sand consisting of hard, durable, angular particles, free from clay lumps, cementation, organic material, frozen material and other deleterious materials.
2. Gradations to be within limits of specified when tested to ASTM C 136 and ASTM C 117. Sieve sizes to CAN/CGSB-8.1.

<u>Sieve Designation</u>		<u>% Passing</u>	
26.5	mm		100
19	mm	85 -	100
13.2	mm	65 -	90
9.5	mm	50 -	73
4.75	mm	35 -	55
1.18	mm	15 -	40
0.300	mm	5 -	22
0.150	mm	-	
0.075	mm	2 -	8

3. Plasticity Index ASTM D4318-17e1.
4. Los Angeles Abrasion ASTM C131/C131M-14 Gradation 'A' Max. % loss by weight: 60.
5. Crushed particles: at least 50% of particles by mass within each of following sieve designation ranges to have at least 10 freshly fractured face. Material to be divided into ranges using methods of ASTM C136-84a.

<u>Passing</u>	<u>Retained on</u>
19 mm	26.5 mm
4.75 mm	19 mm

6. Petrographic number MTO LS 69, Maximum 250.
7. Soaked CBR: AASHTO T193-72 when compacted to 100% of AASHTO T180-774 Method D, Min 80 for use under Portland cement and Min 100 for use under asphalt concrete.

3. **EXECUTION**

3.1. **Sequence Of Operation**

1. Place granular base after finished sub-base surface or subgrade is inspected and approved by Consultant.
2. Placing
 1. Construct granular base to depth and grade in areas indicated.
 2. Ensure no frozen material is placed.
 3. Place material only on clean unfrozen surface, free from snow and ice.
 4. Place material using methods which do not lead to segregation or degradation of aggregate.
 5. Place material to full width in uniform layers not exceeding 150 mm compacted thickness.
 6. Shape each layer to smooth contour and compact to specified density before

succeeding layer is placed.

7. Remove and replace that portion of layer in which material becomes segregated during spreading.
3. Compaction Equipment
 1. Compaction equipment to be capable of obtaining required material densities.
 2. Efficiency of equipment not specified to be proved at least as efficient as specified equipment at no extra cost and written approval must be received from Consultant before use.
 3. Equipped with device that records hours of actual work, not motor running hours.
4. Compacting in accordance with ASTM D 698 and ASTM D 1557.
 1. Compaction of Pavement Base: Compact to density of not less than 100% SPMDD.
 2. Compaction of Concrete Slab on Grade or Concrete Sidewalks Base: Compact to density of not less than 100% of SPMDD.
 3. Shape and roll alternately to obtain smooth, even and uniformly compacted base.
 4. Apply water as necessary during compacting to obtain specified density.
 5. In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Consultant.
 6. Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.2. **Site Tolerances**

1. Finished base surface to be within plus or minus 10 mm of established grade and cross section but not uniformly high or low.

3.3. **Proof Rolling**

1. For proof rolling use roller of 45,400 kg gross mass with four pneumatic tires each carrying 11,350 kg and inflated to 620 kPa. Four tires arranged abreast with centre to centre spacing of 915 mm maximum.
2. Consultant may authorize use of other acceptable proof rolling equipment.
3. Proof roll top of base upon completion of fine grading and compaction.
4. Make sufficient passes with proof roller to subject every point on surface to three separate passes of loaded tire.
5. Where proof rolling reveals defective areas:
 1. Remove base, sub-base and subgrade material to depth and extent directed by Consultant.
 2. Backfill excavated subgrade with sub-base material and compact in accordance with Section 31 23 10.
 3. Replace sub-base material and compact in accordance with Sections 31 23 10 and 32 11 19.
 4. Replace base material and compact in accordance with this Section.

3.4. **Inspection and Testing**

1. Testing of materials and compaction will be carried out under Cash Allowance by testing

laboratory designated by Consultant. Frequency of tests will be determined by Consultant.

3.5. **Protection**

1. Maintain finished base in condition conforming to this section until succeeding material is applied or until acceptance by Consultant.

END OF SECTION

1. **GENERAL**

1.1. **General Requirements**

1. Read and be governed by conditions of the *Contract Documents*, including sections of Division 01.
2. Conform to the requirements stated in the General Conditions, Supplementary General Conditions of this Specification and all addenda for all work, including work outside the property line including work within Regional and Municipal right of way unless otherwise noted.

1.2. **Related Work**

- | | |
|--|------------------|
| 1. Excavating, Trenching and Backfilling | Section 31 23 10 |
| 2. Granular Base | Section 32 11 23 |
| 3. Granular Sub-Base | Section 32 11 19 |
| 4. Asphalt Paving | Section 32 12 16 |

1.3. **References**

1. Canadian Standards Association (CSA)
 1. CAN/CSA-A23.1-94, Concrete Materials and Methods of Concrete Construction.
2. Canadian General Standards Board (CGSB)
 1. CAN/CGSB-1.2-M89, Boiled Linseed Oil
 2. CAN/CGSB-3.3-M89, Kerosene
3. American Society for Testing and Materials (ASTM).
 1. ASTM D698-12e2, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600 kN-m/m³)
4. Ontario Provincial Standard Specification 353.

2. **PRODUCTS**

2.1. **Materials**

1. Concrete mixes and material shall conform to Ontario Provincial Standard Specifications 1301, 1302, 1303, 1305, 1306, 1308, 1315, and 1350. Concrete for curb and toe wall construction shall have a minimum compressive strength of 30 MPa after 28 days.
2. Granular Base and Sub-Base: to Section 32 11 23 and 32 11 19 respectively.
3. Non-staining mineral type form release agent: chemically active release agents containing compounds that react with free lime to provide water soluble soap.
4. Fill material: to Section 31 23 10.
5. Boiled linseed oil: to CAN/CGSB-1.2.
6. Kerosene: to CAN/CGSB-3.3.

3. **EXECUTION**

3.1. **Grade Preparation & Sub-Base Course**

1. Grading: to Section 32 23 13.
2. Place sub-base course of OPSS Granular 'B', Type I in maximum 150 mm loose lifts and compact to a minimum of 100% of SPMDD.
- 3.2. **Granular Base**
 1. Obtain Consultant's approval of subbase before placing granular base.
 2. Place compacted OPSS Granular 'A' to depth, lines and widths as indicated.
 3. Compact granular base to a minimum of 100% of SPMDD.
- 3.3. **Concrete**
 1. Obtain Consultant's approval of granular base.
 2. Do concrete curb construction in accordance with OPSS MUNI 353.
 3. Provide 1.0m. wide depressions in curb where specified on the drawings as required to allow surface drainage to be conveyed to adjacent bio-swale areas.
- 3.4. **Tolerances**
 1. Finish surfaces to within 3 mm in 3 m as measured with 3 m straightedge placed on surface.
- 3.5. **Expansion and Contraction Joints**
 1. Joints are to be constructed in accordance with OPSS 353.07.07
- 3.6. **Curing**
 1. Cure concrete by adding moisture continuously in accordance with CAN/CSA-A23.1 to exposed finished surfaces for at least 1 day after placing or sealing moisture in by curing compound approved by Consultant.
 2. Where burlap is used for moist curing, place two prewetted layers on concrete surface and keep continuously wet during curing period.
 3. Apply curing compound evenly to form continuous film. In accordance with manufacturer's requirements.
 4. Concrete curing is to be in accordance with OPSS MUNI 904.
- 3.7. **Linseed Oil Treatment**
 1. After concrete has cured for specified curing time and when surface of concrete is dry, apply two coats of linseed oil mixture uniformly to surfaces of curbs, walks and gutters.
- 3.8. **Backfill**
 1. Allow concrete to cure for 7 days prior to backfilling.
 2. Backfill to designated elevations with material approved by Consultant. Compact and shape to required contours as indicated or as directed by Consultant.
- 3.9. **Defective Concrete**
 1. Concrete is defective when:
 1. Containing excessive honeycombing or embedded debris.
 2. Concrete damaged by freezing or which is unsatisfactory due to placement at too high a temperature.
 3. Average 28-day strength of any three consecutive strength tests is less than specified minimum 28-day strength.

4. Any 28-day strength test result is more than 3.5 MPa below the specified minimum 28-day strength.
 2. Repair of defective concrete work:
 1. Repair defective areas while concrete is still plastic, otherwise wait until curing is completed. Use repair methods approved by Consultant.
 2. Grind off high surface variations where directed by Consultant.
 3. Remove and replace defective concrete where directed by Consultant:
 1. Remove between joints by sawing through concrete across full width.
 2. Replace with new concrete to this Section as directed by Consultant.
 3. Construct contraction joint between sawn face of existing concrete and face of new concrete.
 4. Install tie bars between old and new concrete as directed by Consultant.
- 3.10. **Field Quality Control**
 1. Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by Consultant in accordance with CAN/CSA-A23.1.
 2. Consultant may take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.

END OF SECTION

1. **GENERAL**

1.1. **General Requirements**

1. Read and be governed by conditions of the *Contract Documents*, including sections of Division 01.
2. Conform to the requirements stated in the General Conditions, Supplementary General Conditions of this Specification and all addenda for all work, including work outside the property line including work within Regional and Municipal right of way unless otherwise noted.

1.2. **Related Work**

- | | |
|--|------------------|
| 1. Excavating, Trenching and Backfilling | Section 31 23 10 |
| 2. Granular Base | Section 32 11 23 |
| 3. Granular Sub-Base | Section 32 11 19 |
| 4. Asphalt Paving | Section 32 12 16 |

1.3. **References**

1. Canadian Standards Association (CSA)
 1. CAN/CSA-A23.1-94, Concrete Materials and Methods of Concrete Construction.
2. Canadian General Standards Board (CGSB)
 1. CAN/CGSB-1.2-M89, Boiled Linseed Oil
 2. CAN/CGSB-3.3-M89, Kerosene
3. American Society for Testing and Materials (ASTM).
 1. ASTM D698-12e2, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600 kN-m/m³)
 2. Ontario Provincial Standard Specifications 1301, 1302, 1303, 1306, 1308, 1315, and 1350.
 3. Ontario Provincial Standards Drawing No. 310.010

2. **PRODUCTS**

2.1. **Materials**

1. Concrete mixes and material: to Section 03 30 00.
2. Joint filler and Curing Compound: to Section 03 30 00.
3. Granular Base and Sub-Base: to Section 32 11 23 and 32 11 19 respectively.
4. Non-staining mineral type form release agent: chemically active release agents containing compounds that react with free lime to provide water soluble soap.
5. Fill material: to Section 31 23 10.
6. Boiled linseed oil: to CAN/CGSB-1.2.
7. Kerosene: to CAN/CGSB-3.3.

3. **EXECUTION**

3.1. **Grade Preparation & Sub-Base Course**

1. Grading: to Section 31 23 13.
2. Compact subgrade to 95% of Standard Proctor Maximum Dry Density (SPMDD). Excavate and fill all weak and soft spots as required and backfill with compacted granular 'B', Type I to 100% SPMDD.

3.2. **Concrete**

1. Obtain Consultant's approval of granular base and reinforcing steel prior to placing concrete.
2. Do concrete work in accordance with Section 03 30 00.
3. Immediately after floating, give concrete walkway surface uniform broom finish to produce regular corrugations not exceeding 2 mm deep, by drawing broom in direction normal to centre line.
4. Provide edging as indicated with 10 mm radius edging tool.
5. Slip-form pavers equipped with string line system for line and grade control may be used if quality of work acceptable to Consultant can be demonstrated. Hand finish surfaces when directed by Consultant.

3.3. **Tolerances**

1. Finish surfaces to within 3 mm in 3 m as measured with 3 m straightedge placed on surface.

3.4. **Expansion and Contraction Joints - Concrete Walkways**

1. Install tooled transverse contraction joints after floating, when concrete is stiff, but still plastic, at intervals of 1.5 m.
2. Install expansion joints at intervals of 6 m.
3. Install expansion joints around manholes and catch basins and along length adjacent to concrete curbs, catch basins, buildings, or permanent structure.
4. Seal expansion joints with sealant approved by Consultant.

3.5. **Curing**

1. Cure concrete by adding moisture continuously in accordance with CAN/CSA-A23.1 to exposed finished surfaces for at least 1 day after placing, or sealing moisture in by curing compound approved by Consultant.
2. Where burlap is used for moist curing, place two prewetted layers on concrete surface and keep continuously wet during curing period.
3. Apply curing compound evenly to form continuous film. In accordance with manufacturer's requirements.

3.6. **Linseed Oil Treatment**

1. After concrete has cured for specified curing time and when surface of concrete is dry, apply two coats of linseed oil mixture uniformly to surfaces of curbs, walks and gutters.

3.7. **Backfill**

1. Allow concrete to cure for 7 days prior to backfilling.
2. Backfill to designated elevations with material approved by Consultant. Compact and

shape to required contours as indicated or as directed by Consultant.

3.8. **Defective Concrete**

1. Concrete is defective when:
 1. Containing excessive honeycombing or embedded debris.
 2. Concrete damaged by freezing or which is unsatisfactory due to placement at too high a temperature.
 3. Average 28-day strength of any three consecutive strength tests is less than specified minimum 28-day strength.
 4. Any 28-day strength test result is more than 3.5 MPa below the specified minimum 28-day strength.
2. Repair of defective concrete work:
 1. Repair defective areas while concrete is still plastic, otherwise wait until curing is completed. Use repair methods approved by Consultant.
 2. Grind off high surface variations where directed by Consultant.
3. Remove and replace defective concrete where directed by Consultant:
 1. Remove between joints by sawing through concrete across full width.
 2. Replace with new concrete to this Section as directed by Consultant.
 3. Construct contraction joint between sawn face of existing concrete and face of new concrete.
 4. Install tie bars between old and new concrete as directed by Consultant.

3.9. **Field Quality Control**

1. Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by Consultant in accordance with CAN/CSA-A23.1.
2. Consultant may take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.

END OF SECTION

1. **GENERAL**

1.1. **General Requirements**

1. Read and be governed by conditions of the *Contract Documents*, including sections of Division 01.
2. Conform to the requirements stated in the General Conditions, Supplementary General Conditions of this Specification and all addenda for all work, including work outside the property line including work within Regional and Municipal right of way unless otherwise noted.

1.2. **Related Work**

- | | |
|--|------------------|
| 1. Site Grading | Section 31 23 13 |
| 2. Excavating, Trenching and Backfilling | Section 31 23 10 |
| 3. Storm Sewers | Section 33 44 00 |
| 4. Aggregates: General | Section 31 05 17 |

1.3. **References**

1. ASTM A48/A48M-03 (2016), Specification for Gray Iron Castings.
2. ASTM C139-18 (1989), Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes.
3. ASTM C478M-90, Specification for Precast Reinforced Concrete Manhole Sections
4. CSA A3000, Portland Cement.
5. CSA A3000, Masonry Cement.
6. CAN/CSA-A23.1-M90, Concrete Materials and Methods for Concrete Construction.
7. CSA A82.56-M1976, Aggregate for Masonry Mortar.
8. CAN3-A165 Series-M85, CSA Standards on Concrete Masonry Units.
9. CAN/CSA-G30.18-M92, Billet Steel Bars for Concrete Reinforcement.
10. CAN/CSA-G164-M92, Hot Dip Galvanizing of Irregularly Shaped Articles.
11. Ontario Provincial Standard Specification 407.

2. **PRODUCTS**

2.1. **Materials**

1. Precast manhole units: to ASTM C478M, circular or oval. Top sections eccentric cone or flat slab top type with opening offset for vertical ladder installation. Monolithic bases to be approved by Consultant and set on concrete slabs cast in place.
 1. 1200 mm diameter manhole as per OPSD 701.010.
2. Precast catch basins: to ASTM C478M.
 1. Catch basins as per OPSD 705.010
3. Joints: to be made watertight using rubber rings or cement mortar.
4. Mortar:
 1. Aggregate: to CSA A82.56.
 2. Cement: to CAN/CSA-A8.

5. Ladder rungs: to CAN/CSA-G30.18, No. 25M billet steel deformed bars, hot dipped galvanized to CAN/CSA G164 Rungs to be safety pattern (drop step type).
6. Adjusting rings: to ASTM C478M.
7. Concrete Brick: to CAN3-A165 Series.
8. Frames, gratings, covers to dimensions as indicated and following requirements:
 1. Metal gratings and covers to bear evenly on frames. A frame with grating or cover to constitute one unit. Assemble and mark unit components before shipment.
 2. Gray iron castings: to ASTM A48, strength class 30B.
 3. Castings: coated with two applications of asphalt varnish.
 4. Storm manhole frames and covers: heavy duty municipal type for road service. Cover cast without perforations and complete with two 25 mm square lifting holes, as per OPSD 400.010, unless otherwise specified.
 5. Catchbasin frame and cover: as per OPSD 400.010.
 6. Manhole frame and cover as per OPSD 401.010.
9. Granular bedding and backfill: Granular B Type I: to OPSD 1010 and Section 02701 – Aggregates: General and to Section 02315 – Excavating, Trenching and Backfilling.
10. Unshrinkable fill: to Section 02315 – Excavating, Trenching and Backfilling.

3. **EXECUTION**

3.1. **Excavation and Backfill**

1. Excavate and backfill in accordance with Section 31 23 10 – Excavating, Trenching and Backfilling.
2. Obtain approval of Consultant before installing manholes or catch basins.

3.2. **Installation**

1. Construct units in accordance with details indicated, plumb and true to alignment and grade.
2. Complete units as pipe laying progresses. Maximum of three units behind point of pipe laying will be allowed.
3. Dewater excavation free of standing water or as directed by Consultant and remove soft and foreign material before placing concrete base.
4. Set precast concrete base on 150 mm minimum of granular bedding compacted to 100% Corrected Maximum Dry Density.
5. Precast units.
 1. Set bottom section of precast unit in bed of cement mortar and bond to concrete slab or base. Make each successive joint watertight with rubber ring gaskets, cement mortar, or combination thereof.
 2. Clean surplus mortar and joint compounds from interior surface of unit as work progresses.
 3. Plug lifting holes with precast concrete plugs set in cement mortar or mastic compound.
6. For sewers:

1. Place stub outlets and bulkheads at elevations and in positions indicated.
2. Bench to provide a smooth U-shaped channel in manholes.
7. Compact granular backfill to 98% Corrected Maximum Dry Density.
8. Place frame and cover on top section to elevation as indicated. If adjustment required use concrete ring.
9. Clean units of debris and foreign materials. Remove fins and sharp projections. Prevent debris from entering system.

3.3. **Leakage Test**

1. Visual inspection of leakage will be carried out. If any leakage is observed, correct leakage as directed by Consultant at no additional cost.

END OF SECTION

1. **GENERAL**

1.1. **General Requirements**

1. Read and be governed by conditions of the *Contract Documents*, including sections of Division 01.
2. Conform to the requirements stated in the General Conditions, Supplementary General Conditions of this Specification and all addenda for all work, including work outside the property line including work within Regional and Municipal right of way unless otherwise noted.

1.2. **Description**

1. The work included in this Section includes for all labour, equipment and materials required for the watermain construction within the site, and watermain construction within the municipal right of way connecting to existing municipal servicing.
2. Included in the work is coordination and cooperation with Municipal forces as required to complete the work including providing temporary blow offs, isolation valves, pressure testing and chlorination as required by Municipal forces.

1.3. **Related Work**

1. Excavating, Trenching and Backfilling Section 31 23 10

1.4. **References**

1. The Municipality Standards and Specifications for watermain construction.

1.5. **Scheduling Of Work**

1. Schedule work to minimize interruptions to existing services.

2. **PRODUCTS**

1. All products utilized within the water system to comply with the Municipality Standards and Specifications.

3. **EXECUTION**

3.1. **Preparation**

1. Clean pipes, fittings, and appurtenances of accumulated debris and water before installation. Carefully inspect materials for defects to approval of Consultant. Remove defective materials from site as directed by Consultant.

3.2. **Trenching**

1. Do trenching work in accordance with Section 31 23 10 – Excavating, Trenching and Backfilling.
2. Trench depth to provide cover over pipe of not less than 2.0 metres from finished grade or as indicated.
3. Trench alignment and depth require Consultants' approval prior to placing bedding material and pipe.

3.3. **Granular Bedding**

1. Place granular bedding material in uniform layers not exceeding 150 mm compacted thickness to depth of 300 mm below bottom of pipe or to depth as indicated.
2. Do not place material in frozen condition.
3. Shape bed true to grade to provide continuous uniform bearing surface for pipe.
4. Shape transverse depressions in bedding as required to suit joints.
5. Compact each layer full width of bed to at least 95% of corrected maximum dry density.
6. Fill authorized or unauthorized excavation below design elevation of bottom of specified bedding in accordance with Section 31 23 10 – Excavating, Trenching and Backfilling with compacted bedding material.

3.4. **Pipe Installation**

1. Lay pipes to ANSI/AWWA C600 Manual of Practice and manufacturer's standard instructions and specifications. Do not use blocks except as permitted in 3.3.2.
2. Join pipes in accordance with ANSI/AWWA C600, ANSI/AWWA C206, AWWA Manual of Practice and manufacturer's recommendations.
3. Bevel or taper ends of PVC pipe to match fittings.
4. Handle pipe by methods approved by Engineer recommended by pipe manufacturer. Do not use chains or cables passed through pipe bore so that weight of pipe bears on pipe ends.
5. Lay pipes on prepared bed, true to line and grade. Ensure barrel of each pipe is in contact with shaped bed throughout its full length. Take up and replace defective pipe. Correct pipe which is not in true alignment or grade or pipe which shows differential settlement after installation greater than 10 mm in 3 m.
6. Face socket ends of pipe in direction of laying. For mains on a grade of 2% or greater, face socket ends upgrade.
7. Do not exceed permissible deflection at joints as recommended by pipe manufacturer.
8. Keep jointing materials and installed pipe free of dirt and water and other foreign materials. Whenever work is stopped, install a removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.
9. Position and join pipes with equipment and methods approved by Consultant.
10. Cut pipes in an approved manner as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.
11. Align pipes carefully before jointing.
12. Install gaskets to manufacturer's recommendations. Support pipes with hand slings or crane as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.
13. Avoid displacing gasket or contaminating with dirt or other foreign material. Gaskets so disturbed or contaminated shall be removed, cleaned, lubricated and replaced before jointing is attempted again.
14. Complete each joint before laying next length of pipe.
15. Minimize deflection after joint has been made.
16. Apply sufficient pressure in making joints to ensure that joint is completed to manufacturer's recommendations.
17. Ensure completed joints are restrained by compacting bedding material alongside and

over installed pipes or as otherwise approved by the Consultant.

18. Provide necessary fittings and adaptors as required between existing watermain pipe materials and proposed watermain pipe materials.
19. When stoppage of work occurs, block pipes in an approved manner to prevent creep during down time.
20. Recheck plastic pipe joints assembled above ground after placing in trench to ensure that no movement of joint has taken place.
21. Do not lay pipe on frozen bedding.
22. Contractor responsible for satisfactory completion of hydrostatic and leakage testing to Consultant's approval. Contractor also responsible for degree of backfilling complete prior to hydrostatic and leakage testing as well as isolation and correction of any leaks resulting in failed tests.
23. Backfill remainder of trench.

3.5. **Cathodic Protection And Tracer Wire**

1. ALL mechanical restraint systems shall be installed with cathodic protection complete with 12-gauge tracer wire along the top of Polyvinyl Chloride (PVC) and concrete Pressure Pipe (CPP).

3.6. **Hydrostatic And Leakage**

1. Provide labour, equipment and materials required to perform hydrostatic and leakage tests hereinafter described as required by the Municipality standards.
2. Notify Consultant at least 24 h in advance of all proposed tests. Perform tests in presence of Consultant.
3. Where any section of system is provided with concrete thrust blocks, conduct tests at least 5 days after placing concrete or 2 days if high early strength concrete is used.
4. Test pipeline in sections not exceeding 365 m in length, unless otherwise authorized by Consultant.
5. Upon completion of pipe laying and after Consultant has inspected work in place, surround and cover pipes between joints with approved granular material placed to dimensions indicated or directed by Consultant.
6. Leave hydrants, valves, backflow preventer, water meter, joints and fittings exposed.
7. When testing is done during freezing weather, protect hydrants, valves, backflow preventer, water meter, joints and fittings from freezing.
8. Strut and brace caps, bends, tees, and valves, to prevent movement when test pressure is applied.
9. Open valves.
10. Expel air from main by slowly filling main with potable water. Install corporation stops at high points in main where no air-vacuum release valves are installed. Remove stops after satisfactory completion of test and seal holes with plugs.
11. Thoroughly examine exposed parts and correct for leakage as necessary.
12. Examine exposed pipe, joints, fittings and appurtenances while system is under pressure.
13. Remove joints, fittings and appurtenances found defective and replace with new sound material and make watertight.
14. Repeat hydrostatic test until all defects have been corrected.
15. Apply a leakage test pressure of equal to design pressure after complete backfilling of

trench, based on elevation of lowest point in main and corrected to elevation of gauge, for period of 2 h.

16. Define leakage as amount of water supplied from water meter in order to maintain test pressure for 2 h.
17. Do not exceed allowable leakage of 0.03 L/mm diameter per 300 m of pipe, including lateral connections, per hour.
18. Locate and repair defects if leakage is greater than amount specified.
19. Repeat test until leakage is within specified allowance for full length of water main.

Pipe Surround

20. Upon completion of pipe laying and after Consultant has inspected work in place, surround and cover pipes as indicated.
21. Hand place surround material in uniform layers not exceeding 150 mm compacted thickness as indicated. Do not dump material within 5 m of pipe.
22. Place layers uniformly and simultaneously on each side of pipe.
23. Do not place material in frozen condition.
24. Compact each layer from pipe invert to mid height of pipe to at least 95% of SPMDD to ASTM D698.
25. Compact each layer from (mid height) of pipe to underside of backfill to at least 95% of SPMDD and in accordance with Geotechnical Report for site.

3.7. Backfill

1. Place backfill material above pipe surround in uniform layers not exceeding 150 mm compacted thickness up to grades as indicated.
2. Do not place backfill in frozen condition.
3. Compact native backfill to at least 95% of SPMDD.

3.8. Flushing And Disinfecting

1. The Municipality shall perform all chlorination works.
2. Flush water mains through available outlets with a sufficient flow of potable water to produce a velocity of 1.5 m/s, within pipe for 10 min., or until foreign materials have been removed and flushed water is clear.
3. Flushing flows shall be as follows:

<u>Pipe Size NPS</u>	<u>Flow (L/s) Minimum</u>
6 and below	38
8	75

4. Provide connections and pumps for flushing as required.
5. Open and close valves, hydrants and service connections to ensure thorough flushing.
6. Complete flushing to satisfaction of Consultant and The Municipal forces.

END OF SECTION

1. **GENERAL**

1.1. **General Requirements**

1. Read and be governed by conditions of the *Contract Documents*, including sections of Division 01.
2. Conform to the requirements stated in the General Conditions, Supplementary General Conditions of this Specification and all addenda for all work, including work outside the property line including work within Regional and Municipal right of way unless otherwise noted.

1.2. **Related Work**

- | | |
|--|------------------|
| 1. Site Grading | Section 31 23 13 |
| 2. Excavating, Trenching and Backfilling | Section 31 23 10 |
| 3. Manholes and Catchbasins | Section 33 05 14 |
| 4. Aggregates: General | Section 31 05 17 |

1.3. **References**

1. ASTM D3034, Specification for Type PSM Poly Vinyl Chloride (PVC) Sewer Pipe and fittings.
2. CAN/CSA-B182.2, PVC Sewer Pipe and Fittings (PSM Type),
3. CAN/CSA-B182.11, Recommended Practice for the Installation of Plastic Crain and Sewer Pipe and Pipe Fittings.
4. Ontario Provincial Standard Specification MUNI 410.

1.4. **Material Certification**

1. Submit manufacturer's test data and certification at least 2 weeks prior to commencing work.
2. Certification to be marked on pipe.

1.5. **Scheduling of Work**

1. Schedule work to minimize interruptions to existing services and to maintain existing flow during construction.

2. **PRODUCTS**

2.1. **PVC Pipe**

Poly Vinyl Chloride pipe as specified in the Contract Drawings shall be in accordance with OPSS 410, Pipe Sewer Installation in Open Cut.

2.2. **Pipe Bedding, Surround and Cover Materials**

1. Granular embedment materials to Section 31 05 17 – Aggregates.

2.3. **Backfill Material**

1. Backfill to Section 31 23 10 – Excavation, Trenching and Backfilling
2. Backfill within the public right of way to be un-shrinkable fill.

2.4. **Joint Mortar**

1. Portland cement: to CAN/CSA-A5, normal type 10.

2. Mortar: one part Portland cement to two parts clean sharp sand mixed with minimum amount of water to obtain optimum consistency for use intended. Do not use additive..

3. **EXECUTION**

3.1. **Preparation**

1. Clean pipes and fittings of debris and water before installation, and remove defective materials from site.

3.2. **Trenching**

1. Do trenching work in accordance with Section 31 23 10 – Excavating, Trenching and Backfilling.
2. Do not allow contents of any sewer or sewer connection to flow into trench.
3. Trench alignment and depth to approval of Consultant prior to placing bedding material and pipe.

3.3. **Granular Bedding**

1. Place granular bedding material to details indicated in bedding detail OPSD 802.010 to OPSD 802.054, depending on type of soil and pipe. Use Class B bedding and place bedding in unfrozen condition. Type of soil to be defined in the field as Type 1, 2, 3, or 4 as per Health and Safety Act and Regulations for Construction Projects.
2. Place granular bedding material in uniform layers not exceeding 150 mm compacted thickness.
3. Compact each layer full width of bed to at least 95% corrected maximum dry density.
4. Shape bed true to grade and to provide continuous, uniform bearing surface for pipe. Do not use blocks when bedding pipes.
5. Shape transverse depressions as required to suit joints.
6. Fill excavation below bottom of specified bedding adjacent to manholes or catch basins with compacted common backfill.

3.4. **Installation of Sanitary Sewer Pipes**

1. Lay and join pipe in accordance with manufacturer's recommendations and to approval of Consultant.
2. Handle pipe using methods approved by Consultant. Do not use chains or cables passed through rigid pipe bore so that weight of pipe bears upon pipe ends.
3. Commence laying at outlet and proceed in upstream direction with socket ends of pipe facing upgrade.
4. Do not exceed maximum joint deflection recommended by pipe manufacturer.
5. Do not allow water to flow through pipes during construction except as may be permitted by Consultant.
6. Whenever work is suspended, install removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.
7. PVC Pipe as specified in the Contract Drawings shall be installed in accordance with OPSS MUNI 410, Pipe Sewer Installation in Open Cut.
8. When any stoppage of work occurs, restrain pipes as directed by Consultant, to prevent "creep" during down time.
9. Cut pipes as required for special inserts, fittings or closure pieces, as recommended by

pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.

10. Make watertight connections to manholes and catch basins. Use shrinkage compensating grout when suitable gaskets are not available. Support connections as per OPSD 708.020.
11. Use prefabricated saddles or approved field connections for connecting pipes to existing sewer pipes. Joint to be structurally sound and watertight.
12. Temporarily plug open upstream ends of pipes with removable watertight concrete, steel or plastic bulkheads.

3.5. **Pipe Surround**

1. Place surround material in unfrozen condition.
2. Upon completion of pipe laying, and after Consultant has inspected pipe joints, surround and cover pipes as indicated.
3. Hand place surround material in uniform layers not exceeding 150 mm compacted thickness as indicated. Pipe surround material to extend 300 mm above crown of pipe.
4. Place layers uniformly and simultaneously on each side of pipe.
5. Compact each layer from pipe invert to mid height of pipe to at least 95% corrected maximum dry density.

3.6. **Backfill**

1. Place backfill material in unfrozen condition.
2. Place backfill material above pipe surround in uniform layers not exceeding 150 mm compacted thickness up to grades as indicated.

3.7. **Field Testing**

1. Repair or replace pipe, pipe joint or bedding found defective.
2. When directed by Consultant, draw tapered wooden plug with diameter of 50 mm less than nominal pipe diameter through sewer to ensure that pipe is free of obstruction.
3. Remove foreign material from sewers and related appurtenances by flushing with water.

END OF SECTION

1. **GENERAL**

1.1. **General Requirements**

1. Read and be governed by the conditions of the *Contract Documents*, including sections of the Division 01.
2. Conform to the requirements stated in the General Conditions, Supplementary General Conditions of this Specification and all addenda.

1.2. **Related Work**

1. Excavating, Trenching and Backfilling Section 31 23 10
2. Manholes and Catchbasins Section 33 05 14
3. Aggregates: General Section 31 05 17

1.3. **References**

1. ASTM C14, Specification for Concrete Sewer, Storm Drain and Culvert Pipe.
2. ASTM C76, Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe
3. ASTM C443M-85a (1990), Specification for Joints for Circular Concrete Sewer and Culvert Pipe, using Rubber Gaskets.
4. CSA A3000, Portland Cement.
5. CAN/CSA-A257, Series M92, Standards for Concrete Pipe.
6. CAN3-G401-M81, Corrugated Steel Pipe products.
7. Ontario Provincial Standard Specification MUNI 410.

1.4. **Material Certification**

1. Certification to be marked on pipe.

1.5. **Scheduling of Work**

1. Schedule work to minimize interruptions to existing services and to maintain existing flow during construction.

2. **PRODUCTS**

2.1. **Concrete Pipe**

1. Non-reinforced circular concrete pipe and fittings: to CAN/CSA-A-257-2, ASTM C14M, Class 3 designed for flexible rubber gasket joints to ASTM C443 M and CAN/CSA A257.
2. Reinforced circular concrete pipe and fittings: to CAN/CSA-A257, ASTM C76M, strength classification as indicated in the Contract Drawings, designed for flexible rubber gasket joints to ASTM C443M and CAN/CSA A257.
3. Manufactured tees for pipe-to-pipe connections.
4. Lifting holes:
 1. Pipe 900 mm and less diameter: no lift holes.

2. Pipe greater than 900 mm diameter: lift holes not to exceed two in piece of pipe.
3. Provide pre-fabricated plugs to effectively seal lift holes after installation of pipe.

2.2. PVC Pipe

Poly Vinyl Chloride pipe as specified in the Contract Drawings shall be in accordance with OPSS MUNI 410, Pipe Sewer Installation in Open Cut.

2.3. Trench drains

Trench drains as specified in the Contract Drawings shall be in accordance with manufacturers requirements.

2.4. Pipe Embedment, Surround and Cover Materials

1. Granular material to Section 31 05 17 – Aggregates.
2. Granular A to Section 31 23 13 – Site Grading
3. Pipe embedment shall be in accordance with OPSD 802.010

2.5. Backfill Material

1. Backfill shall be granular material as specified in Section 31 23 10 – Excavation, Trenching and Backfilling.

2.6. Joint Mortar

1. Portland cement: to CAN/CSA-A5, normal type 10.
2. Mortar: one part Portland cement to two parts clean sharp sand mixed with minimum amount of water to obtain optimum consistency for use intended. Do not use additives.

3. EXECUTION

3.1. Preparation

1. Clean pipes and fittings of debris and water before installation and remove defective materials from site.

3.2. Trenching

1. Do trenching work in accordance with Section 31 23 10 – Excavating, Trenching and Backfilling.
2. Do not allow contents of any sewer or sewer connection to flow into trench.
3. Trench alignment and depth to approval of Consultant prior to placing bedding material and pipe.

3.3. Granular Bedding

1. Place granular bedding material to details indicated in bedding detail OPSD 802.010 to OPSD 802.054, depending on type of soil and pipe. Use Class B bedding and place bedding in unfrozen condition.

Type of soil to be defined in the field as Type 1, 2, 3, or 4 as per Health and Safety Act and Regulations for Construction Projects.

2. Place granular bedding material in uniform layers not exceeding 150 mm compacted thickness.
3. Compact each layer full width of bed to at least 95% corrected maximum dry density.
4. Shape bed true to grade and to provide continuous, uniform bearing surface for pipe. Do not use blocks when bedding pipes.
5. Shape transverse depressions as required to suit joints.
6. Fill excavation below bottom of specified bedding adjacent to manholes or catch basins with compacted granular backfill.

3.4. Installation of Storm Drainage Pipes

1. Lay and join pipe in accordance with manufacturer's recommendations and to approval of Consultant.
2. Handle pipe using methods approved by Consultant. Do not use chains or cables passed through rigid pipe bore so that weight of pipe bears upon pipe ends.
3. Commence laying at outlet and proceed in upstream direction with socket ends of pipe facing upgrade.
4. Do not exceed maximum joint deflection recommended by pipe manufacturer.
5. Do not allow water to flow through pipes during construction except as may be permitted by Consultant.
6. Whenever work is suspended, install removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.
7. Joints

1. Poly Vinyl Chloride Pipe

PVC Pipe as specified in the Contract Drawings shall be installed in accordance with OPSS MUNI 410, Pipe Sewer Installation in Open Cut.

8. When any stoppage of work occurs, restrain pipes as directed by Consultant, to prevent "creep" during down time.
9. Cut pipes as required for special inserts, fittings or closure pieces, as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.
10. Make watertight connections to manholes and catch basins. Use shrinkage compensating grout when suitable gaskets are not available. Support connections as per OPSD 708.020.

11. Use prefabricated saddles or approved field connections for connecting pipes to existing sewer pipes. Joint to be structurally sound and watertight.
12. Temporarily plug open upstream ends of pipes with removable watertight concrete, steel or plastic bulkheads.

3.5. Pipe Surround

1. Place surround material in unfrozen condition.
2. Upon completion of pipe laying, and after Consultant has inspected pipe joints, surround and cover pipes as indicated.
3. Hand place surround material in uniform layers not exceeding 150 mm compacted thickness as indicated. Pipe surround material to extend 300 mm above crown of pipe.
4. Place layers uniformly and simultaneously on each side of pipe.
5. Compact each layer from pipe invert to mid height of pipe to at least 95% corrected maximum dry density.

3.6. Backfill

1. Place backfill material in unfrozen condition.
2. Place backfill material above pipe surround in uniform layers not exceeding 150 mm compacted thickness up to grades as indicated.
3. Trench backfill shall be imported granular material consisting of Granular B Type I, or reclaimed granulars free of organics.
4. Trench backfill within the public right of way is to be unshrinkable fill.

3.7. Field Testing

1. Repair or replace pipe, pipe joint or bedding found defective.
2. When directed by Consultant, draw tapered wooden plug with diameter of 50 mm less than nominal pipe diameter through sewer to ensure that pipe is free of obstruction.
3. Remove foreign material from sewers and related appurtenances by flushing with water.

END OF SECTION

1. GENERAL

1.1. General Requirements

1. Read and be governed by the conditions of the *Contract Documents*, including sections of the Division 01.
2. Conform to the requirements stated in the General Conditions, Supplementary General Conditions of this Specification and all addenda.

1.2. Related Work

1. Excavating, Trenching and Backfilling Section 31 23 10
2. Aggregates: General Section 31 05 17

1.3. References

1. OPSS 1801 – Corrugated Steel Pipe Products
2. OPSS 1840 – Polyethylene Pipe Products
3. OPSS 1860 – Geotextiles
4. CSA G164-M1981 – Hot Dip Galvanizing of Irregularly Shaped Articles.
5. CGSB 41-GP-29Ma-1983 - Tubing, Plastic, Corrugated, Drainage

1.4. Material Certification

1. Certification to be marked on pipe.

1.5. Scheduling of Work

1. Schedule work to minimize interruptions to existing services and to maintain existing flow during construction.

2. PRODUCTS.

2.1. PVC Pipe

Poly Vinyl Chloride pipe as specified in the Contract Drawings shall be in accordance with OPSS 410, Pipe Sewer Installation in Open Cut.

2.2. Pipe Embedment, Surround and Cover Materials

1. Granular material to Section 31 05 17 – Aggregates.
2. Pipe embedment shall be in accordance with OPSD 802.010

2.3. Backfill Material

1. Backfill shall be granular material as specified in Section 31 23 10 – Excavation, Trenching and Backfilling.

3. EXECUTION

3.1. Preparation

1. Clean pipes and fittings of debris and water before installation, and remove defective materials from site.

3.2. Trenching

1. Do trenching work in accordance with Section 31 23 10 – Excavating, Trenching and Backfilling.
2. Do not allow contents of any sewer or sewer connection to flow into trench.
3. Trench alignment and depth to approval of Consultant prior to placing bedding material and pipe.

3.3. Granular Pipe Surround

1. Granular materials surrounding the pipe shall be in accordance with OPSS MUNI 1010.

3.4. Installation of Subdrains

1. Installation of subdrains is to be in accordance with OPSS MUNI 405.

3.5. Pipe Surround

1. Place surround material in unfrozen condition.
2. Pipe surround material shall be HL-8 Coarse Bedding Stone

3.6. Backfill

1. Place backfill material in unfrozen condition.
2. Place backfill material above pipe surround in uniform layers not exceeding 150 mm compacted thickness up to grades as indicated.
3. Trench backfill shall be imported granular material consisting of Granular B Type I, or reclaimed granulars free of organics.
4. Trench backfill within the public right of way is to be unshrinkable fill.

END OF SECTION