

PART 1 - DESIGN CLARIFICATION

1.1. INTENT

- 1.1.1. This Tender Addendum is issued to provide for modifications and/or clarifications during Design and forms part of Bid and Contract Documents for above Project.
- 1.1.2. Except as otherwise specified herein, or as shown on accompanying Drawings, work required by this Tender Addendum shall be in accordance with Specifications dated May 11, 2026 and Drawings accompanying same.

PART 2 - SPECIFICATIONS – PROCUREMENT AND CONTRACTING REQUIREMENTS GROUP AND SPECIFICATIONS GROUP

2.1. SPECIFICATIONS REVISIONS

- 2.1.1. Specification pages listed below accompany and form part of this Tender Addendum.
- 2.1.2. Each revised Section voids and supersedes previously issued Section of same number in its entirety. Each page is marked at bottom with a "Revised & Reissued" entry that includes date of this issue.
- 2.1.3. Extent of new, revised and/or deleted text is defined by leading and trailing 1 symbol, as applicable.
- 2.1.4. A new Section is added with this issue. Each page is marked at bottom with an "Issued" entry that includes date of this issue.
- 2.1.5. Revised Sections and Pages:

Section Number	Rev No.	Section Title	Page Numbers
00 01 10	R1	Table of Contents	1 thru 3
00 30 00	R1	Available Information	1 and 2
01 50 00	R1	Temporary Facilities and Controls	1 thru 6
05 51 00	R0	Metal Stairs and Balustrades	1 thru 8
05 73 13	R1	Glazed Decorative Metal Railings	1 thru 10
06 40 00	R0	Architectural Woodwork	1 thru 6
07 13 26	R1	Self Adhering Sheet Waterproofing	1 thru 6
07 16 16	R1	Crystalline Waterproofing	1 thru 5
07 21 19	R1	Foamed-In-Place Insulation	1 thru 3
07 31 13	R0	Asphalt Shingles	1 thru 6
07 46 19	R1	Metal Siding System	1 thru 6
08 06 80	R1	Glazing Schedule	1 thru 4
08 71 00	R1	Door Hardware	1 thru 5
10 28 00	R1	Washroom Accessories	1 thru 4
11 81 29	R1	Facility Fall Protection	1 thru 9
13 48 00	R1	Acoustic Isolated Floating Floors	1 thru 3

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INTRODUCTORY INFORMATION					
Section No.	Section Title	Rev. No.	Date	Consult.	Page No's
00 00 01	PROJECT TITLE PAGE	--	2026-05-11	SQV	1 Only
00 01 05	LIST OF CONSULTANTS	00	2026-05-11	SQV	1 and 2
00 01 10	TABLE OF CONTENTS	00	2026-05-11	SQV	1 thru 4
00 01 15	LIST OF DRAWINGS	00	2026-05-11	SQV	1 Only
PROCUREMENT REQUIREMENTS					
00 30 00	AVAILABLE INFORMATION	R1	2026-06-01	SQV	1 and 2
CONTRACTING REQUIREMENTS					
00 63 13	REQUEST FOR INTERPRETATION FORM	00	2026-05-11	SQV	1 Only
00 65 37	MAINTENANCE MATERIAL FORM (SPECIMEN)	00	2026-05-11	SQV	1 Only
*00 70 00	"AGREEMENT BETWEEN OWNER AND CONSTRUCTION MANAGER – FOR SERVICES", "SCHEDULES TO THE AGREEMENT", "DEFINITIONS" AND "GENERAL CONDITIONS", STANDARD CONSTRUCTION DOCUMENT CCDC 2 – 2020				Not Enclosed
00 71 00	AMENDMENTS TO DEFINITIONS	00	2026-05-11	SQV	1 and 2
*00 73 10	SUPPLEMENTARY CONDITIONS	00			1 thru
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01 50 00	TEMPORARY FACILITIES AND CONTROLS	R1	2026-06-01	SQV	1 thru 6
01 60 00	PRODUCT REQUIREMENTS	00	2026-05-11	SQV	1 thru 5
01 70 00	EXECUTION AND CLOSEOUT REQUIREMENTS	00	2026-05-11	SQV	1 thru 12
FACILITY CONSTRUCTION SUBGROUP					
DIVISION 02 – EXISTING CONDITIONS					
02 41 00	DEMOLITION AND SALVAGE	00	2026-05-11	SQV	1 thru 6
DIVISION 03 – CONCRETE					
03 10 00	CONCRETE FORM AND ACCESSORIES	00	2026-05-11	TSM	1 thru 3

03 20 00	CONCRETE REINFORCEMENT & ACCESSORIES	00	2026-05-11	TSM	1 thru 3
03 03 00	CAST-IN-PLACE CONCRETE	00	2026-05-11	TSM	1 thru 7
03 35 13	CONCRETE FLOOR FINISHING	00	2026-05-11	SQV	1 thru 3
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04 05 12	MASONRY MORTAR AND GROUT	00	2026-05-11	TSM	1 thru 6
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04 21 13	BRICK MASONRY	00	2026-05-11	TSM	1 thru 4
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06 40 00	ARCHITECTURAL WOODWORK	R0	2026-06-01	SQV	1 thru 6
06 90 00	GENERAL INSTALLATIONS	00	2026-05-11	SQV	1 thru 5
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07 11 13	BITUMINOUS DAMPPROOFING	00	2026-05-11	SQV	1 thru 2
07 13 26	SELF-ADHERING SHEET WATERPROOFING	R1	2026-06-01	SQV	1 thru 6
07 16 16	CRYSTALLINE WATERPROOFING	R1	2026-06-01	SQV	1 thru 5
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08 51 66	ALUMINUM WINDOW WALL	00	2026-05-11	SQV	1 thru 26
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33 46 13	FOUNDATION DRAINAGE	00	2026-05-11	SQV	1 and 2

LEGEND

* - Specifications prepared by Consultants other than Square Vis Architects Inc. have been prefixed with an asterisk. These Specifications are not included under, nor governed by Square Vis Architects Inc.'s seal.

PART 1 - GENERAL**1.1. GENERAL INSTRUCTIONS**

- 1.1.1. Read and conform to:
 - 1.1.1.1. CCDC 2 - 2020, Stipulated Price Contract as amended in the Contract Documents.
 - 1.1.1.2. Division 1 requirements and documents referred to therein.

1.2. AVAILABLE INFORMATION AVAILABLE TO BIDDERS *

- 1.2.1. Following Available Information is bound in Specifications appended to this Section.
- 1.2.2. Following Reports are for information only. Neither Consultant nor Owner assumes any liability for items extracted from Reports.
- 1.2.3. Available Information forms part of Contract Documents.

1.3. REPORTS *

- 1.3.1. 1... A copy of soil bearing report prepared by T.Smith Engineering Inc.Refer to the following:
- 1.3.2. "Engineering Report on Soil Bearing pressure Samples dated May 12, 2026" ...1
- 1.3.3. Geotechnical Investigation Reports:
 - 1.3.3.1. A copy of geotechnical investigation reports prepared by Owner's consultant for the Place of the Work are bound herein. Refer to following:
 - 1.3.3.1.1. "Wastewater Treatment System Assessment Report" dated October 12,2021 prepared by Ground work Engineering Limited and revised on October 20,2021
 - 1.3.3.2. Geotechnical investigation documents are not guaranteed to be representative of actual subsurface conditions.
 - 1.3.3.3. When calculating soil volumes for bidding purposes, assume flat plane geometric layers formed by straight lines drawn between subgrade elevations, for each material identified in soils report.

Submit a Base Bid Price which includes and accommodates work implied in, or reasonably inferable from, investigation documents. Owner's investigation consultant will be interpreter of documents. Consultant will be arbiter of a change to Construction Cost and/or Contract Time.

LEGEND

** - Documents provided by the Owner have been prefixed by an asterisk and are not included under, nor governed by, Square Vis Architects Inc.'s, seal.*

- 1.3.4. 1... A copy of the Land Survey dated May , 1978" ...1

END OF SECTION



Square Vis Architects Inc.
930 The East Mall, Unit 100
Etobicoke, Ontario
M9B6J9

May 12, 2026

Our File: 25-10031PR

Attention: Natalie Taleb
ntaleb@sqvis.ca

Re: Engineering Report on Soil Bearing Pressure Samples

Location: 6094 Carleton Drive, Verona, ON, K0H2W0
Insured: Kingston & Frontenac Housing Corporation

Dear Ms. Natalie,

T. Smith Engineering Inc. conducted an independent engineering inspection and assessment of soil bearing pressure to the residential building located at the above noted address.

We attended the site on February 12, 2021 for the purpose of conducting our inspection. Several test pits were advanced to the footing elevation. Soil bearing capacity was verified to exceed 100 kPa using a soil penetrometer.

We recommend that additional field verification be conducted for the soil to support the proposed firewall, this verification should occur following excavation and forming for the new footing, prior to concrete placement.

We trust you will find everything in order with our assessment; however, should you have any questions and/or concerns please do not hesitate to contact us.

Sincerely,

Joseph Smith
25-10031PR L5



Terry Smith, P.Eng





McMullen Manor

Wastewater Treatment System Assessment Report

6094 Carleton Drive, Verona, Ontario

Prepared for:

Alex Siu

T Smith Engineering Inc.

Prepared by:

Groundwork Engineering Limited

Project No. **GW-21002-55**

October 12, 2021

Revised: October 20, 2021

GEOTECHNICAL • CIVIL • STORMWATER • ONSITE WASTEWATER

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1.0 Introduction

On August 30th, 2021 a site assessment of the wastewater treatment systems (WWTS) at McMullen Manor (**McM**) was conducted by Groundwork Engineering Limited (**GEL**). The purpose of the assessment is to define and inspect the existing onsite wastewater treatment systems and identify any deficiencies of the systems. This information will be used to ensure capacity and operational functionality for the new building being constructed to replace the previous 28-unit single (1) bedroom apartment building which burned down in January 2021. The subsequent evaluation of the WWTS presented in this assessment report includes recommendations for the repair, replacement, and/or upgrades to ensure function, efficiency and effectiveness for the proposed reconstruction.

This report prepared by GEL on behalf of Alex Siu of T Smith Engineering Inc. details the findings of the site assessment completed in August 2021. The assessment included the visual inspection of one (1) septic tank, one (1) pump chamber, and eight (8) specialized Class 4 Level IV treatment units operating in conjunction with one (1) Type-A subsurface disposal system. This information was then used to determine the capacity of the existing systems relative to the current Ontario Building Code (OBC) requirements and serves as the basis for identifying any additional deficiencies. Recommendations have been provided to address key deficiencies of the existing WWTS.

2.0 Site Overview

McM (the site) is a residential apartment building located at 6094 Carleton Drive, Verona, Township of South Frontenac, Frontenac County. No legal survey was provided for this assessment.

The site is considered to be residential use. The site is bordered by a church to the north, Carleton Drive to the east, a graveyard and community space to the south, and a combination of residential and community space to the west.

The site contains one (1) 28-unit single (1) bedroom apartment building and one (1) garden shed. At the time of inspection, the apartment building had been demolished to the floor slab, following a fire in January 2021.

We have identified the WWTS on site as followings:

WWTS 1: McMullen Manor

The system is operating under The Ministry of the Environment (MOE) Certificate of Approval (CoA) 2882-8GGJ5A issued May 30, 2011.

3.0 Observations

The visual inspection of the WWTS on site was completed on August 30, 2021. Where possible each WWTS identified was inspected through surface access ports of the system. Where required the tankage and sanitary piping within the systems was viewed internally using a Pearpoint P340 Flexiprobe camera (sewer camera).

A partial topographic Global Navigation Satellite Survey (GNSS) of the site was completed. Geodetic elevations were established using the CAN-NET GNSS Real-time Correction Network. No temporary benchmarks (TBMs) were set out at this site. A set of Existing Site Plan drawings prepared by GEL in support of this report is attached as Appendix A.

There is one (1) water supply well on site. The well distributes water exclusively to the apartment. All other sites and structures are assumed to not be fully serviced unless identified otherwise.

Supplementary figures taken at the time of inspection are attached to this report as Appendix B.

3.1 Wastewater Treatment System 1: McMullen Manor

WWTS 1 consists of one (1) septic tank, one (1) pump chamber, eight (8) specialized Class 4 Level IV treatment units operating in conjunction with one (1) Type-A subsurface disposal system. This system services the apartment exclusively.

3.1.1 Septic Tank 1 (ST1)

ST1 is located approximately 7 m offset from the eastern edge of the floor slab positioned inside a perimeter fence (Figure 1). The tank is precast concrete with two (2) chambers and two (2) access ports. This tank previously received sewage from the apartment via 150 mm diameter

gravity sewer pipe. Effluent leaves this tank via a gravity sewer to Pump Chamber 1(PC1) as described next.

ST1 has approximate internal dimensions of 4.98 m long X 2.24 m wide X 2.39 m deep as measured from the outlet pipe invert. The working volume was calculated to be approximately 26,660 L based on these dimensions. This matches well with the CoA description indicating a volume of 27,300 L.

This tank was observed to be in good operating condition and generally good structural condition at the time of inspection. There was no indication of damage or spalling of the concrete. The inlet baffle was present and in good condition (Figure 2). The outlet of the septic tank was equipped with an effluent filter. The filter was in good structural condition and operating order (Figure 3). The tank was operating with a fluid level elevation above the outlet pipe invert. This is to be expected as the system is disused and there is no active power supply to the pump chamber to transfer wastewater to the subsurface disposal bed. There was evidence of cracks in the lids and risers of ST1 (Figure 4 & 5).

The level of sludge at the bottom of the septic tank was determined to be minimal measuring under 5 cm. This was verified by raking the bottom of the tank. There was some evidence of settled garbage at the bottom of the tank and there was a layer of silt and ash. The level of the scum at the top of the tank was minimal measuring under 1 cm. There was some plastic garbage floating on the surface and a slight oily sheen was visible (Figure 6).

The sewer camera was inserted into the 150 mm diameter gravity sewer at the inlet of ST1. As the camera traversed through the pipe there was a layer of dark silt and ash which had been deposited on the bottom of the pipe (Figure 7). The presence of the silt and ash did not restrict the sewer camera which was able to advance into the sewer pipes beneath the floor slab (Figure 8).

3.1.2 Pump Chamber 1 (PC1)

PC1 is located directly south of ST1 and receives effluent exclusively from ST1(Figure 9). The tank is precast concrete with one (1) chamber and three (3) access ports. PC1 pumps effluent to the 1-to-8 way distribution valve via a 50 mm diameter pressurized forcemain.

The total volume of PC1 is approximately 9,400 L based on the internal measurements of the chamber. The dosage volume of PC1 which is the volume of sewage effluent pumped to the

distribution valve during each pump cycle could not be determined at the time of inspection due to the lack of electrical supply or the ability to access the control floats. PC1 has approximate internal dimensions of 3.76 m long X 1.94 m wide X 2.25 m deep as measured from the inlet pipe invert. The maximum dosage volume possible is estimated to be 9,118 L based on these dimensions. This matches well with the CoA description of the CoA indicating a working volume of 9,277 L.

PC1 is equipped with a two (2) unknown brand, single phase sewage pumps. The pumps are configured to dose on demand. However the model number of the controller would suggest that the pump controller is time-dosing capable (Figure 10). Without access to power, it could not be determined if the pumps were set to alternate each dose or if one pump is a secondary pump for redundancy. The pumps are regulated by a high-level (on) and low-level (off) float as well as a high-level alarm float (Figure 11). PC1 was equipped with a high-level audio/ visual alarm which is built into the pump controller. This pump chamber was not equipped with venting.

The pump chamber was observed to be in generally good structural condition and non-operating condition at the time of inspection (Figure 12). There was some indication of damage to one of the lids of PC1 (Figure 13). In accordance with the CoA the pumps are set to pump at a rate of 30 L/cycle/unit once every thirty (30) minutes over a 24-hour period.

3.1.3 Specialized Treatment Units & Subsurface Disposal Bed

The treatment units and subsurface disposal bed are located approximately 45 m east of the apartment building floor slab and approximately 17 m west of the property boundary along Carleton Drive (Figure 14). There are eight (8) Ecoflo brand Model ST-650 treatment units (Figure 15). Each treatment unit uses a peat filter media to provide a higher degree of wastewater treatment than a septic tank. This allows for the system to have a relatively large wastewater treatment capacity in a small footprint. The peat is contained within a fibreglass shell. In this instance, the fibreglass shell rests directly on top of a septic stone layer which disperses the treated effluent. The treatment units and septic stone area are encompassed by a perimeter fence. Within the bed area are two (2) vent stacks which equalize the pressure of the system near the distribution valve and allow for septic off gassing. There are two (2) effluent sampling ports. A perforated pipe collects a portion of effluent from beneath the treatment units. Effluent sampling can be performed at these locations (Figure 16).

There is one distribution valve which divides the effluent received from PC1 across each treatment unit (Figure 17). It is speculated that upon each dose of effluent from PC1 the valve shifts forward, directing effluent to the next treatment unit in the sequence. By doing so the likelihood of hydraulically overloading of any one portion of the bed can be reduced. At the time of inspection there did not appear to be any damage or cracking of the distribution valve. It was not possible to test the operational capability of the valve without a functioning pump chamber.

Each treatment unit was visually inspected (Figure 18 & Figure 19) and provided with an identification number (ID #). The location of each Ecoflo is presented in Appendix A. The visual inspection of each Ecoflo included the following;

- Condition of the lid and fasteners,
- Condition of insulation,
- The condition and operational capability of the tipping bucket,
- The condition of the distribution plates,
- Condition of the peat media and estimated lifespan remaining,
- The structural integrity of the fibreglass shell and internal plastic components

Our findings for each Ecoflo are summarized in the following table. Figures are provided as needed to identify any areas of concern.

ID#	Lid	Insulation	Tipping Bucket	Distribution Plates	Peat	Structural Integrity	Figures
1	Can be fastened, unit appears out of level	Present and in good condition	Functioning as intended	Functioning as intended no damage	Fair 2-5 years	No damage observed	Figure 20
2	Lid does not fasten correctly	Present and in good condition	Functioning as intended	Functioning as intended no damage	Fair 2-5 years	Significant crack in shell	Figure 21
3	Can be fastened, worn clasps	Present and in good condition	Functioning as intended	Functioning as intended no damage	Fair 2-5 years	Small crack in shell	Figure 22
4	Can be fastened, worn clasps	Present and in good condition	Functioning as intended	Functioning as intended no damage	Fair 2-5 years	No damage observed	
5	Difficult to close out of level and damaged clasps	Present and in good condition	Functioning as intended	Functioning as intended no damage	Fair 2-5 years	Significant crack in shell	Figure 23

6	Can be fastened, worn clasps	Present and in good condition	Functioning as intended	Functioning as intended no damage	Fair 2-5 years	Damage to plastic under central sample port	Figure 24
7	Can be fastened, worn clasps	Present and in good condition	Functioning as intended	Functioning as intended no damage	Fair 2-5 years	Small crack in shell, piece broken off	Figure 25
8	Can be fastened, worn clasps	Present and in good condition	Functioning as intended	Functioning as intended no damage	Fair 2-5 years	Small crack in shell	Figure 26

Based on our findings our consensus was that the lids were generally in good working order but some fasteners were non-functioning. Insulation was present and in good condition for each unit. Tipping buckets were in good condition and when tested moved and could tip freely. Distribution plates were all present and in good structural condition, though some were slightly out of level. The peat was found to be in fair condition (Figure 27). For reference, the peat media has a lifespan of roughly 10 years. The majority of the treatment units had some form of crack in the fibreglass shell. In certain instances, the cracks were significant enough to impact the performance of the treatment unit. It appeared that an active maintenance inspection was performed in 2019 and 2020 by an Ecoflo maintenance service provider.

4.0 Theoretical Sewage Flows

The theoretical sewage flow for McM is calculated using the building use and occupancy type. This structure is most accurately represented as an apartment building as per the Ontario Building Code (OBC) Table 8.2.1.3.A(1) – Apartments, etc. – per person. The occupant load has been calculated as fifty-six (56) persons. The maximum occupancy of a twenty-eight (28) single (1) bedroom unit apartment building is based on the maximum occupancy of two (2) persons per apartment unit as per OBC 3.1.17.1.(b).

56 persons (28 unit) @ 275 L/Day as per OBC 8.2.1.3.A(1) = 15,400 L/Day

Theoretical Daily Design Sewage Flow (Q) = 15,400 L/day
--

5.0 Capacity Assessment

This section addresses specific capacities of the existing WWTS as inferred from volumes of septic tanks, hydraulic capacities of the treatment units, and the capacity of the Type-A subsurface disposal bed. The original design for this system was completed by Ecoflo in 2011 who used the Building Materials Evaluation Commission (BMEC) authorization approval application applicable at the time.

5.1 Septic Tank Capacity

The existing capacity for Septic Tank 1 (ST1) based on the approximate internal volume of the septic tank and any provided documentation of the existing WWTS. As this system was designed using the BMEC authorization which the manufacturer's requirement at the time was thirty-six (36) hour retention time (a Q factor of 1.5) in the septic tank. It should be noted that as per the current OBC in residential occupancies the required septic tank capacity is two (2) times the daily flow (Q).

Septic Tank 1 Capacity (As per field measurement) = 26,660 L

Septic Tank 1 Capacity (As per CoA) = 27,300 L

Required Septic Tank Capacity = 15,400 L (Q) X 1.5 = **23,100 L**

ST1 should be pumped, volume pumped recorded and the tank reinspected when empty.

5.2 Treatment Unit Capacity

The capacity of the Ecoflo Class 4, Level IV treatment units is defined in the manufacturer's documentation. The relevant page is attached as Appendix C.

We have verified that all Ecoflo treatment units are Model ST-650. At the time of inspection, the pump controller used for dosing effluent to the treatment units was set to Demand Dose (Figure 4563456). The manufacture's documentation states that the hydraulic capacity of an ST-650 dosed on demand is 2,000 L/Day. As there are eight (8) treatment units, the total hydraulic capacity is 16,000 L/Day.

Estimated Combined Treatment Unit Capacity = **16,000 L**

Required Combined Treatment Unit Capacity = **15,400 L**

As per the CoA the dosing arrangement consists of 30 L/cycle/unit once every thirty (30) minutes over a 24-hour period. This amounts to 11,520 L/Day. The dose should be 40 L/cycle.

5.3 Type-A Subsurface Disposal Bed Capacity

The main variables in the determination of a WWTS's capacity are the percolation rate of the soil in which the effluent is dispersed over and the daily design sewage flow. For the McM site the theoretical sewage flow (Q) has been calculated as 15,400 L/Day.

The current capacity of the existing Type-A subsurface disposal bed is based on the area of the stone layer (A_{ST}) the area of the sand layer (A_{SA}) and the flow (Q).

A_{SA} = area of contact in square meters between the base of the sand and the underlying soil

A_{ST} = area of the stone layer in square meters

B = If $Q > 3000$ L/Day , $B = 50$, else $B = 75$

T = the lesser of 50 and the percolation time of the underlying soil

Q = daily flow capacity

Therefore, the capacity Q, for a Type-A subsurface disposal bed is calculated as:

$$Q = A_{ST} * B$$

$$Q = (850 * A_{SA}) / T$$

If the $T > 15$ the sand layer shall extend 15 m beyond the perimeter of the treatment units in any direction that the effluent is expected to move laterally and have an area not less than the value determined by $A_{SA} = QT/400$.

We have determined the minimum required stone layer area to be $A_{ST} = 308 \text{ m}^2$ given that $Q = 15,400$ L/Day and $B = 50$. This matches with the CoA description.

Using the information provided and the observations gathered in the field, we estimate that the existing A_{ST} is in the range of 334 to 400 m^2 . A stone layer area of this size would be sufficient for a Q in the range of 16,700 L/Day to 20,000 L/Day.

We have determined the minimum required sand layer area to be $A_{SA} = 273 \text{ m}^2$ given that $Q = 15,400 \text{ L/Day}$ with a $T = 15$. It is a design requirement that A_{SA} must be greater or equal to A_{ST} .

As the placement of the treatment units is set into what appears to be the native soil we have interpreted that the percolation rate of the native soil is less than or equal to $T = 15 \text{ min/cm}$.

Using the information provided and the observations gathered in the field, we estimate that the existing A_{SA} is at least within the range of 334 to 400 m^2 . A sand layer area of this size would be sufficient for a Q in the range of 18,926 L/Day to 22,666 L/Day.

6.0 Conclusions

The existing WWTS at McM showed no signs of sewage or effluent breakout at the surface. There did not appear to be any risk to public health, safety and the environment.

The existing 150 mm diameter sewer connecting the apartment building to ST1 appears to be sufficient for continued use. However, as the entire length of the sewer was submerged it may be desirable to reinspect the sewer for damage at a later date once the fluid level has been lowered.

The capacity of the ST1 was estimated to be of 26,660 L. This matches fairly well with the CoA description of a volume of 27,300 L. As this system was designed using the BMEC authorization which the manufacturer's requirement at the time was thirty-six (36) hour retention time (a Q factor of 1.5) in the septic tank. For the McM site the minimum required septic tank capacity should be 23,100 L. We would consider a volume of 26,600 L to be considered generally sufficient for the actual sewage flows produced at the McM site.

The size and condition of PC1, the pumping, distribution, and control methods are sufficient for reuse. The components are sized appropriately to accommodate the theoretical flow at the McM site. PC1 would meet the current OBC requirements for pump chambers upon successful recommissioning.

The capacity of the existing treatment units and subsurface disposal bed was found to be sufficiently sized to accommodate the theoretical flow at the McM site. It was observed that the majority of the treatment units had cracks in the fibreglass shells. Ecoflo units #2 and #5 had

significant cracks so much so that they may warrant replacement to ensure proper functionality of the system.

7.0 Recommendations

We recommend the following actions and activities:

- Pump out ST1 and PC1 entirely with an appropriate pumper equipped for the removal and disposal of potentially contaminated water.
- Flush the 150 mm diameter sewer pipe into ST1 and repump ST1. Consider reinspecting the sewer to ensure there is no physical damage or infiltration.
- Replace the damaged lids identified on ST1 and PC1.
- Once power is resupplied to PC1 it should be recommissioned. The pumps, floats, alarms and controller should all be function tested to ensure proper operation. Non-functioning components must be replaced as required. The dose rate is to be confirmed.
- Ensure proper functionality of the distribution valve once PC1 has been recommissioned.
- Consider the replacement of Ecoflo units #2 and #5. These treatment units have sustained significant damage to the fibreglass shell which may be affecting their structural integrity and operational capabilities. It is suggested to contact the equipment manufacturer Premier Tech Aqua and discuss options for replacement.
- Wash the distribution plates of each treatment unit to rinse clear any sand or soil resting on the plates.
- Replace all damaged treatment unit lid clasps.
- Specialized Class 4, Level IV treatment units are generally to be inspected annually by a certified service provider designated by the equipment manufacturer. It is recommended a service agreement be renewed with the designated service provider for Ecoflo brand treatment units.

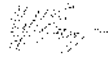
8.0 Closing Remarks

The recommendations of this report are applicable only to the site described in the report and refer to the existing conditions observed at the time of inspection. Any significant changes to the facility will require a review by Groundwork Engineering Limited to ensure compatibility with recommendations contained in this report.

The findings in this document are based on the tasks completed by Groundwork Engineering Limited under the mutually agreed scope of work. Professional judgement, experience with similar investigations, and available data collected within the scope of work form the basis for this report. Groundwork Engineering Limited has prepared this report using information understood to be factual and correct and shall not be responsible for conditions arising from information or facts that were inaccurate, concealed, or not fully disclosed at the time of the investigation.

We trust this report provides sufficient information for your present purposes. If you have any questions concerning this report or if we may be of further services to you, please do not hesitate to contact the undersigned.

Report Prepared by:



M.A.Burger, B.Eng

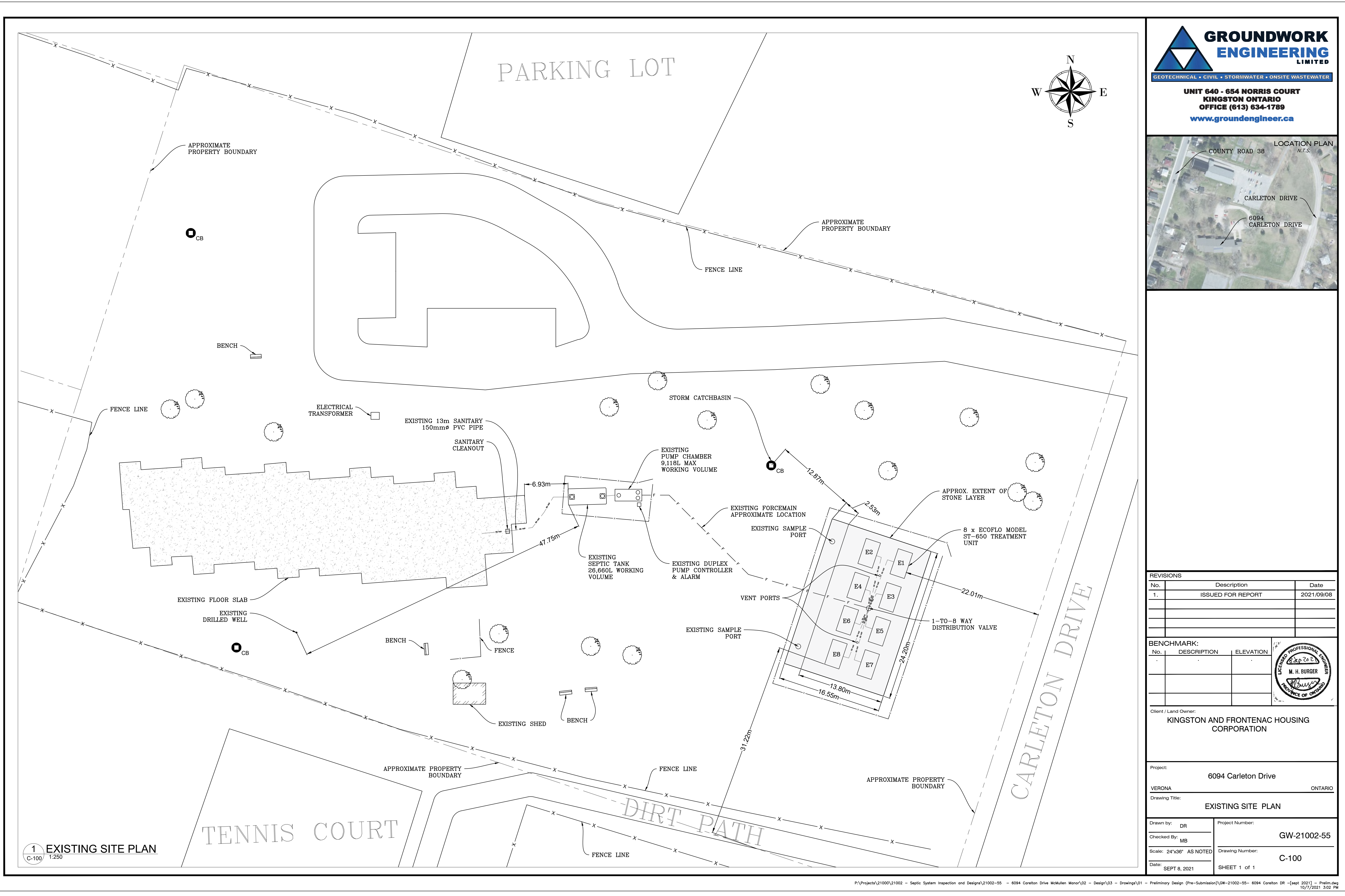


Report Reviewed by:

Martin Burger, M.Eng., P.Eng.

Appendix A

Existing Site Plan





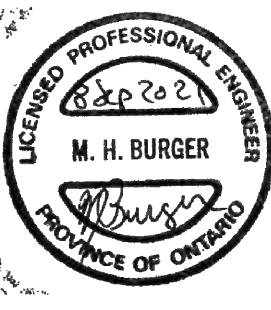
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OFFICE (613) 634-1789
www.groundengineer.ca**



REVISIONS		
No.	Description	Date
1.	ISSUED FOR REPORT	2021/09/08

BENCHMARK:		
No.	DESCRIPTION	ELEVATION



Client / Land Owner:
KINGSTON AND FRONTENAC HOUSING CORPORATION

Project: **6094 Carleton Drive**
VERONA ONTARIO
Drawing Title: **EXISTING SITE PLAN**

Drawn by: DR	Project Number: GW-21002-55
Checked By: MB	Drawing Number: C-100
Scale: 24"x36" AS NOTED	Date: SEPT 8, 2021
Date: SEPT 8, 2021	SHEET 1 of 1

Appendix B

Figures



Figure 1: Location of Septic Tank 1 (ST1). The 150 mm diameter sewer pipe is identified with paint markings visible in the background of the photo.



Figure 2: Inlet chamber of ST1. The inlet baffle was present and in good condition. The fluid level was elevated as the pumps in the tank adjacent were not operational.



Figure 3: Outlet chamber of ST1. The outlet pipe was equipped with a commercial grade effluent filter. The filter was relatively clean and in good operational order.

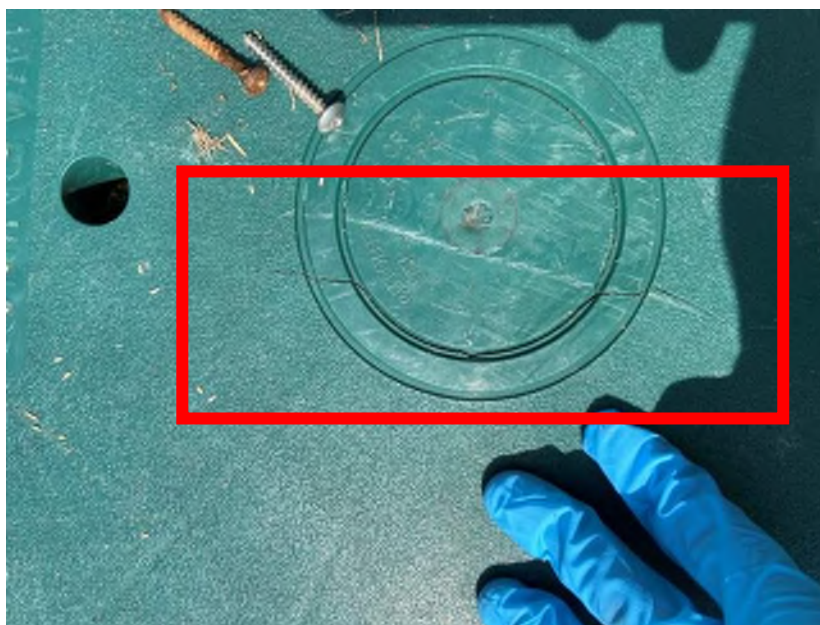


Figure 4: Cracked access lid at the inlet chamber of ST1.

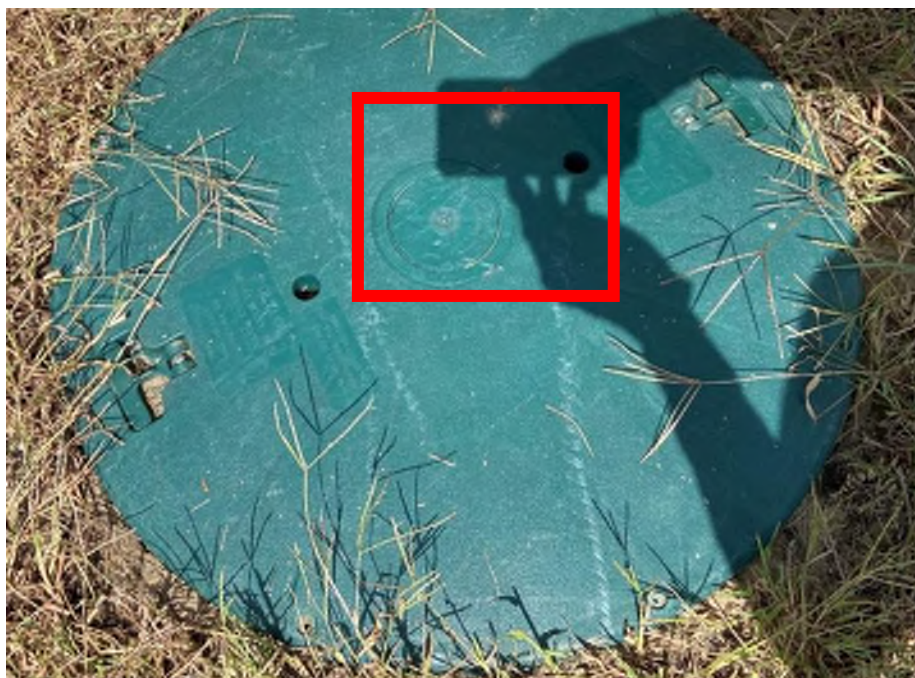


Figure 5: Cracked access lid at the outlet chamber of ST1.



Figure 6: There was plastic garbage floating in the surface scum layer. There was a surface sheen on the top of the fluid in the inlet and outlet chambers of ST1.

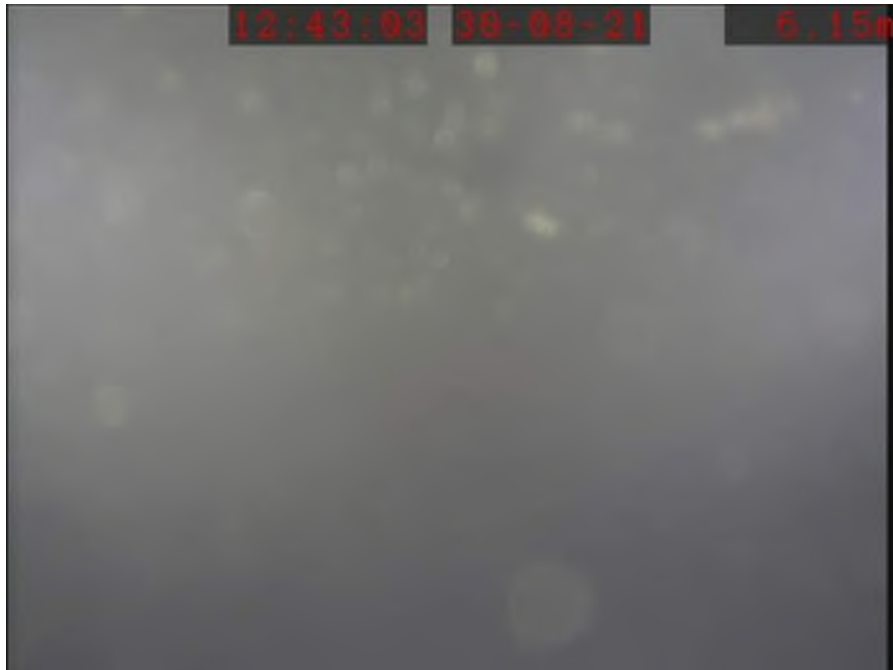


Figure 7: Internal view of the 150 mm diameter gravity sewer. As the sewer camera advanced fine black silt and ash was churned up.



Figure 8: Internal view of the sewer as the sewer camera began to advance beneath the floor slab.



Figure 9: Location of Pump Chamber 1 (PC1) and associated pump controller and alarm system.



Figure 10: The existing pump controller and alarm is an SJE-Rhombus brand IFS series model IFS31W114X8AC. The controller dictates the operation of two (2) sewage pumps which were configured to dose on demand.



Figure 11: View of PC1 at pump discharge location. As was the case in ST1 the fluid level was elevated as the pumps were not operational. The fluid in the tank may have entered into the grey electrical box.



Figure 12: View of PC1 at the inlet from ST1.



Figure 13: Cracked access lid of PC1.



Figure 14: Location of the Ecoflo treatment units and subsurface disposal bed.



Figure 15: A typical manufacturer's information plate for the treatment units on the site.

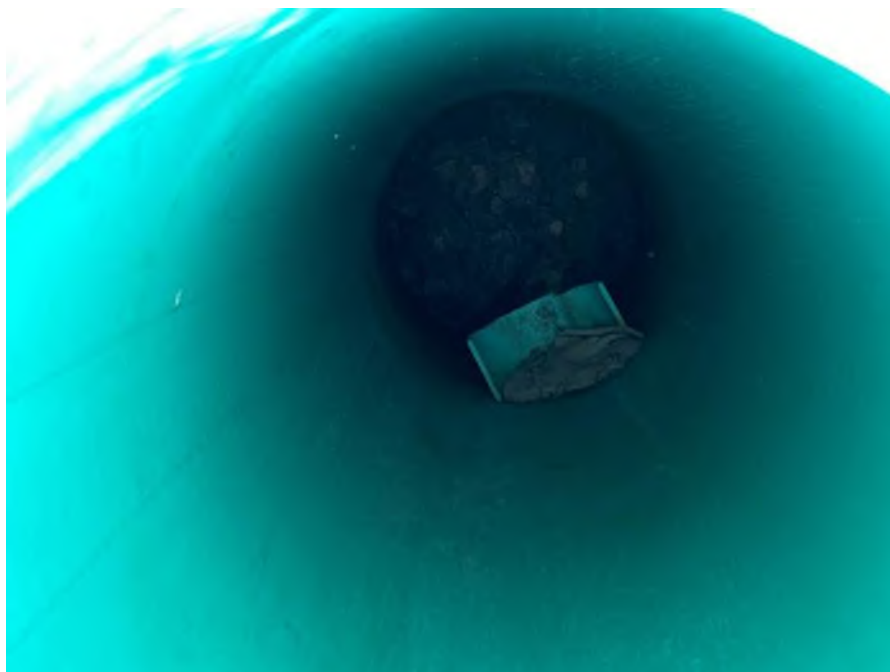


Figure 16: Internal view of one (1) of the sampling ports which collect effluent from beneath the treatment units.



Figure 17: View of the 1-to-8 way distribution valve. The valve receives effluent from PC1 via a pressurized forcemain entering from below and discharges to the Ecoflo treatment units.



Figure 18: Typical internal view of an Ecoflo ST-650 treatment unit.



Figure 19: Typical internal view of an Ecoflo ST-650 treatment unit with tipping bucket removed and central port visible.



Figure 20: Ecoflo #1 (foreground) appears out of level.



Figure 21: Significant damage to Ecoflo #2 causing difficulties closing lid.



Figure 22: Small 15 cm crack in fibreglass shell of Ecoflo #3.



Figure 23: Significant damage to Ecoflo #5. 40-50 cm crack.



Figure 24: Piece of fractured plastic observed through central access port of Ecoflo #6.



Figure 25: Small 15 cm crack in fibreglass shell of Ecoflo #7.



Figure 26: Small 10 cm crack observed in fibreglass shell of Ecoflo #8.



Figure 27: Typical state of the peat filter media in the treatment units observed.

END

Appendix C

Ecoflo Design Guide

5. Effluent discharge

IMPORTANT! THIS IS A CRUCIAL STEP FOR EVERY SEPTIC INSTALLATION.

The Ecoflo biofilter provides a variety of disposal/dispersal methods of the treated effluent (depending on local regulations). Here are possible methods according to OBC:

- Type A dispersal bed
- Type B dispersal bed
- shallow buried trenches

Ecoflo biofilter treated effluent can be discharged either by gravity or pumped to the final dispersal area. Generally, with open-bottom Ecoflo biofilter models, the treated effluent is discharged directly beneath the Ecoflo biofilter. For closed-bottom models, the treated effluent can be discharged either by gravity or pumped toward one of the dispersal methods mentioned above.

5.1. Hydraulic conductivity

Site assessment and soil conditions are critical to determine the appropriate type of treated effluent discharge. An accurate assessment of the soil's hydraulic conductivity is essential in planning any septic installation. This assessment should be performed in accordance with local regulations and will determine if subsurface discharge is possible. Adequate sizing of the soil absorption system relies on the determination of the soil's infiltrative capacity and will ensure adequate infiltration of the treated effluent into the soil at all times. The soil's infiltrative capacity is often expressed as a percolation rate (average time, in minutes, that is required for water to drop 1 cm in the soil), which can be determined by a qualified individual through a field permeability test, a laboratory soil particle-size analysis, or any other method approved by local regulations.

5.2. Subsurface discharge

Once the soil characteristics have been established, determine the size of the soil absorption system required to receive the treated effluent of the Ecoflo biofilter(s). The shape of the soil absorption system may vary depending on site constraints and applicable regulations.

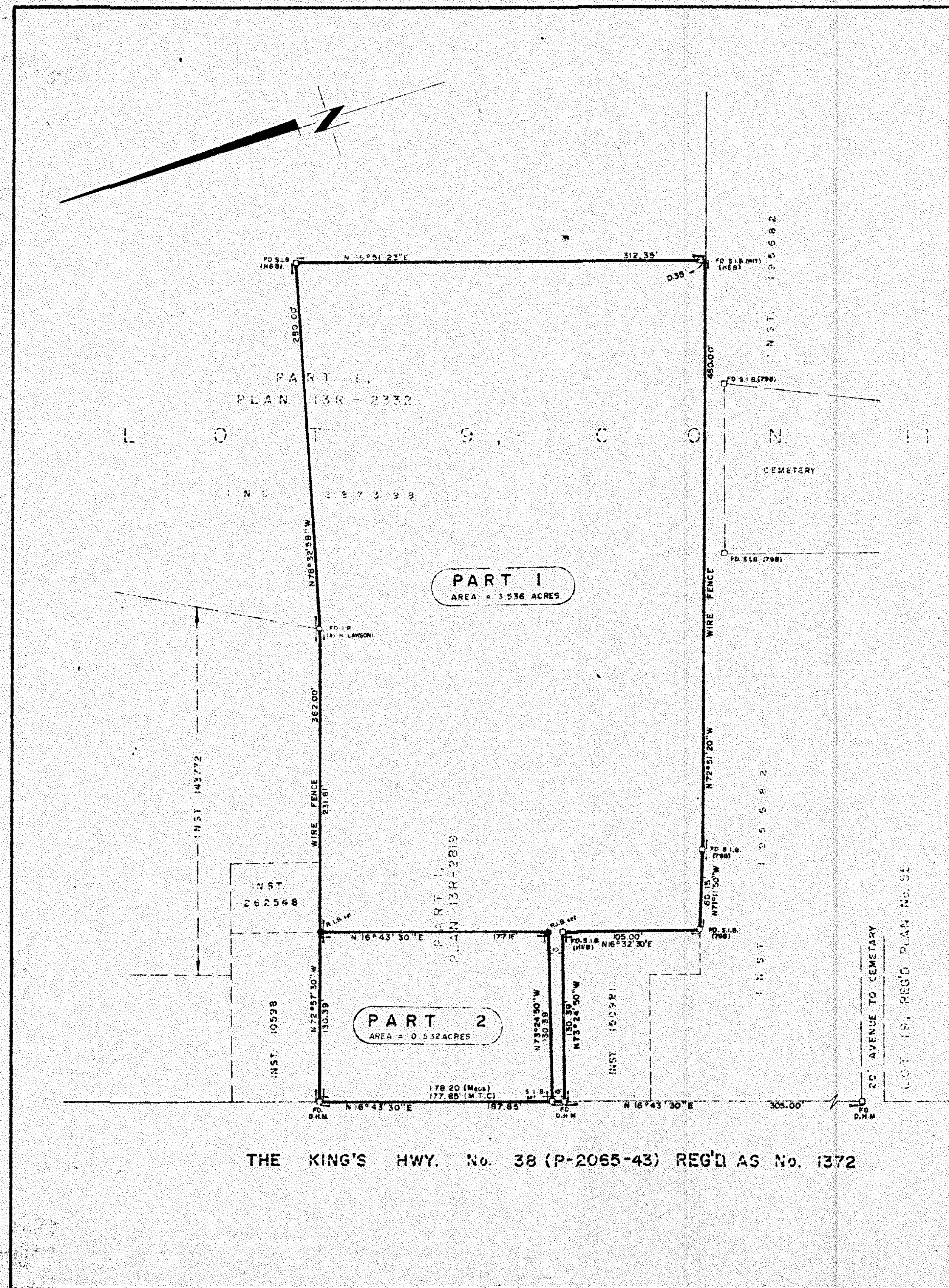
The Ecoflo biofilter's treated effluent meets the requirements to be discharged into a Type A or B dispersal bed, shallow buried trench, filter bed (surface loading of maximum 100 L/m²), or absorption trench sized with a one-third length reduction ($L = QT/300$).

5.2.1. Type A dispersal bed

Tables 6 and 7 present typical Type A dispersal bed sizing for demand and time-dose options, respectively.

Table 6: Demand-dose configuration (308 L/m²-d)

Ecoflo Model	Daily Flow (Q)	T < 15 min/cm		T > 15 min/cm			
		Stone Area	Sand Area	Stone Area	Sand Area		
		A = Q/75	The larger of Y and A=QT/850	A = Q/75	The larger of A = [Y + W*L] and A = QT/400	Min. width (W)	Min. length downstream from Ecoflo shell (L)
ST-500	1,600 L/d	21 m ²	21 m ² or 1.88*T	21 m ²	89 m ² or 4.0*T	4.5 m	15 m
STB-570P/PR	1,755 L/d	23 m ²	23 m ² or 1.88*T	23 m ²	98 m ² or 4.4*T	5.0 m	15 m
ST-650 STB-650B/BR	2,000 L/d	27 m ²	27 m ² or 2.35*T	27 m ²	124 m ² or 5.0*T	6.5 m	15 m
STB-730P/PR	2,250 L/d	30 m ²	30 m ² or 2.65*T	30 m ²	142 m ² or 5.6*T	7.5 m	15 m
ST-750	2,310 L/d	31 m ²	31 m ² or 2.72*T	31 m ²	143 m ² or 5.8*T	7.5 m	15 m
STB-840B/BR	2,600 L/d	35 m ²	31 m ² or 3.06*T	35 m ²	148 m ² or 6.5*T	7.5 m	15 m



I REQUIRE THIS PLAN TO BE DEPOSITED UNDER PART II OF THE REGISTRY ACT		RECEIVED AND DEPOSITED AS
DATE <u>April 11, 1978</u>		PLAN <u>13R-3086</u>
<u>S.L. Teetzel</u> S.L. TEETZEL O.L.S. CHIEF SURVEYOR, DOCUMENTS, REALTY SERVICES BRANCH		<u>May 8, 1978</u> <u>Shuttle</u> LAND REGISTRAR FOR THE REGISTRY DIVISION OF FRONTENAC (No. 13)

PLAN OF SURVEY
SHOWING
PART OF LOT 9, CON. 11
TOWNSHIP OF
PORTLAND
COUNTY OF
FRONTENAC
SCALE: 1" = 50'
1978

SURVEYOR'S CERTIFICATE
I HEREBY CERTIFY THAT
1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT AND THE REGULATIONS MADE THEREUNDER
2. THE SURVEY WAS COMPLETED ON THE 31 DAY OF MARCH 1978
DATE 3 APRIL 1978
David T. Humphries
DAVID T. HUMPHRIES
ONTARIO LAND SURVEYOR

PARTS SCHEDULE			
PART	LOT	CONCESSION	INST. No.
1	PART OF LOT 9	CONCESSION 11	287 3 9 8
2	PART OF LOT 9	CONCESSION 11	287 3 9 8

CAUTION: THIS PLAN IS NOT A PLAN OF SUBDIVISION WITHIN THE MEANING OF SECTION 29, 32, OR 33 OF THE PLANNING ACT.

ALL HANGING LINES SHOWN ON THIS PLAN HAVE BEEN VERIFIED *

BEARING REFERENCE
BEARINGS ARE ASTROMOMIC, DERIVED FROM THE EASTERLY LIMIT OF THE KING'S HWY. No. 38 AS ESTABLISHED BY A PLAN REG'D AS No. 1372 AND ARE REFERRED TO THE MERIDIAN THROUGH THE SOUTHWEST ANGLE OF LOT 1, CON. 1, TWP. OF HINCHINBROOK. (LONG. 78° 41' 30"W.)
(798) DENOTES RAY HUNTER O.L.S.
(HEB) DENOTES HUMPHRIES & BURGHAM LTD.
D.H.M. DENOTES DEPARTMENT OF HIGHWAYS, ONT. (NOW MINISTRY OF TRANSPORTATION AND COMMUNICATIONS) MONUMENT
M.T.C. DENOTES MINISTRY OF TRANSPORTATION AND COMMUNICATIONS
SURVEY PARTY CHIEF JEFF MORRISON
DRAWN BY: RAY NOURRY
EXAMINED BY: DAVID T. HUMPHRIES
MINISTRY OF GOVERNMENT SERVICES
PROVINCE OF ONTARIO
TORONTO

PART 1 - GENERAL

1.1. GENERAL INSTRUCTIONS

- 1.1.1. Read and conform to:
 - 1.1.1.1. CCDC 2 - 2020, Stipulated Price Contract as amended in the Contract Documents.
 - 1.1.1.2. Division 1 requirements and documents referred to therein.
- 1.1.2. Be responsible for arranging, obtaining and paying for any permit necessary for temporary facilities and controls. Provide and maintain all temporary facilities and controls. Remove them when directed and/or when no longer required. Payment for temporary facilities and controls shall be made by Construction Manager unless specified otherwise.
- 1.1.3. Provide and maintain adequate temporary supports, structures, light, power and water in accordance with GC 3.3, as required by all trades and to produce environment for Work to proceed without delay at all times of year. Cost of temporary light, power and water shall be included in Construction Cost. Pay for installation, light, power and water used, maintenance and removal.

1.2. REFERENCES

- 1.2.1. Abbreviations and Acronyms:
 - 1.2.1.1. AWMAC/WI: Architectural Woodwork Manufacturers Association of Canada/Woodwork Institute; www.awmac.com.
 - 1.2.1.2. COFI: Council of Forest Industries; www.cofi.org.
 - 1.2.1.3. HVAC: Heating, Ventilating and Air Conditioning.

1.3. TEMPORARY UTILITIES

- 1.3.1. Temporary Water Supply:
 - 1.3.1.1. Arrange and pay for supply of water required for construction purposes.
 - 1.3.1.2. Provide connections, piping and fittings for distribution of water and, upon completion of the Work, remove such temporary distribution.
- 1.3.2. Temporary Power:
 - 1.3.2.1. Provide continuous temporary power and lighting service. Arrange and pay for energy charges and include costs for connection and the provision of a separate meter.
 - 1.3.2.2. Level of illumination on all floors and stairs shall be not less than 161 lux (15 lumens/sq ft or 15 foot candles). When finishing trades are performing work, provide illumination comparable to final illumination. Extension cords, lamps and hoses shall be provided by those using them in accordance with governing regulations and ordinances.
- 1.3.3. Temporary Heating, Ventilation and Air Conditioning:
 - 1.3.3.1. Provide temporary heating, ventilation and air conditioning for enclosed building until Substantial Performance of the Work to ensure adequate protection of work under way and of completed work. Temporary heating, ventilation and air conditioning without limitation includes heating, cooling and desiccant de-humidification equipment, associated power cables, gas lines, temporary duct work and accessories.

- 1.3.3.2. Provide controlled environment for construction drying and curing of construction work to prevent growth of mold and speed up drying of concrete to meet moisture emission levels required by finish flooring installation. Conform to following performance requirements, except where more stringent requirements are required by work of other Sections:
- 1.3.3.2.1. Supply Air: Minimum 1 air change every 120 minutes.
- 1.3.3.2.2. Filtration of Out Air: 100%.
- 1.3.3.2.3. Temperatures: Minimum between 15 deg C (59 deg F) and 27 deg C (80 deg F).
- 1.3.3.2.4. Relative Humidity: Maintain at or below 50% RH.
- 1.3.3.2.5. Ensure moisture content in wood and hardwood materials is stabilized to maximum percentage recommended by AWMAC/WI requirements.
- 1.3.3.2.6. Control condensation and maintain environmental conditions, including air and surface temperatures suitable for surface preparation, application and curing of paints and coatings.
- 1.3.3.2.7. Noise Criteria: Conform to requirements specified in Contract Documents.
- 1.3.3.3. Submit schematic equipment layout, duct and/or pipe route, staging, sequencing layouts, enclosure and barricade construction.
- 1.3.3.4. Submit Product data, climate control equipment, temperature and humidity controls, duct, duct accessories, pipe and piping accessories materials and construction. Where placed outside, anchor and securely attach temporary supply canvas spiral duct to withstand wind damage. Ensure interior distribution polyethylene tubing has perforations to distribute air evenly throughout areas being served.
- 1.3.3.5. Provide proper heating for drying out of new work. Maintain minimum temperature specified herein. Uniformly distribute heat to avoid hot or cool areas or excessive drying. Protect concrete, masonry, excavations, backfilling and other work from frost during construction.
- 1.3.3.6. Dehumidify interior spaces continuously during installation and curing periods required for moisture emitting work to maintain required relative humidity levels, including without limitations work of involving:
 - 1.3.3.6.1. joint compounds, skim coating, gypsum board work and plaster.
 - 1.3.3.6.2. cementitious materials.
 - 1.3.3.6.3. paints.
 - 1.3.3.6.4. spray applied fireproofing.
 - 1.3.3.6.5. finish carpentry, casework, wood paneling, wood flooring and other millwork.
- 1.3.3.7. Ensure environmental control company performing this work is specialized in this work and having documented 5 years continuous experience performing work of similar size, scope and type.
- 1.3.3.8. As soon as construction is sufficiently advanced, and in order to prevent delays in progress of Work, enclose building using necessary tarpaulins, plastic sheeting or glazing and temporary doors, with locks to doors.
- 1.3.3.9. Construction heaters used inside building must be vented to outside or be flameless type. Do not use direct fired space heaters and propane, salamander type heaters. Ventilate heated areas and keep building free of exhaust and combustion gases.
- 1.3.3.10. Maintain supervision of operation of temporary heating and ventilation equipment. Maintain temporary climate control equipment in service until completion of building commissioning or when use is no longer required as directed by Consultant.
- 1.3.3.11. Remove climate control equipment from site at successful commissioning of new HVAC equipment.

- 1.3.3.12. Do not use any of permanent facilities and controls without obtaining written permission from Consultant.
- 1.3.4. Temporary Drainage:
 - 1.3.4.1. Protect excavation, trenches and building from damage by rainwater, ground water, backing up of drains or sewers and other water, frost and other weather conditions. Provide sheeting, piling, shoring, pumps, equipment, temporary drainage, protective covering and enclosures. Provide necessary pumps including spare pump for keeping project free of water throughout construction period.
 - 1.3.4.2. Keep site properly and efficiently drained during construction and until completion. Be responsible for disturbances, dirt and damage which may be caused by or result from water backing up or flowing over, through, from or along any part of the Work or due to operations which may cause water to flow elsewhere. Drain water away from site without causing any danger to public health.
- 1.3.5. Temporary Protection: Provide and maintain following temporary protection at all times:
 - 1.3.5.1. Window Openings: Translucent, weatherproof protection until windows and glazing are installed.
 - 1.3.5.2. Door Openings: Minimum wood doors, frames, hinges, locks and bolts to exterior and interior to existing areas.
 - 1.3.5.3. Air Intakes: Provide protection against infiltration of dirt, dust and other deleterious matter.
 - 1.3.5.4. Stair treads and landings.
 - 1.3.5.5. Roof and Waterproofing Protection: planking or other protection to prevent damage from falling materials, construction traffic, etc.
 - 1.3.5.6. Scaffolding Enclosures: to enable the Work to continue during inclement weather and winter conditions.

1.4. CONSTRUCTION FACILITIES

- 1.4.1. Construction Manager's Field Offices and Sheds:
 - 1.4.1.1. Provide Construction Manager's field offices and storage sheds within the Place of the Work only. Provide offices and sheds, properly painted and maintained.
- 1.4.2. Sanitary Facilities:
 - 1.4.2.1. Provide and maintain temporary facilities for use by workers in compliance with Occupational Health and Safety Act, applicable codes and by-laws. Provide portable, weatherproof toilets, serviced at least weekly, which may be replaced by adequate, permanent or temporary water closets, urinals and basins when plumbing system has been installed, tested and approved.
 - 1.4.2.2. When water and drain connections within building are completed, provide temporary water closets, urinals and flushing devices complete with temporary screens and partitions and temporary wood washroom entrance doors. Install units in acceptable locations throughout building, convenient to labour force and clearly mark "For use of Trades only".
 - 1.4.2.3. Misuse of water closets and washing facilities or fouling of building by workers shall constitute grounds for instant dismissal from site.
- 1.4.3. Garbage Removal: Provide garbage bins and schedule pick up of garbage.
- 1.4.4. Safety Program:
 - 1.4.4.1. Owner will undertake role of "Constructor" as defined under The Occupational Health and Safety Act, as amended.
 - 1.4.4.2. Conform to Construction Safety Association of Ontario's Manual on Propane in construction. Watch work area for minimum of 30 minutes after hot work is completed. Provide site fire security when required by local building department and/or municipal fire department. Ensure water supply is adequate for fire fighting.

- 1.4.4.3. Provide on site such equipment and medical facilities as are necessary to furnish first aid to anyone who may be injured in connection with Work in accordance with regulations of *Occupational Health and Safety Act (Ontario)*.
- 1.4.4.4. Promptly report in writing to Consultant all accidents arising out of or in connection with performance of Work, whether on or adjacent to site, which caused death, personal injury or property damage, giving full details and statements of witnesses. In addition, in case of death, serious injuries or damages, report accident immediately by telephone or messenger to Consultant.
- 1.4.4.5. If any claim is made by anyone against Owner or any Trade Contractor on account of any accident or damage, promptly report facts in writing to Consultant, giving full details of claim.

1.5. CONSTRUCTION AIDS

- 1.5.1. Construction Hoists: Provide, install, maintain, locate where directed and pay costs for hoisting equipment if required. Position equipment so not to interfere with Work. Operate equipment by qualified hoist operator along with well trained flag and signal persons. Trade Sections shall make their own financial and schedule arrangements with Construction Manager for use thereof. Provide concrete pads for hoisting equipment.
- 1.5.2. Scaffolding: Erect fixed or mobile scaffolding as applicable independent of walls. Use it in manner as to interfere as little as possible with other Sections. When not in use, move it as necessary to permit installation of other work. Construct and maintain scaffolding in rigid, secure and safe manner. Remove it promptly when no longer required or remove it at end of each Day and store in secure place as directed.

1.6. TEMPORARY BARRIERS AND ENCLOSURES

- 1.6.1. Hoarding and Boardwalk:
- 1.6.1.1. Provide hoarding and gates in accordance with the requirements of the Municipality, the Occupational Health and Safety Act, Regulations for Construction Projects and other authorities having jurisdiction to:
- 1.6.1.1.1. Protect public, Owner's occupants, personnel and property from injury and damage.
- 1.6.1.1.2. Exclude non-construction personnel and public from parts of the Place of the Work under construction.
- 1.6.1.2. Framing, sheathing decking as per details indicated on Drawings and materials listed herein are minimum requirements which may be superseded by Engineer's design.
- 1.6.1.3. Wood Hoarding and Boardwalk Framing: National Lumber Grades Authority No. 1 Grade SPF.
- 1.6.1.4. Plywood Hoarding Sheathing: Exterior COFI Select tight face.
- 1.6.1.5. Plywood Boardwalk Decking: Exterior COFI Sheathing.
- 1.6.1.6. Wire Mesh: 50 mm x 50 mm x 3.4 mm (2" x 2" x 1/8") galvanized.
- 1.6.1.7. Gates and Pass Doors: Selected by Construction Manager.
- 1.6.1.8. Gate and pass door hardware shall be selected by Construction Manager including fire exit hardware.
- 1.6.1.9. Temporary Roofing and Cladding (Minimum): Waterproof tarpaulins.
- 1.6.1.10. Limit extent of the Place of the Work shall be as indicated on Drawings.
- 1.6.1.11. Prohibit use of roads outside of the Place of the Work except for construction purposes and as required for access to the Place of the Work.
- 1.6.1.12. Provide a 3-colour, graphic paint finish to hoarding system in accordance with Consultant's later design.
- 1.6.1.13. Provide extra framing and design to support Project signs mounted on top of hoarding wall.

- 1.6.1.14. Provide pass door access openings and gates including operating and security hardware.
- ~~1.6.1.15. Provide minimum 300 mm x 900 mm (12" x 36") pedestrian view ports in hoarding at maximum 4000 mm (13') on centres. Provide wire mesh screening to prevent entry into construction areas through view ports.~~
- ~~1.6.1.16. Provide temporary but effective protection, including roofing and cladding, continuous over hoarded boardwalk to protect Owner's tenants and patrons from weather. Detail and provide roofing and cladding systems to prevent damage to existing tenant spaces and to prevent damage and disfigurement to hoarded boardwalk, interior finishes and construction.~~
- ~~1.6.1.17. Maintain hoarding in a clean condition, free of unauthorized bills, signs and defacement.~~
- ~~1.6.1.18. Provide covered extensions of hoarding and boardwalks, beyond those indicated on Drawings, where risk of falling objects exists, to protect the Owner's personnel, tenants and patrons.~~
- 1.6.1.19. Post adequate warning signage, prominently displayed and within view of each other on hoarding, warning of the illegality and danger of unauthorized trespassing into the parts of the Place of the Work under construction.
- 1.6.1.20. Maintain Access to Exits and Exits, for emergency escape through or around hoarding to a safe area of refuge acceptable to authorities having jurisdiction.
- 1.6.1.21. Relocate and reconstruct hoarding to accommodate phasing of the Work.
- 1.6.1.22. Remove and dispose of hoarding upon completion of the parts of the Work.
- 1.6.2. Temporary Heated Enclosures:
 - 1.6.2.1. Conform to requirements of Occupational Health and Safety Act.
 - 1.6.2.2. Take precautions and provide temporary protection to prevent damage to Work affected by temperature, water, weather and other environmental conditions.
 - 1.6.2.3. Provide temporary heated enclosures in advance of cold weather to continue full scope of operations through cold climatic temperature and weather from commencement to completion without delay.
 - 1.6.2.4. Take precautions to protect openings made in existing building(s) from entry of elements and of persons during construction and to protect existing structure and finishes from damage. Protection of exterior enclosure shall be air tight and have minimum thermal resistance value of $R = 5$ (RSI = 1).
 - 1.6.2.5. Provide heating to maintain the recommended Product storage, mixing, substrate, ambient air, placement, Product installation and curing temperatures recommended by respective Product manufacturers.
 - 1.6.2.6. Provide temporary enclosures and heating required by Contract Documents.
- 1.6.3. Barricades:
 - 1.6.3.1. Erect sturdy railings around shafts, stairwells and in similar areas to protect workers and public from injury.
 - 1.6.3.2. Close off access routes by placing barricades or posting guards to prevent unauthorized personnel from having access to Work. Unauthorized personnel means public and anyone not directly concerned with execution, supervision or inspection of Work.

1.7. TEMPORARY CONTROLS

- 1.7.1. Pollution Control: Take appropriate dust control measures to avoid contamination of adjacent areas near site from dust. Respond immediately to complaints of dust received from public, authorities, or Consultant. Keep public and private roads free of dust, mud and construction debris resulting from trucks employed on this Project.

- 1.7.2. Pest Control: Be responsible to provide control measures, restraining procedures and treatments to prevent infestation and spread of insects, rodents and other pests deemed to be present at site and/or noticed during course of the Work. Carry out fumigation, pest control procedure and posting of warning signs, notices including contents of such notices in accordance with requirements of Pesticides Act and any other authorities having jurisdiction.

END OF SECTION

PART 1 - GENERAL

1.1. GENERAL INSTRUCTIONS

- 1.1.1. Read and conform to:
 - 1.1.1.1. CCDC 2 - 2020, Stipulated Price Contract as amended in the Contract Documents.
 - 1.1.1.2. Division 1 requirements and documents referred to therein.

1.2. SUMMARY

- 1.2.1. Section Includes: Provide steel stairs and balustrades including but not limited to following:
 - 1.2.1.1. steel stairs with metal pan treads and landings.
 - 1.2.1.2. support steel, hangers, posts, reinforced steel pan construction for treads, main and intermediate landings, steel railings, face plate trim and closure plates at landings.
 - 1.2.1.3. metal pan stair balustrades.
 - 1.2.1.4. wall and floor mounted ballustrades and fixings to main structure.
 - 1.2.1.5. stainless steel grating.
- 1.2.2. Related Sections: Following description of work is included for reference only and shall not be presumed complete:
 - 1.2.2.1. Provision of general LEED® requirements: Section 01 33 29, General LEED® Requirements.
 - 1.2.2.2. Waste management and disposal requirements: Section 01 74 19, Construction Waste Management and Disposal.
 - 1.2.2.3. Provision of indoor air quality requirements: Section 01 81 19, Indoor Air Quality Requirements.
 - 1.2.2.4. Installation of miscellaneous metal fabrications in concrete: Section 03 30 00, Cast-In-Place Concrete.
 - 1.2.2.5. Concrete fill in stair treads, risers and landings: Section 03 30 00, Cast-In-Place Concrete.
 - 1.2.2.6. Installation of miscellaneous metal fabrications in masonry: Section 04 20 00, Masonry Units.
 - 1.2.2.7. Building structural steel: Section 05 12 00, Structural Steel Framing.
 - 1.2.2.8. Provision of metal decking: Section 05 30 00, Steel Decking.
 - 1.2.2.9. Provision of steel handrails and guardrails: Section 05 50 00, Metal Fabrications.
 - 1.2.2.10. Temporary wood treads and landings: Section 06 10 00, Rough Carpentry.
 - 1.2.2.11. Provision of finish paint system: Section 09 91 00, Painting.

1.3. REFERENCES

- 1.3.1. Abbreviations and Acronyms:
 - 1.3.1.1. IAQ: Indoor Air Quality.
 - 1.3.1.2. LEED®: Leadership in Energy and Environmental Design; www.cagbc.org.
 - 1.3.1.3. SCAQMD: South Coast Air Quality Management District; www.aqmd.gov.
 - 1.3.1.4. VOC: Volatile Organic Compound.

1.3.2. Reference Standards:

- | | | |
|----------|-------------------|--|
| 1.3.2.1. | ASTM A53/A53M-12 | - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless |
| 1.3.2.2. | ASTM A307-12 | - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength |
| 1.3.2.3. | ASTM A325M-13 | - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength [Metric] |
| 1.3.2.4. | CSA G40.20-04(09) | - General Requirements for Rolled or Welded Structural Quality Steel |
| 1.3.2.5. | CSA G40.21-04(09) | - Structural Quality Steel |
| 1.3.2.6. | CSA W48-06(11) | - Filler Metals and Allied Materials for Metal Arc Welding |
| 1.3.2.7. | CSA W59-03(08) | - Welded Steel Construction (Metal Arc Welding) |
| 1.3.2.8. | GS-36-2000 | - Green Seal™ Standard for Adhesives for Commercial Use |
| 1.3.2.9. | SCAQMD Rule 1168 | - Adhesive and Sealant Applications (amended January 2005) |

1.4. SUBMITTALS

1.4.1. Shop Drawings:

- 1.4.1.1. Submit Shop Drawings of the work of this Section in accordance with Section 01 30 00. In addition to minimum requirements indicate following:
- 1.4.1.1.1. large scale details of members, materials and connections, attachments, reinforcing, anchorage and location of exposed fastenings.
 - 1.4.1.1.2. jointing details.
 - 1.4.1.1.3. methods of setting, sealing, securing, anchorage.
 - 1.4.1.1.4. field connections.
- 1.4.1.2. Ensure a licensed engineer specified herein is responsible for:
- 1.4.1.2.1. production and review of Shop Drawings.
 - 1.4.1.2.2. sealing and signing each Shop Drawing and any associated calculations performed.
- 1.4.1.3. Submit Shop Drawings for following work bearing the stamp of a licensed engineer registered in the Province of Ontario:
- 1.4.1.3.1. steel stairs.
 - 1.4.1.3.2. handrails and balustrades.

1.4.2. Samples: Submit samples in accordance with Section 01 30 00. Submit following samples in sizes indicated:

- 1.4.2.1. Steel Sheet: minimum 300 mm (12") square and of specified thickness.

1.5. CLOSEOUT SUBMITTALS

1.5.1. LEED® Submittals: Provide completed and signed Schedules specified herein as applicable, supplemented as follows:

- 1.5.1.1. MRc4: Recycled Content:
- 1.5.1.1.1. For Product(s) required to contain recycled content, provide following information:
 - 1.5.1.1.1.1. Product Name(s).
 - 1.5.1.1.1.2. Product Code/ID(s).

- 1.5.1.1.1.3. Manufacturer(s).
- 1.5.1.1.1.4. Location(s) Used.
- 1.5.1.1.1.5. Post-Consumer Recycled Content.
- 1.5.1.1.1.6. Pre-Consumer Recycled Content.
- 1.5.1.1.1.7. Budgeted Material Cost(s) (excluding labour – including overhead and profit).
- 1.5.1.1.1.8. For each Product required to contain recycled content, provide supporting technical information to substantiate Pre-Consumer and Post-Consumer recycled content claims.
- 1.5.1.1.2. For steel Product(s) required to contain recycled content and obtained from multiple sources, provide following information:
 - 1.5.1.1.2.1. Product Name(s).
 - 1.5.1.1.2.2. Supplier(s).
 - 1.5.1.1.2.3. Producing Mill(s).
 - 1.5.1.1.2.4. % of total Product supplied from each Supplier/Producing Mill.
 - 1.5.1.1.2.5. Location(s) Used.
 - 1.5.1.1.2.6. Post-Consumer Recycled Content.
 - 1.5.1.1.2.7. Pre-Consumer Recycled Content.
 - 1.5.1.1.2.8. Total Aggregate Budgeted Material cost(s) (excluding labour – including overhead and profit).
 - 1.5.1.1.2.9. For each Product required to contain recycled content, provide supporting technical information to substantiate Pre-Consumer and Post-Consumer recycled content claims.
- 1.5.1.2. MRc5: Regional Materials:
 - 1.5.1.2.1. For Product(s) required to contain regional content, provide following information:
 - 1.5.1.2.1.1. Product Name(s).
 - 1.5.1.2.1.2. Product Code/ID(s).
 - 1.5.1.2.1.3. Final Manufacturing Location(s).
 - 1.5.1.2.1.4. Distance between Manufacturing Location(s) and Project Site.
 - 1.5.1.2.1.5. Budgeted Material Cost(s) (excluding labour – including overhead and profit).
 - 1.5.1.2.2. For each Product required to contain regional content, provide supporting technical information confirming that Product sourced at Manufacturing Location contains regional content in accordance with Section 01 33 29.
- 1.5.1.3. EQc4.1: Low-Emitting Materials: Adhesives and Sealants:
 - 1.5.1.3.1. For Product(s) required to fall below prescribed LEED® VOC thresholds, provide following information:
 - 1.5.1.3.1.1. Product Name(s).
 - 1.5.1.3.1.2. Product Code/ID(s).
 - 1.5.1.3.1.3. Manufacturer(s).
 - 1.5.1.3.1.4. Product Classification(s) (e.g. Wall Primer, Floor Coating).

1.5.1.3.1.5. Location(s) Used.

1.5.1.3.2. For each Product required to fall below prescribed LEED® VOC thresholds, provide supporting technical information indicating VOC content in g/l.

1.6. QUALITY ASSURANCE

1.6.1. Qualifications:

1.6.1.1. Installers: Provide work of this Section executed by competent installers with minimum 5 years experience in the application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.

1.6.1.2. Welding: Provide welding in accordance with CSA W59 performed by a fabricator and mechanics fully approved by the Canadian Welding Bureau.

1.6.1.3. Licensed Professionals: Employ a licensed engineer carrying minimum \$2,000,000.00 professional liability insurance and is registered in the Province of Ontario.

1.6.2. Structural Design and Inspection:

1.6.2.1. Design following without limitations:

1.6.2.1.1. stairs including landings and supports.

1.6.2.1.2. balustrades, handrails and railings.

1.6.3. Certifications: Submit certification from a licensed engineer carrying a minimum \$2,000,000.00 professional liability insurance and is registered in Province of Ontario, who shall affix his/her seal and signature to certificate, stating steel stairs and balustrades is capable of supporting its own weight and specified live loads.

1.7. DELIVERY, STORAGE AND HANDLING

1.7.1. Delivery and Acceptance Requirements: Coordinate deliveries to comply with construction schedule and arrange ahead for strategic off-the-ground, undercover storage locations. Do not load areas beyond the designed limits.

1.7.2. Storage and Handling Requirements:

1.7.2.1. Handle and store metal materials at job site in such a manner to prevent damage to other materials, to existing buildings or property.

1.7.2.2. Handle components with care and provide protection for surfaces against marring or other damage. Ship and store members with cardboard or other resilient spacers between surfaces. Use lifting chokers of material which will not damage surface of steel members.

PART 2 - PRODUCTS

2.1. MATERIALS

2.1.1. Description:

2.1.1.1. Sustainability Characteristics: Provide Products meeting following LEED® performance criteria:

2.1.1.1.1. MRc4: Provide Product with maximum pre-consumer and post-consumer recycled content available.

2.1.1.1.2. MRc5: Provide Product with regional content.

EQc4.1: Provide adhesives and sealants with VOC quantities lower than stated in SCAQMD Rule 1168 and Green Seal's Standard GS-36. Ensure VOC quantities for sealants do not exceed 250 g/l under any circumstances.

2.1.2. Performance/Design Criteria:

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- 2.1.2.1. Structural Design: Employ a licensed engineer specified herein to:
 - 2.1.2.1.1. design components for work of this Section requiring structural performance.
 - 2.1.2.1.2. be responsible for determining sizes, yield strengths, gauge thicknesses and joint spacing to allow thermal movement and loading of components in accordance with applicable codes and regulations.
 - 2.1.3. Structural Shapes, Plates, Etc.: New material conforming to CSA G40.20 and CSA G40.21, Grade 350W.
 - 2.1.4. Hollow Structural Sections: New material conforming to CSA G40.20 and CSA G40.21, Grade 350W, Class H.
 - 2.1.5. Welding Materials: Conforming to CSA W48 and CSA W59.
 - 2.1.6. High Strength Bolts:
 - 2.1.6.1. Supply bolts, nuts and washers conforming with ASTM A325M. Supply each type and size of bolt and nut of same manufacture and of same lot.
 - 2.1.6.2. Bolts: Heavy, hexagon head high strength structural bolts, of standard size, of lengths required for thickness of members joined and for type of connection.
 - 2.1.6.3. Nuts: Heavy hexagon semi-finished nuts.
 - 2.1.6.4. Washers: Flat and smooth hardened washers, quenched and tempered.
 - 2.1.7. Common or Ordinary Bolts and Anchor Bolts: Unfinished bolts conforming with ASTM A307, Grade A, with hexagon heads and nuts where exposed in the finish work. Supply common bolts of lengths required to suit thickness of material being joined, but not projecting more than 6 mm (1/4") beyond nut, without the use of washers. Supply anchor bolts of lengths noted, but projecting not less than 13 mm (1/2") beyond nut unless otherwise noted.
 - 2.1.8. Primer Paint: Supply "MR053" by Selectone or DuPont "209 Series" as distributed by SWT.
 - 2.1.9. Steel Pipe Handrails: Conforming to ASTM A53/A53M, Type "S", Schedule 40, Grade A steel pipe of sizes shown.
 - 2.1.10. Non-Slip Inserts: 9 mm x 9 mm x 1.21 mm (3/8" x 3/8" x 18 ga) galvanized steel strips, "Spectra®" by Wooster Products Inc., www.wooster-products.com.
 - 2.1.11. Slip Resistant Aggregate: Aluminum oxide.
 - 2.1.12. Stainless Steel Grating: Pressure locked grating capable of supporting side walk loading, "Type BB" by Borden Metal Products (Canada) Limited; www.bordengratings.com, Fisher & Ludlow; www.fisherludlow.com or Amico-ISG; www.amico-online.com.
 - 2.1.13. Fabrication:
 - 2.1.13.1. Fabricate each item of work of this Section in accordance with following general requirements:
 - 2.1.13.1.1. members square and straight.
 - 2.1.13.1.2. members plumb and true.
 - 2.1.13.1.3. joints accurately and tightly fitted.
 - 2.1.13.1.4. intersecting members in true, flush planes.
 - 2.1.13.1.5. fasteners concealed.
 - 2.1.13.1.6. steel connections.
 - 2.1.13.2. Fabricate, fit and assemble work in shop where possible. Where shop fabrication is not possible, make trial assembly in shop.
 - 2.1.13.3. Provide hot rolled structural steel channel stringers, other framing members, steel shapes;
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channels, angles and plates. Provide treads, risers, soffits, metal pans and landings as detailed. Ensure treads, landings, metal pans and risers are 3 mm (1/8") thick minimum, unless otherwise indicated. Provide stair handrails and pickets spaced as shown. Provide wall railings to match balustrade railings complete with brackets.

- 2.1.13.4. Provide hangers, rods, bars, bolts, anchors, brackets, rivets, bearing plates and bracing, fitting, drilling, stopping, soldering, as required for a complete assembly.
- 2.1.13.5. Insulate dissimilar metals to prevent galvanic corrosion.
- 2.1.13.6. Weld connections unless otherwise indicated.
- 2.1.13.7. Provide exposed welds continuous.
- 2.1.13.8. File and grind exposed welds smooth and flush.
- 2.1.13.9. Provide exposed metal fastenings and accessories of the same material, texture, colour and finish as the base metal to which they are applied or fastened.
- 2.1.14. Finishes:
 - 2.1.14.1. Provide work of this Section free from:
 - 2.1.14.1.1. wrinkles, waves, cracks or other defects which would reduce the strength or mar the appearance of finished work.
 - 2.1.14.1.2. distortion, weld splatter, weld burn and defects detrimental to appearance.
 - 2.1.14.1.3. File and grind marks and other imperfections to a smooth surface.
 - 2.1.14.2. Touch-up surfaces damaged due to cutting, welding, threading and installation.
 - 2.1.14.3. Do not provide trademarks or labels on exposed finished surfaces.
 - 2.1.14.4. Finish: Prime paint finish unless indicated otherwise.

PART 3 - EXECUTION

3.1. EXAMINATION

- 3.1.1. Verification of Conditions: Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation.
- 3.1.2. Evaluation and Assessment: Commencement of work implies acceptance of previously completed work.

3.2. INSTALLATION

- 3.2.1. Where fastenings, anchors, or angles/plates for welding have to be built in by other trades, supply necessary templates, instructions and supervise to ensure satisfactory installation. Provide weld plates and anchorages for building in by other Sections as indicated and required.
- 3.2.2. Erect treads, metal pans, grating treads, stringers, hanger assemblies, landings, closures, balustrades and handrails of this Section plumb, square, true and level.
- 3.2.3. Weld connections between handrails and balusters and in lengths of handrails continuously. Weld balustrades to steel stairs. Secure wall handrails to walls.
- 3.2.4. Ensure ends of tube railings have closure plates continuously welded to railing.
- 3.2.5. Securely anchor work of this Section and rivet, weld or bolt to structural framing of the building. Where secured to concrete, provide bolts for setting in concrete. Provide expansion bolt supports to masonry.
- 3.2.6. Provide 1 coat of bituminous paint to metal surfaces in contact with concrete, masonry or dissimilar metals.
- 3.2.7. Grind off surplus welding material smooth and flush. Ensure internal and external corners have sharp

lines. Remove grind marks.

- 3.2.8. Provide necessary fitting, setting and cutting required in connection with the fitting of the work of this Section to other parts of the Work.
- 3.2.9. Provide WWF 51 x 51 x MW9.1 x MW9.1 welded wire mesh reinforcement in tread pans, which are designated to receive concrete fill.
- 3.2.10. Prior to filling tread pans with concrete install and secure-in-place, non-slip inserts.
- 3.2.11. After filling tread pans with concrete, install aluminum oxide aggregate into inserts.
- 3.2.12. Erect stair work to line, plumb, square, true and level, with runs of stairs registering level with floor levels.

3.3. SITE QUALITY CONTROL

- 3.3.1. Site Tests and Inspections:
 - 3.3.1.1. Structural Inspection: Ensure a licensed engineer specified herein inspects work of this Section during erection/installation and submits sealed and signed Field Review Report within 5 Days of site visit.
 - 3.3.1.2. Indoor Air Quality Control Requirements: Perform work in accordance with IAQ requirements specified in Section 01 81 19 and as follows:
 - 3.3.1.2.1. Protect building materials from damage by:
 - 3.3.1.2.1.1. fully covering stored materials.
 - 3.3.1.2.1.2. elevating stored materials off ground.
 - 3.3.1.2.1.3. disposing of materials with evidence of moisture damage.
- 3.3.2. Non-Conforming Work: Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of Consultant at no cost to Owner.

3.4. CLEANING

- 3.4.1. On completion of installation, carefully clean metal work. Touch up damaged portions of primed finish coat where necessary.

3.5. ATTACHMENTS

- 3.5.1. Schedules:
 - 3.5.1.1. METAL PAN STAIRS AND BALUSTRADE (INTERIOR)
 - 3.5.1.1.1. Stringers: minimum 250 x 12.5 MC prime painted steel channel sections.
 - 3.5.1.1.1.1. Stringer end cover plate: minimum 6 mm (1/4") continuous prime painted steel, welded.
 - 3.5.1.1.1.2. Finish: prime finish.
 - 3.5.1.1.2. Tread and riser carrier bars (horizontal and vertical): minimum 30 mm x 30 mm x 6 mm (1-1/4" x 1-1/4" x 1/4") prime painted steel angles, welded to the steel stringers.
 - 3.5.1.1.2.1. Finish: prime finish.
 - 3.5.1.1.3. Treads and Landings: minimum 2.657 mm (12 ga) sheet steel, welded.
 - 3.5.1.1.3.1. Finish: prime finish.
 - 3.5.1.1.3.2. Pan depth: 38 mm (1-1/2").
 - 3.5.1.1.3.3. Projection: 25 mm (1").
 - 3.5.1.1.3.4. Reinforce tread and landing nosings with 2 - 3.416 mm (10 ga) gusset plates.

- 3.5.1.1.3.5. Provide concrete to fill metal pans.
- 3.5.1.1.4. Risers: closed, minimum 2.657 mm (12 ga) sheet steel, welded.
- 3.5.1.1.4.1. Finish: prime finish.
- 3.5.1.1.5. Ballustrade:
 - 3.5.1.1.5.1. Handrails and Ballustrade Posts: minimum 75 mm (3") diameter.
 - 3.5.1.1.5.2. Ballustrade Pickets: minimum 12 mm (1/2") diameter.
 - 3.5.1.1.5.3. Balustrade and Wall Bracket Finish: prime finish.
- 3.5.1.2. "Schedule S1 – Material Information Data Sheet" appended to Section 01 33 29.
- 3.5.1.3. "Schedule D1 – Proposed Receiving Facilities Form" and "Schedule D2 – Waste Tracking Log" appended to Section 01 74 19.
- 3.5.1.4. "Schedule I1 – IAQ Management Inspection Log" and "Schedule I2 – Photograph Documentation Checklist" appended to Section 01 81 19.

END OF SECTION

PART 1 – GENERAL

1.1. GENERAL INSTRUCTIONS

- 1.1.1. Read and conform to:
 - 1.1.1.1. CCDC 2 - 2020, Stipulated Price Contract as amended in the Contract Documents.
 - 1.1.1.2. Division 1 requirements and documents referred to therein.

1.2. SUMMARY

- 1.2.1. Section Includes: Provide glazed decorative metal railings including but not limited to following:
 - 1.2.1.1. exterior tempered safety structural glass balustrades with custom aluminum handrails and guardrail cap.
 - 1.2.1.2. aluminum shoe caps.
- 1.2.2. Related Sections: Following description of work is included for reference only and shall not be presumed complete:
 - 1.2.2.1. Provision of structural steel support structure: Structural.
 - 1.2.2.2. Provision of glazing types: Section 08 06 80, Glazing Schedule.

1.3. REFERENCES

- 1.3.1. Abbreviations and Acronyms:
 - 1.3.1.1. GANA: Glass Association of North America; www.glass.org.
 - 1.3.1.2. NAAMM: National Association of Architectural Metal Manufacturers; www.naamm.org.
 - 1.3.1.3. OBC: Ontario Building Code.
- 1.3.2. Reference Standards:
 - 1.3.2.1. AAMA CW 12-84 Structural Properties of Glass
 - 1.3.2.2. ASTM B209/B209M-21a Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
 - 1.3.2.3. ASTM B221M-21 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric)
 - 1.3.2.4. ASTM C1048-19 Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass
 - 1.3.2.5. ASTM C1107/C1107M-20 Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
 - 1.3.2.6. ASTM E488/E488M-18 Standard Test Methods for Strength of Anchors in Concrete Elements
 - 1.3.2.7. ASTM E894-18 Standard Test Method for Anchorage of Permanent Metal Railing Systems and Rails for Buildings
 - 1.3.2.8. ASTM E935-21 Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings
 - 1.3.2.9. ASTM E2353-21 Standard Test Methods for Performance of Glazing in Permanent Railing Systems, Guards, and Balustrades

- 1.3.2.10. ~~ASTM E2358-17~~ ~~Standard Specification for the Performance of Glass in Permanent Glass Railing Systems, Guards, and Balustrades~~
- 1.3.2.11. ~~BS EN 14179-1:2005~~ ~~Glass in building – Heat soaked thermally toughened soda lime silicate safety glass – Part 1: Definition and description~~
- 1.3.2.12. ~~CAN/CGSB 12.1-17~~ ~~Safety glazing~~
- 1.3.2.13. ~~CSA G40.20-013(18)~~ ~~General Requirements for Rolled or Welded Structural Quality Steel~~
- 1.3.2.14. ~~CSA G40.21-13(18)~~ ~~Structural Quality Steel~~
- 1.3.2.15. ~~CSA W48-18~~ ~~Filler Metals and Allied Materials for Metal Arc Welding~~
- 1.3.2.16. ~~CSA W59-18~~ ~~Welded Steel Construction (Metal Arc Welding)~~
- 1.3.2.17. ~~GANA 01-0300~~ ~~Glass Information Bulletin – Proper Procedures for Cleaning Architectural Glass Products~~

1.4. ADMINISTRATIVE REQUIREMENTS

- 1.4.1. ~~Preinstallation Meetings: Arrange preinstallation meeting 1 week prior to commencing work with all parties associated with trade as designated in Contract Documents or as requested by Consultant. Presided over by Construction Manager, include Consultant who may attend, Trade Contractor performing work of this trade, Owner's representative, testing company's representative and consultants of applicable discipline. Review Contract Documents for work included under this trade and determine complete understanding of requirements and responsibilities relative to work included, storage and handling of materials, materials to be used, installation of materials, sequence and quality control, Project staffing, restrictions on areas of work and other matters affecting construction, to permit compliance with intent of work of this Section.~~
- 1.4.2. ~~Scheduling:~~
 - 1.4.2.1. ~~Coordinate installation of anchorages for railings. Supply setting drawings, templates and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts and items with integral anchors, to be embedded in concrete or masonry. Deliver such items to site in time for installation.~~
 - 1.4.2.2. ~~Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.~~

1.5. SUBMITTALS

- 1.5.1. ~~Product Data: Submit Product data for handrails and railings, structural glass system, grout, anchoring cement and paint Products indicated.~~
- 1.5.2. ~~Shop Drawings:~~
 - 1.5.2.1. ~~Submit Shop Drawings in accordance with Section 01-30-00. Submit large scale details of members, materials and connections, attachments, reinforcing and anchorage.~~
 - 1.5.2.2. ~~Submit jointing details showing methods of setting, sealing, securing, anchorage and field connections. Submit necessary templates and instructions where fastenings or anchors have to be built in by other trades.~~
 - 1.5.2.3. ~~Ensure a licensed engineer specified herein is responsible for:~~
 - 1.5.2.3.1. ~~production and review of Shop Drawings.~~
 - 1.5.2.3.2. ~~sealing and signing each Shop Drawing and any associated calculations performed.~~
 - 1.5.2.4. ~~Calculations: Submit calculations proving structural glass systems performance and compliance with specified loads, signed and sealed by a licensed engineer registered to practice in the Province of Ontario.~~

~~1.5.3. Samples:~~~~1.5.3.1. Submit samples in accordance with Section 01 30 00. Submit samples of materials, fittings and finishes required for the Project. Prepare samples on metal of same alloy and gauge to be used for work.~~~~1.5.3.2. Provide 300 mm x 300 mm (12" x 12") samples of glass and 300 mm (12") long samples of trim, closures, handrails, sealants and gaskets.~~~~1.5.3.3. Submit sample of spring plate and attachments complete with glass, bolt and accessories.~~~~1.5.4. Quality Assurance Submittals:~~~~1.5.4.1. Provide test reports indicating products meet or exceed specified requirements.~~~~1.5.4.2. Compatibility Test Report: From sealant manufacturer, indicating sealant compatibility with interlayer and is approved for full contact with sealant.~~~~1.5.5. Test Reports: Submit test reports from an independent laboratory certifying fully suspended structural glass balustrade system proposed for use has been tested. System tested must be similar in type of materials and design shown on Consultant's drawings, utilizing counter sunk bolted attachments through glass. In addition, tested specimen must be equivalent in glass type and panel configuration shown on Drawings. If existing test reports are submitted, then those tests have been carried out to loads at least equal to or greater than those called for in this specification. If test reports are not available, test system. Costs for testing will be borne by glass system manufacturer.~~**1.6. QUALITY ASSURANCE**~~1.6.1. Qualifications:~~~~1.6.1.1. Installers: Provide work of this Section executed by competent installers with minimum 5 years experience in the application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.~~~~1.6.1.2. Welding: Provide welding in accordance with CSA W59 performed by a fabricator and mechanics fully approved by the Canadian Welding Bureau.~~~~1.6.1.3. Licensed Professionals: Employ a full time licensed engineer carrying minimum \$2,000,000.00 professional liability insurance and is registered in the Province of Ontario.~~~~1.6.2. Mock-Ups:~~~~1.6.2.1. Build mock-ups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.~~~~1.6.2.2. Build on-site mock-ups for each form and finish of railing consisting of 2 full panels, top cap, handrail and anchorage system components that are full height and are not less than 1500 mm (60") in length.~~~~1.6.2.3. After review with no objections recorded, mock-ups serve as a standard for material, workmanship and finishes and may become part of final installation.~~~~1.6.3. Certifications: Welders employed on this Project may be asked by Consultant at any time for their welding certificate.~~~~1.6.4. Preconstruction Testing Service:~~~~1.6.4.1. Engage a qualified independent testing agency to test for compliance with specified requirements for performance and test methods. Conduct tests using specimens and assemblies representative of proposed materials and construction.~~~~1.6.4.2. Fabricate and install test assemblies using personnel who will perform same tasks for Project.~~~~1.6.4.3. Select sizes and configurations of assemblies to adequately demonstrate capability and to comply with performance requirements.~~

1.6.4.4. ~~Notify Consultant 7 Days in advance of dates and times when assemblies will be constructed.~~

1.6.4.5. ~~When testing is complete, remove assemblies; do not reuse materials on Project.~~

1.6.5. ~~Test glazed decorative metal railings in accordance with ASTM E2353.~~

1.7. DELIVERY, STORAGE AND HANDLING

1.7.1. ~~Delivery and Acceptance Requirements: Coordinate deliveries to comply with construction schedule and arrange ahead for strategic off the ground, undercover storage locations. Do not load areas beyond designed limits.~~

1.7.2. ~~Storage and Handling Requirements:~~

1.7.2.1. ~~Handle and store metal materials at site in a manner to prevent damage to other materials, to existing buildings or property where applicable.~~

1.7.2.2. ~~Handle components with care and provide protection for surfaces against marring or other damage. Ship and store members with cardboard or other resilient spacers between surfaces. Use lifting chokers of material which will not damage surface of steel members.~~

1.7.2.3. ~~Store laminated glass according to fabricator's written instructions.~~

1.7.2.4. ~~Protect laminated glass from condensation, temperature changes and exposure to direct sun.~~

1.8. WARRANTY

1.8.1. ~~Manufacturer Warranty: Warrant work of this Section for period of 5 years against defects and/or deficiencies in accordance with General Conditions of the Contract. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Consultant and at no expense to Owner. Defects include but are not limited to: delamination, bond failure and extensive colour fading of glass laminate.~~

PART 2 – PRODUCTS

2.1. MATERIALS

2.1.1. ~~Performance/Design Criteria:~~

2.1.1.1. ~~Ensure design of railings, support steel, as well as welding and fixings complies with OBC, Fire Regulations, Health and Safety Regulations and any other regulations applying to these types of installations.~~

2.1.1.2. ~~Design railings to withstand vertical and horizontal live load requirements in OBC, transferred through supports and anchorages to building structure.~~

2.1.1.3. ~~Ensure gap between outer edge of balcony and portion of guard protecting balcony is 38 mm (1-1/2") maximum.~~

2.1.1.4. ~~Design railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on following:~~

2.1.1.4.1. ~~Steel: 72% of minimum yield strength.~~

2.1.1.4.2. ~~Glass: 25% of mean modulus of rupture (50% probability of breakage), as listed in "Mechanical Properties" in AAMA CW-12.~~

2.1.1.5. ~~Structural Performance: In accordance with ASTM E2358, System Type V: One side Support with Protective Top Rail Glazing as Structural Member, Performance Level: Level 1 (Type L1), provide railings capable of withstanding effects of gravity loads and following loads and stresses within limits and under conditions indicated:~~

2.1.1.5.1. ~~Handrails:~~

2.1.1.5.1.1. ~~Uniform load of 730 N/m (50 lbf/ft) applied in any direction.~~

- ~~2.1.1.5.1.2. Concentrated load of 890 N (200 lbf) applied in any direction.~~
- ~~2.1.1.5.2. Top Rails of Guards:~~
- ~~2.1.1.5.2.1. Uniform load of 730 N/m (50 lbf/ft) applied in any direction.~~
- ~~2.1.1.5.2.2. Concentrated load of 890 N (200 lbf) applied in any direction.~~
- ~~2.1.1.5.2.3. Uniform and concentrated loads need not be assumed to act concurrently.~~
- ~~2.1.1.5.3. Infill of Guards:~~
- ~~2.1.1.5.3.1. Concentrated load of 1623 N (365 lbf) applied horizontally on an area of 929 cm² (1 sq ft).~~
- ~~2.1.1.5.3.2. Uniform load of 2.87 kPa (60 lbf/sq ft) applied horizontally.~~
- ~~2.1.1.5.3.3. Infill load and other loads need not be assumed to act concurrently.~~
- ~~2.1.1.5.4. Glass Supported Railings: Support each section of top rail by a minimum of 3 glass panels or by other means so top rail will remain in place if any 1 panel fails.~~
- ~~2.1.1.6. Structural Design: Employ a licensed engineer specified herein to:~~
- ~~2.1.1.6.1. design components for work of this Section requiring structural performance.~~
- ~~2.1.1.6.2. be responsible for determining sizes, yield strengths, gauge thicknesses and joint spacing to allow thermal movement and loading of components in accordance with applicable codes and regulations.~~
- ~~2.1.2. Metal Surfaces: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolourations or blemishes.~~
- ~~2.1.3. Brackets, Flanges, Railings, Shoe Caps and Anchors: Same metal and finish as supported rails, unless otherwise indicated. Thicknesses as indicated on Drawings.~~
- ~~2.1.4. Shoe: Aluminum shoe meeting performance criteria listed herein of profile shown on Drawings.~~
- ~~2.1.5. Steel and Iron:~~
- ~~2.1.5.1. Structural Shapes, Plates, Etc.: New material conforming to CSA G40.20 and CSA G40.21, Grade 300W.~~
- ~~2.1.5.2. Hollow Structural Sections (HSS): New material conforming to CSA G40.20 and CSA G40.21, Grade 350W, Class H.~~
- ~~2.1.6. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of alloy and temper designated below for each aluminum form required:~~
- ~~2.1.6.1. Extruded Bars and Shapes: ASTM B221M, alloy 6063-T6.~~
- ~~2.1.6.2. Drawn Seamless Tubes: Alloy 6063-T832.~~
- ~~2.1.6.3. Plate and Sheet: ASTM B209/B209M, alloy 6061-T6.~~
- ~~2.1.7. Dielectric Separator: Provide best grade, quick drying non-staining alkali resistant bituminous paint or epoxy resin solution or membrane type for Consultant's review.~~
- ~~2.1.8. Glass:~~
- ~~2.1.8.1. Free from bubbles, waves, discolouration and other defects. Ensure glass (particularly heat-strengthened, tempered and laminated) bears manufacturer's labels on bottom inner right hand corner indicating quality.~~
- ~~2.1.8.2. Ensure glass meets following roller wave distortion criteria:~~
- ~~2.1.8.2.1. maximum peak to valley measurement of 0.1 mm (0.003") for every 300 mm (12") in any direction.~~
- ~~2.1.8.2.2. roller distortion and/or ripples runs in same direction for entire Project.~~

- 2.1.8.2.3. ~~unless precluded by manufacturing process, orient roller-wave in the horizontal direction. Ensure glass is heat-treated through the horizontal tempering process.~~
- 2.1.8.2.4. ~~Limit deviation from flatness over any 300 mm (12") span (vertical displacement from peak to valley) within 267 mm (10 1/2") of leading and trailing edges to 0.2 mm (0.006").~~
- 2.1.8.3. ~~Tempered Glass (TGL):~~
- 2.1.8.3.1. ~~Clear transparent tempered glass conforming to ASTM C1048, Kind FT and meeting requirements of CAN/CGSB 12.1. Ensure surface compression is equal to or greater than 68.9 MPa (10 000 psi). Ensure tempered glass is heat-soaked in accordance with BS EN 14179-1.~~
- 2.1.8.3.2. ~~Ensure heat soaking records are kept in accordance with Section 01 70 00 and glass remains traceable.~~
- 2.1.8.3.3. ~~Retest heat soak batches with breakage greater than 1 in 100 units. Batches with additional breakages will be rejected and not used on this Project.~~
- 2.1.8.3.4. ~~"Statistical Heat Soak", "Partial Batch" and "On-Line" heat soaking are not permitted.~~
- 2.1.8.3.5. ~~Tempered glass at a height greater than 3 m (10') above a trafficable walkway and has 1 or more unframed edges or is point-fixed will treated as inclined glazing with requirements for secondary retention in case of breakage.~~
- 2.1.8.3.6. ~~Ensure glass does not have long marks.~~
- 2.1.8.3.7. ~~Written warranties against nickel sulfide inclusions in lieu of heat soaking will not be permitted.~~
- 2.1.8.3.8. ~~Ensure edges are ground flat and polished unless otherwise noted.~~
- 2.1.8.3.9. ~~Ensure edgework, holes and notches in tempered glass panels are completed before tempering and comply with following requirements:~~
- 2.1.8.3.9.1. ~~Dimensional tolerance on panel size will be +/- 0.8 mm (+/- 1/32") of theoretical dimension required.~~
- 2.1.8.3.9.2. ~~Squareness of each panel will be within 1.6 mm (1/16").~~
- 2.1.8.3.9.3. ~~Bow allowance is 0.1%.~~
- 2.1.8.3.9.4. ~~Positional tolerances on all holes will be +/- 0.8 mm (+/- 1/32") from a single datum point.~~
- 2.1.8.3.10. ~~Prestress glass around holes to a level which is compatible with design and use of fittings. Check by differential surface refractometer on stress level.~~
- 2.1.8.4. ~~Glass Units (GL): For single glass unit types, refer to Section 08 06 80.~~
- 2.1.8.5. ~~Glazing Cement and Accessories for Structural Glazing: Provide glazing cement, setting blocks, shims and related accessories as recommended or supplied by railing manufacturer for installing structural glazing in metal subrails.~~
- 2.1.8.6. ~~Glazing Gaskets for Stainless Steel Supports: Provide glazing gaskets and related accessories recommended or supplied by railing manufacturer for installing stainless steel rail supports on glass.~~
- 2.1.9. ~~Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.~~
- 2.1.10. ~~Provide concealed fasteners for interconnecting railing components and for attaching railings to other work, unless otherwise indicated.~~
- 2.1.11. ~~Anchors: Provide cast-in-place or torque-controlled expansion anchors, fabricated from corrosion-resistant materials with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry and equal to 4 times the load imposed when installed in concrete, as determined by testing per ASTM E488/E488M conducted by a qualified independent testing agency.~~

- 2.1.12. ~~Welding Materials: Conforming to CSA W48 and CSA W59.~~
- 2.1.13. ~~Non-Shrink, Nonmetallic Grout: Factory packaged, non-staining, non-corrosive, non-gaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior applications.~~
- 2.1.14. ~~Anchoring Cement: Factory packaged, non-shrink, non-staining, hydraulic-controlled expansion cement formulation for mixing with water at site to create pourable anchoring, patching and grouting compound.~~
- 2.1.15. ~~Fabrication:~~
- 2.1.15.1. ~~Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish and anchorage, but not less than required to support structural loads.~~
- 2.1.15.2. ~~Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.~~
- 2.1.15.3. ~~Cut, drill and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 0.8 mm (1/32"), unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.~~
- 2.1.15.4. ~~Form work true to line and level with accurate angles and surfaces.~~
- 2.1.15.5. ~~Cut, reinforce, drill and tap as indicated to receive finish hardware, screws and similar items.~~
- 2.1.15.6. ~~Welded Connections:~~
- 2.1.15.6.1. ~~Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.~~
- 2.1.15.6.2. ~~Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.~~
- 2.1.15.6.3. ~~Obtain fusion without undercut or overlap.~~
- 2.1.15.6.4. ~~Remove flux immediately.~~
- 2.1.15.6.5. ~~At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.~~
- 2.1.15.7. ~~Mechanical Connections:~~
- 2.1.15.7.1. ~~Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.~~
- 2.1.15.7.2. ~~Fabricate splice joints for field connection using an epoxy structural adhesive if this is manufacturer's standard splicing method.~~
- 2.1.15.8. ~~Form changes in direction as follows:~~
- 2.1.15.8.1. ~~As detailed on Drawings.~~
- 2.1.15.8.2. ~~Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.~~
- 2.1.15.8.3. ~~Close exposed ends of hollow railing members with prefabricated end fittings.~~
- 2.1.15.9. ~~Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns, unless clearance between end of rail and wall is 6 mm (1/4") or less.~~
- 2.1.15.10. ~~Brackets, Flanges, Fittings and Anchors: Provide wall brackets, flanges, miscellaneous fittings and anchors to interconnect railing members to other work, unless otherwise indicated.~~

- 2.1.15.11. ~~At brackets and fittings fastened to plaster or gypsum board partitions, provide fillers made from crush-resistant material, or other means to transfer wall loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.~~
- 2.1.15.12. ~~Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.~~
- 2.1.16. ~~Finishes:~~
 - 2.1.16.1. ~~Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.~~
 - 2.1.16.2. ~~Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.~~
 - 2.1.16.3. ~~Isolate dissimilar metals using dielectric separator to prevent galvanic corrosion.~~
 - 2.1.16.4. ~~Appearance of Finished Work: Noticeable variations in abutting, adjacent or same piece are not permitted.~~

PART 3 – EXECUTION

3.1. EXAMINATION

- 3.1.1. ~~Verification of Conditions:~~
 - 3.1.1.1. ~~Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation.~~
 - 3.1.1.2. ~~Coordinate custom design and fabrication of multi-dimensional preformed silicone seals with construction of joints and adjacent elements constructed by others. Field verify dimensions and configurations prior to fabricating silicone seals. Verify requirements for joint movement.~~
- 3.1.2. ~~Evaluation and Assessment: Commencement of work implies acceptance of previously completed work.~~

3.2. INSTALLATION

- 3.2.1. ~~Fit exposed connections together to form tight, hairline joints.~~
- 3.2.2. ~~Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment and elevation; measured from established lines and levels and free of rack.~~
- 3.2.3. ~~Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.~~
- 3.2.4. ~~Set posts plumb within a tolerance of 1.6 mm in 3 m (1/16" in 10').~~
- 3.2.5. ~~Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 3 mm in 3.66 m (1/8" in 12').~~
- 3.2.6. ~~Adjust railings before anchoring to ensure matching alignment at abutting joints.~~
- 3.2.7. ~~Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.~~
- 3.2.8. ~~Railing Connections:~~
 - 3.2.8.1. ~~Non-Welded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Use wood blocks and padding to prevent damage to railing members and fittings. Seal recessed holes of exposed locking screws using plastic cement filler coloured to match finish of railings.~~

- ~~3.2.8.2. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in Part 2 "Fabrication" whether welding is performed in the shop or in the field.~~
- ~~3.2.9. Anchoring Posts:~~
- ~~3.2.9.1. Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with non-shrink, non-metallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions.~~
- ~~3.2.9.2. Form or core-drill holes not less than 125 mm (5") deep and 19 mm (3/4") larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts and fill annular space between post and concrete with non-shrink, non-metallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions.~~
- ~~3.2.9.3. Cover anchorage joint with flange of same metal as post, attached to post with set screws.~~
- ~~3.2.9.4. Anchor posts to metal surfaces with flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:~~
- ~~3.2.9.4.1. For stainless steel railings, weld flanges to posts and bolt to metal supporting surfaces.~~
- ~~3.2.9.4.2. For steel railings, weld flanges to posts and bolt to metal supporting surfaces.~~
- ~~3.2.10. Glass Panels:~~
- ~~3.2.10.1. Glass Supported Railings: Install assembly to comply with railing manufacturer's written instructions.~~
- ~~3.2.10.2. Attach base channel to building structure, then insert and connect factory-fabricated and factory-assembled glass panels if glass was bonded to base and top rail channels in factory.~~
- ~~3.2.10.3. Support glass panels in base channel at quarter points with channel-shaped setting blocks that also act as shims to maintain uniform space for glazing cement. Fill remaining space in base channel with glazing cement for uniform support of glass.~~
- ~~3.2.10.4. Adjust spacing of glass panels so gaps between panels are equal before securing in position.~~
- ~~3.2.10.5. Erect glass railings under direct supervision of manufacturer's authorized technical personnel.~~

3.3. SITE QUALITY CONTROL

- ~~3.3.1. Site Tests and Inspections:~~
- ~~3.3.1.1. Structural Inspection: Ensure a licensed engineer specified herein inspects work of this Section during erection/installation and submits sealed and signed Field Review Report within 5 Days of site visit.~~
- ~~3.3.1.2. Extent and Testing Methodology: Consultant in conjunction with testing agency will randomly select completed railing assemblies for testing that are representative of different railing designs and conditions in the completed Work. Railings will be tested according to ASTM E2353, ASTM E2358, ASTM E894 and ASTM E935 for compliance with performance requirements.~~
- ~~3.3.1.3. Remove and replace railings where test results indicate they do not comply with specified requirements unless they can be repaired in a manner satisfactory to Consultant and will comply with specified requirements.~~
- ~~3.3.1.4. Additional testing and inspecting, at Contractor's [Construction Manager's] expense, will be performed to determine compliance of replaced or additional work with specified requirements.~~
- ~~3.3.2. Non-Conforming Work: Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of Consultant at no cost to Owner.~~

3.4. CLEANING

~~3.4.1. Clean and polish glass in accordance with GANA 01-0300 including removal of markings indicating presence of glass.~~

3.5. PROTECTION

~~3.5.1. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Performance.~~

~~3.5.2. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in field to shop; make required alterations and refinish entire unit or provide new units.~~

END OF SECTION

PART 1 - GENERAL

1.1. GENERAL INSTRUCTIONS

- 1.1.1. Read and conform to:
 - 1.1.1.1. CCDC 2 - 2020, Stipulated Price Contract as amended in the Contract Documents.
 - 1.1.1.2. Division 1 requirements and documents referred to therein.

1.2. SUMMARY

- 1.2.1. Section Includes: Provide architectural woodwork including but not limited to following:
 - 1.2.1.1. laminated casework.
 - 1.2.1.2. casework drawers and doors.
 - 1.2.1.3. edgebanding for casework and casework doors.
 - 1.2.1.4. countertops.
 - 1.2.1.5. casework hardware.
- 1.2.2. Related Sections: Following description of work is included for reference only and shall not be presumed complete:
 - 1.2.2.1. Provision of carbon impact design requirements: Section 01 33 30, Carbon Impact Design Requirements.
 - 1.2.2.2. Building in and anchoring of steel frames in masonry partitions: Section 04 20 00, Masonry Units.
 - 1.2.2.3. Supply of hollow metal doors and frames: Section 08 11 13, Hollow Metal Doors and Frames.
 - 1.2.2.4. Supply of wood doors: Section 08 14 00, Wood Doors.
 - 1.2.2.5. Supply of door hardware: Section 08 71 00, Door Hardware.
 - 1.2.2.6. Glass and glazing: Section 08 80 00, Glass and Glazing.
 - 1.2.2.7. Building in and anchoring of steel frames in gypsum board partitions: Section 09 21 16, Gypsum Board Assemblies.
 - 1.2.2.8. Filling nail holes and provision of finish painting: Section 09 91 00, Painting.

1.3. REFERENCES

- 1.3.1. Abbreviations and Acronyms:
 - 1.3.1.1. AWMAC/WI: Architectural Woodwork Manufacturers Association of Canada/Woodwork Institute; www.awmac.com.
 - 1.3.1.2. EPD: Environmental Product Declaration.
 - 1.3.1.3. HPD: Health Product Declaration.
 - 1.3.1.4. HUD: Department of Housing and Urban Development.
 - 1.3.1.5. MDF: Medium Density Fibreboard.
 - 1.3.1.6. NAAWS: North American Architectural Woodwork Standards – 4.0, 2021, as amended.
 - 1.3.1.7. NEMA: National Electrical Manufacturers Association; www.nema.org.
- 1.3.2. Reference Standards:
 - 1.3.2.1. 24 CFR Part 3280 - Manufactured Home Construction and Safety Standards
 - 1.3.2.2. ANSI/NPA A208.2-22 - Medium Density Fiberboard (MDF) for Interior Applications
 - 1.3.2.3. ANSI/NEMA LD 3-05 - High-Pressure Decorative Laminates

- 1.3.2.4. ASTM E84-23 - Standard Test Method for Surface Burning Characteristics of Building Materials
- 1.3.2.5. CSA O153:19 - Poplar plywood
- 1.3.2.6. ISO 14025:2016 - Environmental labels and declarations - Type III environmental declarations - Principles and procedures
- 1.3.2.7. ISO 21930:2017 - Sustainable in buildings and civil engineering works - Core rules for environmental product declarations of construction products and services

1.4. SUBMITTALS

- 1.4.1. Product Data:
 - 1.4.1.1. EPDs: When available, submit Product-specific Type III EPD or industry-wide (generic) EPD conforming to ISO 14025, ISO 21930 or other recognized environmental Product declaration framework demonstrating carbon impact of materials using life cycle analysis methods.
 - 1.4.1.2. HPDs: When available, submit documentation demonstrating chemical inventory of materials to at least 0.1% (1000 ppm) and conforming to 1 of following standards:
 - 1.4.1.2.1. Health Product Declaration open Standard.
 - 1.4.1.2.2. Cradle to Cradle v2 Basic level.
 - 1.4.1.2.3. Cradle to Cradle v3 Bronze level.
 - 1.4.1.2.4. Or other recognized material ingredient framework.
- 1.4.2. Shop Drawings: Submit Shop Drawings for work of this Section in accordance with Section 01 30 00 and Section 01 of NAAWS. Clearly indicate material being supplied and show connections, attachments, reinforcing, anchorage and location of exposed fastenings.
- 1.4.3. Samples: Submit samples in accordance with Section 01 30 00 in following sizes:
 - 1.4.3.1. each type of hardware.
 - 1.4.3.2. each plastic laminate in manufacturer's standard chip size.
 - 1.4.3.3. minimum 300 mm (12") square x 25 mm (1") thick countertop materials.

1.5. QUALITY ASSURANCE

- 1.5.1. Qualifications:
 - 1.5.1.1. Provide work of this Section in accordance with NAAWS produced by AWMAC/WI, except as specified otherwise herein and by reference are hereby made a part of this Section. Ensure any reference to grades and terminology in this Section is as defined in NAAWS.
 - 1.5.1.2. Requirements of this Section govern and modify NAAWS.
 - 1.5.1.3. Installers: Provide work of this Section executed by competent installers with minimum 5 years' experience in the application of Products, systems and assemblies specified and be a member of AWMAC/WI.

1.6. DELIVERY, STORAGE AND HANDLING

- 1.6.1. Delivery and Acceptance Requirements:
 - 1.6.1.1. Do not deliver finished Products during rainy or damp weather.
 - 1.6.1.2. Do not deliver work of this Section until building and storage areas are sufficiently dry so Products will not be damaged by excessive changes in moisture content.
 - 1.6.1.3. Deliver Products of this Section in accordance with Section 13, 13.5.1.2 of NAAWS.

1.6.1.4. Do not deliver damaged Products.

1.6.2. Storage and Handling Requirements:

1.6.2.1. Store and handle Products of this Section in accordance with Section 13, 13.5.1.3 and 13.5.1.4 of NAAWS.

1.6.2.2. Cover finished plastic laminate surfaces and varnished surfaces with heavy kraft paper and put in cartons for protection. Protect installed plastic laminate surfaces by acceptable means. Do not remove protective covers until immediately prior to final cleaning.

1.7. WARRANTY

1.7.1. Manufacturer Warranty: Warrant work of this Section for a period of 2 years against defects and/or deficiencies in accordance with General Conditions of the Contract. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Consultant and at no expense to Owner. Defects include but are not limited to, delamination of plastic laminate, opening of seams, warpage and extensive colour fading.

PART 2 - PRODUCTS

2.1. MATERIALS

2.1.1. Performance/Design Requirements:

2.1.1.1. Carbon Impact Design: Preference will be given to those manufacturers who have provided EPDs outlining their programs for reducing their Operational and Embodied Carbon footprints as specified herein.

2.1.1.2. Material Ingredient Disclosure: Preference will be given to those manufacturers who have provided HPDs or similar documentation identifying their Product chemical content as specified herein.

2.1.1.3. Ensure millwork (e.g. countertops, wall cabinets, etc.) are capable of supporting structural loads without deflection in accordance with "Casework Integrity Testing" in "Appendix" of NAAWS.

2.1.2. Framing Lumber: Select Merchantable Western White Spruce, kiln dried, or sound material of any species may be used for concealed members, free from sap, shakes, knots, splits and other defects.

2.1.3. Architectural Lumber: Clear, straight, kiln dried, Select Yellow Birch for fitments and door jambs. Provide kiln dried lumber to 7% moisture content, free from blemishes that would be apparent after finish is applied.

2.1.4. Plywood: Architectural Grade Selected Birch veneer for exposed faces and Sound Grade (SO) Birch veneer for unexposed faces.

2.1.5. Solid Birch: Of uniform grain and colour, Premium Grade.

2.1.6. High Pressure, Paper Base, Decorative Laminates (PLAM):

2.1.6.1. Products of following manufacturers are permitted subject to conformance to requirements of Drawings, Schedules and Specifications:

2.1.6.1.1. Arborite; www.arborite.com

2.1.6.1.2. Formica Inc.; www.formica.com

2.1.6.1.3. Industrial Laminates/Norplex, Inc.; www.micarta.com

2.1.6.1.4. Nevamar Company, LLC; www.nevamar.com

2.1.6.1.5. Pionite Decorative Laminates; www.pionite.com

2.1.6.1.6. Wilsonart Canada; www.wilsonart.com

2.1.6.2. Provide types and thicknesses conforming to ANSI/NEMA LD 3 and Section 04, "Table: 04-009 – HPL TYPES and MINIMUM PERFORMANCE REQUIREMENTS" of NAAWS.

- 2.1.6.3. Colours and Finishes: Provide full colour range including solid, woodgrain and printed patterns, textured, mirror, suede or matte, glossy, high luster/furniture crystal and ashwood finishes. Maximum 5 colours and Product design will be selected later by Consultant from any or all of above listed manufacturers.
- 2.1.7. Plastic Laminate Adhesive: Provide in accordance with Section 04, 04.5.5.2 and "Adhesive Usage Guide" in "Appendix" of NAAWS.
- 2.1.8. Wood Cores:
- 2.1.8.1. MDF Core: Medium density panels, meeting requirements of ANSI/NPA A208.2, balanced design, manufactured from 100% recycled materials, without use of formaldehyde resins, meeting HUD rule 24 CFR Part 3280 for emissions, of minimum density of 770 kg/m³ (48 lb/cu ft) and surface character to match sample in Consultant's possession. Ensure fire retardant Product contains fire-retardant chemicals injected with raw materials during manufacturing and achieve a maximum Flame Spread rating of 25 with a maximum Smoke Developed of 200 when tested to ASTM E84. Do not use MDF panels in moist areas. "Excel+ MDF" by Uniboard Canada Inc.; www.uniboard.com or CanFibre Group Ltd.
- 2.1.8.2. Plywood Core (Veneer): Poplar plywood conforming to CSA O153, Grades A and B.
- 2.1.9. Casework Hardware: Provide following hardware:
- 2.1.9.1. Shallow Drawer Slides: "8357" by Knappe & Vogt Manufacturing Company; www.knappeandvogt.com or "3832EC" by Accuride; www accuride.com, full extension type with a capacity of 34 kg (75 lb).
- 2.1.9.2. Deep Drawer Slides: "8500" by Knappe & Vogt Manufacturing Company or "4005" by Accuride, full extension type with a capacity of 68 kg (150 lb).
- 2.1.9.3. Flipper Door Slides (Non-adjustable): "1432" by Accuride; www accuride.com or Knappe & Vogt Manufacturing Company; www.knappeandvogt.com.
- 2.1.9.4. Shelf Pins: Nickel-plated metal, minimum 5 mm diameter pin, "Art. No. 282-04-711" by Hafele Canada; www.hafele.ca or "331 ANO" by Knappe & Vogt Manufacturing Company; www.knappeandvogt.com. Provide 4 pins per shelf.
- 2.1.9.5. Recessed Shelf Pilasters, Standards and Clips: Provide "255 ZC, zinc finished" pilaster and "256 ZC, zinc finished" clip supports by Knappe & Vogt Manufacturing Company; www.knappeandvogt.com or "120-10 Series" pilasters and "1903-2G" clip supports by Richelieu Hardware Ltd.; www.richelieu.com.
- 2.1.9.6. Concealed Hinges: European style "CLIP top" by Blum Canada Ltd.; www.blum.com, "NEXIS IMPRESSO 65" by Grass Canada Inc.; www.grass.at or "Salice 200 Series, 165" by Hafele Canada; www.hafele.ca minimum 170 degree opening angle and is self closing. Supply manufacturer's recommended number of hinges to suit door size and thickness.
- 2.1.9.7. Piano Hinges: Nickel plated finish; "Product #3225180" by Richelieu Hardware Ltd.; www.richelieu.com. Provide piano hinges along full length of door.
- 2.1.9.8. Pulls (Doors and Drawers) (HW): Refer to "Finish Schedule" on Drawings.
- 2.1.10. Finishing:
- 2.1.10.1. Prime unexposed surfaces including backs of fitments against walls and underside of fitments.
- 2.1.10.2. Before priming, treat knots and sap streaks, with a coat of shellac/sealer and then prime with a wood primer.
- 2.1.10.3. Shop finish natural finished wood surfaces.
- 2.2. COMPONENTS**
- 2.2.1. Supply casework conforming to Section 10 of NAAWS as applicable.
- 2.2.2. Casework for Plastic Laminate Finish:

- 2.2.2.1. AWMAC/WI Quality Grade: Custom.
- 2.2.2.2. Construction: Ensure casework conforms to Section 10 of AWS.
- 2.2.2.3. Exposed Parts Core: Composition board (MDF).
- 2.2.2.4. Exposed Parts Finish: Plastic laminate; HGS for horizontal surfaces and VGS for vertical surfaces in accordance with Section 10, 10.2 SURFACE DEFINITIONS of NAAWS.
- 2.2.2.5. Semi-Exposed Parts Core: Composition board (MDF).
- 2.2.2.6. Semi-Exposed Parts Finish: Plastic laminate; HGS for horizontal surfaces and VGS for vertical surfaces in accordance with Section 10, 10.2 SURFACE DEFINITIONS of NAAWS.
- 2.2.2.7. Concealed Parts Finish: Backing sheet as required for balance.
- 2.2.3. Edgebanding: As per Section 10, 10.5.6 of NAAWS.
- 2.2.4. Laminate Countertops and Backsplashes:
 - 2.2.4.1. Provide laminate countertops and backsplashes in accordance with Section 11, "Countertops and Horizontal Surfaces" contained in Resource Guide of NAAWS in configurations and details as shown on Drawings.
 - 2.2.4.2. Finish edgebanding other than backsplash or sidesplash with same plastic laminate material used for countertops in accordance with Section 11, 11.5.1 of NAAWS.
 - 2.2.4.3. Laminate: Provide HGP post-forming for horizontal locations and VGP for vertical locations.
- 2.2.5. Field Touch-Up: Field touch-up is responsibility of installing trade or architectural woodwork manufacturer providing it is responsible for factory finishing. Field touch-up includes filling and touch-up of exposed job-made nail and screw holes, refinishing of raw surface resulting from job fitting, repair of job-inflicted scratches and mars and final cleaning up of finished surfaces.
- 2.2.6. Fabrication:
 - 2.2.6.1. Fabricate joints accurately fitted, coped where possible and well glued up. Fabricate joints mitred to perfect fit and alignments carefully matched.
 - 2.2.6.2. Fabricate finished woodwork in 1 piece where possible. Fabricate running members in the longest lengths obtainable.
 - 2.2.6.3. Fabricate to conceal fastenings.
 - 2.2.6.4. Provide plastic laminate work in shop where practical and/or possible.
 - 2.2.6.5. Fabricate exposed gables to match the required exposed finishes.
 - 2.2.6.6. Exposed wood construction:
 - 2.2.6.6.1. Fabricate joints carefully matched for grain and colour.
 - 2.2.6.6.2. Fabricate millwork with slow fed machines free from sticker and/or sander markings, with sections and moulding work cut accurately to profiles.
 - 2.2.6.6.3. Sandpaper woodwork, smooth removing burrs, feathers, sleeves, raised grain and sharp arises and leave exposed surfaces perfectly clean and smooth ready for finishing.
 - 2.2.6.6.4. Provide edges noted to be solid, as minimum 6 mm (1/4") thick wood to match exposed veneer, glued to core prior to the application of face veneers.
 - 2.2.6.7. Countertops:
 - 2.2.6.7.1. Fabricate and assemble countertops and splashbacks in shop to profiles and lengths required.
 - 2.2.6.7.2. Fabricate cutouts for services penetrations as required.
 - 2.2.6.7.3. Verify governing dimensions before fabricating items which abut wall surfaces.
 - 2.2.6.7.4. Provide cutouts required and round internal corners, chamfer edges and seal exposed core.

- 2.2.6.7.5. Provide sidesplashes at abutting ends of counters and at adjoining walls, unless otherwise indicated.
- 2.2.6.7.6. Provide a 6 mm (1/4") drip groove approximately 13 mm (1/2") in from the underside edge.

PART 3 - EXECUTION**3.1. EXAMINATION**

- 3.1.1. Verification of Conditions: Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation.
- 3.1.2. Evaluation and Assessment: Commencement of work implies acceptance of previously completed work.

3.2. INSTALLATION

- 3.2.1. Install work of this Section in accordance with appropriate Section of NAAWS.
- 3.2.2. Provide work of this Section true and straight and securely fastened in place.
- 3.2.3. Mitre exposed corners and butt joints.
- 3.2.4. Provide plastic laminate countertops plumb and true, neatly scribed to adjoining surfaces.
- 3.2.5. Thoroughly fix and anchor work of this Section into position.
- 3.2.6. Mechanical and Electrical Fittings:
 - 3.2.6.1. Provide openings required to accommodate mechanical and electrical fittings as part of the work of this Section and provide a core sealant to protect counter cores which are exposed to accommodate:
 - 3.2.6.1.1. mechanical services and fittings.
 - 3.2.6.1.2. washroom accessories.
 - 3.2.6.2. Mechanical and electrical fittings and services will be provided as part of the work of Mechanical and Electrical.
- 3.2.7. Installation of Hardware:
 - 3.2.7.1. Install architectural woodwork hardware in accordance with manufacturer's requirements and templates. Adjust architectural woodwork hardware to provide smooth operation and ensure clearances are maintained. Repair damage to adjacent surfaces resulting from failure to conform with this requirement.
 - 3.2.7.2. Provide lubricants required and use in manner to ensure smooth function of hardware consistent with manufacturer's recommendations.
 - 3.2.7.3. Verify fastening components are tightened securely. Align screws, bolts and similar fastenings such that relationship of screw head indentations, similar surfaces and slots are perpendicular to matching vertical or horizontal position when on same surface. Do not burr or otherwise mar edges of surfaces of hardware components. Repair defects caused by work of this Section in an acceptable manner.
- 3.2.8. Do not install damaged Products.

3.3. SITE QUALITY CONTROL

- 3.3.1. Non-Conforming Work: Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of Consultant at no cost to Owner.

END OF SECTION

PART 1 – GENERAL

3.2. GENERAL INSTRUCTIONS

- 3.2.1. Read and conform to:
 - 3.2.1.1. CCDC 2 – 2020, Stipulated Price Contract as amended in the Contract Documents.
 - 3.2.1.2. Division 1 requirements and documents referred to therein.

3.3. SUMMARY

- 3.3.1. Section Includes: Provided self-adhering sheet waterproofing including but not limited to following:
 - 3.3.1.1. priming.
 - 3.3.1.2. self-adhering sheet waterproofing below grade.
 - 3.3.1.3. protection board.
 - 3.3.1.4. drainage board.
- 3.3.2. Related Sections: Following description of work is included for reference only and shall not be presumed complete:
 - 3.3.2.1. Provision of concrete foundation walls: Section 03 30 00, Cast-In-Place Concrete.

3.4. REFERENCES

- 3.4.1. Abbreviations and Acronyms:
 - 3.4.1.1. SBS: Styrene Butadiene Styrene.
- 3.4.2. Reference Standards:
 - 3.4.2.1. ASTM D412-16(21) Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers Tension
 - 3.4.2.2. ASTM D882-18 Standard Test Method for Tensile Properties of Thin Plastic Sheeting
 - 3.4.2.3. ASTM D1621-16 Standard Test Method for Compressive Properties of Rigid Cellular Plastics
 - 3.4.2.4. ASTM D1970/D1970M-21 Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
 - 3.4.2.5. ASTM D4716/D4716M-13(21) Standard Test Method for Determining the (In-Plane) Hydraulic Transmissivity of a Geosynthetic by Radial Flow
 - 3.4.2.6. ASTM E96/E96M-22 Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials

3.5. ADMINISTRATIVE REQUIREMENTS

- 3.5.1. Coordination: Ensure continuity of waterproofing membrane throughout work of this Section.
- 3.5.2. Scheduling: Schedule work to provide a watertight seal at the end of each Working Day on areas worked upon during the Day.

3.6. SUBMITTALS

- 3.6.1. Samples: Submit samples of self-adhering sheet membrane waterproofing material and drainage board in accordance with Section 01 30 00.

3.7. QUALITY ASSURANCE

- 3.7.1. Qualifications:

- 3.7.1.1. Installers: Provide work of this Section executed by competent installers with minimum of 5 years experience in application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.

3.8. DELIVERY, STORAGE AND HANDLING

- 3.8.1. Delivery and Acceptance Requirements: Deliver materials to site in undamaged and original packaging indicating name of manufacturer and Product.

- 3.8.2. Storage and Handling Requirements:

- 3.8.2.1. Store cold applied elastomeric membrane in closed containers outdoors.

- 3.8.2.2. Store membrane at temperature of 5 deg C (41 deg F) and above to facilitate handling.

- 3.8.2.3. Membrane contains petroleum solvents and are flammable. Do not use near open flame.

- 3.8.2.4. Store roll materials horizontally in original packaging.

- 3.8.2.5. Store adhesives and primers at temperatures of 5 deg C (41 deg F) and above to facilitate handling.

- 3.8.2.6. Keep solvents away from open flame or excessive heat.

3.9. SITE CONDITIONS

- 3.9.1. Ambient Conditions: Do not perform installation during rainy or inclement weather and on frost or wet covered surfaces.

3.10. WARRANTY

- 3.10.1. Manufacturer Warranty: Warrant work of this Section for period of 5 years against defects and/or deficiencies in accordance with General Conditions of the Contract. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Consultant and at no expense to Owner Representative. Defects include but are not limited to actual leakage.

PART 2 - PRODUCTS

2.1. MANUFACTURERS

- 2.1.1. Manufacturer List: Products of following manufacturers are permitted subject to conformance to requirements of Drawings, Schedules and Specifications:

- 2.1.1.1. Carlisle Coatings & Waterproofing; www.carlisle-cw.com

- 2.1.1.2. GCP Applied Technologies, Inc.; www.gcpat.com

- 2.1.1.3. Henry Company; www.henry.com

- 2.1.1.4. W.R. Meadows of Canada; www.wrmeadows.com

2.2. MATERIALS

2.2.1. Performance/Design Criteria:

2.2.1.1. Provide self-adhering sheet waterproofing on exterior vertical face of foundation walls incorporating full width of top of footings to walls, including but not limited to following:

2.2.1.1.1. foundation walls and footings.

2.2.1.1.2. primer.

2.2.1.1.3. self-adhering sheet waterproofing membrane.

2.2.1.1.4. protection board.

2.2.1.1.5. drainage board.

2.2.2. Primer for Self-Adhering Waterproofing Membrane: Provide "Bituthene® Adhesive Primer B2 LVC" by GCP Applied Technologies, Inc., "Mel Prime™ W/B Water-Based Adhesive" by W.R. Meadows of Canada, "Bakor Hi Tac™ Primer" or "Blueskin® Adhesive" by Henry Company or "CCW 702" by Carlisle Coatings & Waterproofing, a synthetic rubber based adhesive type, quick setting for all temperatures, having following physical properties:

2.2.2.1. Weight: Minimum 0.8 kg/L (6 lb/US gal).

2.2.2.2. Solids by Weight: Minimum 35%.

2.2.3. Waterproofing Membrane (WP-03): Provide "Bituthene® 3000" by GCP Applied Technologies, Inc., "MEL-ROL® Rolled, Self-Adhering Waterproofing Membrane" by W.R. Meadows of Canada, "Bakor Blueskin® WP200 Self-Adhesive Waterproofing Membrane" by Henry Company or "CCW MiraDRI 860/861 Self-Adhering Waterproofing Membrane" by Carlisle Coatings & Waterproofing, SBS modified bitumen, self-adhering sheet membrane with a cross-laminated polyethylene film and having following physical properties:

2.2.3.1. Thickness: 1.5 mm (60 mils) minimum.

2.2.3.2. Flexibility: Pass @ -40 deg C (-40 deg F) to ASTM D1970/D1970M.

2.2.3.3. Vapour Permeance: 2.8 ng/Pa.s.m² (0.05 perms) to ASTM E96/E96M.

2.2.3.4. Tensile Strength (Membrane): 2.24 MPa (325 psi) to ASTM D412.

2.2.3.5. Tensile Strength (Film): 34.5 MPa (5000 psi) to ASTM D882.

2.2.3.6. Elongation: Minimum 300% to ASTM D412.

2.2.3.7. Puncture Resistance: 222 N (50 lb) minimum.

2.2.4. Liquid Membrane and Termination Sealant: Provide "Bituthene® Liquid Membrane" by GCP Applied Technologies, Inc., "Henry® 925 BES Sealant" by Henry Company, "CCW LM-800XL Liquid Mastic" and "CCW 704 Mastic" by Carlisle Coatings & Waterproofing or "Pointing Mastic" by W.R. Meadows of Canada, compatible with sheet waterproofing membrane, substrate and insulation materials, remains flexible with ageing and chemically resistant to alkalis, calcium chloride, mild acid and salt solutions.

2.2.5. Protection Board: Provide "990-31 Polypropylene Protection Board", "CCW Protection Boards" by Carlisle Coatings & Waterproofing or "Protection Course (Vibraflex® PC)" by W.R. Meadows of Canada.

2.2.6. Drainage Board: Provide "Hydroduct® 220" by GCP Applied Technologies, Inc., "Delta-Drain" by Cosella Dörken Products Inc.; www.cosella-dorken.com, "MiraDRAIN 1000" by Carlisle Coatings & Waterproofing, "Bakor DB 2000 Prefabricated Drainage Composites" by Henry Company or "Mel-Drain™" by W.R. Meadows of Canada, a high density polyethylene sheet, dimpled throughout field of sheet, with flat flanges on manufactured edges; polypropylene filter fabric heat bonded to top of dimples with following properties:

2.2.6.1. Dimpled Thickness: 8 mm (5/16").

- 2.2.6.2. ~~Water Flow Rate in Vertical Orientation: 1.25 l/min/m (6 gal/min/ft) when tested in accordance with ASTM D4716/D4716M.~~
- 2.2.6.3. ~~Compressive Strength: Approximately 250 kN/m² (5,200 psf), when tested in accordance with ASTM D1621.~~
- 2.2.6.4. ~~Sheet Width: As required to result in as few seams as possible.~~
- 2.2.6.5. ~~Colour: Brown.~~
- 2.2.6.6. ~~Working Temperature Range: 30 deg C (- 22 deg F) to 80 deg C (176 deg F).~~

PART 3 – EXECUTION

3.1. EXAMINATION

- 3.1.1. ~~Verification of Conditions: Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation.~~
- 3.1.2. ~~Evaluation and Assessment: Commencement of work implies acceptance of previously completed work.~~

3.2. PREPARATION

- 3.2.1. ~~Surface Preparation:~~
 - 3.2.1.1. ~~Ensure surfaces are sound, dry, clean and free of oil, grease, dirt, excess mortar, frost or other contaminants. Fill spalled areas in substrate to provide an even plane.~~
 - 3.2.1.2. ~~Ensure new concrete is cured for a minimum of 7 Days and must be dry before waterproofing membranes are applied. Cure lightweight structural concrete a minimum of 14 Days.~~

3.3. INSTALLATION

- 3.3.1. ~~Primer:~~
 - 3.3.1.1. ~~Apply primer for self-adhered sheet waterproofing membrane by roller or spray at rate recommended by manufacturer.~~
 - 3.3.1.2. ~~Allow minimum 30 minutes open time. Primed surfaces not covered by sheet waterproofing membrane during the same Working Day must be re-primed.~~
- 3.3.2. ~~Joint and Crack Treatment:~~
 - 3.3.2.1. ~~Pre-treat cracks in concrete 1.5 mm to 3 mm (1/16" to 1/8") wide with a 1.5 mm (60 mil) coating of liquid membrane 50 mm (2") wide centred on the crack. Alternately, apply a 150 mm (6") wide strip sheet of waterproofing membrane centred over crack. Provide 75 mm (3") end laps.~~
 - 3.3.2.2. ~~Pre-treat horizontal to vertical inside corner transition areas with a liquid membrane fillet extending 19 mm (3/4") vertically and horizontally from the corner. Apply a minimum 225 mm (9") strip of waterproofing membrane centred at the joint.~~
 - 3.3.2.3. ~~Pre-treat outside corners with a minimum 225 mm (9") strip of waterproofing membrane centred at joint.~~
 - 3.3.2.4. ~~Where 3 or more planes come into contact reinforce with cut sections of waterproofing membrane reinforcing sheet as per manufacturer's instructions.~~
- 3.3.3. ~~Projections: Extend waterproofing membrane tight to projection and seal with liquid membrane extending 65 mm (2 1/2") along projection and 65 mm (2 1/2") onto waterproofing membrane.~~
- 3.3.4. ~~Waterproofing Membrane – Vertical Applications:~~
 - 3.3.4.1. ~~Apply waterproofing membrane to prepared substrate in lengths of 2400 mm (8') or less.~~

- 3.3.4.2. ~~Provide 65 mm (2-1/2") laps at both sides and ends. Position for alignment and remove protective film. Press firmly into place. Promptly roll laps with a counter top roller to effect seal. If more than 1 length is required on a vertical surface, apply in a shingle fashion.~~
- 3.3.4.3. ~~Terminate membrane using termination mastic or termination bar, reglet or counter flashing as indicated. Refer to manufacturer's standard details.~~
- 3.3.4.4. ~~Seal laps within 300 mm (12") of a 90° change in plane with termination sealant.~~
- 3.3.5. ~~Waterproofing Membrane – Horizontal Applications:~~
- 3.3.5.1. ~~Apply 2 plies of waterproofing membrane to prepared substrate in lengths of 2400 mm (8') or less.~~
- 3.3.5.2. ~~Provide 65 mm (2-1/2") laps at both sides and ends. Position for alignment and remove protective film. Press firmly into place. Promptly roll laps with a counter top roller to effect seal. If more than 1 length is required on a vertical surface, apply in a shingle fashion.~~
- 3.3.5.3. ~~Terminate membrane using termination mastic or termination bar, reglet or counter flashing as indicated. Refer to manufacturer's standard details.~~
- 3.3.5.4. ~~Seal laps within 300 mm (12") of a 90° change in plane with termination sealant.~~
- 3.3.6. ~~Protection Board: Install protection board directly on waterproofing membrane as soon as the membrane has set. Use manufacturer's recommended adhesive.~~
- 3.3.7. ~~Drainage Board (Vertical):~~
- 3.3.7.1. ~~Align and hang drainage board up to foundation wall. Position bottom edge of drainage board to be in moderate contact with weeping tile system.~~
- 3.3.7.2. ~~Secure drainage board to foundation wall with nails and washers spaced 450 mm (18") oc horizontally. Install minimum of 2 rows staggered and spaced 150 mm (6") apart and min 150 mm (6") from top edge.~~
- 3.3.7.3. ~~Align and install termination strip along top edge with nails spaced 300 mm (12") oc and seal with termination sealant.~~
- 3.3.7.4. ~~Align and install moulding strip over completed top edge detail.~~
- 3.3.7.5. ~~Overlap end laps, pull back loose fabric to expose drain core and position core of second panel over overlap flange of first panel.~~
- 3.3.7.6. ~~Bend drainage board to create inside corners and cut board to create outside corners, provide 75 mm (3") of extra fabric to wrap corner.~~
- 3.3.7.7. ~~Stagger or offset joints of drainage board sheets.~~
- 3.3.7.8. ~~Place subsequent sheets in an overlapping shingle fashion.~~
- 3.3.7.9. ~~Backfill bottom edge in conjunction with weeping tile system.~~
- 3.3.8. ~~Drainage Board (Horizontal):~~
- 3.3.8.1. ~~Ensure edge of core flange is at the higher edges of substrate, away from drains.~~
- 3.3.8.2. ~~Overlap in direction of water flow. Pull back loose fabric to expose drain core and position core of second panel over overlap flange of first panel.~~
- 3.3.8.3. ~~Bend drainage board to create inside corners and cut drainage board to create outside corners, provide 75 mm (3") of extra fabric to wrap corner.~~
- 3.3.8.4. ~~Stagger or offset joints of drainage board sheets.~~
- 3.3.8.5. ~~Place subsequent sheets in an overlapping shingle fashion.~~

3.4. SITE QUALITY CONTROL

- 3.4.1. Site Tests and Inspections: Carry out inspection and testing of waterproofing application by testing laboratory designated by Consultant when requested.
- 3.4.2. Non-Conforming Work: Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of Consultant at no cost to Owner.

3.5. PROTECTION

- 3.5.1. Provide adequate protection of materials and work of this Section from damage by weather, backfilling operations and other causes.
- 3.5.2. Protect work of other trades from damage resulting from work of this Section. Make Good such damage at own expense to satisfaction of Consultant.
- 3.5.3. Apply drainage board as soon as possible after installation of waterproofing membrane.

END OF SECTION

PART 1 – GENERAL

1.1. GENERAL INSTRUCTIONS

- 1.1.1. Read and conform to:
 - 1.1.1.1. CCDC 2 – 2020, Stipulated Price Contract as amended in the Contract Documents.
 - 1.1.1.2. Division 1 requirements and documents referred to therein.

1.2. SUMMARY

- 1.2.1. Section Includes: Provide crystalline waterproofing including but not limited to following:
 - 1.2.1.1. application of crystalline waterproofing to interior of elevator pits, sumps and other pits or depressions in slabs on grade and elsewhere where indicated.
- 1.2.2. Related Sections: Following description of work is included for reference only and shall not be presumed complete:
 - 1.2.2.1. Provision of cast-in-place concrete: Section 03 30 00, Cast-In-Place Concrete.

1.3. REFERENCES

- 1.3.1. Reference Standards:
 - 1.3.1.1. ASTM C267-20 – Standard Test Methods for Chemical Resistance of Mortars, Grouts and Monolithic Surfacing and Polymer-Concretes

1.4. ADMINISTRATIVE REQUIREMENTS

- 1.4.1. Coordination: Coordinate work of this Section with items to be cast in or grouted into surfaces to receive crystalline waterproofing to ensure compatibility and continuity of waterproofing application.

1.5. SUBMITTALS

- 1.5.1. Product Data: Submit Product data, including manufacturer's specifications and general recommendations for waterproofing applications.
- 1.5.2. Test and Evaluation Reports: Submit test reports from permitted independent testing laboratories certifying waterproofing system conforms to performance characteristics and testing requirements specified herein.
- 1.5.3. Certificates: Provide certificate signed by manufacturer's representative certifying materials installed comply with requirements of this Specification and applicator is qualified and approved to install Product in accordance with manufacturer's recommendations.

1.6. QUALITY ASSURANCE

- 1.6.1. Qualifications:
 - 1.6.1.1. Installers: Provide work of this Section executed by competent installers with minimum 5 years experience in the application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.

1.7. SITE CONDITIONS

- 1.7.1. Ambient Conditions: Ensure surfaces and ambient air temperature is not less than 5 deg C (41 deg F) for a minimum period of 48 hours before, during and for 48 hours after applications.

1.8. WARRANTY

- 1.8.1. Manufacturer Warranty: Warrant work of this Section for a period of 2 years against defects and/or deficiencies in accordance with General Conditions of the Contract. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Consultant and at no expense to Owner. Defects include but are not limited to; water leakage, except as result of structural failure of concrete substrate. Cracks arising from normal shrinkage and/or expansion of concrete which are 0.3 mm (1/100") wide or less are not to be considered as structural failure. Hairline cracks which result from these causes are to be considered normal and consequently warranty will not be invalidated as a result of these minor defects.

PART 2 - PRODUCTS

2.1. MANUFACTURERS

- 2.1.1. Manufacturer List: Products of following manufacturers are permitted subject to conformance to requirements of Drawings, Schedules and Specifications:
- 2.1.1.1. Aquafin, Inc.; www.aquafin.net
- 2.1.1.2. Edco Technologies Inc.; www.edcotechnologies.com
- 2.1.1.3. Euclid Chemical Canada Ltd.; www.euclidchemical.com
- 2.1.1.4. Kryton International Inc.; www.kryton.com
- 2.1.1.5. Tremco Canada; www.tremcosealants.com
- 2.1.1.6. W.R. Meadows of Canada; www.wrmeadows.com
- 2.1.1.7. Xypex Chemical Corporation; www.xypex.com
- 2.1.2. Substitution Limitations: This Specification is based on Tremco Canada's "Permaquik Products". Comparable Products from manufacturers listed herein may be reviewed provided they meet requirements of this Specification.

2.2. MATERIALS

- 2.2.1. Performance/Design Criteria:
- 2.2.1.1. Cementitious crystalline waterproofing is a blend of Portland cement, fine treated silica sand active proprietary chemicals. When mixed with water and applied as cementitious coating, active chemicals cause a catalytic reaction which generates a non-soluble crystalline formation of dendritic fibers within pores and capillary tracts of concrete causing concrete to become permanently sealed against penetration of liquids from any direction.
- 2.2.1.2. Ensure chemical resistance in accordance with ASTM C267 exhibits no detrimental effects after exposure.
- 2.2.1.3. Ensure waterproofing treatment prevents passage of water under pressure and capable of spanning cracks up to 0.3 mm (1/100") without failure.
- 2.2.2. Crystalline Waterproofing: "Permaquik® Crystalline Waterproofing" by Tremco Canada, "Vandex Super/Super White" by Euclid Chemical Canada Ltd., "Krystol T1®" by Kryton International Inc. or "Cem-Kote CW Plus" by W.R. Meadows of Canada surface applied waterproofing compound, consisting of a patented formula of chemicals, cement and specially treated quartz which waterproofs by crystalline growth through cementitious voids in concrete substrate.
- 2.2.3. Slurry Coat: "Permaquik® 200" by Tremco Canada, "Vandex Super/Super White" by Euclid Chemical Canada Ltd., "Krystol T2®" by Kryton International Inc. or "Cem-Kote CW Plus" by W.R. Meadows of Canada applied in slurry consistency or powder application on concrete surfaces to prevent passage of water under pressure.

- 2.2.4. ~~Premixed Mortar: Ensure premixed waterproofing material is "Permaquik Mortar 300" used in connection with "Permaquik® 200" by Tremco Canada, "Vandex Uni Mortar 1 ZSR" by Euclid Chemical Canada Ltd., "Krystol T1®" used in connection with "Krystol T2®" by Kryton International Inc. or "Meadow-Crete OV" by W.R. Meadows of Canada; mixed to mortar consistency for filling of form tie holes, honeycombed areas, routed out cracks and seal strips and coves at construction joints, to assure water tightness of structure.~~
- 2.2.5. ~~Water: Free from matter deleterious to waterproofing materials.~~
- 2.2.6. ~~Sealant: Compatible with waterproofing material, of type which will not re-emulsify and acceptable to manufacturer of waterproofing material.~~
- 2.2.7. ~~Mixes:~~
- 2.2.7.1. ~~Slurry Consistency: Use separate containers for measuring by volume powdery materials. Add water to materials (not vice versa) and mix thoroughly. Ensure ratio of water to powder is as recommended by waterproofing material manufacturer. Prepare only as much slurry mixture as can be applied within 20-30 minutes. Do not add more water when mixture starts to thicken. Stir mixture frequently.~~
- 2.2.7.2. ~~Mortar Consistency: Measure "Slurry Coat" and "Premixed Mortar" material and mix powder thoroughly. Add water to powdery mixture and work with trowel until a medium stiff consistency is reached. Prepare only as much mortar as can be applied within 10-15 minutes. Ensure ratio of water and powder is as recommended by waterproofing manufacturer.~~

PART 3 – EXECUTION

3.1. EXAMINATION

- 3.1.1. ~~Verification of Conditions: Examine concrete surfaces to be waterproofed for visible structural defects. Report unacceptable surface conditions. Report in writing, location of cracks exceeding 0.3 mm (1/100").~~
- 3.1.2. ~~Evaluation and Assessment: Commencement of work implies acceptance of previously completed work.~~

3.2. PREPARATION

- 3.2.1. ~~Surface Preparation:~~
- 3.2.1.1. ~~Remove form scale, laitance, oil, form release agents and other foreign materials likely to affect bond, penetration and performance of waterproofing. Employ steam cleaning or sandblasting as required.~~
- 3.2.1.2. ~~Prepare smooth surfaces resulting from steel formwork and similarly smooth surfaces by light sandblasting or high pressure water blasting.~~
- 3.2.1.3. ~~Ensure prepared surfaces use an open crystalline system to assure permanent bonding of waterproofing application.~~
- 3.2.1.4. ~~Horizontal Concrete Surfaces:~~
- 3.2.1.4.1. ~~Do not treat concrete surfaces with floor hardener or curing agents prior to waterproofing application.~~
- 3.2.1.4.2. ~~Rout out to minimum 38 mm (1 1/2") wide by 19 mm (3/4") deep, construction joints and visible cracks exceeding 0.3 mm (1/100") in size. Thoroughly rinse with water all concrete slab surfaces. Remove free water a Day prior to waterproofing application. Ensure concrete surfaces are damp at time slurry coating is applied.~~
- 3.2.1.5. ~~Vertical Concrete Surfaces:~~
- 3.2.1.5.1. ~~Ensure form tie holes are left approximately 25 mm (1") back of surface.~~
- 3.2.1.5.2. ~~Ensure honeycombed pockets and faulty construction joints are routed out to sound concrete.~~

- ~~3.2.1.5.3. Ensure vertical and horizontal construction joints and visible cracks in concrete surfaces exceeding 0.3 mm (1/100") are routed out 38 mm (1 1/2") wide by 19 mm (3/4") deep.~~
- ~~3.2.1.5.4. Rinse surfaces to be waterproofed thoroughly with water a Day prior to waterproofing application. Ensure moisture is present in concrete substrate to achieve maximum initial penetration of activated waterproofing chemicals. Ensure surfaces are moist only (not wet) when waterproofing is applied.~~

3.3. APPLICATION

- ~~3.3.1. Waterproofing:~~
- ~~3.3.1.1. Apply waterproofing material to concrete surfaces as soon as possible after stripping of formwork.~~
- ~~3.3.1.2. Carry waterproofing up to pipes, standards and other items projecting through substrate, cut back to receive sealant.~~
- ~~3.3.1.3. Waterproof concrete construction joints and pipes, standards and other items projecting through substrate.~~
- ~~3.3.1.4. Apply slurry coatings by using a stiff masonry brush, or with suitable spray equipment.~~
- ~~3.3.1.5. Allow each successive coat to reach initial set before recoating.~~
- ~~3.3.1.6. Horizontal Concrete Surfaces:~~
- ~~3.3.1.6.1. Dry sprinkle and power trowel or wood float application for slabs unless otherwise directed. When concrete of structure slab starts to reach initial set, dry sprinkle Slurry Coat 1.4 kg/m² (2.5 lbs/sq yd) on concrete surfaces and power trowel or wood float surfaces until uniformity in coverage and specified finish is reached.~~
- ~~3.3.1.6.2. Where it is not possible or practical to float waterproofing into concrete structure and where permitted, apply slurry coating to concrete surfaces, "Slurry Coat" 1.4 kg/m² (2.5 lbs/sq yd) in slurry consistency. Apply slurry coatings uniformly in quantities specified (in 1 or 2 successive coatings). Second slurry coating of "Slurry Coat" may be applied while first coat is still green but after it has reached an initial set.~~
- ~~3.3.1.6.3. Ensure vertical construction joints are treated with "Slurry Coat" 1.4 kg/m² (2.5 lbs/sq yd) in slurry consistency or powder form on pre-wetted surface immediately prior to pouring of concrete.~~
- ~~3.3.1.6.4. Install seal strip 19 mm x 38 mm (3/4" x 1 1/2") at construction joints and at routed out cracks. Ensure seal strips consists of 2 laminating layers of "Slurry Coat" and "Premixed Mortar" material 1:6 in mortar consistency.~~
- ~~3.3.1.7. Vertical Concrete Surfaces:~~
- ~~3.3.1.7.1. Treat horizontal construction joints where accessible with "Slurry Coat" at rate of 0.8 kg/m² (1.5 lbs/sq yd) in slurry consistency or dry sprinkled on pre-wetted surfaces immediately prior to pouring of concrete.~~
- ~~3.3.1.7.2. Rout out honeycombed areas, faulty construction joints and cracks, apply slurry coating of "Slurry Coat" 1.4 kg/m² (2.5 lbs/sq yd) and fill with mortar ("Slurry Coat" and "Premixed Mortar") 1:6 in laminating layers.~~
- ~~3.3.1.7.3. Ensure form tie holes are filled with "Slurry Coat" and "Premixed Mortar" material 1:6 in mortar consistency after slurry coat of "Slurry Coat" has been applied.~~
- ~~3.3.1.7.4. Install seal strip 19 mm x 38 mm (3/4" x 1 1/2") at construction joints and junction of walls and slab with "Slurry Coat" and "Premixed Mortar" material 1:6 (mortar consistency) in 2 laminating layers.~~

~~3.3.1.7.5. Apply to concrete surfaces "Slurry Coat" 1.4 kg/m² (2.5 lbs/sq yd). Ensure slurry coating is uniformly applied in quantities specified (minimum 2 coatings). Fill small pockets in concrete surfaces with "Premixed Mortar" in mortar consistency. Second slurry coating of "Slurry Coat" can be applied while first coat is still green, but after it has reached an initial set. Ensure waterproofing is continuous through recesses to receive horizontal slabs and is installed prior to slab pour.~~

~~3.3.2. Curing:~~

~~3.3.2.1. When temperatures fall below freezing, cover waterproofed surfaces with tarpaulins, or other protection, and maintain surface temperature above 5 deg C (41 deg F) for a minimum period of 3 Days after completion of waterproofing application.~~

~~3.3.2.2. Protect freshly waterproofed surfaces from rain for a minimum of 24 hours.~~

~~3.3.2.3. Moist cure waterproofed surfaces for a minimum of 3 Days, starting with fine water fog spraying Day following completion of application.~~

~~3.3.2.4. During extreme hot weather, apply, as required, a light water fog spray to freshly applied slurry application in order to prevent dehydration of waterproofing.~~

~~3.3.3. Waterbars and Sealant:~~

~~3.3.3.1. Examine installed waterbars to ensure that proper waterbars are provided, correctly welded at joints and that placing of concrete does not destroy purpose of waterbars, as required to make foundation walls and slabs on grade watertight. Cooperate with and coordinate work of this Section with work of Section providing waterbars.~~

~~3.3.3.2. Seal around pipes and other protrusions with sealant.~~

3.4. SITE QUALITY CONTROL

~~3.4.1. Site Tests and Inspections: Owner may engage services of an independent inspection and testing company to carry out inspection and testing of work of this Section. Cost of such inspection and testing, if required, will be paid by Owner.~~

~~3.4.2. Non-Conforming Work: Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of Consultant at no cost to Owner.~~

3.5. CLEANING

~~3.5.1. Clean and repair surfaces soiled or otherwise damaged in connection with work of this Section. Replace materials or finishes that cannot be satisfactorily cleaned at no cost to Owner.~~

~~3.5.2. Waste Management: Upon completion of work remove debris, equipment and excess material from site.~~

3.6. PROTECTION

~~3.6.1. Protect surfaces which are not to be waterproofed from soiling or other damage resulting from work of this Section.~~

END OF SECTION

PART 1 - GENERAL

1.1. GENERAL INSTRUCTIONS

1.1.1. Read and conform to:

1.1.1.1. 1... CCDC 2 – 2020, Stipulated Price Contract as amended in the Contract Documents. ... 1

1.1.1.2. Division 1 requirements and documents referred to therein.

1.2. SUMMARY

1.2.1. Section Includes: Provide foamed-in-place insulation including but not limited to following:

1.2.1.1. spray foamed-in-place insulation and air barrier.

1.2.1.2. field testing of spray foamed-in-place insulation and air barrier.

1.2.2. Related Sections: Following description of work is included for reference only and shall not be presumed complete:

1.2.2.1. Provision of cast-in-place concrete: Section 03 30 00, Cast-In-Place Concrete.

1.2.2.2. Provision of concrete block masonry: Section 04 20 00, Masonry Units.

1.2.2.3. Provision of structural steel studs and exterior sheathing: Section 05 41 00, Structural Metal Stud Framing System.

1.3. REFERENCES

1.3.1. Abbreviations and Acronyms:

1.3.1.1. LTTR: Long Term Thermal Resistance.

1.3.2. Reference Standards:

- | | | |
|----------|---------------------|--|
| 1.3.2.1. | ASTM E96/E96M-21 | - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials |
| 1.3.2.2. | CAN/ULC-S705.1-18 | - Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density – Material Specification |
| 1.3.2.3. | CAN/ULC-S705.2-20 | - Standard for Thermal Insulation – Spray Applied Rigid Polyurethane Foam, Medium Density - Application |
| 1.3.2.4. | CAN/ULC-S770-15(20) | - Standard Test Method for Determination of Long-Term Thermal Resistance of Closed-Cell Thermal Insulating Foams |

1.4. QUALITY ASSURANCE

1.4.1. Qualifications:

1.4.1.1. Installers: Provide work of this Section executed by competent installers with minimum of 5 years experience application of Products, systems and assemblies specified and with approval and training of the Product manufacturers. Provide written proof from spray foam manufacturer confirming these requirements have been met prior to installation.

PART 2 - PRODUCTS

2.1. MANUFACTURERS

- 2.1.1. Manufacturer List: Products of following manufacturers are permitted subject to conformance to requirements of Drawings, Schedules and Specifications:
 - 2.1.1.1. BASF Canada Inc.; www.basf.com
 - 2.1.1.2. Carlisle Spray Foam Insulation; www.carlislesfi.com
 - 2.1.1.3. Genyk Inc.; www.genyk.com
 - 2.1.1.4. Huntsman Building Solutions; www.huntsmanbuildingsolutions.com

2.2. MATERIALS

- 2.2.1. Foamed-In-Place Insulation: Provide 2 component closed cell foam-in-place polyurethane foam with following requirements:
 - 2.2.1.1. Minimum Core Density: 28 kg/m³ (1.75 lb/cu ft) in accordance with CAN/ULC-S705.1.
 - 2.2.1.2. LTTR Value: 5.2/inch minimum in accordance with CAN/ULC-S770.
 - 2.2.1.3. Water Vapour Permeance: Maximum of 57 ng/Pa•s•m² (1 US Perm) when tested in accordance with ASTM E96/E96M.
 - 2.2.1.4. Permitted Products: "Walltite® CM01" by BASF Canada Inc., "SealTite™ One" by Carlisle Spray Foam Insulation, "BOREAL ELITE" by Genyk Inc. or "HEATLOK® SOYA HFO™" by Huntsman Building Solutions.

PART 3 - EXECUTION

3.1. EXAMINATION

- 3.1.1. Verification of Conditions: Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation.
- 3.1.2. Evaluation and Assessment: Commencement of work implies acceptance of previously completed work.

3.2. PREPARATION

- 3.2.1. Surface Preparation:
 - 3.2.1.1. Prepare substrate surfaces dry and free of dew, frost, voids, loose material, oil, grease, asphalt and curing compounds in accordance with CAN/ULC-S705.2.
 - 3.2.1.2. Provide masking as necessary to prevent overspray.

3.3. INSTALLATION

- 3.3.1. Provide foamed-in-place insulation in accordance with CAN/ULC-S705.2 and manufacturer's recommendations.
- 3.3.2. Provide foamed-in-place insulation to full area of surfaces indicated to be insulated and to provide a uniform and continuous thermal and airseal barrier.
- 3.3.3. Provide foamed-in-place insulation over projecting anchors and fastenings, around pipes, ducts, obstructions, openings and corners.
- 3.3.4. Provide foamed-in-place insulation free of voids and imbedded foreign materials.
- 3.3.5. Prevent overspray and remove masking materials.

3.4. SITE QUALITY CONTROL

3.4.1. Site Tests and Inspections:

3.4.1.1. Arrange and pay for cost of site reviews/tests in accordance with CAN/ULC-S705.2 by manufacturer's authorized third party testing agent. Schedule number of site reviews/tests in accordance with following schedule:

	Coverage Area	No. of Site Reviews/Tests
3.4.1.1.1.	3252 - 6503 m ² (35,000 - 70,000 sq ft)	1
3.4.1.1.2.	6503 - 9755 m ² (70,000 - 105,000 sq ft)	2
3.4.1.1.3.	9755 - 13 006 m ² (105,000 - 140,000 sq ft)	3
3.4.1.1.4.	over 13 006 m ² (over 140,000 sq ft)	4+

3.4.2. Non-Conforming Work: Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of Consultant at no cost to Owner.

END OF SECTION

PART 1 GENERAL

1.1 GENERAL INSTRUCTIONS

- A. Read and conform to:
- B. CCDC 2 – 2020, Stipulated Price Contract as amended in the contract Documents.
- C. Division 1 requirements and documents referred to therein.

1.2 SUMMARY

- A. Granule surfaced asphalt shingle roofing.
- B. Moisture shedding underlayment, eaves, valley and ridge protection
- C. Associated metal flashing

1.2 RELATED SECTIONS

- A. Section 06 10 00 – Rough Carpentry: Plywood Roof Sheathing
- B. Section 06 15 00– Wood Decking
- C. Section 07 26 00 – Vapor Retarders
- D. Section 07 13 54 – Sheet Waterproofing.
- E. Section 07 60 00 – Flashing and Sheet Metal.
- F. Section 08 62 00 – Unit Skylights
- G. Section 07 40 00 – Roofing and Siding Panels: Siding and Roofing
- H. Section 07 72 53 – Snow Guards

1.3 REFERENCES

- A. ASTM A 653/A 653M – Standard Specification for Steel Sheets, Zinc-Coated (Galvanized) or Zinc-Iron-Alloy-Coated (Galvannealed) by the Hot-Dip Process
- B. ASTM B 209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
- C. ASTM B 370 – Standard Specification for Copper Sheet and Strip for Building Construction.
- D. ASTM D 225 – Standard Specification for Asphalt Shingles (Organic Felt) Surfaced with Mineral Granules.
- E. ASTM D 226 – Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
- F. ASTM D 1970 – Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials used as Steep Roofing Underlayment for Ice Dam Protection.
- G. ASTM D 3018 – Standard Specification for Class A Shingles Surfaced with Mineral Granules.
- H. ASTM D 3161 – Standard Test Method for Wind Resistance of Asphalt Shingles (Fan-Induced Method).
- I. ASTM D 3462 – Standard Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules.
- J. ASTM D 4586 – Standard Specification for Asphalt Roof Cement, Asbestos-Free.
- K. ASTM D-4869 – Standard Specification for Asphalt-Saturated Organic Felt Shingle Underlayment Used in Roofing.
- L. ASTM D 6757 – Standard Specification for Inorganic Underlayment for Use with Steep Slope Roofing Products.
- M. ASTM D7158 – Standard Test Method for Wind Resistance of Asphalt Shingles (Uplift Force/Uplift Resistance Method)
- N. ASTM E 108 – Standard Test Methods for Fire Test of Roof Coverings
- O. ASTM G 21 – Determining Resistance of Synthetic Polymers to Fungi

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 30 00.
- B. Product Data: Provide manufacturer's printed product information indicating material characteristics, performance criteria and product limitations.
- C. Manufacturer's Installation Instructions: Provide published instructions that indicate preparation required and installation procedures.
- D. Certificate of Compliance: Provide Certificate of Compliance from an independent laboratory indicating that the asphalt fiberglass shingles made in normal production meet or exceed the requirements of the following:
 - 1. ASTM E 108/UL 790 Class A Fire Resistance
 - 2. ASTM D 3161/D 7158/UL 997 Wind Resistance.
 - 3. ASTM D 3462
- E. Shop Drawings: Indicate specially configured metal flashing, jointing methods and locations, fastening methods and locations and installation details as required by project conditions indicated.

1.5 QUALITY ASSURANCE

- A. Installer Minimum Qualifications: Installer shall be licensed or otherwise authorized by all federal, state and local authorities to install all products specified in this section. Installer shall perform work in accordance with NRCA Roofing and Waterproofing Manual. Work shall be acceptable to the asphalt shingle manufacturer.
- B. Pre-Installation Meeting – Conduct a pre-installation meeting at the site prior to commencing work of this section: Require attendance of entities directly concerned with roof installation. Agenda will include:
 - 1. Installation methods and manufacturer's requirements and recommendations
 - 2. Safety procedures
 - 3. Coordination with installation of other work
 - 4. Availability of roofing materials.
 - 5. Extra Material – Furnish under provision of section 01 70 00
 - 6. Preparation and approval of substrate and penetrations through roof.
 - 7. Other items related to successful execution of work.
 - 8. Product Compliance – Verify that products conform with all requirements specified by local Authority Having Jurisdiction (AHJ).
- C. Maintain one copy of manufacturer's application instructions on the project site.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store Products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials and materials used with solvent based materials in accordance with requirements of Authorities Having Jurisdiction.
- C. Deliver shingles to site in manufacturer's unopened labeled bundles. Promptly verify quantities and conditions. Immediately remove damaged products from site.

1.7 PROJECT ENVIRONMENTAL CONDITIONS

- A. Anticipate and observe environmental conditions (temperature, humidity and moisture) within limits recommended by manufacturer for optimum results. Do not install products under environment conditions outside manufacturer's limits.
- B. Take special care when applying WinterGuard Waterproofing Shingle Underlayment and shingles when ambient or wind chill temperature is below 45 degrees F (7 degrees C).
- C. Tack WinterGuard in place if it does not adhere immediately to the deck.

1.8 WARRANTY

- A. Manufacturer's Warranty: Furnish shingle manufacturer's warranty for the product listed below:
 - 1. CertainTeed **Landmark**: Lifetime limited warranty.
- B. Warranty Supplement: Provide manufacturer's supplemental warranty (CertainTeed's SureStart or SureStart PLUS) to cover labor and materials in the event of a material defect for the following period after completion of application of shingles:
 - 1. First Ten Years (**Landmark** Shingles)
 - 2. No SureStart or SureStart PLUS for any shingle applied to inadequately ventilated roof deck.
- C. SureStart PLUS Extended Warranty Protection (can only be provided by a CertainTeed Credentialed Contractor): **Landmark** shingles carry:
 - 1. 3-Star Coverage (20 years) material and labor costs for repair or replacement and tear off.
 - 2. 4-Star Coverage (50 years*) material and labor costs for repair or replacement, tear off and disposal costs.
**25 years for premises not used by individual homeowners*
 - 3. 5-Star Coverage (50 years**) material and labor costs for repair or replacement, tear off and disposal costs, and workmanship defects (25 years).
***30 years for premises not used by individual homeowners*
- D. Warranty Transferability Clause: Make available to Owner shingle manufacturer's standard option for transferring warranty to a new owner.
- E. Refer to manufacturer's warranty for adjustments for commercial applications.
- F. Provide Upgraded Wind Warranty from 110 to 130 mph on L AR shingles for first 15 years by complying with all manufacturers' conditions and instructions (see section 2.2-B below).

PART 2 PRODUCTS

2.1 MANUFACTURERS

Acceptable Manufacturer: Provide products manufactured by the CertainTeed Corporation. Contact Sales Support Group, P.O. Box 860, Valley Forge, PA 19482, Toll Free 800-233-8990

- A. Substitutions: Comparable Products from other manufacturers listed or not listed herein may be reviewed provided they meet requirements of this Specification.

2.2 ASPHALT FIBERGLASS SHINGLES

- A. CertainTeed **Landmark**: Conforming to ASTM D 3018 Type I – Self-Sealing, UL Certification of ASTM D 3462, ASTM D 3161/UL997 110-mph Wind Resistance and UL Class A Fire Resistance, glass fiber mat base, ceramically colored/UV resistant mineral surface granules across entire face of shingle; algae-resistance; two piece laminate shingle.
- B. Wind warranty upgrade – These products are warranted to resist blow-off due to wind velocities, including gusts, up to a maximum of 130 miles per hour during the first fifteen (15) years, provided all of the following conditions are met:
 - 1. CertainTeed shingles are not applied over existing roof shingles (roof-overs are not permitted).
 - 2. CertainTeed specified corresponding hip and ridge accessory products are installed as cap shingles (Shadow Ridge™, Cedar Crest™, Mountain Ridge™ (& IR).
 - 3. CertainTeed specified corresponding starter shingles are installed along the roof eaves and rakes (Swiftstart™ and High-Performance Starter).

- C. Weight: 229 / 240 pounds per square (dependent on manufacturing location) (100 square feet).
- D. Color: Charcoal Black

2.3 SHEET MATERIALS

- A. Eaves Protection: CertainTeed “WinterGuard”; ASTM D1970 sheet barrier of self-adhering rubberized asphalt membrane shingle underlayment having internal reinforcement and “split” back plastic release film; provide material warranty equal in duration to that of shingles being applied.
 - 1. CertainTeed WinterGuard Sand
 - 2. CertainTeed WinterGuard HT
 - 3. CertainTeed WinterGuard Granular
- B. Underlayment: CertainTeed “Roofers’ Select”, ASTM D 6757; asphalt-impregnated fiberglass-reinforced organic felt designed for use on roof decks as a water-resistant layer beneath roofing shingles
- C. Underlayment: ASTM D 4869, Asphalt saturated felt.

2.4 FLASHING MATERIALS

- A. Sheet Flashing: ASTM A 361/A361M; 26 Gauge (0.45 mm) steel with minimum G115/Z350 galvanized coating
- B. Sheet Flashing: ASTM B 209; 0.025 (0.63mm) thick aluminum, mill finish.
- C. Sheet Flashing: ASTM B 370; cold rolled copper; 16 ounces per square foot (0.55mm), natural finish.
- D. Bituminous Paint: Acid and alkali resistant type; black color.
- E. Tinner’s Paint: Color as selected by Architect to coordinate with shingle color.

2.5 ACCESSORIES

- A. Nails: Standard round wire type roofing nails, corrosion resistant; hot dipped zinc coated steel, aluminum or chromated steel; minimum 3.8 inch (9.5mm) head diameter; minimum 11 or 12 gage (2.5mm) shank diameter; shank to be sufficient length to penetrate through the roof sheathing or ¾ inch (19mm) into solid wood, plywood or non-veneer wood decking.
- B. Asphalt Roofing Cement: ASTM D 4586, Type I or II

2.6 FLASHING FABRICATION

- A. Form flashing to profiles indicated on Drawings and to protect roofing materials from physical damage and shed water.
- C. Form sections square and accurate to profile, in maximum possible lengths, free from distortion or defects detrimental to appearance or performance.

2.7 ATTIC VENTILATION

- A. CertainTeed Rolled Ridge Vent (28 lf) Filtered or Unfiltered
 - 1 Shingle over low profile ridge vent designed with external baffle to deflect wind and weather over the vent. The external baffle creates low pressure over the vent openings to “pull” air from the attic.
 - 2 Internal weather filter helps protect the attic from wind driven rain, snow, dust and insects.
 - 3 Each vent will provide 12 sq inches of net free area per lineal foot.
 - 4 Accommodates roof pitches of 3/12 to 20/12.
 - 5 The vent carries an approval report with the Texas Department of Insurance
 - 6 Limited Lifetime Warranty and 5-year Sure Start Protection.

3. EXECUTION**3.1 EXAMINATION**

- A. Verify existing site conditions under provisions of Section 01 70 00.
- B. Verify that roof penetrations and plumbing stacks are in place and flashed to deck surfaces.
- C. Verify deck surfaces are dry and free of ridges, warps or voids.

3.2 ROOF DECK PREPARATION

- A. Follow shingle manufacturer's recommendations for acceptable roof deck material.
- B. Broom clean deck surfaces under eave protection and underlayment prior to their application.

3.3 INSTALLATION – EAVE ICE DAM PROTECTION

- A. Place eave edge and gable metal edge flashing tight with fascia boards. Weather-lap joints 2 inches (50mm). Secure flange with nails spaced 8 inches (200 mm) on center.
- B. Apply CertainTeed "WinterGuard" Waterproofing Shingle Underlayment as eave protection in accordance with manufacturer's instructions.
- C. Extend eave protection membrane minimum 24 inches (640 mm) up slope beyond interior face of exterior wall.

3.4 INSTALLATION – PROTECTIVE UNDERLAYMENT

- A. Roof Slopes 4:12 or Greater: Install one layer of asphalt felt shingle underlayment perpendicular to slope of roof and lap minimum 4 inches (100 mm) over eave protection.
- B. Weather-lap and seal watertight with asphalt roofing cement items projecting through or mounted on roof. Avoid contact or solvent-based cements with WinterGuard and Diamond Deck

3.5 INSTALLATION – VALLEY PROTECTION

- A. For "closed-cut," "woven," and "open" valleys, first place one ply of WinterGuard, minimum 36 inches (910 mm) wide, centered over valleys. Lap joints minimum of 6 inches (152 mm) Follow instructions of shingle and waterproofing membrane manufacturer.

3.6 INSTALLATION – METAL FLASHING

- A. Weather-lap joints minimum 2 inches (50 mm).
- B. Seal work projecting through or mounted on roof with asphalt roofing cement and make weather tight.

3.7 INSTALLATION – ASPHALT SHINGLES

- A. Install shingles in accordance with manufacturer's instructions for product type and application specified.

3.8 FIELD QUALITY CONTROL

- A. Field inspection will be performed under provisions of Section 01 45 16.
- B. Visual inspection of the work will be provided by Owner. If conditions are unacceptable, Owner will notify the Architect.

3.9 PROTECTION OF FINISHED WORK

- A. Protect finished work under provisions of Section 01 76 00.
- B. Do not permit traffic over finished roof surface.

END OF SECTION

PART 1 – GENERAL

1.1. GENERAL INSTRUCTIONS

- 1.1.1. Read and conform to:
 - 1.1.1.1. CCDC 2 – 2020, Stipulated Price Contract as amended in the Contract Documents.
 - 1.1.1.2. Division 1 requirements and documents referred to therein.

1.2. SUMMARY

- 1.2.1. Section Includes: Provide metal siding system including but not limited to following:
 - 1.2.1.1. insulated metal siding system.
 - 1.2.1.2. adjustable Z bars.
 - 1.2.1.3. sub-girts.
 - 1.2.1.4. closures, flashings and corner stiffeners.
 - 1.2.1.5. caulking and sealants.
- 1.2.2. Related Sections: Following description of work is included for reference only and shall not be presumed complete:
 - 1.2.2.1. Prepainted coping cap flashings: Section 07 62 00, Sheet Metal Flashing and Trim.
 - 1.2.2.2. Provision of metal wall louvres: Section 08 91 00, Louvres.

1.3. REFERENCES

- 1.3.1. Abbreviations and Acronyms:
 - 1.3.1.1. CSSBI: Canadian Sheet Steel Building Institute; www.cssbi.ca.
- 1.3.2. Reference Standards:
 - 1.3.2.1. ASTM A653/A653M-22 – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - 1.3.2.2. ASTM B117-19 – Standard Practice for Operating Salt Spray (Fog) Apparatus
 - 1.3.2.3. ASTM C165-07(17) – Standard Test Method for Measuring Compressive Properties of Thermal Insulations
 - 1.3.2.4. ASTM C303-10 (16)e1 – Standard Test Method for Dimensions and Density of Preformed Block and Board-Type Thermal Insulation
 - 1.3.2.5. ASTM C920-18 – Standard Specification for Elastomeric Joint Sealants
 - 1.3.2.6. ASTM D523-14(18) – Standard Test Method for Specular Gloss
 - 1.3.2.7. ASTM D714-02(17) – Standard Test Method for Evaluating Degree of Blistering of Paints
 - 1.3.2.8. ASTM D968-17 – Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive
 - 1.3.2.9. ASTM D2244-16 – Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates

- 1.3.2.10. ~~ASTM D2247-15~~ ~~Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity~~
- 1.3.2.11. ~~ASTM D3363-20~~ ~~Standard Test Method for Film Hardness by Pencil Test~~
- 1.3.2.12. ~~ASTM D4214-07(15)~~ ~~Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films~~
- 1.3.2.13. ~~CSA S136-16(21)~~ ~~North American specification for the design of cold-formed steel structural members~~
- 1.3.2.14. ~~CAN/ULC S702.1-21~~ ~~Standard for Mineral Fibre Thermal Insulation for Buildings, Part 1: Material Specification~~

1.4. SUBMITTALS

- 1.4.1. ~~Shop Drawings:~~
 - 1.4.1.1. ~~Submit Shop Drawings for fabrication and installation of metal siding in accordance with Section 01 30 00. Show materials, gauges, dimensions, layouts and installation details.~~
 - 1.4.1.2. ~~Ensure a licensed engineer specified herein is responsible for:~~
 - 1.4.1.2.1. ~~production and review of Shop Drawings.~~
 - 1.4.1.2.2. ~~sealing and signing each Shop Drawing and any associated calculations performed.~~
- 1.4.2. ~~Samples: Submit 2 - 300 mm x 300 mm (12" x 12") prepainted sample sections of (each) siding profile and (each) colour specified. Ensure finished work matches reviewed samples in colour, gloss and texture.~~

1.5. QUALITY ASSURANCE

- 1.5.1. ~~Qualifications:~~
 - 1.5.1.1. ~~Installers: Provide work of this Section executed by competent installers with minimum of 5 years experience in application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.~~
 - 1.5.1.2. ~~Licensed Professionals: Employ a licensed engineer carrying minimum \$2,000,000.00 professional liability insurance and is registered in the Province of Ontario.~~

1.6. DELIVERY, STORAGE AND HANDLING

- 1.6.1. ~~Delivery and Acceptance Requirements: Transport materials to site storage compound in a manner to prevent in-transit damage. These measures include, but are not limited to crating, polyethylene wrapping system, etc.~~
- 1.6.2. ~~Storage and Handling Requirements:~~
 - 1.6.2.1. ~~Store materials on site in a manner to prevent damage thereto, or deterioration of finish. Galvanized surfaces which show evidence of "white rust" will not be permitted.~~
 - 1.6.2.2. ~~Stockpile panels tilted to provide water run-off, free from ground contact on firm, level, non-staining supports extending full width of sheet and spaced not more than 450 mm (36") apart. Where possible, pile individual sheets or panel length and types separately. Cover components with opaque polyethylene sheet to protect from direct sunlight and moisture penetration. Vent to allow air movement.~~

PART 2 – PRODUCTS

2.1. MANUFACTURERS

- 2.1.1. Manufacturer List: Products of following manufacturers are acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:
- 2.1.1.1. Agway Metals Inc.; www.agwaymetals.com
- 2.1.1.2. Mitten Building Products; www.mittensiding.com
- 2.1.1.3. Vicwest; www.vicwest.com
- 2.1.2. Substitution Limitations: Comparable Products from other manufacturers not listed herein may be reviewed provided they meet requirements of this Specification.

2.2. MATERIALS

- 2.2.1. Performance/Design Criteria:
- 2.2.1.1. Design metal siding, soffits and fasteners to support a positive wind load of 0.9 kN/m² (20 psf) and a negative wind load of 0.5 kN/m² (12 psf), with maximum deflection of L/180 of the span at full load. Ensure minimum base steel thickness for siding and liner sheet is 0.607 mm (24 ga).
- 2.2.1.2. Ensure unit stress does not exceed 138 MPa (20,000 psi).
- 2.2.1.3. Ensure general design is based on CSA S136.
- 2.2.1.4. Structural Design: Employ a licensed engineer specified herein to:
- 2.2.1.4.1. design components for work of this Section requiring structural performance.
- 2.2.1.4.2. be responsible for determining sizes, yield strengths, gauge thicknesses and joint spacing to allow thermal movement and loading of components in accordance with applicable codes and regulations.
- 2.2.2. Exterior Sheets:
- 2.2.2.1. Steel Sheet: Conforming to ASTM A653/A653M, CS, Type A, with a minimum base steel thickness of 0.607 mm (24 ga), finished with Z275 (G90) zinc coating in accordance with CSSBI Standards and prepainted with finishes specified herein.
- 2.2.2.2. Exterior Sheet Profile: "LUX V-Grove 6" Panel" by Mitten Building Products.
- 2.2.3. Insulation: Fibrous glass or stone wool rigid or semi-rigid board insulation, "Fiberglas™ Type 703" by Owens Corning Canada LP, "ROCKWOOL PLUS™ MB" by ROCKWOOL™ International A/S; www.rockwool.com. Ensure insulation has a thermal resistance value of not less than RSI=0.70 (R=4) at a mean temperature of 24 deg C (75 deg F) and a minimum nominal density of 32 kg/m³ (2 pcf) in accordance with ASTM C303. Ensure deformation of fibrous glass rigid board does not exceed 10% when tested at 1.2 kPa (25 psf) in accordance with CAN/ULC-S702.1, Type 1 and ASTM C165. Thickness as indicated.
- 2.2.4. Fasteners for Rigid Insulation: Type N "Stik-Klip" fasteners and Type S neoprene adhesive, with self-locking washers manufactured by Eckel Industries of Canada Ltd., Morrisburg, "Insul-Anchors" by Continental Stud Welding Inc., or impale type, perforated 50 mm x 50 mm (2" x 2") cold rolled steel, 0.759 mm (22 ga) adhesive pack, spindle of 0.098 x 0.106" dia. annealed steel, length to suit insulation 25 mm (1") dia. washers of self-locking nylon manufactured by Flock Bros.
- 2.2.5. Insulation Adhesive: Rubber asphalt adhesive, compatible with insulation, "Bakor 230-21" by Henry Company; www.henry.com.
- 2.2.6. Sub-Girts, Z-bars: Sheet steel conforming to ASTM A653/A653M, Grade A Zinc coating to Z275 (G90) designation, formed from minimum 1.219 mm (18 ga) base thickness.
- 2.2.7. Type A Fasteners: Supply standard concealed fasteners compatible with preformed siding used.

- 2.2.8. Type C Fasteners: Supply type B hex head cadmium plated high carbon steel, self tapping sheet metal screws.
- 2.2.9. Type D Fasteners: Supply Weatherguard "Confas" or Tapcon equivalent.
- 2.2.10. Concealed Sealant: Supply butyl rubber, "Curtain Wall Sealant" by Tremco Canada.
- 2.2.11. Exposed Sealant: Non-sag type, 1 component medium modulus, pre-pigmented, neutral cure elastomeric silicone sealant conforming to ASTM C920, Type S, Grade NS, Class 50, Use NT, G, M, A and O. Supply in standard colours as selected. Supply 1 of following:
- 2.2.11.1. "DOWSIL™ 795 Silicone Building Sealant" by The Dow Chemical Company.
- 2.2.11.2. "GE SilPruf SCS2000" by Momentive Performance Materials.
- 2.2.11.3. "Spectrem 2" by Tremco Canada.
- 2.2.12. Closures and Flashings: Provide same material as specified for exterior sheets, prepainted to match adjacent siding where exposed to view. Ensure metal thickness is as required but not less than 0.759 mm (22 ga) base thickness.
- 2.2.13. Corner Stiffeners: Steel sheet in required thickness, finished with Z275 (G90) zinc coating.
- 2.2.14. Zinc Rich Primer: Supply primer for touch up if galvanized, supply "METALHIDE® ONE PAC | 97-676" by PPG Architectural Coatings; www.ppg.com, "Zinc Clad® 5 Organic Zinc Rich Primer" by The Sherwin-Williams Company; www.sherwin-williams.com or "ZRC® Cold Galvanizing Repair Compound" by ZRC Worldwide; www.zrcworldwide.com in accordance with manufacturer's printed directions.
- 2.2.15. Finishes:
- 2.2.15.1. Primer and silicone modified polyester SMP, 2 coat system (primer/colour coat), "WeatherXL™" by Sherwin-Williams Coil Coatings; www.coil.sherwin.com with following characteristics:
- | Description | Performance Characteristics |
|---|---|
| 2.2.15.1.1. Coating Thickness: | 0.005 mm to 0.0075 mm (0.20 to 0.30 mils) primer
0.0175 mm to 0.02 mm (0.70 to 0.80 mils) colour topcoat |
| 2.2.15.1.2. Gloss (ASTM D523 @ 60°): | 25 to 35 for matte finish <10 |
| 2.2.15.1.3. Pencil Hardness (ASTM D3363): | F minimum |
| 2.2.15.1.4. Abrasion Resistance Falling Sand (ASTM D968): | 35 g/ml |
| 2.2.15.1.5. Colour Retention 30 yrs South Florida (ASTM D2244): | ΔE <5.0 at 90° vertical angle and ΔE <7.0 at non-vertical |
| 2.2.15.1.6. Humidity Resistance ASTM D714, ASTM D2247, 1000 hrs, 100% R.H. @ 100°F: | No field blisters |
| 2.2.15.1.7. Salt Spray Resistance ASTM B117, 1000 hrs 5% NaCl @ 100°F: | 1/8" maximum undercutting |
| 2.2.15.1.8. Chalking Resistance 30 yrs South Florida (ASTM D4214): | No less than #8 at 90° vertical angle and #6 at non-vertical |
| 2.2.15.2. Colours and Sheens: | Dark Cherry. |

PART 3 – EXECUTION

3.1. EXAMINATION

- 3.1.1. Verification of Conditions: Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation.
- 3.1.2. Evaluation and Assessment: Commencement of work implies acceptance of previously completed work.

3.2. INSTALLATION

- 3.2.1. Apply continuous bead of specified concealed caulking on face of top and bottom supports of siding liner sheet to provide a complete seal.
- 3.2.2. Install Z-bars and/or sub-girts to structural steel using manufacturer's recommended spacing and to suit wind loads and siding design, using specified Type C fasteners.
- 3.2.3. Use specified Type D fasteners to secure Z-bars to concrete block.
- 3.2.4. Install insulation with adhesive. Tightly butt joints.
- 3.2.5. Install corner supports, interior corner pieces, closures and related accessories etc. with specified Type C fasteners.

SPEC NOTE: ~~Edit below to suit type of siding used. Flat profile siding sections utilize concealed clips while ribbed siding utilizes exposed fasteners. Type A fasteners are used for concealed fastening.~~

- 3.2.6. Install exterior face sheets with Type A fasteners. Secure to sub-girts in accordance with manufacturer's standards for non-exposed fastenings.
- 3.2.7. Vertical Rib Orientation: Ensure face sheets are 1 piece full height of siding (to a maximum of 12 m (40')) except at profile or colour changes. Ensure there is no apparent difference between face sheets of same colour. Remove and replace off-colour sheets as directed by Consultant.
- 3.2.8. Horizontal Rib Orientation: Ensure face sheets are 1 piece to a maximum of 12 m (40') except at profile or colour changes. Ensure there is no apparent difference between face sheets of same colour. Remove and replace off-colour sheets as directed by Consultant.
- 3.2.9. Install corner pieces, closures, flashings, etc. where shown and where required. Provide formed-steel closures around openings.
- 3.2.10. Bed flashings, closures and corner pieces in sealant to provide a weathertight installation.
- 3.2.11. Prime surfaces and apply sealant around siding and openings in siding and below metal flashings to siding in accordance with manufacturer's printed directions for a weatherproof siding assembly. Tool-caulked joints. Remove excess sealant.

3.3. REPAIR

- 3.3.1. Touch up marred siding surfaces with air dry formulation to match pre-finished siding or replace if necessary.
- 3.3.2. Clean and touch up marred galvanized surfaces after installation, with zinc rich primer.

3.4. SITE QUALITY CONTROL

- 3.4.1. Site Tests and Inspections:
- 3.4.1.1. Structural Inspection: Ensure a licensed engineer specified herein inspects work of this Section during erection/installation and submits sealed and signed Field Review Report within 5 Days of site visit.

~~3.4.2. Non-Conforming Work: Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of Consultant at no cost to Owner.~~

3.5. CLEANING

~~3.5.1. Leave siding work clean and free of grime, dirt and sealant stains. Remove stains on adjacent work of other trades resulting from sealant work.~~

END OF SECTION

PART 1 - GENERAL

1.1. GENERAL INSTRUCTIONS

- 1.1.1. Read and conform to:
 - 1.1.1.1. CCDC 2 - 2020, Stipulated Price Contract as amended in the Contract Documents.
 - 1.1.1.2. Division 1 requirements and documents referred to therein.

1.2. SUMMARY

- 1.2.1. Section Includes: Provide glazing schedule including but not limited to following:
 - 1.2.1.1. vision glass types (VG).
 - 1.2.1.2. spandrel glass types (SG).
 - 1.2.1.3. miscellaneous glass types (GL).
- 1.2.2. Related Sections: Following description of work is included for reference only and shall not be presumed complete:
 - 1.2.2.1. Installation of glazing units: Section 05 73 13, Glazed Decorative Metal Railings.
 - 1.2.2.2. Installation of glazing units: Section 08 11 13, Hollow Metal Doors and Frames.
 - 1.2.2.3. Installation of glazing units: Section 08 14 00, Wood Doors.
 - 1.2.2.4. Installation of glazing units: Section 08 44 13, Glazed Aluminum Curtain Wall.
 - 1.2.2.5. Installation of glazing units: Section 08 51 66, Aluminum Window Wall.
 - 1.2.2.6. Installation of glazing units: Section 08 80 00, Glass and Glazing.

1.3. REFERENCES

- 1.3.1. Abbreviations and Acronyms:
 - 1.3.1.1. CGL: Clear Float Glass.
 - 1.3.1.2. FGIA: Fenestration & Glazing Industry Alliance; www.fgiaonline.org.
 - 1.3.1.3. HSGL: Heat-Strengthened Glass.
 - 1.3.1.4. LGL: Laminated Glass.
 - 1.3.1.5. PVB: Polyvinyl Butyral.
 - 1.3.1.6. TGL: Tempered Glass.
- 1.3.2. Reference Standards:
 - 1.3.2.1. CAN/CGSB-12.8-97 - Insulating Glass Units
 - 1.3.2.2. CAN/CGSB-12.9-M87 - Spandrel Glass

1.4. SUBMITTALS

- 1.4.1. Samples:
 - 1.4.1.1. Submit samples of materials in accordance with Section 01 30 00 identifying quality and type of glass before commencing work. Ensure samples are clearly labelled with manufacturer's name and type.

- 1.4.1.2. Submit following samples:
- 1.4.1.2.1. 300 mm x 300 mm (12" x 12") tempered glass.
- 1.4.1.2.2. 300 mm x 300 mm (12" x 12") laminated glass.
- 1.4.1.2.3. Vision Glass (VG): 300 mm x 300 mm (12" x 12") of each VG glass unit type complete with specified glass pane types and thicknesses, Low 'E' coating, ceramic frit as required, spacer, primary and secondary seals in colour indicated.
- 1.4.1.2.4. Spandrel Glass (SG): 300 mm x 300 mm (12" x 12") of each SG glass unit type complete with specified glass pane types and thicknesses, Low 'E' coating, water-based silicone coating, spacer, primary and secondary seals in colour indicated.

1.5. WARRANTY

- 1.5.1. Manufacturer Warranty: Warrant factory sealed insulating units against defects for a period of 10 years. Warrant factory sealed insulating units free from condensation, fogging of material, obstruction of vision as result of dust or film formation on internal glass surfaces by any cause, under normal conditions anticipated under this Project, other extrinsic glass breakage, but including breakage due to thermal shock and temperature differential due to inherent glass or glazing fault.

PART 2 - PRODUCTS

2.1. MANUFACTURERS

- 2.1.1. Manufacturer List for Insulated Glass Units: Products of following manufacturers are permitted subject to conformance to requirements of Drawings, Schedules and Specifications:
 - 2.1.1.1. Oldcastle Building Envelope; www.obe.com
 - 2.1.1.2. Prelco; www.prelco.ca
 - 2.1.1.3. Saand Inc.; www.saand.ca
 - 2.1.1.4. Trulite Glass & Aluminum Solutions, LLC; www.trulite.com
 - 2.1.1.5. Viracon; www.viracon.com

2.2. MATERIALS

- 2.2.1. Glazing Materials:
 - 2.2.1.1. For glass material types, refer to "Related Sections" specified herein.
 - 2.2.1.2. Primary Seal: Provide a polyisobutylene based sealant exhibiting excellent long-term stability remaining permanently flexible, even at low temperatures, "ADOTHERM™ PIB Series" by ADCO; www.adcocorp.com. Provide in black or grey colour as selected by Consultant.
 - 2.2.1.3. Secondary Seal: Provide 1 of following:
 - 2.2.1.3.1. 2 component high-modulus elastomeric silicone sealant. Provide in colour specified herein.
 - 2.2.1.3.2. 1 component high-modulus, moisture cure elastomeric silicone sealant. Provide in colour specified herein.
 - 2.2.1.4. Low Emissivity Glass Coating (Low 'E'): To glass units specified herein, as applicable and unless otherwise designated apply Low 'E' coating to No. 2 surface of a sealed insulating glass unit to meet criteria specified herein. Permitted manufacturers and applicators of Low 'E' coatings are AGC Glass Company North America; www.agc-yourglass.com, Cardinal Glass Industries; www.cardinalcorp.com, Guardian Industries Corp.; www.guardianglass.com, Pilkington Building Products; www.pilkington.com, Viracon; www.viracon.com and Vitro Architectural Glass; www.vitro.com. Uniformly apply Low 'E' coating to glass. Edge delete Low 'E' coating where silicone sealant is in contact with glass.

- 2.2.1.5. Factory sealed insulating glass units to requirements of CAN/CGSB-12.8 using dual seal. Maintain separation of panes with non-corrosive desiccant filled spacer core. Dehydrate air space and hermetically seal inner and outer panes at periphery with flexible sealer. Ensure thermal resistance of glazing system edge seals are minimum 0.06 m²•°C/W for units having service conditions of interior building relative humidity of greater than 35% and minimum 0.035 m²•°C/W for other areas.
- 2.2.1.6. Spandrel Glass with Opacifier: Conforming to CAN/CGSB-12.9-M, Type 2, Class A, Style 3 Organic Coated, Form M, monolithic heat strengthened with water-based coloured silicone coating with a minimum dry film thickness of 0.165 mm (6.5 mils), "OPACI-COAT-300®", Silicone Coating" by ICD High Performance Coatings; www.icdcoatings.com.
- 2.2.2. Fabrication: Manufacture factory sealed insulating glass units in accordance with FGIA's "IGMAC Certification Program Manual".

PART 3 - EXECUTION

3.1. GLAZING SCHEDULE

3.1.1. Vision Glass Types (VG):

3.1.1.1. Type VG-1: Factory sealed insulating glass unit assembly consisting of:

- 3.1.1.1.1. Outboard Pane: minimum 8 mm (5/16") thick heat strengthened glass (HSGL).
- 3.1.1.1.2. Low 'E' Coating: "SunGuard® SuperNeutral SNR 50" by Guardian Industries on surface #2.
- 3.1.1.1.3. Air Space: 12.7 mm (1/2") thick 90% Argon filled.
- 3.1.1.1.4. Spacer: Black stainless steel.
- 3.1.1.1.5. Secondary Sealant Colour: Black.
- 3.1.1.1.6. Inboard Pane: minimum 6 mm (1/4") thick clear float glass (CGL).

3.1.1.2. Type VG-2: Factory sealed insulating glass unit assembly consisting of:

- 3.1.1.2.1. Outboard Pane: minimum 8 mm (5/16") thick heat strengthened glass (HSGL).
- 3.1.1.2.2. Low 'E' Coating: "SunGuard® SuperNeutral SNR 50" by Guardian Industries on surface #2.
- 3.1.1.2.3. Air Space: 12.7 mm (1/2") thick 90% Argon filled.
- 3.1.1.2.4. Spacer: Black stainless steel.
- 3.1.1.2.5. Secondary Sealant Colour: Black.
- 3.1.1.2.6. Ceramic Frit: pattern to meet bird friendly guidelines on surface #3.
- 3.1.1.2.7. Inboard Pane: minimum 6 mm (1/4") thick clear float glass (CGL).

3.1.1.3. Type VG-3: Factory sealed insulating glass unit assembly consisting of:

- 3.1.1.3.1. Outboard Pane: minimum 8 mm (5/16") thick heat strengthened glass (HSGL).
- 3.1.1.3.2. Low 'E' Coating: "SunGuard® Neutral 78/65" by Guardian Industries on surface #2.
- 3.1.1.3.3. Air Space: 12.7 mm (1/2") thick 90% Argon filled.
- 3.1.1.3.4. Spacer: Black stainless steel.
- 3.1.1.3.5. Secondary Sealant Colour: Black.
- 3.1.1.3.6. Ceramic Frit: pattern to meet bird friendly guidelines on surface #3.
- 3.1.1.3.7. Inboard Pane: minimum 6 mm (1/4") thick clear float glass (CGL).

~~3.1.2. Spandrel Glass Types (SG):~~

~~3.1.2.1. Type SG-1: Factory sealed insulating glass unit assembly consisting of:~~

~~3.1.2.1.1. Outboard Pane: minimum 8 mm (5/16") thick heat strengthened glass (HSGL).~~

~~3.1.2.1.2. Low 'E' Coating: "VRE-46" by Viracon on surface #2.~~

~~3.1.2.1.3. Air Space: 12.7 mm (1/2") thick 90% Argon filled.~~

~~3.1.2.1.4. Spacer: Stainless steel.~~

~~3.1.2.1.5. Secondary Sealant Colour: Black.~~

~~3.1.2.1.6. Coating: water based silicone coating opacifier in colour selected later by Consultant.~~

~~3.1.2.1.7. Inboard Pane: minimum 6 mm (1/4") thick tempered glass (TGL).~~

~~3.1.3. Miscellaneous Glass Types (GL):~~

~~3.1.3.1. Type GL-1: Single glass unit consisting of:~~

~~3.1.3.1.1. Glass Type: clear tempered glass (TGL).~~

~~3.1.3.1.2. Glass Thickness: 6 mm (1/4").~~

~~3.1.3.2. 1... Type GLT: Single glass unit consisting of:...1~~

~~3.1.3.2.1. Glass Type: clear tempered glass (TGL) with pattern to meet bird friendly guidelines.~~

~~3.1.3.2.2. Glass Thickness: 6 mm (1/4").~~

~~3.1.3.3. Type GL-3: Laminated glass (LGL) unit consisting of:~~

~~3.1.3.3.1. Outboard Pane: 6 mm (1/4") thick clear heat strengthened glass (HSGL).~~

~~3.1.3.3.2. Interlayer: 1.6 mm (0.060") thick frosted PVB.~~

~~3.1.3.3.3. Inboard Pane: 6 mm (1/4") thick clear heat strengthened glass (HSGL).~~

END OF SECTION

PART 1 - GENERAL

1.1. GENERAL INSTRUCTIONS

- 1.1.1. Read and conform to:
 - 1.1.1.1. CCDC 2 - 2020, Stipulated Price Contract as amended in the Contract Documents.
 - 1.1.1.2. Division 1 requirements and documents referred to therein.

1.2. SUMMARY

- 1.2.1. Section Includes: Supply door hardware including but not limited to following:
 - 1.2.1.1. hollow metal doors.
 - 1.2.1.2. hollow metal frames.
 - 1.2.1.3. wood doors.
- 1.2.2. Related Sections: Following description of work is included for reference only and shall not be presumed complete:
 - 1.2.2.1. Installation of door hardware: Section 06 90 00, General Installations.
 - 1.2.2.2. Supply of hollow metal doors and frames: Section 08 11 13, Hollow Metal Doors and Frames.
 - 1.2.2.3. Supply of wood doors: Section 08 14 00, Wood Doors.

1.3. REFERENCES

- 1.3.1. Abbreviations and Acronyms:
 - 1.3.1.1. AODA: Accessibility for Ontarians with Disabilities Act; www.aoda.ca.
 - 1.3.1.2. AHC: Architectural Hardware Consultant.
 - 1.3.1.3. BHMA: Builders Hardware Manufacturers Association; www.buildershardware.com.
 - 1.3.1.4. CSA: Canadian Standards Association; www.csagroup.org.
 - 1.3.1.5. DHI: Door and Hardware Institute Canada; www.dhicanada.ca.
 - 1.3.1.6. NFPA: National Fire Protection Association; www.nfpa.org.
 - 1.3.1.7. UL: Underwriters Laboratories Inc.; www.ul.com.
 - 1.3.1.8. ULC: Underwriters Laboratories of Canada; www.canada.ul.com.
- 1.3.2. Reference Standards:
 - 1.3.2.1. NFPA 80-22 - Standard for Fire Doors and Other Opening Protectives
 - 1.3.2.2. CAN/ULC-S104-15 - Standard Method for Fire Tests of Door Assemblies
 - 1.3.2.3. CAN/ULC-S105-16 - Standard Specification for Fire Door Frames Meeting the Performance Required by CAN/ULC-S104

1.4. SUBMITTALS

- 1.4.1. Shop Drawings:
 - 1.4.1.1. Submit Shop Drawings for hardware installation in accordance with Section 01 30 00.

- 1.4.1.2. Submit Shop Drawings in schedule form, prepared by an AHC, indicating manufacturers' names, Product descriptions, makes, models, materials, finishes, functions, location of each item, complete keying schedule and other pertinent information. Repeat hardware item numbers used in Door Hardware Schedule. Include list of abbreviations and finish symbols and their meaning. Include manufacturer's cut sheets for each hardware item.
- 1.4.2. Samples:
 - 1.4.2.1. Submit samples in accordance with Section 01 30 00.
 - 1.4.2.2. Do not order hardware from manufacturer until samples have been reviewed by Consultant. Hardware and finishes supplied shall be identical to reviewed samples.
 - 1.4.2.3. Supply 1 of each item of hardware with specified finishes to Consultant. Label each sample as to manufacturer, type, finishes, size and location for use proposed. Reviewed samples will be retained for comparison and returned upon completion of the Work.
 - 1.4.2.4. Do not submit substitutions to accepted alternates.

1.5. CLOSEOUT SUBMITTALS

- 1.5.1. Operational and Maintenance Data:
 - 1.5.1.1. Instruct Owner's designated representative in proper care and preventative maintenance of hardware to assure longevity of operation.
 - 1.5.1.2. Provide 3 copies of descriptive information, operating, adjustment and maintenance instructions and "As-Built" record of location of each hardware group and other pertinent information.
 - 1.5.1.3. Provide maintenance data, parts list and manufacturer's instructions for each type of door closer, lockset, fire exit hardware and door holder. Provide manufacturer's instructions for proper care of hardware, including lubrication, for incorporation into operation and maintenance instruction manual.
 - 1.5.1.4. Provide this information in 3-ring binders suitably identified in accordance with requirements of Section 01 70 00.

1.6. MAINTENANCE MATERIAL SUBMITTALS

- 1.6.1. Tools: Prior to date of Substantial Performance, supply a complete set of specialized tools as needed for Owner's continued adjustment, maintenance and removal and replacement of builders hardware.

1.7. QUALITY ASSURANCE

- 1.7.1. Qualifications:
 - 1.7.1.1. Suppliers: A recognized architectural door hardware supplier for exit devices, cylinders, power supply, magnetic holders and similar items that has a record of successful in-service performance for supplying door hardware similar in quantity, type and quality to that indicated for this Project and employs an experienced AHC who is available to Owner, Consultant and Trade Contractor at reasonable times during course of the work for consultation.

1.8. DELIVERY, STORAGE AND HANDLING

- 1.8.1. Delivery and Acceptance Requirements: Supply scheduled hardware to the Place of the Work.
- 1.8.2. Storage and Handling Requirements:
 - 1.8.2.1. Pack hardware in suitable wrappings and containers to protect from damage during shipping and storage. Enclose accessories, fastening devices and other loose items with each item. Pack screws, bolts and fastenings necessary for proper installation in same package. Mark packages for easy identification legibly indicating manufacturer's numbers, types, sizes. Markings must include floor, item number and door number.

- 1.8.2.2. Provide assistance in counting hardware on major shipments to confirm hardware is shown as shipped. Provide inventory list with Door Hardware Schedule. Obtain assistance from hardware supplier to confirm hardware has been delivered to site correctly for all major shipments. Be responsible to unload hardware, to check hardware shipments and to set up shelving and organize hardware room.
- 1.8.2.3. Provide templates, template information, installation instructions and details necessary for preparation and installation of hardware.
- 1.8.2.4. Provide 3 copies of installation instructions for hardware supplied.

1.9. WARRANTY

- 1.9.1. Manufacturer Warranty: Warrant work of this Section for period of 2 years for general, 10 years for closers and lifetime for butt hinges against defects and/or deficiencies in accordance with General Conditions of the Contract. Promptly correct any defects or deficiencies which become apparent within warranty period including making good any work damaged by this work, to satisfaction of Consultant and at no expense to Owner.

PART 2 - PRODUCTS

2.1. MATERIALS

- 2.1.1. Door Hardware:
 - 2.1.1.1. 1 ... Provide door closers, locksets and latchsets meeting ANSI/BHMA Qualified Products List. Provide door hardware in accordance with Door Hardware Schedule appended Architectural Drawings Sheet A004. No substitutions are allowed without review by Consultant. ... 1
 - 2.1.1.2. Supply door hardware for work of Sections 08 11 13 and 08 14 00 for installation as part of the work of Section 06 90 00.
 - 2.1.1.3. Fire Rated Openings: Provide hardware for fire-rated openings in compliance with NFPA 80. Provide only hardware which has been tested and listed by ULC for the types and sizes of doors required and complies with requirements of door and door frame labels.
- 2.1.2. Fastenings:
 - 2.1.2.1. Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.
 - 2.1.2.2. Where pull is scheduled on 1 side of door and push plate on other side, supply fastening devices and install so pull can be secured through door from reverse side. Install push plate to cover fasteners. Prepare holes or cutouts for cylinders or deadlocks in pushplates where applicable.
 - 2.1.2.3. Use fasteners with material through which they pass.
 - 2.1.2.4. Only "3M" brand double sided tape for kickplates, armour plates and pushplates is permitted, where specified.
- 2.1.3. Keying:
 - 2.1.3.1. Key locks to Owner's requirements (construction master keyed, grand master keyed, sub-master keyed, as directed).
 - 2.1.3.2. Provide interchangeable cores to Owner's grand master key system. Number of keys to be determined by Owner. Provide a minimum of 2 cut keys per cylinder, but coordinate "maximum" quantity per key group with Owner before ordering final amounts.
 - 2.1.3.3. Provide operational brass construction cores for locks and cylinders. Cores will be returned to manufacturer when permanent cores are provided.
 - 2.1.3.4. Include and provide for cost of permanent cores.

PART 3 - EXECUTION

3.1. EXAMINATION

- 3.1.1. Verification of Conditions:
 - 3.1.1.1. Before supplying any hardware and installation instructions, carefully check Drawings for work requiring hardware, verify door swings, door and frame materials and operating conditions and assure hardware will fit work to be attached.
 - 3.1.1.2. Check Shop Drawings and frame and door lists affecting hardware type and installation, and verify to correctness thereof, or advise of required revisions. Ensure doors, frames and panels requiring additional support are reinforced.
 - 3.1.1.3. Point out special requirements to installer and ensure final adjustment of hardware, in particular closer arms, valves and locksets has all been done properly.
 - 3.1.1.4. Be responsible to check and confirm dimensions for hardware for this Project, including door protection, overhead stop sizes, exit devices, power door operators and other related hardware items that may require coordination for sizing.
 - 3.1.1.5. Be responsible to coordinate and confirm electric hardware requirements with related trades and Consultants.
 - 3.1.1.6. Electric Hardware Responsibilities: Hardware supplier is responsible for following:
 - 3.1.1.6.1. Coordinate and confirm block diagrams with related trades and Consultants for electrical hardware applications, including but not limited to, electric latch retraction exit devices, power transfers, electric strikes, power door operators and associated accessories, maglocks, electrically operated door equipment, power supplies and key switches for operators.
 - 3.1.1.6.2. Performing low voltage connections for equipment listed herein and ensuring equipment functions in intended manner. Commission equipment supplied in this Section and test each item. Coordinate to ensure related trades have performed their work in order for equipment provided in this Section to function correctly.
 - 3.1.1.6.3. Ensure installation trades have installed equipment supplied in this Section correctly. Report any incorrect installation. Do not wire or commission equipment that has been incorrectly installed.
 - 3.1.1.6.4. Install, adjust and test mechanical operations of electric hardware. For example, electric strikes shall be adjusted to allow locks or exit devices to latch correctly taking into account seals, wind pressures, or any other issues affecting normal operation of door and hardware while electric hardware is not activated.
 - 3.1.1.6.5. Ensure electric action of electric hardware supplied under this Section performs correctly.
 - 3.1.1.6.6. Where applicable, arrange to either remove item in order to make wire connections, or make connections during initial installation. Do not inhibit other trades from performing their work as a result of electrical connections.
 - 3.1.1.6.7. Maglock installation shall be by hardware installer, or if necessary, by security system provider. Ensure mechanical operation of door and hardware is not impeded by maglock installation.
 - 3.1.1.6.8. Be responsible to ensure related trades with respect to electric hardware is provided. Consult Owner to ensure proper coordination and commissioning of electric hardware.
 - 3.1.1.6.9. Apply for and obtain applicable maglock permits.
 - 3.1.1.6.10. Conduit, junction boxes, 120V connections and wire, including low voltage wire, shall be provided by Division 26. Coordinate and confirm Division 26 has applicable information from this Section in order to perform their work correctly.

- 3.1.1.6.11. Provide low voltage connections for push button actuators, motion detectors, presence sensors and key switches related to power door operators. Coordinate fire alarm, 120VAC connections, security system connections and any other related connections for power door operators with related trades. After connections are made, commission equipment, test and adjust to suit requirements of hardware and operator applications.
- 3.1.1.7. Provide ULC or UL approved hardware where labelled doors are specified. Provide CSA approved electrical devices where required.

3.2. INSTALLATION

- 3.2.1. Supply door hardware to Section 06 90 00 for installation.

3.3. SITE QUALITY CONTROL

- 3.3.1. Site Tests and Inspections: After installation, have hardware inspected by manufacturer's representative, an experienced AHC who is a member of DHI, who shall certify in writing with a copy to Consultant, items and their installation are in accordance with Specification requirements and are functioning properly and notify Consultant of any cases where it has not been properly installed, is defective or is not as specified. Replace or re-install defective or improperly installed hardware at no cost to Owner.
- 3.3.2. Supervision: Provide following Project services relative to Project co-ordination, supervision and inspection:
- 3.3.2.1. Provide services of AHC familiar with type of work being performed, with type of Project, for preparation of hardware Shop Drawings (schedule), keying, coordination with other trades, consultation with Owner and Consultant and for performing on-site inspections.
- 3.3.2.2. Verify hardware listed in the Schedule is of proper selection for its apparent function and required fire rating or submit alternative proposals. Ensure hardware for fire-rated openings complies with requirements of authorities having jurisdiction, with door and frame manufacturer's tested and labelled assemblies and that hardware items bear certification labels.
- 3.3.2.3. Hardware for doors in fire separations and exit doors certified by a Canadian Certification Organization accredited by Standards Council of Canada. Ensure door and hardware are tested as an assembly to maintain labelling requirements. Hardware for fire rated door and frame assemblies shall conform to CAN/CSA-S104, CAN/CSA-S105 and NFPA 80. Electronic hardware such as magnetic locks, power supplies, key switches and alarm panic bolts shall be ULC labelled.
- 3.3.2.4. Ensure mortise locks, exit devices and door closers conform to both BHMA certified ANSI/BHMA A156 Series Grade I classifications and to AODA standards.
- 3.3.2.5. Inspect to verify hardware has been properly installed and is functioning satisfactorily.
- 3.3.2.6. Recommend adjustments.
- 3.3.2.7. Replace defective hardware.
- 3.3.2.8. Check door closers after installation to ensure adjustment such as backchecking degree has been properly made and if not, make such adjustments or instruct those installing hardware to make these adjustments.
- 3.3.2.9. Submit 6 copies of finalized schedule to Consultant for review. Provide additional copies as required for Project and office use.

END OF SECTION

PART 1 - GENERAL

1.1. GENERAL INSTRUCTIONS

- 1.1.1. Read and conform to:
 - 1.1.1.1. CCDC 2 - 2020, Stipulated Price Contract as amended in the Contract Documents.
 - 1.1.1.2. Division 1 requirements and documents referred to therein.

1.2. SUMMARY

- 1.2.1. Section Includes: Provide washroom accessories including but not limited to following:
 - 1.2.1.1. concealed sheet steel reinforcing.
- 1.2.2. Related Sections: Following description of work is included for reference only and shall not be presumed complete:
 - 1.2.2.1. Rough-in for recessed or built-in fixtures in masonry: Section 04 20 00, Masonry Units.
 - 1.2.2.2. Provision of frameless and custom sized mirrors: Section 08 80 00, Glass and Glazing.
 - 1.2.2.3. Rough-in for recessed or built-in fixtures and reinforcing requirements for wall mounted accessories in gypsum board: Section 09 21 16, Gypsum Board Assemblies.

1.3. REFERENCES

- 1.3.1. Reference Standards:
 - 1.3.1.1. ASTM A653/A653M-22
 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - 1.3.1.2. ASTM A666-15
 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar
 - 1.3.1.3. CSA W59-18
 - Welded Steel Construction (Metal Arc Welding)

1.4. ADMINISTRATIVE REQUIREMENTS

- 1.4.1. Coordination: Coordinate location of washroom accessories with other work to prevent interference with clearances required for access, proper installation, adjustment, operation, cleaning and servicing of washroom accessories.

1.5. SUBMITTALS

- 1.5.1. Shop Drawings: Submit Shop Drawings for work of this Section in accordance with Section 01 30 00. Ensure Shop Drawings are in the form of catalogue cuts and fully illustrate specified materials with description of components, surface finishes, hardware and securement devices.
- 1.5.2. Samples: Submit complete samples of each accessory and modular unit to Consultant for review of construction quality, materials and finish prior to delivery of required quantities of items. Submit sample of each colour where applicable. Remove trademark and/or labels on exposed finishes prior to review.

1.6. CLOSEOUT SUBMITTALS

- 1.6.1. Operational and Maintenance Data: Submit maintenance instructions in accordance with Section 01 70 00. Submit an accessories schedule, keys and parts manual as part of Project closeout documents. Submit 2 sets of following items of manufacturer's literature:
- 1.6.1.1. Technical Data Sheets of each item used for the Project.
- 1.6.1.2. Service and Parts Manuals.
- 1.6.1.3. Name of local representative to be contacted in the event of need of field service or consultation.

1.7. DELIVERY, STORAGE AND HANDLING

- 1.7.1. Delivery and Acceptance Requirements: Deliver materials in sealed cartons and containers with manufacturer's name and Product description clearly marked thereon.

PART 2 - PRODUCTS

2.1. MATERIALS

- 2.1.1. Ensure washroom accessories are stainless steel, Type 304 or Type 302, of 1 type throughout, ANSI No. 4 mechanical brushed finish, of contemporary design, with minimum material thicknesses of components as specified herein. Arrange stainless steel sheet so grain of brushed finish runs vertically in finished installation.
- 2.1.1.1. Minimum thickness, any location or component: 0.607 mm (24 ga)
- 2.1.1.2. Hygienic accessory - exposed double pan doors and panels: 0.607 mm (24 ga)
- 2.1.1.3. Hygienic accessory - exposed single pan doors: 1.214 mm (18 ga)
- 2.1.1.4. Reinforcement: 1.214 mm (18 ga)
- 2.1.2. Concealed Sheet Steel Reinforcing: Commercial quality cold rolled galvanized sheet steel to ASTM A653/A653M with zinc coating designation of Z275 (G90) in minimum thickness of 0.912 mm (20 ga); or ASTM A666, Type 304 sheet stainless steel.
- 2.1.3. Provide washroom accessories as specified with options indicated. Model numbers may not reflect all options required.
- 2.1.4. Provide stainless steel collars to accommodate semi-recessed mounting of units whose depth exceeds wall cavity depth.

2.2. MANUFACTURED UNITS

- 2.2.1. 1 ... Washroom Accessories: Refer to Architectural Drawings Sheet A003. ... 1
- 2.2.2. Fabrication:
- 2.2.2.1. Fabricate accessories true, square, rigid, free from distortion and from defects detrimental to appearance and performance. Assemble sheet metal accessories by welding in accordance with CSA W59. Conceal welds, or grind smooth such as to be undetectable in finished work. Unless approved by Owner, ensure assembly fastenings, hardware fixings and mounting or installation devices are concealed in finished work.
- 2.2.2.2. Use non-corrosive metal fasteners of expansion type, toggle type or other permitted type of positive, mechanical anchor as required to suit construction to which accessory is to be mounted. Ensure exposed fasteners, where permitted, are finished to match adjacent accessory surface and countersunk. Where accessories are mounted to sheet metal, provide a 3 mm (1/8") thick minimum full-size metal back-up plate drilled and tapped to receive machine screws and finished to match adjacent sheet metal surface.

- 2.2.2.3. Ensure frameless accessories have 1 piece fronts with 90 degree formed returns at their edges and openings. Ensure returns are continuously welded and ground smooth at corners. Where accessory fronts are framed, ensure frame edges, both inside and outside, have 90 degree formed returns continuously welded and ground smooth at corners. Ensure doors also have 90 degree formed returns.
- 2.2.2.4. Use concealed stainless steel piano hinges which extend full-length of hinged element. Ensure hinged elements have concealed, mechanically-retained, rubber bumpers for silent closing, and close flush with faces of fronts or frames. Locate hinges to afford easy and unobstructed access to interiors taking into consideration location of accessory relative to surrounding and adjacent items and finishes.
- 2.2.2.5. Ensure portions of sheet metal accessory interiors visible in completed work are stainless steel. Ensure changes in plane are formed or continuously welded and ground smooth. Ensure sheet metal accessory parts concealed in finished installation are galvanized or stainless sheet steel. Ensure edges of sheet metal accessible by users or maintenance personnel are hemmed for safety with no sharp edges.
- 2.2.2.6. Ensure lettering or pressure sensitive international symbols on accessories is silk screened with durable paint to withstand wear or is engraved or embossed. Size, location and type face of lettering is subject to review. Ensure edges of letters are straight and sharp.

PART 3 - EXECUTION

3.1. EXAMINATION

- 3.1.1. Verification of Conditions:
 - 3.1.1.1. Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation.
 - 3.1.1.2. Verify gypsum board walls have been reinforced in accordance with Section 09 21 16 for wall mounted accessories.
- 3.1.2. Evaluation and Assessment: Commencement of work implies acceptance of previously completed work.

3.2. INSTALLATION

- 3.2.1. Provide necessary wall reinforcement for grab bars and towel bars as detailed for 227 kg (500 lbs) downward pull.
- 3.2.2. Install washroom accessories in accordance with manufacturer's printed installation instructions.
- 3.2.3. Provide fastenings and mounting kits for washroom accessories.
- 3.2.4. Verify wall opening for correct dimensions, plumbness of blocking or frames and other preparation that would affect installation of washroom accessories.
- 3.2.5. Verify spacing of plumbing fixtures and toilet partitions that affect installation of washroom accessories.
- 3.2.6. Securely fasten accessories, level and plumb using appropriate fastenings as recommended by manufacturer.
- 3.2.7. Provide corrosion resistant fastenings. Where fasteners are exposed, use tamper-proof fasteners finished to match items secured.
- 3.2.8. Locate washroom accessories where indicated on Drawings and where directed by Consultant. Have Consultant review exact locations.
- 3.2.9. Provide manufacturer's recommended anchoring systems.
- 3.2.10. Fit flanges of accessories snug to wall surfaces.

3.3. SITE QUALITY CONTROL

- 3.3.1. Non-Conforming Work: Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of Consultant at no cost to Owner.

3.4. ADJUSTING

- 3.4.1. Test mechanisms, hinges, locks and latches.
- 3.4.2. Adjust and lubricate to ensure washroom accessories are in perfect working order.

3.5. CLEANING

- 3.5.1. Clean and polish mirrors, aluminum and stainless steel surfaces.
- 3.5.2. Remove protective coatings and paper including adhesives.

END OF SECTION

PART 1 – GENERAL

1.1. GENERAL INSTRUCTIONS

- 1.1.1. Read and conform to:
 - 1.1.1.1. CCDC 2 – 2020, Stipulated Price Contract as amended in the Contract Documents.
 - 1.1.1.2. Division 1 requirements and documents referred to therein.

1.2. SUMMARY

- 1.2.1. Section Includes: Provide acoustic isolated floating floors including but not limited to following:
 - 1.2.1.1. acoustic isolated floating floors.
- 1.2.2. Related Sections: Following description of work is included for reference only and shall not be presumed complete:
 - 1.2.2.1. Acoustic report: Section 00 30 00, Available Information.
 - 1.2.2.2. Filling and sealing of sawcut joints in concrete slab: Section 03 35 13, Concrete Floor Finishing.

1.3. REFERENCES

- 1.3.1. Abbreviations and Acronyms:
 - 1.3.1.1. PVC: Polyvinyl Chloride.

1.4. ADMINISTRATIVE REQUIREMENTS

- 1.4.1. Preinstallation Meetings: Arrange preinstallation meeting 1 week prior to commencing work with all parties associated with trade as designated in Contract Documents or as requested by Consultant. Presided over by Construction Manager, include Consultant who may attend, Trade Contractor performing work of this trade, Owner's representative, testing company's representative and consultants of applicable discipline. Review Contract Documents for work included under this trade and determine complete understanding of requirements and responsibilities relative to work included, storage and handling of materials, materials to be used, installation of materials, sequence and quality control, Project staffing, restrictions on areas of work and other matters affecting construction, to permit compliance with intent of work of this Section.

1.5. SUBMITTALS

- 1.5.1. Product Data: Submit manufacturer's Product data and installation instructions for each material and Product used.
- 1.5.2. Shop Drawings:
 - 1.5.2.1. Submit Shop Drawings in accordance with Section 01 30 00. Ensure Shop Drawings indicate material characteristics, details of construction, connections and relationship with adjacent construction.
 - 1.5.2.2. Ensure a licensed engineer specified herein is responsible for:
 - 1.5.2.2.1. production and review of Shop Drawings.
 - 1.5.2.2.2. sealing and signing each Shop Drawing and any associated calculations performed.

1.6. QUALITY ASSURANCE

1.6.1. Qualifications:

- 1.6.1.1. ~~Installers: Provide work of this Section executed by competent installers with minimum 5 years experience in the application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.~~
- 1.6.1.2. ~~Licensed Professionals: Employ a licensed engineer carrying minimum \$2,000,000.00 professional liability insurance and is registered in the Province of Ontario.~~
- 1.6.2. ~~Mock Ups: Construct minimum 10 m² (100 sq ft) mock-up sample at Project location designated by Consultant for review. Once reviewed with no objections recorded, sample remains part of finished work and used as a quality reference standard for balance of Project.~~

PART 2 – PRODUCTS

2.1. MANUFACTURERS

- 2.1.1. ~~Manufacturer List: Products of following manufacturers are permitted subject to conformance to requirements of Drawings, Schedules and Specifications:~~
 - 2.1.1.1. ~~AcoustiGuard – WILREP Ltd.; www.acoustiguard.com~~
 - 2.1.1.2. ~~Pliteq Inc.; www.pliteq.com~~
- 2.1.2. ~~Substitution Limitations: Comparable Products from other manufacturers not listed herein may be reviewed provided they meet requirements of this Specification.~~

2.2. MATERIALS

- 2.2.1. ~~Performance/Design Criteria:~~
 - 2.2.1.1. ~~Ensure floating floor isolation system is roll-out isolation mat floating floor system.~~
 - 2.2.1.2. ~~Ascertain loads and characteristics of supported structure affected by isolation system.~~
 - 2.2.1.3. ~~Ensure floating floor is free from any rigid connections to any part of building structure and designed to reduce transmission of airborne and structure borne sound from mechanical equipment spaces and other acoustically active areas to rest of building.~~
 - 2.2.1.4. ~~Base normal design load calculation on weight of floating slab plus weight of walls, equipment and fixtures supported by floating floor isolation system plus 25% of specified live load.~~
 - 2.2.1.5. ~~Base maximum design load calculation on weight of floating slab plus weight of walls, equipment and fixtures supported by floating floor isolation system plus 100% of specified live load.~~
 - 2.2.1.6. ~~Locate additional structural reinforcing under slab edge when partition is supported on edge of floating slab.~~
 - 2.2.1.7. ~~Ensure dynamic frequency of floating floor system does not exceed 10 Hz excluding affects of air cavity below floating floor.~~
 - 2.2.1.8. ~~Overload Capacity: Ensure assemblies are capable of supporting minimum 6 times normal design load without any visible damage, buckling or permanent set and remain totally functional when overload is removed.~~
 - 2.2.1.9. ~~Design for minimum height of 50 mm (2") of elastomeric material. Ensure in all cases static deflection under maximum design load does not exceed 15% of total thickness of elastomeric material.~~
 - 2.2.1.10. ~~Provide concrete curb around perimeter of floating slab, including "internal" perimeter boundaries to shafts or other major service openings for large pipes, ducts or other similar equivalent items.~~

- ~~2.2.1.11. Structural Design: Employ a licensed engineer specified herein to:-~~
- ~~2.2.1.11.1. design components for work of this Section requiring structural performance.~~
- ~~2.2.1.11.2. be responsible for determining sizes, yield strengths, gauge thicknesses and joint spacing to allow thermal movement and loading of components in accordance with applicable codes and regulations.~~
- ~~2.2.2. Roll Out Isolation Mat: Provide 1 of following:~~
- ~~2.2.2.1. Dimpled rubber pads made from recycled rubber with following characteristics:~~
- ~~2.2.2.1.1. Thickness: 25 mm (1").~~
- ~~2.2.2.1.2. Roll Dimensions: 1220 mm (48") wide x 4.75 m (15') long.~~
- ~~2.2.2.1.3. Density: 500 kg/m³ - 600 kg/m³ (31 pcf - 38 pcf).~~
- ~~2.2.2.1.4. Permitted Product: "GenieMat®" by Pliteq Inc.~~
- ~~2.2.2.2. Isolation Materials: Provide recycled rubber padding with an elastic polyurethane binder and with no PVC or formaldehyde. Permitted Product: "ISO-SEP 25HD" by AcoustiGuard - WILREP Ltd.~~
- ~~2.2.3. Perimeter Isolation Tape: 13 mm (1/2") thick flat, resilient, single ply white polyethylene foam perimeter isolation strip; "GenieMat® PMI12 PF" by Pliteq Inc,~~
- ~~2.2.4. Seam Tape: Duct tape or high quality carpet tape to secure butt joints and seams.~~
- ~~2.2.5. Sealant: "GenieClip™ ACS Acoustical Sealant" by Pliteq Inc.~~

PART 3 – EXECUTION

3.1. EXAMINATION

- ~~3.1.1. Verification of Conditions: Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation.~~
- ~~3.1.2. Evaluation and Assessment: Commencement of work implies acceptance of previously completed work.~~

3.2. INSTALLATION

- ~~3.2.1. Install acoustic isolated floating floor system in accordance with manufacturer's written instructions and acoustical report appended to Section 00 30 00.~~

3.3. SITE QUALITY CONTROL

- ~~3.3.1. Site Tests and Inspections:~~
- ~~3.3.1.1. Structural Inspection: Ensure a licensed engineer specified herein inspects work of this Section during erection/installation and submits sealed and signed Field Review Report within 5 Days of site visit.~~
- ~~3.3.2. Non-Conforming Work: Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of Consultant at no cost to Owner.~~

3.4. CLEANING

- ~~3.4.1. Upon completion of work, check concrete is not in threaded holes and ensure their cleanliness and proper function and remove debris, equipment and excess material from site.~~

END OF SECTION