



**Waterloo Region
District School Board**

REQUEST FOR TENDER

23-7360-RFT

**Crestview Public School Library, Gym, and Vestibules Renovation.
New Universal Washroom & Room Renumbering**

ISSUE DATE: March 7, 2023

ELECTRONIC SUBMISSIONS will be received by the Bidding System no later than **2:00 p.m. local time, on March 29, 2023.**

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00 01 00 Consultant/Professional Seals

1.1 The following professional seals and signatures are provided as required by Paragraph 1.21.1 (4) Division C of the Ontario Building Code and apply to the areas of expertise for which each consultant was commissioned.

1.1.1 Architect



1.1.2 Structural



1.1.3 Mechanical



1.1.4 Electrical



END OF SECTION

00 21 13 – Instructions to Bidders

1. Single Point of Contact

Rebecca Witteman
Procurement Specialist
Waterloo Region District School Board
rebecca_witteman@wrdsb.ca

Bidders shall not communicate with any employee or agent of the Board; Any member of the Board's governing body (such as Board of Trustees, or advisors); Any employee, consultant or agent of the Board's Clients, including Advisory Group members, other than the Single Point of Contact listed above. Any attempt by a Bidder to bypass or influence the procurement process may result in disqualification of the Bid.

2. Communication

All requests for information, instructions, or clarifications shall be through the Bidding System by clicking on the "Submit a Question" button found within the bid detail of the specified Bid Solicitation. Addenda will be issued accordingly.

The Board will not be responsible for any verbal statement, instruction, or representations. In case of difference between any verbal information and written document, the written document shall govern. Information obtained from any source, other than the Single Point of Contact in writing, shall not be relied upon.

3. Blackout Period

A black out period shall exist between the deadline for questions and the date of award. During this period, there shall be no communication between the Bidders, the Board, or any Board consultants or employees, unless initiated by the Board's Single Point of Contact.

4. Architect/Consultant

The Board has hired the following architect/consultant to assist in the preparation of this Tender: The Ventin Group.

The architect/consultant and any sub consultants are not to be contacted by any interested parties from the bid issue date to the bid award notification. The architect/consultant or any sub consultants will not respond to any direct communication.

The Board will be responsible for the contract administration of the project after the purchase order has been issued or the contract has been signed by the Board

5. Vendor Registration

If not currently registered, the Board encourages Bidders to complete the Vendor Registration form prior to the submission of any Bid. In order to be considered for award, Bidders shall complete the form and be accepted by the Board in the appropriate goods and services categories, met by their experience and qualifications.

Bidders can obtain the form by visiting this link: [Vendor Registration Form](#)

6. About the Waterloo Region District School Board

The Waterloo Region District School Board is a provincially funded institution reporting to the Ministry of Education of Ontario and is one of the larger school boards in Ontario, operating 121 school locations and serving approximately 64,000 students in the Region of Waterloo.

7. Anticipated Project Schedule

The following table represents the anticipated project timelines. This timeline is an estimate only and may be subject to change by the Board at any time.

DESCRIPTION	DATE
Issue Date of Tender	March 7, 2023
Non-Mandatory Pre-Bid Site Examination	March 15 2023 3.30 pm local time 153 Montcalm Drive Kitchener, Ontario
Deadline for Questions	March 22, 2023
Closing Date and Time	March 29, 2023, 2:00 pm local time
Anticipated Contract Start / Work begins	June 5, 2023
Substantial Completion Date	August 25, 2023
Ready for Takeover	September 1, 2023
Deemed Complete Date	October 23, 2023

8. Pre-Bid Site Examination

Bidders are strongly encouraged to attend the non-mandatory pre-bid site examination and sign the attendance sheet. Date, time and location are provided above in the Anticipated Project Schedule. The Board may not provide another opportunity to visit the site. However, absence from this site meeting will not

disqualify any Bidder.

Bidders shall attend the site meeting at their own risk and hold the Board harmless for any issues or damages arising out of their attendance of the site meeting.

The Owner will not consider any claims for additional payments during the execution of the Work for extra work or difficulties encountered resulting from conditions which were either visible or could be reasonably inferred from an examination of the Place of the Work and the available project information prior to the submission of Bids

Bidders are encouraged to bring their own measuring tape, camera, or other portable tools as required to the site meeting. Bidders are solely responsible for making their own assessment of the site.

9. Secondary Site Examinations

Bidder may request a secondary site examination through the Bidding System by clicking on the “Submit a Question” button found within the bid details page of that Procurement. Include the contact’s name and email of the person who will visit the site.

Bidders shall attend the site meeting at their own risk and hold the Board harmless for any issues or damages arising out of their attendance of the site meeting.

The Owner will not consider any claims for additional payments during the execution of the Work for extra work or difficulties encountered resulting from conditions which were either visible or could be reasonably inferred from an examination of the Place of the Work and the available project information prior to the submission of Bids.

Bidders are encouraged to bring their own measuring tape, camera, or other portable tools as required to the site meeting. Bidders are solely responsible for making their own assessment of the site.

10. Public Health Safety Protocol

Best practices include but not limited to wearing a medical grade mask and maintaining physical distancing (2m/6.5ft).

Recommended practices are subject to change at any time For information and updates, refer to the following resources and website: [Waterloo Region District School Board](#) and [Regional of Waterloo Public Health Services](#)

11. Addenda

All Addenda issued through the Bidding System shall form part of the Bid Solicitation Document.

Prior to bid closing any discrepancies, omissions, questions, or clarifications regarding the procurement documents must be sent immediately through the Bidding System by clicking on the “Submit a Question” button found within the bid

details page of that opportunity.no later than the deadline noted in the Anticipated Project Schedule. Those that are deemed pertinent to the Bid Solicitation Document will be addressed in the form of an Addendum.

The Board shall not be bound by any verbal instruction or information provided by any Board employee or consultant of the Board. Only responses provided in an Addendum shall form part of this Bid Solicitation Document.

Bidders shall acknowledge the receipt of all Addenda in the Bidding System prior to the submission of a Bid. Where Addenda has been issued, the system will not allow the Bidder to submit a Bid prior to acknowledging said Addenda.

Where an Addendum is issued after a Bid has been submitted, the Bidding System will automatically withdraw the submitted Bid. The Bid status will change to incomplete and will not be accepted by the Board as a submitted Bid. It is the responsibility of the Bidder to make any required adjustments to their submission, acknowledge all Addenda and ensure the Bid has been received by the Bidding System. Bidders should check the Bidding System for Addenda up until the Bid Closing Date and Time.

Addenda cannot be acknowledged after the Closing Date and Time.

12. Brand Name and Requesting Approved Equivalent

Any reference to a brand name or a particular manufacturer shall be understood to have been made solely for the purpose of establishing and describing required performance and quality levels of the product to be supplied, unless specified otherwise.

No reference to the brand name of a particular manufacturer shall be construed to restrict Bidders to that manufacturer. Bidders are invited to Bid equivalent and comparable equipment or items of any manufacturer, pending approval from the Board in the form of an Addendum. It is the Bidder's responsibility to demonstrate that the item meets the specifications.

Bidders shall request through the Bidding System by clicking on the "Submit a Question" button found within the bid details page of that Procurement that a proposed product be considered an approved equivalent prior to the Deadline for Questions in the Anticipated Project Schedule.

The request must include enough detail to determine equivalency by comparing the Board's specifications to the alternate product. It will not be the Board's responsibility to perform this comparison.

The Board may, depending on the nature of the product request site visits within a reasonable distance (preferable within 100 km of the Board) showing product and

installation based on a certain age, minimum 18 months in use, room use, room size, etc. based on same or similar purpose as described in this Procurement.

The Board/Consultant will endeavor to complete a review and make a decision prior to the Closing Date, and, if required, the Board reserves the right to extend the Closing Date to complete its review. However, in the event additional time is required beyond a suitable extension to the Closing Date, the request will be pending until the product is thoroughly vetted, therefore, it may not be approved for this particular Procurement.

If the Board is willing to consider the product with its differences, it will be communicated in the form of an Addendum prior to the Closing Date.

The cost of any testing requirements to establish acceptable equivalent or comparable products will be borne by the Bidder, unless otherwise stated by the Board.

13. Compliance with Laws, Acts and Regulations

Bidders shall abide by all applicable provincial and federal laws, as well as Board Policies. Some of the applicable laws are highlighted below for information purposes only. In case of any discrepancy between this Bid Solicitation Document and the provision of applicable laws, the latter shall prevail. This list is not intended to be a comprehensive summary of relevant laws.

- i. Broader Public Sector Accountability Act, 2010
- ii. Construction Act
- iii. Architect Act
- iv. Canada Revenue Agency (CRA) regulations
- v. Accessibility for Ontarians with Disabilities Act (AODA)
- vi. Workplace Safety and Insurance Act (WSIB)
- vii. Occupational Health and Safety Act
- viii. Trade Agreements (CETA/CFTA)
- ix. Education Act
- x. [WRDBS Procurement Services Policies website](#)
- xi. [WRDSB Policies and Procedures](#)

Non-compliance to provincial and/or federal laws, or Board Policies may result in rejection of the Bidder's Bid submission and/or termination of Contract.

14. No Lobbying

Any attempt by the Bidder or its agents to contact any of the following persons, directly or indirectly, with respect to this procurement may lead to disqualification:

- i) any elected or appointed officer;
- ii) any staff of the Board except the Single Point of Contact as identified in the Bid Solicitation Document; or

iii) any other person connected in any way with the procurement.

15. No Collusion

Bidders including any of their agents are prohibited from engaging in any comparison of figures or arrangement with any other individual, corporation or person submitting a Bid for the same Work and shall be fair in all respects and shall be without collusion or fraud.

16. Conflict of Interest

The Contractor, Subcontractors and Suppliers and any of their respective advisors, partners, directors, officers, employees, agents, and volunteers shall not engage in any activity or provide any services where such activity or the provision of such services creates a conflict of interest (actually or potentially, in the sole opinion of the Owner) with the provision of the Work pursuant to the Contract. The Contractor acknowledges and agrees that a conflict of interest, as described in this Article A-9, includes, but is not limited to, the use of Confidential Information where the Owner has not specifically authorized such use.

The Contractor shall disclose to the Owner, in writing, without delay, any actual or potential situation that may be reasonably interpreted as either a conflict of interest or a potential conflict of interest, including the retention of any Subcontractor or Supplier that is directly or indirectly affiliated with or related to the Contractor.

The Contractor covenants and agrees that it will not hire or retain the services of any employee or previous employee of the Owner where to do so constitutes a breach by such employee or previous employee of the Owner's conflict of interest policy, as it may be amended from time to time, until after completion of the Work under the Contract.

It is of the essence of the Contract that the Owner shall not have direct or indirect liability to any Subcontractor or Supplier, and that the Owner relies on the maintenance of an arm's-length relationship between the Contractor and its Subcontractors and Suppliers. Consistent with this fundamental term of the Contract, the Contractor will not enter into any agreement or understanding with any Subcontractor or Supplier, whether as part of any contract or any written or oral collateral agreement, pursuant to which the parties thereto agree to cooperate in the presentation of a claim for payment against the Owner, directly or through the Contractor, where such claim is, in whole or in part, in respect of a disputed claim by the Subcontractor or Supplier against the Contractor, where the payment to the Subcontractor or Supplier by the Contractor is agreed to be conditional or contingent on the ability to recover those amounts or a portion thereof from the Owner, failing which the Contractor shall be saved harmless from all or a portion of those claims. The Contractor acknowledges that any such agreement would undermine the required arm's-length relationship and constitute a conflict of interest. For greater certainty, the Contractor shall only be entitled to advance claims against the Owner for amounts pertaining to Subcontractor or Supplier

claims where the Contractor has actually paid or unconditionally acknowledged liability for those claims or where those claims are the subject of litigation or binding arbitration between the Subcontractor or Supplier and the Contractor has been found liable for those claims.

Notwithstanding paragraph 7.1.2 of GC 7.1 - OWNER'S RIGHT TO PERFORM THE WORK, TERMINATE THE CONTRACTOR'S RIGHT TO CONTINUE WITH THE WORK, OR TERMINATE THE CONTRACT, a breach of this Article A-9 by the Contractor, any of the Subcontractors, or any of their respective advisors, partners, directors, officers, employees, agents, and volunteers shall entitle the Owner to terminate the Contract, in addition to any other rights and remedies that the Owner has in the Contract, in law, or in equity."

17. Incurred Costs

The Board will not be liable, nor reimburse any Bidder for costs incurred in the preparation of the Bid, or any other services that may be requested as part of the procurement process.

18. Examination of Site and Work

- i) Bidders will accept the site conditions, and the requirements of the Work, as is. No modifications to the Bid will be accepted after the Closing Time.
- ii) No claim for extras will be allowed for Work or difficulties encountered due to conditions of the site which were visible, knowable, or reasonably inferable, prior to the time of submission of Bid. Bidders shall accept sole responsibility for any error or neglect on their part in this regard.
- iii) Before submitting a Bid, each Bidder shall:
 - a. carefully examine this entire Bid Solicitation Document to determine the extent of the Work, and various provisions including the maps, drawings, reports and specifications;
 - b. immediately report all discrepancies between the various documents and site conditions;
 - c. provide subcontractors, sub-consultants, and suppliers to whom the Bidder intends to sublet a portion or portions of the Work with complete information as to the requirements of the Work. This is to include maps, drawings, reports, specifications, and all requirements of the Bid Solicitation Document including any addenda.
- iv) In the event of discrepancies between the maps, drawings, reports, and the specifications with regard to quantity or quantities of materials or items, and in the absence of Addenda in clarification of said discrepancies, the Bidder is to include for the larger quantity or quantities.
- v) No additional payments will be made for any costs incurred through failure of the Bidder to abide by provisions stipulated in all of the articles and sub-

articles of this item.

- vi) Any soils investigation, environmental, geotechnical or other reports prepared or obtained with respect to the Place of the Work (collectively the “Reports”) are available from the Consultant. Where the Work involves existing buildings, structures, facilities, plant or equipment, any reports, data or as-built drawings concerning such buildings, structures, facilities, plant or equipment (collectively the “Data”) are available from the Consultant. The Reports should not be considered a representation of the site conditions of the entire Place of the Work, and the Reports and Data are provided for general information and guidance purposes only. Neither the Owner nor the Consultant guarantees the accuracy or completeness of the Reports or the Data, nor does either assume any responsibility for any interpretations or conclusions that bidders may make or draw from the Reports or the Data.
- vii) Each Bidder is solely responsible, at its own cost and expense, to carry out its own independent research and due diligence, or to perform any other investigations considered necessary by the Bidder to satisfy itself as to all existing conditions. The Bidders’ obligations set out in this paragraph apply irrespective of any Reports, Data or any information contained in the Bid Documents.
- viii) No allowances will be made for additional costs and no claims will be entertained in connection with conditions which could reasonably have been ascertained by investigation or other due diligence undertaken prior to the Submission Deadline, and/or in connection with Work which is required and which is reasonably inferable from the Bid Documents, the Reports and/or Data as being necessary.

19. Designated Substances

The Occupational Health and Safety Act of Ontario (OHSA) allows for certain toxic substances to be especially designated. The OHSA defines a designated substance as “a biological, chemical, or physical agent or combination thereof prescribed as a designated substance to which the exposure of a worker is prohibited, regulated, restricted, limited, or controlled”. Ontario Regulation 490/09 - Designated Substances (O.Reg. 490/09), made under the Occupational Health and Safety Act outlines required steps to control exposure of workers to designated substances. Under O. Reg. 490/09 there are eleven (11) designated substances: acrylonitrile, arsenic, asbestos, benzene, coke oven emissions, ethylene oxide, isocyanates, lead, mercury, silica and vinyl chloride. This regulation applies to every employer and worker at a workplace where the designated substances are present, produced, processed, used, handled or stored and at which a worker is likely to be exposed to the designated substance.

i) Asbestos

Asbestos-containing material (ACMs) were identified during the completion of the Asbestos Audit Update Report (AAU), prepared by MTE Consultants Inc. Each facility was surveyed, and if applicable, an AAU Report is available, refer to attached, Appendix 01 35 34A. If these materials, including those deemed or suspected, will be disturbed, or will likely be disturbed, during building maintenance, renovations, construction, or demolition activities, they must be handled and disposed of in accordance with the procedures prescribed by O. Reg. 278/05.

Should the Contractor encounter asbestos, not noted in the above AAU Report, that would be disturbed during the course of the Work they should stop the work in that immediate area and report the same to the Board Contact.

All asbestos work must be conducted by contractors approved by the Board as vendor of record, who are trained in the type of asbestos operations required and should be overseen by a qualified third-party Health, Safety and Environmental professional. To conduct Type 3 asbestos operations, contractors must be certified as Asbestos Abatement Workers AAW (Trade code 253W) and Asbestos Abatement Supervisors AAS (Trade code 253S) by The Ministry of Training, Colleges and Universities as prescribed by Section 20 of O. Reg. 278/05.

Unless otherwise specifically covered by Cash Allowance or Contingency Allowance for known asbestos materials, include in this contract for the removal under abatement, in compliance with O. Reg. 278/05, of all known asbestos containing materials, as identified in the audit, within 0.6 meter (2'-0") of all new services, materials, and equipment, and/or as required to complete the work. No claims for extra cost will be accepted for areas known to contain asbestos containing materials.

ii) Lead

Lead was historically used in mortar pigments, ceramic glazing; plumbing solder, electrical equipment and electronics solder, in pipe gaskets as packing in cast iron bell and spigot joints of sanitary drains, flexible plumbing connections, flashing panels, acoustical dampeners, phone cable casing and some architectural applications. The assessment of lead for this assignment was limited to paint on interior and exterior surfaces which may be disturbed during the Work.

Preliminary paint, coatings or materials were collected within the work area to determine if lead-containing paints, including lead-based paints, are present. The analytical results, if applicable, including the location marked on the floor plans are available, refer to attached, Appendix 01 35 34B.

Should the Contractor encounter paint and coatings, not sampled, that would be disturbed during the course of the Work, they should stop the work in that immediate area and report the same to the Board Contact.

Unless otherwise specifically covered by Cash Allowance or Contingency Allowance for known lead-containing paint and coatings, include in this contract for the removal or disturbance of lead-containing materials, must be completed in compliance with “Lead on Construction Projects” guideline (April 2011). No claims for extra cost will be accepted for lead-containing paint or coatings in identified areas.

The classification of typical lead-containing construction tasks is based on presumed airborne concentrations obtained from the U.S. Occupational Safety and Health Administration (OSHA), the Ontario Ministry of Labour, and published research studies. The classification of Type 1, Type 2, or Type 3 operations are grouped based on the following concentrations of airborne lead.

Contractor shall inform all workers of the presence of paint finishes that are lead containing. Disturbance of lead-containing materials, paints or surface coatings shall be conducted in accordance with the procedures outlined in the Environmental Abatement Council of Canada (EACC) “Lead Guideline” (October 2014) and/or the Ministry of Labour (MOL) “Lead on Construction Projects” guideline (April 2011). The extent of procedures required depends on the type of work to be conducted. Waste to be handled and disposed of in accordance with O.Reg. 347.

iii) Mercury

Mercury is typically used in building service applications such as thermometers, barometers, thermostats, gauges, electrical switches, and lighting products including fluorescent light bulbs and a variety of High Intensity Discharge (HID) lamps as mercury vapour, metal halide and high pressure sodium lamps. Lamps and other devices that require demolition are to be handled with care and kept intact to avoid potential exposure. Any mercury-containing lamps or other equipment that are demolished are to be recycled. Waste to be handled and disposed of in accordance with O.Reg. 347.

iv) Silica

Silica is present in rock, stone, soil, and sand. Masonry products such as concrete block, brick, and mortar, as well as concrete and associated products contain silica. Due to its ubiquitous nature, silica was historically used in a wide variety of building materials and is still used today in new construction.

All work involving the demolition silica-containing materials shall follow the procedures outlined in the MOL "Silica on Construction Projects" guideline. Type 1 operations may be necessary based on the type of work conducted and the Contractor shall implement dust suppression methods and protect workers.

v) **Other Designated Substance**

In addition to asbestos and/or lead, silica, and mercury are present in all WRDSB facilities. New construction, renovation or alterations require compliance by the Contractor with the applicable legislation. Other designated substances (i.e. acrylonitrile, arsenic, benzene, coke oven emissions, isocyanates, ethyl oxide, and vinyl chloride) are not encountered in WRDSB facilities as significant constituents or in a form that would represent an exposure concern. responsible for obtaining its own independent financial, legal, accounting, and technical advice with respect to any information included in the Bid Solicitation Document or in any data, materials, or documents provided or required by the Board.

20. Reserved Rights of the Board

The Board reserve the right, in their respective sole and unfettered discretion, to:

- a) Reject any Bid received from a Bidder which is party to any potential, current, past or existing suits, actions, and litigation proceedings, arbitrations, alternative dispute resolutions, investigations, vendor performance evaluations that are below expectations, or claims by or against or otherwise involving either of the Board and the Bidder;
- b) waive formalities and accept Bids which substantially comply with the requirements of this tender;
- c) accept any Bid in whole or in part;
- d) accept, reject or cancel any or all Supplementary pricing;
- e) discuss with any Bidders different or additional terms to those contemplated in this Bid Solicitation Document or in any Bid submission;
- f) make public the names of any or all Bidders;
- g) accept or reject equivalent or alternative brand names;
- h) check references other than those provided by any Bidder;
- i) reject any, or any part of, any or all Bids, or cancel the bidding process at any stage and/or issue a new Bid call for the same or similar deliverables;
- j) disqualify any Bidder:
 - i. whose Bid contains misrepresentations or any other, inaccurate, or misleading information, or any qualifications within its Bid,
 - ii. who has engaged in conduct prohibited by the Bid Solicitation

- Document,
- iii. with inadequate credentials or due to unsatisfactory past performance,
- k) reject Bid(s) from Bidder who has engaged in lobbying or has contravened any of the terms of the Bid Solicitation Document;
 - l) reject a Bid on the basis of:
 - i. information provided by references or credit check or other due diligence efforts,
 - ii. the information provided by a Bidder pursuant to the Board exercising its clarification rights under the procurement process, or
 - iii. other relevant information that arises during the procurement process;
 - m) choose to reject a Bid if only a single Bid is received and cancel the bidding process or enter into direct negotiations with the sole Bidder;
 - n) accept a Bid other than the lowest or highest scoring and/or to not accept any Bid for any reason whatsoever;
 - o) negotiate in circumstances permitted for in the Bid document or by relevant policies, or directives, and include additional terms and conditions during the process of negotiations;
 - p) no longer consider a Bidder if a satisfactory outcome is not reached as part of negotiation, as determined by the Board in their sole discretion and move to the next highest ranked Bid in such event;
 - q) select a Bidder other than the Bidder whose Bid reflects the lowest cost to the Board and/or award the Contract to any Bidder;
 - r) award any business/Work described in this Bid Solicitation to more than one (1) Bidder;
 - s) not award the Contract if the costs of completing the Work exceed budget funding; or
 - t) do not respond to all requirements or do not represent fair market value or where necessary internal approvals are not obtained.

These reserved rights are in addition to any other expressed rights or any other rights which may be implied in the circumstances. The Board shall not be liable for any expenses, costs or losses suffered by any Bidder or any third party resulting from the Board exercising any of its express or implied rights under this bidding process.

21. Bid Submission Requirements and Instructions

1. All Bids shall be submitted through the Bidding System only. The onus is on the Bidder to ensure all requirements of the Bid Solicitations are submitted.
2. Bidder shall have a "Vendor account" in the Bidding System and shall ensure the account is created with the Bidders full legal company name and be

registered as a “plan taker” for this bid solicitation. Only the plan takers will have access to download bid documents, receive addenda email notifications, download addenda and to submit their bid electronically through the Bidding System.

3. The onus is on the Bidder to ensure that the Bid is received in the Bidding System on or before the Closing Time. The Closing Time shall be determined by the Bidding System’s web clock. The timing of the Bid submission shall be based on when the Bid is received by the Bidding System, not when a Bid is submitted by a Bidder.
4. Bidders shall allow sufficient time to upload their Bid submission including all requirements as stated in this Procurement and to resolve any issues that may arise as Bid transmission can be delayed in an “internet traffic jam” due to file transfer size, transmission speed, and other electronic considerations.
5. All prices including supplementary bid pricing, if requested, shall be submitted in the Schedule of Prices forms available through the Bidding System. Supplementary bid pricing including but not limited to:
 - i) Itemized, Separate, Alternative and Optional Prices:
The Owner reserves the right to accept or reject any or all supplementary bid prices submitted, and such prices shall remain in effect for the duration of the Contract. Failure to submit supplementary prices where required may result in the Bid being declared non-compliant.
 - ii) Unit Prices:
The Owner reserves the right to accept or reject any or all unit prices submitted, and such prices shall be in effect for the duration of the Contract and may be used to calculate the cost of additional work under the Contract. Failure to submit a unit price where required may result in the Bid being declared non-compliant
6. Bids submitted by fax or paper copy or any other format will not be accepted.
7. The Bidding System will not accept Bids after the Closing Time as determined by the Bidding System’s web clock.
8. The Board hereby consent to the use of an Electronic Signature for the signing of all documents requested hereunder. Acceptable forms of signatures include, but are not limited to, the typing of the Bidder’s authorized signing officer’s name or the inclusion of an image of the Bidder’s authorized signing officer’s signature, so long as the electronic signature is sufficient to identify the Bidder’s authorized signing officer. The Bidder’s authorized signing officer agrees that whatever form of electronic signature is provided

constitutes a signature for the purpose of executing all documents requested hereunder.

9. Upon submitting a Bid, the Bidding System will send a confirmation email to the Bidder advising that the Bid was submitted successfully. If a Bidder does not receive a confirmation email despite submitting a Bid, the Bidder should contact technical support of the service provider hosting the Bidding System via email: support@bidsandtenders.ca
10. There will be no public opening for this Bid.

22. Bid Prices

- i. The amounts stipulated on the Schedule of Prices are intended to cover the cost of the complete Work as described in this Bid Solicitation Document.
- ii. All prices shall be in Canadian Funds, Free On Board (FOB) Destination, Freight Prepaid (Board locations).
- iii. HST is extra and shall not be included in Bid prices.
- iv. The person submitting the Bid on behalf of the Bidder must have authority to bind the Bidder.
- v. Quantities may be estimated, and therefore the Board, at its discretion, may purchase more or less of the commodity based on the unit price bid.
- vi. All information required on the forms shall be completed in full including references and subcontractors that it proposes to use for Work described. Changes made to the list of nominated subcontractors after the closing of the Bid, must have prior written approval of the Board's Single Point of Contact.
- vii. All price(s) submitted shall be a reasonable price for each particular item as determined by the Board and under no condition will an unbalanced Bid be considered. Submissions containing prices which appear to be so unbalanced as to likely affect the interests of the Board adversely will be clarified and may be rejected.

23. Withdrawal of Bid Submission / Irrevocable Period

Bidders may edit or withdraw a Bid in the Bidding System up until the Closing Date and Time. The Closing Time shall be determined by the web clock within the Bidding System. After such time, requests to withdraw Bid Submissions will not be considered.

Bids will be irrevocable by the Bidder, and open for acceptance by the Board, for **60 (sixty)** days following the Closing Date.

24. Bid Irregularities

Bids with one or more of the following may be declared informal and/or disqualified and/or non-compliant:

- i. Bids that do not comply strictly with all terms and conditions of the Bid Solicitation Document.
- ii. Bids that are incomplete, conditional, qualified, or obscure.
- iii. Bids that are based upon an unreasonable period of time for completion of the Work.
- iv. Bids received from Bidders involved in Claims with either of the Board or banned or on probation with the Board.
- v. Bids received from any Bidder deemed to be unskilled or experienced in the work contemplated, or those who have defaulted on, or failed to satisfactorily complete other similar work in the past.
- vi. Bids submitted by Bidders that are not prequalified, where applicable.

25. Bid Review

- a) All Bids received on or before the Closing Time will be reviewed for compliance based on this Bid Solicitation Document. Non-compliant Bids may be rejected. Bids not meeting any of the mandatory requirements included in this Bid Solicitation Document may be disqualified. Bidders may be contacted to clarify its submissions.
- b) It is the Bidder's responsibility to satisfy the Board that the Bidder can comply with the requirements contained within this Bid Solicitation Document and that the Bidder possesses the necessary inventory, equipment, facilities, resources and staff to perform the Work specified in this Bid Solicitation Document. Substitution of materials, equipment, or methods different from that outlined in the terms of reference will not be accepted unless provided for within this Bid Solicitation Document or with the written approval from the Board.
- c) The Board also reserves the right to examine Bidder's facilities, equipment and visit the subcontractors or sub-consultants proposed or Bidder's existing and past clients. The award decision may be revised based on the above.
- d) The Board will not be responsible for travel costs if travel is required. No additional charges will be accepted by the Board for any cost incurred by the Bidder or any other party in participating in the Bid evaluations.
- e) The Board may, in their sole discretion, check references, conduct credit checks, review the litigation history and history of professional liability or other

insurance claims, and obtain any other type of information that might aid the Board in its selection. The Board reserves the right to consider all or any information received from all available sources, whether internally or externally obtained. The Board may disqualify any Bid from further consideration based on results of reference or credit checks or review of litigation or claim history. The foregoing may include the Board's own experiences with the respective Bidder(s) or any of the subcontractors and sub-consultants proposed in its Bid.

26. Tie Bids

Where two (2) or more Bids have been received reflecting the same, lowest Bid price, the time stamp for date and time submission in the Bidding System will dictate the award (earliest submission shall prevail).

27. Intent to Award Notice

- a) Subject to the reserved rights of the Board and availability of funds, the lowest compliant Bid will be recommended for award.
- b) There shall be no obligation on the Board as a result of seeking Bids or conducting the procurement process and the Board reserves the right to pursue other Bidders, cancel the Bid Solicitation, issue a revised request, or to pursue any other course of action which would aid in meeting their needs.
- c) Within **twenty-four (24) hours** of receiving a request or intent to award from the Board, the Bidder (the "Recommended Bidder") shall provide a list in a Board-provided form of all Subcontractors that it proposes to use for all Work described in this Procurement including the specification sections.
- d) Within **seven (7) calendar days** of receiving a request or intent to award from the Board, the Bidder (the "Recommended Bidder") shall provide the following:
 - i. Insurance certificate with coverage specified in the Bid Solicitation Document.
 - ii. WSIB clearance certificate valid on date of award or an exemption letter (if applicable and requested).
 - iii. Bonding Requirements applicable as specified in the Bid Solicitation Document.
 - iv. An executed Board issued Form of Agreement, if applicable, and duly signed by the authorized signatory.
 - v. Any other submittal specified in the Bid Solicitation Document or in the intent to award, as a requirement of award.

- vi. For construction projects above \$200,000 the Successful Bidder will be required to execute a “Canadian Standard Form of Construction Contract to a Stipulated Sum” (CCDC 2 - 2020 including amendments thereto as set out in this Procurement.

28. Post Award

Ministry of Labour Notice of Project confirmation notice to be uploaded in Bids and Tender prior to mobilization and/or prior to first project draw

In addition to all of the Board’s other remedies, if a recommended Bidder fails to satisfy the requirements and/or execute the Form of Agreement or any other applicable conditions within seven (7) calendar days of notice of selection, the Board may, in their sole and absolute discretion and without incurring any liability, rescind the selection of that Bidder.

The Bidder may protest within the five (5) day Notice of Intent to Award, after that, the protest will not be reviewed or accepted.

29. Award Notification

For procurements valued at \$100,000 or more, and in accordance with the Broader Public Sector Procurement Directive, once the Board is satisfied that all requirements are met, the project award notification will be posted in the same manner as the procurement documents were posted. The notification will be posted after the purchase order and/or agreement between the successful bidder and the Board has been issued/executed. The award notification will list the name of the successful bidder, agreement start and end dates, and any extension options.

30. Confirmation to Proceed

No work shall commence until the Board has issued a purchase order and/or contract, if applicable to the successful Bidder. Goods/Service or Work as described shall not commence until all the required documents have been submitted to Procurement Services and the Form of Agreement and/or the CCDC 2 - 2020 if applicable, are executed by the Successful Bidder and the Board. For payment purposes, a Purchase Order shall be generated and issued to the Successful Bidder. The Purchase Order number must appear on all invoices in order to ensure prompt payment.

31. Debriefing Requests

For procurements valued at \$100,000 or more, and in accordance with the Broader Public Sector Procurement Directive, unsuccessful Bidders are entitled to a debriefing in order to receive feedback with respect to their Bid submission. In order to obtain a debriefing, Bidders shall contact the Single Point of Contact listed

in this Bid Solicitation Document in writing with their request within sixty (60) calendar days of the award notification.

32. Warranty and Maintenance

The Successful Bidder, at the time of substantial completion, shall furnish a written warranty covering material, maintenance, and work performed under the contract for a minimum period of two (2) years from the date of completion. Individual sections may extend warranties beyond the two (2) year time frame. The Successful Bidder is responsible for all required maintenance complete with materials and labour during the warranty period.

33. Definitions

Capitalized terms not otherwise defined in this Section or elsewhere in these Instructions to Bidders shall have the meanings ascribed to them in the Contract. All references in these Instructions to Bidders to “Section” or “paragraph” shall, unless specifically indicated otherwise, refer to a Section or paragraph of these Instructions to Bidders.

- .1 **“Bid”** means a proposal, quotation or tender submitted in response to a solicitation issued by the Board.
- .2 **“Bid Solicitation Document” or “Procurement”** means all documentation related and developed to describe all of the elements of the construction project such as and not limited to include the tender documents, plans, specifications, drawings, appendices, attachments, addenda, reports, Scope of Work, Supplementary Conditions & Amendments to Standard Construction Document CCDC 2-2020 etc. which become the contract between both parties,
- .3 **“Bidding System”** means a computer-based system that provides suppliers with access to information related to open competitive procurements.
- .4 **“Board” or “Owner”** means the Waterloo Region District School Board.
- .5 **“Consultant”** means a person or entity that, under an agreement, other than an employment agreement, provides expert or strategic advice and related services for consideration and decision-making.
- .6 **“Contract”** means an obligation, such as an accepted offer in the form of Agreement and/or CCDC 2 – 2020 stipulated price contract, as amended by supplementary conditions, between competent parties upon a legal consideration, to do or abstain from doing some act. It is essential to the creation of a contract that the parties intend that their agreement shall have legal consequences and be legally enforceable. The essential elements of a contract are an offer and an acceptance of that offer; the capacity of the parties to contract; consideration to support the contract; a mutual identity of consent or consensus ad idem; legality of purpose; and sufficient certainty of terms.
- .7 **“Project Coordinator”** means the designated Facilities Services Representative employed by the Board for the project.

- .8 **“Single Point of Contact”** means the designated Procurement Services Representative employed by the Board and NOT the Consultant.
- .9 **“Schedule of Prices”** means all forms where pricing is request within the Bidding System.

END OF SECTION

00 21 14 – Vendors of Record

For more information about Vendor Registration, refer to Section 00 21 13 Instructions to Bidders, sub-section 5. Vendor Registration.

1.0 General Contractor or Prime Contractor

- 1.1 Only those General Contractors noted below may submit bids.
- 1.2 Bidders must be a Registered Vendor of Record. Bids received from contractors who have not been registered prior to the closing date will not be accepted.
- 1.3 The Owner reserves the right to issue an addendum naming additional registered general contractors.
- 1.4 In the near future, the Board will require General Contractors to have their IHSA - Certificate of Recognition (COR®). Although not mandatory at this time, Bidders may be required to complete a survey in the Bidding System for this tender.
- 1.5 The following General or Prime Contractors are Vendors of Record with the Board and are invited to submit bids:

Vendor Name	Email	Phone Number
2SC Contracting Inc.	nick@2SCcontracting.com	(416) 992-5437
Bestco Construction (2005) Ltd	estimating@bestcoconstruction.com	(905) 304-4597
Caird-Hall Construction Inc.	caird-hall@bell.net	(905) 634-0903
Collaborative Structures Limited	jblackler@collaborativestructures.com	(519) 658-2750
Complete Building Systems Inc.	estimating@completebuildingsystems.ca	(519) 576-5800
CPM Group Inc	harslan@cpmgroup.ca	(416) 227-1612
CRD Construction	sbock@crdconstruction.on.ca	(519) 822-1801
Dakon Construction	james@dakon.ca	(519) 746-0920
Elgin Contracting and Restoration Ltd.	info@elgincontracting.com	(519) 633-9969
Gateman-Milloy Inc.	info@gatemanmilloy.com	(519) 748-6500
Golden Gate Contracting Inc	estimation@ggcontracting.ca	(905) 844-1122
Gordner Construction	admin@gordner.ca	(519) 741-0052
Hall Construction	info@hallconstruction.ca	(905) 662-9200
Harrington Construction Inc	jason@harrcon.ca	(519) 837-3581
ICIR Construction Ltd	icirconstruction@gmail.com	(647) 346-8528
K&L Construction (Ontario) Ltd	todd.hodgins@kandlconstruction.com	(519) 472-7164
Mega Group Construction Ltd	vijay@megagroupconstruction.com	(905) 799-1212
Melloul Blamey Construction	teresa.oreilly@melloul.com	(519) 886-8850
Morris-Lee Construction Corp.	morrislee@rogers.com	(519) 746-8545
Nith Valley Construction Ltd	mail@nithvalley.com	(519) 662-1324
Norfield Construction Inc.	alves@norfieldconstruction.ca	(905) 951-3030
PM Contracting Ltd	sarahziegler@pm.on.ca	(519) 576-8327

Reid & Deleye Contractors Ltd	gregd@reid-deleye.com	(519) 688-2600
RENOKREW	info@renokrew.com	(416) 604-7042
RHC	info@rhcbuilds.ca	(519) 249-0758
SG Cunningham Ltd	allan@cunningham.on.ca	(519) 886-2730
Sierra Construction	info@sierraconstruction.ca	(519) 421-7413
SPEC Construction Inc.	info@spec-build.com	(519) 650-4030
STM Construction Ltd	robertbox@stmconstruction.com	(519) 756-7030
Tambro Construction	btami@tambro.com	(519) 766-1234
TRP Construction	info@trpconstruction.ca	(905) 336-1041
Van Horne Construction Ltd	otekin@vanhorne.ca	(905) 677-5150
Zehr Levesque Inc.	estimating@zehrgroup.ca	(519) 576-2233

2.0 Subcontractors

- 2.1. Refer to specification sections for products, suppliers and installers that will be required and must be included on the Subcontractor Board approved form.
- 2.2. The Subcontractor list is not required at time of bid submission.
- 2.3. The Subcontractor list is mandatory after the bid closing date from the Recommended Bidder **within twenty-four (24) hours** of receiving a request or intent to award from the Board.
- 2.4. Subcontractors are not required to complete and/or be a Registered Vendor of the Board.
- 2.5. The Bidder (the “Recommended Bidder”) shall provide a listing in a Board provided form of Subcontractors that it proposes to use for all Work described in this Procurement including the specification sections, as per the following:
 - 2.5.1 Bidders shall select experienced and qualified Subcontractors or Suppliers in their field to perform or supply an item of Work indicated in this Procurement.
 - 2.5.2 The Bidder shall be fully aware of the capability of each Subcontractor and/or Supplier included in its bid, including but not limited to technical ability, financial stability and ability to maintain the proposed construction schedule.
 - 2.5.3 The Owner reserves the right to reject any nominated subcontractor or supplier, based on the following but not limited to unsatisfactory past performance, suspended/removed from a Vendor of Record list and/or outstanding/unresolved corrective action notice issued by the Owner to the Subcontractor within the last three (3) years.
 - 2.5.4 The Owner reserves the right to obtain information from the Bidder and from third parties respecting the qualifications and experience of the Bidder’s nominated list of subcontractors for such item of the Work.

- 2.5.5 The Board reserves the right to examine Bidder's facilities, equipment and visit the subcontractors or sub-consultants proposed.
- 2.5.6 The substitution of any Subcontractor and/or Suppliers after the list is submitted will not be accepted unless a valid reason is given in writing to and approved by the Owner, whose approval may be arbitrarily withheld.
- 2.5.7 Where a bidder lists "own forces" in place of a Subcontractor, the bidder shall carry out such item of the Work with its own forces.
- 2.5.8 Where "own forces" have been listed by a bidder, the Owner reserves the right to obtain information from the bidder and from third parties respecting the qualifications and experience of the bidder's "own forces" for such item of the Work.

END OF SECTION

00 21 15 – Scope of Work

1. Renovation of existing library, including new flooring, ceiling, new millwork, ventilation system and new windows.
2. Renovation of quiet room with new wall and new window, wall, floor and ceiling finish
3. Provision of new universal washroom
4. Renovation of 2 existing vestibules for provision of new door barrier free system as indicated in the drawings.
5. Reconfiguration of existing boy's change room
6. Renovation of gymnasium consisting of new sport floor system, new paints, and finish, 2 new backboards.
7. Cash Allowance Work as indicated in the cash allowance section comprised of:
 - a. Soundfield system for the library
 - b. Provision of three 75" Television installed in library.
 - c. Renumbering of entire school rooms including new signage for entire school and coordination of new numbering with annunciator fire panel.

END OF SECTION

00 31 34 – Subsurface Investigation Report

1.0 General

1.1. Related Sections

.1 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.2. SUBSURFACE INVESTIGATION REPORT

.1 Not applicable

END OF SECTION

Appendix 00 31 34A – Soil Report

Not applicable.

END OF SECTION

00 41 13A – Asset and Warranty Card



WRDSB PROJECT ASSET & WARRANTY CARD

Instructions:

- a. The WRDSB Project Asset & Warranty Card shall be filled out and completed for any project or work that calls for the replacement or new installation of any asset that has a warranty and requires ongoing preventative maintenance, as well any asset that is being removed.
- b. The information for the WRDSB Project Asset & Warranty Card shall be collected and coordinated by the General Contractor responsible for the overall project. The WRDSB Project Asset & Warranty Card shall be filled out and submitted to the Board electronically to FAC_maintenance@wrdsb.ca and carbon copy the project coordinator at the point in time where the project is deemed "Substantially Complete" or at the start of the Warranty Period for said asset. For any project without a General Contractor, the Contractor or Trade responsible for the installation and/or removal of the asset shall complete the WRDSB Project Asset & Warranty Card and submit it to the Board in the same manner as mentioned above.
- c. All items shall include the asset Identifier, asset description, location, manufacturer, model, serial number, and warranty end date (refer to example at bottom of page).
- d. NO Warranty Period shall start without the written permission of the Board prior to the point of Substantial Completion of the project.
- e. The Contractor that is responsible for the coordination and completion of the WRDSB Project Asset & Warranty Card shall ensure that the contractor or trade responsible for the installation of the item understands that the contractor or trade is responsible for the preventative and general maintenance of that item for the minimum 2 year warranty period as noted on the WRDSB Project Asset & Warranty Card.
- f. **All** items installed under this contract that require ongoing preventative maintenance (PM) shall be included on the WRDSB Project Asset & Warranty Card. The following list contains examples to be included but not limited to;

Air Compressor	Chiller	Grease Trap
Air Handler- ERV, Heat Pump, RTU	Cooling Tower	Gym Equipment
AC Split -Indoor/Outdoor Unit	Elevator/Lift	Hoods- Kitchen/Fume
Automatic Doors	Eyewash Station-location only	Operable Partitions
Backflow Preventer	Fire Panel	Sprinkler System -area covered
Boiler		Tech Equipment
- g. All maintenance during the warranty period shall be the responsibility of the contractor. This shall include, but not be limited to: air handling unit filter changes (3x min.per year), or as per manufacturers recommendations, servicing testable backflow preventors, including fees; and any and all required maintenance.

Sample:

To be filled out by Consultant				To be filled out by Contractor				
IDENTIFIER	ASSET	LOCATION (incl. Rm. No.)	REMOVED (R) OR NEW (N)	CONTRACTOR	MANUFACTURER	MODEL	SERIAL NUMBER	WARRANTY END DATE
Boiler 2	Condensing Boiler	Boiler Rm. B005	R	Bob's Mechanical	Viessman	Vitocrossal 300 CA3B	1234x5678y90	Jan. 1, 2025
HVAC 7	New RTU	Roof D	N	Bob's Mechanical	Daikin	DPS020A	ABCD1EFGH2IJ	Jan. 1, 2025
n/a	Gym Partition	Gyms 122/123	R	Extreme Partitions	Hufcor	933EC	n/a	Jun. 30, 2028



WRDSB Project Asset & Warranty Card

Project Name: _____

School / Location: _____

Date: _____

To be filled out by Consultant				To be filled out by Contractor				
IDENTIFIER	ASSET	LOCATION (include Room No.)	ASSET REMOVED (R) OR NEW (N)	CONTRACTOR	MANUFACTURER	MODEL	SERIAL NUMBER	WARRANTY END DATE

00 41 73 – Supplementary Bid Information – NOT APPLICABLE

END OF SECTION

00 56 13 – Definitions Stipulated Price

1.1. Definitions Declaration

- .1 CCDC 2-2020 Edition, Stipulated Price Contract as may be amended, forms the basis of Definitions between the Owner and Contractor.
- .2 These Definitions are bound to the CCDC 2 Definitions and CCDC 2 General Conditions.

1.2. Supplementary Words and Terms to CCDC 2-2020

- .1 The following words and terms are additional to the CCDC 2 Definitions.
- .2 Addendum: A document that amends the Bid Documents during the Bidding Period and becomes part of the Contract Documents when a Contract is executed. (Plural: Addenda).
- .3 Agreement: The signed and sealed legal instrument binding parties in a Contract, describing in strict terms their mutual arrangement, roles and responsibilities, commencement, and completion responsibilities.
- .4 Alternative Price: The amount stipulated by a Bidder for an Alternative and stated as an addition, a deduction, or no change to the Bid Price.
- .5 Authorities: Those having jurisdiction under law over Work or Parts thereof.
- .6 Bid: To offer as a Bid stating for what price a Contractor will assume a Contract.
- .7 Bid Documents: A set of documents consisting of the Instructions to Bidders, Bid Form, Contract Documents, and other information issued for the benefit of Bidders to prepare and submit a Bid.
- .8 Bid Form: The specific and detailed form used to collect information about a Bid.
- .9 Bidding: The process of preparing and submitting a Bid.
- .10 Construction Documents: The Drawings and Project Manual. When combined with a Contract and Contract conditions, these documents form the Contract Documents.
- .11 Contingency Allowance: An additional monetary amount added to a Project cost estimate and designated to cover unpredictable or unforeseen items of Work. The amount is usually based on some percentage of the estimated cost and expended and adjusted by Change Order. It is not intended to cover additions to the scope of Work.
- .12 General Conditions: That part of the Contract Documents which sets forth many of the rights, responsibilities and relationships of the parties involved in a Contract.

- .13 Exposed: Visible at completion of Work, in usable areas as well as interior of closets, cabinets, drawers, storage and service rooms, stairwells and exterior surfaces.
- .14 Instructions To Bidders: Instructions contained in the Bid Documents to convey an Owner's expectations and criteria associated with submitting a Bid.
- .15 Ready for Takeover: *Ready-for-Takeover* shall have been attained when the conditions set out in GC12.1, SC 55.1 , 12.1.1
- .16 Section: A portion of a Project Specification covering one or more segments of the total Work or requirements. Sections are included in a Project manual as required to meet Project requirements.
- .17 Standard: A document describing a grade or a level of quality, which has been established by a recognized agency or organization, utilizing an internal voting process.
- .18 Separate Price: A separate price for work to be added to the base price if selected by the Owner. This price type is not a part of the base bid price.
- .19 Stipulated Price: An amount set forth in a Stipulated Price Contract as the total payment for the performance of the Work. Sometimes referred to as a stipulated sum or a lump sum stipulated price.
- .20 Tender: Refer to definition of Bid.
- .21 Unit Price: The amount payable for a single unit of Work as stated in a Schedule of Prices.
- .22 Install: To remove from site storage, move or transport to intended location, install in position, connect to utilities, repair site caused damage, and make ready for use.
- .23 Supply: To acquire or purchase, ship or transport to the site, unload, remove packaging to permit inspection for damage, re-package, replace damaged items, and safely store on-site.
- .24 Provide: To Supply and Install
- .25 Wherever words 'approved', 'selected', 'satisfactory', 'directed', 'permitted', 'inspected', 'instructed', 'required', 'submit', 'ordered', 'reviewed', 'reported to', or similar words or phrases are used in Contract Documents, it shall be understood, unless context provides otherwise, that words 'by Consultant' or 'to Consultants' follow.
- .26 Words 'by others' when used in Specifications or on Drawings shall not mean by someone other than Contractor. Only means by which something shown or specified shall be indicated as not being in Contract is by initials 'NIC' or words 'not in Contract', 'by Owner', or 'by Other Contractor'.

END OF SECTION

00 72 13 – Terms and Conditions

1. Proceedings Against the Board

The Bidder represents and warrants that the Bidder is not a party to any legal suits, actions, litigation proceedings, arbitrations, alternative dispute resolutions, investigations or claims (Hereinafter collectively referred to as “Claims”) by or against or otherwise involving the Board and the Bidder. The Board may reject any Bid in the event of potential, current, pending, or threatened litigation, arbitration, alternative dispute resolution or disputes involving the Board and the Bidder.

2. Confidential Information and Municipal Freedom of Information and Protection of Privacy Act

All information and documentation provided by the Board or to the Board in connection with this Procurement, before or after the issuance of this Procurement is the sole property of the Board and shall be treated as confidential, subject to the provisions of the Municipal Freedom of Information and Protection of Privacy Act (MFIPPA).

Bidders shall identify any confidential information in their Bid Submission. The Board will make reasonable efforts to safeguard confidential information, subject to its disclosure requirements under MFIPPA or any other disclosure requirements imposed by law or by order of a court or competent tribunal. Bidders are advised that their Bid submissions may be disclosed, on a confidential basis, to advisers retained by the Board to advise or assist with the Bid process, including the evaluation of Bid submissions.

Bidders should be advised that when submitting a Bid the name, title, and contact information will be made public upon request. Under MFIPPA, and as a record of the Board, the Bid prices submitted and agreed to under contract with the Board can also be made available through a Freedom of Information request. Bidders will be notified regarding requests for any other information submitted in a Bid; information may be disclosed to a requester in whole or part unless otherwise considered exempt from disclosure under MFIPPA.

3. Criminal Background Checks and Collection of Personal Information

The Board must comply with Ontario Regulation 521/01 (Collection of Personal Information) of the Education Act with respect to criminal background checks and offence declarations.

If required by the Board, the Vendor will provide to the Board, or designate, a Criminal Background check for pertinent individuals covering offences under the Criminal Code, the Controlled Drugs and Substances Act, and any other offences

which would be revealed by a search of the automated Criminal Records Retrieval System.

An Offence Declaration on a Board-approved form for every employee of the Bidder who may come in direct contact with Board staff and/or students on a regular basis at any Board site prior to the occurrence and on or before September 1 each year thereafter may be required. Updated Offence Declarations may be required annually. The Board will determine in its sole discretion whether this is a requirement.

Termination of contracts may be the result of non-compliance to this requirement.

4. Bonding Requirements

Bonding is required if the project is equal to or greater than \$200,000.00.

Note: The Bidding System has flagged these fields as mandatory. If your bid is less than \$200,000.00, you may upload a pdf document stating: Not Applicable.

i. Bid Amount

Bonding requirements are based on the total base bid amount INCLUSIVE of ALL applicable taxes.

ii. Bid Deposit Bond & Agreement to Bond

Bid submissions must be accompanied by a bid deposit in the form of a digital Bid Bond in an electronically verifiable and enforceable (e-Bond) format in the amount of 10% of the total base bid (inclusive of HST) made payable to the Waterloo Region District School Board (the "Board") as surety that, if the Bid is accepted, a Contract will be entered into for the proper performance of the work. For more information, contact your surety company or visit the Surety Association of Canada website.

Bid Submissions must be accompanied by an Agreement to Bond in the form of a digital Bond in an electronically verifiable and enforceable (e-Bond), completed and executed by the Bidder's Surety, assuring the successful Contractor shall provide for a Performance Bond for 50% of the total Contract Price, and a Labour and Material Payment Bond for 50% of the total Contract Price.

Bidders shall upload their digital Bid Deposit Bond and Agreement to Bond separately to the Bidding System, in the bid submission files labeled "Bid Deposit Bond" & "Agreement to Bond". If both Bonds are within one (1) document, upload it in both files. All instructions and details for accessing authentication shall be included with the digital Bonds uploaded in the Bidding System. Do not include and/or upload Performance Bond and Labour and Materials Bond in this section.

Bids that do not contain the bid deposit(s) in the required amount will be declared non-compliant and will be rejected. A scanned PDF copy of bonds or original

certified cheque, bank draft, money order, etc. are not acceptable as Bid deposit and will result in your Bid being rejected.

The bid deposit of the Bidder whose submission is accepted shall be forfeited by the Bidder should the Bidder fail to execute a Contract or provide the necessary documents as required within this Bid Solicitation document (including but not necessarily limited to: signed agreement, satisfactory security, insurance certificate, appropriate Workplace Safety and Insurance Board letter of clearance certificate) within the time stipulated as a written notice from the Board.

For bid amounts where Bonding is not requested, the Awarded Bidder agrees to pay to the Board the difference in costs between the bid submitted and the final contract should the Awarded Bidder fail to either execute or deliver the contract documents in accordance with the Bid Solicitation within seven (7) calendar days of written notification of the award of the contract.

iii. Performance and Labour & Materials Bonds

For bid amounts where bonding is required, inclusive of all taxes, the successful Bidder shall provide a digital Bid Performance and Labour and Materials Bond in an electronically verifiable and enforceable (e-Bond) format in the amount(s) of not less than 50% Performance Bond and a 50% Labour and Materials Bond of the total Contract Price made payable to the Waterloo Region District School Board (the 'Board') as surety that, if the Bid is accepted, a Contract will be entered into for the proper performance of the work and extends protection to Subcontractors, Suppliers, and any other persons supplying labour or materials to the Project. For more information, contact your surety company or visit the Surety Association of Canada website.

If the successful Bidder fails to provide a performance bond and/or labour and materials bond when requested, the Board may declare the bid deposit forfeited and the Bidder will be held responsible for any increased costs or damages incurred by the Board. Any Bidder who fails to provide all required documents within the timelines provided, or otherwise fails to enter into an agreement with the Board upon notice of being the successful Bidder may be subject to future bidding constraints by the Board.

Performance bond shall guarantee all conditions as set out in the contract, including proper execution of the work and for all matters for which the successful Bidder is responsible for throughout the two (2) year period of maintenance and warranty.

Any costs associated with performance bond are the responsibility and cost of the Bidder.

Bonds must be submitted through the Bidding System within seven (7) calendar days of receiving the Intent to Award.

5. Insurance

The successful Bidder shall provide, maintain, and pay for the insurance coverages below. Unless otherwise stipulated, the duration of each insurance policy shall be from the date of commencement of the Work until the expiration of the warranty periods set out in the Contract Documents. Prior to commencement of the Work and upon the placement, renewal, amendment, or extension of all or any part of the insurance, the successful Bidder shall promptly provide the Owner with confirmation of coverage and, if required, a certified true copy of the policies certified by an authorized representative of the insurer together with copies of any amending endorsements.

Certificates of Insurance evidencing renewal or replacement of policies shall be uploaded through the Bidding System within 72 hours of the expiration or replacement of the current policies, without demand by the Board.

i) General Liability Insurance

General liability insurance shall be in the name of the *Contractor*, with the *Owner* and the *Consultant* named as Additional insureds, with limits of not less than \$5,000,000.00 inclusive per occurrence for bodily injury, death, and damage to property, including loss of use thereof, for itself and each of its employees, *Subcontractors* and/or agents. The insurance coverage shall not be less than the insurance required by IBC Form 2100, or its equivalent replacement, provided that IBC Form 2100 shall contain the latest edition of the relevant CCDC endorsement form. To achieve the desired limit, umbrella, or excess liability insurance may be used. All liability coverage shall be maintained for completed operations hazards from the date of *Ready-for-Takeover*, as set out in the certificate of *Ready-for-Takeover*, on an ongoing basis for a period of 6 years following *Ready-for-Takeover*. Where the *Contractor* maintains a single, blanket policy, the Addition of the *Owner* and the *Consultant* is limited to liability arising out of the *Project* and all operations necessary or incidental thereto. The policy shall be endorsed to provide the *Owner* with not less than 30 days' notice, in writing, in advance of any cancellation and of change or amendment restricting coverage.

ii) Automobile Liability Insurance

Automobile liability insurance in respect of licensed vehicles shall limits of not less than \$2,000,000.00 inclusive per occurrence for bodily injury, death and damage to property, covering all licensed vehicles owned or leased by the Contractor, and endorsed to provide the Owner with not less than 30 days'

notice, in writing, in advance of any cancellation, change or amendment restricting coverage. Where the policy has been issued pursuant to a government-operated automobile insurance system, the Contractor shall provide the Owner with confirmation of automobile insurance coverage for all automobiles registered in the name of the Contractor.

6. Workplace Safety Insurance Board (WSIB) Certificate

The Board requires all service providers be in full compliance with all requirements imposed upon them by the Workplace Safety Insurance Board. All certificates of training and Safety Policies and Manuals must be available for presentation upon request.

Prior to commencing the services covered by this Bid Solicitation, the Vendor will provide to the Board's a copy of certificates of good standing with the Workplace Safety and Insurance Board ("WSIB Certificates") stating that the consultant and all of its sub consultants have complied with the requirements of the Workplace Safety and Insurance Act and in particular, that all requisite premiums under such Act have been paid. Where the Vendor is exempt from registration with the WSIB, the Vendor must provide evidence of such by way of written confirmation from WSIB.

WSIB Certificate evidencing renewal or replacement of Certificates shall be uploaded through the Bidding System within 72 hours of the expiration or replacement of the current certificate, without demand by the Board.

7. Responsibilities of the Vendor

Acceptance of a purchase order issued by the Board and/or a signed agreement shall constitute a contract (the "Contract") between the Board and the Vendor, which shall bind the Vendor on his part to furnish and deliver the goods, equipment and services at the prices given and in accordance with the conditions of the Bid solicitation document.

The Vendor shall:

- a. perform the Contract in accordance with the specifications, terms and conditions under which it is awarded;
- b. act in a professional manner at all times when dealing with Board staff, with the public, and while working on site;
- c. not, except with the consent of the Board in writing, release information relating to any subsequent order for advertising, promotional or technical purposes or otherwise give it publicly in any fashion, nor shall the name of either of the Board be used for, or in connection with, any advertising or promotional purpose of the Vendor;

- d. treat information gained while working with the Board confidentially and not use it for any other project and return it to the Board if requested;
- e. submit to Finance – Accounts Payable, an invoice for payment at the completion of the Work, unless otherwise stated. All applicable taxes including HST are to be itemized separately on invoices. Include the purchase order number on each invoice; and
- f. provide necessary information if they wish to receive payment by Electronic Funds Transfer (EFT).

8. Compliance with Laws

The Vendor will be required to comply with all applicable federal, provincial laws as well as municipal by-laws in performing its obligations under the Contract including, without limitation, the *Occupational Health and Safety Act*, as amended, and the *Workplace Safety and Insurance Act*, 1997, as amended, and *Accessibility for Ontarians With Disabilities Act*, 2005, S.O. 2005, c.11, Accessibility Standards for Customer Services O. Reg. 429/07 requirements, under the *Accessibility for Ontarians With Disabilities Act*, 2005, as amended, or any successor legislation applicable, and to provide to the Board, upon request, periodic reports and evidences confirming such compliance.

By supplying the goods or equipment and/or providing services, the Vendor warrants that the goods or equipment supplied, and services provided to the Board conforms in all respects to the standards and codes set forth by federal and provincial agencies. Failure to comply with this condition will be considered a breach of this Contract.

The obligations of the parties and resolutions of any disputes shall be governed by and construed in accordance with the laws of the Province of Ontario and the federal laws of Canada, including the Construction Act, as to interpretation and performance, and shall be treated, in all respects, as an Ontario contract. The parties shall attorn to the exclusive jurisdiction of the courts of the Province of Ontario.

9. Indemnification

The Bidder will indemnify and save harmless and defend the Board, and their respective elected officials, officers, employees, agents and their respective successors and assigns, from and against all actions claims and demands whatsoever which may be brought against or made upon any of the Indemnified Parties and against all losses, liability, judgments, claims, costs, demands or expenses which the Indemnified Parties may sustain, suffer, or be put to resulting from or arising out of the Bidder's failure to exercise reasonable care, skill or diligence in the performance or rendering of any Work or service required hereunder to be performed or rendered by the Bidder, its agents, servants, employees or subcontractors, or any of them as well as for the infringement of or use of any intellectual property rights including any copyright or patent arising out of the reproduction or use in any manner of any plans, designs, drawings, specifications,

information, negatives, data, material, sketches, notes, documents, memoranda, or computer software furnished by the Bidder in the performance of this Contract.

10. Non-Assignment

It is mutually agreed and understood that the Bidder shall not assign, transfer, convey, sublet or otherwise dispose of its agreement or its right, title or interest therein, or their power to execute the Contract, to any other person, firm, Bidder or corporation without the previous written consent of the Board.

No assignment by the Bidder shall relieve the Bidder of any responsibility for the full performance of all its' obligations under this contract.

The Bidder shall not change its corporate name without the prior written approval of the Board.

11. Waiver

No term or provision of the Bid Solicitation Document shall be deemed waived and no breach consented to, unless such waiver or consent is in writing and signed by an authorized representative of the party claimed to have waived or consented to the breach. No consent by a party to, or waiver of, a breach under the procurement process shall constitute consent to, waiver of, or excuse for any other, different, or subsequent breach.

The Board does not accept responsibility for any information or any errors or omissions which may be contained in the Bid Solicitation Document or the data, materials or documents disclosed or as provided to the Bidders pursuant to the procurement. The Board make no representation or warranty, either expressed or implied, in fact or in law with respect to the accuracy or completeness of the Bid Solicitation Document or such data, materials or documents and the Board shall not be responsible for any actions, costs, losses or liability whatsoever arising from any Bidder's reliance or use of the Bid Solicitation Document or any other technical or historical data, materials or documents provided by the Board. The Bidder is responsible for obtaining its own independent financial, legal, accounting, and technical advice with respect to any information included in the Bid Solicitation Document or in any data, materials, or documents provided or required by the Board.

12. Volume and Exclusivity

The Board makes no guarantee of value or volume of work to be assigned to the Successful Bidder. Any agreement executed with the Successful Bidder may not be an exclusive contract for the provision of the described goods/services.

13. Payment Terms

The payment terms shall be net twenty-eight days (28) days after receipt of proper invoice where the Construction Act is applicable, unless otherwise agreed by the Board in writing. All other payment terms will reflect Net 30. An early payment discount, if offered, may be considered on a mutual agreement basis. Payment may be delayed if the invoice is incorrect or the goods, equipment and/or services are not acceptable to the Board. The Board will not pay any interest, penalty, or late fee

for delayed payments. The Board preferred payment method is Credit Card or EFT, however alternate payment methods may be approved. Vendors are required to invoice promptly, without delay.

14. Invoice Requirements

All invoices shall be sent to finance-ap@wrdsb.ca.

Invoices must contain the following information and the Proper Invoice Requirements, as per the Construction Act, R.S.O. 1990, c. C.30, Part I.1 Prompt Payment, in order to be deemed complete:

To satisfy the requirements for a Proper Invoice, the following criteria, as may be applicable in each case, must be included with the Contractor's application for payment:

- .1 the written bill or request for payment must be in writing;
- .2 the *Contractor's* name and current address;
- .3 the *Contractor's* HST registration number;
- .4 the date the application for payment was prepared by the *Contractor*;
- .5 the period of time in which the services or materials were supplied to the *Owner*;
- .6 the purchase order number provided by the *Owner*;
- .7 reference to the provisions of the *Contract* under which payment is being sought (e.g. GC 5.3 –PAYMENTS for progress payments, GC 5.4 – SUBSTANTIAL PERFORMANCE OF THE WORK AND PAYMENT OF HOLDBACK GC 5.5 – FINAL PAYMENT for final payment, etc.);
- .8 a description, including quantities where appropriate, of the services or materials, or a portion thereof, that were supplied and form the basis of the *Contractor's* request for payment;
- .9 the amount the *Contractor* is requesting to be paid by the *Owner*, set out in a statement based on the schedule of values approved under GC 5.2.4, separating out any statutory or other holdbacks, set-offs and HST;
- .10 a sworn Statutory Declaration in the form CCDC 9A-2018, only for second and subsequent progress payments;
- .11 a current Workplace Safety Insurance Board clearance certificate;
- .12 a pre-approved schedule of values, supplied by the *Contractor*, for Divisions 1 through 14 of the *Specifications* (or equivalent Construction Specifications Institute Masterformat) of the *Work*, aggregating the total amount of the *Contract Price*, including all supporting invoicing;
- .13 a separate pre-approved schedule of values, supplied by each *Subcontractor*, for each of Division 15, 16, and 17 of the *Specifications* (or equivalent Construction Specifications Institute Masterformat) of the *Work*, aggregating the total amount of the *Contract Price*, including all supporting invoicing;
- .14 invoices and other supporting documentation for all claims against the cash allowance;
- .15 a current, acceptable, and up to date *Construction Schedule Update*;

- .16 if requested by the *Owner*, a current and valid certificate(s) of insurance as required under GC 11.1 – INSURANCE;
- .17 the name, title, telephone number and mailing address of the person at the place of business of the *Contractor* to whom payment is to be directed;
- .18 a current, up to date, and approved *Shop Drawing* log;
- .19 in the case of the *Contractor's* application for final payment, in addition to the foregoing requirements (as applicable):
 - (a) any *Close-Out Documentation*, together with complete and final as-built drawings;
 - (b) the *Contractor's* written request for release of the deficiency holdback, including a statement that no written notices of lien have been received by it;
 - (c) the *Contractor's* written certification that there are no outstanding claims, pending claims or future claims from the *Contractor* or their *Subcontractors* or *Suppliers*; and
 - (d) sufficient evidence of the *Contractor's* compliance with GC 3.11.

15. Ownership of Work

For the purposes of this paragraph:

“ **Deliverables** ” means all material prepared by the Vendor forming the Work under this Contract including, without limitation, all electronic media, reports, documents and instruments of service;

“ **Intellectual Property Rights** ” means any and all rights provided under: (a) patent law; (b) copyright law; (c) trade-mark law; (d) industrial design law; (e) any other statutory provision or common law principle applicable to this Contract, including trade secret law; and (f) any and all registrations and licenses in relation to the foregoing; and

“ **Personnel** ” means employees, representatives, agents and subcontractors.

The Vendor and the Board acknowledge and agree that the development of the Deliverables and the provision of the Work may result in the creation or development of new intellectual property and may contain or utilize the existing intellectual property of the Vendor or of third parties. Accordingly, the Vendor and the Board agree as follows.

- (a) Except as set out in paragraph (b) below, the Vendor hereby assigns and agrees to assign to the Board all right, title and interest, including all Intellectual Property Rights, in and to each Deliverable from the moment of creation, and will cause its Personnel to assign the same. The Vendor will cause its Personnel to waive all moral rights they may have in each Deliverable.
- (b) To the extent that a Deliverable contains or utilizes the intellectual property of the Vendor or a third party (“Retained Materials”), and the Vendor

expressly identifies such Retained Materials, the Vendor and the applicable third party will, subject to the following sentence, retain all of their respective right, title and interest, including all Intellectual Property Rights, which each may have in such Retained Materials. To the extent that a Deliverable contains or utilizes Retained Materials, the Vendor hereby grants to each of the Board a royalty-free, irrevocable, perpetual, world-wide, non-exclusive license to make, use, sell, modify, prepare derivative works, disclose, publish, sublicense, copy and communicate by electronic means such Retained Materials.

- (c) The Vendor agrees to cooperate fully at all times, and will cause its Personnel to cooperate fully at all times, with respect to signing such documents and doing such acts and other things reasonably requested by the Board to confirm the transfer of ownership rights in the Deliverables.

16. Records, Inspection, Audits

The Board will have the right, upon reasonable notice, to full access to the accounts and records of the Vendor in respect of the goods, services and equipment provided by it under the Contract, for the purposes of inspection and/or audit. The Vendor shall make and retain such records during the term of the Contract and for a minimum of seven (7) years following its termination, cancellation, or expiry.

17. Performance

- i. Where the Vendor is in default in carrying out any of its obligations under the contract, the Board may issue a verbal warning outlining the deficiency in supply or other aspects of performance and requiring the Vendor to correct those deficiencies within such period of time as stated.
- ii. If the deficiency is not corrected within the time specified, or there is a further instance of deficient performance, the Board may issue a written notice to the Vendor, identifying the deficiency in performance and setting a final date or time period for its correction.
- iii. If corrective steps are not taken by the final date or within that time, the Board may terminate the Contract and take corrective action.
- iv. Termination of any Contract can be immediate depending on the severity of the default.
- v. The Vendor shall have no right to perform the services contemplated under this agreement beyond the time when such services become unsatisfactory to the Board; and in the event that Vendor shall be discharged before all the services contemplated hereunder have been completed, or the services are for any reason terminated, stopped or discontinued because of the inability of the Vendor to serve under this agreement they shall be paid only for that portion of the Work which shall have been satisfactorily completed at the time of termination.

vi. Where deemed appropriate, a performance evaluation shall be completed by the Board. The evaluation report shall be reviewed with Procurement Services, and a copy of the completed evaluation forwarded to the Vendor for their records.

18. Default

In the event that the Vendor fails to properly, promptly, and fully carry out the Work required by these documents, the Board reserves the right to notify the Vendor to discontinue all Work under this Contract, to advertise for new Bids or carry out the Work in any way as the Board may, in their sole discretion, deem best.

The Vendor further agrees to indemnify and save harmless the Indemnified Parties from all loss, damage, liability, cost, charge or expense whatsoever which it, they or any of them may suffer, incur or be put to by reason of such default or failure.

19. Termination

In the event that the Vendor fails to comply with any provision of this agreement or otherwise fails to perform its obligations hereunder in a competent manner satisfactory to the Board, the Board may give the Vendor notice in writing of such failure. In the event that the Vendor has not remedied its failure within ten (10) working days of the said notice, the Board shall be entitled to exercise any one or more of the following remedies:

- a) The Board may terminate the contract without further notice, and exercise its rights to the Contract security provided by the Vendor;
- b) The Board may withhold any payment due to the Vendor hereunder until the Vendor has remedied its failure;
- c) The Board may engage the services of another Vendor to remedy the Vendor's failure, and obtain reimbursement therefore from the Vendor. The said reimbursement may be obtained either through deduction from any amounts owing to the Vendor hereunder, or through any other legal means available to the Board; or
- d) The Board may assert any other remedy available to it in law or equity.

Unless the Board expressly agrees to the contrary, any failure of the Board to exercise any of the foregoing remedies, or the granting of any extension or indulgences, shall not be prejudicial to any right of the Board to subsequently obtain such remedies.

20. Termination for Convenience

The Board may terminate the Contract, in whole or in part, whenever the Board determine that such termination is in the best interests of the Board without showing cause, upon providing written notice to the Vendor. The Board shall pay all reasonable costs incurred by the Vendor up to the date of termination considering the Work performed and/or services were provided in accordance with the Contract and to the complete satisfaction of the Board. Payment shall be in accordance with prices as per Contract. However, in no event shall the Vendor be paid an amount,

which exceeds the Total Bid Price. The Vendor will not be reimbursed for any profits which may have been anticipated but which have not been earned up to the date of termination.

21. Termination for Lack of Funding

Should the Board fail to appropriate funds to enable payments including multi-year agreements, the Board may cancel the contract without termination charges, provided the Vendor receives thirty (30) days written notice of such termination from the Board.

22. Force Majeure

If either party is delayed in the performance of their obligations under this Contract by Force Majeure, then the Contract Time shall be extended for such reasonable time as the Owner and the Contractor shall agree. The extension of time shall not be less than the time lost as a result of the event causing the delay, unless the parties agree to a shorter extension. Neither party shall be entitled to payment for costs incurred by such delays. Upon reaching agreement on the extension of the Contract Time attributable to the Force Majeure event, the Owner and the Contractor shall execute a Change Order indicating the length of the extension to the Contract Time and confirming that there are no costs payable by the either party for the extension of Contract Time. However, if at the time an event of Force Majeure arises a party is in default of its obligations under the Contract and has received a notice of default pursuant to PART 7 – DEFAULT NOTICE, this paragraph 6.5.3 shall not excuse a party from its obligation to cure the default(s). For greater certainty, the defaulting party, to the extent possible, must continue to address and cure the default notwithstanding an event of Force Majeure.”

Any cause, unknown at the effective date of the Contract and beyond either party’s control, other than financial difficulties, bankruptcy or insolvency, which prevents the performance by a party, or both, of any of their respective obligations under the Contract and the event of Force Majeure did not arise from a party’s default and could not be avoided or mitigated by the exercise of reasonable effort or foresight. Force Majeure includes Labour Disputes; fire; unusual delay by common carriers or unavoidable casualties; delays in obtaining third-party licences, permits, agreements, or approvals (excluding approvals of any Subcontractors or Suppliers of any tier); civil disturbance; emergency acts, orders, legislation, regulations or directives or revoking of funding from any government or other public authority; acts of a public enemy; war; riot; sabotage; blockage; embargo; lightning; earthquake; adverse weather conditions but only if substantially beyond the weather norms of the Place of the Work; acts of God; or declared epidemic or pandemic outbreak or other public health emergency (e.g. SARS, COVID-19)

If in the reasonable opinion of either party to this Contract that performance of the Contract is made impossible by force majeure, then either party shall notify the other in writing and the Board shall either terminate the Contract forthwith without any future payments being made or authorize the Vendor to continue performance of the

Contract with such adjustments as may be required by the existence of the force majeure and agreed upon by both parties.

23. Suspension of Bidders

At the sole discretion of the Manager of Procurement Services, any Bidder may be suspended from consideration for default of delivery, unsatisfactory performance, safety concerns, lobbying or contravention of the Bid Solicitation Document.

24. Bankruptcy

In the event that, during the term of the Contract, the Successful Bidder makes an assignment for the benefit of creditors, or becomes bankrupt or insolvent, or makes a proposal to its creditors, the Contract with the Successful Bidder shall immediately be terminated, and the Board shall be entitled to enter into an agreement with another party without the consent of the Vendor.

25. Dispute Resolution

All disputes arising out of or in connection with this Contract, or in respect of any legal relationship associated with or derived from this Contract, other than with respect to the Board' right to terminate this Contract, shall first be mediated pursuant to the [National Mediation Rules of the ADR Institute of Canada, Inc.](#) Despite this agreement to mediate, the Vendor or the Board may apply to a court of competent jurisdiction or other competent authority for interim measures of protection at any time. All disputes remaining unsettled after mediation shall be arbitrated and finally resolved before a single arbitrator pursuant to the National Arbitration Rules of the ADR Institute of Canada, Inc. The place of mediation and arbitration shall be Toronto, Ontario, Canada. The language of the mediation shall be English.

26. Standard of Behaviour

The Board will not knowingly purchase goods and/or services from Vendors who operate in contravention of local and international laws. If a product and/or service supplied to the Board is discovered to be in contravention, the Board reserves the right to rectify the issue with the Vendor, including the cancellation of the contract.

The Board expects that all employees and Vendors act within the parameters of the [Administrative Procedure 4360 Principles of Business Conduct for Board Employees](#)

27. No Smoking and Scent-Free Environment

The Province of Ontario has legislated under the Smoke Free Ontario Act that smoking is not permitted on any Board owned properties. Furthermore, most Board properties are "scent free". Smoking will not be permitted on-site. Offenders will be asked to leave the site, and infractions could result in corrective action and or fine.

28. Sustainable Purchasing

The procurement needs of the Board represent a significant level of responsibility to demonstrate leadership and support for greener business practices. Integrating

environmental performance and impact into supply chain decisions is a commitment to improvement of the environment and the quality of life.

Green procurement shall be viewed in the context of achieving value for money for the total life-cycle costs. It requires the inclusion of environmental impact considerations into the procurement process, including planning, acquisition, use and disposal. Value for money shall include the consideration of many environmental tangible and intangible factors when determining the total life-cycle costs and environmental impact.

END OF SECTION

00 73 00 “The Supplementary Conditions”

**SUPPLEMENTARY CONDITIONS & AMENDMENTS TO STANDARD
CONSTRUCTION DOCUMENT CCDC2 -2020 STIPULATED PRICE
SUBCONTRACT**

(the “Supplementary Conditions”)

**AGREEMENT, DEFINITIONS, AND
GENERAL CONDITIONS**

The Standard Construction Document CCDC 2 2020 for a Stipulated Price Contract, English version, consisting of the Agreement Between *Owner* and Contractor, Definitions and General Conditions of the Stipulated Price Contract, Parts 1 to 13 inclusive, governing same, together with the changes with the new *Construction Act* is hereby made part of these *Contract Documents*, with the following amendments, additions and modifications:

AGREEMENT BETWEEN OWNER AND CONTRACTOR

ARTICLE A-1 – THE WORK

SC1.1	A-1.3	<p><u>Amend</u> Article A-1.3 by <u>deleting</u> all of the words after “<i>Contract Documents</i>” and <u>replace</u> them with the following”</p> <p>“attain</p> <p>.1 <i>Substantial Performance of the Work</i> by the 25 day of September in the year 2023. .2 (if applicable) <i>Occupancy</i> by the 25 day of August in the year 2023 and .3 <i>Ready-for-Takeover</i> by the 01 day of September in the year 2023.”</p>
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ARTICLE A-3 – CONTRACT DOCUMENTS

SC2.1	A-3.1	<p><u>Add</u> the following documents to the list of <i>Contract Documents</i> in Article A-3.1:</p> <ul style="list-style-type: none"> • Waterloo Region District School Board’s Supplementary Conditions & Amendments to Standard Construction Document CCDC 2-2020 Stipulated Price Subcontract, May 2022 Version, including any Special Supplementary Conditions listed in Appendix 2 thereto • <i>Drawings</i> • <i>Specifications</i> • Performance Bond (Form 32 -Performance Bond under Section 85.1 of the <i>Act</i>) if applicable • Labour and Material Payment Bond (Form 31 – Labour and Material Payment Bond under Section 85.1 of the <i>Act</i>), if applicable
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ARTICLE A-4 – CONTRACT PRICE

SC3.1	A-4.4	<p><u>Delete</u> Article A-4.4 and <u>replace</u> it with the following:</p> <p>“4.4 The <i>Contract Price</i> shall remain fixed for the duration of the <i>Contract Time</i>, subject only to adjustments as provided for in the <i>Contract Documents</i>. For certainty, and without limiting the general application of the preceding sentence, the <i>Contractor</i> assumes all risks in connection with cost increases for overhead, <i>Products</i>, <i>Labour</i>, and <i>Construction Equipment</i> prescribed by the <i>Contract Documents</i> for the performance of the <i>Work</i>, and the <i>Contractor</i> assumes all responsibility for liabilities and additional costs that may arise as a result of the <i>Contractor’s</i> inclusion of any <i>Product</i>, <i>Construction Equipment</i>, <i>Supplier</i>, or <i>Subcontractor</i> in its calculation of the <i>Contract Price</i>.”</p>
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ARTICLE A-5 – PAYMENT

SC4.1	A-5.1	<p><u>Delete</u> Article A- 5.1 in its entirety including all subparagraphs and <u>replace</u> it with the following:</p>
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		<p>"5.1 Subject to the provisions of the <i>Contract Documents</i> and the <i>Construction Act</i>, the <i>Owner</i> shall:</p> <ul style="list-style-type: none"> .1 make progress payments to the <i>Contractor</i> on account of the <i>Contract Price</i> when due together with such <i>Value Added Taxes</i> as may be applicable to such payments, .2 upon <i>Substantial Performance of the Work</i> as certified by the <i>Consultant</i>, and on the 61st day after the publication of the certificate of <i>Substantial Performance of the Work</i>, in accordance with the <i>Construction Act</i>, there being no claims for lien registered against the title to the <i>Place of the Work</i> and no written notices of lien delivered to the <i>Owner</i>, pay the <i>Contractor</i> the unpaid balance of the 10% holdback, together with such <i>Value Added Taxes</i> as may be applicable to such payment, less any amount stated in the <i>Owner's Notice of Non-Payment</i>. .3 after <i>Ready-for-Takeover</i> has been achieved in accordance with the <i>Contract Documents</i> and the <i>Work</i> is complete, there being no claims for lien registered against the title to the <i>Place of the Work</i> and no written notices of lien delivered to the <i>Owner</i>, pay the <i>Contractor</i> any unpaid balance of the <i>Contract Price</i> in accordance with GC 5.5 – FINAL PAYMENT, excluding <i>Deficiency Holdback</i>, together with such <i>Value Added Taxes</i> as may be applicable to such payment."
SC 4.2	A-5.2.1	<p><u>Delete</u> subparagraph 5.2.1 in its entirety and <u>replace</u> it with the following:</p> <p>"1.1 Should either party fail to make payments as they become due under the terms of the <i>Contract</i> or in an award by arbitration or court, interest shall also become due and payable on such unpaid amounts at the prejudgment interest rate prescribed by the <i>Courts of Justice Act</i> (Ontario), as it may change from time to time."</p>

***NEW* ARTICLE A-9 – CONFLICT OF INTEREST**

SC3.1	A-9	<p><u>Add</u> new ARTICLE A-9 CONFLICT OF INTEREST as follows:</p> <p>"ARTICLE A-9 CONFLICT OF INTEREST</p> <ul style="list-style-type: none"> 9.1 The <i>Contractor</i>, <i>Subcontractors</i> and <i>Suppliers</i> and any of their respective advisors, partners, directors, officers, employees, agents, and volunteers shall not engage in any activity or provide any services where such activity or the provision of such services creates a conflict of interest (actually or potentially, in the sole opinion of the <i>Owner</i>) with the provision of the <i>Work</i> pursuant to the <i>Contract</i>. The <i>Contractor</i> acknowledges and agrees that a conflict of interest, as described in this Article A-9, includes, but is not limited to, the use of <i>Confidential Information</i> where the <i>Owner</i> has not specifically authorized such use. 9.2 The <i>Contractor</i> shall disclose to the <i>Owner</i>, in writing, without delay, any actual or potential situation that may be reasonably interpreted as either a conflict of interest or a potential conflict of interest, including the retention of any <i>Subcontractor</i> or <i>Supplier</i> that is directly or indirectly affiliated with or related to the <i>Contractor</i>. 9.3 The <i>Contractor</i> covenants and agrees that it will not hire or retain the services of any employee or previous employee of the <i>Owner</i> where to do so constitutes a breach by such employee or previous employee of the <i>Owner's</i> conflict of interest policy, as it may be amended from time to time, until after completion of the <i>Work</i> under the <i>Contract</i>. 9.4 It is of the essence of the <i>Contract</i> that the <i>Owner</i> shall not have direct or indirect liability to any <i>Subcontractor</i> or <i>Supplier</i>, and that the <i>Owner</i> relies on the maintenance of an arm's-length relationship between the <i>Contractor</i> and its
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		<p><i>Subcontractors and Suppliers.</i> Consistent with this fundamental term of the <i>Contract</i>, the <i>Contractor</i> will not enter into any agreement or understanding with any <i>Subcontractor or Supplier</i>, whether as part of any contract or any written or oral collateral agreement, pursuant to which the parties thereto agree to cooperate in the presentation of a claim for payment against the <i>Owner</i>, directly or through the <i>Contractor</i>, where such claim is, in whole or in part, in respect of a disputed claim by the <i>Subcontractor or Supplier</i> against the <i>Contractor</i>, where the payment to the <i>Subcontractor or Supplier</i> by the <i>Contractor</i> is agreed to be conditional or contingent on the ability to recover those amounts or a portion thereof from the <i>Owner</i>, failing which the <i>Contractor</i> shall be saved harmless from all or a portion of those claims. The <i>Contractor</i> acknowledges that any such agreement would undermine the required arm's-length relationship and constitute a conflict of interest. For greater certainty, the <i>Contractor</i> shall only be entitled to advance claims against the <i>Owner</i> for amounts pertaining to <i>Subcontractor or Supplier</i> claims where the <i>Contractor</i> has actually paid or unconditionally acknowledged liability for those claims or where those claims are the subject of litigation or binding arbitration between the <i>Subcontractor or Supplier</i> and the <i>Contractor</i> has been found liable for those claims.</p>
	9.5	<p>Notwithstanding paragraph 7.1.2 of GC 7.1 - OWNER'S RIGHT TO PERFORM THE WORK, TERMINATE THE CONTRACTOR'S RIGHT TO CONTINUE WITH THE WORK, OR TERMINATE THE CONTRACT, a breach of this Article A-9 by the <i>Contractor</i>, any of the <i>Subcontractors</i>, or any of their respective advisors, partners, directors, officers, employees, agents, and volunteers shall entitle the <i>Owner</i> to terminate the <i>Contract</i>, in addition to any other rights and remedies that the <i>Owner</i> has in the <i>Contract</i>, in law, or in equity."</p>

***NEW* ARTICLE A-10 TIME OF THE ESSENCE**

SC6.1	Article A-10	<p><u>Add</u> the following new Article A-10 as follows:</p> <p>"ARTICLE A-10 TIME OF THE ESSENCE</p> <p>10.1 It is agreed that one of the reasons the <i>Contractor</i> was selected by the <i>Owner</i> for this <i>Contract</i> is the <i>Contractor's</i> representation and covenant that it will attain <i>Substantial Performance, Occupancy</i> (if applicable), and <i>Ready-for-Takeover</i> within the <i>Contract Time</i> stated in Article A-1 of this <i>Contract</i>.</p> <p>10.2 The <i>Contractor</i> acknowledges and agrees that it is responsible to marshal its resources and those of its <i>Subcontractors and Suppliers</i> in a manner which will permit timely attainment of <i>Substantial Performance, Occupancy</i> (if applicable), and <i>Ready-for-Takeover</i>. The <i>Contractor</i> agrees that time is of the essence of this <i>Contract</i>."</p> <p>10.3 The <i>Contractor</i> shall pay to the <i>Owner</i> compensation for all additional costs and damages borne by the Board to cover costs incurred due to delay beyond contract timelines, until <i>Ready-for-Takeover</i> is achieved and certified pursuant to the terms of the <i>Contract</i>. Liquidated damages will be assessed as incurred and amounts will be payable directly to the Board. Additional costs may include, but are not limited to: temporary classrooms, temporary washrooms, additional staff, etc.</p>
SC6.2		

DEFINITIONS

Revisions to Existing Definitions		
SC5.1	Consultant	<p><u>Amend</u> the definition of “Consultant” by <u>adding</u> the following to the end of the definition:</p> <p>“For the purposes of the <i>Contract</i>, the terms “<i>Consultant</i>”, “<i>Architect</i>” and “<i>Engineer</i>” shall be considered synonymous.”</p>
SC5.2	Payment Legislation/Construction Act	<p><u>Delete</u> the Definition of <i>Payment Legislation</i> and replace it with “Construction Act” as follows:</p> <p>“Construction Act</p> <p><i>Construction Act</i> means the <i>Construction Act</i>, R.S.O. 1990, c. C.30, as amended, including all regulations passed under it that are enforceable as of the date of execution of this <i>Contract</i>. For certainty, the first procurement process for the <i>Project</i> (i.e., the “improvement” as that term is defined in the <i>Construction Act</i>) commenced on or after October 1, 2019.”</p>
SC5.3	Ready-for-Takeover	<p><u>Amend</u> the Definition of <i>Ready-for-Takeover</i> by deleting all the words after “as verified” and replacing them with “and approved by the <i>Owner</i>.”</p>
New Definitions		
	Adjudication	<p><u>Add</u> the following definition:</p> <p>“Adjudication</p> <p><i>Adjudication</i> means construction dispute interim adjudication as defined under the <i>Construction Act</i>.”</p>
	Close-Out Documentation	<p><u>Add</u> the following new definition:</p> <p>“Close-Out Documentation</p> <p><i>Close-Out Documentation</i> has the meaning given to it under GC 5.4.2.”</p>
	Confidential Information	<p><u>Add</u> the following definition:</p> <p>“Confidential Information</p> <p><i>Confidential Information</i> means all the information or material of the <i>Owner</i> that is of a proprietary or confidential nature, whether it is identified as proprietary or confidential or not, including but not limited to information and material of every kind and description (such as drawings and move-lists) which is communicated to or comes into the possession or control of the <i>Contractor</i> at any time, but <i>Confidential Information</i> shall not include information that:</p> <ol style="list-style-type: none"> .1 is or becomes generally available to the public without fault or breach on the part of the <i>Contractor</i>, including without limitation breach of any duty of confidentiality owed by the <i>Contractor</i> to the <i>Owner</i> or to any third party, but only after that information becomes generally available to the public; .2 the <i>Contractor</i> can demonstrate to have been rightfully obtained by the <i>Contractor</i> from a third party who had the right to transfer or disclose it to the <i>Contractor</i> free of any obligation of confidence;

		<p>.3 the <i>Contractor</i> can demonstrate to have been rightfully known to or in the possession of the <i>Contractor</i> at the time of disclosure, free of any obligation of confidence; or</p> <p>.4 is independently developed by the <i>Contractor</i> without use of any <i>Confidential Information</i>.”</p>
	Construction Schedule	<p><u>Add</u> the following definition:</p> <p>“Construction Schedule <i>Construction Schedule</i> means the schedule for the performance of the <i>Work</i> provided by the <i>Contractor</i>, and approved by the <i>Owner</i>, pursuant to GC 3.4.1, including any amendments to the <i>Construction Schedule</i> made pursuant to the <i>Contract Documents</i>.”</p>
	Construction Schedule Update	<p><u>Add</u> the following definition:</p> <p>“Construction Schedule Update <i>Construction Schedule Update</i> means an update to the <i>Construction Schedule</i> by the <i>Contractor</i> using Microsoft Project (or other approved scheduling software) that accurately depicts the progress of the <i>Work</i> relative to the critical path established in the <i>Construction Schedule</i> approved in GC 3.5.1 (or any approved successor <i>Construction Schedule</i>), aligns with the currently approved date for <i>Substantial Performance of the Work</i>, shows up-to-date projected major activity sequences and durations, and shows any changes or delays in anticipated completion dates of major activities in the <i>Work</i> relative to the last <i>Construction Schedule Update</i>, and includes the following minimum deliverables:</p> <p style="padding-left: 40px;">(a) a record version of the updated <i>Construction Schedule</i> in .pdf format;</p> <p style="padding-left: 40px;">(b) an editable copy of the updated original digital file of the <i>Construction Schedule</i> (e.g., .mpp format files for Microsoft Project).”</p>
	Deficiency Holdback	<p><u>Add</u> the following definition:</p> <p>Deficiency Holdback - a value applied to the total contract value to cover the cost of completing deficiencies in, or correcting defects in The Work.</p>
	Direct Costs	<p><u>Add</u> the following definition:</p> <p>“Direct Costs <i>Direct Costs</i> are the reasonable costs of performing the contract or subcontract including costs related to the additional supply of services or materials (including equipment rentals), insurance and surety bond premiums, and costs resulting from seasonal conditions, that would not have been incurred, but do not include indirect damages suffered, such as loss of profit, productivity or opportunity, or any head office overhead costs.”</p>
	EFT	<p><u>Add</u> the following definition:</p> <p>“EFT <i>EFT</i> has the definition given to it under GC 5.3.2.”</p>

	Excess Soil	<p><u>Add</u> the following definition:</p> <p>“Excess Soil <i>Excess Soil</i> means “excess soil” as that term is defined under section 3 of the <i>Excess Soil Regulation</i>.”</p>
	Excess Soil Regulation	<p><u>Add</u> the following Definition:</p> <p>“Excess Soil Regulation <i>Excess Soil Regulation</i> means O. Reg. 406/19: On-Site and Excess Soil Management to the <i>Environmental Protection Act</i>, R.S.O. 1990, c. E.19.”</p>
	Final Pre-Invoice Submission Meeting	<p><u>Add</u> the following ne definition:</p> <p>“Final Pre-Invoice Submission Meeting <i>Final Pre-Invoice Submission Meeting</i> has the meaning given to it in GC 5.5.1.”</p>
	Force Majeure	<p><u>Add</u> the following definition:</p> <p>“Force Majeure</p> <p><i>Force Majeure</i> means any cause, unknown at the effective date of the <i>Contract</i> and beyond either party’s control, other than financial difficulties, bankruptcy or insolvency, which prevents the performance by a party, or both, of any of their respective obligations under the <i>Contract</i> and the event of <i>Force Majeure</i> did not arise from a party’s default and could not be avoided or mitigated by the exercise of reasonable effort or foresight. <i>Force Majeure</i> includes <i>Labour Disputes</i>; fire; unusual delay by common carriers or unavoidable casualties; delays in obtaining third-party licences, permits, agreements, or approvals (excluding approvals of any <i>Subcontractors</i> or <i>Suppliers</i> of any tier); civil disturbance; emergency acts, orders, legislation, regulations or directives or revoking of funding from any government or other public authority; acts of a public enemy; war; riot; sabotage; blockage; embargo; lightning; earthquake; adverse weather conditions but only if substantially beyond the weather norms of the <i>Place of the Work</i>; acts of God; or declared epidemic or pandemic outbreak or other public health emergency (e.g. SARS, COVID-19).”</p>
	Install	<p><u>Add</u> the following definition:</p> <p>“Install</p> <p><i>Install</i> means install and connect. <i>Install</i> has this meaning whether or not the first letter is capitalized.”</p>
	Labour Dispute	<p><u>Add</u> the following definition:</p> <p>“Labour Dispute</p> <p><i>Labour Dispute</i> means any lawful or unlawful labour problems, work stoppage, labour disruption, strike, job action, slow down, lock-outs, picketing, refusal to work or continue to work, refusal to supply materials, cessation or work or other labour controversy which does, or might, affect the <i>Work</i>.”</p>
	Notice of Non-Payment	<p><u>Add</u> the following definition:</p> <p>“Notice of Non-Payment</p>

		<i>Notice of Non-Payment</i> means a notice of non-payment of holdback (Form 6) or a notice of non-payment (Form 1.1) under the <i>Act</i> , as applicable to the circumstances.”
	OHSA	<u>Add the following definition:</u> “OHSA <i>OHSA</i> means the <i>Occupational Health and Safety Act</i> , R.S.O. 1990, c. O.1, as amended, including all regulations thereto.”
	Overhead	<u>Add the following definition:</u> “Overhead <i>Overhead</i> means all site and head office operations and facilities, all site and head office administration and supervision; all duties and taxes for permits and licenses required by the authorities having jurisdiction at the <i>Place of the Work</i> ; all requirements of Division 1, including but not limited to submittals, warranty, quality control, calculations, testing and inspections; meals and accommodations; and, tools, expendables and clean-up costs.”
	Payment Period	<u>Add the following definition:</u> “Payment Period <i>Payment Period</i> has the definition given to it under GC 5.2.1.”
	Pre-Invoice Submission Meeting	<u>Add the following definition:</u> “Pre-Invoice Submission Meeting <i>Pre-Invoice Submission Meeting</i> has the definition given to it under GC 5.2.1.”
	Proper Invoice	<u>Add the following definition:</u> “Proper Invoice <i>Proper Invoice</i> means a “proper invoice” as that term is defined in Section 6.1 of the <i>Act</i> , including the minimum requirements set out in Appendix “1” of the Supplementary Conditions.”
	Proper Invoice Submission Date	<u>Add the following definition:</u> “Proper Invoice Submission Date <i>Proper Invoice Submission Date</i> has the definition given to it under GC 5.2.2.1.”
	Request for Information (RFI)	<u>Add the following definition:</u> “Request for Information (RFI) <i>Request for Information</i> or <i>RFI</i> means written documentation sent by the <i>Contractor</i> to the <i>Owner</i> or to the <i>Owner’s</i> representative or the <i>Consultant</i> requesting written clarification(s) and/or interpretation(s) of the <i>Drawings</i> and/or <i>Specifications</i> , <i>Contract</i> requirements and/or other pertinent information required to complete the <i>Work</i> of the <i>Contract</i> without applying for a change or changes to the <i>Work</i> .”
	Restricted Period	<u>Add the following definition:</u>

		<p>“Restricted Period</p> <p><i>Restricted Period</i> means the (inclusive) period of time between December 1 to January 8 and August 15 to September 15 of any given year throughout the duration of the <i>Contract</i>.”</p>
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GENERAL CONDITIONS OF THE STIPULATED PRICE CONTRACT

Where a General Condition or paragraph of the General Conditions of the *Contract* is deleted by these amendments, the numbering of the remaining General Conditions or paragraphs shall remain unchanged, unless stated otherwise herein, and the numbering of the deleted item will be retained, unused.

PART 1 GENERAL PROVISIONS

GC 1.1 CONTRACT DOCUMENTS

SC5.1	1.1.3	<p><u>Delete</u> GC 1.1.3 in its entirety and <u>replace</u> it with the following:</p> <p>“1.1.3 The <i>Contractor</i> shall review the <i>Contract Documents</i> and shall report promptly to the <i>Consultant</i> any error, inconsistency, or omission the <i>Contractor</i> may discover. Such review by the <i>Contractor</i> shall be undertaken with the standard of care described in GC 3.13.1. Except for its obligation to make such a review and report the result, the <i>Contractor</i> does not assume any responsibility to the <i>Owner</i> or to the <i>Consultant</i> for the accuracy of the <i>Contract Documents</i>. Provided it has exercised the degree of care and skill described in this GC 1.1.3, the <i>Contractor</i> shall not be liable for damage or costs resulting from such errors, inconsistencies, or omissions in the <i>Contract Documents</i>, which the <i>Contractor</i> could not reasonably have discovered through the exercise of the required standard of care.”</p>
SC5.2	1.1.4	<p><u>Delete</u> GC 1.1.4 in its entirety and <u>replace</u> it with the following:</p> <p>“1.1.4 Except for the obligation to complete the review prescribed in GC 1.1.3, and report the results as set out in this GC 1.1.4, the <i>Contractor</i> is not responsible for errors, omissions or inconsistencies in the <i>Contract Documents</i>. If there are errors, omissions or inconsistencies discovered by or made known to the <i>Contractor</i> as part of its review under GC 1.1.3 or at any time during the performance of the <i>Work</i>, the <i>Contractor</i> shall immediately notify the <i>Consultant</i>, and request instructions, a <i>Supplemental Instruction</i>, <i>Change Order</i>, or <i>Change Directive</i>, as the case may require, and shall not proceed with the <i>Work</i> affected until the <i>Contractor</i> has received corrected or additional information from the <i>Consultant</i>. The <i>Contractor</i> shall not be liable for damage or costs resulting from such errors, inconsistencies, or omissions in the <i>Contract Documents</i>, which the <i>Contractor</i> could not reasonably have discovered through the exercise of care and skill described in GC 3.13.”</p>
	1.1.5.1	<p><u>Delete</u> GC 1.1.5.1 and <u>replace</u> with the following:</p> <p>“.1 the order of priority of documents, from highest to lowest, shall be:</p> <ul style="list-style-type: none"> .1 Supplementary Conditions; .2 the Agreement between the Owner and the Contractor; .3 the Definitions; .4 the General Conditions; .5 Division 01 of the <i>Specifications</i> .6 technical <i>Specifications</i>; .7 material and finishing schedules; and

		.8 the <i>Drawings</i> .
	1.1.5.5	Delete GC 1.1.5.5 and <u>replace</u> with the following: “.5 Noted materials and annotations on the <i>Drawings</i> shall govern over the graphic representation of the <i>Drawings</i> .”
	1.1.5.6 to 1.1.5.8	<u>Add</u> the following new GC 1.1.5.6 to 1.1.5.8 as follows: “.6 Finishes in the room finish schedules shall govern over those shown on the <i>Drawings</i> . .7 Architectural drawings shall have precedence over structural, plumbing, mechanical, electrical and landscape drawings insofar as outlining, determining and interpreting conflicts over the required design intent of all architectural layouts and architectural elements of construction, it being understood that the integrity and installation of the systems designed by the <i>Consultant</i> or its sub- <i>Consultants</i> are to remain with each of the applicable drawing disciplines. .8 Should reference standards contained in the <i>Specifications</i> conflict with the <i>Specifications</i> , the <i>Specifications</i> shall govern. Should reference standards and <i>Specifications</i> conflict with each other or if certain requirements of the <i>Specifications</i> conflict with other requirements of the <i>Specifications</i> , the more stringent requirements shall govern.”
	1.1.9	<u>Add</u> the following to the end of GC 1.1.9: “The <i>Specifications</i> are divided into divisions and sections for convenience but shall be read as a whole and neither such division nor anything else contained in the <i>Contract Documents</i> will be construed to place responsibility on the <i>Owner</i> or the <i>Consultant</i> to settle disputes among the <i>Subcontractors</i> and <i>Suppliers</i> with respect to such divisions. The <i>Drawings</i> are, in part, diagrammatic and are intended to convey the scope of the <i>Work</i> and indicate general and appropriate locations, arrangements and sizes of fixtures, equipment, outlets and other elements. The <i>Contractor</i> shall obtain more accurate information about the locations, arrangements and sizes from study and coordination of the <i>Drawings</i> , including <i>Shop Drawings</i> and shall become familiar with conditions and spaces affecting those matters before proceeding with the <i>Work</i> . Where site conditions require reasonable minor changes where the change requires only the additional labour two hours or less, the <i>Contractor</i> shall make such changes at no additional cost to the <i>Owner</i> . Similarly, where known conditions or existing conditions interfere with new installation and require relocation, the <i>Contractor</i> shall include such relocation in the <i>Work</i> . The <i>Contractor</i> shall arrange and install fixtures and equipment in such a way as to conserve as much headroom and space as possible. The schedules are those portions of the <i>Contract Documents</i> , wherever located and whenever issued, which compile information of similar content and may consist of drawings, tables and/or lists.”
	1.1.13	<u>Add</u> new paragraphs 1.1.13 as follows: 1.1.13 The <i>Contractor</i> shall keep one copy of the current <i>Contract Documents</i> , <i>Supplemental Instructions</i> , contemplated <i>Change Orders</i> , <i>Change Orders</i> , <i>Change Directives</i> , cash allowance disbursement authorizations, reviewed <i>Shop Drawings</i> , submittals, reports and records of meeting at the <i>Place of the Work</i> , in good order and available to the <i>Owner</i> and <i>Consultant</i> .”

GC 1.3 RIGHTS AND REMEDIES

SC6.1	1.3.2	In paragraph 1.3.2 <u>delete</u> the word “No” from the beginning of the paragraph and <u>replace</u> it with the words:
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		"Except with respect to the requirements set out in paragraphs 6.4.1, 6.5.4, 6.6.1 and 8.3.2, no..."
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***NEW* GC 1.5 EXAMINATION OF DOCUMENTS AND SITE**

SC8.1	1.5	<p><u>Add</u> new GC 1.5 – EXAMINATION OF DOCUMENTS AND SITE as follows:</p> <p>"GC 1.5 EXAMINATION OF DOCUMENTS AND SITE</p> <p>1.5.1 The <i>Contractor</i> declares and represents that in tendering for the <i>Work</i>, and in entering into a <i>Contract</i> with the <i>Owner</i> for the performance of the <i>Work</i>, it has investigated for itself the character of the <i>Work</i> to be done, based on information generally available from a visit to the <i>Place of the Work</i> and to the standard set out under GC 3.14.1 and further represents and warrants and acknowledges that it considered and took into account in the <i>Contract Price</i> all reasonably known impacts and restrictions arising from the COVID-19 pandemic, including without limitation corresponding legislative changes that may impact performance of the <i>Project</i>, various weather conditions that may affect the <i>Work</i>, the availability of supplies and labour or other conditions or risks that the <i>Contractor</i> knew about or reasonably ought to have known about prior to the date of the <i>Contract</i>. The <i>Contractor</i> has assumed and does hereby assume all risk of known conditions now existing or arising in the course of the <i>Work</i> which might or could make the <i>Work</i>, or any items thereof more expensive in character, more onerous to fulfill than was contemplated or known when the tender was made or the <i>Contract</i> signed.</p> <p>1.5.2 The <i>Contractor</i> also declares that prior to commencement of the <i>Work</i>, where in tendering for the <i>Work</i> and in entering into this <i>Contract</i>, the <i>Contractor</i> relied upon information furnished by the <i>Owner</i> or any of its agents or servants respecting the nature or confirmation of the ground at the site of the <i>Work</i>, the <i>Contractor</i> shall review to the standard specified in GC 3.14.1, the accuracy of the information furnished by the <i>Owner</i>. If a condition is materially different than what is stated in the information furnished by the <i>Owner</i>, the <i>Contractor</i> shall, no later than five (5) <i>Working Days</i> after the first observation of such condition(s), deliver to the <i>Owner</i> and to the <i>Consultant</i> a <i>Notice in Writing</i> specifying the materially different condition and the <i>Contractor</i> shall not proceed with the affected part of the <i>Work</i> until receiving written direction from the <i>Owner</i> or the <i>Consultant</i>. Where the <i>Contractor</i> fails to provide prompt <i>Notice in Writing</i> in accordance with this GC 1.5.2, the <i>Contractor</i> expressly waives and releases the <i>Owner</i> from all claims with respect to the said information with respect to the <i>Work</i>.</p>
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PART 2 ADMINISTRATION OF THE CONTRACT

GC 2.2 ROLE OF THE CONSULTANT

SC11.1	2.2.5	<p><u>Delete</u> paragraph 2.2.4 and <u>replace</u> it with the following:</p> <p>"2.2.4 Upon receipt of an application for payment that satisfies the requirement of a <i>Proper Invoice</i>, based on the <i>Consultant's</i> observations and evaluation of the <i>Contractor's</i> application for payment, the <i>Consultant</i> will determine the amounts owing to the <i>Contractor</i> under the <i>Contract</i> and will issue certificates for payment as provided in Article A-5 - PAYMENT, GC 5.3 - PAYMENT, GC 5.4 SUBSTANTIAL PERFORMANCE OF THE WORK AND PAYMENT OF HOLDBACK, and GC 5.5 - FINAL PAYMENT. If the <i>Consultant</i> determines that the amount payable to the <i>Contractor</i> differs from the amount stated in a <i>Proper Invoice</i>, the <i>Consultant</i> shall notify the <i>Owner</i> as provided in GC 5.3.1.2 and prepare a draft of the applicable <i>Notice of Non-Payment</i> for the amount in dispute."</p>
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	2.2.6	In the first sentence of paragraph 2.2.6, <u>delete</u> the words “Except with respect to GC 5.1 – FINANCING INFORMATION REQUIRED OF THE OWNER”.
	2.2.12	At paragraph 2.2.12, <u>insert</u> the following at end of that paragraph: “If, in the opinion of the <i>Contractor</i> , the <i>Supplemental Instruction</i> involves an adjustment in the <i>Contract Price</i> or in the <i>Contract Time</i> , it shall, within ten (10) <i>Working Days</i> of receipt of a <i>Supplemental Instruction</i> , provide the <i>Consultant</i> with a notice in writing to that effect. Failure to provide written notification within the time stipulated in this paragraph 2.2.12 shall be deemed an acceptance of the <i>Supplemental Instruction</i> by the <i>Contractor</i> , without any adjustment in the <i>Contract Price</i> or <i>Contract Time</i> .”

GC 2.3 REVIEW AND INSPECTION OF THE WORK

SC10.1	2.3.2	<u>Amend</u> paragraph 2.3.2 by <u>adding</u> the words “and <i>Owner</i> ” after the words “ <i>Consultant</i> ” in the second and third lines.
	2.3.3	<u>Delete</u> paragraph 2.3.3 in its entirety and <u>replace</u> it with the following: “2.3.3 The <i>Contractor</i> shall furnish promptly two copies to the <i>Consultant</i> and one copy to the <i>Owner</i> of all certificates and inspection reports relating to the <i>Work</i> .”
	2.3.4	In paragraph 2.3.4 <u>add</u> the word “review” after the word “inspections” in the first and second lines of paragraph 2.3.4.
	2.3.5	In paragraph 2.3.5 in the first line after the word “ <i>Consultant</i> ”, <u>add</u> “or the <i>Owner</i> ”.
	2.3.8	<u>Add</u> a new paragraph 2.3.8 as follows: “2.3.8 The <i>Consultant</i> will conduct periodic reviews of the <i>Work</i> in progress, to determine general conformance with the requirements of the <i>Contract Documents</i> . Such reviews, or lack thereof, shall not give rise to any claims by the <i>Contractor</i> in connection with construction means, methods, techniques, sequences and procedures, nor in connection with construction safety at the <i>Place of Work</i> , responsibility for which belongs exclusively to the <i>Contractor</i> .”

GC 2.4 DEFECTIVE WORK

SC11.1	2.4.1	<u>Amend</u> GC 2.4.1 by inserting “, the <i>Owner</i> and/or its agent” in the first sentence following “rejected by the <i>Consultant</i> ”.
	2.4.1.1 to 2.4.1.2	<u>Add</u> new paragraphs 2.4.1.1 and 2.4.1.2 as follows: “2.4.1.1 The <i>Contractor</i> shall rectify, in a manner acceptable to the <i>Consultant</i> and to the <i>Owner through the Consultant</i> all defective work and deficiencies throughout the <i>Work</i> , whether or not they are specifically identified by the <i>Consultant</i> . 2.4.1.2 The <i>Contractor</i> shall prioritize the correction of any defective work, which, in the sole discretion of the <i>Owner through the Consultant</i> , adversely affects the day to day operations of the <i>Owner</i> or which, in the sole discretion of the <i>Consultant</i> , adversely affects the progress of the <i>Work</i> .”
	2.4.2	<u>Delete</u> paragraph 2.4.2 in its entirety and <u>replace</u> it with the following: “2.4.2 The <i>Contractor</i> shall promptly pay the <i>Owner</i> for costs incurred by the <i>Owner</i> , the <i>Owner’s</i> own forces or the <i>Owner’s</i> other contractors, for work destroyed or

		damaged or any alterations necessitated by the <i>Contractor's</i> removal, replacement or re-execution of defective work."
	2.4.4	<u>Add</u> new paragraph 2.4.4 as follows: "2.4.4 Neither acceptance of the <i>Work</i> by the <i>Consultant</i> or the <i>Owner</i> , nor any failure by the <i>Consultant</i> or the <i>Owner</i> to identify, observe or warn of defective <i>Work</i> or any deficiency in the <i>Work</i> shall relieve the <i>Contractor</i> from the sole responsibility for rectifying such defect or deficiency at the <i>Contractor's</i> sole cost, even where such failure to identify, observe or warn is negligent."

PART 3 EXECUTION OF THE WORK

GC 3.1 CONTROL OF THE WORK

SC12.1	3.1.2	Amend paragraph 3.1.2 by <u>inserting</u> the words "Construction Schedule" after the word "sequences".
SC12.2	3.1.3 & 3.1.4	<u>Add</u> new paragraphs 3.1.3 and 3.1.4 as follows: "3.1.3 Prior to commencing individual procurement, fabrication and construction activities, the <i>Contractor</i> shall verify at the <i>Place of the Work</i> , all relevant measurements and levels necessary for proper and complete fabrication, assembly and installation of the <i>Work</i> and shall further carefully compare such field measurements and conditions with the requirements of the <i>Contract Documents</i> . Where dimensions are not included or exact locations are not apparent, the <i>Contractor</i> shall immediately notify the <i>Consultant</i> in writing and obtain written instructions from the <i>Consultant</i> before proceedings with any part of the affected <i>Work</i> . 3.1.4 Notwithstanding the provisions of paragraphs 3.1.1 and 3.1.2, the <i>Owner</i> shall have access to the site at all times to monitor all aspects of construction. Such access shall in no circumstances affect the obligations of the <i>Contractor</i> to fulfill its contractual obligations."

GC 3.2 CONSTRUCTION BY OWNER OR OTHER CONTRACTORS

SC13.1	3.2.2.1	<u>Delete</u> subparagraph 3.2.2.1 and <u>replace</u> it with "[Intentionally left blank]".
	3.2.3.2	<u>Delete</u> subparagraph 3.2.3.2 and <u>replace</u> it with the following: ".2 co-ordinate and schedule the activities and work of other contractors and the <i>Owner's</i> own forces, including where other contractors or the <i>Owner's</i> own forces are used after the <i>Owner</i> and the <i>Contractor</i> cannot reach agreement on the value of a change, with the <i>Work</i> of the <i>Contractor</i> and connect as specified or shown in the <i>Contract Documents</i> ."
	3.2.3.4	<u>Delete</u> the period at the end of subparagraph 3.2.3.4 and <u>replace</u> it with a semicolon.
	3.2.3.5	<u>Add</u> new subparagraph 3.2.3.5 as follows: ".5 Subject to GC 9.4 CONSTRUCTION SAFETY, for the <i>Owner's</i> own forces and for other contractors, assume overall responsibility for compliance with all aspects of the applicable health and safety legislation in force at the <i>Place of the Work</i> , including all of the responsibilities of the "constructor", pursuant to the <i>OHSA</i> ."

GC 3.3 TEMPORARY WORK

SC14.1	3.3.2	In paragraph 3.3.2, in the second line after the words “where required by law”, insert “or by the <i>Consultant</i> ”.
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GC 3.4 CONSTRUCTION SCHEDULE

SC17.1	3.4.1	<p><u>Delete</u> GC 3.4.1 in its entirety and <u>replace</u> it with the following:</p> <p>“3.4.1 The <i>Contractor</i> shall:</p> <ol style="list-style-type: none"> 1 within five (5) calendar days of receiving written confirmation of the award of the <i>Contract</i>, prepare and submit to the <i>Owner</i> and the <i>Consultant</i> for their review and approval, a construction schedule in the format indicated below that indicates the timing of the activities of the <i>Work</i> and provides sufficient detail of the critical events and their inter-relationship to demonstrate the <i>Work</i> will be performed in conformity with the <i>Contract Time</i> and in accordance with the <i>Contract Documents</i>. Such schedule is to include a delivery schedule for <i>Products</i> whose delivery is critical to the schedule for the <i>Work</i> or are required by the <i>Contract</i> to be included in a <i>Products</i> delivery schedule. The <i>Contractor</i> shall employ construction scheduling software, being the latest version of “Microsoft Project”, that permits the progress of the <i>Work</i> to be monitored in relation to the critical path established in the schedule. The <i>Contractor</i> shall provide such schedule and any successor or revised schedules in both original digital file format (e.g., .mpp format for Microsoft Project), portable data file (PDF) format, and hard copy. Once accepted by the <i>Owner</i> and the <i>Consultant</i>, the construction schedule submitted by the <i>Contractor</i> shall become the baseline “Construction Schedule”; .2 provide the expertise and resources, such resources including manpower equipment and tools, as are necessary on a best efforts basis to maintain progress under the accepted baseline <i>Construction Schedule</i> or revised construction schedule accepted by the <i>Owner</i> pursuant to GC 3.4 CONSTRUCTION SCHEDULE, which includes without limitation, the <i>Contractor</i>’s use of all possible and, if necessary, extraordinary measures, to bring the progress of the <i>Work</i> into compliance with the <i>Construction Schedule</i>, such as (i) increasing the presence of its own forces at the <i>Place of the Work</i>; (ii) directing any <i>Subcontractors</i> or <i>Suppliers</i> to increase their labour forces and equipment; (iii) working overtime and extra shifts; and (iv) providing any additional supervision and coordination of the <i>Project</i>, all at the <i>Contractor</i>’s own cost and expense save and except where GC 6.5.1, 6.5.2, or 6.5.3 apply; and, .3 monitor the progress of the <i>Work</i> on a weekly basis relative to the baseline <i>Construction Schedule</i>, or any revised <i>Construction Schedule</i> accepted by the <i>Owner</i> pursuant to GC 3.4 CONSTRUCTION SCHEDULE, deliver a <i>Construction Schedule Update</i> to the <i>Consultant</i> and <i>Owner</i> with each application for payment, at a minimum, or as may be reasonably required by the <i>Consultant</i> and advise the <i>Consultant</i> and the <i>Owner</i> weekly in writing of any variation from the baseline or slippage in the schedule; and, .4 if after applying the expertise and resources required under paragraph 3.4.1.2, the <i>Contractor</i> forms the opinion that the slippage in schedule reported in paragraph 3.4.1.3 cannot be recovered by the <i>Contractor</i>, it shall, in the same notice provided under paragraph 3.4.1.3, indicate to the <i>Consultant</i> if the <i>Contractor</i> intends to apply
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		<p>for an extension of <i>Contract Time</i> as provided in PART 6 —CHANGES IN THE WORK; and,</p> <p>.5 ensure that the <i>Contract Price</i> shall include all costs required to phase or stage the <i>Work</i>.”</p>
	3.4.2	<p><u>Add</u> new GC 3.4.2 and GC 3.4.3 as follows:</p> <p>“3.4.2 If, at any time, it should appear to the <i>Owner</i> or the <i>Consultant</i> that the actual progress of the <i>Work</i> is behind schedule or is likely to become behind schedule, or if the <i>Contractor</i> has given notice of such to the <i>Owner</i> or the <i>Consultant</i> pursuant to GC 3.4.1.3, the <i>Contractor</i> shall, either at the request of the <i>Owner</i> or the <i>Consultant</i>, or following giving notice pursuant to GC 3.4.1.3, take appropriate steps to cause the actual progress of the <i>Work</i> to conform to the schedule or minimize the resulting delay. Within 5 calendar days of the request by the <i>Owner</i> or the <i>Consultant</i> or the notice being given pursuant to GC 3.4.1.3, the <i>Contractor</i> shall produce and present to the <i>Owner</i> and the <i>Consultant</i> a plan demonstrating how the <i>Contractor</i> will recover the performance of the <i>Work</i> to align with the currently approved <i>Construction Schedule</i>.</p> <p>3.4.3 The <i>Contractor</i> shall not amend the <i>Construction Schedule</i> without the prior written consent of the <i>Owner</i>.. Any revisions to the <i>Construction Schedule</i> approved by the <i>Owner</i> shall not be deemed to be an extension of the <i>Contract Time</i>. All requests by the <i>Contractor</i> for a revision to the <i>Construction Schedule</i> that include an extension to the <i>Contract Time</i> must be approved by the <i>Owner</i> through an executed <i>Change Order</i>.”</p>

GC 3.5 SUPERVISION

SC17.1	3.5.1	<p><u>Delete</u> GC 3.5.1 and <u>replace</u> it with the following:</p> <p>“3.5.1 The <i>Contractor</i> shall employ a competent full-time superintendent, acceptable to the <i>Owner</i> and <i>Consultant</i>, who shall be in full time attendance at the <i>Place of the Work</i> while the <i>Work</i> is being performed. The superintendent shall not be changed by the <i>Contractor</i> without valid reason which shall be provided in writing and shall not be changed without prior consultation with and agreement by the <i>Owner</i> and the <i>Consultant</i>. The <i>Contractor</i> shall replace the superintendent within 7 <i>Working Days</i> of the <i>Owner</i>’s written notification, if the superintendent’s performance is not acceptable to the <i>Owner</i>. The <i>Contractor</i> shall provide the <i>Owner</i> and the <i>Consultant</i> with the names, addresses and telephone numbers of the superintendent referred to in this GC 3.5.1 and other responsible persons who may be contacted for emergency and other reasons during non-working hours. .”</p>
	3.5.2	<p><u>Delete</u> GC 3.5.2 and <u>replace</u> it with the following:</p> <p>“3.5.2 The superintendent, and any project manager appointed by the <i>Contractor</i>, shall represent the <i>Contractor</i> at the <i>Place of the Work</i> and shall have full authority to act on written instructions given by the <i>Consultant</i> and/or the <i>Owner</i>. Instructions given</p>

		to the superintendent or the project manager shall be deemed to have been given to the <i>Contractor</i> and both the superintendent and any project manager shall have full authority to act on behalf of the <i>Contractor</i> and bind the <i>Contractor</i> in matters related to the <i>Contract</i> .”
	3.5.3 to 3.5.6	<p><u>Add</u> new GC 3.5.3, 3.5.4, 3.5.5 and 3.5.6 as follows:</p> <p>“3.5.3 The <i>Owner</i> may, at any time during the course of the <i>Work</i>, request the replacement of the appointed representative(s). Immediately upon receipt of the request, the <i>Contractor</i> shall make arrangements to appoint an acceptable replacement, which is approved by the <i>Owner</i>.</p> <p>3.5.4 The supervisory staff assigned to the <i>Project</i> shall also be fully competent to implement efficiently all requirements for scheduling, coordination, field engineering, reviews, inspections and submittals defined in the <i>Specifications</i>, and have a minimum 5 years documented “Superintendent/Project Management” experience.</p> <p>3.5.5 The <i>Consultant and Owner</i> shall reserve the right to review the record of experience and credentials of supervisory staff assigned to the <i>Project</i> prior to commencement of the <i>Work</i>.</p> <p>3.5.6 A superintendent assigned to the <i>Work</i> shall be “Gold Seal Certified” as per the Canadian Construction Association; or a superintendent that can demonstrate the requisite experience and success related to the <i>Project</i> to the sole satisfaction of the <i>Owner</i>.”</p>

GC 3.6 SUBCONTRACTORS AND SUPPLIERS

SC18.1	3.6.1.1	In paragraph 3.6.1.1 <u>add</u> to the end of the second line the words “including any warranties and service agreements which extend beyond the term of the <i>Contract</i> .”
	3.6.1.2	In subparagraph 3.6.1.2 after the words “the <i>Contract Documents</i> ” <u>add</u> the words “including any required surety bonding”.
	3.6.2	<p><u>Delete</u> paragraph 3.6.2. in its entirety and <u>replace</u> it with the following:</p> <p>“3.6.2 The substitution of any <i>Subcontractor</i> and/or <i>Suppliers</i> after submission of the <i>Contractor’s</i> bid will not be accepted unless a valid reason is given in writing to and approved by the <i>Owner</i>, whose approval may be arbitrarily withheld. The reason for substitution must be provided to the <i>Owner</i> and to the original <i>Subcontractor</i> and/or <i>Supplier</i> and the <i>Subcontractor</i> and/or <i>Supplier</i> shall be given the opportunity to reply to the <i>Contractor</i> and <i>Owner</i>. The <i>Contractor</i> shall be fully aware of the capability of each <i>Subcontractor</i> and/or <i>Supplier</i> included in its bid, including but not limited to technical ability, financial stability and ability to maintain the proposed construction schedule.”</p>
	3.6.7, 3.6.8, 3.6.9 & 3.6.10	<p><u>Add</u> new paragraphs 3.6.7, 3.6.8, 3.6.9, and 3.6.10 as follows:</p> <p>“3.6.7 The <i>Contractor</i> represents and warrants that it has confirmed the availability of its <i>Subcontractors</i> for the <i>Project</i> and, in particular, for the performance of their</p>

		<p>respective portions of the <i>Work</i> to ensure completion of the <i>Project</i> within the <i>Contract Price</i> and the <i>Contract Time</i>.</p> <p>3.6.8 The <i>Consultant</i> or the <i>Owner</i>, acting reasonably, may from time to time require the <i>Contractor</i> to remove from the <i>Project</i> any personnel of the <i>Contractor</i>, including project managers, superintendents or <i>Subcontractors</i>. Such persons shall be replaced by the <i>Contractor</i> in a timely fashion to the satisfaction of the <i>Consultant</i> or the <i>Owner</i>, as the case may be, at no cost to the <i>Owner</i>.</p> <p>3.6.9 Where provided in the <i>Contract</i>, the <i>Owner</i> may assign to the <i>Contractor</i>, and the <i>Contractor</i> agrees to accept, any contract procured by the <i>Owner</i> for <i>Work</i> or services required on the <i>Project</i> that has been pre-tendered or pre-negotiated by the <i>Owner</i>, and upon such assignment, the <i>Owner</i> shall have no further liability to any party for such contract.</p> <p>3.6.10 The <i>Contractor</i> covenants that each subcontract or supply contract which the <i>Contractor</i> enters into for the purpose of performing the <i>Work</i> shall expressly provide for the assignment thereof to the <i>Owner</i> (at the option of the <i>Owner</i>) and the assumption by the <i>Owner</i> of the obligations of the <i>Contractor</i> thereunder, upon the termination of the <i>Contract</i> and upon written notice by the <i>Owner</i> to the other parties to such subcontracts or supply contracts, without the imposition of further terms or conditions; provided, however, that until the <i>Owner</i> has given such notice, nothing herein contained shall be deemed to create any contractual or other liability upon the <i>Owner</i> for the performance of obligations under such subcontracts or supply contracts and the <i>Contractor</i> shall be fully responsible for all of its obligations and liabilities (if any) under such subcontracts and supply contracts.”</p>
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GC 3.7 LABOUR AND PRODUCTS

SC19.1	3.7.1	<u>Amend</u> paragraph 3.7.1 by <u>adding</u> the words, “..., agents, <i>Subcontractors</i> and <i>Suppliers</i> ...” after the word “employees” in the first line.
SC19.2	3.7.2	<p><u>Delete</u> paragraph 3.7.2 and <u>substitute</u> with the following:</p> <p>“3.7.2 <i>Products</i> provided shall be new and shall conform to all current applicable specifications of the Canadian Standards Association, Canadian Standards Board or General Standards Board, ASTM, National Building Code, provincial and municipal building codes, fire safety standards, and all governmental authorities and regulatory agencies having jurisdiction at the <i>Place of the Work</i>, unless otherwise specified. <i>Products</i> which are not specified shall be of a quality consistent with those specified and their use acceptable to the <i>Consultant</i>. <i>Products</i> brought on to the <i>Place of the Work</i> by the <i>Contractor</i> shall be deemed to be the property of the <i>Owner</i>, but the <i>Owner</i> shall be under no liability for loss thereof or damage thereto arising from any cause whatsoever. The said <i>Products</i> shall be at the sole risk of the <i>Contractor</i>. Workmanship shall be, in every respect, first class and the <i>Work</i> shall be performed in accordance with the best modern industry practice.”</p>
	3.7.4 to 3.7.8	<p><u>Add</u> new paragraphs 3.7.4, 3.7.5, 3.7.6, 3.7.7, and 3.7.8 as follows:</p> <p>“3.7.4 Upon receipt of a <i>Notice in Writing</i> from the <i>Owner</i>, the <i>Contractor</i> shall immediately remove from the <i>Place of the Work</i>, tradesmen and labourers or anyone whose conduct jeopardizes the safety of the <i>Owner’s</i> operations or who are considered by the <i>Owner</i> or the <i>Consultant</i> to be unskilled or otherwise objectionable. Immediately</p>

		<p>upon receipt of the request, the <i>Contractor</i> shall make arrangements to appoint an acceptable replacement.</p> <p>3.7.5 The <i>Contractor</i> shall cooperate with the <i>Owner</i> and its representatives and shall take all reasonable and necessary actions to maintain stable and harmonious labour relations with respect to the <i>Work</i> at the <i>Place of the Work</i>, including cooperation to attempt to avoid <i>Work</i> stoppages, trade union jurisdictional disputes and other <i>Labour Disputes</i>. Any costs arising from labour disputes shall be at the sole expense of the <i>Contractor</i>.</p> <p>3.7.6 The cost for overtime required beyond the normal <i>Working Day</i> to complete individual construction operations of a continuous nature, such as pouring or finishing of concrete or similar work, or <i>Work</i> that the <i>Contractor</i> elects to perform at overtime rates without the <i>Owner</i> requesting it, shall not be chargeable to the <i>Owner</i>.</p> <p>3.7.7 All manufactured <i>Products</i> which are identified by their proprietary names or by part or catalogue number in the <i>Specifications</i> shall be used by the <i>Contractor</i>. No substitutes for such specified <i>Products</i> shall be used without the written approval of the <i>Owner</i> and the <i>Consultant</i>. Substitutes will only be considered by the <i>Consultant</i> when submitted in sufficient time to permit proper review and investigation. When requesting approval for the use of substitutes, the <i>Contractor</i> shall include in its submission any proposed change in the <i>Contract Price</i>. The <i>Contractor</i> shall use all proprietary <i>Products</i> in strict accordance with the manufacturer's directions. Where there is a choice of proprietary <i>Products</i> specified for one use, the <i>Contractor</i> may select any one of the <i>Products</i> so specified for this use.</p> <p>3.7.8 Materials, appliances, equipment and other <i>Products</i> are sometimes specified by reference to brand names, proprietary names, trademarks or symbols. In such cases, the name of a manufacturer, distributor, <i>Supplier</i> or dealer is sometimes given to assist the <i>Contractor</i> to find a source <i>Supplier</i>. This shall not relieve the <i>Contractor</i> from its responsibility from finding its own source of supply even if the source names no longer supplies the <i>Product</i> specified. If the <i>Contractor</i> is unable to obtain the specified <i>Product</i>, the <i>Contractor</i> shall supply a substitute product equal to or better than the specified <i>Product</i>, as approved by the <i>Consultant</i> with no extra compensation. Should the <i>Contractor</i> be unable to obtain a substitute <i>Product</i> equal to or superior to the specified <i>Product</i> and the <i>Owner</i> accepts a different <i>Product</i>, the <i>Contract Price</i> shall be adjusted accordingly, as approved by the <i>Consultant</i>."</p>
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GC 3.8 SHOP DRAWINGS

SC21.1	3.8.1	<p><u>Delete</u> paragraph 3.8.1 in its entirety and <u>replace</u> with the following:</p> <p>"3.8.1 The <i>Contractor</i> shall provide shop drawings as described in the <i>Contract Documents</i> and as the <i>Consultant</i> may reasonably request."</p>
	3.8.3	<p><u>Delete</u> paragraph 3.8.3 and <u>replace</u> it with the following:</p> <p>"3.8.3 The <i>Contractor</i> shall prepare a <i>Shop Drawings</i> schedule acceptable to the <i>Owner</i> and the <i>Consultant</i> prior to the first application for payment. A draft of the proposed <i>Shop Drawings</i> schedule shall be submitted by the <i>Contractor</i> to the <i>Consultant</i> and the <i>Owner</i> for approval. The draft <i>Shop Drawings</i> schedule shall clearly</p>

		indicate the phasing of <i>Shop Drawings</i> submissions. The <i>Contractor</i> shall periodically re-submit the <i>Shop Drawings</i> schedule to correspond to changes in the <i>Construction Schedule</i> .”
	3.8.5	<u>Delete</u> paragraph 3.8.5 in its entirety and <u>substitute</u> the following: “3.8.5 At the time of providing <i>Shop Drawings</i> , the <i>Contractor</i> shall advise the <i>Consultant</i> in writing of any deviations in <i>Shop Drawings</i> from the requirements of the <i>Contract Documents</i> . The <i>Consultant</i> shall indicate the acceptance of such deviation expressly in writing. Where manufacturers’ literature is submitted in lieu of scaled drawings, it shall be clearly marked in ink, to indicate the specific items for which review is requested.”
	3.8.8 to 3.8.12	<u>Add</u> new paragraphs 3.8.8, 3.8.9, 3.8.10, 3.8.11, and 3.8.12 as follows: “3.8.8 Reviewed <i>Shop Drawings</i> shall not authorize a change in the <i>Contract Price</i> and/or the <i>Contract Time</i> . 3.8.9 Except where the parties have agreed to a different <i>Shop Drawings</i> schedule pursuant to paragraph 3.10.3, the <i>Contractor</i> shall comply with the requirements for <i>Shop Drawings</i> submissions stated in the <i>Specifications</i> . 3.8.10 The <i>Contractor</i> shall not use the term “by others” on <i>Shop Drawings</i> or other submittals. The related trade, <i>Subcontractor</i> or <i>Supplier</i> shall be stated. 3.8.11 Certain <i>Specifications</i> sections require the <i>Shop Drawings</i> to bear the seal and signature of a professional engineer. Such professional engineer must be registered in the jurisdiction of the <i>Place of the Work</i> and shall have expertise in the area of practice reflected in the <i>Shop Drawings</i> . 3.8.12 The <i>Consultant</i> will review and return <i>Shop Drawings</i> and submittals in accordance with the schedule agreed upon in paragraph 3.10.3, The <i>Contractor</i> shall allow the <i>Consultant</i> a minimum of 10 <i>Working Days</i> to review <i>Shop Drawings</i> from the date of receipt. If resubmission of <i>Shop Drawings</i> is required, a further 10 <i>Working Day</i> period is required for the <i>Consultant’s</i> review.”

***NEW* GC 3.9 USE OF THE WORK**

SC22.1	GC 3.9	<u>Add</u> new GC 3.9 – USE OF THE WORK as follows: “ GC 3.9 USE OF THE WORK 3.9.1 The <i>Contractor</i> shall confine <i>Construction Equipment</i> , <i>Temporary Work</i> , storage of <i>Products</i> , waste products and debris, and operations of employees and <i>Subcontractors</i> to limits indicated by laws, ordinances, permits, by the direction of the <i>Owner</i> or the <i>Consultant</i> , or the <i>Contract Documents</i> and shall not unreasonably encumber the <i>Place of the Work</i> . 3.9.2 The <i>Contractor</i> shall not load or permit to be loaded any part of the <i>Work</i> with a weight or force that will endanger the safety of the <i>Work</i> .”
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		<p>3.9.3 The <i>Owner</i> shall have the right to enter or occupy the <i>Place of the Work</i> in whole or in part for the purpose of placing fittings and equipment, or for other use before <i>Substantial Performance of the Work</i>, if, in the opinion of the <i>Consultant</i>, such entry and occupation does not prevent or substantially interfere with the <i>Contractor</i> in the performance of the <i>Contract</i> within the <i>Contract Time</i>. Such entry or occupation shall neither be considered as acceptance of the <i>Work</i> or in any way relieves the <i>Contractor</i> from its responsibility to complete the <i>Contract</i>.”</p>
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***NEW* GC 3.10 CUTTING AND REMEDIAL WORK**

SC23.1	GC 3.10	<p>Add new GC 3.10 – CUTTING AND REMEDIAL WORK as follows:</p> <p>“GC 3.10 CUTTING AND REMEDIAL WORK</p> <p>3.10.1 The <i>Contractor</i> shall perform the cutting and remedial work required to make the affected parts of the <i>Work</i> come together properly. Such cutting and remedial work shall be performed by specialists familiar with the <i>Products</i> affected and shall be performed in a manner to neither damage nor endanger the <i>Work</i>.</p> <p>3.10.2 The <i>Contractor</i> shall coordinate the <i>Work</i> to ensure all cutting and remedial work required is kept to a minimum.</p> <p>3.10.3 Unless specifically stated otherwise in the <i>Specifications</i>, the <i>Contractor</i> shall do all cutting and making good necessary for the proper installation and performance of the <i>Work</i>.</p> <p>3.10.4 To avoid unnecessary cutting, the <i>Contractor</i> shall lay out its work and advise the <i>Subcontractors</i>, when necessary, where to leave holes for installation of pipes and other work.”</p>
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***NEW* GC 3.11 CLEAN UP**

SC24.1	3.11.1, 3.11.2, 3.11.3, 3.11.4, 3.11.5 & 3.11.6	<p>Add new paragraphs 3.11.1, 3.11.2, 3.11.3, 3.11.4, 3.11.5, and 3.11.6 as follows:</p> <p>“3.11.1 The <i>Contractor</i> shall maintain the <i>Work</i> in a safe and tidy condition and free from the accumulation of waste products and debris, other than that caused by the <i>Owner</i>, other contractors or their employees. The <i>Contractor</i> shall remove accumulated waste and debris at least once a week as a minimum or as required by the nature of the <i>Work</i>.</p> <p>3.11.2 Before applying for <i>Substantial Performance of the Work</i>, the <i>Contractor</i> shall remove waste products and debris, other than that resulting from the work of the <i>Owner</i>, other contractors or their employees, and shall leave the <i>Place of the Work</i> clean and suitable for use or occupancy by the <i>Owner</i>. The <i>Contractor</i> shall remove products, tools, materials, <i>Construction Equipment</i>, and <i>Temporary Work</i> not required for the performance of the remaining work.</p>
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		<p>3.11.3 As a condition precedent to submitting its application for final payment, the <i>Contractor</i> shall remove any remaining products, tools, materials, <i>Construction Equipment</i>, <i>Temporary Work</i>, and waste products and debris, other than those resulting from the work of the <i>Owner</i>, other contractors or their employees.</p> <p>3.11.4 The <i>Contractor</i> shall clean up garbage during and after construction and maintain the <i>Place of the Work</i> in a neat and orderly condition on a daily basis. Prior to leaving the <i>Place of the Work</i> and following completion of the <i>Work</i>, the <i>Contractor</i> shall make good all damage to the building and its components caused by the performance of the <i>Work</i> or by any <i>Subcontractor</i> or <i>Supplier</i>. The <i>Contractor</i> shall leave the <i>Place of the Work</i> in a clean and finished state; remove all <i>Construction Equipment</i> and materials; remove all paint, stains, labels, dirt, etc. from the <i>Place of the Work</i>; and touch up all damaged painted areas (if applicable). The <i>Contractor</i> shall be responsible for restoring those areas of the <i>Place of the Work</i>, impacted by the <i>Work</i>, to their original condition.”</p> <p>3.11.5 Without limitation to or waiver of the <i>Owner’s</i> other rights and remedies, the <i>Owner</i> shall have the right to back charge to the <i>Contractor</i> the cost of damage to the site caused by transportation in and out of the <i>Place of the Work</i> by the <i>Contractor</i>, <i>Subcontractors</i> or <i>Suppliers</i>, if not repaired before final payment.</p> <p>3.11.6 The <i>Contractor</i> shall dispose of debris at a location and in a manner acceptable to the <i>Owner</i> (and to the authorities having jurisdiction at the <i>Place of the Work</i> and at the disposal area) and the <i>Contractor</i> shall cover containers with tarpaulins.”</p>
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***NEW* GC 3.12 EXCESS SOIL MANAGEMENT**

SC25.1	GC 3.12	<p><u>Add</u> new GC 3.12 – EXCESS SOIL MANAGEMENT as follows:</p> <p>“GC 3.12 EXCESS SOIL MANAGEMENT</p> <p>3.12.1 The <i>Contractor</i> shall be solely responsible for the proper management of all <i>Excess Soil</i> at the <i>Place of the Work</i> and for performance of the <i>Work</i> in compliance with the rules, regulations and practices required by the <i>Excess Soil Regulation</i> until such time as <i>Ready-for-Takeover</i> is achieved. Without restricting the generality of the previous sentence, the <i>Contractor’s</i> responsibility under this GC 3.12 includes the designation, transportation, tracking, temporary and/or final placement, record keeping, and reporting of all <i>Excess Soil</i> in connection with the <i>Work</i> all in compliance with the <i>Excess Soil Regulation</i>.</p> <p>3.12.3 The <i>Contractor</i> shall indemnify and save harmless the <i>Owner</i>, their agents, officers, directors, administrators, employees, consultants, successors and assigns from and against the consequences of any and all health and safety infractions committed directly by the <i>Contractor</i>, or those for whom it is responsible at law, under the <i>Excess Soil Regulation</i>, or any environmental protection legislation, including the payment of legal fees and disbursements on a substantial indemnity basis. Such indemnity shall apply to the extent to which the <i>Owner</i> is not covered by insurance.”</p>
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***NEW* GC 3.13 CONTRACTOR STANDARD OF CARE**

SC25.1	3.13	<p><u>Add</u> a new GC 3.13 – CONTRACTOR STANDARD OF CARE as follows:</p> <p>“GC 3.13 CONTRACTOR STANDARD OF CARE</p> <p>“3.13.1 In performing its services and obligations under the <i>Contract</i>, the <i>Contractor</i> shall exercise the standard of care, skill and diligence that would normally be provided by an experienced and prudent contractor supplying similar services for similar projects. The <i>Contractor</i> acknowledges and agrees that throughout the <i>Contract</i>, the performance of the <i>Contractor’s</i> obligations, duties and responsibilities shall be interpreted in accordance with this standard. The <i>Contractor</i> shall exercise the same standard of care, skill and diligence in respect of any <i>Products</i>, personnel or procedures which it may recommend to the <i>Owner</i> or employ on the <i>Project</i>.</p> <p>3.13.2 The <i>Contractor</i> further represents, covenants and warrants to the <i>Owner</i> that:</p> <ul style="list-style-type: none"> .1 the personnel it assigns to the <i>Project</i> are appropriately experienced; .2 it has a sufficient staff of qualified and competent personnel to replace any of its appointed representatives, subject to the <i>Owner’s</i> approval, in the event of death, incapacity, removal or resignation; and .3 there are no pending, threatened or anticipated claims, liabilities or contingent liabilities that would have a material effect on the financial ability of the <i>Contractor</i> to perform its work under the <i>Contract</i>.”
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PART 4 ALLOWANCES

GC 4.1 CASH ALLOWANCES

SC27.1	4.1.3	In GC 4.1.3 <u>delete</u> the words “through the <i>Consultant</i> ” and <u>replace</u> them with “in writing.”
	4.1.4	<p><u>Delete</u> GC 4.1.4 in its entirety and <u>replace</u> it with the following:</p> <p>“4.1.4 Where the actual cost of the <i>Work</i> under any cash allowance exceeds the amount of the allowance, any unexpended amounts from other cash allowances shall be reallocated, by the <i>Consultant</i> at the <i>Owner’s</i> direction, to cover the shortfall, and, in that case, there shall be no additional amount added to the <i>Contract Price</i> for overhead and profit. Only where the actual cost of the <i>Work</i> under all cash allowances exceeds the total amount of all cash allowances shall the <i>Contractor</i> be compensated for the excess incurred and substantiated, plus an amount for overhead and profit on the excess only, as set out in the <i>Contract Documents</i>.”</p>
	4.1.7	<p><u>Delete</u> GC 4.1.7 in its entirety and <u>replace</u> it with the following:</p> <p>“4.1.7 The net amount of any unexpended cash allowances, after providing for any reallocations as contemplated in paragraph 4.1.4, shall be deducted from the</p>

		<i>Contract Price</i> by <i>Change Order</i> without any adjustment for the <i>Contractor's</i> overhead and profit on such amount.”
	4.1.8 and 4.1.9	<p><u>Add</u> new GC 4.1.8 and 4.1.9 as follows:</p> <p>“4.1.8 The <i>Owner</i> reserves the right to call, or to have the <i>Contractor</i> call, for competitive bids for portions of the <i>Work</i> to be paid for from cash allowances.</p> <p>4.1.9 Cash allowances cover the net cost to the <i>Contractor</i> of services, <i>Products</i>, <i>Construction Equipment</i>, freight, unloading, handling, storage, installation, provincial sales tax, and other authorized expenses incurred in performing any <i>Work</i> stipulated under the cash allowances but does not include any <i>Value Added Taxes</i> payable by the <i>Owner</i> and the <i>Contractor</i>.”</p>

PART 5 PAYMENT

GC 5.1 FINANCING INFORMATION REQUIRED OF THE OWNER

SC28.1	5.1	<u>Delete</u> GC 5.1 – FINANCING INFORMATION REQUIRED OF THE OWNER and all paragraphs thereunder, including any reference to GC 5.1 throughout the <i>Contract</i> .
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GC 5.2 APPLICATIONS FOR PAYMENT

SC29.1	5.2.1	<p><u>Delete</u> GC 5.2.1 and <u>replace</u> it with the following:</p> <p>“5.2.1 Upon execution of the <i>Contract</i>, and in any event prior to the <i>Contractor</i> submitting its first application for payment, the <i>Owner</i> shall issue a purchase order to the <i>Contractor</i> for the performance of the <i>Contract</i>. The number indicated on such purchase order must be clearly identifiable on all applications for payment. Applications for payment shall be dated the last day of each month or an alternative day of each month agreed to in writing by the parties, with each month representing one payment period under the <i>Contract</i> (each a “Payment Period”). Within 3 calendar days of the end of each <i>Payment Period</i>, the <i>Contractor</i> will submit a draft application for payment to the <i>Owner</i> and the <i>Consultant</i>. Upon receipt of the draft application for payment, and within 7 calendar days, a representative of each of the <i>Contractor</i>, <i>Owner</i>, and the <i>Consultant</i> shall attend a meeting to discuss and review the work completed during the <i>Payment Period</i>, including quantities, if applicable (the “Pre-Invoice Submission Meeting”). In the event that the scheduled date for the <i>Pre-Invoice Submission Meeting</i> is not a <i>Working Day</i>, the <i>Pre-Invoice Submission Meeting</i> shall occur on the next <i>Working Day</i>. The <i>Contractor</i> shall bring with it to the <i>Pre-Invoice Submission Meeting</i> the following:</p> <ol style="list-style-type: none"> .1 a copy of the draft application for payment; .2 any documents the <i>Contractor</i> is required to bring to the <i>Pre-Invoice Submission Meeting</i> as stipulated in the <i>Contract Documents</i> or as reasonably requested by the <i>Owner</i>; and .3 any other documents reasonably requested, in advance, by the <i>Owner</i> or the <i>Consultant</i>.”
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SC29.2	5.2.2	<p><u>Delete</u> GC 5.2.2 in its entirety and <u>replace</u> it with the following:</p> <p>"5.2.2 Applications for payment shall be given in accordance with the following requirements:</p> <p>.1 Within 5 calendar days following the <i>Pre-Invoice Submission Meeting</i>, the <i>Contractor</i> shall deliver its application for payment to the <i>Owner</i> and to the <i>Consultant</i> for <i>Work</i> performed during the <i>Payment Period</i> ("Proper Invoice Submission Date") subject to the following:</p> <p>.1 If the fifth calendar day following the <i>Pre-Invoice Submission Meeting</i>, to which an invoice relates falls on a day that is not a <i>Working Day</i>, the <i>Proper Invoice Submission Date</i> shall be deemed to fall on the next <i>Working Day</i>.</p> <p>.2 The application for payment must be delivered to the <i>Owner</i> and to the <i>Consultant</i> in the same manner as a <i>Notice in Writing</i> during the hours of 9:00 am to 4:00pm (EST) on the <i>Proper Invoice Submission Date</i>. Delivery to the <i>Owner</i> shall be to the following email address:</p> <p style="text-align: center;">facilities_cap@wrdsb.ca</p> <p>.3 If an application for payment is received after 4:00 p.m. (EST) on the applicable <i>Proper Invoice Submission Date</i>, the application for payment will not be considered or reviewed by the <i>Owner</i> and <i>Consultant</i> until the next <i>Proper Invoice Submission Date</i>. Notwithstanding the foregoing, the <i>Owner</i> in its sole and absolute discretion may elect to accept an application for payment submitted after 4:00 p.m. on the applicable <i>Proper Invoice Submission Date</i>; however, such acceptance shall not be construed as a waiver of any of its rights or waive or release the <i>Contractor's</i> obligations to strictly comply with the requirements prescribed in this subparagraph 5.2.2.3.</p> <p>.4 No applications for payment shall be accepted by the <i>Owner</i> prior to the <i>Proper Invoice Submission Date</i>.</p> <p>.5 All applications for payment shall include all of the requirements for a <i>Proper Invoice</i> prescribed by the <i>Construction Act</i> and this <i>Contract</i> and be dated the last day of the applicable <i>Payment Period</i>;"</p>
SC29.3	5.2.3	<p><u>Delete</u> GC 5.2.3 and <u>replace</u> it with the following:</p> <p>"5.2.3 The amount claimed shall be for the value, proportionate to the amount of the <i>Contract</i>, of <i>Work</i> performed and <i>Products</i> delivered and incorporated into the <i>Work</i> as of the last date of the applicable <i>Payment Period</i>. Materials may also be deemed to be supplied to an improvement, for payment purposes, when, in the <i>Owner's</i> opinion, they are placed and properly secured on the land on which the improvement is made, or placed upon land designated by the <i>Owner</i> or agent of the <i>Owner</i>, but placing the materials on the land so designated does not, of itself, make that land subject to a lien. No amount claimed shall include products delivered and incorporated into the work, unless the products are free and clear of all security interests, liens and other claims of third parties. No amount claimed shall include</p>

		<i>Products delivered to the Place of the Work unless the Products are free and clear of all security interests, liens, and other claims of third parties."</i>
SC29.4	5.2.4	After the word " <i>Consultant</i> " in GC 5.2.4 <u>add</u> the words "and the <i>Owner</i> "
SC29.5	5.2.5	After the word " <i>Consultant</i> " in GC 5.2.5 <u>add</u> the words "or the <i>Owner</i> ".
SC29.6	5.2.9	<u>Add</u> new 5.2.9 as follows: "5.2.9 The <i>Contractor</i> shall prepare and maintain current as-built drawings which shall consist of the <i>Drawings</i> and <i>Specifications</i> revised by the <i>Contractor</i> during the <i>Work</i> , showing changes to the <i>Drawings</i> and <i>Specifications</i> , which current as-built drawings shall be maintained by the <i>Contractor</i> and made available to the <i>Consultant</i> for review with each application for progress payment. The <i>Consultant</i> shall recommend to the <i>Owner</i> that the <i>Owner</i> retain a reasonable amount for the value of the as-built drawings not presented for review."

GC 5.3 PAYMENT

SC30.1	5.3.1	<p><u>Delete</u> GC 5.3.1 in its entirety, including all subparagraphs thereunder, and <u>replace</u> it with the following:</p> <p>"5.3.1 After receipt by the <i>Owner</i> and the <i>Consultant</i> of an application for payment submitted by the <i>Contractor</i> in accordance with GC 5.2 - APPLICATIONS FOR PAYMENT:</p> <p style="padding-left: 40px;">.1 the <i>Consultant</i> will either:</p> <p style="padding-left: 80px;">(a) issue to the <i>Owner</i> with a copy to the <i>Contractor</i>, a progress payment certificate in the amount applied for by the <i>Contractor</i> in the <i>Proper Invoice</i>, or</p> <p style="padding-left: 80px;">(b) issue to the <i>Owner</i>, with a copy to the <i>Contractor</i>, a certificate for payment for an amount determined by the <i>Consultant</i> to be properly due to the <i>Contractor</i> after applying any credits, withheld amounts, or other set-offs which the <i>Consultant</i> has determined that the <i>Owner</i> is entitled to notwithstanding any notice of dispute or disagreement that the <i>Contractor</i> may have served, along with the <i>Consultant's</i> reasons why an amount other than what is claimed in the <i>Proper Invoice</i> is properly due to the <i>Contractor</i>, which finding the <i>Owner</i> may accept or amend prior to the <i>Owner</i> issuing a <i>Notice of Non-Payment</i>, if any, in accordance with GC 5.3.2;</p> <p style="padding-left: 40px;">.2 the <i>Owner</i> shall make payment to the <i>Contractor</i> on account as provided in Article A-5 PAYMENT,</p> <p style="padding-left: 80px;">(a) in the amount stated in the certificate for payment, or</p> <p style="padding-left: 80px;">(b) in the amount stated in the certificate for payment less such amount stated in the <i>Owner's Notice of Non-Payment</i> issued pursuant to GC 5.3.3,</p>
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		<p style="text-align: center;">on the 28th calendar day after receipt of a <i>Proper Invoice</i>, unless such 28th calendar day lands on a day that is other than a <i>Working Day</i>, in which case payment shall be made on the next <i>Working Day</i> after such 28th day.”</p>
	<p>5.3.2 to 5.3.7</p>	<p><u>Add</u> new paragraphs 5.3.2, 5.3.3, 5.3.4, 5.3.4, 5.3.5, 5.3.6, and 5.3.7 as follows:</p> <p>5.3.2 All payments to the <i>Contractor</i> shall be processed using electronic funds transfer (“EFT”) and deposited directly to the <i>Contractor’s</i> bank account unless agreed to otherwise by the <i>Contractor</i> and the <i>Owner</i> in writing. Prior to the <i>Contractor</i> submitting its first application for payment, the <i>Owner</i> and the <i>Contractor</i> shall exchange such information as is necessary to facilitate <i>EFT</i> payments.</p> <p>5.3.3 In the event that the application for payment delivered by the <i>Contractor</i> pursuant to GC 5.2 - APPLICATIONS FOR PAYMENT does not include the requirements for a <i>Proper Invoice</i> or where the <i>Owner</i> disputes the amount claimed as payable in the <i>Proper Invoice</i>, then the <i>Owner</i> shall within 14 calendar days of receipt of the application for payment, issue a <i>Notice of Non-Payment</i> (Form 1.1).</p> <p>5.3.4 Where the <i>Owner</i> has delivered a <i>Notice of Non-Payment</i>, the <i>Owner</i> and the <i>Contractor</i> shall first engage in good faith negotiations to resolve the dispute. If within 5 calendar days following the issuance of a <i>Notice of Non-Payment</i>, despite good faith efforts by both parties and the assistance of the <i>Consultant</i>, the <i>Owner</i> and the <i>Contractor</i> cannot resolve the dispute, either party may commence an <i>Adjudication</i> in accordance with the procedures set out in the <i>Construction Act</i>. Any portion of the <i>Proper Invoice</i> which is not the subject of the <i>Notice of Non-Payment</i> shall be payable within the time period set out in GC 5.3.1.2.</p> <p>5.3.5 Provided that the <i>Owner</i> complies with its obligations under the <i>Construction Act</i>, and subject to any interim determination of an adjudicator in accordance with any <i>Adjudication</i>, and where applicable, a final determination made in accordance with the dispute resolution processes prescribed by this <i>Contract</i>, the <i>Owner</i> shall be entitled to claim in a <i>Notice of Non-Payment</i> a right to deduct from or, set off against, any payment of the <i>Contract Price</i>:</p> <ul style="list-style-type: none"> .1 any amount expended by the <i>Owner</i> in exercising the <i>Owner’s</i> rights under this <i>Contract</i> to perform any of the <i>Contractor’s</i> obligations that the <i>Contractor</i> has failed to perform; .2 any damages, costs or expenses (including, without limitation, reasonable legal fees and expenses) incurred by the <i>Owner</i> as a result of the failure of the <i>Contractor</i> to perform any of its obligations under the <i>Contract</i>; .3 any other amount owing from the <i>Contractor</i> to the <i>Owner</i> under this <i>Contract</i>. <p>5.3.6 The amounts disputed and described under the <i>Notice of Non-Payment</i> shall be held by the <i>Owner</i> until all disputed amounts of the <i>Proper Invoice</i> have been resolved pursuant to PART 8 – DISPUTE RESOLUTION.</p>

		<p>5.3.7 The <i>Contractor</i> represents, warrants, and covenants to the <i>Owner</i> that it is familiar with its prompt payment and trust obligations under the <i>Construction Act</i> and will take all required steps and measures to ensure that it complies with the applicable prompt payment and trust provisions under the <i>Construction Act</i> including, without limitation, section 8.1 of the <i>Construction Act</i>. Evidence of the <i>Contractor's</i> compliance under this GC 5.3.7, including evidence demonstrating that all <i>EFTs</i> by the <i>Owner</i> to the <i>Contractor</i> are kept in a bank account in the <i>Contractor's</i> name will be made available to the <i>Owner</i> within 5 <i>Working Days</i> following receipt by the <i>Contractor</i> of a <i>Notice in Writing</i> making such request.”</p>
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GC 5.4 SUBSTANTIAL PERFORMANCE OF THE WORK- AND PAYMENT OF HOLDBACK

SC32.1	GC 5.4	<p><u>Delete</u> GC 5.4 – SUBSTANTIAL PERFORMANCE OF THE WORK AND PAYMENT OF HOLDBACK in its entirety and <u>replace</u> it with the following:</p> <p>“GC 5.4 SUBSTANTIAL PERFORMANCE OF THE WORK AND PAYMENT OF HOLDBACK</p> <p>5.4.1 When the <i>Contractor</i> considers that <i>Substantial Performance of the Work</i> has been achieved, the <i>Contractor</i> shall prepare and submit to the <i>Consultant</i> and the <i>Owner</i> a comprehensive deficiency list of items to be completed or corrected, including any incomplete <i>Close-Out Documentation</i>, and apply for a review by the <i>Consultant</i> and the <i>Owner</i> to establish <i>Substantial Performance of the Work</i>. Failure to include an item on the list does not alter the responsibility of the <i>Contractor</i> to complete the <i>Contract</i>.</p> <p>5.4.2 Prior to, or as part of its written application for <i>Substantial Performance of the Work</i> the <i>Contractor</i> shall submit to the <i>Consultant</i> submit to the <i>Consultant</i> all closeout documentation required by the <i>Contract Documents</i>, including but not limited to, warranties, manuals, guarantees, as-built drawings, warranty cards and all other relevant literature from suppliers and manufacturers including, but not limited to, where applicable (the “Close-Out Documentation”):</p> <ol style="list-style-type: none"> .1 equipment, maintenance, and operations manuals; .2 equipment specifications, data sheets and brochures, parts lists and assembly drawings, performance curves and other related data; .3 line drawings, value charts and control sheets sequences with description of the sequence of operations; .4 warranty documents; .5 guarantees; .6 certificates; .7 service and maintenance reports; .8 <i>Specifications</i>; .9 <i>Shop Drawings</i>; .10 coordination drawings; .11 testing and balancing results and reports; .12 <i>Commissioning</i> and quality assurance documentation; .13 distribution system diagrams;
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		<p>.14 spare parts;</p> <p>.15 samples;</p> <p>.16 existing reports and correspondence from authorities having jurisdiction in the <i>Place of the Work</i>;</p> <p>.17 inspection certificates;</p> <p>.18 red-lined record drawings from the construction trailer in two copies and</p> <p>.19 other materials or documentation required to be submitted under the <i>Contract</i>.</p> <p>5.4.3 The <i>Consultant</i> will review the <i>Work</i> to verify the validity of the application and shall promptly, and in any event, no later than 30 calendar days after receipt of the <i>Contractor's</i> complete deficiency list and application:</p> <p>.1 prepare a final deficiency list incorporating all items to be completed or corrected, including any incomplete or unsubmitted <i>Close-Out Documentation</i>. Each item shall have an indicated value for correction or completion and the determination of the total value of such items shall be determined pursuant to GC 5.8 – DEFICIENCY HOLDBACK. The final deficiency list complete with values is to be included with the <i>Consultant's</i> draft verification and shall be reviewed with the <i>Owner</i> prior to the <i>Consultant</i> rendering a determination in accordance with GC 5.4.3.2</p> <p>.2 having completed the requirements set out in GC 5.4.3.1,</p> <p style="padding-left: 40px;">(a) the <i>Consultant</i> shall advise the <i>Contractor</i> in writing that the <i>Work</i> or the designated portion of the <i>Work</i> is not substantially performed and give reasons why, or</p> <p style="padding-left: 40px;">(b) the <i>Consultant</i> shall state the date of <i>Substantial Performance of the Work</i> in a certificate and issue a copy of that certificate to each the <i>Owner</i> and the <i>Contractor</i>.</p> <p>5.4.4 Following the issuance of the certificate of <i>Substantial Performance of the Work</i> referenced in subparagraph 5.4.3.2(b):</p> <p>.1 The <i>Contractor</i> shall publish, in a construction trade newspaper in the area of the location of the <i>Work</i>, a copy of the certificate of <i>Substantial Performance of the Work</i> referred to in GC 5.4.2.2(b) within seven (7) calendar days of receiving a copy of the certificate signed by the <i>Consultant</i>, and the <i>Contractor</i> shall provide suitable evidence of the publication to the <i>Consultant</i> and the <i>Owner</i>. If the <i>Contractor</i> fails to publish such notice, the <i>Owner</i> shall be at liberty to publish said certificate and back-charge the <i>Contractor</i> its reasonable costs for doing so;</p> <p>.2 The <i>Contractor</i> shall complete the <i>Work</i> within forty (40) calendar days of the date certified as the date of <i>Substantial Performance of the Work</i>;</p> <p>.3 Notwithstanding any other provisions of the <i>Contract</i>, no payments will be processed between <i>Substantial Performance of the Work</i> and <i>Ready-for-Takeover</i>;</p> <p>.4 The <i>Owner</i> reserves the right to contract out any or all unfinished <i>Work</i> if it has not been completed within forty (40) days of <i>Substantial Performance of the Work</i> using, without limitation, the funds retained in accordance with GC</p>
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		<p>5.8 - DEFICIENCY HOLDBACK, without prejudice to any other right or remedy and without affecting the warranty period. The cost to the <i>Owner</i> of completing the <i>Work</i> including <i>Owner</i> and <i>Consultant</i> wages and materials shall be deducted from the <i>Contract Price</i>.</p> <p>5.4.5 After publication of the certificate of the <i>Substantial Performance of the Work</i>, and provided that the <i>Contractor</i> has completed performance of the <i>Work</i> within the 40 calendar days following certification of <i>Substantial Performance of the Work</i>, the <i>Contractor</i> may submit an application for payment of the outstanding <i>Construction Act</i> holdback amount, which application for payment shall:</p> <ul style="list-style-type: none"> .1 include all of the requirements listed in EXHIBIT "1" - PROJECT SPECIFIC REQUIREMENTS FOR A PROPER INVOICE, as applicable to the application for payment of the holdback amount; and .2 include a statement that the <i>Contractor</i> has not received any written notices of lien or any claims for liens from any <i>Subcontractor</i> or <i>Supplier</i>. <p>5.4.6 The <i>Construction Act</i> holdback amount shall become due and payable the day immediately following the expiration of the holdback period prescribed by the <i>Construction Act</i> (in most cases being the 61st calendar day following the publication of the certificate of <i>Substantial Performance of the Work</i> referred to in GC 5.4.4.1), subject to the occurrence of any of the following:</p> <ul style="list-style-type: none"> .1 the preservation of a lien in respect of the <i>Project</i> that has not been satisfied, discharged or otherwise provided for in accordance with the <i>Construction Act</i>, .2 receipt by the <i>Owner</i> of a written notice of lien that has not been satisfied, discharged or otherwise provided for in accordance with the <i>Construction Act</i>; or .3 prior to the expiry of 40 calendar days following the publication of the certificate of <i>Substantial Performance of the Work</i>, the <i>Owner</i> publishes a <i>Notice of Non-Payment</i> of holdback in accordance with the <i>Construction Act</i> (Form 6), setting out the amount of holdback that will not be paid, which may include non-payment to secure the correction of deficiencies and/or the completion of the <i>Work</i>. <p>5.4.7 Notwithstanding the <i>Owner's</i> obligation to make payment of the holdback amount in accordance with GC 5.4.6, the processing of such payment remains subject to the <i>Owner's</i> internal <i>EFT</i> timing limitations. The <i>Owner</i> covenants, and the <i>Contractor</i> agrees, that payment of the holdback shall be made by <i>EFT</i> at the first opportunity during the <i>Owner's</i> normal processing of <i>EFTs</i> upon the holdback becoming due in accordance with GC 5.4.6..</p>
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GC 5.5 FINAL PAYMENT

SC35.1	GC 5.5	<p><u>Delete</u> GC 5.5 in its entirety, including all subparagraphs thereunder and <u>replace</u> it with the following:</p> <p>“5.5.1 When <i>Ready-for-Takeover</i> has been achieved in accordance with GC 12.1 – READY-FOR-TAKEOVER and the <i>Contractor</i> considers the <i>Work</i> is complete, and after the <i>Contractor</i>, the <i>Owner</i>, and the <i>Consultant</i> have attended a <i>Pre-Invoice Submission Meeting</i> analogous to the requirement in GC 5.2.1 (the “<i>Final Pre-Invoice Submission Meeting</i>”), the <i>Contractor</i> may submit an application for final payment to the <i>Owner</i> and to the <i>Consultant</i>, which application for payment shall:</p> <ol style="list-style-type: none"> .1 include all of the requirements set out in GC 5.2.2, including without limitation those requirements listed in APPENDIX “1” - PROJECT SPECIFIC REQUIREMENTS FOR A PROPER INVOICE that are specific to an application for final payment; and .2 if applicable, (a) a certificate from the <i>Consultant</i> or written confirmation from the <i>Owner</i> that the deficiencies or incomplete <i>Work</i> waived by the <i>Owner</i> pursuant to GC 12.1.2 have been fully rectified as of the date of the <i>Contractor’s</i> application for final payment, and/or (b) written confirmation, signed by the <i>Owner</i> and the <i>Contractor</i>, that the <i>Contract Price</i> has been reduced by a specified amount in exchange for the <i>Owner</i> releasing the <i>Contractor</i> of its obligation to rectify the certain outstanding deficiencies and/or incomplete <i>Work</i> waived by the <i>Owner</i> pursuant to GC 12.1.2, as detailed in such written confirmation. <p>5.5.2 No later than 5 calendar days prior to the <i>Final Pre-Invoice Submission Meeting</i>, the <i>Contractor</i> will, if not already provided, submit to the <i>Consultant</i> all <i>Close-Out Documentation</i>.</p> <p>5.5.3 Delivery of all <i>Close-Out Documentation</i> is a requirement for the <i>Proper Invoice</i> for final payment.</p> <p>5.5.4 After receipt by the <i>Owner</i> and the <i>Consultant</i> of an application for payment submitted by the <i>Contractor</i> that is a <i>Proper Invoice</i> and by no later than 10 calendar days after the receipt of the <i>Proper Invoice</i>:</p> <ol style="list-style-type: none"> .1 the <i>Consultant</i> will either: <ol style="list-style-type: none"> (a) issue to the <i>Owner</i> with a copy to the <i>Contractor</i>, a progress payment certificate in the amount applied for by the <i>Contractor</i> in the <i>Proper Invoice</i>, or (b) deliver a finding to the <i>Owner</i> with reasons why an amount other than what is claimed in the <i>Proper Invoice</i> is properly due to the <i>Contractor</i>, which finding the <i>Owner</i> may accept or amend prior to issuing a <i>Notice of Non-Payment</i> (Form 1.1), if any, in accordance with GC 5.5.2; .2 the <i>Owner</i> shall make payment to the <i>Contractor</i> on account as provided in Article A-5 PAYMENT,
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		<p>(a) in the amount stated in the certificate for payment, or</p> <p>(b) in the amount stated in the certificate for payment less such amount stated in the <i>Owner's Notice of Non-Payment</i> issued pursuant to GC 5.5.5,</p> <p>on the 28th calendar day after receipt of a <i>Proper Invoice</i>, unless such 28th calendar day lands on a day that is other than a <i>Working Day</i>, in which case payment shall be made on the next <i>Working Day</i> after such 28th day.</p> <p>5.5.5 In the event that the application for final payment delivered by the <i>Contractor</i> does not include the requirements of GC 5.5.1 (including the requirements for a <i>Proper Invoice</i>) and GC 5.5.2 or where the <i>Owner</i> disputes the amount claimed as payable in the <i>Proper Invoice</i>, then the <i>Owner</i> shall within 14 calendar days of receipt of the application for payment, issue a <i>Notice of Non-Payment</i>. Where the <i>Owner</i> has delivered a <i>Notice of Non-Payment</i>, as specified under this GC 5.5.5, the <i>Owner</i> and the <i>Contractor</i> shall first engage in good faith negotiations to resolve the dispute. If within 5 calendar days following the issuance of a <i>Notice of Non-Payment</i>, despite good faith efforts by both parties with the assistance of the <i>Consultant</i>, the <i>Owner</i> and the <i>Contractor</i> cannot resolve the dispute, either party may commence an <i>Adjudication</i> in accordance with the procedures set out in the <i>Construction Act</i>. Any portion of the <i>Proper Invoice</i> which is not the subject of the <i>Notice of Non-Payment</i> shall be payable within the time period set out in GC 5.5.4.2.</p> <p>5.5.6 Subject to the provisions of the <i>Construction Act</i> and any other rights conferred on the <i>Owner</i> at law or under this <i>Contract</i> to withhold payment or back charge or set-off against payment, the <i>Owner</i> shall pay the amount payable under a <i>Proper Invoice</i> for final payment in accordance with the <i>Construction Act</i>.</p> <p>5.5.7 When the <i>Consultant</i> issues a certificate of completion in accordance with GC 5.5.4.1, the <i>Consultant</i> shall also issue a certificate for release of any holdback for finishing work amount. In accordance with the <i>Construction Act</i>, the <i>Owner</i> may retain any amounts which are required by law to satisfy any liens against the <i>Work</i>, in respect of any third party claims made to the <i>Owner</i> in respect of the <i>Contract</i> or the <i>Work</i>, and in respect of any claims the <i>Owner</i> may have against the <i>Contractor</i>. Subject to the foregoing, the <i>Owner</i> shall release the holdback in accordance with the <i>Construction Act</i>."</p>
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GC 5.6 DEFERRED WORK

SC33.1	5.6.1	<p><u>Delete</u> paragraph 5.6.1 and <u>replace</u> with the following:</p> <p>"5.6.1 If because of conditions reasonably beyond the control of the <i>Contractor</i>, there are items of work that cannot be performed, payment in full for that portion of the <i>Work</i> which has been performed as certified by the <i>Consultant</i> shall not be withheld or delayed by the <i>Owner</i> on account thereof, but the <i>Owner</i> may withhold, subject to its requirement to issue a <i>Notice of Non-Payment</i> under the <i>Construction Act</i>, until the remaining portion of the <i>Work</i> is finished, only such an amount that the <i>Consultant</i> determines is sufficient and reasonable to cover the cost of performing</p>
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		such remaining work. The remaining work shall be valued as deficient work as defined in GC 5.8.1.”
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***NEW* GC 5.8 DEFICIENCY HOLDBACK**

SC34.1	5.8.1	<p><u>Add</u> new GC 5.8 – DEFICIENCY HOLDBACK as follows:</p> <p>“GC 5.8 DEFICIENCY HOLDBACK</p> <p>5.8.1 Notwithstanding any provisions contained in the <i>Contract Documents</i> concerning certification and release of monies to the <i>Contractor</i>, the <i>Owner</i> reserves the right to retain a <i>Deficiency Holdback</i>. In addition to the Construction Act holdback. The <i>Deficiency Holdback</i> in the value of 2% shall be applied against the total Contract value and shall be applied to each progress payment. The <i>Deficiency Holdback</i> shall be payable to the Contractor upon the confirmation of completion of all deficiencies and defects in work by the Consultant and the Owner.</p> <p>5.8.2 In performing the calculation under GC 5.8.1,</p> <p style="padding-left: 20px;">.1 no individual deficiency will be valued at less than five hundred dollars (\$500.00); and</p> <p style="padding-left: 20px;">.2 for any <i>Close-Out Documentation</i> not submitted in advance of or as part of the <i>Contractor's</i> application for <i>Substantial Performance of the Work</i>, an amount shall be retained by the <i>Owner</i> as part of the deficiency holdback that is equal to the estimated time and material costs to retain a third-party to re-create the applicable <i>Close-Out Documentation</i>, as determined by the <i>Consultant</i>, until such time as the applicable <i>Close-Out Documentation</i> is submitted and approved.</p> <p>5.8.3 The deficiency holdback shall be due and payable to the <i>Contractor</i> on the 61st day following completion of all of the deficiencies listed by the <i>Consultant</i> and confirmed to be corrected, there being no claims for lien registered against the title to the <i>Place of the Work</i> issued in accordance with the <i>Construction Act</i>, and less any amounts disputed under an <i>Owner's Notice of Non-Payment</i> (Form 1.1).”</p>
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PART 6 CHANGES IN THE WORK

GC 6.1 OWNER'S RIGHT TO MAKE CHANGES

SC37.1	6.1.2	<p><u>Add</u> the following to the end of GC 6.1.2:</p> <p>“This requirement is of the essence and it is the express intention of the parties that any claims by the <i>Contractor</i> for a change in the <i>Contract Price</i> and/or <i>Contract Time</i> shall be barred unless there has been strict compliance with PART 6 - CHANGES IN THE WORK. No verbal dealings between the parties and no implied acceptance of alterations or additions to the <i>Work</i> and no claims that the <i>Owner</i> has been unjustly enriched by any alteration or addition to the <i>Work</i>, whether in fact there is any such unjust enrichment or not, shall be the basis of a claim for additional payment under this <i>Contract</i>, an increase to the <i>Contract Price</i>, or a claim for any extension of the <i>Contract Time</i>.”</p>
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	6.1.3 to 6.1.8	<p><u>Add</u> new paragraphs 6.1.3, 6.1.4, 6.1.5, 6.1.6, 6.1.7 and 6.1.8 as follows:</p> <p>“6.1.3 The <i>Contractor</i> agrees that changes resulting from construction coordination, including but not limited to, scheduling, site surface conditions, site coordination, and <i>Subcontractor and Supplier</i> coordination are included in the <i>Contract Price</i> and the <i>Contractor</i> shall be precluded from making any claim for a change in the <i>Contract Price</i> as a result of such changes.</p> <p>6.1.4 Labour costs shall be actual, prevailing rates at the <i>Place of the Work</i> paid to workers, plus statutory charges on labour including WSIB, unemployment insurance, Canada pension, vacation pay, hospitalization and medical insurance. The <i>Contractor</i> shall provide these rates, when requested by the <i>Consultant</i>, for review and/or agreement.</p> <p>6.1.5 Quotations for changes to the <i>Work</i> shall only include <i>Direct Costs</i> and be accompanied by itemized breakdowns together with detailed, substantiating quotations or cost vouchers from <i>Subcontractors</i> and <i>Suppliers</i>, submitted in a format acceptable to the <i>Consultant</i> and shall include any <i>Direct Costs</i> associated with extensions in <i>Contract Time</i>.</p> <p>6.1.6 When both additions and deletions covering related <i>Work</i> or substitutions are involved in a change to the <i>Work</i>, payment, including <i>Overhead</i> and profit, shall be calculated on the basis of the net difference, if any, with respect to that change in the <i>Work</i>.</p> <p>6.1.7 Changes to the contract shall be quoted to permit the work to be executed within the <i>Contract Time</i> unless approved by the <i>Consultant</i> and the <i>Owner</i>.</p> <p>6.1.8 No extension to the <i>Contract Time</i> shall be granted for changes in the <i>Work</i> unless the <i>Contractor</i> can clearly demonstrate that such changes significantly alter the overall construction schedule submitted at the commencement of the <i>Work</i>. Extensions of <i>Contract Time</i> and all associated costs, if approved, shall be included in the relevant <i>Change Order</i>.</p> <p>6.1.9 When a change in the <i>Work</i> is proposed or required, the <i>Contractor</i> shall within 10 calendar days submit to the <i>Consultant</i> for review a claim for a change in <i>Contract Price</i> and/or <i>Contract Time</i>. Should 10 calendar days be insufficient to prepare the submission, the <i>Contractor</i> shall within 5 calendar days, advise the <i>Consultant</i> in writing of the proposed date of submission of the claim. Claims submitted after the dates prescribed herein will not be considered.”</p>

GC 6.2 CHANGE ORDER

SC38.1	6.2.1	In paragraph 6.2.1 after the last sentence in the paragraph <u>add</u> the following:
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		<p>"The adjustment in the <i>Contract Time</i> and the <i>Contract Price</i> shall include an adjustment, if any, for delay or for the impact that the change in the <i>Work</i> has on the <i>Work</i> of the <i>Contractor</i>, and once such adjustment is made, the <i>Contractor</i> shall be precluded from making any further claims for delay or impact with respect to the change in the <i>Work</i>."</p>
6.2.3 to 6.2.5		<p><u>Add</u> new paragraphs 6.2.3, 6.2.4, and 6.2.5 as follows:</p> <p>"6.2.3 The value of a change shall be determined in one or more of the following methods as directed by the <i>Consultant</i>:</p> <p style="padding-left: 40px;">.1 by estimate and acceptance of a lump sum;</p> <p style="padding-left: 40px;">.2 by negotiated unit prices which include the <i>Contractor's</i> overhead and profit, or;</p> <p style="padding-left: 40px;">.3 by the actual <i>Direct Cost</i> to the <i>Owner</i>, such costs to be the actual cost after all credits included in the change have been deducted, plus the following ranges of mark-up on such costs:</p> <p style="padding-left: 80px;">.1 Contractor on work of their own forces, 5% overhead, 5% profit.</p> <p style="padding-left: 80px;">.2 Subcontractor on work of their own forces, 5% overhead, 5 % profit</p> <p style="padding-left: 80px;">.3 Contractor on work of Subcontractor, 5% overhead only.</p> <p>6.2.4 All quotations shall include <i>Direct Costs</i> and be submitted in a complete manner listing:</p> <p style="padding-left: 40px;">.1 quantity of each material,</p> <p style="padding-left: 40px;">.2 unit cost of each material,</p> <p style="padding-left: 40px;">.3 man hours involved,</p> <p style="padding-left: 40px;">.4 cost per hour,</p> <p style="padding-left: 40px;">.5 <i>Subcontractor</i> quotations submitted listing items 1 to 4 above and item 6 below.</p> <p style="padding-left: 40px;">.6 mark-up.</p> <p>6.2.5 The <i>Owner</i> and the <i>Consultant</i> will not be responsible for delays to the <i>Work</i> resulting from late, incomplete or inadequately broken-down valuations submitted by the <i>Contractor</i>."</p>

GC 6.3 CHANGE DIRECTIVE

SC39.1	6.3.6.1	<p><u>Amend</u> paragraph 6.3.6.1 by deleting the final period and adding the following:</p> <p style="padding-left: 40px;">".1 Contractors work by their own forces - 5% overhead and 5% profit, Subcontractor work by their own forces – 5% overhead and 5% profit, Contractors on Subcontractors work – 5% overhead only.</p>
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	6.3.6.2	<u>Delete</u> paragraph 6.3.6.2 and <u>replace</u> it with the following: “.2 If a change in the <i>Work</i> results in a net decrease in the <i>Contract Price</i> , the amount of the credit shall be the net cost, without deduction for <i>Overhead</i> or profit.”
	6.3.7.1(4)	<u>Delete</u> GC 6.3.7.1(4).
	6.3.7.7	Amend GC 6.3.7.7 by <u>deleting</u> the words “described in paragraph 6.3.7.1” and <u>replacing</u> them with “approved by the <i>Owner</i> in writing and in advance of any such expenses being incurred;”
	6.3.7.9	Amend GC 6.3.7.9 by <u>adding</u> the following to the end of the paragraph: “...when specifically requested by the <i>Owner</i> or as directed by the <i>Consultant</i> .”
	6.3.7.10	Amend GC 6.3.7.10 by <u>adding</u> the following to the end of the paragraph: “, provided that such amounts are not caused by negligent acts, omissions, or default of the <i>Contractor</i> or <i>Subcontractor</i> .”
	6.3.7.13	<u>Delete</u> GC 6.3.7.13.
	6.3.7.15	<u>Delete</u> GC 6.3.7.15.
	6.3.7.17	<u>Delete</u> GC 6.3.7.17 in its entirety including all subparagraphs.
	6.3.11	<u>Delete</u> GC 6.3.11 and <u>replace</u> it with the following: “6.3.11 The value of the <i>Work</i> performed as a result of a <i>Change Directive</i> shall not be eligible to be included in progress payments until the amount, including the method for determining the amount, of such <i>Change Directive</i> has been determined.”

GC 6.4 CONCEALED OR UNKNOWN CONDITIONS

SC40.1	6.4.1	<u>Delete</u> paragraph 6.4.1 in its entirety and <u>replace</u> with the following: “6.4.1.1 Prior to the submission of the bid on which the Contract was awarded, the Contractor confirms that it carefully investigated the Place of the Work insofar as the Place of Work was available for investigation and, in doing so, applied to that investigation the degree of care and skill required by paragraph 3.14.1 6.4.1.2 No claim by the <i>Contractor</i> will be considered by the <i>Owner</i> or the <i>Consultant</i> in connection with conditions which could reasonably have been ascertained by such investigation or other due diligence undertaken prior to the execution of the <i>Contract</i> .”
	6.4.2	<u>Amend</u> paragraph 6.4.2 by <u>adding</u> a new first sentence as follows:

		<p>"Having regard to paragraph 6.4.1, if the <i>Contractor</i> believes that the conditions of the <i>Place of the Work</i> differ materially from those reasonably anticipated, differ materially from those indicated in the <i>Contract Documents</i> and were concealed from discovery notwithstanding the conduct of the investigation described in paragraph 6.4.1, it shall provide the <i>Owner</i> and the <i>Consultant</i> with <i>Notice in Writing</i> no later than five (5) <i>Working Days</i> after the first observation of such conditions."</p> <p>-and-</p> <p><u>amend</u> the existing second sentence of paragraph 6.4.2 in the second line, following the word "materially" by <u>adding</u> the words "or were concealed from discovery notwithstanding the conduct of the investigation described in paragraph 6.4.1,".</p>
	6.4.3	<p><u>Delete</u> paragraph 6.4.3 in its entirety and <u>substitute</u> the following:</p> <p>"6.4.3 If the <i>Consultant</i> makes a finding pursuant to paragraph 6.4.2 that no change in the <i>Contract Price</i> or the <i>Contract Time</i> is justified, the <i>Consultant</i> shall report in writing the reasons for this finding to the <i>Owner</i> and the <i>Contractor</i>."</p>
	6.4.5	<p><u>Add</u> new paragraph 6.4.5 as follows:</p> <p>"6.4.5 No claims for additional compensation or for an extension of <i>Contract Time</i> shall be allowed if the <i>Contractor</i> fails to give <i>Notice in Writing</i> to the <i>Owner</i> or <i>Consultant</i>, as required by paragraph 6.4.2."</p>

GC 6.5 DELAYS

SC41.1	6.5.1	<p>In paragraph 6.5.1 <u>delete</u> the words after the word "for" in the fourth line and <u>replace</u> them with the words "...reasonable <i>Direct Costs</i> directly flowing from the delay, but excluding any consequential, indirect or special damages (including, without limitation, loss of profits, loss of opportunity or loss of productivity)."</p>
	6.5.2	<p><u>Delete</u> GC 6.5.2 in its entirety and <u>replace</u> it with the following:</p> <p>"6.5.2 If the <i>Contractor</i> is delayed in the performance of the <i>Work</i> by a stop work order issued by a court or other public authority and providing that such order was issued on account of a direct breach, violation, contravention, or a failure to abide by any laws, ordinances, rules, regulations, or codes by the <i>Owner</i>, <i>Other Contractor(s)</i>, or the <i>Consultant</i>, and relating to the <i>Work</i> or the <i>Place of the Work</i>, then the <i>Contract Time</i> shall be extended for such reasonable time as the <i>Consultant</i> may determine. The <i>Contractor</i> shall be reimbursed by the <i>Owner</i> for reasonable <i>Direct Costs</i> directly flowing from the delay, but excluding any consequential, indirect or special damages (including, without limitation, loss of profits, loss of opportunity or loss of productivity)."</p>
	6.5.3	<p><u>Delete</u> paragraph 6.5.3 in its entirety and <u>replace</u> with the following:</p> <p>"6.5.3 If either party is delayed in the performance of their obligations under this <i>Contract</i> by <i>Force Majeure</i>, then the <i>Contract Time</i> shall be extended for such reasonable</p>

		<p>time as the <i>Owner</i> and the <i>Contractor</i> shall agree. The extension of time shall not be less than the time lost as a result of the event causing the delay, unless the parties agree to a shorter extension. Neither party shall be entitled to payment for costs incurred by such delays. Upon reaching agreement on the extension of the <i>Contract Time</i> attributable to the <i>Force Majeure</i> event, the <i>Owner</i> and the <i>Contractor</i> shall execute a <i>Change Order</i> indicating the length of the extension to the <i>Contract Time</i> and confirming that there are no costs payable by either party for the extension of <i>Contract Time</i>. However, if at the time an event of <i>Force Majeure</i> arises a party is in default of its obligations under the <i>Contract</i> and has received a notice of default pursuant to PART 7 – DEFAULT NOTICE, this paragraph 6.5.3 shall not excuse a party from its obligation to cure the default(s). For greater certainty, the defaulting party, to the extent possible, must continue to address and cure the default notwithstanding an event of <i>Force Majeure</i>.”</p>
	6.5.4	<p><u>Delete</u> paragraph 6.5.4 in its entirety and <u>replace</u> it with the following:</p> <p>“6.5.4 No extension or compensation shall be made for delay or impact on the <i>Work</i> unless notice in writing of a claim is given to the <i>Consultant</i> not later than ten (10) <i>Working Days</i> after the commencement of the delays or impact on the <i>Work</i>, provided however, that, in the case of a continuing cause of delay or impact on the <i>Work</i>, only one notice of claim shall be necessary.”</p>
	6.5.6 to 6.5.8	<p><u>Add</u> new paragraphs 6.5.6, 6.5.7 and 6.5.8 as follows:</p> <p>“6.5.6 If the <i>Contractor</i> is delayed in the performance of the <i>Work</i> by an act or omission of the <i>Contractor</i> or anyone directly or indirectly employed or engaged by the <i>Contractor</i>, or by any cause within the <i>Contractor’s</i> control, then (i) firstly, at its expense, and to the extent possible, the <i>Contractor</i> shall accelerate the work and/or provide overtime work to recover time lost by a delay arising under this paragraph 6.5.6, and (ii) secondly, where it is not possible for the <i>Contractor</i> to recover the time lost by implementing acceleration measures and/or overtime work, the <i>Contract Time</i> may be extended for such reasonable time as the <i>Owner</i> may decide in consultation with the <i>Consultant</i> and the <i>Contractor</i>. The <i>Owner</i> shall be reimbursed by the <i>Contractor</i> for all reasonable costs incurred by the <i>Owner</i> as the result of such delay, including, but not limited to, <i>Owner’s</i> staff costs, the cost of all additional services required by the <i>Owner</i> from the <i>Consultant</i> or any sub-consultants, project managers, or others employed or engaged by the <i>Owner</i>, and in particular, the costs of the <i>Consultant’s</i> services during the period between the date of <i>Substantial Performance of the Work</i> stated in Article A-1 herein, as the same may be extended through the provision of these General Conditions, and any later or actual date of <i>Substantial Performance of the Work</i> achieved by the <i>Contractor</i>.</p> <p>6.5.7 Without limiting the obligations of the <i>Contractor</i> described in GC 3.2 – CONSTRUCTION BY OWNER OR OTHER CONTRACTORS or GC 9.4 – CONSTRUCTION SAFETY, the <i>Owner</i> or <i>Consultant</i> may, by <i>Notice in Writing</i>, direct the <i>Contractor</i> to stop the <i>Work</i> where the <i>Owner</i> or <i>Consultant</i> determines that there is an imminent risk to the safety of persons or property at the <i>Place of the Work</i>. In the event that the <i>Contractor</i> receives such notice, it shall immediately stop the <i>Work</i> and secure the site. The <i>Contractor</i> shall not be entitled to an extension of the <i>Contract Time</i> or to an increase in the <i>Contract Price</i> unless the resulting delay, if any, would entitle the <i>Contractor</i> to an extension of the <i>Contact Time</i> or the</p>

		<p>reimbursement of the <i>Contractor's</i> costs as provided in paragraphs 6.5.1, 6.5.2 or 6.5.3.</p> <p>6.5.8 No claim for delay shall be made by the <i>Contractor</i> and the <i>Contract Time</i> shall not be extended due to climatic conditions or arising from the <i>Contractor's</i> efforts to maintain the <i>Construction Schedule</i>."</p>
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PART 7 DEFAULT NOTICE

GC 7.1 OWNER'S RIGHT TO PERFORM THE WORK, TERMINATE THE CONTRACTOR'S RIGHT TO CONTINUE WITH THE WORK OR TERMINATE THE CONTRACT

SC43.1	7.1.2	In GC 7.1.2, <u>delete</u> the words "and if the <i>Consultant</i> has given a written statement to the <i>Owner</i> and <i>Contractor</i> which provides the detail of such neglect to perform the <i>Work</i> properly or such failure to comply with the requirements of the <i>Contract</i> to a substantial degree".
SC43.2	7.1.3.4	<u>Add</u> a new subparagraph 7.1.3.4 as follows: ".4 an "acceptable schedule" as referred to in subparagraph 7.1.3.2. means a schedule approved by the <i>Consultant</i> and the <i>Owner</i> wherein the default can be corrected within the balance of the <i>Contract Time</i> and shall not cause delay to any other aspect of the <i>Work</i> or the work of other contractors, and in no event shall it be deemed to give a right to extend the <i>Contract Time</i> ."
	7.1.4.1	<u>Delete</u> subparagraph 7.1.4.1 and <u>replace</u> it with the following: ".1 correct such default and deduct the cost, including <i>Owner's</i> expenses, thereof from any payment then or thereafter due the <i>Contractor</i> ."
	7.1.4.2	<u>Delete</u> subparagraph 7.1.4.2 and <u>replace</u> it with the following: ".2 by providing <i>Notice in Writing</i> to the <i>Contractor</i> , terminate the <i>Contractor's</i> right to continue with the <i>Work</i> in whole or in part or terminate the <i>Contract</i> , and publish a notice of termination (Form 8) in accordance with the <i>Act</i> ."
	7.1.5.3	In subparagraph 7.1.5.3 <u>delete</u> the words: "however, if such cost of finishing the <i>Work</i> is less than the unpaid balance of the <i>Contract Price</i> , the <i>Owner</i> shall pay the <i>Contractor</i> the difference"
	7.1.6 to 7.1.10	<u>Delete</u> GC 7.1.6 and <u>replace</u> it with new paragraphs 7.1.6, 7.1.7, 7.1.8, 7.1.9 and 7.1.10 as follows: "7.1.6 In addition to its right to terminate the <i>Contract</i> set out herein, the <i>Owner</i> may terminate this <i>Contract</i> at any time for any other reason and without cause upon giving the <i>Contractor</i> fifteen (15) <i>Working Days Notice in Writing</i> to that effect. In such event, the <i>Contractor</i> shall be entitled to be paid for all <i>Work</i> performed including reasonable profit, for loss sustained upon <i>Products</i> and <i>Construction Equipment</i> , and such other damages as the <i>Contractor</i> may have sustained as a result of the termination of the <i>Contract</i> , but in no event shall the <i>Contractor</i> be entitled to be compensated for any loss of profit on unperformed portions of the <i>Work</i> , or indirect, special, or consequential damages incurred.

		<p>7.1.7 The <i>Owner</i> may suspend <i>Work</i> under this <i>Contract</i> at any time for any reason and without cause upon giving the <i>Contractor Notice in Writing</i> to that effect. In such event, the <i>Contractor</i> shall be entitled to be paid for all <i>Work</i> performed to the date of suspension and be compensated for all actual costs incurred arising from the suspension, including reasonable profit, for loss sustained upon <i>Products</i> and <i>Construction Equipment</i>, and such other damages as the <i>Contractor</i> may have sustained as a result of the suspension of the <i>Work</i>, but in no event shall the <i>Contractor</i> be entitled to be compensated for any indirect, special, or consequential damages incurred. In the event that the suspension continues for more than thirty (30) calendar days, the <i>Contract</i> shall be deemed to be terminated and the provisions of paragraph 7.1.6 shall apply.</p> <p>7.1.8 In the case of either a termination of the <i>Contract</i> or a suspension of the <i>Work</i> under GC 7.1 - OWNER'S RIGHT TO PERFORM THE WORK, TERMINATE THE CONTRACTOR'S RIGHT TO CONTINUE WITH THE WORK, OR TERMINATE THE CONTRACT or GC 7.2 - CONTRACTOR'S RIGHT TO SUSPEND THE WORK OR TERMINATE THE CONTRACT, the <i>Contractor</i> shall use its best commercial efforts to mitigate the financial consequences to the <i>Owner</i> arising out of the termination or suspension, as the case may be.</p> <p>7.1.9 Upon the resumption of the <i>Work</i> following a suspension under GC 7.1 - OWNER'S RIGHT TO PERFORM THE WORK, TERMINATE THE CONTRACTOR'S RIGHT TO CONTINUE WITH THE WORK, OR TERMINATE THE CONTRACT or GC 7.2 - CONTRACTOR'S RIGHT TO SUSPEND THE WORK OR TERMINATE THE CONTRACT, the <i>Contractor</i> will endeavour to minimize the delay and financial consequences arising out of the suspension.</p> <p>7.1.10 The <i>Contractor's</i> obligations under the <i>Contract</i> as to quality, correction, and warranty of the <i>Work</i> performed by the <i>Contractor</i> up to the time of termination or suspension shall continue after such termination of the <i>Contract</i> or suspension of the <i>Work</i>."</p>
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GC 7.2 CONTRACTOR'S RIGHT TO SUSPEND THE WORK OR TERMINATE THE CONTRACT

SC44.1	7.2.2	<p><u>Delete</u> paragraph 7.2.2 and <u>replace</u> it with the following:</p> <p>"7.2.2 If the <i>Work</i> is suspended or otherwise delayed for a period of 40 consecutive <i>Working Days</i> or more under a stop work order issued by a court or other public authority on account of a breach, violation, contravention, or a failure to abide by any laws, ordinances, rules, regulations, or codes directly by the <i>Owner</i>, the <i>Owner's</i> other contractor(s), or the <i>Consultant</i>, and relating to the <i>Work</i> or the <i>Place of the Work</i>, the <i>Contractor</i> may, without prejudice to any other right or remedy the <i>Contractor</i> may have, terminate the <i>Contract</i> by giving the <i>Owner</i> Notice in <i>Writing</i> to that effect."</p>
SC44.2	7.2.3.1	<u>Delete</u> subparagraph 7.2.3.1 in its entirety.
	7.2.3.2	<u>Delete</u> subparagraph 7.2.3.2 in its entirety.

	7.2.3.4	In subparagraph 7.2.3.4, <u>delete</u> the words "except for GC 5.1 - FINANCING INFORMATION REQUIRED OF THE OWNER".
	7.2.5	<p><u>Delete</u> paragraph 7.2.5 and <u>replace</u> it with the following:</p> <p>"7.2.5 If the default cannot be corrected within the 5 <i>Working Days</i> specified in paragraph 7.2.4, the <i>Owner</i> shall be deemed to have cured the default if it:</p> <ul style="list-style-type: none"> .1 commences correction of the default within the specified time; .2 provides the <i>Contractor</i> with an acceptable schedule for such correction; and, .3 completes the correction in accordance with such schedule."
	7.2.6 to 7.2.9	<p><u>Add</u> new paragraphs 7.2.6, 7.2.7, 7.2.8 and 7.2.9 as follows:</p> <p>"7.2.6 If the <i>Contractor</i> terminates the <i>Contract</i> under the conditions described in GC 7.2 – CONTRACTOR'S RIGHT TO SUSPEND THE WORK OR TERMINATE THE CONTRACT, the <i>Contractor</i> shall be entitled to be paid for all <i>Work</i> performed to the date of termination, as determined by the <i>Consultant</i>. The <i>Contractor</i> shall also be entitled to recover the direct costs associated with termination, including the costs of demobilization and losses sustained on <i>Products</i> and <i>Construction Equipment</i>. The <i>Contractor</i> shall not be entitled to any recovery for any special, indirect or consequential losses, including loss of profit.</p> <p>7.2.7 The <i>Contractor</i> shall not be entitled to give notice of the <i>Owner's</i> default or terminate the <i>Contract</i> in the event the <i>Owner</i> withholds certificates or payment or both in accordance with the <i>Contract</i> because of:</p> <ul style="list-style-type: none"> .1 the <i>Contractor's</i> failure to pay all legitimate claims promptly, or .2 the failure of the <i>Contractor</i> to discharge construction liens which are registered against the title to the <i>Place of the Work</i>. <p>7.2.8 The <i>Contractor's</i> obligations under the <i>Contract</i> as to quality, correction and warranty of the <i>Work</i> performed by the <i>Contractor</i> up to the effective date of termination shall continue in force and shall survive termination of this <i>Contract</i> by the <i>Contractor</i>.</p> <p>7.2.9 If the <i>Contractor</i> suspends the <i>Work</i> or terminates the <i>Contract</i> as provided for in GC 7.2 – CONTRACTOR'S RIGHT TO SUSPEND THE WORK OR TERMINATE THE CONTRACT, the <i>Contractor</i> shall ensure the site and the <i>Work</i> are left in a safe, secure condition as required by authorities having jurisdiction at the <i>Place of the Work</i> and the <i>Contract Documents</i>."</p>

PART 8 DISPUTE RESOLUTION

GC 8.1 AUTHORITY OF THE CONSULTANT

SC45.1	8.1.3	<u>Delete</u> paragraph 8.1.3 in its entirety and <u>substitute</u> as follows:
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		<p>"8.1.3 If a dispute is not resolved promptly, the <i>Consultant</i> will give such instruction as in the <i>Consultant's</i> opinion are necessary for the proper performance of the <i>Work</i> and to prevent delays pending settlement of the dispute. The parties shall act immediately according to such instructions, it being understood that by doing so neither party will jeopardize any claim the party may have."</p>
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GC 8.2 ADJUDICATION

SC45.2	8.2.2 to 8.2.7	<p><u>Add</u> new GC 8.2.2, 8.2.3, 8.2.4, 8.2.5, 8.2.6, and 8.2.7 as follows:</p> <p>"8.2.2 Save and except where the <i>Contractor</i> has given an undertaking, in accordance with the <i>Act</i>, to refer a dispute to <i>Adjudication</i>, prior to delivering a notice of <i>Adjudication</i> in a form prescribed by the <i>Act</i>, the parties agree to first address all disputes with at least one in-person meeting with the <i>Owner's</i> representative, the <i>Consultant's</i> representative, and the <i>Contractor's</i> representative. The parties agree that such steps will be taken to resolve any disputes in a timely and cost-effective manner.</p> <p>8.2.3 Notwithstanding any other provisions in PART 8 DISPUTE RESOLUTION, the parties shall engage in <i>Adjudication</i> proceedings as required by, and in accordance with, the <i>Construction Act</i>.</p> <p>8.2.4 The following procedures shall apply to any <i>Adjudication</i> the parties engage in under the <i>Construction Act</i>:</p> <ul style="list-style-type: none"> .1 any hearings shall be held at a venue within the jurisdiction of the <i>Place of the Work</i> or such other venue as the parties may agree and which is acceptable to the adjudicator; .2 the <i>Adjudication</i> shall be conducted in English; .3 each party may be represented by counsel throughout an <i>Adjudication</i>; .4 there shall not be any oral communications with respect to issues in dispute that are the subject of an <i>Adjudication</i> between a party and the adjudicator unless it is made in the presence of both parties or their legal representatives; and .5 a copy of all written communications between the adjudicator and a party shall be given to the other party at the same time. <p>8.2.5 Any documents or information disclosed by the parties during an <i>Adjudication</i> are confidential and the parties shall not use such documents or information for any purpose other than the <i>Adjudication</i> in which they are disclosed and shall not disclose such documents and information to any third party, unless otherwise required by law, save and except the for the adjudicator.</p> <p>8.2.6 If the <i>Contractor</i> fails to comply with any of the notice requirements set out in the <i>Contract</i>, including the time limits set out in any of the following:</p> <ul style="list-style-type: none"> .1 GC 6.4 – CONCEALED OR UNKNOWN CONDITIONS; .2 GC 6.5 – DELAYS; .3 GC 6.6 – CLAIMS FOR A CHANGE IN CONTRACT PRICE; .4 PART 8 DISPUTE RESOLUTION .5 GC 9.2 – TOXIC AND HAZARDOUS SUBSTANCES .6 GC 9.3 – ARTIFACTS AND FOSSILS; or .7 GC 9.5 - MOULD <p>in respect of any claim or dispute, the <i>Contractor</i> shall have no entitlement whatsoever (including to an increase in the <i>Contract Price</i>, or an extension of <i>Contract Time</i>) in the context of an <i>Adjudication</i> under the <i>Construction Act</i> and waives the right to make any such claims or disputes in an <i>Adjudication</i>. This GC</p>
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		<p>8.2.6 shall operate conclusively as an estoppel and bar in the event such claims or disputes are brought in an <i>Adjudication</i> and the <i>Owner</i> may rely on this GC 8.2.6 as a complete defence to any such claims or disputes.</p> <p>8.2.7 The parties hereby acknowledge and agree,</p> <p style="padding-left: 20px;">.1 that counterclaims, claims of set-off or the exercise or use of other contractual rights that permit the <i>Owner</i> to withhold, deduct or retain from monies otherwise owed to the <i>Contractor</i> under the <i>Contract</i> may be referred to, and included as part of, <i>Adjudications</i> under the <i>Construction Act</i>;</p> <p style="padding-left: 20px;">.2 that disputes related to the termination or abandonment of the <i>Contract</i>, as well as any disputes that arise or are advanced following the termination or abandonment of the <i>Contract</i>, shall not be referred to <i>Adjudication</i> under the <i>Construction Act</i>;</p> <p style="padding-left: 20px;">.3 that notice(s) of <i>Adjudication</i>, with respect to any dispute or claim relating to the <i>Project</i>, shall not be given, and no <i>Adjudication</i> shall be commenced following <i>Contract</i> completion, <i>Contract</i> abandonment, or termination of the <i>Contract</i>;</p> <p style="padding-left: 20px;">.4 that any <i>Adjudication</i> between the <i>Contractor</i> and a <i>Subcontractor</i> or a supplier that relates to an <i>Adjudication</i> between the <i>Owner</i> and the <i>Contractor</i> shall be joined together to be adjudicated by a single adjudicator, provided that the adjudicator agrees to do so, and the <i>Contractor</i> shall include a provision in each of its contracts that contain an equivalent obligation to this GC 8.2.7.4; and</p> <p style="padding-left: 20px;">.5 that, other than where the <i>Contractor</i> is obliged to commence an <i>Adjudication</i> pursuant to an undertaking under the <i>Construction Act</i>, neither the <i>Owner</i> nor the <i>Contractor</i> shall commence an <i>Adjudication</i> during the <i>Restricted Period</i>.</p> <p>8.2.8 The parties acknowledge and agree that no <i>Adjudication</i>, arbitration, action, suit or other proceeding may be brought by the <i>Contractor</i> against the <i>Owner</i> in respect of a claim for an increase to the <i>Contract Price</i> as set out in GC 6.6, before the <i>Consultant</i> has issued its findings in respect of same, pursuant to GC 6.6.5. For greater clarity and without limiting the foregoing, the amount applied for in each <i>Proper Invoice</i> shall not include any amounts pertaining to the <i>Contractor's</i> claim for an increase in <i>Contract Price</i> unless and until the <i>Consultant</i> has issued a written notice to the <i>Contractor</i> regarding the validity of such claim, as provided for in GC 6.6.5. However, nothing in this GC 8.2.8 shall prevent a <i>Contractor</i> from commencing an <i>Adjudication</i> where, pursuant to the <i>Construction Act</i>, the <i>Contractor</i> is required to give an undertaking to a <i>Subcontractor</i> to commence an <i>Adjudication</i> following delivery of a <i>Notice of Non-Payment</i>."</p>
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GC 8.3 NEGOTIATION, MEDIATION AND ARBITRATION

SC46.1	8.3.1	<u>Amend</u> paragraph 8.3.1 by changing part of the second line from "shall appoint a <i>Project Mediator</i> " to "may appoint a <i>Project Mediator</i> , except that such an appointment shall only be made if both the <i>Owner</i> and the <i>Contractor</i> agree."
	8.3.4	<u>Amend</u> paragraph 8.3.4 by changing part of the second line from "the parties shall request the <i>Project Mediator</i> " to "and subject to paragraph 8.3.1 the parties may request the <i>Project Mediator</i> ".

8.3.6 to 8.3.9	<p><u>Delete</u> paragraphs 8.3.6, 8.3.7 and 8.3.8 in their entirety and <u>replace</u> them with the following new GCs 8.3.6, 8.3.7, 8.3.8, and 8.3.9:</p> <p>8.3.6 The dispute may be finally resolved by arbitration under the Rules for Arbitration of Construction Disputes as provided in CCDC 40 in effect at the time of bid closing, provided that both the <i>Contractor</i> and the <i>Owner</i> agree. If the <i>Contractor</i> and the <i>Owner</i> agree to resolve the dispute by arbitration, the arbitration shall be conducted in the jurisdiction of the <i>Place of the Work</i>.</p> <p>8.3.7 Prior to delivering a notice of <i>Adjudication</i> in a form prescribed by the <i>Act</i>, the parties agree to first address all disputes by attending at least one meeting with the <i>Owner's</i> representative, the <i>Consultant's</i> representative, and the <i>Contractor's</i> representative, prior to commencing an <i>Adjudication</i>. The parties agree that such steps will be taken to resolve any disputes in a timely and cost effective manner. If a resolution to the dispute(s) is not made at such a meeting, any party who plans to commence an <i>Adjudication</i> shall provide the other party with 5 <i>Working Days' Notice in Writing</i> of its intention to issue a notice of <i>Adjudication</i>.</p> <p>8.3.8 Other than where the <i>Contractor</i> is obliged to commence an <i>Adjudication</i> pursuant to an undertaking under the <i>Construction Act</i>, neither the <i>Owner</i> nor the <i>Contractor</i> shall commence an <i>Adjudication</i> during the <i>Restricted Period</i>.</p> <p>8.3.9 Where either party has delivered a notice of <i>Adjudication</i> in a form prescribed by the <i>Act</i>, the procedures and rules set out under the <i>Construction Act</i> and the regulations thereto shall govern the <i>Adjudication</i>."</p>
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PART 9 PROTECTION OF PERSONS AND PROPERTY

GC 9.1 PROTECTION OF WORK AND PROPERTY

SC47.1	9.1.1.1	<p><u>Delete</u> subparagraph 9.1.1.1 in its entirety and <u>substitute</u> the following:</p> <p>“.1 errors in the <i>Contract Documents</i> which the <i>Contractor</i> could not have discovered applying the standard of care described in paragraph 3.14.1;”</p>
	9.1.2	<p><u>Delete</u> paragraph 9.1.2 in its entirety and <u>substitute</u> as follows:</p> <p>“9.1.2 Before commencing any <i>Work</i>, the <i>Contractor</i> shall determine the locations of all underground or hidden utilities and structures indicated in or inferable from the <i>Contract Documents</i>, or that are inferable from an inspection of the <i>Place of the Work</i> exercising the degree of care and skill described in paragraph 3.14.1.”</p>
	9.1.5	<p><u>Add</u> new paragraph 9.1.5 as follows:</p> <p>“9.1.5 With respect to any damage to which paragraphs 9.1.3 or 9.1.4 apply, the <i>Contractor</i> shall neither undertake to repair or replace any damage whatsoever to the work of other contractors, or to adjoining property, nor acknowledge that the same was caused or occasioned by the <i>Contractor</i>, without first consulting the <i>Owner</i> and receiving written instructions as to the course of action to be followed from either the <i>Owner</i> or the <i>Consultant</i>. Where, however, there is danger to life, the environment, or public safety, the <i>Contractor</i> shall take such emergency action as it deems necessary to remove the danger.”</p>

GC 9.2 TOXIC AND HAZARDOUS SUBSTANCES

SC48.1	9.2.1	<p>Amend GC 9.2.1 by <u>inserting</u> the following to the end of the paragraph:</p> <p>“For the purposes of GC 9.2 – TOXIC AND HAZARDOUS SUBSTANCES, <i>Excess Soil</i> shall not be considered a ‘toxic and hazardous substance’.”</p>
SC48.2	9.2.5.5	<p>Add a new subparagraph 9.2.5.5 as follows:</p> <p>“.5 in addition to the steps described in subparagraph 9.2.5.3, take any further steps it deems necessary to mitigate or stabilize any conditions resulting from encountering toxic or hazardous substances or materials.”</p>
	9.2.6	<p><u>Amend</u> GC 9.2.6 by <u>adding</u> the following words after the word “responsible” in the second line:</p> <p>“or whether any toxic or hazardous substances or materials already at the <i>Place of the Work</i> (and which were then harmless or stored, contained or otherwise dealt with in accordance with legal and regulatory requirements) were dealt with by the <i>Contractor</i> or anyone for whom the <i>Contractor</i> is responsible in a manner which does not comply with legal and regulatory requirements, or which threatens human health and safety or the environment, or material damages to the property of the <i>Owner</i> or others.”.</p>
	9.2.8	<p><u>Amend</u> GC 9.2.8 by <u>adding</u> the following words after the word “responsible” in the second line:</p> <p>“or whether any toxic or hazardous substances or materials already at the <i>Place of the Work</i> (and which were then harmless or stored, contained or otherwise dealt with in accordance with legal and regulatory requirements) were dealt with by the <i>Contractor</i> or anyone for whom the <i>Contractor</i> is responsible in a manner which does not comply with legal and regulatory requirements, or which threatens human health and safety or the environment, or material damages to the property of the <i>Owner</i> or others.”.</p>
	9.2.10	<p><u>Add</u> new paragraph 9.2.10 as follows:</p> <p>“9.2.10 The <i>Contractor</i>, <i>Subcontractors</i> and <i>Suppliers</i> shall not bring on to the <i>Place of the Work</i> any toxic or hazardous substances and materials except as required in order to perform the <i>Work</i>. If such toxic or hazardous substances or materials are required, storage in quantities sufficient to allow work to proceed to the end of any current work week only shall be permitted. All such toxic and hazardous materials and substances shall be handled and disposed of only in accordance with all laws and regulations that are applicable at the <i>Place of the Work</i>.”</p>

GC 9.4 CONSTRUCTION SAFETY

SC49.1	9.4.1	<p><u>Delete</u> GC 9.4.1 in its entirety and <u>replace</u> it with the following:</p>
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		<p>“9.4.1 The <i>Contractor</i> shall be solely responsible for construction safety at the <i>Place of the Work</i> and for compliance with the rules, regulations, and practices required by the <i>OHSA</i>, including, but not limited to those of the “constructor”, and shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the <i>Work</i>. The <i>Contractor’s</i> health and safety program documentation shall be made available for review by the <i>Owner</i> or <i>Consultant</i> immediately upon request. Without limiting the foregoing, the <i>Contractor</i> shall be solely responsible for construction safety in respect of the <i>Consultant, Subcontractors</i> and <i>Suppliers</i>, the <i>Owner’s</i> own forces, <i>Other Contractors</i>, and all persons attending the <i>Place of the Work</i> during the course of the <i>Project</i>.”</p>
	9.4.2	<p>Amend GC 9.4.2 by <u>adding</u> the following words after “and the <i>Contractor</i>”: “ , <i>Subcontractors</i> and <i>Suppliers</i>”.</p>
	9.4.3	<p>Amend GC 9.4.3 by <u>adding</u> the following words after “and the <i>Contractor</i>”: “ , <i>Subcontractors</i> and <i>Suppliers</i>”.</p>
	9.4.4	<p><u>Delete</u> GC 9.4.4 and replace it with the following: “9.4.4 The <i>Owner</i> undertakes to include in its contracts with other contractors and in its instructions to its own forces the requirement that the other contractor or its own forces, as the case may be, comply with the policies and procedures of and the directions and instructions from the <i>Contractor</i> with respect to occupational health and safety and related matters.”</p>
	9.4.5	<p><u>Delete</u> GC 9.4.5 in its entirety and <u>replace</u> it with the following: “9.4.5 Prior to the commencement of the <i>Work</i>, the <i>Contractor</i> shall submit to the <i>Owner</i>:</p> <ul style="list-style-type: none"> .1 a current WSIB clearance certificate; .2 copies of the <i>Contractor’s</i> insurance policies having application to the <i>Project</i> or certificates of insurance, at the option of the <i>Owner</i>; .3 documentation setting out the <i>Contractor’s</i> in-house safety programs; .4 a copy of the Notice of Project filed with the Ministry of Labour naming itself as “constructor” under the <i>OHSA</i>; and .5 copies of any documentation or notices to be filed or delivered to the authorities having jurisdiction for the regulation of occupational health and safety at the <i>Place of the Work</i>.”
	9.4.6 to 9.4.12	<p><u>Add</u> new GC 9.4.6, 9.4.7, 9.4.8, 9.4.9, 9.4.10, 9.4.11, and 9.4.12 as follows: “9.4.6 The <i>Contractor</i> shall indemnify and save harmless the <i>Owner</i>, its agents, trustees, officers, directors, employees, consultants, successors, appointees, and assigns from and against the consequences of any and all safety infractions committed by the <i>Contractor</i> under <i>OHSA</i> and any other occupational health and safety legislation in force at the <i>Place of the Work</i> including the payment of legal fees and</p>

		<p>disbursements on a solicitor and client basis. Such indemnity shall apply to the extent to which the <i>Owner</i> is not covered by insurance.</p> <p>9.4.7 If the <i>Owner</i> is of the reasonable opinion that the <i>Contractor</i> has not taken such precautions as are necessary to ensure compliance with the requirements of paragraph 9.4.1, the <i>Owner</i> may take any remedial measures which it deems necessary, including stopping the performance of all or any portion of the <i>Work</i>, and the <i>Owner</i> may use its employees, the <i>Contractor</i>, any <i>Subcontractor</i> or any other contractors to perform such remedial measures.</p> <p>9.4.8 The <i>Contractor</i> shall file any notices or any similar document required pursuant to the <i>Contract</i> or the safety regulations in force at the <i>Place of the Work</i>. This duty of the <i>Contractor</i> will be considered to be included in the <i>Work</i> and no separate payment therefore will be made to the <i>Contractor</i>.</p> <p>9.4.9 Unless otherwise provided in the <i>Contract Documents</i>, the <i>Contractor</i> shall develop, maintain and supervise for the duration of the <i>Work</i> a comprehensive safety program that will effectively incorporate and implement all required safety precautions. The program shall, at a minimum, respond fully to the applicable safety regulations and general construction practices for the safety of persons or property, including, without limitation, any general safety rules and regulations of the <i>Owner</i> and any workers' compensation or occupational health and safety statutes or regulations in force at the <i>Place of the Work</i>.</p> <p>9.4.10 The <i>Contractor</i> shall provide a copy of the safety program described in GC 9.4.9 hereof to the <i>Consultant</i> for delivery to the <i>Owner</i> prior to the commencement of the <i>Work</i>, and shall, ensure, as far as it is reasonably practical to do so, that every employer and worker performing work in respect of the <i>Project</i> complies with such program.</p> <p>9.4.11 The <i>Contractor</i> shall arrange regular safety meetings, and shall supply and maintain, at its own expense, at its office or other well-known place at the job site, safety equipment necessary to protect the workers and general public against accident or injury as prescribed by the authorities having jurisdiction at the <i>Place of the Work</i>, including, without limitation, articles necessary for administering first-aid to any person and an emergency procedure for the immediate removal of any injured person to a hospital or a doctor's care.</p> <p>9.4.12 The <i>Contractor</i> shall promptly report in writing to the <i>Owner</i> and the <i>Consultant</i> all accidents of any sort arising out of or in connection with the performance of the <i>Work</i>, whether on or adjacent to the job site, giving full details and statement of witnesses. If death or serious injuries or damages are caused, the accident shall be promptly reported by the <i>Contractor</i> to the <i>Owner</i> and the <i>Consultant</i> by telephone or messenger in addition to any reporting required under the applicable safety regulations." "</p>
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PART 10 GOVERNING REGULATIONS

GC 10.1 TAXES AND DUTIES

SC50.1	10.1.2	Amend paragraph 10.1.2 by adding the following sentence to the end of the paragraph:
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		<p>“For greater certainty, the <i>Contractor</i> shall not be entitled to any mark-up for overhead or profit on any increase in such taxes and duties and the <i>Owner</i> shall not be entitled to any credit relating to mark-up for overhead or profit on any decrease in such taxes. The <i>Contractor</i> shall provide a detailed breakdown of <u>Additional taxes</u> if requested by the <i>Owner</i> in a form satisfactory to the <i>Owner</i>.”</p>
	10.1.3	<p><u>Add</u> new paragraph 10.1.3 as follows: “10.1.3 Where the <i>Owner</i> is entitled to an exemption or a recovery of sales taxes, customs duties, excise taxes or <i>Value Added Taxes</i> applicable to the <i>Contract</i>, the <i>Contractor</i> shall, at the request of the <i>Owner</i>, assist with the application for any exemption, recovery or refund of all such taxes and duties and all amounts recovered or exemptions obtained shall be for the sole benefit of the <i>Owner</i>. The <i>Contractor</i> agrees to endorse over to the <i>Owner</i> any cheques received from the federal or provincial governments, or any other taxing authority, as may be required to give effect to this paragraph.”</p>

GC 10.2 LAWS, NOTICES, PERMITS, AND FEES

SC51.1	10.2.5	<p><u>Amend</u> paragraph 10.2.5 by <u>adding</u> the words “Subject to paragraph 3.4” at the beginning of the paragraph.</p> <p>-and-</p> <p><u>Add</u> the following to the end of the second sentence:</p> <p>“...and no further <i>Work</i> on the affected components of the <i>Contract</i> shall proceed until these directives have been obtained by the <i>Contractor</i> from the <i>Consultant</i>.”</p>
	10.2.6	<p><u>Amend</u> paragraph 10.2.6 by <u>adding</u> the following sentence to the end of the paragraph:</p> <p>“In the event the <i>Owner</i> suffers loss or damage as a result of the <i>Contractor</i>’s failure to comply with paragraph 10.2.5 and notwithstanding any limitations described in paragraph 12.1.1, the <i>Contractor</i> agrees to indemnify and to hold harmless the <i>Owner</i> and the <i>Consultant</i> from and against any claims, demands, losses, costs, damages, actions suits or proceedings resulting from such failure by the <i>Contractor</i>.”</p>
	10.2.7	<p><u>Amend</u> paragraph 10.2.7 by inserting the words “which changes were not, or could not have reasonably been known to the <i>Owner</i> or to the <i>Contractor</i>, as applicable, at the time of bid closing and which changes did not arise as a result of a public emergency or other <i>Force Majeure</i> event” to the second line, after the words “authorities having jurisdiction”.</p>
	10.2.8	<p><u>Add</u> new paragraph 10.2.8 as follows: “10.2.8 The <i>Contractor</i> shall furnish all certificates that are required or given by the appropriate governmental authorities as evidence that the <i>Work</i> as installed conforms with the laws and regulations of authorities having jurisdiction, including certificates of compliance for the <i>Owner</i>’s occupancy or partial occupancy. The certificates are to be final certificates giving complete clearance of the <i>Work</i>, in the event that such governmental authorities furnish such certificates.”</p>

GC 10.4 WORKERS’ COMPENSATION

SC52.1	10.4.1	<p><u>Delete</u> paragraph 10.4.1 and <u>replace</u> with the following:</p>
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		<p>“10.4.1 Prior to commencing the <i>Work</i>, and with each and every application for payment thereafter, including the <i>Contractor’s</i> application for payment of the holdback amount following <i>Substantial Performance of the Work</i> and again with the <i>Contractor’s</i> application for final payment, the <i>Contractor</i> shall provide evidence of compliance with workers’ compensation legislation in force at the <i>Place of the Work</i>, including payments due thereunder.”</p>
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GC 11.1 INSURANCE

SC53.1	11.1	<p><u>Delete</u> entirety of GC 11.1 and <u>replace</u> with the following: “GC 11.1 INSURANCE</p> <p>11.1.1 Without restricting the generality of GC 12 – INDEMNIFICATION, the <i>Contractor</i> shall provide, maintain, and pay for the insurance coverages specified in GC 11.1 – INSURANCE. Unless otherwise stipulated, the duration of each insurance policy shall be from the date of commencement of the <i>Work</i> until the expiration of the warranty periods set out in the <i>Contract Documents</i>. Prior to commencement of the <i>Work</i> and upon the placement, renewal, <u>amendment</u>, or extension of all or any part of the insurance, the <i>Contractor</i> shall promptly provide the <i>Owner</i> with confirmation of coverage and, if required, a certified true copy of the policies certified by an authorized representative of the insurer together with copies of any <u>amending</u> endorsements.</p> <p>.1 General Liability Insurance</p> <p>General liability insurance shall be in the name of the <i>Contractor</i>, with the <i>Owner</i> and the <i>Consultant</i> named as <u>Additional</u> insureds, with limits of not less than \$5,000,000.00 inclusive per occurrence for bodily injury, death, and damage to property, including loss of use thereof, for itself and each of its employees, <i>Subcontractors</i> and/or agents. The insurance coverage shall not be less than the insurance required by IBC Form 2100, or its equivalent <u>replacement</u>, provided that IBC Form 2100 shall contain the latest edition of the relevant CCDC endorsement form. To achieve the desired limit, umbrella, or excess liability insurance may be used. All liability coverage shall be maintained for completed operations hazards from the date of <i>Ready-for-Takeover</i>, as set out in the certificate of <i>Ready-for-Takeover</i>, on an ongoing basis for a period of 6 years following <i>Ready-for-Takeover</i>. Where the <i>Contractor</i> maintains a single, blanket policy, the <u>Addition</u> of the <i>Owner</i> and the <i>Consultant</i> is limited to liability arising out of the <i>Project</i> and all operations necessary or incidental thereto. The policy shall be endorsed to provide the <i>Owner</i> with not less than 30 days’ notice, in writing, in advance of any cancellation and of change or <u>amendment</u> restricting coverage.</p> <p>.2 Automobile Liability Insurance</p> <p>Automobile liability insurance in respect of licensed vehicles shall limits of not less than \$2,000,000.00 inclusive per occurrence for bodily injury, death and damage to property, covering all licensed vehicles <i>owned</i> or leased by the <i>Contractor</i>, and endorsed to provide the <i>Owner</i> with not less than 30 days’ notice, in writing, in advance of any cancellation, change or <u>amendment</u> restricting coverage. Where the policy has been issued pursuant to a government-operated automobile insurance system, the <i>Contractor</i> shall provide the <i>Owner</i> with confirmation of</p>
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		<p>automobile insurance coverage for all automobiles registered in the name of the <i>Contractor</i>.</p> <p>.3 Aircraft and Watercraft Liability Insurance</p> <p>Intentional Deleted. Not Applicable</p> <p>.4 Property and Boiler and Machinery Insurance</p> <p>(1) Builder's Risk property insurance shall be in the name of the <i>Contractor</i> with the <i>Owner</i> and the <i>Consultant</i> named as <u>Additional</u> insureds. The policy shall insure against all risks of direct physical loss or damage to the property insured which shall include all property included in the <i>Work</i>, whether owned by the <i>Contractor</i> or the owner or owned by others, so long as the property forms part of the <i>Work</i>. The property insured also includes all materials and supplies necessary to complete the work, whether installed in the work temporarily or permanently, in storage on the project site, or in transit to the project site, as well as temporary buildings, scaffolding, falsework forms, hoardings, excavation, site preparation and similar work. The insurance shall be for not less than the sum of the amount of the contract price and the full value of products that are specified to be provided by the owner for incorporation into the work, if applicable, with the deductible of \$10,000.00 payable by the contractor. The insurance shall include the foregoing and, otherwise, shall not be less than the insurance required by IBC Form 4042 or its equivalent <u>replacement</u> provided that the IBC Form 4042 shall include the latest <u>Addition</u> of the relevant CCDC endorsement form. The coverage shall be based on a completed value form and shall be maintained continuously until ten (10) days after the date of the final certificate of payment.</p> <p>(2) Boiler and machinery insurance shall be in the name of the <i>Contractor</i>, with the <i>Owner</i> and the <i>Consultant</i> named as <u>Additional</u> insureds, for not less than the <u>replacement</u> value of the boilers, pressure vessels and other insurable objects forming part of the <i>Work</i>. The insurance provided shall not be less than the insurance provided by the "Comprehensive Boiler and Machinery Form" and shall be maintained continuously from commencement of use or operation of the property insured and until 10 days after the date of the final certificate for payment.</p> <p>(3) The policies shall allow for partial or total use or occupancy of the <i>Work</i>.</p> <p>(4) The policies shall provide that, in the case of a loss or damage, payment shall be made to the <i>Owner</i> and the <i>Contractor</i> as their respective interests may appear. The <i>Contractor</i> shall act on behalf of the <i>Owner</i> for the purpose of adjusting the amount of such loss or damage payment with the insurers. When the extent of the loss or damage is determined, the <i>Contractor</i> shall proceed to restore the <i>Work</i>. Loss or damage shall not affect the rights and obligations of either party under the <i>Contract</i> except that the <i>Contractor</i> shall be entitled to such reasonable extension of the <i>Contract Time</i>, relative to the extent of the loss or damage, as determined by the <i>Owner</i>, in its sole discretion.</p> <p>(5) The <i>Contractor</i> shall be entitled to receive from the <i>Owner</i>, in <u>Addition</u> to the amount due under the <i>Contract</i>, the amount at which the <i>Owner's</i> interest in restoration of the <i>Work</i> has been appraised, such amount to be paid as the restoration of the <i>Work</i> proceeds and as provided in GC 5.2 – APPLICATIONS</p>
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		<p>FOR PROGRESS PAYMENT and GC 5.3 – PROGRESS PAYMENT. In <u>Addition</u>, the <i>Contractor</i> shall be entitled to receive from the payments made by the insurer the amount of the <i>Contractor’s</i> interest in the restoration of the <i>Work</i>.</p> <p>(6) In the case of loss or damage to the <i>Work</i> arising from the work of other contractors, or the <i>Owner’s</i> own forces, the <i>Owner</i>, in accordance with the <i>Owner’s</i> obligations under paragraph 3.2.2.4 of GC 3.2 – CONSTRUCTION BY OWNER OR OTHER CONTRACTORS, shall pay the <i>Contractor</i> the cost of restoring the <i>Work</i> as the restoration of the <i>Work</i> proceeds and as provided in GC 5.2 – APPLICATIONS FOR PROGRESS PAYMENT and GC 5.3 – PROGRESS PAYMENT.</p> <p>.5 Contractors’ Equipment Insurance</p> <p>“All risks” contractors’ equipment insurance covering construction machinery and equipment used by the <i>Contractor</i> for the performance of the <i>Work</i>, excluding boiler insurance, shall be in a form acceptable to the <i>Owner</i> and shall not allow subrogation claims by the insurer against the <i>Owner</i>. The policies shall be endorsed to provide the <i>Owner</i> with not less than 30 days’ notice, in writing, in advance of cancellation, change or amendment restricting coverage. Subject to satisfactory proof of financial capability by the <i>Contractor</i> for self-insurance of his equipment, the <i>Owner</i> agrees to waive the equipment insurance requirement.</p> <p>11.1.2 The <i>Contractor</i> shall be responsible for deductible amounts under the policies except where such amounts may be excluded from the <i>Contractor’s</i> responsibility by the terms of GC 9.1 - PROTECTION OF WORK AND PROPERTY and GC 9.2 - DAMAGES AND MUTUAL RESPONSIBILITY.</p> <p>11.1.3 Where the full insurable value of the <i>Work</i> is substantially less than the <i>Contract Price</i>, the <i>Owner</i> may reduce the amount of insurance required to waive the course of construction insurance requirement.</p> <p>11.1.4 If the <i>Contractor</i> fails to provide or maintain insurance as required by the <i>Contract Documents</i>, then the <i>Owner</i> shall have the right to provide and maintain such insurance and provide evidence of same to the <i>Contractor</i>. The <i>Contractor</i> shall pay the costs thereof to the <i>Owner</i> on demand, or the <i>Owner</i> may deduct the amount that is due or may become due to the <i>Contractor</i>.</p> <p>11.1.5 All required insurance policies shall be with insurers licensed to underwrite insurance in the jurisdiction of the <i>Place of the Work</i>.”</p>
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***NEW* GC 11.2 CONTRACT SECURITY**

SC52.1	GC 11.2	<p><u>Add</u> new GC 11.2 – CONTRACT SECURITY as follows:</p> <p>“GC 11.2 CONTRACT SECURITY</p> <p style="padding-left: 40px;">11.2.1 The <i>Contractor</i> shall, prior to the execution of the <i>Contract</i>, furnish a performance bond and labour and material payment bond which meets the requirements under paragraph 11.2.2.</p> <p>11.2.2 The performance bond and labour and material payment bond shall:</p>
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		<p>.1 be issued by a duly licensed surety company, which has been approved by the <i>Owner</i> and is permitted under the <i>Construction Act</i>,</p> <p>.2 be issued by an insurer licensed under the <i>Insurance Act</i> (Ontario) and authorized to transact a business of suretyship in the Province of Ontario;</p> <p>.3 shall be in the form prescribed by the <i>Construction Act</i>;</p> <p>.4 have a coverage limit of at least 50 per cent of the <i>Contract Price</i>, or such other percentage of the <i>Contract Price</i> as stated in the <i>Contract Documents</i>;</p> <p>.5 extends protection to <i>Subcontractors</i>, <i>Suppliers</i>, and any other persons supplying labour or materials to the <i>Project</i>; and</p> <p>.6 shall be maintained in good standing until the fulfillment of the <i>Contract</i>, including all warranty and maintenance periods set out in the <i>Contract Documents</i>.</p> <p>11.2.3 It is the intention of the parties that the performance bond shall be applicable to all of the <i>Contractor's</i> obligations in the <i>Contract Document</i> and, wherever a performance bond is provided with language which conflicts with this intention, it shall be deemed to be amended to comply. The <i>Contractor</i> represents and warrants to the <i>Owner</i> that it has provided its surety with a copy of the <i>Contract Documents</i> prior to the issuance of such bonds.</p> <p>11.2.4 Without limiting the foregoing in any way, the bonds shall indemnify and hold harmless the <i>Owner</i> for and against costs and expenses (including legal and <i>Consultant</i> services and court costs) arising out of or as a consequence of any default of the <i>Contractor</i> under this <i>Contract</i>.</p> <p>11.2.4 The <i>Contractor</i> shall be responsible for notifying the surety company of any changes made to the <i>Contract</i> during the course of construction.</p> <p>11.2.5 The premiums for bonds required by the <i>Contract Documents</i> shall be included in the <i>Contract Price</i>.</p> <p>11.2.6 Should the <i>Owner</i> require additional bonds by the <i>Contractor</i> or any of his <i>Subcontractors</i>, after the receipt of bids for the <i>Work</i>, the <i>Contract Price</i> shall be increased by all direct costs attributable to providing such bonds. The <i>Contractor</i> shall promptly provide the <i>Owner</i>, through the <i>Consultant</i>, with any such bonds that may be required."</p>
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PART 12 OWNER TAKEOVER

GC 12.1 READY-FOR-TAKEOVER

SC55.1	12.1.1	<p><u>Delete</u> GC 12.1.1 in its entirety and <u>replace</u> it with the following:</p> <p>"12.1.1 <i>Ready-for-Takeover</i> shall be achieved when all of the following has occurred, as verified and approved by the <i>Owner</i>:</p> <p>.1 <i>Substantial Performance of the Work</i> has been achieved, as certified by the <i>Consultant</i>;</p> <p>.2 a permit for occupancy of the <i>Place of the Work</i> has been obtained from the authorities having jurisdiction;</p> <p>.3 the <i>Work</i> to be performed under the <i>Contract</i> has satisfied the requirements for deemed completion in accordance with Section 2(3) of the <i>Construction Act</i>;</p> <p>.4 final cleaning and waste removal, as required by the <i>Contract Documents</i>;</p>
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		<p>.5 the <i>Contractor</i> has delivered to the <i>Consultant</i> and the <i>Owner</i> all inspection certificates from authorities having jurisdiction with respect to any component of the <i>Work</i> which has been completed;</p> <p>.6 subject only to GC 12.1.2, the entire <i>Work</i> has been completed to the requirements of the <i>Contract Documents</i>, including completion of all items on the punch list prepared at the time of <i>Substantial Performance of the Work</i> and the <i>Work</i> is being used for its intended purpose, and is so certified by the <i>Consultant</i>;</p> <p>.7 subject only to GC 12.1.2, the <i>Contractor</i> has submitted to the <i>Owner</i> and the <i>Consultant</i> in a collated and organized matter, all <i>Close-Out Documentation</i> and any other materials or documentation required by the <i>Contract Documents</i>;</p> <p>.8 subject only to GC 12.1.2, all <i>Products</i>, systems and components of the <i>Project</i> have been commissioned and certified for operation and accepted by the <i>Owner</i> and <i>Consultant</i>, and</p> <p>9 subject only to GC 12.1.2, the <i>Contractor</i> has submitted to the <i>Owner</i> and the <i>Consultant</i> full and complete as-built drawings and <i>Specifications</i> revised by the <i>Contractor</i> to reflect the as-built state of the <i>Work</i>, clearly showing changes to the <i>Drawings</i> and <i>Specifications</i> from the original <i>Contract Documents</i>, all of which have been approved by the <i>Owner</i> acting reasonably.”</p>
SC55.2	12.1.2	<p><u>Delete</u> GC 12.1.2 in its entirety and <u>replace</u> it with the following:</p> <p>“12.1.2 The <i>Owner</i> may, in its sole, absolute, and unfettered discretion, waive compliance with a requirement, or a part thereof, for achieving <i>Ready-for-Takeover</i> set out in GC 12.1.1.6 to 12.1.1.9 (inclusive). Where the <i>Owner</i> exercises the discretion afforded under this GC 12.1.2, the <i>Contractor</i> shall be required to comply with GC 5.5.1.2 as part of its application for final payment and the <i>Owner</i> and the <i>Contractor</i>, in consultation with the <i>Consultant</i>, shall establish a reasonable date for completing the <i>Work</i>.”</p>
SC55.3	12.1.3	<p><u>Delete</u> GC 12.1.3 in its entirety and <u>replace</u> it with the following:</p> <p>“12.1.3 When the <i>Contractor</i> considers the <i>Work Ready-for-Takeover</i>, it shall submit a written application to the <i>Owner</i> and the <i>Consultant</i> for review.”</p>
SC55.4	12.1.4	In GC 12.1.4, <u>delete</u> the words “list and” from the second line.
SC55.5	12.1.5	<p><u>Delete</u> GC 12.1.5 in its entirety and <u>replace</u> it with the following:</p> <p>“12.1.5 Following the confirmation of the date of <i>Ready-for-Takeover</i> by the <i>Consultant</i> and as confirmed by the <i>Owner</i>, the <i>Contractor</i> may submit a final application for payment in accordance with GC 5.5 – FINAL PAYMENT.”</p>
SC55.6	12.1.6	<u>Delete</u> GC 12.1.6 in its entirety.

GC 12.2 EARLY OCCUPANCY

SC56.1	GC 12.2	<p><u>Delete</u> GC 12.2 – EARLY OCCUPANCY BY THE OWNER in its entirety, including all subparagraphs thereunder and <u>replace</u> it with the following:</p> <p>“12.2.1 The Owner reserves the right to take possession of and use for any intended purpose any portion or all of the undelivered portion of the Project even though the Work may not have reached Substantial Performance of the Work. Where the Work extends beyond the Contract Time, progress and completion of the Work shall not unduly interfere with the delivery of scheduled school programs. The taking of possession or use of any such portion of the Project shall not be deemed to be the Owner’s acknowledgement or acceptance of the Work or Project nor shall it relieve the Contractor of any of its obligations under the Contract.</p> <p>12.2.2 Whether the Project contemplates Work by way of renovations in buildings which will be in use or be occupied during the course of the Work or where the Project involves Work that is adjacent to a structure which is in use or is occupied, the Contractor, without in any way limiting its responsibilities under this Contract, shall take all reasonable steps to avoid interference with fire exits, building access and egress, continuity of electric power and all other utilities, to suppress dust and noise and to avoid conditions likely to propagate mould or fungus of any kind and all other steps reasonably necessary to promote and maintain the safety and comfort of the users and occupants of such structures or adjacent structures.”</p>
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GC 12.3 WARRANTY

SC57.1	12.3.1	<u>Delete</u> from the first line of paragraph 12.3.1 the words “one year” and <u>replace</u> it with the words “two years”
	12.3.2	<u>Delete</u> from the first line of paragraph 12.3.2 the word “The” and <u>replace</u> it with the words “Subject to GC 1.1.3, the...”
	12.3.7 to 12.3.12	<p><u>Add</u> new paragraphs 12.3.7 to 12.3.12 as follows:</p> <p>“12.3.7 Where required by the <i>Contract Documents</i>, the <i>Contractor</i> shall provide a maintenance bond as security for the performance of the <i>Contractor’s</i> obligations as set out in GC 12.3 WARRANTY.</p> <p>12.3.8 The <i>Contractor</i> shall provide fully and properly completed and signed copies of all warranties and guarantees required by the <i>Contract Documents</i>, containing:</p> <ul style="list-style-type: none"> .1 the proper name of the <i>Owner</i>; .2 the proper name and address of the <i>Project</i>; .3 the date the warranty commences, which shall be at the “<i>Ready-for-Takeover</i>” unless otherwise agreed upon by the <i>Consultant</i> in writing. .4 a clear definition of what is being warranted and/or guaranteed as required by the <i>Contract Documents</i>; and .5 the signature and seal (if required by the governing law of the <i>Contract</i>) of the company issuing the warranty, countersigned by the <i>Contractor</i>. <p>12.3.9 Should any <i>Work</i> need to be repaired or replaced during the time period for which it is covered by the specified warranty, a new warranty shall be provided under the same conditions and for the same period as specified herein before. The new warranty shall commence at the completion of the repair or replacement.</p>

		<p>12.3.10 The <i>Contractor</i> shall ensure that its <i>Subcontractors</i> are bound to the requirements of GC 12.3 – WARRANTY for the <i>Subcontractor's</i> portion of the <i>Work</i>.</p> <p>12.3.11 The <i>Contractor</i> shall ensure that all warranties, guarantees or other obligations for <i>Work</i>, services or <i>Products</i> performed or supplied by any <i>Subcontractor</i>, <i>Supplier</i> or other person in connection with the <i>Work</i> are obtained and available for the direct benefit of the <i>Owner</i>. In the alternative, the <i>Contractor</i> shall assign to the <i>Owner</i> all warranties, guarantees or other obligations for <i>Work</i>, services or <i>Products</i> performed or supplied by any <i>Subcontractor</i>, <i>Supplier</i> or other person in connection with the <i>Work</i> and such assignment shall be with the consent of the assigning party, where required by law, or by the terms of that party's contract. Such assignment shall be in addition to, and shall in no way limit, the warranty rights of the <i>Owner</i> under the <i>Contract Documents</i>.</p> <p>12.3.12 The <i>Contractor</i> shall commence or correct any deficiency within 2 <i>Working Days</i> after receiving a <i>Notice in Writing</i> from the <i>Owner</i> or the <i>Consultant</i>, and shall complete the <i>Work</i> as expeditiously as possible, except in the case where the deficiency prevents maintaining security or where basic systems essential to the ongoing business of the <i>Owner</i> and/or its tenants cannot be maintained operational as designed. In those circumstances all necessary corrections and/or installations of temporary replacements shall be carried out immediately as an emergency service. Should the <i>Contractor</i> fail to provide this emergency service within 8 hours of a request being made during the normal business hours of the <i>Contractor</i>, the <i>Owner</i> is authorized, notwithstanding GC 3.1, to carry out all necessary repairs or replacements at the <i>Contractor's</i> expense."</p>
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PART 13 INDEMNIFICATION AND WAIVER

GC 13.1 INDEMNIFICATION

SC58.1	GC 13.1	<p><u>Delete</u> GC 13.1 – INDEMNIFICATION in its entirety and <u>replace</u> it with the following:</p> <p>"13.1.1 The <i>Contractor</i> shall indemnify and hold harmless the <i>Owner</i>, its parent, subsidiaries and affiliates, their respective partners, trustees, officers, directors, agents and employees and the <i>Consultant</i> from and against any and all claims, liabilities, expenses, demands, losses, damages, actions, costs, suits, or proceedings (hereinafter called "claims"), whether in respect of claims suffered by the <i>Owner</i> or in respect of claims by third parties, that directly or indirectly arise out of, or are attributable to, the acts or omissions of the <i>Contractor</i>, its employees, agents, <i>Subcontractors</i>, <i>Suppliers</i> or any other persons for whom it is in law responsible (including, without limitation, claims that directly or indirectly arise out of, or are attributable to, loss of use or damage to the <i>Work</i>, the <i>Owner's</i> property or equipment, the <i>Contractor's</i> property or equipment or equipment or property adjacent to the <i>Place of the Work</i> or death or injury to the <i>Contractor's</i> personnel).</p> <p>13.1.2 The <i>Owner</i> shall indemnify and hold the <i>Contractor</i>, its agents and employees harmless from and against claims, demands, losses, costs, damages, actions, suits or proceedings arising out of the <i>Contractor's</i> performance of the <i>Contract</i> which are attributable to a lack of or defect in title or an alleged lack of or defect in title to the <i>Place of the Work</i>.</p>
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		<p>13.1.3 The provisions of GC 13.1 - INDEMNIFICATION shall survive the termination of the <i>Contract</i>, howsoever caused and no payment or partial payment, no issuance of a final certificate of payment and no occupancy in whole or in part of the <i>Work</i> shall constitute a waiver or release of any of the provisions of GC 13.1</p> <p>13.1.4 Notwithstanding the provisions of GC1.1 - CONTRACT DOCUMENTS, GC 1.1.6, GC13.1 - INDEMNIFICATION shall govern over the provisions of GC 1.3.1 of GC1.3 – RIGHTS AND REMEDIES.”</p>
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GC 13.2 WAIVER OF CLAIMS

	13.2.1	<p>In paragraph 13.2.1 in the third line after the word “limitation” <u>add</u> the words “claims for delay pursuant to GC 6.5 DELAYS”</p> <p>-and-</p> <p><u>add</u> the words “(collectively “Claims”)” after “<i>Ready-for-Takeover</i>” in the fourth line.</p>
	13.2.1.1	In subparagraph 13.2.1.1, in each instance change the word “claims” to “Claims” and change the word “claim” to “Claim”.
	13.2.1.2	In subparagraph 13.2.1.2 change the word “claims” to “Claims”.
	13.2.1.3	<u>Delete</u> subparagraph 13.2.1.3 in its entirety.
	13.2.1.4	In paragraph 13.2.1.4 change the word “claims” to “Claims”.
	13.2.2.1	<p>In paragraph 13.2.2.1 <u>delete</u> the words “in paragraphs 13.2.1.2 and 13.2.1.3” and <u>replace</u> them with “in paragraph 13.2.1.2”</p> <p>-and-</p> <p>change the word “claims” to “Claims” in both instances and change the word “claim” to “Claim”.</p>
	13.2.3	<u>Delete</u> paragraph 13.2.3 in its entirety.
	13.2.4	<u>Delete</u> paragraph 13.2.4 in its entirety.
	13.2.5	<u>Delete</u> paragraph 13.2.5 in its entirety.
	13.2.6	In paragraph 13.2.6 change the word “claim” to “Claim” in all instances in the paragraph.
	13.2.8	<p>In paragraph 13.2.8 change “The party” to “The <i>Contractor</i>”</p> <p>-and-</p>

		change the word "claim" to "Claim" in all instances in the paragraph.
	13.2.9	In paragraph 13.2.9 <u>delete</u> the words "under paragraphs 13.2.1 or 13.2.3" and <u>replace</u> them with "under paragraph 13.2.1" -and- change both instances of the words "the party" to "the Contractor". Change the word "claim" to "Claim" in all instances in the paragraph.

***NEW* PART 14 OTHER PROVISIONS**

SC58.1	14.1	<u>Add</u> new PART 14 – OTHER PROVISIONS as follows: "PART 14 OTHER PROVISIONS GC 14.1 OWNERSHIP OF MATERIALS 14.1.1 Unless otherwise specified, all materials existing at the <i>Place of the Work</i> at the time of execution of the <i>Contract</i> shall remain the property of the <i>Owner</i> . All <i>Work</i> and <i>Products</i> delivered to the <i>Place of the Work</i> by the <i>Contractor</i> shall be the property of the <i>Owner</i> . The <i>Contractor</i> shall remove all surplus or rejected materials as its property when notified in writing to do so by the <i>Consultant</i> ."
	14.2	<u>Add</u> new GC 14.2 – CONSTRUCTION LIENS as follows: "GC 14.2 LIENS 14.2.1 Notwithstanding any other provision in the <i>Contract</i> , the <i>Consultant</i> shall not be obligated to issue a certificate, and the <i>Owner</i> shall not be obligated to make payment, subject to the <i>Owner's</i> requirement to issue a <i>Notice of Non-Payment</i> (Form 1.1) to the <i>Contractor</i> , if at the time such certificate or payment was otherwise due: .1 a claim for lien has been registered against the <i>Project</i> lands by a <i>Subcontractor</i> or a <i>Supplier</i> that has not been vacated or discharged by the <i>Contractor</i> in accordance with the requirements of this <i>Contract</i> , or .2 if the <i>Owner</i> or a mortgagee of the <i>Project</i> lands has received a written notice of a lien that has not been resolved by the <i>Contractor</i> through the posting of security or otherwise. 14.2.2 In the event a construction lien arising from the performance of the <i>Work</i> is registered or preserved against the <i>Project</i> lands by a <i>Subcontractor</i> or a <i>Supplier</i> , or a written notice of a lien is given or a construction lien action is commenced

		<p>against the <i>Owner</i> by a <i>Subcontractor</i> or a <i>Supplier</i>, then the <i>Contractor</i> shall, at its own expense:</p> <p>.1 within 10 calendar days of registration of the construction lien, vacate or discharge the lien from title to the premises (i.e. the <i>Place of the Work</i>). If the lien is merely vacated, the <i>Contractor</i> shall, if requested, undertake the <i>Owner's</i> defence of any subsequent action commenced in respect of the lien, at the <i>Contractor's</i> sole expense;</p> <p>.2 within 10 calendar days of receiving notice of a written notice of a lien, post security with the Ontario Superior Court of Justice so that the written notice of a lien no longer binds the parties upon whom it was served; and</p> <p>.3 satisfy all judgments and pay all costs arising from such construction liens and actions and fully indemnify the <i>Owner</i> against all costs and expenses arising from same, including legal costs on a full indemnity basis.</p> <p>14.2.3 In the event that the <i>Contractor</i> fails or refuses to comply with its obligations pursuant to paragraph 14.2.2, the <i>Owner</i> shall, at its option, be entitled to take all steps necessary to address any such construction liens including, without limitation and in addition to the <i>Owner's</i> rights under paragraph 13.2.4, the posting of security with the Ontario Superior Court of Justice to vacate the claim for lien from title to the <i>Project</i> lands, and in so doing will be entitled to a full indemnity from the <i>Contractor</i> for all legal fees, security, disbursements and other costs incurred and will be entitled to deduct same from amounts otherwise owing to the <i>Contractor</i>.</p> <p>14.2.4 In the event that any <i>Subcontractor</i> or <i>Supplier</i> registers any claim for lien with respect to all or part of the <i>Place of Work</i>, the <i>Owner</i> shall have the right to withhold, in addition to the statutory holdback, the full amount of said claim for lien plus either: (a) \$250,000 if the claim for lien is in excess of \$1,000,000 or (b) 25% of the value of the claim for lien and to bring a motion to vacate the registration of said claim for lien and any associated certificate of action in respect of that lien, in accordance with Section 44 of the <i>Act</i>, by paying into court as security the amount withheld.</p> <p>14.2.5 Nothing in this GC 14.2 serves to preclude the <i>Contractor</i> from preserving and perfecting its lien in the event of non-payment by the <i>Owner</i>.”</p>
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**APPENDIX 1
to the Supplementary Conditions**

Project-specific requirements for a “*Proper Invoice*”

To satisfy the requirements for a *Proper Invoice*, the following criteria, as may be applicable in each case, must be included with the *Contractor's* application for payment:

- .1 the written bill or request for payment must be in writing;
- .2 the *Contractor's* name and current address;
- .3 the *Contractor's* HST registration number;
- .4 the date the application for payment was prepared by the *Contractor*;

- .5 the period of time in which the services or materials were supplied to the *Owner*;
- .6 the purchase order number provided by the *Owner*;
- .7 reference to the provisions of the *Contract* under which payment is being sought (e.g. GC 5.3 –PAYMENTS for progress payments, GC 5.4 – SUBSTANTIAL PERFORMANCE OF THE WORK AND PAYMENT OF HOLDBACK GC 5.5 – FINAL PAYMENT for final payment, etc.);
- .8 a description, including quantities where appropriate, of the services or materials, or a portion thereof, that were supplied and form the basis of the *Contractor's* request for payment;
- .9 the amount the *Contractor* is requesting to be paid by the *Owner*, set out in a statement based on the schedule of values approved under GC 5.2.4, separating out any statutory or other holdbacks, set-offs and HST;
- .10 a sworn Statutory Declaration in the form CCDC 9A-2018, only for second and subsequent progress payments;
- .11 a current Workplace Safety Insurance Board clearance certificate;
- .12 a pre-approved schedule of values, supplied by the *Contractor*, for Divisions 1 through 14 of the *Specifications* (or equivalent Construction Specifications Institute Masterformat) of the *Work*, aggregating the total amount of the *Contract Price*, including all supporting invoicing;
- .13 a separate pre-approved schedule of values, supplied by each *Subcontractor*, for each of Division 15, 16, and 17 of the *Specifications* (or equivalent Construction Specifications Institute Masterformat) of the *Work*, aggregating the total amount of the *Contract Price*, including all supporting invoicing;
- .14 invoices and other supporting documentation for all claims against the cash allowance;
- .15 a current, acceptable, and up to date *Construction Schedule Update*;
- .16 if requested by the *Owner*, a current and valid certificate(s) of insurance as required under GC 11.1 – INSURANCE;
- .17 the name, title, telephone number and mailing address of the person at the place of business of the *Contractor* to whom payment is to be directed;
- .18 a current, up to date, and approved *Shop Drawing* log;
- .19 in the case of the *Contractor's* application for final payment, in addition to the foregoing requirements (as applicable):
 - (a) any *Close-Out Documentation*, together with complete and final as-built drawings;
 - (b) the *Contractor's* written request for release of the deficiency holdback, including a statement that no written notices of lien have been received by it;
 - (c) the *Contractor's* written certification that there are no outstanding claims, pending claims or future claims from the *Contractor* or their *Subcontractors* or *Suppliers*; and
 - (d) sufficient evidence of the *Contractor's* compliance with GC 3.11.

END OF AMENDMENTS TO CCDC 2 - 2020

DIVISION 01 - GENERAL REQUIREMENTS

01 14 00 – Work Restrictions

1.0 GENERAL

1.1. SECTION INCLUDES

- .1 Connecting to existing services
- .2 Special scheduling requirements

1.2. RELATED SECTIONS

- .1 Section 01 53 00 - Temporary Construction.
- .2 Section 01 33 00 - Submittal Procedures.
- .3 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.3. EXISTING SERVICES

- .1 Notify Owner and Consultant and utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give Consultant and Owner forty-eight (48) hours of notice for necessary interruption of mechanical or electrical service throughout the course of work.
 - .1 Keep duration of interruptions minimum.
 - .2 Perform interruptions after normal working hours of occupants, preferably on weekends.
- .2 Provide for vehicular, pedestrian and personnel traffic.
- .3 Construct barriers in accordance with Section 01 53 00.

1.2. AFTER HOURS WORK

- .1 Schedule Work with school staff through the Board's contact so as to limit disruption to school operations. Include for any overtime, to ensure orderly and continuous progression of Work and operation of school.
- .2 Direct calls from Contractors to Board staff to adjust alarms and to arrange for access will not be accepted. All correspondence must be through the Project Manager.
- .3 Arrange 48 hours in advance with the Board to obtain an access card and adjust security alarms for after hours Work.
- .4 Bidders are cautioned that the Board will be compensated by the Contractor for false alarms. Any costs associated with each false alarm will be levied

against the Contractor for false fire alarm activation or security alarm activation. These costs may include, but are not limited to:

- .1 Fines or penalties imposed by the local Fire Services,
- .2 Fines or penalties imposed by the local Police Services,
- .3 Overtime costs borne by the Board.
- .5 Contractors are responsible for ensuring doors and windows are secured prior to leaving school.
- .6 Unless specifically stated otherwise school activities take precedence over Contractor's activities.

1.3. SPECIAL REQUIREMENTS

- .1 Schedule and perform work in occupied areas to the Board Representative's approval.
- .2 Schedule and perform noise generating work to the Board Representative's approval.
- .3 Submit schedule of special requirements or disruptions in accordance with Section 01 33 00.
- .4 All Contractor personnel are restricted to the job site and necessary access routes. No personnel shall visit other areas or buildings without specific authorization.

END OF SECTION

01 19 00 – Specifications And Documents

1.0 GENERAL

1.1. RELATED DOCUMENTS

- .1 This section describes requirements applicable to all sections within Divisions 02 to 49.

1.2. WORDS AND TERMS

- .1 Conform to definitions and their defined meanings in the Agreement and Definitions portion of CCDC 2 for Supplementary Words and Terms listed in Section 00 56 13.

1.3. COMPLEMENTARY DOCUMENTS

- .1 Generally, drawings indicate graphically, the dimensions and location of components and equipment. Specifications indicate specific components, assemblies, and identify quality.
- .2 Drawings, specifications, diagrams and schedules are complementary, each to the other, and what is required by one, to be binding as if required by all.
- .3 Should any conflict or discrepancy appear between documents, which leaves doubt as to the intent or meaning, apply the Precedence of Documents article below or obtain guidance or direction from Consultant.
- .4 Examine all discipline drawings, specifications, schedules, diagrams and related Work to ensure that Work can be satisfactorily executed.
- .5 All specification sections of the Project Manual and Drawings are affected by requirements of Division 01 sections.

1.4. PRECEDENCE OF DOCUMENTS

- .1 In the event of conflict within and between the Contract Documents, the order of priority within specifications and drawings for this project are - from highest to lowest:
 - .1 the Agreement and Definitions between the Owner and the Construction
 - .2 the Defined Terms, Definitions;
 - .3 Supplementary Conditions;
 - .4 the General Conditions;
 - .5 Sections of Division 01 of the specifications;
 - .6 Technical specifications Sections of Divisions 02 through 49 of the specifications.
 - .7 Schedules and Keynotes:

- .1 Material and finishing schedules within the specifications, then;
- .2 Material and finishing schedules on drawings, then;
- .3 Keynotes and definitions thereto, then;
- .8 Drawings:
 - .1 Drawings of larger scale shall govern over those of smaller scale of the same date, then;
 - .2 Dimensions shown on drawings shall govern over dimensions scaled from drawings, then;
 - .3 Location of utility outlets indicated on architectural detail drawings takes precedence over positions or mounting heights located on mechanical or electrical Drawings.
- .9 Later dated documents shall govern over earlier documents of the same type.

1.5. SPECIFICATION GRAMMAR

- .1 Specifications are written in the imperative command mode, in an abbreviated form.
- .2 Imperative language of the technical sections is always directed to the Contractor identified as a primary constructor, as sole executor of the Contract, unless specifically noted otherwise.
 - .1 This form of imperative command mode statement requires the primary constructor to perform such action or Work.
 - .2 Perform all requirements of the Contract Documents whether stated imperatively or otherwise.
- .3 Division of the Work among subcontractors, suppliers, or others is solely the prime contractor's responsibility. The Consultant(s) and specification authors assume no responsibility to function or act as an arbiter to establish subcontract scope or limits between sections or divisions of Work.

END OF SECTION

01 21 00 – Allowances

1.0 GENERAL

1.1. RELATED SECTIONS

- .1 Section 01 45 00 – Quality Control.
- .2 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.2. GENERAL

- .1 Allowances included herein are for items of Work which could not be fully quantified prior to Bidding.
- .2 Expend each allowance as directed by the Consultant. Work covered by allowances shall be performed for such amounts and by such persons as directed by Consultant.
- .3 Funds will be expended by means of Cash Allowance allocations and contingency allowance allocations.
- .4 Progress payments for Work and Products authorized under allowances will be made in accordance with the payment terms set out in the Conditions of the Contract.
- .5 The Contractor shall bid the work involved and submit the Bids received to the Consultant and the Board, for approval
- .6 The Contractor shall submit 3 bids unless directed by the Board.

1.3. CASH ALLOWANCES

- .1 Cash allowances, cover the net cost to the Contractor of services, products, construction machinery and equipment, freight, handling, unloading, storage, installation where indicated, and other authorized expenses incurred in performing the Work. Cash allowances shall not be included by a subcontractor in the amount for their subcontract work.
- .2 Supply only allowances shall include:
 - .1 Net cost of Products.
 - .2 Delivery to Site.
 - .3 Applicable taxes and duties, excluding HST.
- .3 Supply and install allowances shall include:
 - .1 Net cost of Products.
 - .2 Delivery to Site.
 - .3 Unloading, storing, handling or products on site.
 - .4 Installation, finishing and commissioning of products.

- .5 Applicable taxes and duties, excluding HST.
- .4 Inspection and testing allowances shall include:
 - .1 Net cost of inspection and testing services.
 - .2 Applicable taxes and duties, excluding HST.
- .5 Other costs related to work covered by cash allowances are not covered by the allowance, but shall be included in the Contract Price.
- .6 Where costs under a cash allowance exceed the amount of the allowance, the Contractor will be compensated for any excess incurred and substantiated plus an allowance for overhead and profit as set out in the Contract Documents.
- .7 Progress payments on accounts of work authorized under cash allowances shall be included in the monthly certificate for payment.
- .8 Submit, before application for final payment, copies of all invoices and statements from suppliers and subcontractors for work which has been paid from cash allowances.

1.4. ALLOWANCES SCHEDULE

Include in the Bid Price a cash allowance of to address the cost of the following items:

1	Designated Substance Removal. (Additional removal not already identified in the ACM Summary report)	\$ 10,000.00
2	Audio/Visual/Media/Data	\$30,000.00
3	Supply and Installation of Interior Signage conveying new numbering of school.	\$12,000.00
	Total of All Allowances:	\$52,000.00

END OF SECTION

01 31 00 – Project Managing And Coordination

1.0 GENERAL

1.1. RELATED SECTIONS

- .1 Section 01 32 00 - Construction Progress Documentation.
- .2 Section 01 33 00 - Submittal Procedures.
- .3 Section 01 53 00 – Temporary Construction Facilities
- .4 Section 01 61 00 – Product Requirements
- .5 Section 01 78 10 – Closeout Submittals and Requirements
- .6 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.2. PROJECT COORDINATION

- .1 Perform coordination of progress schedules, submittals, use of site, temporary utilities, construction facilities and construction Work, with progress of Work of other contractors, under instructions of the Consultant.
- .2 The Contractor shall have total control of the Work and shall effectively direct and supervise the Work so as to ensure conformity with the Contract Documents and within the Contract Time.
- .3 The Contractor shall be solely responsible for the construction means, methods, sequences, and procedures and for coordinating parts of the Work under the contract.
- .4 Coordinate progress of the Work, progress schedules, submittals, use of site, temporary utilities, construction facilities, safety regulations and fire protection, as per authorities having jurisdiction codes.
- .5 The Consultant has the authority to stop the Work:
 - .1 whenever they observe or are made aware of unsafe conditions.
 - .2 whenever it is deemed necessary to protect the interests of the Board,
 - .3 whenever materials or workmanship are in contravention to the Contract Documents.

1.3. SITE SUPERVISOR AND PROJECT MANAGER

- .1 If requested, the Contractor shall provide the Consultant, in writing, the name of the Project Manager and Site Supervisor, and proof of competent experience in similar projects.
- .2 Performance of the Contractors Project Manager and Site Supervisor
 - .1 If the Board and or the Consultant become concerned with any of: Site Safety, Project Schedule, or general compliance with the tender

documents due to the performance of the Site Supervisor or Project Manager, the Consultant and or the Board will identify the concerns in writing to the Contractor.

- .2 The Contractor shall respond in writing to the Board and Consultant with a corrective action for each item within 24 hours.
 - .3 If it is found that any of the corrections are not immediately implemented, the Consultant and the Board shall meet with the General Contractor to review the credentials including curriculum vitae and comparable experience of a replacement Site Supervisor and or Project Manager proposed by that Contractor.
 - .4 All outstanding concerns initiating the replacement of the personnel will be immediately addressed to the satisfaction of the Consultant and the Board.
- .3 If the Board and or the Consultant become concerned with site safety, project schedule or general compliance with the tender documents due to the performance of the Site Supervisor or the Project Manager, the Consultant or the Board will issue the concerns in writing to the Contractor. The Contractor shall respond in writing within 24 hours to the Consultant and the Board. If any of the corrections are not immediately implemented, the Consultant or the Board will schedule a meeting with the Consultant, General Contractor and the Board. At this meeting the Contractor will introduce the new Project Manager, and or Site Supervisor and present the Curriculum Vitae for each showing proof of comparable experience in similar projects. The Contractor will then address the outstanding concerns to the satisfaction of the Consultant and the Board.
- .4 The Project Manager, and/or Site Supervisor shall not be replaced by the Contractor without prior written approval from the Board and the Consultant.

1.4. PERMITS

- .1 **The Board will obtain & pay for all building permits, but the Contractor is responsible for all other permits, including electrical inspection and fire alarm verification.**

1.5. CONSTRUCTION DOCUMENTS

- .1 The Consultant will provide the Contractor with PDF copies of both the drawings and the specification and CAD format files of the drawings at no charge to the Contractor. All printing will be at the cost of the Contractor including the AS-BUILT documents.

1.6. PRE-CONSTRUCTION MEETING

- .1 Immediately prior to construction and upon notification by the Consultant of a time and date, the Contractor shall attend the preconstruction meeting at a location as determined by the Consultant, along with authoritative representatives of certain key subcontractors as specifically indicated in the conference notice. Agenda to include following:
 - .1 Appointment of official representative of participants in Work.
 - .2 Project communications procedures
 - .3 Schedule of Work, progress scheduling (including long lead items, cash allowance items) as specified in Section 01 32 00.
 - .4 Schedule of submission of shop drawings, samples, colour chips as specified in Section 01 33 00.
 - .5 Requirements for temporary facilities, washrooms, refuse bin, site sign, offices, storage sheds, utilities, fences as specified in Section 01 53 00.
 - .6 Delivery schedule of specified equipment as specified in Section 01 61 00.
 - .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, and administrative requirements.
 - .8 Owner furnished products.
 - .9 Record drawings as specified in Section 01 78 10.
 - .10 Maintenance material and data as specified in Section 01 78 10.
 - .11 Take-over procedures, acceptance, and warranties as specified in Section 01 78 10.
 - .12 Monthly progress claims, administrative procedures, photographs, and holdbacks.
 - .13 Appointment of inspection and testing agencies
 - .14 Insurances and transcript of policies.
 - .15 Review Vendor Performance Evaluation for the Contractor and Subcontractors
 - .16 Hot Work Permit Process
 - .17 Security Access, Fire Alarm shutdown procedures
 - .18 Any other items as required by the owner, contractor, or Consultant.

1.7. ON-SITE DOCUMENTS

- .1 Maintain at job site at all times, one copy (written or digital) each of the following:
 - .1 Complete set of Contract drawings.
 - .2 Specifications.

- .3 All Addenda.
- .4 Site Instructions and Sketches
- .5 Reviewed shop drawings and samples.
- .6 Change Orders and Contemplated Change Orders.
- .7 Other modifications to Contract.
- .8 Site Instructions
- .9 Colour schedule
- .10 Hardware List
- .11 Field test reports.
- .12 Copy of approved Work schedule.
- .13 Manufacturers' installation and application instructions.
- .14 Progress reports and meeting minutes.
- .15 Approved building permit documents.
- .16 Copy of current Ontario Building Code and National Building Code.
- .17 CSA Standard, CGSB Specifications. ASTM Documents and other standards referenced to in the specifications.
- .18 Labour conditions and wage schedules.
- .19 Applicable current editions of municipal regulations and by-laws. Current building codes, complete with addenda bulletins applicable to the Place of the Work.

1.8. SCHEDULES

- .1 Within three weeks following the award of the Contract, submit a detailed, trade by trade progress schedule for the work in a bar chart form acceptable to the Consultant.
- .2 Submit preliminary construction progress schedule as specified in Section 01 32 00 to Consultant coordinated with Consultant's project schedule.
- .3 After review, revise and resubmit schedule to comply with revised project schedule.
- .4 During progress of Work revise and resubmit as directed by the Consultant.
- .5 Provide schedule updates every month with request for Payment, for duration of Contract.

1.9. CONSTRUCTION PROGRESS MEETINGS

- .1 Prior to the commencement of the Work, the Contractor together with the Consultant shall mutually agree to a sequence for holding regular "on site meetings".

- .2 The Contractor will organize site meetings. Ensure persons, whose presence is required, are present and relative information is available to allow meetings to be conducted efficiently.
- .3 Contractor, major subcontractors and consultants involved in Work are to be in attendance.
- .4 Post and forward copies of progress schedules for advice of Subcontractors, Owner and Consultant.
- .5 Notify parties minimum five (5) days prior to meetings.
- .6 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within two (2) days after meeting.
- .7 Agenda to include following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Field observations, problems, conflicts.
 - .4 Problems which impede construction schedule.
 - .5 Review of off-site fabrication delivery schedules.
 - .6 Corrective measures and procedures to regain projected schedule.
 - .7 Revision to construction schedule.
 - .8 Progress schedule, during succeeding work period.
 - .9 Review submittal schedules: expedite as required.
 - .10 Maintenance of quality standards.
 - .11 Review proposed changes for effect on construction schedule and on completion date.
 - .12 Review site security issues.
 - .13 Other business.
- .8 Schedule additional meetings, to expedite progress, should work require it.
- .9 Keep Owner and Consultant informed of progress, of delays and potential delays during all stages of Work. Do everything possible to meet progress schedule
- .10 Schedule and administer pre-installation meetings when specified in sections and when required to coordinate related or affected Work.

1.10. SUBMITTALS

- .1 Prepare and issue submittals to Consultant for review.
- .2 Submit preliminary Shop Drawings, product data and samples for review for compliance with Contract Documents; for field dimensions and clearances, for relation to available space, and for relation to Work of other contracts. After review, revise and resubmit for transmittal to Consultant.
- .3 Submit requests for payment for review, and for transmittal to Consultant.

- .4 Submit requests for interpretation of Contract Documents, and obtain instructions through Consultant.
- .5 Process substitutions through Consultant.
- .6 Process change orders through Consultant.
- .7 Deliver closeout submittals for review and preliminary inspections, for transmittal to Consultant.

1.11. RECORD (AS-BUILT) DOCUMENTS AND SAMPLES

- .1 Procedures for record as-built documents and samples as specified in Section 01 78 10.
- .2 Keep as-built documents and samples available for inspection by the Consultant.

1.12. CLOSEOUT PROCEDURES

- .1 Take-over procedures, acceptance, and warranties as specified Section 01 78 10
- .2 Notify Consultant and Board when Work is considered ready for Substantial Performance.
- .3 Accompany Consultant and Board on preliminary inspection to determine items listed for completion or correction.
- .4 Comply with Consultant's instructions for correction of items of Work listed in executed certificate of Substantial Performance.
- .5 Notify Consultant of instructions for completion of items of Work determined in Consultant's final inspection.

END OF SECTION

01 32 00 – Construction Progress Documentation

1.0 GENERAL

1.1. RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.2. SCHEDULES

- .1 Within seven 7 days following the award of the Contract, submit a detailed cash flow chart broken down on a monthly basis, in a manner acceptable to the Consultant. Cash flow chart shall indicate anticipated Contractor's monthly progress billings from commencement of work until completion.
- .2 Update cash flow chart whenever changes occur to scheduling and in manner and at times satisfactory to Consultant.
- .3 Submit schedule of values at least fourteen (14) days before the first application
- .4 Submit schedules as follows:
 - .1 Submittal Schedule for Shop Drawings and Product Data.
 - .2 Submittal Schedule for Samples.
 - .3 Submittal Schedule for timeliness of Owner-furnished Products.
 - .4 Product Delivery Schedule.
 - .5 Cash Allowance Schedule for acquiring Products and Installation.
 - .6 Shutdown or closure activity.

1.3. CONSTRUCTION PROGRESS SCHEDULING

- .1 Submit initial schedule to the Consultant and the Board in duplicate within seven (7) days after following the award.
- .2 Schedule Format.
 - .1 Prepare schedule in form of a horizontal bar chart.
 - .2 Split horizontally for projected and actual performance.
 - .3 Provide horizontal time scale identifying each Working Day of each week.
- .3 Schedule Submission.
 - .1 Consultant will review schedule and return reviewed copies within five (5) days after receipt.
 - .2 Submit schedules in electronic format, forward to the Consultant and Owner as a pdf. file.

- .3 Resubmit finalized schedule within five (5) days after return of review copy.
- .4 Submit revised progress schedule with each application for payment.
- .5 Distribute copies of revised schedule to:
 - .1 Job site office.
 - .2 Subcontractors.
 - .3 Other concerned parties.
- .6 Instruct Consultant to report to Contractor within ten (10) days, any problems anticipated by timetable shown in schedule.
- .4 Submit revised schedules with Application for Payment, identifying changes since previous version.
- .5 Select either of the following paragraphs to identify the type and format of schedule required.
- .6 Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.
- .7 Indicate estimated percentage of completion for each item of Work at each submission.
- .8 Indicate submittal dates required for shop drawings, product data, samples, and product delivery dates, including those furnished by Owner and required by Allowances.
- .9 Include dates for commencement and completion of each major element of construction:
 - .1 Site clearing.
 - .2 Site utilities.
 - .3 Foundation Work.
 - .4 Structural framing.
 - .5 Subcontractor Work.
 - .6 Equipment Installations.
 - .7 Finishes.
- .10 Indicate projected percentage of completion of each item as of first day of month.
- .11 Indicate progress of each activity to date of submission schedule.
- .12 Indicate changes occurring since previous submission of schedule:
 - .1 Major changes in scope.
 - .2 Activities modified since previous submission.
 - .3 Revised projections of progress and completion.
 - .4 Other identifiable changes.
- .13 Provide a written report to define:

- .1 Problem areas, anticipated delays, and impact on schedule.
- .2 Corrective action recommended and its effect.
- .3 Effect of changes on schedules of other subcontractors.

1.4. PROGRESS PHOTOGRAPHS

- .1 Digital Photography:
 - .1 Submit electronic copy of progress photographs of project, Digital format, minimum 300 in megapixel resolution.
 - .2 Identification: Name and number of project and date of exposure indicated.
 - .3 Provide both interior and exterior photographs.
 - .4 Number of Viewpoints: Locations of viewpoints determined by Consultant.
 - .5 Frequency: Monthly with progress statement. Provide the required number of pictures to accurately reflect the submitted progress percentage.

1.5. SHOP DRAWING SUBMITTAL SCHEDULE

- .1 Include schedule for submitting shop drawings, product data, samples
- .2 Indicate dates for submitting, review time, resubmission time, and last date for meeting fabrication schedule.
- .3 Include dates when shop drawings and samples will be required for Owner-furnished products.
- .4 Include dates when reviewed submittals will be required from Consultant.
- .5 Provide final signed off copies of the shop drawings in digital format to the Board.

END OF SECTION

01 33 00 – Submittal Procedures

1.0 GENERAL

1.1 RELATED SECTIONS

1. Section 01 32 00 - Construction Progress Documentation.
2. Section 01 78 10 - Closeout Submittals.
3. This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.2 ADMINISTRATIVE

1. Submit to Consultant submittals listed for review. Submit with reasonable promptness and in orderly sequence so as to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
2. Work affected by submittal shall not proceed until review is complete.
3. Present Shop Drawings, product data, samples and mock-ups in Metric (SI) units. Shop drawings containing imperial measurements will be rejected.
4. Where items or information is not manufactured or produced in SI Metric units, converted values within the metric measurement to the next largest imperial size available. Tolerances of .0625 acceptable.
5. Review submittals prior to submission to Consultant. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents.
6. Submittals not stamped, signed, dated, identified as to specific project, and attesting to their being reviewed will be returned without being examined and shall be considered rejected.
7. Shop drawings which require the approval of a legally constituted authority having jurisdiction shall be submitted by Contractor to such authority for approval. Such shop drawings shall receive final approval of authority having jurisdiction before Consultant's final review.
8. No work, requiring a shop drawing submission, shall be commenced until the submission has received Consultant's final review. Only shop drawings bearing Consultant's review stamp are to be sent and used on the job site.
9. Notify Consultant, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

10. Shop drawings shall not contain substituted materials unless such substitutions have been requested in advance and approved by Consultant.
11. Verify field measurements and affected adjacent Work are coordinated.
12. Contractor's responsibility for errors and omissions in submission is not relieved by Consultant's review of submittals.
13. Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Consultant review.
14. Keep one (1) reviewed copy of each submission on site.

1.3 SHOP DRAWINGS AND PRODUCT DATA

- .1 The term "Shop Drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2 The term "design team" means Consultant and Sub-consultants whether Sub-consultants are employees of Consultant or not, and includes structural, mechanical, electrical, etc.
- .3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .4 Allow fourteen (14) days for Consultant's review of each submission.
- .5 Adjustments made on Shop Drawings by Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.
- .6 Make changes in Shop Drawings as Consultant may require, consistent with Contract Documents. When resubmitting, notify Consultant in writing of any revisions other than those requested.
- .7 Accompany submissions with transmittal letter, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
- .8 Submissions shall include:
 - .1 Date and revision dates.

- .2 Project title and number.
- .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
- .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .5 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationship to other parts of the Work.
- .9 After Consultant's review, distribute copies.
- .10 Submit Shop Drawings in Pdf. format for each requirement requested in specification Sections and as consultant may reasonably request.
- .11 Submit product data sheets or brochures in Pdf. format for requirements requested in specification sections and as requested by Consultant where Shop Drawings will not be prepared due to standardized manufacture of product.
- .12 Delete information not applicable to project.
- .13 Supplement standard information to provide details applicable to project.
- .14 If upon review by Consultant, no errors or omissions are discovered or if only minor corrections are made, the drawings will be stamped as reviewed or reviewed as modified and will be returned. At this point fabrication and installation of Work may proceed. If Shop Drawings are rejected, noted copy will be returned and re-submission of corrected Shop Drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .15 Signed drawings shall be returned to and retained by Contractor who is then responsible for distribution of copies of corrected shop drawing to

appropriate Subcontractors for appropriate action and to municipal building department for their records of those subjects required by authorities.

- .16 The Consultant's review is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean the Consultant approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and this review shall not relieve the Contractor of his responsibility for meeting the requirements of the Contract Documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site for information that pertains solely to fabrication processes or to techniques of construction and installation and for coordination of the work of all subtrades.

1.4 SAMPLES

- .1 Submit for review to the Consultant three (3) samples as requested in respective specification Sections.
- .2 Submit samples with identifying labels bearing material or component description, manufacturer's name and brand name, Contractor's name, project name, location in which material or component is to be used, and date.
- .3 Deliver samples prepay any shipping charges involved for delivering samples to destination point and returning to point of origin if required.
- .4 Provide samples of special products, assemblies, or components when so specified.
- .5 No work requiring a sample submission shall commence until submission has received Consultant's final review.
- .6 Notify Consultant in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .7 Where colour, pattern or texture is criterion, submit full range of samples.
- .8 Adjustments made on samples by Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.
- .9 Make changes in samples which Consultant may require, consistent with Contract Documents.
- .10 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.5 MOCK-UP

- .1 Erect mock-ups to Section 01 45 00.

1.6 ` CERTIFICATES AND TRANSCRIPTS

- .1 Immediately after award of Contract, and prior to commencing the work submit the performance bond and the labour and materials payment bond as described in the bid documents.
- .2 Submit transcription of certified true copies of insurance immediately after award of Contract.
- .3 A current WSIB clearance certificate
- .4 The bidder's health and safety policy for the project.
- .5 A copy of the notice of project issued by the ministry of labour for the project
- .6 Building materials, components and elements specified without the use of trade or proprietary names shall meet requirements specified. If requested by Consultant, submit evidence of meeting requirements specified. Evidence shall consist of certification based on tests carried out by an independent testing agency. Certification based on previous tests for same materials, components or elements is acceptable. Certification shall be in form of written test reports prepared by testing agency.

END OF SECTION

01 35 17 – Fire Safety Procedures

1.0 GENERAL

1.1. RELATED SECTIONS

- .1 Section 01 14 00 – Work Restrictions.
- .2 Section 01 31 00 - Project Managing and Coordination.
- .3 Section 01 33 00 - Submittal Procedures.
- .4 Section 01 35 23 – Health and Safety
- .5 This section describes requirements applicable to all Sections within Divisions 02 to 49.
- .6 Appendix 01 35 17A Contractor Hot Work Permit

1.2. FIRE SAFETY PLAN

- .1 Contractors and their personnel will be familiar with this section and its requirements.
- .2 The contractor must take all necessary precautions during the carrying out of the work to prevent the possibility of fire occurring.

1.3. FIRE PROTECTION

- .1 Provide and maintain temporary fire protection equipment during performance of Work required by the governing codes, regulations and bylaws.
- .2 The contractor will, at all times, when welding, brazing and performing any operation with an open flame, combustible adhesives or flammable solvents keep a portable, operable fire extinguisher within 3 meters of the operation.

1.4. HOT WORK

- .1 Take all precautions to Work safely and to provide the necessary protection to persons and property from Hot Work. This includes, but is not limited to Brazing, Cutting, Grinding, Soldering, Thawing Pipe, Torch Applied Roofing and Welding. With all such activity these steps are to be followed:
 - .1 Whenever possible, complete Hot Work in a welding shop or out of doors at the school.
 - .2 Flammable liquids, dust lint and oily deposits to be removed from within 50-ft (15m) of Work. Remove other combustibles where possible. Otherwise protect with fire-resistive tarpaulins or metal shields.
 - .3 Explosive atmosphere in area eliminated. Floors swept clean. Combustible floors wet down, covered with damp sand or fire-resistive tarpaulins.

- .4 All wall and floor openings covered. Fire-resistive tarpaulins suspended beneath Work.
- .5 For on-site Work (indoor and out of doors), advise the Head Custodian, Principal, Consultant (if assigned) and Project Coordinator prior to Work being performed, and of related dangers.
- .6 Where the Fire Alarm system is required to be set to stand-by to discourage false alarms from smoke detectors provide a firewatch throughout the building or structure being worked on. NEVER put the fire alarm system in stand-by mode when the building is occupied by staff or students.
- .7 In the event of a fire as a result of the Hot Work, notify the fire department immediately. Report incident to the head custodian, the Consultant, if assigned, and Project Coordinator immediately, whether extinguished or not. Provide a fire incident report to the Board.
- .8 Barriers must be set up to protect staff and students (i.e. pylons, shields, and caution tape) from exposure to arc flash and smoke migration.
- .9 Have all necessary doors, windows and/or drapes closed. Confer with the Head Custodian to shut down all fan systems in the area to reduce or eliminate smoke distribution.
- .10 Provide and keep fire extinguishers handy and in good Working condition. Temporarily cover all smoke detectors in the area during time of Work.
- .11 Provide a fire watch/spot check for several hours after Work is completed. Uncover smoke detectors.
- .12 On new construction, the requirements of the Hot Work permit may be waived, until such time as either Substantial Completion or Occupancy is granted, whichever comes first.
- .13 On additions to existing buildings, the requirements for Hot Work permits shall remain in place.

1.5. HOT WORK PERMIT

- .1 **A sample Hot Work Permit is attached to the specifications – refer to attached Appendix 01 35 17-A**
- .2 Each permit is valid for seven (7) days only and must be renewed prior to its expiration date
- .3 The contractor must obtain Hot Work Permits from the School Board's representative prior to the start of work.
- .4 The contractor must complete the form as required and must keep the form on site.

- .5 Return each completed form to the School Board's representative on the date of expiration.
- .6 The most current version of the Permit and its requirements shall be used for the purposes of the Work.

1.6. FIRE PROTECTION SYSTEMS

- .1 Any Modifications to Fire Alarm system and its devices including service, additions and changes in device location must be performed only by a Certified Fire Alarm Technician as per the Ontario Fire Code section 1.1, subsection 1.1.5.
- .2 The Contractor will receive from the Board's contact a contact number for the monitoring service and a school system number.
- .3 Bidders are cautioned that the Board will be reimbursed for the cost of false alarms. Refer to Section 01 14 00 Work Restrictions, Para. 1.4.4.
- .4 An approved inspection firm shall verify all new fire alarm devices, in accordance with CSA regulations. Certificate of Verification is required before occupancy.

1.7. FIRE ALARM SHUT-DOWN PROCEDURE

- .1 Plan the operation such that the required work minimizes system down time to the least amount possible. Do not shut the system down or engage silence mode when the building is occupied by students. Only shut the system down when necessary.
- .2 For the purposes of this section, unoccupied shall mean when the school is not occupied by students.
- .3 Wherever possible, shut down only the zone needing work,
- .4 and schedule down time in unoccupied school hours.
- .5 Contractor(s) shall ensure all costs are included in their bid price for work related to the fire alarm system outside of regular hours and/or during unoccupied school hours. This shall include evening and weekend work.
- .6 A fire alarm system must remain active when the building is not occupied by school or contractor's forces and should never be offline overnight.
- .7 Procedure
The following procedure shall be followed when a fire alarm system is completely or partially affected by maintenance, shutdown, bypass, silence, loss of power, or any other nomenclature that affects the proper operation of the complete system.
 - .1 Inform both the principal and head custodian whenever the fire alarm system is to be disabled prior to any partial or whole system shut down.

- Where school staff are not available, ensure that the Project Coordinator and/or area supervisor are informed.
- .2 Ensure that the school or building administration has advised all staff when the fire alarm system is disabled and/or when it is back online. This will include instructions to call 911 if they detect smoke or a fire.
 - .3 Immediately prior to alarm system shutdown and upon restoring the fire alarm system, the person supervising the shutdown must:
 - 1.7.7.1.3.1. obtain the school account number, located on a red decal attached to the fire alarm panel. This number will be formatted as 20-9xxx, with the xxx being the school location code,
 - 1.7.7.1.3.2. contact Direct Detect at 519-741-2494 (the fire alarm monitoring company), to inform them of the state of the fire alarm and the approximate amount of time the fire alarm will be offline. They will require the building name and account number, the contact name, the contractor name as well as any other information they request, and
 - 1.7.7.1.3.3. contact Bestel at 519-741-2494 (the current security monitoring company), to inform them of the state of the fire alarm and the approximate amount of time the fire alarm will be offline. They may require the building name and account number as well as any other information they request.
 - .4 A fire watch, at the Contractor's expense, shall be undertaken by a person with the sole and express purpose of completing the following tasks and in the event of the detection of smoke, fire, or any other emergency, notifying the fire department, and the building occupants. The fire watch patrol shall:
 - 1.7.7.1.4.1. patrol all halls and high-risk areas affected,
 - 1.7.7.1.4.2. have access to a phone and call 911 if they see or detect smoke or fire,
 - 1.7.7.1.4.3. report any other problems they encounter,
 - 1.7.7.1.4.4. notifying the building occupants in the event of an emergency and
 - 1.7.7.1.4.5. remain on patrol until the fire alarm system is reactivated and fully operational.
 - .5 Contact Direct Detect, Bestel, and school administration to inform them that the fire alarm is back online.

- .6 In the event that a fire alarm system is activated, whether by smoke, fire or accidentally, the system must not be reset until authorized by the Fire Department (verbally or in person) and the cause of the alarm has been investigated.

1.8. FIRE PROTECTION EQUIPMENT IMPAIRMENT

- .1 Fire Protection Equipment referred to in this section includes sprinkler systems, special fire suppression systems, and kitchen hood suppression systems.
- .2 The Contractor will take all precautions including restrict all Hot Work operations and shut down hazardous processes during all Fire protection equipment impairment.
- .3 Do not shut the Fire protection equipment down unless necessary. Plan the operation required to reduce system impairment time to the least amount possible.
- .4 Wherever possible, shut down only the Fire protection equipment needing Work and schedule this impairment time for unoccupied school hours. Allow for this in your bid pricing.
- .5 Discuss the possible down time with the head custodian and principal prior to any partial or whole system impairment.
- .6 The school administration shall advise all staff of Fire protection equipment shut down. This will include instructions to call 911 if they see a fire and when system is back online
- .7 The Contractor will plan to use temporary protection such as extra extinguishers, charged hose lines and temporary sprinkler protection during all Fire protection equipment impairment.
- .8 If the sprinkler system is restorable, either in whole or in part, the Contractor or subcontractor shall assign someone to restore the system promptly in the event of a fire.
- .9 A fire patrol may need to be established and will include the following at the Contractor's expense:
 - .1 Patrol all halls and high-risk areas affected.
 - .2 Fire patrol shall have access to a phone and call 911 if they see a fire.
 - .3 Report all other problems they encounter.
 - .4 Remain on patrol until the system is back on.
- .10 The Contractor shall inform all sub trades that the Board has a Red Tag Permit System and it shall be used for all Fire protection equipment impairment.

- .11 For ease of use, a Factory Mutual hanging wall kit has been put in place at all Board Fire protection equipment locations. Supplies of Red Tag Permits are provided there.

1.9. FIRE ALARM MODIFICATIONS AND MAINTENANCE

- .1 Very important changes to Ontario Building Code as they relate to the Standard for the Verification of Fire Alarm Systems CAN/ULC-S537-M have taken effect December 24, 1999. (Minister's Ruling 99-BC-01)
 - .1 Clause 5.1; "Addition of conventional field device(s), or modification(s), to existing input circuit(s) or output circuit(s) shall require re-verification of all devices served by those input circuit(s) or output circuit(s)." If one device is added to a zone, the entire zone or in the case of a single zone panel the entire system is to be verified.
 - .2 Clause 5.2 "Addition of input circuit(s) or output circuit(s) to an existing fire alarm system shall require verification of the new circuit(s) in accordance with this standard, and shall also require all previously existing circuit(s) to be tested as follows:
 - .3 TEST: One conventional field device on each circuit shall be operated to confirm activation of all output circuits in accordance with the systems design." Even though no other zones have been touched, one device per input zone is to be tested when the Fire Alarm system is modified.
 - .4 Clause 5.5 "Where a transponder is added to an existing system, the transponder shall be verified in accordance with subsections 3.2, Wiring; and subsection 3.3 Control Units; and with CAN/ULC-S536, Standard for the Inspection and Testing of Fire Alarm Systems as well as re-verification of existing field devices and verification of new conventional field devices." If a new addressable device is added to a system, the new device is to be tested; as well a test must be conducted on all addressable devices on the loop.
 - .5 Clause 5.6 "Where an existing fire alarm system control unit is replaced with a new control unit, it shall be verified in accordance with CAN/ULC-S536, Standard for the Inspection and Testing of Fire Alarm Systems. Replacement of any control panel will require the testing of all existing fire alarm devices.
- .2 The Contractor and subcontractors shall include in the bid price for the above ULC Standards requirements referenced in the Ontario Building Code.

1.10. INSTALLATION AND/OR REPAIR OF ROOFING

- .1 The Contractor will review with the Consultant and the Board's representative of the location of any asphalt kettles and the dates the kettles will be in use. The Contractor, in the course of performing roofing work, will ensure all personnel utilize the following precautions:
 - .1 Use only kettles equipped with thermometers or gauges in good working order.
 - .2 Locate kettles in a safe place outside of the building.
 - .3 Maintain continuous supervision while kettles are in operation and provide metal covers for the kettles to smother any flames in case of fire.
 - .4 All roofing materials stored in locations no closer than 15 meters to any structures.

1.11. FIRE DEPARTMENT ACCESS

- .1 Designated fire routes must be maintained. The Fire Department must be advised of any work that would impede fire apparatus response.

1.12. SMOKING PRECAUTIONS

- .1 Smoking is not permitted anywhere on Board properties. Workers who wish to smoke must leave the property, and not within sight of students. Any worker found to be in contravention of the Ontario Smoke Free Act will be subject to legislated fines.

1.13. FLAMMABLE LIQUIDS

- .1 The handling and storage on site of flammable liquids are to be governed by the current National Fire Code of Canada.
- .2 Flammable liquids such as gasoline, kerosene and naphtha may be kept for ready use in quantities not exceeding 10 imperial gallons provided they are stored in approved safety cans bearing the Underwriter's Laboratory of Canada or Factory Mutual seal of approval.
- .3 Transfer of flammable liquids is prohibited within buildings.
- .4 Transfer of flammable liquids must not be carried out in the vicinity of open flame or any type of heat producing devices.
- .5 Flammable liquids having a flashpoint below 100° F (37.7°C) such as naphtha or gasoline must not be used as solvents or cleaning agents.
- .6 Flammable waste liquids, for disposal, must be stored in approved containers located in a safe ventilated area. Quantities are to be kept to a minimum.

END OF SECTION

Appendix 013517-A Contractor Hot Work Permit



Waterloo Region
District School Board

Appendix - 013517-A

Facility Services

CONTRACTOR HOT WORK PERMIT

STOP!

Avoid hot work or seek an alternative method if possible.

This hot work permit is required for any temporary operation involving open flames or producing heat and/or sparks. This includes but is not limited to: brazing, cutting, grinding, soldering, torch-applied roofing and welding.

A SEPARATE PERMIT IS REQUIRED FOR EACH AREA

Board Supervisor/ Manager/Proj. Coordinator Responsibilities:

- i. Verify precautions taken in Section A
- ii. Complete and retain Part 1
- iii. Complete Section B prior to commencement of Hot Works
- iv. Issue Part 2 to Contractor completing Hot Work & Post
- v. Obtain Part 2 when Fire Monitoring complete
- vi. Return Part 1 and Part 2 to Controller, Facility Services

Contractor Responsibilities:

- i. Verify precautions taken in Section A
- ii. Complete Section C during each day that Hot Works takes place
- iii. Return Part 2 to Board Supervisor/ Manager/Proj. Coordinator

PART 1

Section A Indicate Precautions Taken
<input type="checkbox"/> Available sprinklers, hose streams, and extinguishers available and in service
Within 35' or 11m of hot work
<input type="checkbox"/> Flammable liquid, dust, lint and oily deposits removed
<input type="checkbox"/> Explosive atmosphere in area eliminated
<input type="checkbox"/> Floors swept clean
<input type="checkbox"/> All wall and floor openings covered
<input type="checkbox"/> Combustible floors covered with fire resistant sheets
<input type="checkbox"/> Protect or shut down ducts that might carry sparks/smoke
Hot work on walls, ceiling or roofs
<input type="checkbox"/> Construction is noncombustible and without combustible covering or insulation
<input type="checkbox"/> Combustible materials on other side of walls, ceilings or roofs moved away
<input type="checkbox"/> Combustible structure wetted down
Hot work on enclosed equipment
<input type="checkbox"/> Enclosed equipment cleaned of all combustible material
<input type="checkbox"/> Containers purged of flammable liquid/vapour
<input type="checkbox"/> Pressurized vessels, piping & equipment removed from service, isolated & vented
Fire watch/hot work and monitoring
<input type="checkbox"/> Fire watch will be provided <u>during</u> and for <u>1 hour</u> after work including break
<input type="checkbox"/> Fire watch is trained and supplied with suitable extinguishers
<input type="checkbox"/> Fire watch is trained in the use of sounding fire alarm
<input type="checkbox"/> Fire watch conducted in adjoining areas, above and below the space where appropriate
<input type="checkbox"/> Monitor hot work area for an additional <u>2 hours</u> after fire watch
<input type="checkbox"/> Other precautions taken (please detail):

Section B Authorization Granted
Board Supervisor/Manager/Proj. Coordinator: _____ <div style="display: flex; justify-content: space-between; width: 100%;"> Print Name Signature </div>
Permit Valid from / to: (max. 7 days) _____ <div style="display: flex; justify-content: space-between; width: 100%;"> From This Date To This Date </div>
(Maximum 7 days or until end of hot work whichever is sooner)

Section C Contractor and Location Affected			
Dates: (max. 7 days)	Name of Contractor conducting hot work	Name & signature of individual assigned to fire watch	Name & signature of individual assigned to fire monitoring
School: _____			
Room/Area: _____			
Nature of Job: _____			
I verify the above location has been examined <u>each day</u> , the precautions listed in Section A have been taken <u>each day</u> , and permission is authorized for this work.			
I further acknowledge that if activity is during <u>school operational hours</u> , that appropriate <u>notification</u> has been given to <u>school</u> administration.			
Hot Works Contractor: _____		Signature	
School Administrator notified: _____		Print Name	
In Case of Emergency call: 911 - Then call: 519-570-0003 Ext. 4123			

Refer to WRDSB Administration Procedure 4200 Hot Works/Fire Watch (Copies Available on Request)

01 35 23 – Health And Safety

1.0 GENERAL

1.1. RELATED SECTIONS

- .1 Section 01 31 00 - Project Managing and Coordination.
- .2 Section 01 33 00 - Submittal Procedures.
- .3 Section 01 35 17 – Fire Safety Requirements
- .4 Section 01 35 43 – Hazardous Materials
- .5 Section 01 41 00 – Regulatory Requirements
- .6 Section 01 53 00 – Temporary Construction Facilities
- .7 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.2. REFERENCES

- .1 Province of Ontario, including requirements for a "Prime Contractor" as defined by the Act.

1.3. SAFETY PLAN

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to commencing any site Work and continue to implement, maintain, and enforce plan until final demobilization from site. The Health and Safety Plan must address project specifications.
- .2 Consultant may respond in writing, where deficiencies or concerns are noted and may request resubmission with correction of deficiencies or concerns.
- .3 Be governed by pertinent safety requirements of Federal or Provincial Governments and of municipal bodies having authority, particularly the Ontario Construction Safety Act, The Occupational Health and Safety Act for Ontario, and regulations of Ontario Ministry of Labour, and work in conjunction with proper safety associations operating under the authority of Ontario Workers' Compensation Act. Protect Owner, Owner's employees, the public and those employed on the Work from bodily injury and to protect adjacent public and private property and Owner's property from damage. Furnish and maintain protection, such as warning signs, tarpaulins, guard rails, barriers, guard lights, night lights, railings around shafts, pits and stairwells, etc. as required. Remove temporary protective measures when no longer required.

1.4. TEMPORARY WORK

- .1 Temporary work requiring engineering proficiency for the design, erection, operation maintenance and removal shall be designed and bear the stamp of the registered professional Engineer or Architect. Detail drawings will be submitted to the Consultant for review prior to commencing any work.
- .2 Before a temporary structure is used, the person responsible for design, or their representative, shall inspect the structure and certify it has been constructed according to their design.

1.5. RESPONSIBILITY

- .1 The "Prime Contractor" according to applicable local jurisdiction, is responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to the extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.
- .3 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, and follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Health and Safety Act having jurisdiction. Advise the Board and the Consultant verbally and in writing.
- .4 The Contractor shall make their own arrangements for emergency treatment of accidents. Any accidents shall be reported immediately to the Board contact.
- .5 The Contractor agrees to hold the Board harmless of any and all liability of every nature and description, which may be suffered through bodily injuries, involving deaths of any persons, by reasons of negligence of the Contractor, his agents, employees, or his subcontractors.

1.6. SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00.
- .2 Submit site-specific Health and Safety Plan: Within ten (10) days after the date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Results of site specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for site tasks and operation

- .3 Submit one (1) copy of Contractor's authorized representative's work site health and safety inspection reports to Consultant and Owner.
- .4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
- .5 Submit copies of incident and accident reports.
- .6 Submit Material Safety Data Sheets (MSDS) to Consultant.
- .7 Consultant's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .8 Medical Surveillance: Where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Consultant.
- .9 On-site Contingency and Emergency Response Plan: Address standard operating procedures to be implemented during emergency situations.
- .10 File Notice of Project with the Ministry of Labour prior to commencement of Work.

1.7. SAFETY ACTIVITIES

- .1 Perform site specific safety hazard assessment related to the project.
- .2 Schedule and administer Health and Safety meeting with Consultant prior to commencement of Work.
- .3 Perform Work in accordance with Section 01 41 00 - Regulatory Requirements and this section.

1.8. HEALTH AND SAFETY COORDINATOR

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Coordinator. Health and Safety Coordinator must:
 - .1 have previous experience as a Health & Safety coordinator,
 - .2 have working knowledge of occupational safety and health regulations,
 - .3 be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work,
 - .4 be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan, and
 - .5 be on site during execution of Work.

1.9. POSTING OF DOCUMENTS

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Health and Safety Act having jurisdiction, and in consultation with Consultant.

1.10. CORRECTION OF NON-COMPLIANCE

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Consultant or by the Board.
- .2 Provide Consultant and/or Board with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Consultant and or the Board may stop Work if non-compliance of health and safety regulations is not corrected.

1.11. PROJECT/SITE CONDITIONS

- .1 Work at site will involve contact with:
 - .1 Refer to Section 01 35 43 Hazardous Materials

1.12. HAZARDOUS WORK

- .1 Blasting or other use of explosives is not permitted at the place of work.

1.13. WORK STOPPAGE

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

1.14. LOCKOUT PROCEDURES

- .1 All Work to be done on electrical systems or machinery, where the unexpected switching on of the system or machinery could result in personal injury to a student, staff, employee, or the Contractor's employee, must be done in accordance with the Contractor's standard lockout procedure.
- .2 The Contractor shall provide his/her own locks for the above procedure.
- .3 The lock shall include contact information for the person(s) locking out such devices.

1.15. OVERHEAD LIFTING

- .1 Under no circumstances will a crane or lifting device be used over an occupied space.
- .2 When working adjacent to occupied spaces, ensure a clearance of one (empty) classroom, or a minimum of 10m between any occupied space and the furthest possible reach of the crane.

1.16. WARNING SIGNS AND NOTICES

- .1 Notices shall be posted advising of the hazard but will not be considered a substitute for providing approved protection, separation, and space from the hazard.

1.17. FIRE PROTECTION

- .1 Provide and maintain temporary fire protection equipment during performance of Work required by the governing codes, regulations and bylaws.
- .2 Burning rubbish and construction waste materials is not permitted on site.
- .3 Maintain placed or installed Fire Protection to protect the portions of the Work during construction.

1.18. SCENT-FREE ENVIRONMENT

- .1 The Board requires that, where advised, a building may be deemed scent-free and as such, the wearing of scented products is prohibited.
- .2 Any methods or materials that are found to create negative responses in staff or students shall cease and be removed under advisement of the Consultant and or the Board, until alternate methods can be determined.

END OF SECTION

01 35 43 – Hazardous Materials

1.0 GENERAL

1.1. RELATED SECTIONS

- .1 Section 01 35 23 – Health and Safety Requirements.
- .2 Section 01 41 00 – Regulatory Requirements.
- .3 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.2. REFERENCES

- .1 Province of Ontario, including requirements for a "Prime Contractor" as defined by the Act.

1.3. ASBESTOS and OTHER REGULATED SUBSTANCES

- .1 An Asbestos Audit, as prepared by MTE Consultants Inc. for this facility, is attached under Appendix 013543 A. A duplicate set is also available in the Facilities Services Departments located in the Education Centre. Unless specifically covered by a Cash Allowance or Contingency Allowance that states otherwise, include in this Contract the required removal of all asbestos containing materials (ACM) to complete the work. No claims for extra costs will be accepted for areas known to contain ACM that are within the scope of this Work.
- .2 Comply with applicable legislation regarding asbestos. Should the Contractor encounter asbestos not noted in the referenced Asbestos Audit that would be disturbed during the course of the Work, they should stop the work in that immediate area and report the same to the Consultant and Board contact.
- .3 In addition, Lead, Mercury, Silica, and Isocyanates are anticipated to be present in existing facilities. New construction, renovations, or alterations require compliance by the Contractor with the applicable legislation.

1.4. PROTOCOL FOR ABATEMENT WORK

- .1 This Protocol establishes the requirements to be followed by all Asbestos Abatement Contractors involved with the Board. It applies to Type 1, Type 2 and Type 3 Operations as stated in the Regulations and applies to emergency and non-emergency work (directly retained or working as a sub-contractor).

- .2 Asbestos Abatement Contractors must maintain appropriate insurance coverage and WISB certification.
- .3 Contractors retained for asbestos abatement work shall use personnel certified by the Ontario College of Trades and must provide the Consultant and Board with proof of asbestos certification (AAS and AAW) for all supervisors / all staff involved.
- .4 School Access
 - .1 During school hours all asbestos contractors are to report to the school office upon arrival. After school hours, ensure card-in / card-out procedures are followed and building security is maintained.
- .5 Communication
 - .1 Establish communication contact list with email and phone numbers that shall include:
 - .1 Principal / Vice Principal
 - .2 Area Facility Manager
 - .3 Head Custodian
 - .4 Environmental Officer
 - .5 Manager of Mechanical, Electrical and Environmental Services
 - .6 Manager of Health Safety & Security
 - .7 Contractor staff
 - .8 Consultant
 - .2 Contact the School Principal / Vice to set up a firm date for the abatement (removal / repair). Schedule to allow at least 72 hours notice ahead of the work.
 - .3 Confirm the date by notifying via email the following:
 - .1 Principal / Vice-principal,
 - .2 Area Facility Manager, and
 - .3 Environmental Officer.
 - .4 Consultant
 - .4 Indicate the date, the start time, the anticipated completion time for the work and the work areas in the school.
 - .5 Identify personnel managing the project and provide current cell numbers for emergency contacts.
 - .6 For emergency work, as requested by Area Supervisors, Facility Managers or Environmental Officer, no notification to the school is required.
 - .7 Additionally, for Type 3 work also contact:
 - .1 Manager of Health, Safety & Security, and
 - .2 Notify the MOL (also for Type 2) where required by regulation.

- .3 Consultant
- .8 Discussions with other groups, school staff, media and others is discouraged and shall be directed to the Board Communication Officer where warranted.
- .6 Asbestos Operations
 - .1 Emergency work shall be carried out the same day (evening/night) or under exceptional conditions the following day / evening / night. Contractors shall exercise discretion when working in the school to minimize anxiety of staff/school community. Where warranted, contact Area Supervisor, Facility Manager or Environmental Officer to obtain further direction.
 - .2 For non-emergency work, contractor is to assess the work on site and provide a cost estimate to the Environmental Officer, (daniela_budure@wrdsb.on.ca) and Consultant. Some work will require discussion with the Facility Manager or Environmental Officer to assess if additional work should be done as to completely remove all ACM material form the area or similar.
 - .3 Where the MTE report shows ACM requiring repair, remove and re-insulate where required.
 - .4 Before beginning any Type 1, Type 2 or Type 3 Operations, the work area must be secured, doors closed, warning signs added to all entrances, caution tape used in open areas and signs used to restrict access to the work area so as to keep persons not involved in the work from entering in the work area.
 - .5 Provide “Construction” warning signs on solid barriers between the Work and public areas. Install a sufficient number of “asbestos abatement” warning signs behind the barriers, posted to warn of the hazard, and that access to the work area is restricted to persons wearing protective clothing and equipment.
 - .6 The contactor is responsible to disable the mechanical ventilation serving the work area and positively prevent operation using Lock-out / Tag-out devices for each air handling unit /fan. Exercise caution during heating season to ensure areas of the building are maintained above freezing and ensure equipment is turned back on after abatement / air clearance completed.
 - .7 Contractor’s employees shall put on / take off PPE within work area marked by construction signs. No employee shall leave the work area wearing PPE.

- .8 All dust and waste is to be cleaned up and removed at frequent / regular intervals as the work proceeds and immediately upon completion. No waste bags or similar are to be left behind.

1.5. SUBMITTALS

- .1 Once the abatement is completed, forward a Letter of Completion to the Environmental Officer, (daniela_budure@wrdsb.on.ca). This letter shall be received no later than 72 hours after completion and shall include any sample results.
- .2 For those projects requiring Air Clearance, ensure this info is sent without delay but in all cases no later than 24 hours after sampling. All Type 3 work must take into account that the initial samples may not pass and the contactor must allow one additional day to re-clean and re-sample before school is to resume operations. For those projects not under the direct supervision of a Environmental Consultant, the contactor is to expedite the air clearance sampling with the lab of their choice and carry these costs.
- .3 Forward Air Clearance results to:
 - .1 Principal / Vice-principal,
 - .2 Facility Manager,
 - .3 Environmental Officer,
 - .4 Manager of Mechanical, Electrical and Environmental Services, and
 - .5 Manager of Health, Safety & Security.
 - .6 Consultant

1.6. ACKNOWLEDGEMENT

- .1 The protocols for asbestos work must be read and understood by Asbestos Contractor.
- .2 Submit a signed copy of the most current copy of PROTOCOL FOR ABATEMENT WORK (ASBESTOS ABATEMENT CONTRACTORS) to the General Contractor, the Consultant, and the Board's Environmental Officer.

END OF SECTION

Appendix 01 35 43A Asbestos Audit Report

Refer to attached Asbestos Report

END OF SECTION

Appendix 01 35 34B– Lead Report

Refer to attached Lead Report

END OF SECTION

01 42 00 – References

1.0 GENERAL

1.1. SECTION INCLUDES

- .1 References and standards.
- .2 Standards producing industry organizations and their addresses.

1.2. RELATED SECTIONS

- .1 Section 01 61 00 – Product Requirements.
- .2 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.3. REFERENCES

- .1 For Products or quality specified by association, trade, or other references or consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- .2 Conform to reference standard by Ontario Building Code except where a specific date is established or required by code.
- .3 Obtain copies of standards where required by product specification sections.
- .4 Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of the Consultant shall be altered from the Contract Documents by mention or inference otherwise, in any reference document.

1.4. STANDARDS

- .1 The following associations and organizations are cited in specification sections. Acronym, name, address, and Internet URL addresses are as follows:
- .2 Canadian Organizations:
 - .1 Street, Suite 616, Ottawa, ON K1P 5G4; URL: <http://www.acec.ca>.
 - .2 **AWMAC** - Architectural Woodwork Manufacturers Association of Canada, 516-4 Street West, High River, AB T1V 1B6; URL: <http://www.awmac.com>.
 - .3 **Canada Green Building Council**, 330 - 55 rue Murray Street, Ottawa, ON. K1N5M3; Tel: 613-241-1184, Fax: 613-241-5750; URL: <http://www.cagbc.org>.
 - .4 **CCA** - Canadian Construction Association, 75 Albert St., Suite 400, Ottawa, ON K1P 5E7; URL: <http://www.cca-acc.com>.
 - .5 **CCDC** – Canadian Construction Documents Committee, Refer to ACEC, CCA, CSC or RAIC; URL: <http://www.CCDC.org>.

- .6 **CGA** - Canadian Gas Association, 20 Eglinton Avenue West, Suite 1305, Toronto, ON M4R 1K8; URL: <http://www.cga.ca>.
- .7 **CGSB** - Canadian General Standards Board, Place du Portage, Phase III, 6B1, 11 Laurier Street, Hull, QC K1A 0S5; URL: <http://w3.pwgsc.gc.ca/cgsb>.
- .8 **CISC** - Canadian Institute of Steel Construction, 201 Consumers Road, Suite 300, Willowdale, ON M2J 4G8; URL: <http://www.cisc-icca.ca>.
- .9 **CLA** - Canadian Lumbermen's Association, 27 Goulburn Avenue, Ottawa, ON K1N 8C7; URL: <http://www.cla-ca.ca>.
- .10 **CNLA** - Canadian Nursery Landscape Association, RR #4, Stn. Main, 7856 Fifth Street, Milton, ON L9T 2X8; URL: <http://www.canadanursery.com>.
- .11 **CRCA** - Canadian Roofing Contractors Association, 155 Queen Street, Suite 1300, Ottawa, ON K1P 6L1; URL: <http://www.roofingcanada.com>.
- .12 **CSA** - Canadian Standards Association International, 178 Rexdale Blvd., Toronto, ON M9W 1R3; URL: <http://www.csa-international.org>.
- .13 **CSC** - Construction Specifications Canada, 120 Carlton Street, Suite 312, Toronto, ON M5A 4K2; URL: <http://www.csc-dcc.ca>.
- .14 **CSDMA** - Canadian Steel Door Manufacturers Association, One Yonge Street, Suite 1801, Toronto, ON M5E 1W7; URL: <http://www.csdma.org>.
- .15 **CSPI** - Corrugated Steel Pipe Institute, 652 Bishop Street N, Unit 2A, Cambridge, ON N3H 4V6; URL: <http://www.cspi.ca>.
- .16 **CSSBI** - Canadian Sheet Steel Building Institute, 652 Bishop St. N., Unit 2A, Cambridge, ON N3H 4V6; URL: <http://www.cssbi.ca>.
- .17 **CUFCA** - Canadian Urethane Foam Contractor's Association, Box 3214, Winnipeg, MB R3C 4E7; URL: <http://www.cufca.ca>.
- .18 **CWC** - Canadian Wood Council, 1400 Blair Place, Suite 210, Ottawa, ON K1J 9B8; URL: <http://www.cwc.ca>.
- .19 **EC** - Environment Canada, Conservation and Protection, Inquiry Centre, 351 St. Joseph Blvd, Hull, QC KIA 0H3; URL: <http://www.ec.gc.ca>.
- .20 **EFC** - Electro Federation of Canada, 5800 Explorer Drive, Suite 200, Mississauga, ON L4W 5K9; URL: <http://www.electrofed.com>.
- .21 **MPI** - The Master Painters Institute, 4090 Graveley Street, Burnaby, BC V5C 3T6; URL: <http://www.paintinfo.com>.
- .22 **NABA** - National Air Barrier Association, PO Box 2747, Winnipeg, MB R3C 4E7; URL: <http://www.naba.ca>.

- .23 **NLGA** - National Lumber Grades Authority, 406-First Capital Place, 960 Quayside Drive, New Westminster, BC V3M 6G2; URL: <http://www.nlga.org>.
- .24 **NRC** - National Research Council, Building M-58, 1200 Montreal Road, Ottawa, ON K1A 0R6; URL: <http://www.nrc.gc.ca>.
- .25 **QPL** - Qualification Program List, c/o Canadian General Standards Board, Place du Portage, Phase III, 6B1, 11 Laurier Street, Hull, QC K1A 1G6; URL: <http://www.pwgsc.gc.ca/cgsb>.
- .26 **RAIC** - Royal Architectural Institute of Canada, 55 Murray Street, Suite 330, Ottawa, ON K1N 5M3; URL: <http://www.raic.org>.
- .27 **SCC** - Standards Council of Canada, 270 Albert Street, Suite 2000, Ottawa, ON K1P 6N7; URL: <http://www.scc.ca>.
- .28 **TTMAC** - Terrazzo, Tile and Marble Association of Canada, 30 Capston Gate, Unit 5 Concord, ON L4K 3E8; URL: <http://www.ttmac.com>.
- .29 **ULC** - Underwriters' Laboratories of Canada, 7 Crouse Road, Toronto, ON M1R 3A9; URL: <http://www.ulc.ca>.
- .3 USA Organizations:
 - .1 **AA** - Aluminum Association, 900 19th Street N.W., Washington, DC 20006; URL: <http://www.aluminum.org>.
 - .2 **AASHTO** - American Association of State Highway and Transportation Officials, 444 N Capitol Street N.W., Suite 249, Washington, DC 20001; URL: <http://www.aashto.org>.
 - .3 **AHA** - American Hardboard Association, 1210W Northwest Hwy, Palatine, IL 60067; URL: <http://www.hardboard.org>.
 - .4 **AITC** - American Institute of Timber Construction, 7012 S. Revere Parkway, Suite 140, Englewood, CO 80112; URL: <http://www.aitc-glulam.org>.
 - .5 **AMCA** - Air Movement and Control Association Inc., 30 West University Drive, Arlington Heights, IL 60004-1893; URL: <http://www.amca.org>.
 - .6 **ANSI** - American National Standards Institute, 25 West 43rd Street, 4th Floor, New York, NY 10036; URL: <http://www.ansi.org>.
 - .7 **APA** - The Engineered Wood Association, P.O. Box 11700, Tacoma, WA 98411-0700; URL: <http://www.apawood.org>.
 - .8 **API** - American Petroleum Institute, 1220 L St. Northwest, Washington, DC 20005-4070; URL: <http://www.api.org>.
 - .9 **ARI** - Air Conditioning and Refrigeration Institute, 4100 N Fairfax Drive, Suite 200, Arlington, VA 22203; URL: <http://www.ari.org>.

- .10 **ASHRAE** - American Society of Heating, Refrigeration and Air-Conditioning Engineers, 1791 Tullie Circle NE, Atlanta, GA 30329; URL: <http://www.ashrae.org>.
- .11 **ASME** - American Society of Mechanical Engineers, ASME Headquarters, 3 Park Avenue, New York, NY 10016-5990; URL: <http://www.asme.org>.
- .12 **ASTM International**, 100 Barr Harbor Drive West, Conshohocken, PA 19428-2959; URL: <http://www.astm.org>.
- .13 **AWCI** - Association of the Wall and Ceiling Industries International, 803 West Broad Street, Suite 600 , Falls Church, VA 22046; URL: <http://www.awci.org>.
- .14 **AWPA** - American Wire Producer's Association, 801 N Fairfax Street, Suite 211, Alexandria, VA 22314-1757; URL: <http://www.awpa.org>.
- .15 **AWPA** - American Wood Preservers' Association, P.O. Box 5690, Granbury TX 76049-0690; URL: <http://www.awpa.com>
- .16 **AWS** - American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126; URL: <http://www.amweld.org>.
- .17 **AWWA** - American Water Works Association, 6666 W. Quincy Avenue, Denver, CO 80235; URL: <http://www.awwa.org>.
- .18 **EIMA** - EIFS Industry Manufacturer's Association, 3000 Corporate Center Drive, Suite 270, Morrow, GA 30260; URL: <http://www.eima.com>.
- .19 **ISAP** - International Society for Asphalt Paving, 400 Selby Avenue, Suite 1, St. Paul, MN 55102; URL: <http://www.asphalt.org>.
- .20 **IEEE** - Institute of Electrical and Electronics Engineers, IEE Corporate Office, 3 Park Avenue, 17th Floor, New York, NY 10016-5997; URL: <http://www.ieee.org>
- .21 **MSS** - Manufacturers Standardization Society of the Valve and Fittings Industry, 127 Park Street, N.E., Vienna, VA 22180-4602; URL: <http://www.mss-hq.com>.
- .22 **NAAMM** - National Association of Architectural Metal Manufacturers, 8 South Michigan Avenue, Suite 1000, Chicago, IL 60603; URL: <http://www.naamm.org>.
- .23 **NEMA** - National Electrical Manufacturers Association, 1300 N 17th Street, Suite 1847, Rosslyn, VA 22209; URL: <http://www.nema.org>.
- .24 **NFPA** - National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101 Quincy, MA 02269-9101; URL: <http://www.nfpa.org>.
- .25 **NFSA** - National Fire Sprinkler Association, P.O. Box 1000, Patterson, NY 12563; URL: <http://www.nfsa.org>.

- .26 **NHLA** - National Hardwood Lumber Association, 6830 Raleigh-La Grange Road, Memphis, TN 38184-0518; URL: <http://www.natlhardwood.org>.
- .27 **NSPE** - National Society of Professional Engineers, 1420 King Street, Alexandria, VA 22314-2794; URL: <http://www.nspe.org>.
- .28 **PCI** - Prestressed Concrete Institute, 209 W. Jackson Blvd., Suite 500, Chicago, IL 60606-6938; URL: <http://www.pci.org>.
- .29 **PEI** - Porcelain Enamel Institute, PO Box 920220, Norcross, GA 30010; URL: <http://www.porecelainenamel.com>.
- .30 **SSPC** - The Society for Protective Coatings, 40 24th Street, 6th Floor, Pittsburgh, PA 15222-4656; URL: <http://www.sspc.org>.
- .31 **TPI** - Truss Plate Institute, 583 D'Onofrio Drive, Suite 200, Madison, WI 53719; URL: <http://www.tpinst.org>.
- .32 **UL** - Underwriters' Laboratories, 333 Pfingsten Road, Northbrook, IL 60062-2096; URL: <http://www.ul.com>.

END OF SECTION

01 45 00 – Quality Control

1.0 GENERAL

1.1. RELATED SECTIONS

- .1 Section 01 21 00 - Allowances.
- .2 Section 01 78 10 – Closeout Submittals and Requirements
- .3 Section 01 79 00 – Demonstration and Training
- .4 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.2. REFERENCES

- .1 **ISO/IEC 17025-2005** - General Requirements for the Competence of Testing and Calibration Laboratories.
- .2 **SCC** (Standards Council of Canada).

1.3. INSPECTION BY AUTHORITY

- .1 Allow Authorities Having Jurisdiction access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection whenever portions of the Work are designated for special tests, inspections or approvals, either when described in the Contract Documents or when required by law in the Place of the Work.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.

1.4. REVIEW BY CONSULTANT

- .1 Consultant may order any part of the Work to be reviewed or inspected if Work is suspected to be not in accordance with Contract Documents.
- .2 If, upon review such work is found not in accordance with Contract Documents, correct such Work and pay the cost of additional review and correction.
- .3 If such Work is found in accordance with Contract Documents, The owner will pay the cost of review and replacement.

1.5. INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection and Testing Agencies will be engaged by Contractor for the purpose of inspecting and testing portions of Work.
- .2 The Board may, at their discretion, request that the Consultant direct the Contractor to engage independent inspecting and or testing agencies to review or test the Work.
- .3 Allocate Costs for inspections and testing to Section 01 21 00.
- .4 Provide equipment required for executing inspection and testing by appointed agencies.
- .5 Employment of inspection and testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .6 If defects are revealed during inspection and/or testing, the appointed agency will request additional inspection and testing to ascertain the full degree of defect. Correct defects and irregularities as advised by the Consultant at no cost to the Owner. Contractor shall pay costs directly to the inspection agency for retesting and re-inspection.

1.6. ACCESS TO WORK

- .1 Allow inspection and testing agencies access to Work, off site manufacturing and fabrication plants.
- .2 Cooperate to provide reasonable access and facilities for such access.

1.7. CONTRACTOR RESPONSIBILITIES

- .1 Notify appropriate agency minimum 48 hours in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.8. DUTIES & AUTHORITY OF TESTING AGENCY

- .1 Testing agency is expected to do the following:
 - .1 Act in a professional and unprejudiced basis and carry out inspection and testing functions to establish compliance with requirements of Contract Documents.
 - .2 Check work as it progresses and prepare reports stating results of tests and conditions of work and state in each report whether specimens

tested conform to requirements of Contract Documents, specifically noting deviations.

- .3 Distribute reports as follows
 - .1 Consultant
 - .2 Owner
 - .3 Contractor
- .2 Testing agency is not authorized to amend or release any requirements of Contract Documents, nor to approve or accept any portion of work.

1.9. REJECTED WORK

- .1 The Contractor shall remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by the Consultant as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 If, it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, the Owner may choose to accept the condition. The difference in value between Work performed and that called for by Contract Documents shall be deducted from the Contract value via Change Order. The amount of this change shall be determined by the Consultant. The Contractor shall warrant the work performed for the time period specified as if it were performed in accordance with the Contract Documents.

1.10. TESTING OF EXCAVATION & BACKFILL

- .1 The Consultant must approve all Sample and fill tests prior to purchase.
- .2 In coordination with the Consultant and Contractor, inspect and test backfill and fill to ensure the degree of compaction specified has been obtained.
- .3 Inspect excavation at required levels in regard to bearing values for footings, foundations and floor slabs.
- .4 Authorization and calculation of extra excavation work, if required, due to unsatisfactory bearing shall be adjusted by Unit Price.

1.11. CONCRETE STRENGTH TESTS

- .1 Review the proposed concrete mix design and check test if considered necessary.
- .2 Obtain representative samples of fresh concrete for each mix design of concrete placed in any one day as directed by the Consultant.

- .3 Make standard slump tests.
- .4 Mould three (3) standard 150mm diameter cylindrical test specimens from each sampling of fresh concrete. Store specimens as per best practice while they are on the site. Cure all cylinders in the laboratory under standard moisture and temperature conditions. Compression test one of the cylinders at 7 days and the remaining two at 28 days after sampling. Each concrete cylinder test report shall contain the specific location of concrete represented by sample, design strength, aggregate size, admixtures used, date, hour and temperature at time of sampling, percentage air content, unit weight and test strength of cylinder.
- .5 When concrete is placed under the conditions of "Cold Weather Requirements" make one additional cylinder; store it in a heated enclosure for 24 hours and then store it on the job site in a place protected from disturbance and off the ground. Compressive test this cylinder 7 days after sampling.
- .6 Determine the air content of air entrained standard weight concrete.
- .7 Determine the air content and unit weight of light weight concrete by the volumetric method.
- .8 Additional testing required because of changes in materials or proportions of the mix requested by the Contractor as well as any extra testing of concrete or materials occasioned by their failure to meet specification requirements or testing of the structure or performance of the structure, including load testing, shall be carried out at the Contractor's expense.

1.12. INSPECTION OF STRUCTURAL STEEL

- .1 Ensure all steel has mill test reports that comply with the Specification prior to purchase.
- .2 Inspect fabrication of steel in the plant.
- .3 Inspect erection work at site including fit-up, placing, plumbing, levelling, temporary bracing, field cutting and alterations.
- .4 Shop and field inspect welded and bolted connections and painting.
- .5 High strength bolts - the installation and testing of bolts shall conform to the requirements of CSA S16-1969. Check one representative connection in ten by torque testing every bolt, and check each bolt in every connection with a tap of hammer for soundness. Enforce requirements of connection type.
- .6 Examine visually all welded joints for inclusions, porosity, lack of fusion penetration or even contour, undercuts and cracks. Root passes shall be checked for penetration and cracks from the back of the joint. Any suspect welds shall be checked ultrasonically.

1.13. INSPECTION OF METAL DECK

- .1 Check deck for gauge, type and protective coating thickness to ensure compliance with Specification.
- .2 Inspect erection work at the site including anchorage.

1.14. INSPECTION AND TESTING OF PAVING

- .1 Testing shall be carried out in three stages as described below by means of sufficient site visits to ensure satisfactory results but in no case less than three site visits.
- .2 Test within 16 hours from time called to do so by the Contractor, since paving is a critical item at the end of the project.
- .3 Stage One:
 - .1 Visual inspection and compaction tests of subsoil.
- .4 Stage Two:
 - .1 Inspection of granular sub-base (after each layer is placed or after the last layer is placed and compacted).
 - .2 On site density tests.
 - .3 Verify thickness of various levels. (Minimum of 4 checks shall be done on thickness in a paved area of 250m² or less, and 1 additional check for each additional 250m² or part thereof).
 - .4 Laboratory tests: moisture content and grading of materials.
- .5 Stage Three:
 - .1 Inspection of asphalt installation.
 - .2 Checking of thickness and density of material and checking suitability of equipment used.
- .6 Standard Proctor Test shall be carried out for all projects.
- .7 Further, grain size analysis and Marshall test shall be carried out if visual inspection is not satisfactory or, if there is reason to suspect materials supplied are not acceptable.
- .8 All laboratory tests shall be performed according to A.S.T.M. methods, latest revisions
- .9 Paving Contractor shall obtain from their supplier grading tables of materials used and submit them to the testing laboratory for approval. The paving contractor shall ensure material delivered complies with grading tables.
- .10 Be responsible for all approvals given to the Paving Contractor. At completion of the paving project, inform the Consultant all tests were performed according to the Specifications and the Contractor's performance has been approved.
- .11 The Consultant will not entertain any credits for work either not performed or incorrectly performed by the contractor. If thicknesses or consistencies of

sub-base are not as specified, or if asphaltic material is not as specified, then the Contractor shall remove the same at their expense and provide proper specified materials.

1.15. BUILDING THERMOGRAPHIC SCAN

- .1 Upon completion of the Work, the Consultant and/or Owner may arrange for an independent agency to carry out a thermographic scan of the building to determine acceptability of thermal performance of the building envelope.
- .2 Consultant, prior to start of construction work, will designate a sample area of the building to include a portion of exterior wall and roof.
- .3 Consultant will implement a special inspection program for this sample area to be carried out as construction progresses. Contractor shall not cover any completed work until notifying the Consultant and receiving acceptance of completed work. Contractor shall remove and replace any work which is installed in contravention of this requirement.
- .4 Results of a thermographic scan of the entire building will be evaluated and compared to those of the sample area to determine acceptance or rejection of any part of the building envelope.
- .5 Contractor shall carry out remedial work as required to bring the quality of any rejected portion of the building envelope to that of the sample area. Contractor shall pay for costs of any follow-up thermographic scans required to determine acceptability of remedial work. This procedure shall be repeated until all parts of the building envelope have been accepted.

1.16. TESTS AND MIX DESIGNS

- .1 Furnish test results and mix designs as may be requested.
- .2 The cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work shall be appraised by Consultant and may be authorized as recoverable.

1.17. MOCK-UP

- .1 Prepare mock-up for Work specifically requested in specifications. Include for Work of all Sections required to provide mock-ups.
- .2 Prepare mock-ups for Consultants review with reasonable promptness and in an orderly sequence, so as not to cause any delay in Work.
- .3 Failure to prepare mock-ups in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.

- .4 If requested, Consultant will assist in preparing a schedule fixing dates for preparation.
- .5 Remove mock-up at conclusion of Work or when acceptable to the Consultant. Repair any damage and clean-up at place of mock-up.
- .6 Approved mock-up may remain as part of Work.

1.18. EQUIPMENT AND SYSTEMS

- .1 Submit adjustment and balancing reports for mechanical and electrical systems to the consultant.
- .2 Refer to Sections 01.78.10 and 01.79.00 for definitive requirements.

END OF SECTION

01 51 00 – Temporary Utilities

1.0 GENERAL

1.1. RELATED SECTIONS

- .1 Section 01 52 00 - Construction Facilities.
- .2 Section 01 53 00 - Temporary Construction.
- .3 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.2. INSTALLATION AND REMOVAL

- .1 Provide temporary utilities controls in order to execute work expeditiously.
- .2 Location of temporary facilities shall be subject to the Consultant's approval.
- .3 Salvage and assist in recycling products for potential reuse wherever possible.
- .4 Remove temporary facilities from the site when directed by the Consultant.

1.3. DEWATERING

- .1 Provide temporary drainage and pumping facilities to keep excavations and the site free from standing water. Provide necessary pumps (including spare pumps) and temporary drainage for keeping the Work free of water throughout the construction period. Locate sumps away from foundation elements. Control grading around excavation to prevent surface water from draining into excavation and from damaging adjoining property.

1.4. WATER SUPPLY

- .1 Provide continuous supply of potable water for construction use until such time as permanent municipal water supply is available.
- .2 Hose extensions to be provided by subcontractors requiring them.
- .3 For New Builds, arrange for connection with the appropriate utility company and pay all costs for installation, maintenance, removal, and usage costs until occupancy has been achieved.
- .4 For Additions and renovations the contractor can use existing Board service unless noted otherwise.

1.5. TEMPORARY HEATING AND VENTILATION

- .1 Provide temporary heating required during construction period, including unit rental costs, maintenance.

- .2 Provide temporary heating fuel, if not already available on site, until such time as a permanent natural gas line is installed, and thereafter fuel costs shall be borne by the Board. The Contractor shall provide all connections and piping between the permanent fuel source and the heating appliance(s).
- .3 Provide temporary heat and ventilation in enclosed areas as required to:
 - .1 Facilitate progress of Work.
 - .2 Protect Work and products against dampness and cold.
 - .3 Prevent moisture condensation on surfaces.
 - .4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
 - .5 Provide adequate ventilation to meet health regulations for a safe working environment.
- .4 Maintain temperatures of minimum:
 - .1 10 degrees C in areas where construction is in progress, until takeover by the Board. Contractor to ensure temporary enclosures remain sealed and penetrations are repaired or closed in a timely fashion.
 - .2 16 degrees C in areas where finishes are in progress.
 - .3 16 degrees C in building once it is enclosed.
 - .4 Refer to other Sections for intermittent heating requirements up to 21 degrees C. Provide insulated tarp enclosures for openings as required to enclose the building after completion of main building shell components and roof.
 - .5 If the Contractor fails to ensure the temporary enclosures remained sealed (including temp doors when not in use) the Consultant and or the Board shall require the contractor to pay 40% of that months usage charge
- .5 Use forced hot air heaters. Open-flame type heaters or salamanders are not permitted. Ventilate direct fired heating units to the outside.
- .6 Uniformly distribute heat to avoid hot and cold areas and to prevent excessive drying.
- .7 Early heating of the building shell will be required to expedite interior finishing to meet the project schedule.
- .8 Ventilating:
 - .1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
 - .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into the atmosphere of occupied areas.
 - .3 Dispose of exhaust materials in a manner that will not result in harmful exposure to persons.

- .4 Ventilate storage spaces containing hazardous or volatile materials.
- .5 Ventilate temporary sanitary facilities.
- .6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.
- .7 Provide minimum 1 air change per hour for enclosed areas receiving architectural finishes.
- .8 Do not allow excessive build-up of moisture inside the building.
- .9 The permanent mechanical systems for the new building, when installed in safe operating conditions, may be used for temporary heating or cooling if approved in writing by the Consultant, without penalty to the warranty.
- .10 Follow the requirements of "Temporary Use of New Permanent Services and Equipment" if the permanent heating system installed under the contract is intended to be used for temporary heating during the construction.
- .11 Provide competent persons to operate and maintain permanent systems for the duration of temporary use period.
- .12 Perform required repairs and maintenance immediately after each inspection. Pay for operating costs. Upon termination of temporary use period, services and equipment shall be inspected, tested, adjusted, fitters replaced, balanced, cleaned and lubricated.
- .13 Permanent services and equipment shall be turned over to the Owner in new and perfect operating condition.
- .14 Use of permanent systems and equipment as temporary facilities shall not affect the guarantee conditions and guarantee period for such systems and equipment. Make due allowance to ensure Owner will receive full benefits of the equipment manufacturer's warranty from the date of Substantial Performance.
- .15 Ensure date of Substantial Performance of the Work and Warranties for heating system do not commence until entire system is in as near original condition as possible and is certified by Consultant.
- .16 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
 - .1 Conform with applicable codes and standards.
 - .2 Enforce safe practices.
 - .3 Prevent abuse of services.
 - .4 Prevent damage to finishes.
 - .5 Vent direct-fired combustion units to outside.
- .17 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.6. TEMPORARY POWER AND LIGHT

- .1 Provide temporary electrical service and system including lighting and power system for use by all Sections.
- .2 Contractor will provide a source for, and pay the costs of temporary power during construction for temporary lighting and operating of power tools until such time as a permanent source is available.
- .3 Contractor to ensure that the use of power from a source provided by the Board shall not exceed the capacity of the current use required for the operation of any existing facility.
- .4 Install and maintain temporary electrical service and systems in accordance with Construction Safety Association's "Temporary Wiring Standards on Construction Sites", the Ontario Electrical Code and other authorities having jurisdiction.
- .5 Provide at least one temporary panel on each floor with service capacity suitable for construction requirements and to authorities and utilities approval.
- .6 Provide temporary wiring with lighting to all areas of each floor to provide adequate lighting.
 - .1 Lighting levels must be maintained at a minimum of 10 foot candles, or to suit the particular location or operation, whichever is greater.
 - .2 Do not use materials of the temporary service in permanent installation.
 - .3 Increase lighting levels equivalent to the final requirements when finishing operations are underway.
- .7 Extension cords, lights, etc., required by various subcontractors and run from above outlet positions will be supplied and maintained by the party or parties requiring the same.
- .8 Follow requirements of "Temporary Use of New Permanent Services and Equipment" if electrical power and lighting systems installed under the contract are intended to be used for temporary electricity and lighting during the construction.
- .9 Electrical power and lighting systems installed under this contract can be used for construction provided damages are made good and all lamps that have been used for more than two months are replaced with new lamps.
- .10 For New Builds, arrange for connection with the appropriate utility company and pay all costs for installation, maintenance, removal and usage costs until occupancy has been achieved.
- .11 For Additions and renovations the contractor can use existing Board service unless noted otherwise.
- .12 Provide and pay for temporary power for electric cranes and other equipment requiring temporary power in excess of above noted requirements.

1.7. TEMPORARY COMMUNICATION FACILITIES

- .1 Contractor to provide and pay for temporary Phone, e-mail and printer hook up, for the duration of contract until completion for use by the contractor.
- .2 The site superintendent is to have email access and a printer on site.

END OF SECTION

01 53 00 – Temporary Construction Facilities

1.0 GENERAL

1.1. RELATED SECTIONS

- .1 Section 01 51 00 - Temporary Utilities.
- .2 Section 01 35 23 – Health and Safety
- .3 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.2. INSTALLATION AND REMOVAL

- .1 Provide temporary construction facilities in order to execute work expeditiously.
- .2 Remove temporary facilities from the site when directed by the Consultant.

1.3. PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

- .1 Protect surrounding private and public property from damage during performance of Work.
- .2 Be responsible for damage incurred.

1.4. PROTECTION OF SURROUNDING WORK

- .1 Provide protection for finished and partially finished Work from damage.
- .2 Provide necessary cover and protection.
- .3 Be responsible for damage incurred due to lack of or improper or inappropriate protection.

1.5. ROOF AND STRUCTURE PROTECTION

- .1 Ensure no part of Work or existing structures are subjected to a load, which will endanger its safety or will cause permanent deformation.
- .2 The Contractor when indicated by the Board Contact or Consultant shall provide roof protection. Ensure all precautions are taken to avoid liability for roof damage.
- .3 Typical roof protection shall consist of a layer of 1 inch rigid foam insulation set directly on the roof surface and a layer of 19 mm (3/4 inch) plywood in all places under scaffold legs, ladder legs and in areas of foot traffic or falling debris.

1.6. WORK SITE ENCLOSURE & SAFETY BARRIERS

- .1 Erect and maintain for the duration of the work:

- .1 a minimum 1800 mm high chain link fence or self-supporting, heavy duty, interconnected fence panels (commonly referred to as Insta-fence) for a temporary site enclosure (hoarding) completely around perimeter of work site,
 - .2 any temporary posts shall be completely removed by the contractor prior to occupancy,
 - .3 under no circumstance shall t-bar posts be used on board property
 - .4 any additional safety devices including full hoarding as required and noted on the drawings, to protect the students, staff, public and private property from injury and damage,
 - .5 any additional requirements as regulated by authorities having jurisdiction, local by-laws and zoning.
- .2 The Contractor is to assume full responsibility for any injury or damage caused due to failure to comply with Paragraph 1 above.
 - .3 Any hazardous conditions identified outside of the main fenced area will be barricaded with a fence complying to the above.
 - .4 Provide lockable truck entrance gate/gates and at least one (1) pedestrian door as directed and conforming to applicable traffic restrictions on adjacent streets. Equip gates with locks and keys with restricted availability, in the project office.
 - .5 Erect and maintain pedestrian walkways including roof and side covers, complete with signs and electrical lighting as required by law.
 - .6 Provide barriers around trees and plants designated to remain.
 - .7 Protect from damage by equipment and construction procedures.

1.7. TREE PROTECTION

- .1 Protect all existing trees to remain from damage during construction period. Make good, at Contractor's expense, trees damaged during construction.
- .2 Confine movement of heavy equipment, storage of same, and storage of materials to a predetermined area. Do not store materials or place equipment over root systems of any existing trees to remain.
- .3 Install fencing or approved equal at limits of drip line of existing trees to remain unless directed otherwise. Where this case is not practical, and only if approved by the Consultant, the trunks shall be protected with an approved tree guard.
- .4 No rigging cables shall be wrapped around or installed in trees. Do not flush concrete trucks or cement mixing machines over root systems or near trees. Flush concrete trucks or cement mixing machines in areas approved by the Consultant.

- .5 Areas where root systems of trees are exposed directly adjacent to a structure will be backfilled with good loam only.
- .6 Whenever excavating is required within branch spread of trees that are to remain, the contractor shall contact the consultant for direction prior to the start of work.
- .7 If any existing tree to remain is injured and does not survive the following year, it will, as determined by the Board, be removed in its entirety and be replaced with a tree of similar size and value, as directed by the Consultant.
- .8 Should the destroyed tree be of such a size or shape that it cannot be feasibly replaced, the Contractor shall compensate the Owner for the minimum sum of five thousand dollars (\$5,000.00) per destroyed tree.

1.8. GUARD RAILS AND BARRIERS

- .1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stairwells, open edges of floors and roofs.
- .2 Erect and maintain for the duration of the Work, safety devices and barricades including hoarding, as required, to protect the staff, students, public and private property, from injury and damage.
- .3 The Contractor is to ensure that all requirements from authorities having jurisdiction and all requirements from the Owner are met.
- .4 The Contractor is to assume full responsibility for any damage caused due to his failure to comply with paragraph 2 above.
- .5 Hazardous conditions on the exterior shall be fenced.

1.9. WEATHER ENCLOSURES

- .1 Provide weather-tight closures to unfinished door and window openings, tops of shafts and other openings in floors and roofs.
- .2 Close off floor areas where walls are not finished; seal off other openings; enclose building interior work for temporary heat.
- .3 Design enclosures to withstand wind pressure.

1.10. DUST TIGHT BARRIERS

- .1 Provide dust tight barriers and screens or partitions to localize dust generating activities, and for protection of workers, finished areas of Work and public.
- .2 Maintain and relocate protection until such work is complete.
- .3 Where required, adjust air handling units to eliminate migration of dust.

1.11. SCAFFOLDING

- .1 Erect scaffolding independent of walls and use in such a manner limiting interference with other work. When not in use, move scaffolding as necessary to permit installation of other work. Construct and maintain scaffolding in a rigid, secure and safe manner. Remove it promptly when no longer required. Protect the surface on which scaffolding is bearing.

1.12. SHORING, BRACING, PILING

- .1 Provide shoring, bracing, piling, sheeting and sheet piling and underpinning required to support soil banks, existing work and property in accordance with Construction Safety Act and other applicable regulations. Maintain shoring until the building is strong enough and sufficiently braced to withstand pressure of backfilling. Make construction aids free of permanent work so they may be removed entirely when no longer required, without damaging the Work. Locate construction aids so adequate room is left for damp-proofing foundation walls, laying substructure drainage and other work.
- .2 Shoring and false work over one tier in height shall be designed and shall bear the stamp of a registered professional engineer, having experience in this field.

1.13. HOISTING

- .1 Provide, operate and maintain services required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof.
- .2 Machinery shall be operated by qualified operator.

1.14. OVERHEAD LIFTING

- .1 Any condition requiring the use of a crane or lifting device over a Board structure must follow the requirements of Health and Safety Section 01 35 23, Paragraph 1.15 Overhead Lifting.

1.15. ELEVATORS/LIFTS

- .1 When elevators/lifts are to be used by construction personnel, provide protective coverings for finish surfaces of elevator cabs and entrances.
- .2 Co-ordinate use of elevator cabs with Consultant and the Board.

1.16. USE OF THE WORK

- .1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with Products.

- .2 Do not load or permit to load any part of Work with a weight or force that will endanger the Work.

1.17. CONSTRUCTION PARKING

- .1 Construction personnel vehicle parking, to be confined to the work site enclosure, or.
- .2 Parking will be permitted on site only where and if it does not disrupt the employees of the place of work as directed by the Board
- .3 Permission to park vehicles on site does not imply any liability or responsibility for safe keeping of vehicles and contents thereof by the School Board.

1.18. ACCESS TO SITE

- .1 Provide and maintain adequate access to the project site.
- .2 Build and maintain temporary roads where necessary and provide snow removal within the area of work, and access to the work, during the period of Work. The area shall be restored to the satisfaction of the Board at the completion of the project.
- .3 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractors' use of roads.
- .4 Clean roadways and taxi areas where used by Contractor's equipment.

1.19. SECURITY

- .1 The Contractor shall ensure the security of the work site, contents, and built structures for the duration of the project.
- .2 The Contractor shall be responsible to provide and pay for security personnel to guard the site and contents of the site after working hours and during holidays as required.
- .3 Notify the Board of the use of security guards or systems.
- .4 The Board shall not be responsible for the loss, theft, or vandalism.

1.20. OFFICES

- .1 Provide and maintain, until completion of Contract, for Contractor's use, a temporary office, large enough to accommodate site administrative activities and site meetings, complete with light, heat, air conditioning, ventilation, table and chairs. Do not store materials in the office area; keep clean and tidy.
- .2 Provide a clearly marked and fully stocked first-aid case in a readily available location.

- .3 Subcontractors may provide their own offices as necessary. Direct location of these offices.

1.21. EQUIPMENT, TOOL AND MATERIALS STORAGE

- .1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds and platforms for storage of tools, equipment and materials.
- .2 Review storage areas on site with the Consultant. Store materials and equipment to ensure preservation of quality of product and fitness for the Work. Store materials and equipment on wooden platforms or other hard, clean surfaces, raised above the ground or in water tight storage sheds of sufficient size for storage of materials and equipment which might be damaged by storage in the open. Locate stored materials and equipment to facilitate prompt inspection.
- .3 Store packaged materials and equipment undamaged, in their original wrappings or containers, with manufacturer's labels and seals intact.
- .4 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities.
- .5 Storage sheds required by subcontractors shall be provided by them.

1.22. SANITARY FACILITIES

- .1 Provide weatherproof temporary toilet/sanitary facilities for the work force in accordance with governing regulations and ordinances.
- .2 Service temporary toilet/sanitary facilities as required by authorities but not less than weekly.
- .3 Post notices and take such precautions as required by local health authorities.
- .4 The use of existing washroom facilities is not allowed unless specifically approved by the Board. The Contractor will be required to clean and maintain the existing washrooms to Board standards.
- .5 Except where connected to the municipal sewer system, periodically remove wastes from Site.
- .6 Keep toilet/sanitary facilities clean and sanitary and protect from freezing.
- .7 Keep sanitary facilities clean and fully stocked with the necessary supplies at all times.

END OF SECTION

01 54 00 – Materials And Equipment

1.0 GENERAL

1.1. RELATED SECTIONS

- .1 This section describes requirements applicable to all Sections within Divisions 02 to 49

1.2. PRODUCT AND MATERIAL QUALITY

- .1 Products, materials, equipment and articles referred to as “Products”; throughout the specifications incorporated in the Work, shall be new, not damaged or defective, and of the best quality, compatible with specifications for the purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Defective products will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is a precaution against oversight or error. Remove and replace defective products at own expense, and be responsible for delays and expenses caused by rejections.
- .3 Should any dispute arise as to the quality or fitness of products, the decision rests strictly with the Board contact, based upon requirements of the Contract Documents.
- .4 Current Material Safety Data Sheets shall be on file with the successful Contractor and shall be provided to the Board contact upon request, within twenty-four (24) hours.
- .5 Material safety data sheets are not required for products currently WHMIS exempt.

1.3. EQUIPMENT/TOOL MATERIALS STORAGE, HANDLING, AND PROTECTION

- .1 Handle and store products in a manner to prevent damage, adulterations, deterioration, and soiling, and in accordance with manufacturer’s instructions.
- .2 Store packaged or bundled products in original and undamaged condition, with manufacturer’s seals and labels intact.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Provide and maintain tools, equipment and materials in a clean and orderly condition. Board tools, ladders, lifts, power cords, flashlights etc. are not to be used.
- .5 Materials are to be stored in a manner to cause the least interference with Work activities.

- .6 The Contractor shall determine with the Board contact, prior to ordering materials, those locations that are suitable for receiving and storage of materials and equipment.
- .7 All materials and equipment shall be kept in a secure area, at Contractor's expense, or removed from the job site when Work is not actually in progress.
- .8 Vehicles, trailers or other similar apparatus may not be stored or parked overnight at site without written authorization from Board contact. Written requests are to be forwarded directly to the Board contact.
- .9 Approval for parking does not imply any liability or responsibility for safe keeping by the Board.
- .10 The Contractor may use the existing electrical and water services, as required, for the Work, and the costs of these services shall be borne by the Board.

1.4. WORKMANSHIP

- .1 Workmanship shall be the best quality, executed by Workers experienced and skilled in the respective duties for which they are employed. Immediately notify the Consultant if required Work is such as to make it impractical to produce required results.
- .2 Do not employ any unfit persons or anyone unskilled in their required duties.
- .3 Decisions as to the quality or fitness of Workmanship in cases of dispute rest solely with the Board contact, whose decision is final.
- .4 All Contractor personnel are restricted to the job site and necessary access routes. No personnel shall visit other areas or buildings without specific authorization.
- .5 The Contractor shall make their own arrangements for emergency treatment of accidents.
- .6 Any accidents shall be reported immediately to the Board contact.
- .7 The Contractor agrees to hold the Board harmless of any and all liability of every nature and description, which may be suffered through bodily injuries, involving deaths of any persons, by reasons of negligence of the Contractor, his agents, employees, or his Subcontractors.
- .8 The Contractor shall supply constant on-site supervision in the form of a Project Superintendent. The Project Superintendent shall have within their authority to negotiate minor changes regarding scheduling, manpower and equipment.

1.5. MANUFACTURER’S INSTRUCTIONS

- .1 Unless otherwise indicated in the specifications, install, apply or erect products in accordance with manufacturer’s instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.

1.6. TOOLS OF THE TRADE

- .1 The Board will not pay the Awarded Bidder a fee for tools and equipment that are considered “tools of the trade” that are required to perform the work in this Tender or any change orders.

1.7. EXISTING EQUIPMENT

- .1 Contractor shall demolish and dispose of all existing equipment specified to be removed and or replaced including obsolete services not being reused. The Board shall have first rights of refusal on all demolished equipment and or parts and the Contractor shall provide a minimum of (5) working days notice prior to disposal of the equipment, parts, or equipment and set aside same in a suitable location to be recovered by Board technicians.

END OF SECTION

01 61 00 – Product Requirements

1.0 GENERAL

1.1. RELATED SECTIONS

- .1 This section describes requirements applicable to all Sections within Divisions 02 to 49.
- .2 Section 01 31 00 – Project Managing and Coordination

1.2. TERMINOLOGY

- .1 New: Produced from new materials.
- .2 Renewed: Produced or rejuvenated from an existing material to like-new condition to serve a new or existing service.
- .3 Defective: A condition determined exclusively by the Consultant.

1.3. PRODUCT QUALITY

- .1 The term 'new' in the following paragraph does not exclude re-manufactured products that have some or all of the materials recycled from other sources. Preference in recycling is for post-consumer recycled materials.
- .2 Products, materials, equipment, parts or assemblies (referred to as Products) incorporated in Work:
- .3 New Product, not damaged or defective, of best quality (compatible with specification requirements) for purpose intended. If requested, provide evidence as to type, source and quality of Products provided.
- .4 Defective Products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective Products at own expense and be responsible for delays and expenses caused by rejection.
- .5 Should any dispute arise as to the quality or fitness of Products, decision rests strictly with Consultant.
- .6 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout the building.

1.4. AVAILABILITY

- .1 Immediately upon receipt of the Board's Purchase Order, review Product delivery requirements and anticipate foreseeable supply delays for any items.
- .2 Immediately upon receipt of the Board's Purchase Order the Contractor shall issue Purchase Orders and or Contracts to all Sub-trades. Provide proof to

the Consultant and the Board within 3 days. The Subcontractors shall identify in writing any delivery issues within 14 days of receiving the Contractor's purchase order or contract. The Schedule noted in 01-31 00 1.7.1 shall incorporate all deliveries and installation.

- .3 If delays in supply of Products are foreseeable, notify Consultant of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.
- .4 In the event of failure to notify Consultant at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Consultant reserves the right to substitute more readily available Products of similar character, at no increase in Contract Price or Contract Time.

1.5. STORAGE AND PROTECTION

- .1 Store and protect Products in accordance with manufacturers' written instructions.
- .2 Store with seals and labels intact and legible.
- .3 Store sensitive Products in weather tight, climate controlled, enclosures in an environment favourable to Product.
- .4 For exterior storage of fabricated Products, place on sloped supports above ground.
- .5 Cover Products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of Products.
- .6 Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- .7 Provide equipment and personnel to store Products by methods to prevent soiling, disfigurement, or damage.
- .8 Arrange storage of Products to permit access for inspection. Periodically inspect to verify Products are undamaged and are maintained in acceptable condition.

1.6. TRANSPORTATION AND HANDLING

- .1 Transport and handle Products in accordance with manufacturer's written instructions.
- .2 Promptly inspect shipments to ensure that Products comply with requirements, quantities are correct, and Products are undamaged.
- .3 Provide equipment and personnel to handle Products by methods to prevent soiling, disfigurement, or damage.
- .4 Suitably pack, crate and protect products during transportation to site to preserve their quality and fitness for the purpose intended.

- .5 Store products in original, undamaged condition with manufacturer's labels and seals intact until they are being incorporated into completed work.
- .6 Protect materials from damage by extreme temperatures or exposure to the weather.

1.7. EXISTING UTILITIES

- .1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum disturbance to the owner.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in a manner approved by authority having jurisdiction. Stake and record location of capped service.

1.8. MANUFACTURER'S WRITTEN INSTRUCTIONS

- .1 Unless otherwise indicated in specifications, install or erect Products to manufacturer's written instructions. Do not rely on labels or enclosures provided with Products. Obtain written instructions directly from manufacturers.
- .2 Notify Consultant in writing, of conflicts between specifications and manufacturer's instructions, so that Consultant may establish course of action.
- .3 Improper installation or erection of Products, due to failure in complying with these requirements, authorizes Consultant to require removal and reinstallation at no increase in Contract Price or Contract Time.

1.9. QUALITY OF WORK

- .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Consultant if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. Consultant and or Board reserves right to require dismissal from site any workers deemed incompetent or careless.
- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Consultant, whose decision is final.
- .4 Products, materials, systems and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the applicable manufacturer's printed directions.

- .5 Where specified requirements are in conflict with manufacturer's written directions, follow manufacturer's directions. Where specified requirements are more stringent than manufacturer's directions, comply with specified requirements.

1.10. COORDINATION

- .1 Ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of openings, sleeves and accessories.
- .3 Contractor is responsible to ensure suppliers or distributors of materials specified or alternatives accepted, which he intends to use, have materials with original schedule, and similarly it shall be the responsibility of all subcontractors and suppliers to so inform the Contractor.
- .4 Contractor shall contact Consultant immediately upon receipt of information indicating materials or items, will not be available on time, in accordance with the latest approved schedule, and similarly it shall be the responsibility of all subcontractors and suppliers to so inform the Contractor.
- .5 The above, in no way releases the Contractor, or their subcontractors and suppliers of their responsibility for ensuring timely ordering of materials and items required, including the necessary expediting, to complete the Work as scheduled in accordance with the Contract Documents including temp accommodations and or materials to ensure occupancy date is achieved.

1.11. CONCEALMENT

- .1 In finished areas, conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.
- .2 Before installation, inform the Consultant if there is interference. Install as directed by the Consultant at no additional cost to the Board.

1.12. REMEDIAL WORK

- .1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.
- .2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.13. LOCATION OF FIXTURES

- .1 Inform Consultant of conflicting installation. Install as directed.

1.14. FASTENINGS - EQUIPMENT

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use Type 304 or 316 stainless steel for exterior areas.
- .3 Bolts may not project more than one diameter beyond nuts.
- .4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.15. PROTECTION OF WORK IN PROGRESS

- .1 Prevent overloading of any part of the Project.
- .2 Do not cut, drill or sleeve any load bearing structural member, unless specifically indicated, without written approval of the Consultant.

END OF SECTION

01 70 00 – Examination And Preparation

1.0 GENERAL

1.1. RELATED SECTIONS

- .1 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.2. REFERENCES

- .1 Owner's identification of existing survey control points and property limits.

1.3. SUBMITTALS

- .1 Submit name and address of Surveyor to Consultant.
- .2 On request of Consultant, submit documentation to verify accuracy of field engineering work.
- .3 Submit certificate signed by surveyor certifying that elevations and locations of completed Work conforms with Contract Documents.

1.4. QUALIFICATIONS OF SURVEYOR

- .1 Qualified registered land surveyor, licensed to practice in the Place of the Work.

1.5. SURVEY REFERENCE POINTS

- .1 Existing base horizontal and vertical control points are designated on Drawings.
- .2 Locate, confirm and protect control points prior to starting site Work. Preserve permanent reference points during construction.
- .3 Make no changes or relocations without prior written notice to the Consultant.
- .4 Report to Consultant when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
- .5 Require the surveyor to replace control points in accordance with original survey control.

1.6. SURVEY REQUIREMENTS

- .1 Establish existing and new permanent bench marks on site, referenced to established benchmarks by survey control points.
- .2 Record locations, with horizontal and vertical data in Project Record Documents.
- .3 Establish lines and levels, locate and lay out, by instrumentation.

- .4 Establish pipe invert elevations.
- .5 Stake batter boards
- .6 Establish foundation and floor elevations.
- .7 Establish lines and levels for mechanical and electrical work.

1.7. SUBSURFACE CONDITIONS

- .1 Promptly notify Consultant in writing if discovered surface or subsurface conditions at Place of Work differ materially from those indicated in Contract Documents.
- .2 Advise the Consultant of a reasonable assumption of probable conditions when determined.
- .3 After prompt investigation, should Consultant determine that conditions do differ materially, instructions will be issued for changes in Work.

1.8. EXAMINATION

- .1 The Contractor is expected to be totally familiar with site conditions and shall assume full responsibility for the cost involved in repairing any damage to the building, site and services, city property, adjacent buildings, etc., during general construction, regardless of the extent of the damage.
- .2 Inspect existing conditions, including elements or adjacent Work subject to irregularities, damage, movement, including Work during cutting and patching.
- .3 The Contractor shall provide all equipment necessary to make a full and detailed site evaluation. This shall include but not be limited to ladders, flashlights and hand tools.
- .4 The Contractor expressly agrees that conditions above existing suspended acoustic ceilings, but below fixed structure, unless obscured by an additional ceiling above, shall be considered exposed conditions for the purposes of making findings under the provisions of the Contract. There shall be no claims for extra costs for extra Work in these areas.
- .5 After uncovering, inspect conditions affecting performance of the Work.
- .6 Beginning of cutting or patching means acceptance of existing conditions.

1.9. PREPARATION

- .1 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of the project from damage.
- .2 Provide protection from elements for areas which may be exposed by uncovering work; maintain excavations free of water.

1.10. EXISTING SERVICES

- .1 Before commencing work, establish location and extent of service lines in the area of Work and notify the Consultant of findings.
- .2 Remove abandoned service lines running through existing and new structures. Cap or seal lines at cut-off points as directed by the Consultant.

1.11. LOCATION OF EQUIPMENT AND FIXTURES

- .1 Inform Consultant of conflicting installations, install as directed.
- .2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
- .3 Inform Consultant of impending installation and obtain approval for actual location.
- .4 Submit field drawings to indicate relative position of various services and equipment when required by Consultant.

1.12. SURVEY RECORD

- .1 Maintain a complete, accurate log of control and survey work as it progresses.
- .2 On completion of foundations and major site improvements, prepare a certified survey showing dimensions, locations, angles and elevations of Work.
- .3 Record locations of maintained, re-routed and abandoned service lines.

END OF SECTION

SECTION 01 73 30 – EXECUTION AND CUTTING AND PATCHING

1.0 GENERAL

1.1. RELATED SECTIONS

- .4 Section 01 32 00 - Construction Progress Documentation: Submittals and scheduling.
- .5 Section 01 61 00 - Product Requirements.
- .6 Section 01 70 00 – Examination and Preparation
- .7 Individual Product Specification Sections:
 - .1 Cutting and patching incidental to work of the section.
 - .2 Advance notification to other sections of openings required in Work of those sections.

1.2. SUBMITTALS

- .8 Submit written request in advance of cutting or alteration which affects:
 - .1 Structural integrity of any element of Project.
 - .2 Integrity of weather exposed or moisture resistant element.
 - .3 Efficiency, maintenance, or safety of any operational element.
 - .4 Visual qualities of sight exposed elements.
 - .5 Work of Owner or separate contractor.
- .9 Include in request:
 - .1 Identification of Project.
 - .2 Location and description of affected Work.
 - .3 Necessity for cutting or alteration.
 - .4 Description of proposed Work and Products to be used.
 - .5 Alternatives to cutting and patching.
 - .6 Effect on work of Owner or separate contractor.
 - .7 Written permission of affected separate contractor.
 - .8 Date and time work will be executed.

1.3. TOLERANCES

- .10 Monitor fabrication and installation tolerance control of Products to produce acceptable Work.
- .11 Do not permit tolerances to accumulate beyond effective or practical limits.
- .12 Comply with manufacturers' tolerances. In case of conflict between manufacturers' tolerances and Contract Documents, request clarification from the Consultant before proceeding.
- .13 Adjust Products to appropriate dimensions; position and confirm tolerance acceptability, before permanently securing Products in place.

2.0 PRODUCTS

2.1. MATERIALS

- .1 Primary Products: Those required for original installation.
- .2 Product Substitution: For any proposed change in materials, submit a request for substitution described in Section 01 33 00.

3.0 EXECUTION

3.1. EXAMINATION

- .1 Examine existing conditions prior to commencing Work, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering existing Work, assess conditions affecting performance of work.
- .3 Beginning of cutting or patching means acceptance of existing conditions.

3.2. PREPARATION

- .1 Provide temporary supports to ensure structural integrity of the Work. Provide devices and methods to protect other portions of the Project from damage.
- .2 Provide protection from elements for areas which may be exposed by uncovering work.
- .3 Maintain excavations free of water.

3.3. CUTTING

- .1 Execute cutting and fitting as needed to complete the Work. Prior to any cutting and or coring of concrete floors the contractor shall confirm the area is free of services or rebar. Notify the Consultant of any interferences.
- .2 Uncover work to install improperly sequenced work.
- .3 Remove and replace defective or non-conforming work.
- .4 Remove samples of installed work for testing for Hazardous materials.
- .5 Provide openings in the Work for penetration of mechanical and electrical work.
- .6 Employ experienced installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- .7 Cut rigid materials using a masonry saw or core drill. Pneumatic tools are not allowed without prior approval.

- .8 Do all cutting, patching, and making good, to leave a finished condition and to make the several parts of the work come together properly. Coordinate work to keep cutting and patching to a minimum.
- .9 Make cuts with clean, true, smooth edges. Fit unit to tolerance established by test standard practice for applicable work. Make patches invisible in the final assembly.
- .10 Cutting shall be done in a manner to keep patching to minimum. Obtain Consultant's approval of method to be used to conceal new mechanical and electrical services before beginning cutting. Chasing of concrete surfaces is not permitted.
- .11 Cutting or coring of any structural concrete is to be reviewed and approved by the Consultant.
- .12 Do not endanger any work by cutting, digging or otherwise altering, and do not cut nor alter any load bearing element without written authorization by Consultant. Provide bracing, shoring and temporary supports as required to keep construction safely supported at all times
- .13 Any cost caused by omission or ill-timed work shall be borne by the party responsible thereof.
- .14 Regardless of which Section of work is responsible for any portion of cutting and patching, in each case tradesmen qualified in work being cut and patched shall be employed to ensure it is correctly done.

3.4. PATCHING

- .1 Execute patching to complement adjacent Work.
- .2 Fit Products together to integrate with other Work.
- .3 Execute work by methods to avoid damage to other Work, and which will provide appropriate surfaces to receive patching and finishing.
- .4 Employ original installer to perform patching for weather exposed and moisture resistant elements, and sight-exposed surfaces.
- .5 Restore work with new Products in accordance with requirements of Contract Documents.
- .6 Fit work with adequate support to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .7 At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with firestop material.
- .8 Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to the nearest intersection or natural break. For an assembly, refinish the entire unit.

- .9 Complete and tightly fit all construction to pipes, ducts and conduits which pass through construction to completely prevent the passage of air.
- .10 Patching and making good shall be done by trade specialists in material to be treated, and shall be made undetectable in finished work when viewed from a distance of 1.5m under normal lighting.

END OF SECTION

01 74 00 – Cleaning and Waste Management

1.0 GENERAL

1.1. RELATED SECTIONS

- .1 Common Work by All Trades
- .2 This section describes requirements applicable to all Sections within Divisions 02 to 49.
- .3 Conduct cleaning and disposal operations to comply with local ordinances and environmental protection legislation.
- .4 Store volatile wastes in covered metal containers, and remove them from premises at the end of each working day.
- .5 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

2.0 PRODUCTS

2.1. CLEANING PRODUCTS

- .1 Cleaning Agents and Materials: Low VOC content wherever possible. The Consultant and the Board shall be notified prior to use of any exception.

3.0 EXECUTION

3.1. CLEANING DURING CONSTRUCTION

- .1 Maintain the Work in tidy condition, free from accumulation of waste products and debris, other than that caused by the Owner or other Contractors.
- .2 Remove waste material and debris from the work areas and deposit in a waste container at the end of each working day.
- .3 Vacuum clean interior areas prior to the start of finishing work. Maintain areas free of dust and other contaminants during finishing operations.
- .4 Individual Subcontractors are responsible for the daily clean-up and removal of debris related to, or generated by, their own work. The overall responsibility for project cleanliness rests with the Contractor.
- .5 The Contractor shall be responsible for snow removal within the construction area.
- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 Wherever possible recycle materials
- .8 Containers:

- .1 Provide adequate number and sizes of on-site garbage and recycling containers within designated work site as required for collection of waste materials and debris on a daily basis.
- .2 Provide additional waste containers when the extent of work warrants.
- .3 Provide and use clearly marked, separate bins for recycling.
- .9 Dispose of waste materials and debris at registered waste disposal and recycling facility.
- .10 Remove oily rags, waste and other hazardous substances from premises at close of each day, or more often when required.
- .11 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

3.2. WASTE MANAGEMENT

- .1 Audit, separate and dispose of construction waste generated by new construction or by demolition of existing structures in whole or in part, in accordance with Ontario Regulations 102/94 and 103/94 made under the Environmental Protection Act.
- .2 Containers:
 - .1 Provide adequate number and sizes of on-site garbage and recycling containers within designated work site as required for collection of waste materials and debris on a daily basis.
 - .2 Provide additional waste containers when the extent of work warrants.
 - .3 Provide and use clearly marked, separate bins for recycling.
- .3 Fires, and burning of rubbish or waste on site is strictly prohibited.
- .4 Burying of rubbish or waste materials on site is strictly prohibited.
- .5 Disposal of waste or volatile materials such as mineral spirits, oil, gasoline or paint thinner into ground, waterways, or sewer systems is prohibited.
- .6 Empty waste containers on a regular basis to prevent contamination of site and adjacent properties by wind-blown dust or debris

3.3. PREPARATION FOR FINAL CLEANING

- .1 Prior to final cleaning the General Contractor shall:
 - .1 remove all surplus products, tools, construction machinery and equipment not required for the performance of remaining work, and thereafter remove any remaining materials, equipment, waste and debris,
 - .2 replace all filters installed on any equipment in operation in the area of work,

- .3 remove all paint spots or overspray from all affected surfaces, and

3.4. FINAL CLEANING PRIOR TO ACCEPTANCE: INTERIOR

- .1 Prior to applying for Substantial Performance of the Work, or, prior to Owner occupancy of the building or portion of the building affected by the Work, whichever comes first, conduct full and complete final cleaning operations for the areas to be occupied.
- .2 Final cleaning operations shall be performed by an experienced professional cleaning company, possessing equipment and personnel sufficient to perform full building cleaning operations. Contractors “broom cleaning” is not acceptable as a “Final Clean”. The cleaning contractor shall:
 - .1 clean interiors of all millwork and surfaces of any furniture and equipment present,
 - .2 use only cleaning materials recommended by the manufacturer of the surface to be cleaned,
 - .3 remove all stains, spots, scuff marks, dirt, dust, remaining labels, adhesives or other surface imperfections,
 - .4 clean and polish all glass and mirrors and remove remaining manufacturer's and safety "X" labels,
 - .5 clean and polish all finished metal surfaces such as enamelled or stainless steel, chrome, aluminum, brass, and bronze,
 - .6 clean and polish all vitreous surfaces such as plumbing fixtures, ceramic tile, porcelain enamel, or other such materials,
 - .7 clean all ceramic tile surfaces in accordance with the manufacturer's instructions,
 - .8 vacuum, clean and dust behind grilles, louvres and screens,
 - .9 steam clean all unprotected carpets immediately prior occupancy by Owner, and
 - .10 clean all equipment and fixtures to a sanitary condition.
- .3 For any areas to be occupied after the owner's initial occupancy, provide full cleaning operations as outlined above prior to turning over to owner,
- .4 The Board's supplies and equipment must not be used for any cleaning operations including, but not limited to: garbage cans, mops, brooms, rags, ladders, chemicals etc.

3.5. FINAL CLEANING PRIOR TO ACCEPTANCE: EXTERIOR

- .1 For areas affected by construction final exterior cleaning operations shall be performed by the General Contractor or competent Subcontractor. Contractor's “broom cleaning” only is not acceptable.

- .2 Final exterior cleaning shall include:
 - .1 broom clean and wash exterior walkways, steps, and surfaces; rake clean other surfaces of grounds,
 - .2 remove dirt and other disfiguration from exterior surfaces,
 - .3 sweep and wash clean paved areas,
 - .4 replace filters of mechanical equipment for all equipment that was in use during construction,
 - .5 clean all roofs, gutters, downspouts, areaways, drywells, and drainage systems,
 - .6 remove debris and surplus materials from crawl areas and other accessible concealed spaces.
 - .7 remove overspray

END OF SECTION

01 78 10 – Closeout Submittals and Requirements

1.0 GENERAL

1.1. RELATED SECTIONS

- .1 Section 01 78 10 – WRDSB Warranty Card, Appendix 00 41 13A

1.2. TAKE-OVER PROCEDURES

- .1 Take over procedures will be in strict accordance with the requirements as set out in this Section.

1.3. SUBSTANTIAL PERFORMANCE

- .1 Prior to requesting a Substantial Performance deficiency inspection submit 2 hard copies, 1 digital copy of the Operating and Maintenance Manuals for Consultants approval.
- .2 Application for Substantial Performance must include.
 - .1 One (1) electronic copy of inspection and acceptance certificates required from regulatory agencies, including but not limited to.
 - .1 Certificates of Approval of the Work by the local Building Department.
 - .2 Electrical Inspection Certificate of Inspection.
 - .3 Fire Alarm Verification Certificate.
- .3 Advise Consultant in writing, when the project has been substantially completed. If Consultant agrees this stage has been reached, the Consultant shall prepare a complete list of deficiencies and submit copies of this list to Contractor and the Board.

1.4. COMMENCEMENT OF LIEN PERIODS

- .1 The date of publication of the Certificate of Substantial Performance of the Work, provided to the contractor by the Consultant, shall be the date for commencement of the lien period.

1.5. TOTAL PERFORMANCE

- .1 Prior to requesting a final inspection submit written certificate that the following have been performed:
 - .1 Work has been completed and inspected for compliance with Contract Documents and is ready for final inspection
 - .2 Defects have been corrected and deficiencies have been completed.

- .3 Equipment and systems have been tested and are fully operational.
Submit two copies of the balancing reports
- .4 Certificates required by the contractor have been submitted.
- .5 Operation of systems have been demonstrated to Owner's personnel.
- .6 Submit Record drawings.
- .7 Submit maintenance materials.
- .8 Provide certified site survey
- .2 When items noted above are completed, request final inspection of Work by consultant, and building inspector. If Work is deemed incomplete by Consultant, complete outstanding items and request re-inspection.

1.6. PAYMENT OF SUBSTANTIAL PERFORMANCE HOLDBACK

- .1 Prior to the release of lien holdback provide one copy of the following by the Contractor and each subcontractor:
 - .1 Statutory Declaration or Declaration of Last supply
 - .2 Workplace Safety and Insurance Board "Certificate of Clearance".
- .2 The Contractor shall submit an application for payment of the holdback amount.
- .3 After the receipt of an application for payment which will include a Statutory Declaration and WSIB Clearance from the, the Consultant will issue a certificate for payment of the holdback amount.

1.7. FINAL PAYMENT

- .1 When the Contractor considers final deficiencies and defects have been corrected and it appears requirements of Contract have been completed, make application for final payment.
- .2 When the Consultant finds the Contractor's application for final payment valid, the Consultant will issue a final certificate of payment
- .3 The Board reserves the right to charge the Contractor for school access card(s) that have not been returned.
- .4 The cost to reprogram or replace the card(s) access system is estimated at \$50.00 (fifty dollars) for each card issued, \$30.00 (thirty dollars) for each keybox key, plus \$35.00 (thirty five dollars) administration fee.

1.8. CLOSEOUT SUBMITTALS

- .1 Prepare instructions and data using personnel experienced in maintenance and operation of described products and submit them to the Consultant for review.
- .2 Copy will be returned to the contractor with the Consultant's comments.

- .3 Revise content of documents as required prior to final submission.
- .4 Two (2) weeks prior to Substantial Performance of the Work, submit to the Consultant, the final copies of operating and maintenance manuals.
- .5 Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as products provided in Work.
- .6 If requested, furnish evidence as to type, source and quality of products provided.
- .7 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.
- .8 Pay costs of transportation.

1.9. OPERATION AND MAINTENANCE MANUAL FORMAT

- .1 Provide two copies of operating and maintenance data, prepared on 215 X 280mm sheets in printed or typewritten form, contained in 3-ring binders with soft vinyl covers for materials and equipment which require special maintenance or operating procedures.
- .2 When multiple binders are used, correlate data into related consistent groupings. Identify contents of each binder at the front of each volume.
- .3 Cover: Identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .4 Arrange content by the divisions of the specifications under Section numbers and sequence of Table of Contents.
- .5 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .6 Include the following in each manual:
 - .1 Complete list of subcontractors and suppliers, their addresses and telephone numbers. Provide 24 hour emergency telephone numbers for such subcontractors as Plumbing, Electrical, Sprinklers, Fire System, Heating, etc.
 - .2 Specified warranties for contractor, each subcontractor and supplier.
 - .3 WRDSB Project Asset and Warranty Card, Appendix 00 41 13A
 - .4 Copy of finish hardware list, complete with all amendments and revisions and lock manufacturer's descriptive and service literature.
 - .5 Schedule of paints and coatings. Include sufficient explanation to fully identify each surface with the applicable paint or coating used. Enclose a copy of the colour schedule.
 - .6 Maintenance instructions for finished surfaces.
 - .7 Brochures, cuts of equipment and fixtures.

- .8 Operating and maintenance instructions for equipment.
- .9 Submit copies of letters from manufacturers of equipment and systems indicating their technical representatives have inspected and tested systems and are satisfied with methods of installation, connection and operations. These letters shall state names of persons present at testing, methods used and list of functions performed.
- .10 Submit one complete set of reviewed shop drawings of architectural, structural, mechanical and electrical items, folded to 215 x 280mm size, contained in heavy duty manila envelopes, numbered and labelled. Follow specification format with no more than one Section per envelope, hard copy and PDF.
- .11 Relevant certificates issued by authorities having jurisdiction
- .12 Computer disc or flash drive with all the above documentation in PDF format

1.10. RECORDING ACTUAL SITE CONDITIONS

- .1 Record information on a set of black line opaque drawings, and within the Project Manual.
- .2 Annotate with coloured felt tip marking pens, maintaining separate colours for each major system, for recording changed information.
- .3 Record information concurrently with construction progress. Do not conceal Work of the Project until required information is accurately recorded.
- .4 Contract drawings and shop drawings: legibly mark each item to record actual construction, including:
 - .1 Measured depths of elements of foundation in relation to finish first floor datum.
 - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
 - .4 Field changes of dimension and detail.
 - .5 Changes made by change orders.
 - .6 Details not on original Contract Drawings.
 - .7 References to related shop drawings and modifications.
- .5 Specifications: legibly mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.

- .6 Other Documents: Maintain warranties, test reports and samples required by individual specifications sections.

1.11. RECORD (AS-BUILT) DOCUMENTS AND SAMPLES

- .1 Store AS-BUILT documents and samples in the field office apart from documents used for construction. Provide files, racks, and secure storage.
- .2 Label AS-BUILT documents and file in accordance with section number listings in List of Contents of the Project Manual. Label each document AS-BUILT DOCUMENTS in neat, large, printed letters.
- .3 Maintain AS-BUILT documents in clean, dry and legible condition. Do not use as-built documents for construction purposes.
- .4 Keep as-built documents and samples available for inspection by the Consultant.

1.12. RECORD DRAWINGS

- .1 Prior to Substantial Performance of the Work, update the marked up information from the AS-BUILT documents to a master set of drawing.
- .2 Submit one set of completed AS-BUILT documents to the Consultant for review.
- .3 Documents will be returned to the contractor with the Consultant's comments.
- .4 Revise content of documents as required prior to final submission.
- .5 After the review is completed resubmit to the Consultant for Consultant to produce electronic record drawings for the owner to use.

1.13. SPARE PARTS

- .1 Provide spare parts, in quantities specified in individual specification sections.
- .2 Provide items of same manufacture and quality as items in Work.
- .3 Receive and catalogue all items. Submit inventory listing to Consultant. Include approved listings in the Maintenance Manual.
- .4 Obtain receipt for delivered products and submit prior to final payment.

1.14. REPLACEMENT (MAINTENANCE) MATERIALS

- .1 Deliver to site, unload and store where directed, replacement (maintenance) materials as required elsewhere in these Specifications. Obtain a signed receipt from the Owner's Representative for delivered materials and include a copy of receipt in Operation and Maintenance manuals.
- .2 Package materials so they are protected from damage and loss of essential properties.
- .3 Label packaged materials for proper identification of contents.

1.15. SPECIAL TOOLS

- .1 Provide special tools, in quantities specified in the individual specification section.
- .2 Provide items with tags identifying their associated function and equipment.
- .3 Receive and catalogue all items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual

1.16. FINAL SITE SURVEY

- .1 Submit final site survey certificate in accordance with Section 01 70 00, certifying that elevations and locations of completed Work are in conformance Contract Documents.

1.17. WARRANTIES AND BONDS

- .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
- .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
- .3 Except for items put into use with Owner's permission, leave the date of beginning of time of warranty until the Date of Substantial Performance is determined. The date of Substantial Performance of the Work shall be the date for commencement of the warranty period.
- .4 Verify that documents are in proper form, contain full information, and are notarized.
- .5 Co-execute submittals when required.
- .6 Retain warranties and bonds until time specified for submittals.

END OF SECTION

01 78 40 – Maintenance Requirements

1.0 GENERAL

1.1. SECTION INCLUDES

- .1 Equipment and systems.
- .2 Materials and finishes.
- .3 Spare parts
- .4 Maintenance manuals.
- .5 Special tools.
- .6 Storage, handling and protection.
- .7 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.2. RELATED SECTIONS

- .1 Section 01 45 00 - Quality Control.
- .2 Section 01 78 40 – Maintenance Requirements.
- .3 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.3. EQUIPMENT AND SYSTEMS

- .1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete
- .2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
- .3 Include installed colour coded wiring diagrams.
- .4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- .5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- .6 Provide servicing and lubrication schedule, and list of lubricants required.
- .7 Include manufacturer's printed operation and maintenance instructions.
- .8 Include sequence of operation by controls manufacturer.

- .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .10 Provide installed control diagrams by controls manufacturer.
- .11 Provide coordination Drawings, with installed colour coded piping diagrams.
- .12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- .13 Provide a list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- .14 Include test and balancing reports as specified in Section 01 45 00.
- .15 Additional requirements: As specified in individual specification sections.

2.0 PRODUCTS

2.1. MATERIALS AND FINISH

- .1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations.
- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .3 Moisture-protection and Weather-exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .4 Building Envelope: include copies of drawings of building envelope components, illustrating the interface with similar or dissimilar items to provide an effective air, vapour and thermal barrier between indoor and outdoor environments. Include an outline of requirements for regular inspections and for regular maintenance to ensure that on-going performance of the building envelope will meet the initial building envelope criteria.
- .5 Additional Requirements: as specified in individual specifications sections.

2.2. SPARE PARTS

- .1 Provide spare parts, in quantities specified in individual specification sections.
- .2 Provide items of same manufacture and quality as items in Work.
- .3 Receive and catalogue all items. Submit inventory listing to Consultant. Include approved listings in the Maintenance Manual.
- .4 Obtain receipt for delivered products and submit prior to final payment.

2.3. MAINTENANCE MATERIALS

- .1 Provide maintenance and extra materials, in quantities specified in individual specification sections.
- .2 Provide items of same manufacture and quality as items in Work.
- .3 Receive and catalogue all items. Submit inventory listing to Consultant. Include approved listings in the Maintenance Manual.
- .4 Obtain receipt for delivered products and submit prior to final payment.

2.4. SPECIAL TOOLS

- .1 Provide special tools, in quantities specified in the individual specification section.
- .2 Provide items with tags identifying their associated function and equipment.
- .3 Receive and catalogue all items. Submit inventory listing to Consultant. Include approved listings in the Maintenance Manual.

3.0 EXECUTION

3.1. DELIVERY TO SITE

- .1 Deliver to place of work and store.
- .2 General Contractor to receive and acknowledge delivery from contractors and subcontractors of all parts and materials assembled for maintenance requirements. Provide a summary inventory list to the Consultant and/or the Board after all materials are gathered and verification of location. Signatures of receipt will not be accepted from anyone except the General Contractor's representative.

3.2. STORAGE, HANDLING AND PROTECTION

- .1 Consult with the Board to determine location for storage.
- .2 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
- .3 Store in original and undamaged condition with manufacturer's seal and labels intact.
- .4 Store components subject to damage from weather in weatherproof enclosures.
- .5 Store paints and freezable materials in a heated and ventilated room.
- .6 Remove and replace damaged products at own expense and to the satisfaction of the Consultant.

END OF SECTION

01 79 00 – Demonstration and Training

1.0 GENERAL

1.1. SECTION INCLUDES

- .1 Procedures for demonstration and instruction of Products, equipment and systems to Owner's personnel.
- .2 Seminars and demonstrations.

1.2. RELATED SECTIONS

- .1 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.3. DESCRIPTION

- .1 At Substantial Performance, at a time acceptable to Owner and Consultant, but not before operations and maintenance manual have been reviewed and accepted by the consultant; contractor shall give a complete demonstration in the presence of consultant; Sub-consultants, Owner and Owner's personnel of operation and maintenance of systems and equipment once they are 100% complete.
- .2 Owner will provide a list of personnel to receive instructions and will coordinate their attendance at agreed-upon times.

1.4. COMPONENT DEMONSTRATION

- .1 Manufacturer to provide authorized representative to demonstrate operation of equipment and systems.
- .2 Instruct Owner's personnel, and provide written report that demonstration and instructions have been completed.

1.5. SUBMITTALS

- .1 Submit schedule of time and date for demonstration of each item of equipment and each system one (1) week prior to designated dates, for Consultant's approval.
- .2 Submit reports within forty eight (48) after completion of demonstration, that demonstration and instructions have been satisfactorily completed.
- .3 Give time and date of each demonstration, with a list of persons present.

1.6. CONDITIONS FOR DEMONSTRATIONS

- .1 Equipment has been inspected and put into operation in accordance with manufacturer's instructions and contract requirements.
- .2 Testing, adjusting, and balancing have been performed in accordance with manufacturer's instructions and contract requirements, and equipment and systems are fully operational.
- .3 Provide information packages as required for use in demonstrations and instructions.

2.0 PRODUCTS

2.1. NOT USED

- .1 Not used.

3.0 EXECUTION

3.1. PREPARATION

- .1 Verify that suitable conditions for demonstration and instructions are available.
- .2 Verify that designated personnel are present.
- .3 Prepare agendas and outlines.
- .4 Establish seminar organization.
- .5 Explain component design and operational philosophy and strategy.
- .6 Develop equipment presentations.
- .7 Present system demonstrations.
- .8 Accept and respond to seminar and demonstration questions with appropriate answers.

3.2. PREPARATION OF AGENDAS AND OUTLINES

- .1 Prepare agendas and outlines including the following:
 - .1 Equipment and systems to be included in seminar presentations.
 - .2 Name of companies and representatives presenting at seminars.
 - .3 Outline of each seminar's content.
 - .4 Time and date allocated to each system and item of equipment.
 - .5 Provide a separate agenda for each system.

3.3. SEMINAR ORGANIZATION

- .1 Coordinate content and presentations for seminars.
- .2 Coordinate individual presentations and ensure representatives scheduled to present at seminars are in attendance.
- .3 Arrange for presentation leaders familiar with the design, operation, maintenance and troubleshooting of the equipment and systems. Where a single person is not familiar with all aspects of the equipment or system, arrange for specialists familiar with each aspect.
- .4 Coordinate proposed dates for seminars with Owner and select mutually agreeable dates.

3.4. EXPLANATION OF DESIGN STRATEGY

- .1 Explain design philosophy of each system. Include following information:
 - .1 An overview of how the system is intended to operate.
 - .2 Description of design parameters, constraints and operational requirements.
 - .3 Description of system operation strategies.
 - .4 Information to help in identifying and troubleshooting system problems.

3.5. DEMONSTRATION AND INSTRUCTIONS

- .1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment.
- .2 Instruct personnel in all phases of operation and maintenance using operation and maintenance manuals as the basis of instruction.
- .3 Instruct personnel on control and maintenance of sensory equipment and operational equipment associated with maintaining energy efficiency and longevity of service.
- .4 Review contents of manual in detail to explain all aspects of operation and maintenance.
- .5 Prepare and insert additional data in operations and maintenance manuals when the need for additional data becomes apparent during instructions.

END OF SECTION

ARCHITECTURAL

A0.0 – COVER
A0.1 - ABBR-DRAWING LIST-WALL & FLOOR SCHEDULES -OBC MATRIX
A0.2 - LIFE SAFETY FLOOR PLAN
D2.1 – LIBRARY PLAN - DEMOLITION
D2.2 – GYMNASIUM PLAN - DEMOLITION
D2.3 - CHANGE RM/WSHRM & VEST. PLAN – DEMOLITION
D4.1 – DEMOLITION SECTION - VESTIBULE 1 & 2
A2.1 – LIBRARY RENOVATION PLAN
A2.2 – GYMNASIUM RENOVATION PLAN
A2.3 – NEW UNV. WSHRM & VESTIBULES PLAN
A2.4 – LEVEL 1 – NEW ROOM NUMBERING
A4.1 – LIBRARY ELEV. & SECTION
A4.2 – 3D VIEWS - LIBRARY
A6.1 - LIBRARY RCP & CEILING DETAILS
A6.2 – BF WSHRM & VESTIBULES RCP
A7.1 – INTERIOR ELEVATIONS – GYMNASIUM
A7.2 – BARRIER FREE WSHRM TYP. DETAILS
A8.1 – WINDOW & DOOR SCHEDULE
A9.1 - MILLWORK ELEV. – LIBRARY
A9.2 – MILLWORK ELEV. & DETAILS

MECHANICAL

M1.1 – KEY PLAN, LEGEND, AND SCHEDULES
M1.2 – SCHEDULES AND DETAILS
M2.1 – GROUND FLOOR PART 'A' - DEMO
M2.2 – GROUND FLOOR PART PLANS 'A' 'C' & 'D' - DEMO
M2.3 – GROUND FLOOR PART PLANS 'B' – DEMO
M3.1 – GROUND FLOOR PART PLANS 'A' – RENOVATION
M3.2 – FLOOR PART PLANS 'A' 'C' & 'D'- RENOVATION
M3.3 - GROUND FLOOR PLANS 'B' – RENOVATION
A3.4 - GROUND FLOOR PART PLANS 'B' - RENOVATION
M4.1 – ROOF PLAN

ELECTRICAL

E1.1 – LEGEND, DETAILS AND SCHEDULES
E1.2 – LIGHTING CONTROL DETAILS AND SCHEDULES
E1.3 – SECOND FLOOR - DEMOLITION
E2.1 – DEMOLITION PLAN
E3.1 – RENOVATION PLAN

STRUCTURAL

S1.1 – STRUCTURAL NOTES
S2.1 – LIBRARY RENOVATION FLOOR PLAN
S2.2 – WASHROOM RENOVATION FLOOR PLAN

END OF SECTION

PART 1 GENERAL

1. EXAMINATION

1. Throughout the project, examine the work of all trades and promptly notify the Consultant if any conditions do not or will not comply with the drawings and specifications.

2. SETTING OUT

1. Lay out work from control bench marks and indicated verified reference points. The General Contractor shall have a qualified land surveyor, registered to practice in Province of Ontario and approved by Consultant, verify accuracy of layout and certify that building foundations and finish grade levels and locations are in accordance with the contract documents. File certification with Building Department and Consultant immediately after foundations are completed. Payment for the Land Surveyor will be carried out by the General Contractor not under the Cash Allowance.
2. The Land Surveyor shall provide four lines and one benchmark for the General Contractor to layout their work to. The General Contractor will provide these layout lines and benchmarks for work on all other areas once they begin work on the site.
3. Protect and preserve bench marks and reference points. Inform Consultant immediately if bench marks or reference points are disturbed or damaged by any work and pay for their repair and/or replacement.
4. Locate and fix grid lines and locations of walls, partitions, shafts and all parts of the construction as work proceeds.
5. Verify grades, lines, levels and dimensions indicated, particularly with road and sidewalk elevation, and report any errors or inconsistencies to the Consultant before commencing work. Confirm job dimensions at once to allow prompt checking of shop and other drawings.
6. As work progresses, provide and maintain bench marks at each floor, giving exact elevation of finished floor.

3. PROTECTION

1. Conform to Ontario Building Code, latest amendments, and The Construction Health and Safety Act, all as currently amended.
2. Provide spare safety helmets for and enforce their use by Owner, Consultant, their representatives and any authorized visitors to site.
3. Protect excavation, trenches, and buildings from damage by rain, water, ground water, backing up of drains or sewers and other water, frost and all other weather

conditions. Do not allow footings or slabs to be placed on frozen ground. Do not permit excavations to reach full depth indicated when freezing temperature may be expected unless footings or slabs can be placed immediately after excavation has been completed. Protect excavations from frost by placing of suitable approved insulating material to adequate depth, if placing of concrete is delayed and after placing of concrete until backfilling occurs or freezing conditions terminate. Provide necessary pumps (including spare pumps) and temporary drainage for keeping project free of water throughout construction period. Pump water to public sewers or ditches by approved means. Refer to soils report for details. Control grading around excavations to prevent surface water from draining into excavation and from damaging adjoining property.

4. Protect building from movement and damage, especially during filling and compaction and until elements are securely anchored and cannot be damaged or moved by filling or compaction. Obtain approval of authorities having jurisdiction for such work and make changes as required by them.
5. Provide temporary construction fence to enclose construction area, and pavement protection as required for protection of public, and of public and private property and as required by law and by authorities having jurisdiction. Erect sturdy railings around shafts, stair wells and the like to protect workers and public from injury. Equip foregoing protection with warning lights and signs. Alter, remove and relocate or replace hoardings, barriers, and entrances therein as required by authorities having jurisdiction and by the work. Hazards requiring such protection shall be eliminated as soon as possible and protection devices removed. Maintain fences, gates until construction is complete. Keep free from unauthorized signs.
6. Provide wood hoarding protection as indicated on drawings and in conformance with the local authority having jurisdiction along all streets where new construction is within 6 metres of the street sidewalk.
7. Provide and maintain in working order, adequate, temporary Canadian Underwriters labelled, chemical solution (soda acid) Class A.1, fire extinguishers and locate in prominent positions to approval of authorities having jurisdiction.
8. Utilities and Services - Before starting the work contact the Public Utilities for location of underground services.

4. AS BUILT DRAWINGS

1. Maintain as work progresses, accurate records of changes to the Drawings and concealed services. Accurate locations, depth, size, and type of underground utilities shall be included in these as built drawings. The General Contractor will be supplied with digital drawings in AutoCad®, 2012 or later and PDF format of the floor plans for making these recordings. As built drawings will be reviewed at each site meeting and must be properly maintained to receive Consultant's approval before the monthly certificate draw will be approved.
2. Keep a daily record showing progress of the work and all factors affecting the work,

i.e., weather, strikes, accidents, shipping delay, etc.

3. The General Contractor shall also provide as built drawings in AutoCad 2012 (or later) by a professional drafting service.
4. Completed as built drawings and instruction and warranty manuals shall be submitted prior to requesting substantial completion.
5. STORAGE AREA
 1. Storage Area: General Contractor to provide storage area at site for products and tools. Include construction and operating hardware, with security locks, as required. Separate storage for painter's materials and tools from other storage areas. Locate storage area where directed by Owner's Representative and provide security.
6. WASHROOM CONVENIENCES
 1. General Contractor to provide washroom facilities as per the Construction Health and Safety Act for use of subcontractors and employees. Facilities shall be provided with a screen and contents shall be removed regularly during construction. Maintain it without offense to neighbourhood and adjacent public and private areas. At completion of building, washroom facilities and contents shall be removed, and the ground carefully levelled and cleared. Employees on work must avail themselves of this convenience. It shall be to the satisfaction of local Health Authority.
 2. Use of permanent toilets is forbidden.
7. TEMPORARY DRAINS
 1. Excavations and building site shall be kept free from water at all times by means of trenches to sewers or pits from which it shall be pumped away and disposed from the site.
8. TEMPORARY WATER SERVICE
 1. The General Contractor shall provide and pay for all temporary water and connections for water used for construction operations. Water for compaction and watering of seed or sod shall be trucked to the site and paid by for the General Contractor.
9. TEMPORARY ELECTRICAL SERVICE
 1. The General Contractor shall provide and pay all temporary light and power necessary to the operations under this contract, including all connections necessary to supply to the Trade Contractors on site.
10. TEMPORARY HEATING

1. Provide temporary heat, heating equipment, and shelter, to keep that work which requires protection from cold, adequately warm and sheltered from elements and to allow it to be done safely and well, maintaining minimum temperature of 16 degrees Celsius (60 degrees F.) when finishing is being done and when building is closed in, until completion of work. Provide heating for materials affected by cold, both in storage and during construction. Construction requiring heat shall be suitably enclosed.
2. Do not use salamanders. Use temporary heaters of forced warm air type, operated in well-ventilated location and vented to exterior, or radiant panel type. If used in areas of completed building, provide protection on floors and adjacent surfaces to prevent damage to floors and adjacent surfaces, particularly when re-fuelling.
3. Provide temporary heat for interior spaces to maintain a minimum temperature of 16 degrees Celsius (60 degrees F.) throughout the building at all times once the building is enclosed.

11. TEMPORARY USE OF PERMANENT HEATING SYSTEM

1. Permanent heating and ventilation system may be used for temporary heating and ventilation only if the Consultant gives their approval to do so in writing, and when piping is complete, all units are connected, all pumps and valves are installed and operating properly, all strainers are installed and permanent or temporary filters are installed, and entire system has been tested and is safe operating condition, and when no further shut-down of system will be necessary for future conditions.
2. Do not use air distribution system until permanent or temporary filters are in place. Filter air distribution system to prevent dirt and dust from entering units via return air. Keep unused ducts sealed to prevent entry of air. Replace or clean filters frequently during construction to minimize entry of dirt. Clean (if cleanable) or replace filters before turning over system to Owner.
3. Put system in charge of fully trained and experienced operator at all times. If required, operators shall be selected jointly by Owner and Contractor with a view to permanent employment by Owner upon completion. Operators shall qualify as set out in Operating Engineers Act, if applicable.
4. Clean, maintain and repair heating and ventilation system as require throughout its use during construction. Notify manufacturer and Consultant immediately before turning over new heating equipment to Owner so that heating items may be checked for possible damage during temporary heating period. Make good damage to heating and air distribution equipment. Replace all worn parts and turn over system to Owner in clean, new condition, operating with circulating water properly treated chemically.
5. Permission might be given by the Consultant in writing only upon 100% operation completeness of the systems. Neither the Owner nor the Consultant are under any obligation to grant permission to use permanent heating system during

construction period.

12. SITE ACCESS FOR CONSTRUCTION ACTIVITIES

1. The Contractor shall construct and maintain in good condition, such temporary service roads, culverts that may be necessary to provide safe, convenient and adequate access for materials, and other supplies at all times while the General Contractor is working on site, all to the approval of the Consultant. NOTE: The Contractor shall protect existing roads, sidewalks, curbs and provide mud mats to the satisfaction of the Local Authorities and replace any that become damaged due to any operations under this contract.

13. DELIVERY AND STORAGE OF MATERIALS

1. Arrange for early deliveries necessary for execution of work without delay and have materials on job well in advance of the time it is needed.
2. Deliver, store and handle materials to exclude foreign material and prevent damage, soiling or breakage.
3. Materials to be stored on site, which need to be protected from weather shall be so protected.
4. Packaged materials shall be delivered in packages with manufacturer's seals and all labels intact.

14. BUILDING AND PREMISES

1. Owner reserves right to take over any completed portion prior to specified completion date, provided it does not affect completion of remaining work.
2. If Owner is forced to occupy building or parts thereof prior to completion, but after date of Substantial Performance, Contractor shall not be entitled to indemnity for interference with the performance of the work.

15. OWNERSHIP OF MATERIALS

1. All work or material delivered on the site or premises to form part of the works shall be considered the property of the Owner and shall not be removed without the consent of the Consultant, but the Contractor shall have the right to and shall remove the surplus materials after he has completed the work. If so directed by the Consultant, such surplus materials shall be removed at any time prior to the completion of the work.
2. All materials which are to be removed from the existing site and are not called for to be re-used or specifically called for in the specifications to be turned over to the Owner, shall become the property of the General Contractor and shall be

removed from the site.

16. DETAILS AND MEASUREMENTS

1. Ensure that necessary job dimensions are taken, and trades are coordinated for the proper execution of the work. Assume complete responsibility for the accuracy and completeness of such dimensions, and for co-ordination.
2. Verify that work, as it proceeds, is executed in accordance with dimensions and positions indicated which maintain levels and clearances to adjacent work, as set out by requirements of the drawings, and ensure that work installed in error is rectified before construction continues.
3. Check and verify dimensions referring to work and interfacing of services. Dimensions, when pertaining to work of other trades, shall be verified with trade concerned.
4. Do not scale directly from the drawings. If there is ambiguity or lack of information, immediately inform the Consultant and await his instructions before proceeding. Be fully responsible for rectifying, altering or redoing any work resulting from disregarding this clause.
5. All details and measurements of any work which is to fit or to conform with work installed shall be taken at the site.
6. Should revised drawings be issued after work has commenced, Contractor shall immediately return to Consultant previous drawings which refer to said work. The Contractor will be held responsible for work being carried out in accordance with said revised drawings.

17. WORKMANSHIP

1. Work shall be done in accordance with best standard practice. Only skilled mechanics shall be used where such are required to produce a first class job.
2. Use, install and handle manufactured materials, equipment and appliances in strict accordance with manufacturer's directions and instructions, unless specified otherwise.

18. FROST PROTECTION

1. Provide proper frost protection, including heating for materials to ensure scheduling of work without delay.
2. Similar protection shall be given to work done.

3. Work or materials damaged by frost shall be replaced by Contractor.
4. Snow and ice shall not be allowed to remain on any part of structure, except finished roofs, and shall be removed by Contractor.

19. PROJECT MEETINGS

1. Arrange regular meetings every week and notify the representatives of the Owner, Consultant, Engineer and each subcontractor concerned with the current progress.
2. Contact all subcontractors concerned at least 24 hours in advance and request their presence at job meeting.
3. Review approved progress schedule for rapid and efficient completion of work according to Contract requirements, with suppliers of materials and subcontractors.
4. Post and forward copies of progress schedule for advice of interested parties.
5. Record the minutes of each meeting and send copies to all attending and interested parties not later than two days after the meeting. In addition, send copies to the Consultant, Consultants and Owner. Contractor to provide updated change order register and shop drawing register attached to each record of minutes to indicate exactly what has been issued and the status of approvals and/or distribution.
6. Keep Consultant informed of progress, delays and of potential delays during all stages of work to avoid delays.

20. BROKEN GLASS

1. Replace all broken, damaged or scratched glass and mirrors. Glass which has been broken, scratched or damaged in installation shall be replaced by installer.

21. TREE PROTECTION

1. Protect tops, trunks and roots of existing trees on project site that are to remain. Box, fence or otherwise protect trunks of existing trees which may be subject to construction damage before any work is started. Do not permit heavy equipment or stockpiles within branch spread. When approved, remove interfering branches without injury to trunks and cover scars with tree paint.
2. Wherever excavating is required within branch spread of trees that are to remain, do not cut tree roots, but tunnel or trench under or around roots by careful hand digging and without injury to roots.

22. CHECK FLOOR DRAINS

1. Just before acceptance of building by Owner, check floor drains and see that they are clean, clear and functioning properly.

23. FIRE PROTECTION AND ACCESS TO EQUIPMENT AND EXITS

1. Take necessary precautions to eliminate fire hazards and to prevent damage to work, equipment and other property both public and private having to do with the work. Inspect work of this contract at least once a week for this purpose.
2. Provide and maintain in working order suitable Underwriters' labelled fire extinguishers and locate in prominent positions, to approval of authorities.
3. When welding, brazing and performing any operation with an open flame, a portable fire extinguisher shall be kept within 10 feet (3000 mm) of the operator at all times.
4. Store and locate materials and equipment packed in cardboard cartons, wood crates and other combustible containers in orderly and accessible manner. Place approved types of firefighting equipment in vicinity of materials or equipment packed in this type of crate or carton until permanent fire protection and equipment are available.
5. Store all rags and waste containing oil, grease or other flammable materials in an approved metal container and remove from the site at the end of each working day.
6. Only fire resistant tarpaulins are permitted on site.
7. Locate temporary buildings and storage areas in relation to their hazards and probability of damage to existing buildings under construction. Unless constructed of non-combustible materials, wherever possible locate them at least 33 feet (10 m) away from buildings. If constructed of combustible materials separate these structures into small, detached units.
8. Provide and maintain free access at all times from the street to fire hydrants and to outside connections for standpipes or other fire extinguishing equipment whether permanent or temporary. Do not place material or construction equipment within 10 feet (3 m) of hydrants or connection, nor between them and centre line of the street.

Maintain free access at all times to control valves and hose on fire lines within building and to all portable extinguishers.

9. Install fire doors and put into operating condition at the earliest possible time.

10. Comply with requirements of 01545 Safety Requirements.

24. SAFETY

1. Take all precautions necessary to protect and safeguard workers from dangerous conditions including fumes; lead paints, etc.; asbestos; and silica hazardous to health.
2. Comply with requirements of 01545 Safety Requirements.

25. EXISTING/ADJACENT BUILDING

1. Particular attention shall be paid to prevention of fire and elimination of fire hazards which would endanger new work or existing property.
2. No existing footings, foundations, pipe lines, electrical conduit and wiring shall be undermined or otherwise damaged or endangered by digging, butting of any other operation in the performance of the work of this Contract. Any existing work so affected shall be immediately repaired and made good to the Consultant's satisfaction at the Contractor's expense.
3. Active services to the adjacent buildings shall be protected.
4. In case of damage to active services, notify Consultant, Utilities and Authorities immediately and make all required repairs under direction of appropriate utility. Carry out repairs during off hours if required.

26. NOTES TO GENERAL CONTRACTOR

1. Ensure that the building is maintained weathertight and secure. The General Contractor shall furnish all temporary protection, enclosures, tarpaulins, etc., as may be required to weatherproof openings in the work.
2. Demolish and clean up all existing trees, scrub and debris and any other items found on the site not indicated to remain.
3. The General Contractor shall carry out all removal and disposal of all resultant debris.
4. In case of damage to active services, notify Consultant, Utilities and authorities immediately and make all required repairs under direction of appropriate utility. Carry out repairs during off hours if required. In absence of specific requirements or direction, plug or cap unused or abandoned utility lines at least 3 feet (1000 mm) outside of new building walls, or as required by utilities, codes and authorities.
5. The location of construction shacks and trailers to be approved by the Consultant and Owner.

6. Take all precautions necessary to protect and safeguard workers from dangerous conditions including fumes, lead and silica products that may be present during the construction that are hazardous to health.
7. Restore disturbed areas to original condition unless shown otherwise on drawings or stated in specifications.

27. CONSTRUCTION PARKING

1. Parking will be permitted on site provided it does not disrupt the performance of Work.

28. PROTECTION FOR OFF-SITE & PUBLIC PROPERTY

1. Protect surrounding private and public property from damage during performance of work.
2. Be responsible for damage incurred.

29. SIGN AND ADVERTISEMENTS

1. Erect no other signs, except those signs which are necessary to give direction or for safety, or warning signs, without the Consultant's permission. Where other signs are required or wanted, obtain Consultant's approval.

30. PROTECTION OF BUILDING FINISHES & EQUIPMENT

1. Provide protection for finished and partially finished building finishes and equipment during performance of work.
2. Provide necessary screens, covers, hoardings as required.
3. Be responsible for damage incurred due to lack of or improper protection. Replace or repair finishes or equipment so damaged.

31. SECURITY

1. Extent of security services shall be at the discretion of the Contractor. Note that the fit, finish and new appearance of the finished building will not be comprised. Materials, products, finishes, etc. damaged due to vandalism are to be restored and/or replaced to an as-new condition.

PART 2 PRODUCTS - Not Used

PART 3 EXAMINATION - Not Used

END OF SECTION

PART1- GENERAL

1.1 SUMMARY

1. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
2. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.

1.2 SUBMITTAL PROCEDURE

1. Provide submittals electronically in Portable Document Format (PDF).
2. Submissions must be clear, to scale, complete, specific and correctly transmitted.
3. Submittals are to be numbered in the sequence which they are submitted. Submittal numbering to be as follows 001, 002, 003 etc.
4. Processing: To avoid the need to delay installation as a result of the time required to process submittals such as samples and shop drawings, allow enough time for submittal review, including time for resubmittals.
 1. Allow Consultant five (5) working days to respond to Request for Information (RFI).
 2. Allow ten (10) days for initial review of shop drawings and samples. Allow additional time if the Consultant must delay processing to permit coordination with subsequent submittals.
 3. The Consultant will return to the Contractor indicating that, the items been:
 1. Reviewed (no re-submittal required).
 2. Reviewed as indicated (no submittal required).
 3. Revise and resubmit (re-submittal required).
 4. Review by the Consultant is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean that the Consultant approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Subcontractor, and

such review shall not relieve the Subcontractor of his responsibility for errors / omissions in the shop drawings or of his Documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to the processes or techniques of construction and installation and for co-ordination of all sub-trades.

5. The Contractor will advise all Trades, Subcontractors and suppliers of the limits of the Consultant's responsibility with respect to Shop Drawings and other submittals.
6. If an intermediate submittal is necessary, process the same as the initial submittal.
7. No extension of contract time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing.

1.3 SHOP DRAWINGS

1. Submit shop drawings as per indicated procedure and as required in various sections of these specifications and on the drawings.
2. Review submittals prior to submission. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated by the General Contractor and identified as to specific project will be returned without being examined and considered rejected.
3. Notify, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
 1. Verify field measurements and affected adjacent Work are coordinated.
 2. Contractor's responsibility for errors and omissions in submission is not relieved by Consultant's review of submittals.
 3. Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Consultant's review.
 4. Keep one reviewed copy of each submission on site.
 5. Submit Shop Drawings as specified in the following Sections:

SHOP DRAWINGS	
Section	Title
02830	Chain Link Fencing & Gates
02871	Playground Surfacing
03200	Concrete Reinforcement
03300	Concrete Mix Design

05500	Miscellaneous Metals
07270	Firestopping and Smoke Seals
08520	Aluminum Windows
08800	Glass and Glazing
09500	Acoustical Treatment (ACT)
09650	Resilient Flooring
09900	Paint Draw Downs
10165	Washroom Partitions
10800	Washroom Accessories
	Mechanical
	Electrical

1.4 SAMPLES

1. Submit samples as listed in List of Samples below.
2. Samples of materials, both manufactured and otherwise, proposed for the use on the work shall be submitted to the Architect for approval as required by the Contract Document and/or reasonably required by the Architect. The work shall be in accordance with approved samples. All samples shall be supplied and delivered to the Architect free of charge. The approval of samples shall not be construed as an acceptance of work subsequently carried out.
3. Samples shall be labelled indicating date of submission, name of project, names of contractor and manufacturer, and complete identification of locations at which materials are to be installed.

SAMPLES	
Section	Title
02871	Playground Surfacing
08800	Glass and Glazing
09500	ACT (to match ex. As close as possible)
09650	Resilient Flooring
09900	Paint Draw Downs
10165	Washroom Partition (colour)

1.5 EXTENDED WARRANTIES

1. In addition to the warranty requirements of GC 12.3 of CCDC Document 2, 2008, and as revised in the Supplementary General Conditions, the Contractor shall

note that the following extended warranty periods are required by the Contract Documents for the individual items under respective Sections.

2. Note: This table is meant to be used as a guide. Extended warranties are dictated by individual sections.

EXTENDED WARRANTIES	
Section	Title
08520	Aluminum Windows - 5 years; Glass - 10 years
08800	Glass & Glazing - 10 years
09680	Tile Carpeting – 10 years
Mechanical	Refer to Mechanical
Electrical	Refer to Electrical

1.6 MAINTENANCE MANUALS

MAINTENANCE MANUALS	
Section	Title
02830	Chain Link Fencing & Gates
02871	Playground Surfacing
03200	Concrete Reinforcement
03300	Concrete Mix Design
05500	Miscellaneous Metals
07270	Firestopping and Smoke Seals
08520	Aluminum Windows
08800	Glass and Glazing
09500	Acoustical Treatment (ACT)
09650	Resilient Flooring
09900	Paint Draw Downs
10165	Washroom Partitions
10800	Washroom Accessories
	Mechanical
	Electrical

1.7 EXTRA MATERIAL

1. Submit extra material as specified in the following Sections:

EXTRA MATERIAL

Section	Title
09500	ACT – 5% of total area
09650	Resilient Flooring - 5% of total of each colours
09900	Painting - See Section
	Mechanical
	Electrical

CERTIFICATE OF PAYMENT APPLICATION FORM

Contractor: _____ Application No. _____

Work: _____ Date: _____

Period Covered: _____

Description	Contract Amount	% To Date	Value Performed to Date	Value Previously Performed	Value Current Period	Balance to Complete
This Section to show breakdown of Contract such details as:						
General Conditions	\$	\$	\$		\$	\$
Excavation						
Concrete Footings						
Concrete Walls, Cash Allowances, Hardware, etc.						
SUB-TOTAL						
Change Orders No. 1 No. 2 No. 3						
TOTAL CONTRACT						

NOTE: HST TO BE INCLUDED IN EACH OF THE FOLLOWING VALUES:

SUMMARY (HST to be included in all items)

Value of Work Completed to date \$ _____

Less Holdback of 10% \$ _____

Holdback Released \$ _____

Current Holdback (Net Retained) \$ _____

Sub-Total \$ _____

Waterloo District School Board

WRDSB No. 23-7360-RFT

Crestview Public School –

Library, Gym, and Vestibules Renovation. New Univ.

WR & Room Renumbering

153 Montcalm Drive Kitchener, Ontario

+VG Project No. 22057

Section 01300

SUBMITTALS

Page 6 of 6

Less Previous Certificates \$ _____

Amount of this Claim \$ _____

Total of H.S.T. included above (\$ _____)

GENERAL CONTRACTOR'S H.S.T. NO. _____

PART 1 GENERAL

1.1 DESCRIPTION

1. See Individual Specifications Sections for full listing of inspections and approvals.
2. Architect's approvals required:
 3. Architect's and Consultant's approval before interfering with existing services and apparatus. One week notice to be given. Section 01010.
 4. Architect's approval of work schedule (Progress Schedule) - 01310.
 5. Architect's and Consultant's approval of substitutions - 01500.
 6. Consultant's approval of footing bearing soil compaction - 02200.
 7. Consultant's approval of compaction - 02200.
2. Notify Architect:
 1. Notify Architect for Deficiency Inspection upon agreed Substantial Performance.
 2. Notify Architect for One-Year Holdback Inspection.
 3. Notify Client for Two Year Inspection of Extended Warranties
 4. Notify Client for Three Year Inspection of Extended Warranties
 5. Notify Client for Five Year Inspection for Extended Warranties
 6. Notify Client for Ten Year Inspection for Extended Warranties.
3. Submit samples for approval.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

PART 1 GENERAL

1.1 DESCRIPTION

1. Before commencing any work, the Construction Manager, along with their trade contractors, are to prepare working / interference drawings, to ensure that all components are to be properly accommodated within the spaces provided, ensuring all clearances required by jurisdictional authorities and for proper maintenance are indicated and maintained.
2. Schedule meetings on site with all associated trades to review all interference areas until all issues have been coordinated and required interference drawings issued.
3. Prepare drawings to indicate coordination and method of installation of a mechanical system with sprinkler, electrical, structural and other systems where their relationship is critical. Ensure all details of equipment, apparatus and connections are coordinated.
4. The Construction Manager shall provide interference drawings prepared by their Mechanical, Sprinkler and Electrical subtrades. Drawings are to be red-line markups scanned to PDF Format and shall indicate any perceived interference between mechanical, sprinkler, structural, and electrical work and the work of all other Divisions along with proposed solution to such interference.
5. Failure to coordinate with all other trades could result in reworking of installed equipment, piping or ducting at the discretion of the Consultant. Any reworking to accommodate the installation of other trades is to be performed at no extra cost.
6. All interference drawings shall be submitted and approved prior to the second Certificate of Payment being released.

1.2 COOPERATION AND COORDINATION

1. Cooperate and coordinate with other trades as required, for satisfactory and expeditious completion of work. Take field dimensions relative to work. Fabricate and erect work to suit field dimensions and field conditions. Provide forms, templates, anchors, sleeves, inserts and accessories required to be fixed to, or inserted in work, and set in place or instruct related trades as to their location. Pay cost of extra work caused by and make up time lost, as a result of failure to provide inadequate time, the necessary cooperative information of items to be fixed to, or built in.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

Waterloo District School Board
WRDSB No. 23-7360-RFT
Crestview Public School –
Library, Gym, and Vestibules Renovation. New Univ.
WR & Room Renumbering
153 Montcalm Drive Kitchener, Ontario
+VG Project No. 22057

Section 01304
INTERFERENCE DRAWINGS
Page 2 of 2

END OF SECTION

PART 1 GENERAL

1.1 ACCEPTABLE PRODUCTS

1. No alternate manufacturers or products or substitutions will be accepted during the tender (bid) period.
2. Should alternates or substitutions be proposed upon award of this Contract the requirements of this Section shall apply.
3. First item named or specified by catalogue number meets specifications in all respects regarding performance, quality of material and workmanship, and is acceptable to the Architect.
4. Items, other than first named, meeting specifications regarding quality of materials and workmanship only, are acceptable to the Architect, if they also meet performance, match the first named product in colour and texture, etc. and/or capacities specified and can be accommodated within the space allotted.
5. Where the contractor proposes the use of equivalent products other than that first named, on which design is based, the contractor shall be responsible for all details of installation including product size, arrangement, fit, colour, etc. and maintenance of all required clearances. Contractor shall prepare and submit revised layouts to indicate arrangement of all affected piping, ductwork, conduit, lighting, equipment, etc. Failure by Contractor to provide such drawings may be considered indication that additional costs associated with equivalent products such as revisions to surrounding architectural finishes, structural components, or the need for larger motor starters, larger power feeders, space revisions to associated product equipment, controls, etc. shall be included in Bid price.

1.2 APPROVAL REQUIRED

1. The Contract is based on the materials, equipment, and methods described in the Contract Documents.
2. The Architect will consider proposals for substitution of materials, equipment, and methods only upon award of Contract and when such proposals are accompanied by full and complete technical data and all other information required by the Architect to evaluate the proposed substitution.
6. Do not substitute materials, equipment, or methods unless such substitution has been specifically approved for this work by the Architect, in writing.

1.3 "OR EQUAL"

1. Where the phrase "or equal", "approved equal", or "equal as approved by the

Architect" occurs in the Contract Documents, do not assume that materials, equipment, or methods will be approved by the Architect.

2. The decision of the Architect shall be final.

1.4 AVAILABILITY OF SPECIFIED ITEMS

1. Verify prior to bidding that all specified items will be available in time for installation during orderly and timely progress of the work.
2. In the event specified items will not be so available, notify the Architect prior to receipt of bids.
3. Costs of delays because of non-availability of specified items, when such delays could have been avoided by the Contractor, shall not be borne by the Owner.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

PART 1 GENERAL

1.1 REQUIREMENTS INCLUDED

1. Systems demonstration
2. Document submission
3. Project commissioning
4. Inspection and takeover procedures

1.2 SYSTEM DEMONSTRATION

1. Prior to final inspection, demonstrate operation of each system to the Owner and Consultant.

1.3 DOCUMENTS

1. Collect reviewed submittals in Section 01010 and 01300 and assemble documents executed by Subcontractors, suppliers, and manufacturers. Submit as per requirements in Section 01010 - General Requirements.
 1. Provide bonds fully executed and notarized.
 2. Submit a final statement of accounting giving total adjusted Contract Sum, previous payments, and monies remaining due.
 3. Architect will issue a final change order reflecting approved adjustments to Contract Sum not previously made.

1.4 PROJECT COMMISSIONING

1. Expedite and complete deficiencies and defects identified by the Consultant.
2. Review record "as-built" drawings for completeness and then have "as-built" AutoCad 2010 or later drawings completed by a professional drafting service and provide "as-builts" on computer disks.
3. Review Cash and Contingency Allowances in relation to Contract Price, change orders, hold-backs and other Contract Price adjustments.
4. Submit required documentation such as statutory declarations, Workplace Safety & Insurance Board Certificates, certificates of approval or acceptance from regulating bodies.

5. Attend "end-of-work" testing and break-in or start-up demonstrations.
6. Review inspection and testing reports to verify conformance to the intent of the documents and that changes, repairs or replacements have been completed.
7. Meet with structural consultant and inspection and testing consultant to coordinate completion, testing approvals.

1.5 INSPECTION/TAKEOVER PROCEDURES

1. The requirements of OAA/OGCA Document No. 100 "Take-Over Procedures" also govern applicable take-over procedures for this Contract.
2. Prior to application for certificate of Substantial Performance, carefully inspect the Work and ensure it is complete, that major and minor construction deficiencies are complete and/or corrected and the building is clean and in condition for occupancy. Notify the Architect, in writing, of satisfactory completion of the Work and request an inspection.
3. During the Architect/Consultant inspections, lists of deficiencies and defects will be tabulated. Correct same.
4. When the Architect/Consultants consider deficiencies and defects have been corrected and it appears requirements of the Contract have been performed, make application for certificate of Substantial Performance. Refer to General Conditions Article GC 14 for specifics to application.
5. All utility meters to be read and transferred into the Owner's name.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

PART 1 GENERAL

1.1 DESCRIPTION

1. The printed forms outlined below shall form the basis of communication between the Architect and the General Contractor. Copies of forms unrelated to the issuance of monies, shall be kept on the site; neatly filed and readily accessible to the parties concerned.
2. TRANSMITTAL RECORD
 1. A record of material issued by the Architect or General Contractor.
3. GENERAL REVIEW REPORT
 1. A progress report completed by the Architect or Consultant on a regular basis.
4. PROPOSED CHANGE
 1. A description of contemplated changes to the Contract.
5. CASH ALLOWANCE CHANGE ORDER
 1. Assignment of money for work executed under the Cash Allowance Section.
6. CHANGE ORDER
 1. Assignment of money for work executed beyond the financial limits of the Contract.
7. CHANGE DIRECTIVE
 1. A description of a change in the work when the Owner requires the Contractor to proceed with a change in the work prior to the Owner and the Contractor agreeing upon the adjustment in Contract Price and Contract Time.
8. CERTIFICATE FOR PAYMENT
 1. For release of contract money based on monthly progress draws.
9. SUPPLEMENTAL INSTRUCTIONS
 1. A description and/or clarification for the purpose of recording a clarification or interpretation of the contract documents or giving directions on problems resulting from field conditions.

END OF SECTION

PART 1 GENERAL

1.1 NEWFORMA SOFTWARE SYSTEM

1. This project will be administered through the Architect using the NEWFORMA software system.
2. The Contractor is required to use this internet-based software for ALL project communications, RFIs, quotations, project schedule, shop drawing log, change log, RFI log, etc., including all administrative forms as outlined in Section 01800 and construction schedules as outlined in Section 01310. All shop drawings, interference drawings and as-built drawings shall be submitted electronically through the Newforma Info Exchange in PDF format and shall be numbered in the order which they are submitted. Numbering shall be in the following format; 001, 002, 003, etc. Submittals will not be deemed as received unless delivered through Newforma Info Exchange.
3. Utilization of this system does not require the purchase or download of the Newforma software. The Architect will send an email notification which will automatically provide online access to the Newforma Info Exchange specific to this project.

1.2 NEWFORMA INSTRUCTIONS

1. You will receive an email instructing you how to get into the system (click on link). The system is self-explanatory as to the “use” for Submittals (Shop Drawings) and RFIs. Refer to attached screen shots.
2. When issuing Submittals and RFIs, the following people are to always be COPIED (not addressed to):

Linda Butler **lbutler@plusvg.com**
3. Shop Drawings are to be issued as “Submittals”. There is a place on the Submittal section to put in the Contractor's “expected response date” – please ensure that is filled in. Submittals are to be numbered in the sequence which they are submitted. Numbering to be as follows; 001, 002, 003, etc. (NOTE: as per the contract, the Architect has 10 working days to respond).
4. RFIs: There is a place on the RFI section to put in the Contractor's “expected response date” – please ensure that is filled in. RFI's are to be numbered in the sequence which they are submitted. Numbering to be as follows; 001, 002, 003, etc. (NOTE: as per the contract, the Architect has 5 working days to respond)
5. RFCs: (all Contractor quotations to be submitted as an RFC) RFC's are to be numbered in the sequence which they are submitted. Numbering to be as follows; 001, 002, 003, etc.

6. Submittals and RFI's requiring consultant review other than the Architect shall be sent via Newforma directly to the respective consultant. The +VG Project Manager as well as the persons noted above shall be copied on all submittals and RFI's.

7. All shop drawings, interference drawings and as-built drawings shall be submitted electronically through the Newforma Info Exchange in PDF format. Submittals will not be deemed as received unless delivered through Newforma Info Exchange.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1. Drawings and general provisions of the Contract, including General and Supplementary conditions as well as Divisions 01 and 1 Specification Sections apply to this section.

1.2 SUMMARY

1. This section requires the selective removal and subsequent disposal of the following:
 1. Carry out demolition in accordance with requirements of CSA S350-M. Demolish and remove materials from Site.
 2. Work includes but is not limited to demolition and/or removal of portions of existing building ,doors, windows, flooring, roofing, ceiling, plumbing fixtures, concrete, fixed furnishings, railings, mechanical equipment/components, and/or electrical work.
 3. Conduct all demolition and removal work as indicated on drawings and as required to accommodate new construction.
 4. Removal and protection of existing fixtures, materials, equipment and/or items indicated to remain, reuse return to Client and/or salvage.
 5. Contractor to remove existing millwork, sinks, appliances, ductwork, plumbing and electrical as noted on the drawings.
 6. Locate, identify, stub off, and disconnect utility services that are not indicated to remain.
 7. Materials and debris shall not be stacked in building but removed entirely from all circulation spaces at the end of each day.
 8. At end of each day's work leave work in safe and clean condition.

1.3 REMOVAL OF WORK SPECIFIED ELSEWHERE

1. Cutting non-structural concrete floors and masonry wall for piping, ducts and conduits is included with the work of the respective fire suppression, plumbing, HVAC and electrical specifications sections in Divisions 20 to 26.

1.4 RELATED WORK SPECIFIED ELSEWHERE

1. Remodelling construction work and patching are included within the respective sections and drawings, including removal of materials for reuse and incorporation

into remodelling or new construction.

2. Relocation of pipes, conduits, ducts and other mechanical and electrical work is specified in their corresponding divisions.

1.5 SUBMITTALS

1. Submit the following in accordance with Conditions of the contract and Division 01 specifications sections.
 1. Schedule indicating proposed sequence of operations for selective demolition work to Owner's Representative for review prior to start of work. Include coordination for shutoff, capping and continuation of utility services as required, together with details for dust and noise control protection.
 2. Photographs of existing conditions of structure surfaces, equipment, and adjacent improvements that might be misconstrued as damage related to removal operations.
 3. File submittals with Owner's Representative prior to start of work.

1.6 STANDARD REFERENCES

1. CSA S350 M80 (R2003) Code of Practice for Safety in Demolition of Structures.

1.7 JOB CONDITIONS

1. Some work may be required to be completed after hours and on weekends.
2. Partial demolition and removal:
 1. Items indicated to be removed but of salvageable value to Contractor may be removed from structure as work progressed. Transport salvaged items from site as they are removed.
 2. Storage or sale of removed items on site will not be permitted.

1.8 PROTECTION

1. Provide temporary barricades and other forms of protection to protect Owner's personnel and general public from injury due to selective demolition work.
2. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement or collapse of structure or element to be demolished to adjacent facilities or work to remain.
3. Protect from damage existing finish work that is to remain in place and become

exposed during demolition operations.

4. Protect floors with suitable coverings when necessary.
5. Protect all existing adjacent work (wainscoting, plaster walls, bases and trim, etc) against damages which might occur from falling debris, scrapes or other causes due to work of this Section.
6. Construct temporary insulated dustproof partitions where required to separate areas where noisy or extensive dirt or dust operations are performed. Equip partitions with dustproof doors and security locks.
7. Ensure that all dust and debris is removed before finishing work commences.
8. Provide temporary weather protection during interval between demolition and removal of existing construction on exterior surfaces and installation of new construction to ensure that no water leakage or damage occurs to structure or interior areas of existing building. .
9. Remove protections at completion of work.

1.9 DAMAGES

1. Inform Owner's Representative immediately of any damage caused to adjacent facilities during demolition activities.
2. Promptly repair damages caused to adjacent facilities by demolition work once Owner's Representative gives the order proceed.

1.10 TRAFFIC

1. Conduct selective demolition operations and debris removals to ensure minimum interference with roads, streets, walks and other adjacent occupied or used facilities.
 1. Do not close or otherwise obstruct streets or walks without written permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

1.11 QUALITY ASSURANCE

1. Regulatory Requirements: Conform to the latest Occupational Health and Safety Act, as currently amended.
2. Most recent Occupational Health and Safety Act, as currently amended,
3. Conform to OBC, as applicable.

4. Conform to Fire Code, Regulation under Fire Marshals Act, especially Part 8.
5. Flame Cutting: Only if permitted by authorities having jurisdiction.
 1. Do not use torches for removal until work area is cleared of flammable materials. At concealed spaces, such as interior of ducts and pipe spaces, verify condition of hidden space before starting flame-cutting operations. Maintain portable fire suppression devices during flame-cutting operations.
6. Utility Services: Maintain existing utilities indicated to remain in service and protect them against damage during demolition operation.
 1. Do not interrupt utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities as acceptable to governing bodies.
 2. Maintain fire protection services during selective demolition operations.
 3. Provide bypass connections as necessary to maintain continuity of service to occupied areas of building. Provide minimum of 72 hours advance notice to Owner if shutdown service is necessary during changeover.
7. Environmental Controls: Use water sprinkling, temporary enclosures, and other methods to limit dust and dirt migration. Comply with regulations pertaining to environmental protection.
8. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding and pollution.
9. Remove hazardous materials in accordance with applicable laws and regulations.

1.12 DISPOSAL OF WASTER MATERIALS

1. Selling or burning of materials on Site is not permitted.
2. Provide bin for garbage on sidewalk in a location acceptable to the Owner.
3. Conform to requirements of municipality's Works Department regarding disposal of waste materials.
4. Materials prohibited from municipality waste management facilities shall be removed from Site and disposed of at recycling companies specializing in recyclable materials

PART 2 **PRODUCTS** Not Used

PART 3 **EXECUTION**

3.1 **PREPARATION**

1. Provide interior and exterior shoring, bracing or support to prevent movement, settlement, or collapse of are to be demolished and adjacent facilities to remain.
2. Cease operations and notify Owner's Representative immediately if safety of structure appears to be endangered. Take precautions to support structure until determination is made for continuing operations.
3. Cover and protect furniture, equipment and fixtures to remain from soilage or damage when demolition work is performed in areas where such items have not been removed.
4. Provide and weatherproof closures for exterior opening resulting from demolition work.

3.2 **DEMOLITION**

1. Perform selective demolition work in a systematic manner. Use such methods as required to complete work indicated on drawings in accordance with demolition schedule and governing regulations.
2. Demolish concrete and masonry in small sections. Cut concrete and masonry at junctures with construction to remain using power-driven masonry saw or hand tools; do not use power-driven impact tools.
3. Locate demolition equipment throughout structure and promptly remove debris to avoid imposing excessive loads on supporting walls, floors or framing.
4. Provide services for effective air and water pollution controls as required.
5. For interior slabs on grade, use removal methods that will not crack or structurally disturb adjacent slabs or partitions.
6. If unanticipated mechanical, electrical or structural elements are encountered and conflict with intended function or design, investigate and measure both nature and extent of the conflict. Submit report to Owner's Representative in written accurate detail. Pending receipt of directive from Owner's Representative, rearrange selective demolition schedule as necessary to continue overall job progress without undue delay.

3.3 **SALVAGED MATERIALS / EQUIPMENT**

1. Salvaged items: Where indicated on drawing as "Salvage" or "Deliver to

Owner", carefully remove indicated item (s), clean, store and turn over to Owner and obtain receipt.

3.4 DISPOSAL OF DEMOLISHED MATERIALS

1. Remove from building site debris, rubbish and other materials resulting from demolition operations. Transport and legally dispose off site.
2. If hazardous materials are encountered during demolition, comply with applicable regulations, laws and ordinances concerning removal, handling and protection against exposure or environmental pollution.
3. Burning of removed materials is not permitted on project site.

3.5 CLEANUP AND REPAIR

1. Upon completion of demolition work, remove tools, equipment, and demolished materials from site. Remove partitions and leave interior areas clean.
2. Repair/replace areas, components and/or items that were intended to remain but got damaged during demolition work to the full satisfaction of the Owner.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

- .1 Provide all labour, materials, accessories and equipment to prepare for, mix, transport, place, finish and cure cast-in-place concrete and grout necessary to construct structure required by the design, specified herein, and as required for the complete and proper provision of Work of this Section, including, but not limited to, the following:
 - .1 concrete including cementing materials, fine and coarse aggregates, admixtures and water
 - .2 steel or polypropylene reinforcing fibres
 - .3 granular underbed and vapour barrier
 - .4 curing and finishing
 - .5 metallic, non-metallic and dry-pack grout, together with grouting of column base and beam bearing plates

1.2 QUALITY VERIFICATION

- .1 Reference Standards, Codes and Acts
 - .1 The latest edition of the following Reference Standards, Codes, and Acts shall govern Work of this Section. Where there are differences between the specifications and drawings and the codes, standards, or acts, the most stringent shall govern. Standards referenced within the Standards noted below are to apply even if they are not included in the list.
 - .1 National Building Code of Canada, 2010 (NBC)
 - .2 Ontario Building Code, 2012 (OBC)
 - .3 Canadian Standards Association (CSA)
 - .1 CSA A23.1-04, Concrete Materials and Methods of Concrete Construction
 - .2 CSA A23.2-04, Methods of Test and Standard Practices for Concrete
 - .3 CSA A23.3-04, Code for the Design of Concrete Structures for Buildings
 - .4 CSA A283-06, Qualification Code for Concrete Testing Laboratories
 - .5 CAN/CSA-A3000-08, Cementitious Materials Compendium
 - .6 CSA S413-07, Parking Structures
- .2 Qualifications
 - .1 Provide concrete only from sources for which plant, equipment and materials comply with CSA A23.1/A23.2.

- .2 Undertake preparation for and application of specified penetrant sealant only by personnel with a minimum of five years documented experience in the successful application of water-based penetrant sealers.
- .3 Inspection and Testing
 - .1 As per SECTION 03 05 00

- .2 Be aware that Contractor retains sole responsibility for quality control of Work and that performance or non-performance of Independent Inspection and Testing Company does not limit, reduce, or relieve Contractor of responsibility for complying with the requirements of the Project Agreement.
- .3 Independent Inspection and Testing Company must be certified under CSA Standard A283, Qualification Code for Concrete Testing Laboratories, for Category 1 Certification.
- .4 Project Records
 - .1 Concrete Pour Records – Record time, date, delivery slip serial number, and area of placement in building of each concrete pour, correlate with related test cylinders and maintain records on site until Project is completed.
 - .2 Delivery Records – File duplicate copies of concrete delivery slips recording supplier, serial number of slip, date, and truck number. Contractor, Project, Class of exposure, cementing materials content, air content, volume in load, time of first mixing of aggregate, cementing materials, added water and ambient air temperature.
 - .3 Record Drawings – Record on a set of Drawings:
 - .1 time and date of each pour
 - .2 high and low ambient air temperatures during each pour
 - .3 date of removal of forms in each area of Work
 - .4 founding elevations of all footings or drilled piers
 - .5 variations of foundation Work from that indicated on drawings
 - .4 Make Record Drawings available for Consultant's inspection at all times.

1.3 SUBMITTALS

- .1 Concrete Producer's Certification
 - .1 Prior to submitting mix designs for review, submit certification that plant, equipment and materials to be used in concrete comply with requirements of CSA A23.1/A23.2
- .2 Concrete Mix Designs
 - .1 Submit designs for concrete mixes required by Contract Documents.
 - .2 When optimum bulk density of aggregates is specified, provide supporting evidence of compliance with requirements.
 - .3 Be aware that review of concrete mix design is for general conformity and that Contractor retains responsibility for compliance with Contract Documents.
- .3 Manufacturer's Certification
 - .1 Submit certificate from manufacturer certifying that product proposed conforms to specified performance requirements.
- .4 Contractor's Quality Control

- .1 Submit proposed quality control procedures for hot or cold weather conditions, for ensuring correlation of concrete mix with strength or exposure classification for area of placement, and for finishing and curing methods.
- .5 Joint Location Drawings

- .1 Submit Drawings showing proposed location of construction and control joints in slab-on-grade in accordance with Typical Detail if joint layout is not detailed on Drawings.

1.4 ARCHITECTURAL CONCRETE

- .1 Architectural Concrete is defined as concrete surfaces designated as "Architectural Concrete" in Project Agreement including surfaces specified to receive finish treatment such as sandblasting and bush-hammering.
- .2 Place, finish, cure and strip Architectural Concrete to ensure hard, dense, smooth and true concrete surfaces of uniform appearance without damage, defects or blemishes.

1.5 ENVIRONMENTAL CONDITIONS

- .1 Comply with the Cold and Hot Weather Requirements of CSA A23.1/A23.2 and additionally as specified herein.
- .2 Provide protection or heat, or both, to ensure temperature of concrete at surfaces is maintained at not less than 21°C for three days after placing, not less than 10°C for the next two days and above freezing for the next two days.
- .3 Provide protection or heat or both to prevent alternate freezing and thawing of concrete for fourteen days after placing.
- .4 Vent exhaust gases from combustion type heaters outside of protection enclosures.
- .5 Provide protection to maintain concrete continuously moist during curing period.
- .6 Provide same hot or cold weather protection for storage of field cured cylinders demonstrating strength development of in-situ concrete as for area of concrete construction which it represents until cylinders are sent to testing laboratory.
- .7 Do not commence placement of concrete when it is raining or rain is anticipated. Should rain commence during placing cover freshly placed concrete with waterproof material.
- .8 Place bonded toppings on rough slabs only when surface temperature is at least 15°C [60°F].
- .9 Do not grout at ambient air temperatures or concrete surface temperatures less than 5°C [40°F], or when air or surface temperature is expected to fall below 5°C [40°F] within 24 hours of grouting.
- .10 Do not apply sealants, or penetrant sealer, at ambient air temperatures or concrete surface temperatures less than 5°C [40°F], or when air or surface temperature is expected to fall below 5°C [40°F] within 12 hours of application.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Cementing Materials
 - .1 Portland Cement: to CSA Standard A3000, Type 10 Cement unless noted otherwise.
 - .2 Cementitious Hydraulic Slag: to CSA Standard A3000.

- .3 Flyash: to CSA Standard A3000.

- .2 Fine Aggregate
 - .1 For slabs-on-grade, fineness modulus of fine aggregate to be between 2.7 and 3.1.

- .3 Coarse Aggregates
 - .1 20 mm [3/4"] to 5 mm [No. 4 sieve] except as specified below.
 - .1 For Slabs-on-Grade
 - .1 Abrasion loss not to exceed 35%.
 - .2 Maximum petrographic number of 125 when tested in accordance with ASTM C295, as conducted by Ministry of Transport of Ontario.
 - .2 For Slabs-on-Grade 125 mm [5"] and Thicker
 - .1 40 mm [1 1/2"] to 5 mm [No. 4 sieve]; combine at least two of the single sizes specified in Table 2 Group II of CSA A23.1/A23.2, one of which is to be 40 mm [1 1/2"], to obtain maximum bulk density (unit weight) and optimum grading, in accordance with an approved procedure.
 - .3 For Slabs Over Steel Deck (Composite or Non-composite) and Bonded Toppings 50 mm [2"] Thick and Less:
 - .1 12 mm [1/2"] to 5 mm [No. 4 sieve].
 - .4 For columns less than 300 mm [12"] in least dimension, or less than 95,000 mm² [150 in²] in cross-sectional area, walls less than 200 mm [8"] in width and concrete for grouting masonry:
 - .1 10 mm [3/8"] to 5 mm [No. 4 sieve].
- .4 Water
 - .1 To conform to CSA A23.1/A23.2
- .5 Admixtures
 - .1 Conform to Reference Standards for chemical and air-entraining admixtures.
 - .2 Provide only admixtures that are free of chlorides.
 - .3 Provide evidence acceptable to the Design Team that superplasticizer does not increase shrinkage of concrete.
- .6 Steel Fibres
 - .1 Cold drawn carbon steel, corrugated profile or straight with hooked ends, with following performance requirements:
 - .1 Length: 51 mm ["] minimum
 - .2 Diameter: 0.75 mm [0.03"] minimum
 - .3 Aspect ratio: 75 minimum
 - .4 Yield strength: 965 MPa [140 ksi] minimum
- .7 Polypropylene Fibres
 - .1 100 percent virgin polypropylene, collated, fibrillated fibres; 50 mm [2"] nominal length.
- .8 Granular Underbed for Slabs-on-Grade
 - .1 As recommended by the Geotechnical Engineer

.9 Vapour Barrier

- .1 0.152 mm [6 mil] thick polyethylene sheet to CAN/CGSB-S1.34-M, perforated with 8 mm [5/16"] diameter holes at 150 mm [6"] centres, each way.

- .10 Curing / Sealing Compound:
 - .1 Water based acrylic emulsion membrane curing compound to ASTM C309, Type 1 generally.
 - .2 Curing / sealing compounds to be compatible with any specified floor hardeners, covering adhesives and waterproofing compounds.
- .11 Grout
 - .1 Dry Pack Grout – under steel plates and where grout thickness does not exceed 75 mm [3"]
 - .1 One part Portland cement to two parts concrete sand that conforms to CSA A23.1/A23.2 with only sufficient water that mix will retain its shape when made into ball by hand.
 - .2 Premixed Grout:
 - .1 Mix with water in accordance with manufacturer's printed instructions.
 - .2 Must be non-shrink and may be metallic or non-metallic.

2.2 CONCRETE MIXES

- .1 Concrete
 - .1 Ready mix with 28 day compressive required by the design.
 - .2 Air dry unit weight:
 - .1 Typically for normal weight concrete, minimum 2300 kg/m³ [145 lbs/ft³]
adjusted proportionally for maximum air content listed in CSA A23.1/A23.2, Clause 14 - Table 10.
 - .3 Design concrete mix in conformance with CSA A23.1/A23.2, Clause 16 - Table 13 (Alternative 1), Clause 15 - Table 12, Clause 17 - Table 14, and as follows:
 - .1 Provide concrete meeting water / cementing materials ratio and air content of Tables 12 and 14 in accordance with Class of Exposure specified in Table of Concrete Properties on Drawings. Note that concrete designed in accordance with water/cementing materials ratio of Tables 12 and 14 may yield strength exceeding minimum strength specified on Drawings.
 - .4 Sulphate Exposure:
 - .1 If required, provide concrete mix in accordance with Clause 15, Table 10 of CSA A23.1/A23.2, for concrete subject to sulphate attack, such as drilled shafts or other concrete in contact with soil.
Submit to Inspection and Testing Company if requested, acceptable evidence and
 - .5 material samples to verify that proposed concrete mix design will produce specified quality of concrete.
- .2 Admixtures
 - .1 Chemical Admixture:
 - .1 Incorporate water-reducing admixture to ASTM C494 type A in all concrete.

- .2 Air Entraining Agent:
 - .1 Incorporate air-entraining agent in addition to chemical admixture in concrete of relevant Class of exposure, in accordance with CSA A23.1/A23.2, Clause 15, Table 9.
- .3 Calcium Chloride:

- .1 Do not use calcium chloride or admixtures containing chloride in concrete.
- .3 Architectural Concrete
 - .1 For concrete required to be Architectural Concrete obtain aggregate and cement for entire Project from same source at same time.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Confirm that subgrade of compacted fill conforms to requirements specified for backfilling before placing slab underbed.
- .2 Confirm that surfaces on which concrete is to be placed are clean and free of debris, frost and water before placing.
- .3 Confirm that concrete reinforcement, control joints, inserts and all other built-in Work is in place and secured, before commencing placement of concrete.
- .4 Confirm that placement of conduct or pipe within concrete section conforms to requirements of CSA A23.1/A23.2 prior to commencement of placement of concrete

3.2 TOLERANCES

- .1 Place and finish concrete to provide tolerances in accordance with CSA A23.1/A23.2 and ACI 117, and additionally as specified herein.
- .2 Difference between elevation of high point and low point in specified area not to exceed:
 - .1 In any bay up to 100 m² [1100 ft²]:12 mm [1/2"]
 - .2 In any bay up to 400 m² [4300 ft²]:25 mm [1"]
- .3 F-Number System:
 - .1 Finish floor slabs to meet tolerance classification in accordance with CSA A23.1/A23.2, Clause 22.1.3 and Table 16 deemed appropriate for the use of the space.
 - .2 Measure FL levelness tolerance at 72 □ 12 hours after completion of floor finishing, on formed slabs before removal of shores and on slabs-on-grade

3.3 PREPARATION FOR SLABS-ON-GRADE

- .1 Granular Underbed:
 - .1 Obtain Geotechnical Consultant's written confirmation that prepared subgrade is acceptable for placement of granular underbed.
 - .2 Place granular underbed over entire area of building and compact to 100% ASTM D698 (Standard Proctor) optimum dry density.
 - .3 Obtain Geotechnical Consultant's confirmation that thickness, elevation and compaction of granular underbed are acceptable.
- .2 Vapour Barrier:

- .1 Use vapour barrier under slabs on grade only where the floor will be covered with finish material adhered with adhesives that may be adversely affected by moisture or where materials will be stored that could be adversely affected by moisture.
- .3 Remove foreign materials from underbed and forms before placing concrete.

3.4 PLACING CONCRETE

- .1 Transport and place concrete in accordance with CSA A23.1/A23.2, and additionally as specified herein.
- .2 Place concrete for entire floor framing system including beams, girders, slab drops, brackets, column capitals and haunches monolithically unless otherwise noted on Drawings.
- .3 Transport and spread concrete over steel framing in a manner to prevent lateral deflection and twisting of members.

3.5 FINISHING CONCRETE

- .1 Floor, Roof, Stair Treads, and Other Slab Surfaces
 - .1 Perform finishing operations on plastic concrete surfaces in accordance with CSA A23.1/A23.2, Clause 22, and as specified herein.
 - .2 Be aware that concrete for this Project may contain slag or flyash cement which results in delay of concrete set and onset of bleeding.
 - .3 Screed surface to an even, level, or sloped surface, to elevations indicated on Drawings or required for specified finishes or concrete toppings.
 - .4 Float surfaces by means of power or hand float when concrete has hardened sufficiently for worker to leave only slight footprint on surface, taking care to avoid bringing bleed water and fines to surface by overfloating.
 - .5 Do not commence finishing of slab surfaces while bleed water is on surface, or add water or cement to surface.
 - .6 Finish slab surfaces to match sample finishes approved by the Design Team.
 - .7 Unless otherwise required by the design, finish slab surfaces to provide a hard, smooth, dense steel trowelled surface, free of ridges or depressions, trowel marks or blemishes, and of uniform appearance.
 - .8 Non-Slip Floor Surfaces:
 - .1 Provide swirled finish of texture acceptable to Consultant by spin troweling final steel troweling.
- .2 Control Joints in Slabs-on-Grade
 - .1 Sawcut control joints in slabs-on-grade along column grid lines and additionally to result in a maximum spacing of 30 times slab thickness, except where concrete mix incorporates 40 mm [1 ½"] aggregate proportioned to provide maximum bulk density in accordance with Clause 2.1.3.1.1, sawcut intermediate control joints to result in a maximum spacing of 40 times slab thickness.
 - .2 Commence sawcutting before slab temperature starts to fall and as soon as concrete may be cut without dislodging aggregate but within 18 hours of placement.
 - .3 Sawcut unreinforced slabs to a depth of 0.25 slab thickness, fibre reinforced slabs to 0.33 slab thickness.
 - .4 Grind edges of sawcuts to remove burrs but do not bevel or chamfer joint edges.

- .5 Keep construction traffic which may erode concrete at edges of sawcuts off floor until joints have been filled and joint filler has cured.
- .3 Formed Surfaces
 - .1 Treat formed surfaces in accordance with CSA A23.1/A23.2, Clauses 24.1 and 24.2, and as additionally specified herein

- .1 Finish vertical surfaces to receive waterproofing membrane smooth with no ridges or depressions.
- .2 Finish surfaces to receive a hot-applied rubberized asphalt membrane smooth with no ridges or depressions, using "Sack-Rubbed Finish" in accordance with CSA A23.1/A23.2, Clause 24.3.4.4 including cleaning surfaces of dust, oil, grease, chemical films, or other coatings or contaminants, and loose or spalled material, repairing any honeycombed areas and removing any projecting mortar or concrete fins.
- .3 Finish surfaces to receive crystalline waterproofing smooth with no ridges or depressions, using "Sack-Rubbed Finish" in accordance with CSA A23.1/A23.2, Clause 24.3.4.4 including cleaning surfaces of dust, oil, grease, chemical fills, or other coatings or containments, and loose or spalled material, repairing any honeycombed areas and removing any projecting mortar or concrete fins.
- .4 Repair, re-rub, regrind or otherwise correct concrete surfaces to approval of Consultant and trade applying waterproofing or adhering finish to surface.
- .5 Plugs at Recessed Ties
 - .1 Clean tie holes to remove all foreign matter.
 - .2 Coat plugs by dipping in adhesive and insert in hole.
 - .3 Remove excess adhesive immediately with thinner recommended by manufacturer to ensure that concrete surface is not stained or blemished in any way.
- .6 Elastomeric Membrane
 - .1 Where fluid elastomeric waterproofing membrane turns up vertical surfaces, provide light sandblast finish.
- .4 Curb Edging
 - .1 Finish external corners of curbs rounded, smooth and straight without undulations.
- .5 Stair Tread Non-Slip Inserts:
 - .1 Install one non-slip insert specified in Paragraph 2.2.15 at each tread and landing, place 40 mm [1 1/2"] from edge of nosings and extend for full width of nosings except for 80 mm [3"] at each end.
 - .2 Set inserts in prepared grooves, secured with waterproof adhesive and with top set 1 mm [0.04"] above treads.
- .6 Finishing Architectural Concrete
 - .1 Perform finishing of Architectural Concrete surfaces only by competent personnel with demonstrated experience in finishing of Architectural Concrete surfaces.
 - .2 Ensure that tools and handling equipment are completely clear of rust, chemicals, contaminants, hardened concrete and other foreign material which would cause discolouring or blemishes.

- .3 Finish plastic Architectural Concrete surfaces in accordance with Article 1.4.2.
- .4 When required by the design, sandblast Architectural Concrete surfaces specified to medium texture evenly over each surface and consistently throughout Project to match approved mock-up.
 - .1 Protect other surfaces and equipment against damage resulting from sandblasting operations.
 - .2 Use material that will minimize environmental contamination.

.5 When required by the design, bush-hammer Architectural Concrete surfaces specified to medium texture evenly over each surface and consistently throughout Project to match approved mock-up. Take care to avoid breaking external corners of bush-hammered concrete.

.1 Remove debris from finishing operations.

3.6 BONDED CONCRETE TOPPINGS

- .1 Conform to CSA A23.1/A23.2, Clause 23, and as additionally specified herein.
- .2 Be aware that thickness of topping required by the design is the nominal value and that actual thickness will vary depending on cambers or deflections of supporting framing.
- .3 Place each section of bonded topping in one continuous operation taking special precautions against plastic shrinkage cracking, whenever rapid drying of the topping may occur, in accordance with CSA A23.1/A23.2, Clause 21.
- .4 Control Joints in Topping
 - .1 Provide control joints for topping directly over construction joints in base slab.
 - .2 Provide control joints in toppings over precast slabs, on centre lines of supporting members, and at 5 m [16'-0"] maximum spacing parallel to span of slabs.
 - .3 In all other respects comply with sawcut control joint requirements for slabs-on-grade.

3.7 CURING AND SEALING

- .1 Cure concrete in accordance with CSA A23.1/A23.2, Clause 21 and as specified herein.
- .2 Be aware that proper curing is essential for durable concrete, and that failure to cure properly may result in accelerated deterioration including scaling, dusting and spalling.
- .3 Curing Compound Method:
 - .1 Use curing and sealing compound specified in Clause 2.1.10 except:
 - .1 On surfaces specified to receive epoxy or **similar** paint finish.
 - .2 On surfaces specified to receive architectural finishes which require adhesives which are incompatible with the curing compound.
 - .3 Air-entrained concrete for exterior slabs and sidewalks placed between October 1 and April 1.
 - .2 Use specified water-based compound except that when temperature is below 5°C [40°F] use solvent-based compound acceptable to Consultant.
 - .3 Apply curing and sealing compound in strict accordance with manufacturer's instructions, ensuring complete and adequate coverage of surface.
- .4 Plastic Film Method
 - .1 Where curing compound method cannot be used, and surfaces are not exposed to freezing and thawing or deicing chemicals, cure finished slab surfaces as follows:

- .1 Cover with 0.102 mm [4 mil] thick polyethylene sheets, lap edges 100 mm [4"] minimum and seal laps.
- .2 Leave in place for the "Basic Curing Period" in accordance with CSA A23.1/A23.2, Clause 21.1.2, but in no case for less than 3 days generally, except not less than 7 days for exposed warehouse and industrial floor surfaces.

3.8 PROTECTION

- .1 Protect floor slabs and other concrete surfaces on which toppings or finishes are to be applied, from grease, oil, dirt and other materials or compounds which would impair bond of toppings or finish materials.
- .2 Protect Architectural Concrete surfaces and surfaces exposed to view or painted from grease, oil, dirt and other materials or compounds which would create surface blemishes or impair bond of finishes.

3.9 GROUTING FOR STEEL MEMBERS

- .1 Cooperate with Sections that supply and set base and bearing plates in scheduling and completing grouting.
- .2 Provide and place grout under column base and beam bearing plates, and additionally as required by the design.
- .3 Use non-shrink and shrinkage-compensating grouts only when grout will be contained against expansion and self-disintegration, and in strict accordance with manufacturer's instructions.
- .4 Do not use grout with fluid or flowable consistency at beam bearing plates unless otherwise indicated, or approved by the Design Team.
- .5 Dampen concrete surfaces immediately before installing grout.
- .6 Install grout in a manner to ensure positive bearing for full area of steel base or bearing plate with no voids.
- .7 Slope grout beyond edge of plate at 45 degrees unless otherwise required by the design.
- .8 Provide same environmental protection and curing as specified for concrete.

3.10 SITE CLEAN UP

- .1 Remove excess materials including waste hardened concrete, mock-up panels, sample areas, and other debris resulting from Work of this Section from site and leave premises in a condition acceptable to Consultant.

3.11 DEFECTIVE WORK

- .1 Failure of materials or workmanship to meet requirements of the Project Agreement including failure to meet specified 28 day concrete strength, variations in hardened surface in excess of specified tolerances, marked, disfigured or honeycombed surfaces which do not meet surface finish requirements and cannot be repaired by approved methods, and failure of products to meet specified performance requirements, will be considered defective Work performed by this Section.
- .2 Repair or replace defective Work as directed by the Sponsor.
- .3 Pay for additional inspection and testing, redesign, corrective measures, and related expenses required to correct defective Work of this Section

END OF SECTION

PART 1

GENERAL

1.1 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-25.20-[95], Surface Sealer for Floors.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature and data sheets for concrete finishes and include product characteristics, performance criteria, physical size, finish and limitations.
 - .1 Provide two copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements. WHMIS MSDS acceptable to Labour Canada and Health and Welfare Canada for concrete floor treatment materials. Indicate VOC content in g/L.
 - .2 Include application instructions for concrete floor treatment.

1.3 ENVIRONMENTAL REQUIREMENTS

- .1 Temporary lighting:
 - .1 Minimum 1200 W light source, placed 2.5 m above floor surface, for each 40 sq m of floor being treated.
- .2 Electrical power:
 - .1 Provide sufficient electrical power to operate equipment normally used during construction.
- .3 Work area:
 - .1 Make work area water tight protected against rain and detrimental weather conditions.
- .4 Temperature:
 - .1 Maintain ambient temperature of not less than 10 degrees C from 7 days before installation to at least 48 hours after completion of work and maintain relative humidity not higher than 40% during same period.
- .5 Moisture:
 - .1 Ensure concrete substrate is within moisture limits prescribed by flooring manufacturer.

- .6 Safety:
 - .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.

- .7 Ventilation:
 - .1 Ventilate area of work by use of approved portable supply and exhaust fans.
 - .2 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.
 - .3 Provide continuous ventilation during and after coating application.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements:
 - .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .3 Packaging Waste Management: 01 74 21 - Construction/Demolition Waste Management and Disposal.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- .1 Product quality and quality of work in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Submit written declaration that components used are compatible and will not adversely affect finished flooring products and their installation adhesives.

2.2 CHEMICAL HARDENERS

- .1 Refer to Section 03 35 05 Concrete Floor Hardeners.

2.3 SEALING COMPOUNDS

- .1 Surface sealer: to CAN/CGSB-25.20, Type 1 - solvent-based, clear.
- .2 Sealants: maximum VOC limit 250 g/L.
- .3 Surface sealers are not manufactured or formulated with hexavalent chromium and their compounds.

- .4 Select compatible material for curing compounds specified in the Section and chemical hardeners specified in Section 03 35 05 - Concrete Floor Hardening, when chemical hardener is applied at a later date in schedule.
- .5 Seal surfaces not receiving chemical hardener.

2.4 CURING COMPOUNDS

- .1 Select low VOC, curing compounds.

2.5 MIXES

- .1 Mixing ratios in accordance with manufacturer's written instructions.

PART 3 EXECUTION

3.1 EXAMINATION

- .1 Verify that substrate surfaces are ready to receive work and elevations are as recommended by manufacturer's written instructions.

3.2 APPLICATION

- .1 Apply concrete finishing floor hardener in accordance with manufacturer's written instructions.
- .2 After floor treatment is dry, seal control joints and joints at junction with vertical surfaces with sealant.
- .3 Apply floor treatment in accordance with Sealer manufacturer's written instructions.
- .4 Clean over spray. Clean sealant from adjacent surfaces.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

3.4 PROTECTION

- .1 Protect finished installation in accordance with manufacturer's instructions.

END OF SECTION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1. Division One - General Requirements is part of this Section and shall apply as if repeated here.

1.2 REFERENCED STANDARDS

1. Do masonry mortar and grout work in accordance with latest CSA A179-M1994 edition except where specified otherwise.

1.3 SAMPLES

1. Samples of coloured mortar will be evaluated when built into mock-up wall. Three colours to be built into mock-up for exterior masonry mock-up for the Architect's review.

PART 2 PRODUCTS

2.1 MATERIALS

1. Masonry Cement shall conform to requirements of CAN/CSA-A8-M93, Masonry Cement.
2. Sand: Conform to requirements of C.S.A. A82.56-M1976 "Aggregate for Masonry Mortar".
3. Water: Potable, free from injurious or other substances detrimental to mortar, or will cause efflorescence.
4. Portland Cement: Conforming to CAN/CSA-A5-M88, white or grey as indicated.
5. Hydrated Lime: Conforming to ASTM C207-79 "Specifications for Hydrated Lime for Masonry Purpose" Type S. Hydrated lime shall be "soaked" 48 hours before paste is mixed with sand.
6. Mortar Colour: Pigment type as supplied by Harcott Pigment Ltd. or approved equal(s) (Davis Colors) colour to match masonry. Allow for three (4) colours at exterior areas where three (4) colours of masonry are used. Colour admixture not to exceed 10% of cement content by mass.
7. Use of any admixture to meet cold weather requirements is expressly forbidden.
8. 1:1:6 Masonry Mortar for Clay Brick: equal to 1:1:6 Type "N" mortar.

2.2 MORTAR TYPES

1. Mortar types shall be as designated and conform to latest C.S.A. A179-M1994 edition, "Mortar and Grout for Unit Masonry".

2. The following mortar types shall be used:
 1. Type S: For masonry foundation walls and masonry in contact with earth
 2. Type S: For interior block unit masonry above grade unless noted otherwise on plans.
 3. 1:1:6 Type "N" mortar: For clay brick masonry exterior (exposed) block veneer, quarried stone and glazed block
 4. Type S: For structurally reinforced masonry walls.

2.3 GROUT

1. To current CSA A179-M1994 standard.
2. The following grout types shall be used:

<u>Type</u>	<u>Fine Grout</u>	<u>Coarse Grout</u>
Portland Cement - cu. ft.	1	1
Hydrated Lime (optional cu.ft.)	1/10	1/10
Damp Loose Sand - cu. ft.	2¼ to 3	2¼ to 3
Pea Gravel - cu. ft.	-----	1 to 2

Water - only enough to give creamy pouring consistency. Use a 1 cu. ft. (or metric box) in measuring portions for use in bond beams, lintels, and vertical cells.

3. Low lift grout as per structural drawings.
4. Grout Masonry components where indicated.

2.4 PARGING

1. Parging Mortar: Type M to latest CSA A179-M1994.

PART 3 EXECUTION

3.1 MIXING

1. Mortar used in the construction of unit masonry walls shall conform to C.S.A. A179-M1994.
2. Material proportions, acceptable compressive strengths, locations of use, incorporation of admixtures included in C.S.A. A-179-M1994, shall be modified as

may be required by Jurisdictional Authorities.

3. Mix premixed 1:1:6 mortar as in strict conformance with directions provided by the manufacturer.
4. All grouting to conform to the requirements of CSA Standard CAN3-A371-M84.

3.2 MIXING OF COLOURED MORTAR

1. Premix colouring agents with dry cement in large batches (for best control) in strict accordance with pigment manufacturer's instructions, accurately measured to ensure constant and even colour of mortar throughout the job. Submit mortar colour "recipe" in operations and maintenance binders.
2. Maintain sufficient mixers on job site, one for regular mortar and one for each coloured mortar exclusively.
3. Three colours of mortar at exterior masonry may be selected by Architect at areas where three colours of masonry are used. Colours as selected by Architect.

3.3 TESTING

1. Testing of mortar materials will be carried out by testing laboratory designated by Architect.
2. Submit samples of sand and water for testing to ensure that mortar will not produce efflorescence.
3. Submit samples of sand and water and premixed mortar for testing to ensure that mortar will not produce efflorescence.
4. Mortar shall be tested in accordance with the requirements of clause 4.4.1 in CSA S304.1-94 and CSA A179-94.
5. Testing shall be completed for each 250 m² of masonry, for each storey.

END OF SECTION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1. Division One - General Requirements are part of this section and shall apply as if repeated here.

1.2 REQUIREMENTS OF REGULATORY AGENCIES

1. Conform to the latest Ontario Building Code, as currently amended and Local Bylaws, except where indicated otherwise on drawings or specified herein. In case of conflict between Codes, the Ontario Building Code will govern.

1.3 STANDARDS

1. Materials, equipment, and practice shall conform to CSA3-S304-04 and CSA-A371-04, Masonry Code of Practice and CAN/CAN/CSA-A82-06 for brick. Brick masonry units must comply to CAN3-A82.2 M78 and concrete masonry units shall comply to CSA A165 Series-14. Brick masonry units must not have a greater Saturation Coefficient than .78 as set by test method CAN3-A82.2 M78 and must meet specifications CAN/CAN/CSA-A82-06 for SW grade FBX type brick. Brick masonry units will be tested once they are delivered to the site and shall not be installed until testing is complete and units have surpassed the tests.
2. Work of this section to comply with "Plain and Reinforced Masonry-Canadian Structural Design Manual" Supplement to the National Building Code of Canada and CSA-A371-94.
3. Ensure fire rated walls, partitions or separations are in accordance with "Fire Performance Ratings Supplement" of the National Building Code of Canada.

1.4 DELIVERY AND STORAGE

1. Stockpile masonry units on platforms or other approved supports to keep units free from ground contact. Prevent staining of masonry units from contact with any material while stored. Secure waterproof covering entirely over each stockpile when masonry work not in progress.
2. Deliver, handle and store masonry units by methods which will guard against soiling or chipping. Protect all holes and reglets from water and ice during freezing weather.
3. Dry out units which fail to meet moisture content limitation during storage on job site and do not lay until tests prove satisfactory.

1.5 SPECIAL PROTECTION

1. Protect exposed masonry corners and projections by methods which will not mar

finished surfaces.

2. Masonry stained or damaged shall be replaced as directed by Architect.
3. Cover tops of all walls with well-secured, approved, non-staining and waterproof material while work is not in progress and until satisfactorily covered by metal deck structure or roof membrane. Cover shall be at least 2'-0" (600 mm) wider than width of wall.
4. In cold weather protect masonry and heat materials as provided in CSA-A371-94 and "Recommended and Guide Specifications for Cold Weather Masonry Construction" available through Ontario Masonry Contractors Association. Maintain dry beds for masonry and use dry masonry units only. Do not wet masonry units in winter.
5. In hot weather, protect freshly laid masonry from drying too rapidly by means of waterproof, non-staining coverings.

1.6 DEFECTS DEFINED

1. In addition to non-compliance with specified requirements or other contract requirements, the following will be considered defects:
 1. shrinkage in individual units and erected work.
 2. spalling.
 3. poor colour of texture blending of units.
 4. surface deterioration, dusting.
 5. discolouration, crumbling and similar deterioration of mortar.
 6. failure of built-in items to remain anchored.
 7. chipped units - any chipped area on exposed surface.

PART 2 PRODUCTS

2.1 MATERIALS

1. Water: Clean, free from salts that will cause efflorescence and other substances detrimental to masonry.
2. Dampproof Coursing: Blueskin TWF by Bakor, ensure membrane is supported on a slope, where there is no support, copper TWF to be installed than Blueskin TWF over top and seal.
3. Sealant: Tremco Dymeric 240 as per Section 07900.
4. Asphalt Emulsion: Conform to CSGB-37-GP-2M.
5. Joint Filler: purpose-made elastomer to ASTM D. 2240-81 of size and shape.

6. Control Joint: "RS Series – Rubber Control Joint", sizing to suit masonry widths as required as manufactured by Hohmann & Barnard Inc. or approved equal.

11. Joint Reinforcement:
 1. Below Grade Walls: 3/16" (4.7mm) diameter ladder design stainless steel joint reinforcement at all below grade block walls by Hohmann & Barnard Inc. or Blok-Lok Ltd.
 2. Interior Walls: 9 ga. (3.66mm) ladder design mill galvanized joint reinforcement at all interior walls as manufactured by Hohmann & Barnard Inc. or Blok-Lok Ltd.
 3. Sizes: 2" (50 mm) less than wall thickness.
 1. Rod Size: Side rods 3/16" (4.7mm) and cross rods 3/16" (4.7mm) unless noted otherwise.
 2. Provide prefabricated tees and corners at all locations.
 3. Masonry Piers: 2" (50 mm) wide stainless-steel ladder masonry reinforcing. The brick shall be tied back to the block with stainless steel "Zee" ties.
 4. Nailing Inserts: 26-gauge hot dipped galvanized steel 1" x 2 1/4" (50 mm x 55 mm) all metal wall plugs.
 5. Galvanizing: In conformance with ASTM A153 Class B2.
 6. Masonry Angle Support / Shelf Angles & other angle supports:
Fero Fast (Fero Angle Support Technology)
Hot dipped galvanized with angle support depth to match / work with insulation thickness required.

12. Concrete Masonry Units: Standard Weight and Lightweight Units
 1. The following concrete masonry units are to be Carboclave masonry units as manufactured by Boehmers or Day & Campbell:
 2. Standard Weight Concrete Masonry Units: to CSA-A165.1.
 1. Classification: H/15/A/M.
 2. Size: CCMPA metric modular. Sizes as indicated on the drawings.
 3. Colour: To be confirmed
 3. Lightweight Concrete Masonry Units: to CSA-A165.1.
 1. Classification: H/15/C/M.
 2. Size: CCMPA metric modular. Sizes as indicated on the drawings

3. Colour: To be confirmed
4. Solid Concrete Masonry Units: to CSA-A165.1.
 1. Classification: S/15/A/M.
 2. Size: CCMPA metric modular. Sizes as indicated on the drawings
 3. Colour: To be confirmed
5. Bull Nose Cornering: For concrete block (other than architectural concrete block) all vertical exposed outside corners and door jambs shall have a 1" (25 mm) radius and window jambs shall be pencil round radius. Provide square edge block for first course above finished floor and pencil round edge from the base course on. Round off the edge of first block course above the top of the base to match bull-nosed edge of other courses.
13. Building Paper Felt: 30 lb. building paper felt, (13600 g.).
14. Grouting and Steel Reinforcement for Vertical Reinforced Masonry (VRM):
 1. Grouting and reinforcement steel to be supplied and installed by this section. All materials and installations to conform to structural drawings and specifications. Provide a mechanical device to hold vertical reinforcement at centres of block cores.

PART 3 EXECUTION

3.1 ERECTION

1. General Workmanship
 1. Install unit masonry work in complete conformance to governing requirements of Jurisdictional Authorities.
 2. Lay face work from face side. Perform work by skilled mechanics according to best standard practice.
 3. Lay masonry level, true to line, square, plumb, and as detailed. Vertical joints in perpendicular line.
 4. Distribute exposed masonry of varying colours, tones and textures, evenly over wall surface to avoid patches and streaks and to produce a homogeneous blend. Avoid using units that are too contrasting in appearance for satisfactory blending.
 5. Chipped or blemished units may only be used where concealed. Defective and broken units shall be rejected.
 6. Make joints uniform in size and tool to match sample joints. Unless

specified or indicated otherwise tool all interior joints whether or not they are behind cabinets or fitments or drywall. Close all cracks and crevices. Strike off flush all joints in unparged masonry covered by earth. Press in flush joints at exterior cavity side of inner block wythe so no voids occur. No mortar shall protrude from joints on wall surfaces to which insulation and waterproofing are to be applied. Rake out joints at juncture of masonry walls and columns on exterior and interior, as necessary to permit caulking detailed or specified, in walls to be plastered upon directly to provide bond, and where otherwise noted on drawings.

7. Fill all joints completely with mortar including webs. Buttering corners of units, throwing mortar scraping into joints, slushing, deep or excessive furrowing of bed joints not permitted. Do not shift or tap units after mortar has taken initial set. When work is resumed on walls previously laid, and which are either partially or totally set, remove all loose brick and mortar from top and adjoining surfaces. Remove mortar completely when masonry is removed and replace with new.
8. Brace walls and piers during construction until structure provides sufficient lateral support.
9. Extend masonry walls to underside of structure above unless indicated otherwise. Cut and fit masonry work as required. Install anchors at top of masonry to provide lateral support, to Structural Consultant's approval. Fill space at block walls at underside of steel deck solid to conform to code and at all interior partitions and at fire separations. Install formed metal closures where top of block and bottom of metal deck is exposed.
10. Build in steel lintels, base plates and wall plates, as specified in Division 5 and reinforced concrete lintels as specified in Division 3. Set steel lintels in a bed of mortar. Install steel reinforcement and grouting as noted and detailed on structural drawings.
11. Install hollow metal door frames with lintels where specified in masonry walls, in accordance with manufacturer's instructions to present a rigid, true, plumb installation.
12. Note: Completely fill frames with mortar. Keep faces of frames free of mortar during installation and leave clean. Maintain protective coverings.
13. Build in water stops, bellows, bent closures, sheet metal flashings, accessories, access panels, and anchors required for frames, guards, sills, etc., and as otherwise provided in other sections. Cooperate in the setting and aligning of this work.
14. Work shall include damp-proof coursing and membrane reinforced flashing at base flashing as detailed.

15. Consult other trades and make necessary provisions to permit the installation of their work in a manner to avoid cutting, patching and fitting.
16. Supply and locate dovetail anchor slots in time for placing in concrete formwork at locations where masonry walls abut concrete and where anchorage is required. Install slots at 2'-0" (600 mm) on centre horizontally and install joint reinforcement ties at 16" o.c. vertically.
17. Chases shall be built, not cut.
18. Bearings and piers required for structural members shall be constructed as indicated on structural drawings.

2. Concrete Masonry Workmanship

1. Lay out work to minimize cutting of units.
2. Use power driven abrasive disc for coping units and splitting units, or for cutting units to accommodate flush mounted electrical outlets, grilles, pipes, etc. Leave 1/8" (3 mm) clearance between edge of item and opening in masonry unit.
3. Use solid unit where bonding is required if webs of hollow blocks do not align one over the other.
4. Concrete masonry units will be rejected if face blemishes, smears or slicks appear whether wall is painted or not. Do not use chipped block where exposed to view.
5. **Keep all cavity spaces free of mortar in cavity walls.**
6. Use blocks with 1" (25 mm) radius vertical edges for external corners including door jambs and pencil round at window jambs. At bottom block course where quarry tile base is to be installed, install square edge outer corner block at first course for quarry tile installation and grind block external corner edge round to 1" (25 mm) radius above quarry tile base to top of first course.
7. Where beams or lintels bear on concrete block walls, the blocks under the bearing shall be solid or filled with concrete for a depth of two courses and a width of 32" (800 mm) or as noted otherwise.
8. Where joists bear on hollow masonry walls provide minimum 5½" (140 mm) solid masonry under joist bearing, where concealed masonry may be brick.
9. Provide reinforced block lintels (where steel lintels are not indicated on Structural drawings):

1. over square head openings where noted and at all other locations as detailed on structural and architectural drawings.
 2. over openings not exceeding 5'-0" (1500 mm) where no other support is shown, fill lintels solid with min. 3000 p.s.i. (21 m.p.a.) concrete and reinforce with min. two #5 steel bars; Note: Conform to structural drawings for bond beam reinforcing and concrete detailing
 3. cast lintels at least 7 days before setting; provide bearing at ends as detailed on structural drawings min. 8" (200 mm).
 1. Where walls 12" (300 mm) and thicker have exposed face on both sides, lay block using two units in wall thickness.
 2. Exposed joints shall be concave unless indicated otherwise.
 3. Use lightweight concrete units for all exposed interior walls.
 4. Provide all structural work at masonry walls as indicated on structural drawings.
3. Damp-proof Course
1. Lay dampproof course over tops of all foundation walls. Lap strips a minimum of 4" (100 mm) at junction and angles and install sealant to secure joints.
 2. Install dampproof course at floor level for all interior partition walls on floor slabs on grade
4. Shrinkage Control Joints
1. Work shall include shrinkage control joints in wall constructed entirely or partially of masonry units manufactured of concrete:
 1. At all locations indicated on drawings.
 2. Provide additional interior control joints at junction of walls and columns at maximum horizontal spacing not exceeding 20'-0" (6 m) in runs of walls where no openings occur at all locations where control joints are not indicated. Obtain Architect's approval of additional control joints prior to proceeding. Carry joints from support of wall to top of wall at structure above.
 2. Control joints shall be constructed as detailed and shall provide a

complete vertical separation through the wall. Joints shall be a nominal 3/8" (10 mm) wide.

3. Form control joints for interior block masonry walls by placing a layer of building paper up the height of the wall separating block on one side from adjacent block or column. Fill void between blocks with mortar. Rake joints back 3/8" (10 mm). Building paper shall not be exposed.
4. Form shrinkage control joints in exterior masonry walls by placing premoulded joint filler in continuous vertical joint, full height of wall. Leave pre-moulded filler back from face of wall to allow space for joint filler and sealant under Section 07900.

5. Joint Reinforcement

1. Reinforce all walls and partitions of concrete masonry units, solid and cavity, and single wythe block walls with joint reinforcement placed in horizontal joints at alternate courses 16" (400 mm) unless indicated otherwise. DO NOT extend joint reinforcement through control joints. Overlap all joints a minimum 8" (200 mm).
2. Where openings occur in these walls, place joint reinforcement in joints at every 8" (200 mm) course, within 32" (800 mm) above and below openings for a distance of 24" (600 mm) beyond opening.
3. Reinforce all masonry walls where thickness is reduced by a column or chase with a 48" (1200 mm) length of joint reinforcement placed in horizontal joints at 16" (400 mm) centres. Centre reinforcement on column or chase.
4. Install prefabricated corner sections in reinforced joints at corners and prefabricated tee sections at reinforced joints where partitions intersect other partitions or walls, unless lateral support is being provided or walls or partitions are erected on a different foundation.
5. Where intersecting walls are erected on different foundations and lateral support is not required, provide straight joint full height of wall with masonry ties at every second joint. Rake joint 3/8" (10 mm).
6. All exterior wall reinforcing to be stainless two wire ladder type with stainless steel Fero Block Shear Connector Tie with V-Tie leg. All interior partition wall reinforcing, and anchors mill galvanizing ladder design
7. Provide structural work as detailed on structural drawings.
8. Place masonry reinforcement according to CSA-S304-94.

6. Bonding

1. Wythes of masonry walls shall be bonded by means specified and/or shown on drawings, or as otherwise required by authorities having jurisdiction.
2. Use running bond unless otherwise indicated. Specialty bonding, banding, stack bonding, soldier coursing to be as indicated on drawings. Use stack bond where indicated on drawings.
3. Cavity wall wythes shall be bonded with joint reinforcement at 16" (400 mm) o.c. and staggered cross members of reinforcement at alternate courses.

7. Built-in Work

1. Set all loose and miscellaneous items of steel and iron, including all isolated beams, lintels, shelf angles, bearing plates, ventilators and all other loose iron and steel work specified for erection or setting by others when built into masonry work. These items shall be grouted in place using cement mortar.
2. Install 30-pound (13600 g) building paper felt under steel lintel bearing on one side only. Locate this bond breaker on the same as the control joint occurs.
3. Supply and install all vertical steel reinforcement and grouting indicated on the structural drawings. Grouting to be installed using at maximum 5'-0" lifts (1525 mm) using low lift grout.

3.2 POINTING AND CLEANING

1. Point using concave joint at all areas except at single scored block which shall be tooled to match square score in block and provide other joint finishes where directed by Architect.
2. Point all holes, except weepers in masonry. Cut out all defective joints and repoint them with mortar.
3. Clean exposed masonry to satisfaction of Architect after mortar has hardened.
4. Wire brushes or abrasives shall not be used for cleaning.
5. Use of muriatic acid shall not be used for cleaning.
6. Leave masonry clean and free of mortar daubs and with tight mortar joints. Submit data for Architect's approval of chemical cleaner to be used to remove excess mortar on bricks.

7. Rinse masonry surfaces with water immediately after cleaning.
8. Remove and replace defective material at Architect's direction and at no cost to the Owner.
9. Clean up masonry debris and remove from site.

END OF SECTION

PART 1 GENERAL

1. GENERAL REQUIREMENTS

1. Division One, General Requirements, is a part of this section and shall apply as if repeated here.

2. SHOP DRAWINGS

1. Submit shop drawings in electronic PDF format.
2. Submit shop drawings for review by the Consultant prior to fabrication.
3. Design Criteria-Applicable Standards:
 1. All standards in accordance with latest issue.
 2. CSA Standard CAN3-S16.1-M, "Steel Structures for Buildings" Limit States Design.
 3. CSA Standard W59, "Welded Steel Construction" (Metal Arc Welding).
 4. CSA Standard W.55.2, "Resistance Welding Practice."
 5. CSA Standard W55.3, "Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings."
 6. CSA Standard W.47, "Certification of Companies for Fusion Welding of Steel Structures."
 7. CSA Standard S.136, "Cold Formed Steel Structural Members".
 8. Ontario Building Code.
4. Certificates:
 1. Provide a certificate signed and sealed by the licensed/registered professional engineer responsible for the stair designs and the detailed steel connections (including guards) stating that the stairs and connections have been designed, detailed, and fabricated in accordance with the applicable standards.
 2. Certification must bear the original seal and signature of the engineer and be dated. Photocopies are not acceptable.
5. Clearly indicate construction details, sizes of steel sections, thickness or

gauge of steel sheet, connections, joints, method of anchorage, number of anchors, supports, reinforcement and accessories. Confirm all dimensions on site.

3. STANDARDS

1. Materials and workmanship shall conform to the requirements of the Latest Ontario Building Code, as currently amended.
2. Do welding work to CSA W59, unless specified otherwise. Welders to qualify under CSA W47, CSA 55.2 and CSA W55.3.
3. Design of steel fabrications, unit stresses and workmanship to conform to CSA CAN3-S16 1-M.

4. DESIGN CRITERIA

1. Design stair: landing construction; guards and railings and connections to conform to the Ontario Building Code.
2. Design detail and fabricate in general to CSA CAN3-S16 1-M.

5. QUALITY ASSURANCE

1. WELDING APPLICABLE STANDARDS:

1. CSA Standard W59, "Welded Steel Construction" (Metal Arc Welding).
2. CSA Standard W.55.2, "Resistance Welding Practice."
3. CSA Standard W55.3, "Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings."
4. CSA Standard W.47, "Certification of Companies for Fusion Welding of Steel Structures."

2. QUALITY ASSURANCE

1. Fabrication and erection of all components to be by companies holding current C.W.B. Certification as Division 1 or Division 2.1. All welding by welders holding current certification for the required welding position.

6. SCOPE

1. Provide all miscellaneous steel angles, plates, lintels, etc., indicated on the

architectural drawings & not indicated on the structural drawings or where noted on the structural drawings by others. Size according to loads, set plumb and true and securely fix. Continuously weld and grind smooth exposed connections. Others may be welded or bolted.

2. Provide all additional miscellaneous steel items as required to complete the above work.
3. Provide all miscellaneous metal work required by the work of other Trades. The General Contractor shall coordinate the work of this section with all other Trades for provision of miscellaneous metal work required but not provided by others.

PART 2 PRODUCTS

1. MATERIALS

1. Ferrous Metals:
 1. Unless otherwise indicated, hot rolled mild steel in .15% to .25% carbon range.
 2. Steel sections and plate: CSA G40.21-/M1987, minimum 260W grade.
 3. Square steel tube: CSA G40.21-/M1987, Grade 350W.
 4. Steel pipe: ASTM A53-76, Type E, Grade A.
 5. Sheet Steel: hot dip galvanized, cold rolled, with stretcher level degree of flatness to ASTM A526; zinc coating designation Z275.
2. Aluminum: CSA HA Series - M1980 for aluminum and aluminum alloys, Alcan 50S Alloy.
3. Prime Paint: Oil alkyd type (shop coat) conforming to CGSB-1-GP-40M. Colour to be grey.
4. Expansion Joints: as specified.
5. Welding Materials: CSA W59-1984.
6. Bituminous Enamel: Alkali resistant asphaltic coating conforming to CGSB1-GP-108M.
7. Non-shrink Grout: Por-Rok by Hallemite Products Ltd., or SET 15 Minute Anchoring Cement by SET Products Ltd.

8. Galvanized Touch-Up Paint: Zinc rich, Galvafrid by W.R. Meddows of Canada Ltd. or approved equal.
9. Hot Dipped Galvanizing: conform to CSA G164-M1981.
10. Bolts and Anchor Bolts: to ASTM A307-82a.
11. Stainless Steel:
 1. To have brushed finish, Type 304 finish to be ornamental grade AISI No.4.

2. FABRICATION - GENERAL

1. Fabricate components in the shop in largest size practicable to minimize field jointing.
2. Fabricate components square, straight, true, free from warpage and other defects. Accurately cut, machine file and fit joints, corners, copes and mitres.
3. Reinforce fabricated components to safely withstand expected loads.
4. Make joints in built-up sections with hairline joints in least conspicuous locations and manner.
5. Make allowance for thermal expansion and contraction when fabricating exterior work.
6. Joints shall be welded unless otherwise indicated and unless details of construction do not permit welding. Exposed welds shall be continuous and shall be ground smooth.
7. Close exposed open ends of tubular members with welded on steel plugs.
8. Where work of other Sections is to be attached to work of this section, prepare work by drilling and tapping holes, as required to facilitate installation of such other work.
9. Work of this Section, supplied for installation under other Sections, shall be prepared as required ready for installation by: drilling, countersinking and tapping holes, forming shapes and cutting to required sizes.
10. Grind off mill stampings and fill recessed markings on steel components left exposed to view.

11. Make workmanship of best grade of modern shop and field practice known to recognized manufacturers specializing in this work. Fit joints and intersecting members accurately. Make work in true plumb, true, square, straight, level and accurate to sizes and shapes detailed, free from distortion or defects detrimental to appearance or performance.
 12. Insulate metals where necessary to prevent corrosion due to contact between dissimilar metals and between metals and masonry, concrete or plaster. Use bituminous paint, butyl tape, building paper or other approved means.
 13. Supply all fastenings, anchors and accessories required for fabrication and erection of the work. Make exposed metal fastenings and accessories of same material, texture, colour and finish as base metal on which they occur unless otherwise shown or specified. Keep exposed fastenings to an absolute minimum and inconspicuous, spacing them evenly and setting them out neatly. Make fastenings of permanent type.
 14. Draw mechanical joints to hairline tightness and seal countersunk screws and access holes for locking screws with metal filler where these occur on exposed surface.
5. FINISHES
1. Thoroughly clean steel of loose scale, rust, oil, dirt and other foreign matter. Suitably prepare steel surfaces by power tool cleaning to receive specified finishes.
 2. Grind smooth sharp projections.
 3. Remove oil and grease by solvent cleaning.
 4. Apply coatings in the shop and before assembly. Where size permits, galvanize components after assembly.
 5. Shop apply coat of primer to interior components after fabrication except where galvanized finish and stainless steel is required.
 6. Hot dip galvanize exterior components and other components, where so indicated, after fabrication in accord with requirements of CSA Standard G164-M1981.
 7. Apply coat of bituminous enamel to contact surfaces of metal components in contact with cementitious materials and dissimilar metals.
 8. After erection and installation, thoroughly clean the work and apply field touch up of same formula as shop coat to all damaged or unpainted

surfaces. Work all paint well into all joints, crevices and open spaces.

PART 3 EXECUTION

1. INSTALLATION

1. Install components plumb, square, straight and true to line. Drill, cut and fit as necessary to attach this work to adjoining work.
2. Provide temporary supports and bracing required to position components until they are permanently anchored in place.
3. Securely anchor components in place; unless otherwise indicated, anchor components as follows:
 1. To concrete and solid masonry with expansion shields and bolts.
 2. To hollow construction with toggle bolts.
 3. To thin metal with screws or bolts.
 4. To thick metal with bolts or by welding.
 5. Fill space between railing members and sleeves with non-shrink grout.
 6. To wood with bolts or lag screws.
4. Provide all components required for anchoring. Make anchoring in concealed manner wherever possible. Make exposed fastenings, where approved by Consultant neatly and of same material, colour, texture and finish as base metal on which they occur. Keep exposed fastenings evenly spaced.
5. Dissimilar metals and metals in contact with cementitious elements shall have contact surfaces coated with bituminous paint or be isolated by other means as approved by Consultant.
6. After installation, clean and refinish injured finishes, welds, bolt heads and nuts. Refinish with zinc rich paint or primer to match original finish.

END OF SECTION

PART 1 GENERAL

1. GENERAL REQUIREMENTS

1. Division One, General Requirements, is a part of this section and shall apply as if repeated here.

2. STORAGE

1. Materials shall be protected from damage and kept dry during delivery and while stored at job site.
2. Do not store materials in areas where glazing is not complete or concrete completely dry.

3. STANDARDS

1. Materials and workmanship shall conform to the requirements of the Ontario Building Code as currently amended.

4. SCOPE

1. Provide all miscellaneous rough carpentry as required to complete the Work of this Contract.

PART 2 PRODUCTS

1. MATERIALS

1. Sawn lumber shall be No. 2 spruce, pine or fir of best merchantable lumber, straight and sized, shaped to the correct dimensions from the nominal sizes noted on the drawings and specified herein. Lumber shall be well-seasoned stock, free from large loose resinous knots, shake, waned edges, splits, dry rot or other defects which would impair its strength or durability.
1. Moisture content of all lumber for rough carpentry, at time of building-in, shall not exceed 17%.
2. Wood Preservative: C.C.A. (chromium copper arseniate) by "Wolmanized".
3. Rough Bucks, Battens, Blocking, Framing: Eastern Spruce, Jack Pine or Fir No. 2 or better.
4. Exterior Rough Bucks Batten Blocking, Framing and Plywood and Interior Wood Attached to Masonry or Concrete: Jack Pine No. 2 or better "Wolmanized" pressure treated wood conforming to C.S.A. 081.1-M1983.

Sizes as indicated on drawings and/or as required. All pressure treated lumber shall bear the trademark "Wolmanized" and bear a mark certifying conformance with AWPB Standard LP-2 or LP-22.

5. Fire Retardant Lumber: to be CSA 080.20 DRICON FRT Lumber and plywood distributed by J. Brewer (Canada) Ltd; (519) 621-7701. Sizes as indicated on drawings and/or as required.
6. Grounds, Nailing Strips, Strapping, Furring: Eastern Spruce or Jack Pine Construction Grade allowing 10% to 15% standard grade.
7. Plywood Sheathing: Construction grade and paint grade good one side fir plywood sheathing, exterior type, conforming to C.S.A. 0121-M1978. Square edge or T&G as required.
8. Galvanized Nails and Spikes, Carriage Bolts, Screws and Washers: Hot dipped galvanized nails and spikes for exterior work and mill galvanized for interior work.
9. Nails, Spikes and Staples: To C.S.A. B111-1974, plain finish. Use spiral thread nails.
10. Adhesive: Waterproof wood adhesive.

PART 3 EXECUTION

1. WORKMANSHIP

1. Work shall be executed by skilled mechanics according to best practice, as specified herein and indicated on drawings.
2. Lay out work carefully and to accommodate work of other trades. Accurately cut and fit, erect in proper position, true to dimensions, align, level, square, plumb, adequately brace and secure permanently in place.
3. Bore holes for bolted work true to line and same size as bolts, drive into place for snug fit, use plate or washer to prevent nut from bearing directly on wood, and turn up nuts, bolts and lag screws tight at time of installation and again immediately before being concealed with other work or at completion of work.
4. Give painter sufficient notice so that untreated or unprimed carpentry items or materials shall be primed immediately upon delivery to site.
5. Co-operate with others engaged in work on the building to the end that proper unity of action will assure the orderly progress of the work. Do necessary

boxing and protecting of sills, jambs, corners, and the like. Construct scaffold, ramps, and other temporary staging necessary.

2. WOOD PRESERVATIVE

1. Treat fresh cut ends of pressure-treated Jack Pine with two coats of end preservative.

3. ROUGH HARDWARE

1. Supply rough hardware such as nails, bolts, nuts, washer, screws, clips, strap iron, and hardware for temporary enclosures.

4. ROOF CURBS, BASES AND SUPPORTS

1. Construct pressure treated wood roof curbs for ventilation ducts, fan bases, etc., as detailed or required by other trades. Construct suitable approved pads to receive duct supports. Note tops of all curbs for roof top units shall be a minimum 14" (350 mm) above finished roof surface.

5. ROUGH BUCKS, GROUNDS, BLOCKING, STRAPPING, FURRING

1. Furring, blocking or strapping indicated is not to be regarded as exact or complete. Location and methods of securing these pieces to option of Contractor. Provide adequate nailing.
2. Cut grounds and screeds in long lengths as practical with square ends. Erect to create true, plumb planes and fasten rigidly in place.
3. Provide minimum 2" x 4" (38 mm x 89 mm) blocking as necessary for attachment of base, trim, cabinets, fixtures, hardware, miscellaneous specialties, equipment and the like unless indicated otherwise. Cut ends square and fasten rigidly to building structure.
4. Rough bucks shall be minimum 2" (38 mm) thick wood of width indicated, set straight, true and plumb, braced and fastened securely in place.
5. For general strapping, set treated wood strips vertically spaced 16" (400 mm) on centre, unless otherwise indicated. Shim so faces form a true plane. Provide intermediate horizontal strapping at all joints to wall finishes applied over grounds.

6. FRAMING

1. Frame walls, partitions, roofs, platforms, etc., as indicated. Note: metal

studs supplied and installed under Section 09110.

2. Set wood joists 16" (400 mm) o.c. unless otherwise noted, using a single bottom plate and double top plates. Double studs at openings and triple at corners and partition intersections. Provide one row of horizontal bridging of same material as studs.

7. BLOCKING

1. Provide minimum 2 x 4 (38 mm x 89 mm) blocking or size as required for secure attachment of base, trims, cabinets, fixtures, miscellaneous specialties, equipment etc. and the like unless specified otherwise. Cut ends square and fasten rigidly to building structure. Coordinate blocking requirements with work of sections listed in 1.4 of this section.

8. FIRE RETARDANT WOOD

1. Electric and Telephone Backboards and Panel Boards: Supply and install 19 mm thick backboards and panel boards, fire pressure treated, fir plywood. Consult electrical drawings for locations and requirements. Provide wood strapping as required. Fasten to wall using fasteners and spacing suitable to wall type to provide secure, sturdy installation which will carry equipment load without damaging.

9. WINDOW SILLS

1. Supply and install first layer of plywood (pressure treated at window sills). Second layer, nosing and plastic laminate by Finish Carpentry. Refer to drawings for detail and locations.

END OF SECTION

PART 1 GENERAL

1. GENERAL REQUIREMENTS

1. Division One - General Requirements, is a part of this Section, and shall apply as if repeated here.

2. REFERENCE STANDARDS

1. Standard of finished carpentry, metal work and cabinet work in accordance with the "Architectural Millwork Standards" of the Architectural Woodwork Manufacturers Association of Canada (AWMAC).

3. QUALIFICATIONS

1. The work of this trade shall be executed by a company having adequate equipment and skilled personnel. Refer to Instructions to Bidders for list of Prequalified Trades.

4. SCOPE OF WORK

1. Miscellaneous finish carpentry and installations as required for final fit and finish of all work where not provided by the General Contractor or other Trades.
2. All trims, copings, cappings to ensure a finished installation of all work including transitions between existing and new work.
3. Installation of washroom accessories including Owner supplied items.
4. Installation of hollow metal doors.
5. The General Contractor shall have final determination of the scope of this section and coordinate the scope with the requirements of all other Trades.

5. SHOP DRAWINGS

1. Submit Shop Drawings in electronic PDF format.
2. Before Shop Drawings and fabrication are started, take critical measurements at the site to facilitate installation and fitting of work.
3. Design Criteria - Applicable Standards:
 1. All standards in accordance with latest issue.
 2. Ontario Building Code
4. Certificates:
 1. Provide a certificate signed and sealed by the licensed/registered

professional engineer responsible for the Lobby Ceiling Feature designs and the detailed wood and steel connections stating that the feature and connections have been designed, detailed and fabricated in accordance with the applicable standards.

2. Certificates must bear the original seal and signature of the engineer and be dated. Photocopies are not acceptable.
5. Clearly indicate construction details, sizes and wood and steel sections, thickness or gauge of wood and steel sheet, connections, joints, method of anchorage, number or anchors, supports, reinforcement and accessories. Confirm all dimensions on site.
6. DELIVERY AND STORAGE
 1. Give Painter sufficient notice so that untreated or unpainted carpentry items or materials can be primed immediately upon delivery to site.
 2. No equipment shall be delivered to the site until a portion of the building in which it is to be installed is completely ready for equipment as approved by the Architect.
 3. Store finished work properly and keep under cover both in transit and at site. Finish woodwork shall not be delivered to site until concrete and masonry work has dried out.
 4. Cover all plastic laminate and melamine faces at shop with heavy Kraft Paper.
 5. Check access clearance at site before assembling.
7. SAMPLES
 1. Submit duplicate 12" x 12" (300 mm x 300 mm) samples of each type of panelling and each type of solid wood or plywood to receive stain or natural finish.
 2. Submit duplicate 12" (300 mm) long samples of each type of moulding.
 3. Submit samples of construction methods and all hardware.
8. WARRANTY
 1. The warranty period stipulated in the General Conditions of the Contract shall be extended five (5) years in writing against defects.
9. MOISTURE CONTENT
 1. Finish material to be dried to a uniform maximum moisture content of 12%

for exterior work and 6% to 8% for interior work.

PART 2 PRODUCTS

1. MATERIALS

1. Materials used for finish work shall be sound, free from defects that would mar finished appearance, well seasoned and air dried and of good quality for intended purposes. Wood laminates pressure bonded.
2. Plywoods: shall be rift cut or quarter sawn Oak and/or plain sliced Maple architectural grade "AA" No. 1 Face Grade and shall comply to C.S.A. 0115-M1982, with plywood core, laminated with waterproof adhesive. Plywood shall be good both sides.
3. Hardwoods - Shall be solid selected Oak / Maple Architectural Grade 'AA'. Wood shall be selected for uniform colours and graining when at stained and varnished items. Finger jointed woods will not be accepted.
4. Framing Lumber - No. 2 or better spruce, pine or fir best mercantile lumber.
5. Penetrating Sealer - "Penetrim" by Tremco Mfg. Co. (Canada) Ltd., or "1402" by MacNaughton Brooks Ltd.
6. Painted Hardwood: American Poplar ("White Wood") "C" select grade.
7. Adhesive: As recommended by manufacturer for required application and to conform to C.S.A. 0121-M1978.
8. Nails, Spikes and Staples: To C.S.A. B111-1974, plain finish nails. Use spiral thread nails and barbed staples.
9. Pressure Treated Wood: Conforming to Section 06100, sizes as indicated and detailed. **NOTE:** Warped, twisted, loose or missing knots in wood will not accepted.
10. Exposed fasteners: All exposed fasteners to be stainless steel. At exposed screw locations use stainless steel screws and cup washers.
11. Refer to drawings and details for complete list of materials to be installed.

PART 3 EXECUTION

1. WORKMANSHIP

1. Work shall be executed by mechanics skilled in their respective trade, according to best practice, or specified herein and indicated on drawings.

1. Check job dimensions and conditions and notify the Architect in writing of unacceptable conditions. Do not proceed until remedial instructions are received. Commencement of work will imply acceptance of site conditions and re-working or modification of the work as deemed necessary by the Architect will be done at no extra cost to the Owner.
2. As far as practical, assemble work at the shop and deliver to the job ready for installation. Leave ample allowance for fitting and scribing on the job.
3. Fabricate work square and to the required lines.
4. Lay out work carefully as indicated and to accommodate work of other trades. Accurately cut and fit; erect in proper position true to dimensions. Align, level, square, plumb, adequately brace, and secure permanently in place.
5. Use treated lumber for studs, blocking nailers, furring and other wood permanently installed in building. Brush coat freshly cut ends with two coats of concentrated form of preservative.
6. Recess and conceal fasteners and anchor heads. Fill with matching wood plugs. Set nail heads and fasteners occurring within exposed interior carpentry work.
7. Provide wood members free from bruises, blemishes, mineral marks, knots, shake and other defects and select for uniform colour grain and texture. Machine and hand sand surfaces exposed in the finished work to an even, smooth surface free from defects detrimental to appearance.
8. Provide running members in the maximum lengths obtainable. Provide thickness of members in maximum dressed size of standard lumber. Where thickness of width indicated is not available in hardwoods, use glue laminations to obtain sizes required. Provide unexposed backs of veneers having the same physical characteristics as the face veneer.
9. Give painter sufficient notice so that untreated or unprimed carpentry items or materials can be primed immediately upon delivery to site. No exposed end grain of plywood shall be permitted; edging shall be solid 3/8" (10 mm) wide by thickness of plywood and of same species of wood. Finger jointed edging will not be accepted.
10. Co-operate with others engaged in work on the building to the end that proper unity of action will assure the orderly progress of the work. Do necessary boxing and protecting of sills, jambs, corners and the like. Construct scaffold, ramps, and other temporary staging necessary.

11. Chamfer edges of plastic laminate to avoid chipping.

2. INSTALLATION

1. Deliver Finish Carpentry to the site. Provide units of such sizes as will not present difficulty of entry to the place of installation. Where units are shipped in knock-down forms, provide clear instructions for assembly.
2. Install Finish Carpentry items plumb, square, true, rigid and secure with concealed fastening at exposed areas and with stainless steel screws and cup washers where secured inside of millwork units.

END OF SECTION

1. GENERAL

1. GENERAL REQUIREMENTS

1. Division One, General Requirements is part of this Section and shall apply as if repeated here.

2. PRODUCTS

2.1 INSULATION

.1 Batt and Blanket Mineral Fibre Insulation (Exterior Wall -Stud Cavity):

1. Rockwool ComfortBatt mineral wool semi-rigid batt insulation with flexible edge. Thickness is to fill wall cavity solid unless specified / shown otherwise on wall types.

Typical thicknesses of 92mm – R14.5 and 140mm - R22.5
(provide minimum value of R13 as required to comply with OBC SB-10)

.2 Batt insulation at cavity wall:

1. Rockwool Cavityrock DD rockwool insulation board. 92mm (provide minimum value of R15 continuous insulation as required to comply with OBC SB-10)

.3 Acoustic Sound Batt Insulation (Interior Wall Systems (Stud Cavity) & Sound Proofing Above Ceilings):

1. Rockwool Acoustical Fire Batt (AFB) mineral wool insulation for fire rated assemblies and Rockwool Safe 'n' Sound for non-fire-rated assemblies. Thickness is to fill wall cavity solid unless specified / shown otherwise on wall types.
2. Rockboard 60 with foil face (facing upward into plenum) at sound rated ceiling systems where ceiling spaces are used for plenums.

.4 Curtain Wall Insulated Panel:

Rockwool Curtain Rock mineral fibre insulation with 'R' value of 4.2 / inch. 152 curtain wall framing to receive 114mm (4.5") thick insulation, 190mm curtain wall framing to receive 152mm (6") thick insulation. Other conditions (different size back mullions which create different size sealed metal backpans) to receive insulation to fill entire void of sealed metal backpan from back side of exterior veneer sealed in curtain wall caps to face of back panel infill typical.

- .5 Floor Slab Edges / Termination:
Rockwool Safe mineral fibre insulation to be installed at edge of floor slab / slab termination to back side of vertical curtain plane to fill the remaining installation / deflection void to maintain fire resistance rating of the floor system. Install finish floor cap over & under to hold in place.
- .6 Requests for approved alternative products must include technical information and be submitted not later than 7 days prior to tender closing.

2.2 ACCESSORIES

- .1 Staples: ½" (13 mm) minimum leg.

3. EXECUTION

3.1 INSULATION INSTALLATION

- .1 Install insulation to maintain continuity of thermal protection to building elements and spaces. Insulation to be friction fit between studs, joists or furring members.
- .2 Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.
- .3 Do not compress insulation to fit into spaces.
- .4 Do not install insulation in any part of the building where protection against inclement weather has not yet been provided and where the insulation could thereby be wet or damaged.
- .5 Provide and install supports as required to keep insulation in place at soffits with floor above and around ducts in attic space.
- .6 Keep insulation a min. 3" (75 mm) from heat emitting devices such as recessed light fixtures.

3.2 LOOSE FIBRE INSULATION

- .1 Pack loose mineral wool insulation in crevices around lintels, frames, beams, around ducts at holes and other places where shown or required to minimize air infiltration.
- .2 Pack loose mineral wool into voids around mechanical and electrical pipes and ducts where they pass through non-fire rated wall, floors and

ceilings.

3.3 FIRE RATED MINERAL WOOL INSULATION

- .1 Supply and install mineral wool at fire separations and where indicated on drawings.
- .2 Refer to Section 07270 - Firestopping and Smoke Seals for mineral wool work by that Section.

3.4 SOUND INSULATION

- .1 Fill all cavities full of mineral wool sound insulation where sound insulation is indicated on drawings.
- .2 Sound insulation above acoustic tile ceilings supplied and installed by Section 09500 – Acoustical Treatment as per this Section.

3.5 BATT INSULATION

- .1 Install mineral wool batt insulation at exterior or air/vapour barrier walls, ceiling spaces, between floor joists at perimeter wall locations and all other locations shown on drawings.
- .2 Place batts in close contact with vapour barrier or air/vapour barrier facing the interior.

END OF SECTION

PART 1 GENERAL

1. GENERAL REQUIREMENTS

1. Division One, General Requirements, is a part of this Section and shall apply as if repeated here.

2. WORK INCLUDED

1. Firestopping and smoke seal at all existing and new wall(s) and floor(s). Mechanical and Electrical penetrations shall be by Mechanical and Electrical Contractors where their equipment and materials penetrated rated walls.

3. SAMPLES

1. Submit samples in accordance with Section 01300 - Shop Drawings, Product Data, Samples and Mock-ups.
2. Submit 1'-0" (300 mm) x 1'-0" (300 mm) sample of each actual firestop material proposed for project.

4. QUALITY ASSURANCE

1. Applicator shall be licensed by the manufacturer of fireproofing materials for installing firestopping and smoke seal systems.
2. Submit manufacturer's certification that materials meet or exceed specified requirements.
3. Product manufactured under ULC Follow-up Program. Each container or package shall bear ULC label or listing mark.

5. SHOP DRAWINGS

1. Submit shop drawings and product data in accordance with Section 01300 - Shop Drawings, Product Data, Samples and Mock-ups.
2. Submit shop drawings to show proposed material, reinforcement, anchorage, fastenings and method of installation. Construction details should accurately reflect actual job conditions.
3. Submit manufacturer's product data for materials and prefabricated devices, providing descriptions are sufficient for identification at job site. Include manufacturer's printed instructions for installation.

6. SEQUENCING AND SCHEDULING

1. Sequence work to permit installation of firestopping and smoke seal materials to be installed after adjacent work is complete and before closure of spaces.

7. MUNICIPAL AUTHORITY APPROVAL

1. Discuss firestopping and smoke seal requirements with municipal building inspector to obtain their approval prior to installation. Determine which products and/or procedures will be required to obtain final approval.
2. Submit in writing, prior to commencing installation, full detailed descriptions of materials and methods to be employed for firestopping work to achieve full final approval of authorities having jurisdiction.

PART 2 PRODUCTS

1. MATERIALS

1. Firestopping and smoke seal systems: A/D FIREBARRIER Firestop Systems by A/D Fire Protection Systems Inc., capable of maintaining an effective barrier against flame, smoke and gases in compliance with requirements of CAN4-S115-M85, and not to exceed opening sizes for which they are intended. Other manufacturers shall not be used unless approved in writing (5) days prior to tender closing. Approved Alternate Manufacturer: Tremco Ltd., Fire Stopping Systems and Hilti Firestopping Systems.
2. Mineral Wool Backing Insulation: ULC Labelled, preformed non-combustible material A/D FIREBARRIER Mineral Wool by A/D Fire Protection Systems Inc.
3. Firestopping Sealant: ULC labelled, single component silicone based, A/D Silicone FIREBARRIER Sealant by A/D Fire Protection Systems Inc.
4. Firestopping Seal: ULC labelled, single component water-based seal, A/D FIREBARRIER Seal by A/D Fire Protection Systems Inc.
5. Spray-On Firestopping Sealant: ULC labelled, high performance single component, water-based, elastomeric acrylic firestop sealant, "TREMstop Acrylic SP" (sprayable grade) by Tremco Ltd.
6. Fire resistance rating of installed firestopping assembly not less than the fire resistance rating of surrounding floor and wall assembly as indicated on the drawings.

7. Firestopping system at openings around penetrations for pipes, ductwork, conduit and other mechanical and electrical items requiring sound and vibration control; elastomeric sealant type with mineral wool; do not use a cementitious or rigid seal at such location.
8. Primers: to manufacturer's recommendation for specific material, substrate, and end use.
9. Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.
10. Damming and backup materials, supports and anchoring devices: to manufacturer's recommendations and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.
11. Sealants for vertical joints: non-sagging.
12. Firestopping mortar is not acceptable.

PART 3 EXECUTION

1. EXAMINATION
 1. Examine existing conditions to receive this work prior to submitting shop drawings.
 2. Examine surfaces to receive work of this Section and report any defects which may affect the Work of this Section.
 3. Verify that openings are ready to receive the Work of this Section.
 4. Confirm compatibility of surfaces to receive firestopping and smoke seal materials.
 5. Beginning of installation means acceptance of existing surfaces and substrate.
2. PREPARATION
 1. Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials. Ensure that substrates and surfaces are dry and frost free.
 2. Prepare surfaces in contact with firestopping materials and smoke seals to manufacturer's instructions.
 3. Maintain insulation around pipes and ducts penetrating fire separation.

-
4. Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

3. INSTALLATION

1. Install firestopping and smoke seal material and components in accordance with ULC certification and manufacturer's instructions.
2. Seal holes or voids made through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained. For vertical sections, sealant is required only on the top side of the mineral wool. It is required on both sides for horizontal sections except only one side on '0' hour rated walls.
3. Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.
4. Tool or trowel exposed surfaces to a neat finish.
5. Remove excess compound promptly as work progresses and upon completion.
6. Install firestopping with smoke seal sealant on both sides of all fire rated walls except for '0' hour rated walls where sealants is required continuously only one side of mineral wool backing insulation.

4. INSPECTION

1. Notify architect when ready for inspection and prior to concealing or enclosing firestopping and smoke seal materials and service penetration assemblies.
2. Arrange for final inspection of the work of this Section by firestopping manufacturer and municipal building inspector prior to concealing or enclosing work. Make corrections required.

5. SCHEDULE

1. Fire and smoke seal at all areas where work is indicated on drawings (corridors, mechanical rooms, ceilings, janitor's room, washrooms, changerooms, servery, Library, gymnasium, etc. fire separations), and at locations as follows:
 1. Generally, all locations required by code.

2. Penetrations through fire resistance rated (including 0 hour rated fire separations) masonry and concrete walls (except mechanical and electrical penetrations which will be firestopped by the mechanical and electrical contractors).

3. Top of fire resistance rated masonry and gypsum rated partitions and walls (Includes corridors noted as 0 hr. fire rating)

NOTE: Refer to Architectural drawings for locations of vertical fire separations.

4. Intersection of fire resistance rated masonry.

5. Control and sway joints in fire resistant rated masonry.

6. Penetrations through all floor slabs and fire rated ceilings (except mechanical and electrical penetrations which will be firestopped by the mechanical and electrical contractors).

7. Openings and sleeves installed for future use through fire resistant rated separations.

6. CLEAN-UP

1. Remove excess materials and debris and clean adjacent surfaces immediately after application.

2. Remove temporary dams after initial set of firestopping and smoke seal materials.

7. CERTIFICATION

1. The manufacturer of the firestopping and smoke seal products shall inspect each application on site and certify in writing its fire rating.

2. Costs for manufacturer's site inspection of firestopping and smoke seals application and certification shall be included in this Contractor's base bid.

END OF SECTION

SCOPE OF WORK

COLD APPLIED BUILT UP ROOF

1. Replacement:
 - 1.1 Furnish and install specified roofing and related components to Waterloo Region District School Board, Crestview Public School at all areas where new roof penetrations will be made through the existing roof where shown on drawings.
2. Preparation:
 - 2.1 Removal and disposal of existing roof and related components down to the roof deck.
 - 2.3 Remove all loose Debris from roofing surface.
 - 2.4 Retrofit and upgrade all existing drains and scuppers to establish proper drainage.
3. Installation.
 - 4.1 Prime any new metal or wood components using Tremprime WB that are to receive asphaltic materials.
 - 4.2 Install 0.5" DensDeck Prime into Low Rise Foam Insulation Adhesive.
 - 4.3 Install self adhering AVC membrane and associated primer over existing substrate.
 - 4.4 Build up perimeter wood detail to suit new insulation thickness.
 - 4.5 Install 2 layers of 2.5." Polyisocyanurate into Low Rise Foam Insulation Adhesive.
 - 4.6 Install Cover Board 2" TopRock DD Plus into Low Rise Foam Insulation Adhesive.
 - 4.7 Install ModulR Sumps at all drains. Minimum size to be 8 ft. x 8 ft.
 - 4.8 Install ModulR crickets where required.
 - 4.9 A built up roof membrane – 3 Ply Cold Process
 - 4.10 Install Roofing Membrane as follows:
 - .a Plies: Three
 - .b Ply Type: Composite Felt, Three plies.
 - .c Interply Adhesive: Burmastic Cold Process Adhesive.
 - 4.11 Surfacing: 3/8" Clean round pea gravel, free of all fines, splinters etc. into Cold Process Flood Coat.
4. Specified Flashings and accessories: Install flashings at all roof perimeters, projections, plenum and drains incorporating:
 - 5.1 Reinforced EPDM/SBR Rubber sheet adhered with Elastomeric Bedding Adhesive as per detail drawings.

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2. REFERENCES

1. CSA - Canadian Standards Association
2. CGSB - Canadian General Standards Board
3. ULC - Underwriters Laboratories of Canada
4. ASTM - American Society for Testing and Materials
5. CRCA - Canadian Roofing Contractors' Association
6. OIRCA - Ontario Industrial Roofing Contractors' Association

3. SITE MEETINGS

2. Pre-job meeting
3. Progress meetings
4. Final Inspection Meeting

4. SUBMITTALS

1. Provide product data sheets and material Safety Data Sheets (MSDS) for all products to be used at the site and/or incorporated in the Work.
2. Manufacturer Certificates: Signed by roofing manufacturer verifying that installer is approved, authorized or licensed by manufacturer to install specified Products.
3. Installer Certificates: Signed by installer verifying that they have the specified qualifications described below.
4. Copy of Manufacturer's 20 Year Warranty.
5. Provide if requested, documentation stating membership in the Ontario Roofing Contractors Association.

5. TEST REPORTS

1. Manufacturer Field Inspection Reports: manufacturer's written acceptance of roofing installation based on regular inspections.

6. PROJECT CONTROL

1. Provide to the General Contractor, all supervision, labour, equipment and materials necessary to the orderly, competent, and expeditious completion of the work. Maintain site supervision capable of acting competently on-site instructions issued by the General Contractor and specification.
2. Do not assume that the presence on site of the Owner, General Contractor, Consultant or the Manufacturer's Representative implies acceptance of work completed to date or work in progress.

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3. Retain on site for reference as required, a copy of all specifications, addenda, drawings, written instructions and changes in the Work.
4. Advise the General Contractor of start-up date and alert the General Contractor to any intended or unintended schedule changes.

7. QUALITY CONTROL

1. During the Work, bring to the attention of the General Contractor any condition not expected or not previously identified.
2. Provide the General Contractor and his representative with access to the site for purposes of inspecting the Work.
3. Pay for any extra testing or inspection whereby the Work was found deficient.
4. Correct, at no cost to the Owner, all deficient work in a manner acceptable to the standard of these specifications.
5. Provide daily inspection reports including photographs to the owner at no additional cost.

8. DELIVERY, STORAGE, HANDLING

1. Deliver materials to job site in new, dry, unopened, and clearly marked containers indicating product and manufacturer names.
2. Store materials with attention to moisture and temperature sensitivity of each. Refer to manufacturers' literature and instructions for guidance.
3. Store material so as not to overload structural deck.
4. Secure stored materials against damage from wind, on going work, vandalism, and theft.
5. Handle and apply all materials in accordance with the manufacturer's recommendations. Identify and remove from site immediately, all damaged materials.

9. SITE CONDITIONS

1. Protect adjacent properties from damage as a result of contract operations.
2. Protect the Work and the Owner's property from damage as a result of contract operations.
3. Confine equipment, material storage, and operations of workers to limits indicated by laws, ordinances, permits, and prior arrangements with the Owner.
4. Do not interrupt or hamper occupant operations without prior written approval.
5. Remove progressively all debris created by the execution of the Work and dispose of same at appropriate disposal sites.

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6. Alert the General Contractor to the expected presence of odours, fumes, or dust and coordinate the shielding of ventilation equipment or scheduling of process to achieve acceptable abatement.
7. Upon completion of the work, leave premises in original order and condition.

10. ENVIRONMENTAL REQUIREMENTS

1. Do not install roofing during weather that might adversely affect the performance of the system.
2. Do not install roofing over surfaces that are wet, icy, dirty or otherwise unacceptable to the system being installed.
3. Secure the Work in a safe and watertight fashion before the onset of inclement weather and at the end of each day's work.

11. CHANGES

1. Where the General Contractor at the request of the Owner wishes to alter, add to, or deduct from the Work, provide pricing as requested.

12. PAYMENT

1. Provide detailed progress billings at the end of each month and/or at the total completion of the Work.
2. Where early shipment of material to site is desirable to avoid transportation problems or supply shortages, make prior arrangements with the General Contractor for progress payments.
3. No payment will exceed the value of the Work completed to date and/or the materials delivered to date, nor shall it imply approval or acceptance of work performed. Sufficient contract monies will be retained to ensure acceptable completion of the contract.
4. Provide, upon the request of the GC, a Statutory Declaration declaring that all previously paid monies have been properly dispersed. It shall be the responsibility of the contractor to verify all terms of payment.

13. WARRANTY

1. Submit extended warranties in accordance with the General Conditions of the Contract.

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2. Installer's Extended Warranty: standard 2-year warranty, commencing from the date of Substantial Performance of the Work.
3. Manufacturer's Extended Warranty: a written guarantee that the manufacturer will replace, at no cost to the Owner, any portion of the roofing system down to the existing roof deck for a period of 20 years, commencing from the date of Substantial Performance of the Work.

14. WARRANTY MAINTENANCE

The Manufacturer shall issue a non-prorated warranty for a period of Twenty Years. All components including the vapour retarder, insulation, cover board, membrane, flood coat, perimeter flashings including metal shall be covered under this warranty.

Warranty shall include inspections in years 2 and 5, 10 & 15 of the warranty. The following duties shall be carried out at no extra cost to the Owner as required, by the Manufacturer.

- sealing of flashing seams
- filling of pitch pockets
- repairs to blisters and ridges
- caulking at metal details as required
- written inspection report
- removal of light debris from the roof and premises
- cleaning of drain screens

Upon satisfactory completion, the warranty and all construction information regarding the roof installation shall be placed on an Online Roof Management Program at no additional cost to the Owner.

Prior to the 2-year expiration of the warranty, the manufacturer shall carry out an Infra Red Roof Analysis of the replaced roof areas.

The manufacturer shall provide to the owner access to an Online Data Base. All pertinent details regarding this project shall be entered on the data base such as:

- construction of the entire roof system
- warranty documentation
- Scale roof drawing.
- Inspection schedule (warranty requirements)
- Photographs of the roof system
- Substantial completion date.

15. MANUFACTURERS

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1. Manufacturers of cold-applied built-up asphalt roofing systems having Products considered acceptable for use as per Tender 6862-KP-18:

Tremco Canada.

1. Materials

1. Primer:
 1. Tremprime WB by Tremco.
 2. Insulation and Substrate: To provide an average R Value of 35.
 1. Substrate Board: Roof Area R-D only - 0.5" DensDeck Prime
 2. Insulation: 2 layers of Polyisocyanurate 2.5"
 3. Overlay Insulation: 2" TopRock DD Plus Insulation by Rockwool.
 4. Sumps and Crickets: 8' Sumps by ModulR. Crickets by ModulR.
2. Substrate Board and Insulation Adhesive
 1. Low Rise Foam Insulation Adhesive by Tremco.
3. Vapour Retarder
 1. AVC Membrane and Primer.
4. Flashing Membrane & Adhesive:
 1. TRA Membrane
 2. Tremlar V
5. Three Ply Cold Applied BUR
 1. Composite Ply HT Felt
 2. Burmastic Adhesive
6. Reinforcing Membrane:
 1. Burmesh by Tremco.
7. Ballast:
 1. 3/8" Pea Gravel free of fines and long splinters.

2. Accessories

1. Drains: Prefabricated drains as manufactured by Altra Metal Specialties – Model ABD-CR-X-SS: Aluminum Body Roof Drain complete with clamping ring.
2. Metal Flashings and Copping

Metal counter flashings and caps shall be 26 gauge, G90 galvanized Grade A steel conforming to ASTM A525. Finish to be Stelco 8000 series and colour to be as selected by the Board. Obtain written confirmation of colour prior to ordering.

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Two-piece gooseneck flashings are to be installed around all electrical projections.

3. Sealant

One-part polyurethane – approved product and manufacturer – Dymonic by Tremco.

EXECUTION

PREPARATION – ROOF AREAS AS PER DRAWINGS R-C, R-D, R-E & R-F.

1. Examine all drains and report any plugged drains to the Inspector. Any drains not reported and found plugged at the end of the contract will be deemed the responsibility of the contractor. Use temporary plugs during roof removal operations and remove before the end of each working day or when rain is imminent.
2. Remove existing counter flashing and dispose.
3. Remove existing roofing, insulation and vapour retarder.
4. Raise and re-install all equipment as necessary to accommodate roofing work. Add blocking to curbs and sleepers to ensure 150 mm (8 inch) flashing clearance from top of cant strip. Contractor shall be responsible for the disconnection and reconnection of any units, if required.
5. Replace all deteriorated wood cants, blocking and equipment supports as required.
6. Install new wood blocking to raise perimeter details to accommodate the new insulation thickness, if necessary. Height of new blocking at perimeter to provide a minimum 2 inches clearance above top of cant strip.
7. Verify acceptability of deck, projections, curbs, parapets, walls and other constructions as these pertain to the roofing work and its expected performance.
8. Correct any deficiencies in these constructions or advise Inspector of conditions believed to be beyond the Scope of Work.
9. Fill and pack all joints, cracks, seams, and openings in the deck and its appurtenances to prevent air leakage from the building interior.

ROOF DECK

- .1 Deck reattachment:

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- .1 Mechanically reattach loose sections of deck to steel or wood support members according to existing fastening pattern.
2. Deck replacement:
 - .1 Remove defective decking. Examine supports. If unsound, contact owner immediately for future action.
 - .2 Install new decking in accordance with appropriate building regulations and CSSBI, (Canadian Sheet Steel Building Institute).
- .1 Deck protection (Metal):
 - .3 Remove loose flaking rust, down to clean, dust free, sound metal surface.
 - .4 Apply one coat of rust inhibitive paint over prepared surface at the rate of 6 m²/litre (250 ft²/gal).

AIR BARRIER

1. Apply primer and install on to substrate, overlapping side and end laps in conformance with manufacturer's written recommendations. Begin work at bottom of slopes, unroll and align on substrate. Ensure all edges are supported.
2. Remove release sheet and adhere membrane, working in sections to avoid wrinkles in membrane.
3. Seal membrane at insulation perimeters and around penetrations to ensure sealed connections with base sheet at upstands.
4. Sprayed in Place Foam:
 1. Fill all cavities and joints with foam insulation according to the manufacturer's directions.

CARPENTRY

1. Wood Blocking:
 1. Construct wood blocking as per details. Blocking, or several thicknesses of wood may be necessary so that the top of the nailer will be level with the top of the roof insulation or top of the deck (if no insulation is used).
 2. Offset blocking layers 300mm (12 inches) and weave corners.
 3. Assemble blocking using two staggered rows of nailing. Space nails in any row a maximum of 600mm (24 inches) on centre. Within 2440mm (8 feet) of outside corners, reduce maximum spacing to 300mm (12 inches) on centre.

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2. Wood Cants

1. Install wood cants over nailer. Nail two (2) rows staggered. Spacing in any one (1) row shall not exceed 600 mm (24 inches). Within 2440 mm (8 feet) of outside corner, spacing shall not exceed 300 mm (12 inches) in any one (1) row. Mitre all inside and outside corners of the wood cant.

VAPOUR RETARDER

1. Self Adhering Membrane:

1. Apply primer and install on to substrate, overlapping side and end laps in conformance with manufacturer's written recommendations. Begin work at bottom of slopes, unroll and align on substrate. Ensure all edges are supported.
2. Remove release sheet and adhere membrane, working in sections to avoid wrinkles in membrane.
3. Seal membrane at insulation perimeters and around penetrations to ensure sealed connections with base sheet at upstands.

INSULATION

1. Firmly butt each insulation board to surrounding boards. Do not jam or deform owners.
2. Minimize elevation variation between boards at joints to provide level surface to accommodate subsequent roofing.
3. Stagger joints at least 150mm (6 inches).
4. Leave no voids at blocking, penetrations, walls, or parapets.
5. At all drains and scuppers slope insulation for a radius of 2400 mm (96 inches), where feasible to ensure positive drainage. Minimum 1200mm (48 inches).
6. Adhere insulation into ribbons of low rise foam insulation adhesive in ½" to ¾" beads approximately 12" o.c. throughout field and 8" o.c. at perimeters.
7. Immediately after placement, walk insulation owners into adhesive to achieve solid contact.

COLD APPLIED BUR

1. Three ply - cold:

1. Starting at the low point of the Roof, install three (3) plies of ply sheet, shingle fashion. Overlap starter strips 660 mm (26 inches) with first ply, then overlap

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- each succeeding ply 625 mm (24 2/3 inches). Place ply sheets to ensure water will flow over or parallel to; but never against exposed edges.
2. Embed into Cold Process Adhesive, 300, 600 and 900 mm (12, 24 and 36 inch) wide plies to start and finish roof membrane along roof edges and terminations.
 3. Solidly coat each ply of felt for the full width with Cold Process Adhesive. Immediately after installation, broom and/or roll ply sheet. Ensure complete and continuous seal and contact between adhesive and felts, including ends, edges and laps without wrinkles, fish mouths, or blisters.
 4. Extend all plies to the top edge of all cant strips and cut off evenly.
 5. Apply uniform and continuous pressure to exposed edge and end laps to ensure complete adhesion.
 6. Avoid walking on plies until adhesive has set.
 7. Overlap previous days' work 600 mm (24 inches) as required.
 8. Cut out fishmouths/side laps which are not completely sealed and patch. Replace all sheets which are not fully and continuously bonded.
 9. Lap ply membrane ends 150 (6 inches). Stagger end laps 1 metre (3 feet) minimum.
 10. Adhesive application rate: Minimum 1.0 Litres/Sq. Metre (2.5 Gals per 100 Sq. ft).

TEMPORARY WATERSTOP/TIE-INS

1. Remove embedded gravel, dirt and debris from top ply of felt along termination for 450 mm (18 inches).
2. Extend roofing system at least 300 mm (12 inches) onto prepared area installing insulation fillers as required.
3. Seal edge with 150 mm (6 inch) wide reinforcing membrane embedded between alternate courses of temporary waterstop adhesive.
4. At beginning of next day's work, remove temporary connection by cutting felts evenly along edge of existing roof system and remove insulation fillers.
5. Temporary waterstop adhesive application rate:
 1. Cold 3.3 l/m² (12 ft²/gallon)

PERMANENT WATERSTOP/TIE-INS

1. Remove embedded gravel, dirt and debris from top ply of felt along termination for a distance of 450 mm (18 inches).
2. Install 450 mm (18 inch) wide ply sheet(s) from exposed deck to the existing roofing with a continuous application of permanent waterstop adhesive.
3. Extend roofing system beyond permanent waterstop ply sheet and at least 300 mm (12 inches) onto prepared area of adjacent roofing.

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4. Seal leading edge of new membrane with 300 mm (12 inch) wide reinforcing membrane embedded between alternate courses of flashing adhesive.
5. Permanent waterstop adhesive application rate:
.1 Cold 3.3 l/m² (12 ft²/gallon)

FLASHINGS

1. Sleeper Flashings - Elastomeric Sheeting:
 1. Adhere sheeting completely to horizontal and vertical blocking surfaces with flashing adhesive. Press sheeting into adhesive. Ensure complete bond and continuity without wrinkles or voids.
 2. Sheeting width: Sufficient to extend over the sleeper down onto adjacent roofing 150 mm (6 inches), minimum.
 3. Lap sheeting ends 100 mm (4 inches); and adhere with flashing adhesive.
 4. Overcoat lap edges with end lap stripping adhesive and membrane.
 5. Tie in leading edge of sheeting with stripping ply membrane embedded between alternate continuous courses of stripping ply adhesive.
 6. If membrane does not completely cover sleeper, secure top edge with a flashing termination bar. Mechanically fasten 300 mm (12 inches) O.C. Overcoat bar with end lap stripping adhesive and membrane
7. Curb Details - Elastomeric Sheeting:
 1. Adhere sheeting completely to horizontal and vertical blocking surfaces with flashing adhesive. Press sheeting into adhesive. Ensure complete bond and continuity without wrinkles or voids.
 2. Sheeting width: Sufficient to extend from 50 mm (2 inches) down inside face of curb down onto adjacent roofing 150 mm (6 inches), minimum. Mechanically fasten sheeting on inside face of curb.
 3. Lap sheeting ends 100 mm (4 inches); and adhere with flashing adhesive.
 4. Overcoat lap edges with end lap stripping adhesive and membrane.
 5. Tie in leading edge of sheeting with stripping ply membrane embedded between alternate continuous courses of stripping ply adhesive.

METAL FLASHINGS

1. Installation of metal flashing shall be in accordance with the metal flashing section of the Canadian Roofing Contractors' Association (CRCA) manual.

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SURFACING APPLICATION

Gravel Finish

1. Prior to application of surface treatment system, contractor shall inspect roof with manufacturer's representative.
2. Ensure surface is clean and dry. Flood coat the entire roof with specified flood coat bitumen at the rate of 6 gallons per square (cold adhesive) or 60 lbs. per square
3. Immediately broadcast minimum 25 kg per sq. metre (500 lbs. per 100 sq. ft.) of new, clean, dry roofing gravel. Cover flood coat material completely.
4. Rake out gravel to provide a neat even surface.

END OF SECTION

PART 1 GENERAL

1. GENERAL REQUIREMENTS

1. Division One, General Requirements, is a part of this section and shall apply as if repeated here.

2. SYSTEM DESCRIPTION

1. Supply all labour, materials, and equipment necessary for the complete work of this Section as indicated on the drawings, specified herein, or as required by job conditions and normally considered as work covered by this Section.
2. The term "sealant" to be synonymous with the term "caulking" where used on the drawings and/or specifications.

3. SUBMISSIONS

1. Submit complete colour samples for Architect's approval.
2. Supply a sample container of each type of caulking or sealant.
3. Sample joints of each type and colour of caulking shall be prepared at the site in a location directed by the Architect and be approved by the Architect before work commences. Approved joints will represent minimum acceptable for the work. Cure samples and under conditions anticipated at job site during construction.

4. ENVIRONMENTAL CONDITIONS

1. Sealant and substrata materials to be minimum 5 C (41 deg. F.).
2. If necessary, to apply sealants below 5 C., consult sealant manufacturer and follow their recommendations.

5. DELIVERY AND STORAGE

1. Deliver and store materials in manufacturer's original wrappings and containers.

6. PROTECTION

1. Mask adjacent surfaces as necessary to prevent contamination.
2. Protect all sealant against puncture or damage until sealant has attained its final set.
3. Be responsible for any damage to adjacent surfaces caused by the work of this Section. Provide extra protection as required when sandblasting.

4. Provide temporary covers over joints where joints have been cleaned out, but not yet caulked.

7. WARRANTY

1. Provide a written warranty, signed and issued in the name of the Owner stating that caulking work of this section is guaranteed against leakage, cracking, crumbling, melting, shrinkage, running, loss of adhesion, or staining adjacent surfaces, for a period of five years from the date of Substantial Certificate of Completion and that any defective caulking will be replaced.
2. At completion of the work, provide a written statement from the manufacturer or authorized manufacturer's representative that material used in the various applications is the recommended one and that the final application is as recommended by the manufacturer for the construction conditions detailed and for the performance required. These requirements are applicable to every material included in the work of this Section.

8. QUALIFICATIONS

1. Applicator for the work of this section shall:
 1. Be approved by the materials manufacturer and Architects.
 2. Have adequate equipment and skilled personnel to expediently complete the work of this section in an efficient and very best workmanlike manner.
 3. Be completely familiar with the published recommendations of the manufacturer of the caulking material being used.
2. Indication of lack of skill or defective work to be sufficient grounds for the Consultant to reject the installed caulking and to require its immediate removal and complete recaulking at no additional cost to the Owner during the guaranty period.
3. Co-operate with the Consultant and/or any inspection and testing agency he may appoint.
4. Materials to be utilized shall be inspected and tested as required.
5. Provide cut tests of 6 inches in length in order to ensure correct thickness, hardness, mixing and surface finish. Provide these cut test samples at times and from locations as directed by the Consultant and make good the areas from which the samples are taken.
6. All tests of the sealant installation shall be inspected by the sealant manufacturer's representative.

PART 2 PRODUCTS

1. MATERIALS

1. Primers: type recommended by sealant manufacturer.
1. Joint Fillers:
 2. General: compatible with primers and sealants, oversized 30 to 50%.
 3. Polyethylene: extruded closed cell foam, Shore A hardness 20, tensile strength 140 to 200 kPa.
3. Bond Breaker: pressure sensitive plastic tape, which will not bond to sealants.
4. Sealant Type A: Equal three-part polyurethane 'Tremco Dymeric 240' conforming to C.G.S.B. CAN2-19-24-M80. Colours to be tinted to specifically match wall colours. Maximum of five colours.
5. Sealant Type B: One-part silicone mildew resistant type equal to sanitary sealant 1702 by C.G.E. Silicones and conforming to CGSB 19-GP-22m or Dow Corning 786.
6. Sealant Type C: Equal to Sikaflex - 15 LM. Colours to be tinted to specifically match wall colours. Maximum of six colours.
7. Colour of Sealants: to be selected by the Architect. Colours of sealant to change where wall colours change (i.e., banding).
8. Joint Cleaner: xylol, methylethyleketon or non-corrosive type recommended by sealant manufacturer and compatible with joint forming materials.
9. Vent Tubing: 6 mm (1/4") inside diameter extruded polyvinyl chloride tubing.
10. Threshold Bedding: oil base caulking compound, to CGSB 19-GP-6.
11. Deliver materials to job site in sealed containers with manufacturer's original labels attached, and accompanied by certification of compliance with the specifications.

PART 3 EXECUTION

10. EXAMINATION

2. Examine all surfaces prior to application and notify the Architect of any

conditions detrimental to satisfactory application.

3. Commencement of work shall imply acceptance of surfaces.

11. PREPARATION

2. Use a dry, clean, oil free compressed air stream to remove dust and other contaminants. Masonry surfaces shall be cleaned with wire brush and then blown clean. Any waterproofing treatments contaminating the joint must be completely removed.
3. Remove rust, mill scale and coatings from ferrous metals by wire brush, grinding or sandblasting.
4. Remove oil, grease and other coatings from non-ferrous metals with joint cleaner.
5. Prepare concrete, masonry, glazed and vitreous surfaces to sealant manufacturer's instructions.
6. Examine joint sizes and correct to achieve depth ratio $\frac{1}{2}$ of joint width with minimum width and depth of 6 mm ($\frac{1}{4}$ "), maximum width 25 mm (1").
7. Before caulking, fill spaces deeper than 13 mm ($\frac{1}{2}$ ") with bedding material, packed tightly in place and set below finished surfaces to suit specified sealant depth. Provide joints less than 13 mm ($\frac{1}{2}$ ") deep with an approved joint breaker.
8. Where necessary to prevent staining, mask adjacent surfaces with tape prior to priming and caulking.
9. Apply bond breaker tape where required to manufacturer's directions.
10. Prime sides of joints to sealant manufacturer's instructions immediately prior to caulking.
11. Remove all existing caulking and prepare for replacement.
12. Check form release agent used on concrete for compatibility with sealant and primer. If they are incompatible inform Consultant and change sealant to compatible type approved by Consultant or clean concrete to Architect's approval.

12. APPLICATION

2. Before application of any sealants, confirm that sealant material is compatible with the materials and finishes of the surfaces to which the material is applied or is in contact with.

3. Apply sealants, primers, joint fillers, bond breakers, to manufacturer's instructions. Apply sealant using a gun with proper size nozzle. Use sufficient pressure to fill voids and joints solid. Superficial pointing with skin bead is not acceptable.
4. Thoroughly mix caulking materials with a mechanical mixer capable of mixing at 80-100 rpm without mixing air into the material. Mix material in accordance with the manufacturer's directions and instructions.
5. Install caulking to the joints using manually operated or power operated guns. Use nozzles of the correct size and shape and provide sufficient pressure to completely fill the joints and make adhesive contact with the backs and sides of the joints. Caulk solidly around entire perimeter of openings.
6. Finish the surface of the caulking with a smooth, full bead, free from ridges, wrinkles, sags, air pockets and embedded impurities. Tool the finish bead with a water wet or dry tool as recommended by the manufacturer, to a slightly concave joint.
7. In masonry cavity construction, vent caulked joints from cavity to 3 mm (1/8") beyond external face of wall by inserting vent tubing at bottom of each joint and maximum of 1500 mm (5'-0") o.c. vertically. Position tube to drain to exterior.
8. Clean adjacent surfaces immediately and leave work neat and clean. Remove excess sealant and droppings using recommended cleaners as work progresses. Remove masking after tooling of joints. Finish work damaged due to this work shall be replaced at this contractor's expense to satisfaction of the Architect.
9. Set thresholds in a full bed of caulking compound at least 1/2" (12 mm) thick. Remove excess compound after threshold is set and neatly point joints.
10. All hidden joints or joints concealed by metal covers occurring in window and door frames, metal curtainwalls, other locations, to be clean, sealant applied and tooled, and inspected and approved prior to the installation of metal covers.
11. Use of sealants specified in the following locations:
 1. Type A: Use at all exterior locations and interior control joints and expansion joints. NOTE: this sealant **must not be** painted over.
 2. Type B: Joints between flooring (except carpet areas) and door frames; between countertops and walls; all high humidity locations at shower and changeroom locations.

3. Type C: At all remaining interior locations.

13. LOCATIONS

2. Do all caulking required (except where specified under other sections).
3. Caulk exposed control joints and expansion joints occurring in masonry and concrete walls. (See item 3.6)
4. Caulk along underside of projecting flashings, except at roof eave detail.
5. Caulk joints between aluminum panels, window or door frames to adjacent building components around perimeter of every external window or door opening at interior and exterior sides aluminum units which work shall be performed by Automatic Aluminum Doors - Section 08710, Aluminum Window Section 08520, and Section 07461 Aluminum Architectural Panel System, Aluminum Curtain Wall - Section 08900.
6. Caulk around exterior louvres.
7. Set windowsills in a bed of caulking compound by Sections 08400 and 08900.
8. Interior hollow metal where it abuts interior finishes.
9. Caulk where shown on drawings and not specified in other sections.
10. Caulk joints at junction of different materials and junction of surfaces in different planes as required or directed (i.e. concrete to metal, concrete to masonry, masonry to metal, masonry to drywall, etc.).
11. Caulking elsewhere to provide a water and weatherproof condition.
12. Caulk areas on interior walls to stop air infiltration.
13. Caulking between resilient/sheet flooring and masonry or concrete walls; and between resilient/sheet flooring and hollow metal frames (Type 'B' sealant).
14. Caulk joints between masonry and gypsum wallboard or plaster.
15. Caulk control joints in drywall partitions.
16. Caulk around access panels, built-in specialties, grilles, pipes, ducts, conduit, outlet boxes, etc. penetrating floors, walls and ceilings.
17. Caulk joints around metal items projecting from ceramic tile work (Type "B" sealant).
18. Caulk around toilets, urinals, sinks, bathtubs, showers, etc. at junction with

floor and wall surfaces (Type "B" sealant).

19. Caulk joints as required to provide soundproofing where soundproofing walls are indicated.
 20. Caulk joints between wood window and wall surfaces and wood door frames and wall surfaces, etc.
 21. Caulk perimeter of all countertops and window plastic laminate sills (including underside) with (Type "B" sealant).
 22. Caulk around access panels and washroom accessories in ceramic tile faced walls.
14. CAULKING NOT TO BE DONE UNDER THIS SECTION
2. Caulking of Sidewalk Joints - Section 02600
 3. Firestopping and smoke seals - Section 07270, Div. 15 and Div. 16
 4. Caulking between aluminum work and aluminum work to surrounding surface - Section 07461, Section 08716, and Section 08520.
 5. Caulking and sealants for glazing - Section 08800
 6. Caulking of Acoustic Drywall Partitions - Section 09250
 7. Caulking of Ceramic and Quarry Tile - Section 09300
 8. Caulking of sheet flooring - Section 09624
15. CAULKING OF MASONRY CONTROL JOINTS
2. Caulk all Masonry Control Joints where shown on drawings. Refer to exterior elevations and interior elevations.

NOTE: For Base Price at each control joint shown on exterior wall elevation allow for control joint to also be located in back up masonry concrete block wall as per AD detail, backer rod and Caulking by this Section. Compressible joint filler by Masonry Section 04200.

NOTE: Linear quantity based on one side/face of exposed concrete block masonry wall.

NOTE: Verification of linear quantities of control joints to be made later. Locations of all additional required Concrete Block Joints to be finalized later after submission of proposed control joint locations on shop drawings to be submitted by Masonry Contractor as required by Specifications Section 04200.

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SEALANTS

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END OF SECTION

1. GENERAL

1. GENERAL REQUIREMENTS

1. Division One, General Requirements is part of this Section and shall apply as if repeated here.

2. SHOP DRAWINGS

1. Submit shop drawings in electronic PDF format in accordance with GC 3.10 of CCDC Document 2, 2008 and Section 01300 – Submittals.
2. Indicate each type frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings, finishes and fire ratings.
3. Fire Ratings indicated on Door Finish Schedule are minimums. If door design cannot be satisfied at specified rating (i.e. 20 min), supply door or frame with acceptable higher rating (i.e. 45 min.).

3. QUALIFICATIONS OF MANUFACTURER

1. Products used in the Work of this Section shall be produced by manufacturers regularly engaged in manufacture of similar items and with a history of successful production acceptable to the Architect.
2. Qualified Manufacturers:
 1. Vision Hollow Metal
 2. Fleming Door Products
 3. Baron Meta Industries Inc.
 4. Daybar Industries Limited
 5. Artek Door
 6. Trillium Steel Doors Limited

4. PROTECTION

1. Use all means necessary to protect materials of this Section before, during and after installation and to protect installed work & materials of all other trades.

5. REPLACEMENTS

1. In the event of damage, immediately make all repairs & replacements necessary to the approval of the Architect and at no additional cost to the Owner.

6. WORK INCLUDED

1. Supply all hollow metal doors and frames as shown on drawings and on door schedule.
 1. Provide removable mullions where indicated. Refer to door and frame schedule.
2. Supply and install all hollow metal fire doors and frames shown on the drawings and on door schedule.
 1. Door cutouts, complete with reinforcing, stops, and closures required for glazing.
 2. Cut outs and reinforcing for finishing hardware including preparations for mortice type hardware.
 3. Cutouts for security system. Coordinate with Div.16.
3. Supply all necessary fastening and anchoring devices for above items.
4. Supply and install door grilles where indicated on drawings or sizes as indicated on the drawings. Refer to Mechanical drawings.

7. STANDARDS

1. Materials and workmanship to be in accordance with Canadian Steel Door and Frame Manufacturer's Association Specifications Standards for steel doors and frames.

8. REGULATORY REQUIREMENTS

1. Supply fire labelled steel doors and frames in accordance with NFPA-80, current edition, except where specified otherwise.

2. PRODUCTS

1. MATERIALS

Steel: cold rolled steel, double annealed patent levelled, fully pickled and free from scale and internal defect. Surfaces shall be free from perceptible waves, buckles and other imperfections.

1. Zinc Coating: wipe coated galvanizing in conformance with ASTM 527, Coating Class A01.

2. Primer for Touch-Up: conforming to CGSB 1GP-181M.
3. Labels: Provide ULC or Warnock-Hersey Labels for fire rated doors and frames.
4. Thermal Break: Polyvinyl Chloride (PVC) thermal break.
5. Reinforcing Channel: to CAN/CSA - G40.21-M7, grade 300W, 3.25 mm.
6. Glass for Hollow Metal Doors: as per 08800 Glass and Glazing Section.
7. Glass for Hollow Metal Frames and Screens: as per 08800 Glass and Glazing Section.

2. FABRICATION

1. Generally

1. Fit and assemble work in shop where possible. Execute according to details and approved shop drawings. Where shop fabrication is not possible, make trial assembly in shop.
2. Weld all components of doors and frames. File or grind exposed welds smooth and flush. Exposed welds shall be continuous. Knock-down frame not to be used on this project.
3. Workmanship shall be best grade modern shop and field practice known to recognized manufacturers specializing in this work. Joints and intersecting members accurately fitted made in true planes with adequate fastening.
4. Insulate where necessary to prevent electrolysis between metal to metal or metal to masonry or concrete.
5. Fabricate and erect work square, plumb, straight, true and accurately fitted. Provide adequate reinforcing and anchorage.
6. Clean, scrape and remove rust, mill scale, grease or extraneous material from frames and doors following fabrication. Flood coat with air-drying paste filler and again sand to eliminate all unevenness or irregularities. Apply in shop a full smooth coat of zinc chromate primer to all surfaces. Deliver work to site with primer undamaged and otherwise satisfactory for following work specified in Section 09900.

2. Doors

1. Provide hollow metal doors of type and size indicated on Door Schedule, and as detailed on Drawings.
2. Construct flush type continuously welded exterior doors conforming to ASTM A527 16 gauge (1.613 mm) hollow metal construction, steel stiffened with vertical steel ribs, all voids filled with semi-rigid fibrous insulation minimum density 24 kg/m³ polystyrene polyurethane and complete with top and bottom caps. Finish shall be "wipe coat" galvanized steel.
3. Construct interior slab and stile and rail type doors and panels of 18 gauge (1.311 mm) cold rolled, roller levelled sheet "wipecoat" galvanized steel with honeycomb structural core consisting of pre-expanded, resin impregnated Kraft paper having 3/4" (20 mm) cell size to thickness indicated.
4. Doors shall be mortised, reinforced, drilled and tapped to receive templated hardware including mortise type hardware. Reinforce for surface mounted hardware.
5. Prepare doors to receive glass or grilles as required. Provide removable stops secured with countersunk tamperproof head screws at 6" (150 mm) o.c. Prepare exterior doors to receive 1" (25 mm) thick insulated sealed glass units.
6. Weld door and panel components together to provide integrated units, square, true and free from distortion or waves. All 18 gauge doors to have welded seams minimum 30% overall and 2" (50 mm) length welds. Weld above and below all hinge locations. All 16 gauge doors to be continuously welded. Grind and fill smooth welded seam.
7. Door head and bottom shall have channel shaped member, closing off top and bottom of door flush with face skins. NOTE: close off top and bottom of exterior doors even with outer edge of door.

3. Fire Rated Doors

1. Provide doors, frames and hardware with Underwriters Laboratories of Canada (ULC) labels, clearly visible, where required to be fire

rated or installed in fire rated assembly.

4. Door Frames

1. Provide steel hollow metal door and window frames for openings indicated on Door Schedule and as detailed elsewhere on drawings.
2. Form interior hollow frames to profile indicated of 16 U.S. gauge (1.613 mm) hot rolled "wipe coat" zinc coated steel. Construct exterior frames of 16 U.S. gauge (1.613 mm) hot rolled, zinc coated steel.
3. Cut mitres and weld corners continuously along inside frame profile. Fill corners of steel frames with metallic paste filler and sand smooth and uniform. Do not weld corner of removable stop.
4. Provide 10 gauge (3.51 mm) channel stiffeners in mullions each side of door openings occurring in screens, or as required to provide a rigid installation.
5. Prepare removable stops secured with counter-sunk tamperproof screws at 6" (150 mm) o.c.
6. Provide three (3) neoprene single stud bumpers for each interior door frame and (2) bumpers at head for pairs of doors.
7. Prepare frames for mortise type hardware at all doors. Blank, reinforce for butts with 1/4" (6.35 mm) steel plate, drill and tap as required. Reinforce both sides of every door closer, provide for concealed door closers where required.
8. Cover reinforcement plates or attachments and cut-outs with 22 gauge (0.853 mm) steel sheet boxes to protect against mortar. Provide channel or angle spreaders readily removable.
9. Provide adjustable "Tee" or wire masonry anchors with head of No. 6 gauge (4.94 mm) steel and body of 10 gauge (3.510 mm) corrugated steel where frames are built into masonry, except at thermal broken frames. Provide manufacturer recommended anchor at all other locations.
10. Supply three anchors for jambs between 4'0" (1219 mm) and 7'0" (2134 mm) and four anchors for jambs exceeding 7'0" (2134 mm)

high. Adjustable type shall be as recommended by manufacturer. Provide adjustable jamb anchors for fixing at floor.

11. Provide head reinforcement in frames wider than 4'-0" (1200 mm) and where indicated or recommended by manufacturer.
12. Prepare frames for electric hardware and security systems where required. Reinforce and drill and tap frames as required. Coordinate with Div.16.
13. Prepare frames for continuous door length type hinges where indicated on door schedule.
14. Provide 12 gauge (2.66 mm) reinforcing in frames for continuous door length type hinges where indicated on door schedule.
15. Provide removable mullions where indicated on door frame schedule.

1. **EXECUTION**

1. INSTALLATION

1. Frame Installation:

1. Allowable limit of distortion shall be 1/16" (1.5 mm) out of plumb each jamb, measured on face of frame, resulting in maximum twist of frame of 1/8" (3 mm) measured diagonally from upper to lower corner.
2. At masonry walls: install frames using the corrugated or wire masonry anchors. At preformed openings and exterior thermally broken doors use machine screws and expansion anchors as provided for this application. After installation, fill countersunk screw heads flush with frame and sand smooth ready for painting. Fill exterior frames with spray-on insulation by Section 07215. Co-operated with masonry trade who will fill interior frames with mortar.
3. Brace frames solidly in position while being built in. Install temporary spreader of wood at mid-height of frame until adjacent wall work is completed. Provide vertical support at centre of head for openings of 4'-0" (1200 mm) wide or wider.
4. Remove temporary jamb spreader bars and vertical supports only

after frames are securely anchored in place.

2. Door Installation:

1. Install hollow metal doors plumb, true and level and at correct elevation.
 2. Co-ordinate installation of hardware.
 3. Adjust operable parts to ensure proper operation.
 4. Install hollow metal panels and closures with concealed fastenings.
 5. Install acoustical assembled doors and frames as per manufacturer's recommendation.
3. Install fire rated doors and frames in accordance with National Fire Codes, Volume 4, produced by National Fire Protection Association (NFPA 80).
 4. Attach fire rating labels to doors and frames required to be fire rated. Ratings shown on door schedule are minimum. Attach temperature rise rated labels to doors required to be 90 MFR or greater.
 5. Make allowances for deflection of structure to ensure structural loads are not transmitted to frames.
 6. Install doors and hardware in accordance with hardware templates and manufacturer's instructions and Section 08700 - Finish Hardware.
 7. Adjust operable parts for correct function.
 8. Install glazed lites, stops and louvres.
 9. Install door grilles provided by Mechanical Contractor.

2. TOUCH-UP

1. Remove rust, clean and touch-up any damaged galvanizing with "Zincrich" or "Galvicon" paint.
2. Remove rust, clean and touch-up any damaged paint with approved primer.

End of Section

PART 1 GENERAL

1. GENERAL REQUIREMENTS

1. Division One, General Requirements, is a part of this section and shall apply as if repeated here.

2. WARRANTY

1. The Work under this Section shall be warrantied in accordance with GC 12.3 of CCDC-2 as currently amended but for a period of 10 years on insulated units and 5 years on all other work from the date of Consultant's Certificate of Substantial Completion.

3. PROTECTION

1. Mark each light with a large cross to indicate presence of glass (colour that stands out to the visible eye). Use material that will leave no residue after removal.
2. Replace under the work of this section, defective, damaged or broken glass due to faulty setting, handling or storage.

4. SUBMITTALS

1. Submit shop drawings in accordance with CCDC-2 as currently amended and Section 01300 - Submittals.

5. STANDARDS

1. Design in conformance with CAN/CGSB-12.20-M, structural design of glass for buildings.

PART 2 PRODUCTS

1. MATERIALS (all exposed glass edges shall be polished and chamfered typical)

1. Tempered Glass: 1/4" (6 mm) minimum clear glass tempered conforming to CAN/CGSB - 12.1 M90 equal to Ford Glass.
2. Glazing Tape: Tremco 440 tape and as indicated in other glass sections, also to be confirmed by manufacturer's written recommendations.
3. Sealant: CWS by Dow Corning.
4. Heal Bead Sealant: One-part polysulphide or acrylic sealant conforming to CGSB 19-GP-5 and as indicated in other glass sections.
5. Spacer Shims: neoprene, Shore "A" durometer hardness 80, 3" (75 mm) long x 0.08" (2.4 mm) thick and 3/8" (9 mm) high.

6. Setting Blocks: neoprene, Shore "A" durometer hardness, 4" (100 mm) long x 1/4" (6 mm) high x width to suit glass thickness.
7. Primer: Sealers and cleaners to glass manufacturer's standard
8. Vision Glass: Sealed insulated glass units, ten (10) year guarantee, 1/2" (12.7 mm) 90% argon and 10% air space, hermetically sealed, insulating units conforming to CAN/CGSB - 12.8 - M90 and with thermally broken stainless-steel glazing spacer. Warm edge spacer is only allowed in curved glazing units.

NOTE: colour selection of glass to be confirmed by Consultant prior to manufacturing.

1. Outer Light Glass Types:

1. 6mm (1/4") Tempered Solargray with Solarban 70XL (Surface 2) by P.P.G. Canada or approved equal at all vision locations. Colour to be confirmed with Architect prior to fabrication.

2. Inner Light Glass Type:

1. 6mm (1/4") Clear Tempered by P.P.G. Canada or equal.

9. NOTE: Applicable to all glass and glazing, contractor shall verify and provide thickness to be confirmed by manufacturer for the assembly in which the glazing is installed, to be submitted in shop drawings stamped by a professional engineer before any manufacturing. Glazing tape to be as per manufacturer's written recommendations.

PART 3 EXECUTION

1. WORKMANSHIP

1. Installation of glass shall be by workmen skilled in this trade and done in strict accordance with material manufacturer's directions to produce a first-class installation.
2. Accurately cut glass to fit opening and provide for glass expansion.
3. Carefully remove glazing stops and replace after glazing. Exercise care to prevent damage to stops.
4. Collect all glass cuttings in boxes and remove when cleaning up debris.
5. Cut glass and mirrors from dimensions taken in field.

6. Remove protective coatings and clean contact surfaces with solvents and wipe dry.
7. Apply primer-sealer to contact surfaces.

2. FINISHING

1. Immediately remove sealant and compound droppings from finished surfaces. Remove labels after work is completed and inspected by Consultant.

END OF SECTION

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS:

1. Division One, General Requirements, is a part of this Section and shall apply as if repeated here.

1.2 DESCRIPTION

1. This section specifies subsurface preparation requirements for areas to receive the installation of applied and resinous flooring. This section includes removal of existing floor coverings, testing concrete for moisture and pH, remedial floor coating for concrete floor slabs having unsatisfactory moisture or pH conditions, floor leveling, and repair as required.
2. **Note:** where new vinyl tile floor finishes are being applied to existing floor substrates other than slab on grade conditions, refer to Section 09650 for leveling material.

1.3 SUBMITTALS

1. Submit in accordance with Section 01300 – Submittals.
2. Written approval confirming product compatibility with subfloor material manufacturer and the flooring manufacturer.
3. Product Data:
 1. Moisture remediation system
 2. Underlayment Primer
 3. Cementitious Self-Leveling Underlayment
 4. Cementitious Trowel-Applied Underlayment (Not suitable for resinous floor finishes)
4. Test Data:
 1. Moisture test and pH results performed by a qualified independent testing agency or warranty holding manufacturer's technical representative.

2.4 DELIVERY AND STORAGE

1. Deliver materials in containers with labels legible and intact and grade-seals unbroken.
2. Store material to prevent damage or contamination.

1.5 APPLICABLE PUBLICATIONS

1. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in text by basic designation only.
2. American Society for Testing and Materials (ASTM):

D638-10 (2010)	Test Method for Tensile Properties of Plastics
D4259-88 (2012)	Standard Practice for Abrading Concrete to alter the surface profile of the concrete and to remove foreign materials and weak surface laitance.
C109/C109M-12 (2012)	Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens) Modified Air Cure Only
D7234-12 (2012)	Standard Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers.
E96/E96M -12 (2012)	Standard Test Methods for Water Vapor Transmission of Materials
F710-11 (2011)	Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
F1869-11 (2011)	Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
F2170-11 (2011)	Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes
C348-08 (2008)	Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars
C191-13 (2013)	Standard Test Method for Time of Setting of Hydraulic Cement by Vicat Needle

PART 2 - PRODUCTS

- 2.1 MOISTURE REMEDIATION COATING (SLAB ON GRADE LOCATIONS ONLY):

1. System Descriptions:
 1. High-solids, epoxy system designed to suppress excess moisture in concrete prior to an overlayment. For use under resinous products, VCT, tile and carpet where issues caused by moisture vapor are a concern.
 2. Products: Subject to compliance with applicable fire, health, environmental, and safety requirements for storage, handling, installation, and clean up.
 3. System Components: Verify specific requirements as systems vary by manufacturer. Verify build up layers and installation method. Verify compatibility with substrate. Use manufacturer's standard components, compatible with each other and as follows:
 1. Liquid applied coating:
 1. Resin: epoxy.
 2. Formulation Description: Multiple component high solids.
 3. Application: Per manufacturer's written installation requirements.
 4. Thickness: minimum 10 mils
 4. Material Vapor Permeance: Application shall achieve a permeance rating of less than 0.1 perm in accordance with ASTM E96/E96M.
 5. Maximum RH requirement: 100% testing in accordance with ASTM F2170.

Property	Test	Value
Tensile Strength	ASTM D638	4,400 psi
Volatile Organic Compound Limits (V.O.C.)	SCAMD Rule 1113	25 grams per liter
Permeance	ASTM E96	0.1 perms
Tensile Modulus	ASTM D638	1.9X10 ⁵ psi
Percent Elongation	ASTM D638	12%
Cure Rate	Per manufacture's Data	4 hours Tack free with 24hr recoat window
Bond Strength	ASTM D7234	100% bond to concrete failure

2.2 CEMENTITIOUS SELF-LEVELING UNDERLAYMENT (AT LOCATIONS WHERE EXISTING FLOOR SURFACE VARIES MORE THAN 3MM OVER 3000MM):

1. System Descriptions:
 1. High performance self-leveling underlayment resurfacer. Single component, self-leveling, cementitious material designed for easy application as an underlayment for all types of flooring materials. It is used for substrate repair and leveling.
 2. Products: Subject to compliance with applicable fire, health, environmental, and safety requirements for storage, handling, installation, and clean up. Gypsum-based products are unacceptable.
2. System Characteristics:
 1. Wearing Surface: smooth
 2. Thickness: Confirm existing conditions, ranging from feathered edge to 1", per application. Applications greater than 1" require additional 3/8" aggregate to mix or as recommended by manufacturer.
3. Underlayment shall be calcium aluminate cement-based, containing Portland cement. Gypsum-based products are unacceptable.
4. Compressive Strength: Minimum 4100 psi in 28 days in accordance with ASTM C109/C109M.
5. Flexural Strength: Minimum 1000 psi in 28 days in accordance with ASTM C348.
6. Dry Time: Underlayment shall receive the application of moisture insensitive tile in 6 hours, floor coverings in 16 hours, and resinous flooring in 3-7 days.
7. Primer: compatible and as recommended by manufacturer for use over intended substrate.
8. System Components: Manufacturer's standard components that are compatible with each other and as follows:
 1. Primer:
 1. Resin: copolymer
 2. Formulation Description: single component ready to use.

3. Application Method: Squeegee and medium nap roller. All puddles shall be removed, and material shall be allowed to dry, 1-2 hours at 70F/21C.
 4. Number of Coats: (1) one.
2. Grout Resurfacing Base:
 1. Formulation Description: Single component, cementitious self-leveling high-early and high-ultimate strength grout.
 2. Application Method: colloidal mix pump, cam rake, spike roll.
 - 1) Thickness of Coats: Per architectural scope, 1" lifts.
 - 2) Number of Coats: More than one if needed.
 3. Aggregates: for applications greater than 1inch, require additional 3/8" aggregate to mix.

Property	Test	Value
Compressive Strength	ASTM C109/C109M	2,200 psi @ 24 hrs 3,000 psi @ 7 days
Initial set time Final Set time	ASTM C191	30-45 min. 1 to 1.5 hours
Bond Strength	ASTM D7234	100% bond to concrete failure

2.3 CEMENTITIOUS TROWEL-APPLIED UNDERLAYMENT(NOT SUITABLE FOR RESINOUS FLOOR FINISHES)

1. Underlayment shall be calcium aluminate cement-based, containing Portland cement. Gypsum-based products are unacceptable.
2. Compressive Strength: Minimum 4000 psi in 28 days
3. Trowel-applied underlayment shall not contain silica quartz (sand).
4. Dry Time: Underlayment shall receive the application of floor covering in 15-20 minutes.

PART 3 - EXECUTION

3.1 ENVIRONMENTAL REQUIREMENTS

1. Maintain ambient temperature of work areas at not less than 16 degree C (60 degrees F), without interruption, for not less than 24 hours before testing and not less than three days after testing.

2. Maintain higher temperatures for a longer period of time where required by manufacturer's recommendation.
3. Do not install materials when the temperatures of the substrate or materials are not within 60-85 degrees F/ 16-30 degrees C.

3.2 SURFACE PREPARATION

1. Existing concrete slabs with existing floor coverings:
 1. Conduct visual observation of existing floor covering for adhesion, water damage, alkaline deposits, and other defects.
 2. Remove existing floor covering and adhesives. Comply with local, state and federal regulations and the RFCI Recommended Work Practices for Removal of Resilient Floor Coverings, as applicable to the floor covering being removed.
2. Concrete shall meet the requirements of ASTM F710 and be sound, solid, clean, and free of all oil, grease, dirt, curing compounds, and any substance that might act as a bond-breaker before application. As required prepare slab by mechanical methods. No chemicals or solvents shall be used.
3. General: Prepare and clean substrates according to flooring manufacturer's written instructions for substrate indicated.
4. Prepare concrete substrates per ASTM D4259 as follows:
 1. Dry abrasive blasting.
 2. Wet abrasive blasting.
 3. Vacuum-assisted abrasive blasting.
 4. Centrifugal-shot abrasive blasting.
 5. Comply with manufacturer's written instructions.
5. Repair damaged and deteriorated concrete according to flooring manufacturer's written recommendations.
6. Verify that concrete substrates are dry.
7. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with application only after substrates have maximum moisture-vapor-emission rate of per flooring manufacturer's formal and project specific written recommendation.
8. Perform in situ probe test, ASTM F2170. Proceed with application only after substrates do not exceed a maximum potential equilibrium relative humidity

per flooring manufacture's formal and project specific written recommendation.

9. Provide a written report showing test placement and results.
10. Prepare joints in accordance with 07900 – Sealants.
11. Alkalinity: Measure surface pH in accordance with procedures provided in ASTM F710 or as outlined by qualified testing agency or flooring manufacturer's technical representative.
12. Tolerances: Subsurface shall meet the flatness and levelness tolerance specified on drawings or recommended by the floor finish manufacturer. Tolerance shall also not to exceed 1/4" deviation in 10'. As required, install underlayment to achieve required tolerance.
13. Other Subsurface: For all other subsurface conditions, such as wood or metal, contact the floor finish or underlayment manufacturer, as appropriate, for proper preparation practices.

3.3 MOISTURE REMEDIATION COATING:

1. Where results of relative humidity testing (ASTM F2170) exceed the requirements of the specified flooring manufacturer, apply remedial coating as specified to correct excessive moisture condition.
2. Prior to remedial floor coating installation mechanically prepare the concrete surface to provide a concrete surface profile in accordance with ASTM D4259.
3. Mix and apply moisture remediation coating in accordance with manufacturer's instructions.

3.4 CEMENTITIOUS UNDERLAYMENT:

1. Install cementitious self-leveling underlayment as required to correct surface defects, floor flatness or levelness corrections to meet the tolerance requirements as or detailed on drawings, address non-moving cracks or joints, provide a smooth surface for the installation of floor covering, or meet elevation requirements detailed on drawings.
2. Mix and apply in accordance with manufacturer's instructions.

3.5 PROTECTION:

1. Prior to the installation of the finish flooring, the surface of the underlayment should be protected from abuse by other trades by the use of plywood, tempered hardwood, or other suitable protection course.

3.6 FIELD QUALITY CONTROL

1. Where specified, field sampling of products shall be conducted by a qualified, independent testing facility.

END OF SECTION

PART 1 - GENERAL

1. GENERAL REQUIREMENTS:
 1. Division One is part of this Section and shall apply as if repeated here.
2. REFERENCE STANDARDS:
 1. Do tile work to Installation Manual 2000 "Quarry Tile and Ceramic Tile", produced by Terrazzo Tile and Marble Association of Canada (TTMAC), except where specified otherwise.
 2. Contractor shall have been and still be a current member of the TTMAC.
3. MAINTENANCE DATA:
 1. Provide maintenance data for tile work.
4. MAINTENANCE MATERIALS:
 1. Provide minimum 2% of each type and colour of porcelain tile required for project maintenance use. Store where directed.
 2. Maintenance material to be of same production run as installed material.
5. ENVIRONMENTAL REQUIREMENTS:
 1. Air temperature and structural base temperature at porcelain tile and ceramic installation area must be above 54°F (12°C) for 48 hours before, during and 48 hours after installation.
6. SAMPLES:
 1. Submit 1'-0" x 1'-0" (300 mm x 300 mm) samples of each type, colour, texture, size and pattern of tile to be used for the approval of the Architect before installation.
7. SHOP DRAWINGS:
 1. **Porcelain and Ceramic Tile: submit shop drawings showing expansion joint, control joint locations and pattern layouts for Architect's approval.**
8. ASSEMBLY:
 1. All installation assemblies will compose of materials from the same

manufacturer and be completely compatible. The completed assembly will pass the service requirements "Extra Heavy Duty" (Passing ASTM C627 - Cycles 1 through 14) as described in the TTMAC Specification Guide and TCA Handbook (Page 10).

PART 2 - PRODUCTS

1. Tiles:

1. Tile: Conforming to CGSB 75-GP-1A.

2. Colours: Indicated for ceramic, porcelain and glass tiles are for tendering purposes. Final colour selection to be confirmed by Architect prior to installation. Three colours to be selected from full range with one colour as the field from price group 2 and two colours as accent from price group 4.

3. NOTE: Provide round edge, round edge both sides, cove base, nosing's and tiles to do all work as per drawings and as required.

4. Porcelain Tiles: (coordinate with room finish schedules)

.1 PT1 - Wall Tile: Equal to Daltile, Imagica, light polished 12" x 24" (305mm x 610mm). Colour to be selected, complete with Schluter, Schiene. Base to be of same wall tile.

.2 PT2- Floor Tile: Equal to Stone Tile, Woodtalk 100mm x 100mm (4" x 4"), and cut tile base 4" x 36" at PT2 locations. Colour to be selected.

.3 PT3 – Base Tile: Equal to 4" x 24" (100mm x 610mm) cut tile of field porcelain tile.

moldings or Stainless Architectural Supply www.sasmfg.com

5. Tactile Warning Surface Indicator (TWSI) Tile:

.1 12" x 12" x 7/16" (300mm x 300mm x 10mm) tile by Kinesik Engineered Products (905-330-9233). Tile to have truncated

domes conforming to latest OBC requirements. Colour to be **selected**

.2 Mortar Beds:

1. For Walls: 1 part Portland Cement: 1/5 to 1/2 parts hydrated lime; 4 parts sand; gauged with Custom - Flex latex by Custom Building Products as per manufacturer's directions. All Custom Building Products are distributed by Brolain Distributors Ltd. 519-740-9311. Approved equal manufacturer is TEC. NOTE: Adhesive application will not be accepted.
2. For Floors: 1 part Portland Cement: 4 parts sand; gauged with Custom - Flex latex by Custom Building Products as per manufacturer's directions. Approved equal manufacturer is TEC. NOTE: Adhesive application will not be accepted.

.3 Thin Set Mortar: Master Blend Thin-Set Mortar gauged with Custom - Flex latex by Custom Building Products as per manufacturer's directions. Approved equal manufacturer is TEC

.4 Porcelain Tile Grout and Joint Filler: Classic-Blend Grout by Custom Building Products floor grout and joint filler mixed with Custom's Acrylic Mortar Admix grout as per manufacturer's directions in colours as selected by Architect. Approved equal manufacturer is TEC. One colour to be selected by Architect.

.5 Ceramic Tile Grout and Joint Filler: Custom 100% Solids epoxy by Custom Building Products grout system. Approved equal manufacturer is TEC. One colour to be selected by Architect.

.6 Glass Tile Grout & Joint Filler: Laticrete, Spectra LOCK 2000 IG 3 part 100% solids epoxy, as recommended by manufacturer for floor installation.

8. Caulking:

.1 Flexible caulking conforming to CGSB 19-GP.22M: Dow Corning 786 and CGE 1702 Sanitary Sealant. Colours as selected by Architect.

.2 Metal Transition Strips: 14 gauge zinc divider strip. Add the following transition strips types by Schluter for the following locations (height of transition strips to suit tile thickness):

- .3 Between PT and Concrete: Reno Ramp (satin aluminum finish) by Schluter Systems.
- .4 Between PT and Epoxy Coated Seamless Floor: Reno U-AEU (satin aluminum finish) by Schluter Systems where PT is installed first with a coat of epoxy installed second; Reno-Ramp (satin aluminum finish) by Schluter Systems where PT is installed second on top of epoxy coat.
- .5** Between PT and Linoleum, VCT, Sheet Vinyl, Rubber Floor: Reno U, AETK (satin aluminum finish) by Schluter Systems.
- .6** **Renovation:**
Between PT and Linoleum, VCT, Sheet Vinyl, Rubber Floor: Reno V, model Reno-AEV T/B by Schluter Systems.
- .7 Between PT and Sport Flooring: Reno-T by Schluter Systems.
- .8 Between PT and Carpet: SCHIENE, AETK (satin aluminum finish) by Schluter Systems and Reno-TK by Schluter Systems. Verify depth of carpet and substrate, SCHIENE for thick carpet, Reno-TK for thinner carpet.
- .9 Between PT and CET: Reno-U, AETK (satin aluminum finish) by Schluter Systems.
- .10 Between PT and Terrazzo: Schiene by Schluter Systems.
- 9. Waterproof Membrane System at shower ceramic tile areas:
 - .1 Waterproof membrane shall be Laticrete liquid applied waterproof Membrane 9235 by Laticrete and rot-proof, hi-tensile cloth specifically treated for use with Laticrete Waterproofing as manufactured by Laticrete International Inc. and distributed by Ceratec Inc., Weston, Ontario (416) 743-5514. Approved equal is Schluter Kerdi matting system distributed by Centura and installed as per Schluter printed installation instructions.
 - .2 Finished membrane application shall meet the following requirements:

- | | | |
|----|---|---|
| 1. | Thickness | 0.02" (20 mils) min. |
| 2. | Water Permeability | Nil |
| 3. | Service Temperatures | -20 deg. F. to +180 deg. F.
-23 deg. C to + 82 deg. C. |
| 4. | Tensile Strength | 415 lbs. per lineal in. (74
kg/cm) |
| 5. | The membrane shall be resistant to urine, sugar, brine and milk waste products. | |

- .3 Where waterproof membrane is installed, tile is to be installed using Laticrete 4237 Latex thin set method and Laticrete latapoxy S.P.100 stainless epoxy grout.

NOTE: Other manufacturers must obtain approval from the Architect at least seven (7) days prior to tender closing. Approval must be in writing.

- .4 Wire Mesh Reinforcing: 2" x 2" (51 mm x 51 mm x 1.6 mm) galvanized wire mesh reinforcing.
- .5 Floor Sealer and Protective Coating: Aqua Mix Penetrating Sealer by Aqua Mix Inc.
- .6 Cleaner: Aqua Mix Miracle Cleaner by Aqua Mix Inc. or as recommended by tile and grout manufacturers.

2. Uncoupling membrane – Under Floor Layout:

- .1 Schluter®-DITRA
1/8" (3 mm) thick, orange, high-density polyethylene membrane with a grid structure of 1/2" x 1/2" (12 mm x 12 mm) square cavities, each cut back in a dovetail configuration, and a polypropylene anchoring fleece laminated to its underside. Conforms to definition for uncoupling membranes in the Tile Council of North America Handbook for Ceramic Tile Installation; and meets or exceeds the requirements of the "American national standard specifications for load bearing, bonded, waterproof membranes for thin-set ceramic tile and dimension stone installation A118.10," and is listed by CUPC®, and is evaluated by ICC-ES (see Report No. ESR-2467 and

PMG 1204).

- .2 Waterproofing seaming membrane:
Provide with Schluter®-KERDI-BAND Seams and Corners material 0.004" (4 mil) thick, orange polyethylene membrane, with polypropylene fleece laminated on both sides.

3. Control Joints:

1. Porcelain Tile:

- .1 Floor to Floor: Schluter Dilex KSN (height to suit tile thickness).
Colour as selected by Architect, **stainless steel**.
- .2 Floor to Wall: Schluter Dilex KSA (height to suit tile thickness).
Colour as selected by Architect, **stainless steel**.

PART 3 - EXECUTION:

1. EXAMINATION:

1. Examine substrates before commencing work to ensure they are satisfactory. Defective work resulting from installation on unsatisfactory surfaces will be considered the responsibility of those performing the work of this section.

2. WORKMANSHIP:

1. Regard recommendations, installation methods specified and illustrated in Terrazzo, Tile and Marble Association Manual No. 2000, and applicable manufacturer's instructions as minimum acceptable standard accept as varied by this Specification.
2. Fit tile units around corners, fitments, fixtures, drains and other built-in objects to maintain uniform joint appearance. Make cut edges smooth, even and free from chipping. Edges resulting from splitting not acceptable.
3. Maximum surface tolerance 1:800.
4. Make joints between tiles uniform. Tile joints shall be approximately 1/4" (6

mm) wide for porcelain tile, plumb, straight, true, even and with adjacent units flush. Align patterns.

5. Drill holes for fixing accessories of other trades.
 6. Finish surfaces flat and level (ensure leveler is used to accomplish this) or sloped and graded to drain where floor drains occur.
 7. Sound tiles after setting and replace hollow sounding units to obtain full bond.
 8. Make internal angles square, external angles bull nosed.
 9. Install transition strips at junction of tile flooring and dissimilar material. Where transition occurs in a doorway, transition strip to be below door.
 10. Clean installed tile surfaces progressively as work proceeds. Do not allow mortar to stain absorbent tile. Do not use acids for cleaning. Seal in accordance with manufacturer's approved products and in accordance with TTMAC certified products only.
 11. Layout borders, defined lines, accent patterns and bands wherever they occur prior to setting tile. Keep inner edges of borders against fields or wall panels straight.
 12. Install base trim, control joints, and beveled reducing strips as per manufacturer's instructions.
3. EXPANSION AND CONTROL JOINTS:
1. Control joints to be located directly on block control joints and concrete floor control joints and expansion joints.
 2. Control joints are also to be placed where tile abuts other hard materials.
 3. Install control joints in tile floors at 10'-0" (3050 mm) max. o.c. and at 20'-0" (6100 mm) max o.c. at wall locations. Align joints at concrete floor and masonry control joint locations as well.
 4. Allow for control joints at the perimeter junction to all walls, around all columns.

5. Submit shop drawings to indicate layout of control joints. Porcelain tile control joints shall occur directly above a concrete floor control joint therefore minimizing the cutting of porcelain tile.
 6. The approved control joint shop drawing layout shall be marked onto the concrete floor slabs by the porcelain tile contractor and the actual cutting of the control joints in the concrete floor slab shall be done by the concrete floor finisher.
 7. It is the responsibility of the porcelain tile contractor and the concrete floor finisher to co-ordinate through the project manager the exact location of floor control joints.
 8. At expansion joint locations install back to back metal transition strips at each side of joint then caulk between.
4. UNDER FLOOR LAYMENT:
1. Installation of the uncoupling membrane as per written manufacturer's instructions.
 2. Apply the thin-set mortar using recommended notched trowel.
 3. Apply the uncoupling membrane & embed the matting into the mortar, making sure to observe the open time of the bonding mortar.
 4. Use the recommended roller weight to ensure bonding of the membrane to the bonding mortar.
 5. Install tile as per written manufacturer's instructions.
5. WATERPROOF MEMBRANE SYSTEM:
1. Install Laticrete 9235 Waterproof Membrane System with reinforced fabric at all new ceramic tile on levelling coats over concrete and masonry locations at shower walls, floors and ceilings and Drying Area, and as indicated on drawings.
 2. Installation shall be made in strict accordance with the manufacturer's instructions.

3. Surface Preparation: Surface to be waterproofed should be plumb and true within 1/4 inch (6 mm) in 10 ft.(3m) as per 3.4 (b) above. Dry, dusty concrete slabs must be dampened and swept off. Installations may be made on a damp surface. Surface should be smooth, clean and free from dirt, grease, concrete sealers or curing compounds.

6. Installation:
 1. Install the waterproofing liquid and fabric at ceilings, walls, floors and into the drains according to the approved details.
 2. Use a brush or roller to apply a layer of liquid waterproofing slightly wider than the width of the fabric.
 3. Immediately install the reinforcing fabric into the liquid. Install a final layer of liquid to completely seal the fabric.
 4. Set tile with Laticrete 4237 Latex Thin Set method and grout with Latapoxy SP-100 stainless grout. Colour as selected by Architect.

7. PORCELAIN TILE:
 1. Refer to TTMAC Specifications and Detail No. 311F-2000 Detail A, thin set method of porcelain tile floor to concrete slab, and Detail No. 303W-2000 thin set method of porcelain tile base to wall.
 2. Install tile using thin set mortar, in accordance with manufacturer's instructions.
 3. Provide levelling coat where required to achieve a level sub-floor prior to installation. Existing wood sub-floors may require additional plywood flooring coverage and shimming to achieve this, install as required.
 4. Provide leveling coat at all wall tile locations.
 5. Wall to wall, floor to wall, wall to ceiling tiles should not touch to stop transfer of noise and vibrations from one plane to the other, all joints are to be caulked (wall tile should start above floor tile with caulking space typical).
 6. Porcelain tile base to be installed on first course of block without rounded corners (i.e. square). Block to be ground above base to match radius of

block courses above first course.

7. Install porcelain tile base using Schluter, Jolly stainless steel cap (thickness to suit tile) complete with 90 degree corner return caps installed as per manufacturer's instructions.
8. Install porcelain tile base using Schluter, Jolly stainless steel at all vertical outside corners (thickness to suit tile) installed as per manufacturer's instructions.

8. GROUTING OF PORCELAIN TILE AND GLASS MOSAIC TILE:

1. Pack joints solid with grout at porcelain tile using a plastic or non-staining trowel.
2. Allow joints to stiffen before finishing.
3. Remove excess grout with clean cloths.
4. Grout shall be mixed according to manufacturer's instructions. Colours as selected by Architect.
5. Clean all surfaces with clean solution specified as per manufacturer's instructions.

9. CAULKING:

1. Install continuous caulking neatly and tool concave around base of all door frames and at all inside corners at 'wall to wall' and 'wall to ceiling' and 'wall to floor' (install at 'floor to wall' locations even where there is a base noted to cover this joint up) transition locations to stop transfer of noise and vibrations. Tiles at plane transitions should not touch, wall tile should start above floor tile with caulking space, etc. typical.

10. CLEANING AND REMEDIAL WORK:

1. Clean tile surfaces upon completion of grouting as per tile manufacturer printed instructions using cleaning agents and procedures recommended by the manufacturers of tile and grout.
2. Remove all grout haze, observing tile manufacturer's recommendations as to use of acid and chemical cleaners. (Do not use muriatic acid on tile

work or pavers.)

3. Rinse tile work thoroughly with clean water before and after using chemical cleaners.
4. After setting, all tile surfaces shall be sounded and visually inspected and wherever any hollow backed or damaged tiles are found they shall be removed and replaced with matching tiles.

11. PROTECTION FROM CONSTRUCTION DIRT:

1. Seal cementitious grout joints and unglazed tile with "Aqua Mix Penetrating Sealer" by Aqua Mix Inc. or as recommended by manufacturer.
2. Cover all tile floors with heavy duty non-staining cotton reinforced paper or 6 mil vapour barrier taped into place.
3. Prior to final acceptance of tile work, remove paper and clean with "Aqua-Mix Miracle Cleaner" by Aqua Mix Inc. or as recommended by manufacturer.

12. PROTECTION FROM TRAFFIC:

1. Prohibit all foot and wheel traffic from using newly tiled floors for at least three days, preferably seven days after grouting is completed.
2. Place large, flat boards in walkways and wheel ways for seven days, where use of newly tiled floor is unavoidable.
3. Leave finished installation clean and free of cracked, chipped, brock, unbonded or otherwise defective tile work. Replace damaged or defective work.
4. Provide cardboard walkway using recycled boxes to protect finished work during construction.

END OF SECTION

PART 1 GENERAL

1. GENERAL REQUIREMENTS

1. Division One is a part of this Section and shall apply as if repeated here.

2. DESCRIPTION OF SYSTEMS

1. Lay-in Tile System: Exposed suspended tee-bar system accommodating 2'-0" x 4'-0" (610 mm x 1220 mm), acoustical panels in areas as indicated drawings and reflected ceiling plans as acoustical tile ceiling.
2. All tile and suspension systems shall comply to U.L.C. Design as indicated on drawings.

3. SAMPLES

1. Submit for approval, two samples (to match existing as closely as possible) of tile to be used in the project.

4. WORK INCLUDED

1. This contractor shall supply and install all acoustic tile and required accessories as indicated on the working drawings, room finish schedule, including the following:
 1. All non-combustible ceiling boards.
 2. All exposed "T" grid suspension systems.

5. MAINTENANCE MATERIALS

1. Deliver acoustical units in packages for maintenance use amounting to 3% of gross ceiling area for each lay-in panel type. Store where directed. Clearly identify packages.
2. Maintenance materials shall be of same production run as installed materials.

6. ENVIRONMENTAL CONDITIONS

1. Commence installation only after building has been enclosed and dust generating activities have been completed.
2. Permit wet work to dry completely before commencement of installation.
3. Ensure that a uniform minimum temperature of 15 deg. C. and humidity of 20-40% before, during, and after installation is maintained.

7. LETTER OF CERTIFICATION

1. The Contractor, together with manufacturer, shall submit a written confirmation, signed by manufacturer's registered professional engineer, stating that the suspended ceiling system will provide adequate support for electrical fixtures, as required by current bulletin of the ESA of Ontario Hydro. NOTE: all electrical fixtures to have independent supports in fire rated ceilings.

8. WARRANTY

1. Provide 10-year warranty on ceiling tiles for humidity and sag resistance.

PART 2 PRODUCTS

1. Lay-in Tile System:

1. Hangers: Min. No. 12 (2.5 mm) SWG galvanized mild steel hanger wire - 24" (600 mm) o.c. or galvanized steel wire of size capable of safety supporting anticipated ceiling system and loading.

2. Tees: Donn Suspension Systems by C.G.C. (Typical Lay In)

3. Tees: Armstrong Prelude XL 15/16" suspension Systems for square lay in tile system

1. Main Tees: .021" (.53 mm) thick cold rolled steel, double web, with rectangular bulb section at least 1 1/2" (38 mm) high. Fabricate with punched cross tee holes at not greater than 16" (400 mm) o.c. and hanger wire holes at 2" (50 mm) o.c. Exposed flange shall be 15/16" (23.8 mm) wide and not less than .009" (.23 mm) thick cold rolled steel.

2. Cross Tees: Double web design with rectangular bulb; web extending to form a positive interlock with main tees in same exposed flange width.

3. See lay-in panel types for width of Tees to be used with each tile type.

4. Accessories:

1. Miscellaneous approved clips, splicers, screws, nails and other standard types to suit applicable conditions. Provide special accessories as required. Accessories shall be galvanized after forming.
2. Standard edge moulding as manufactured by system manufacturer to suit applicable details. Moulding shall be formed of zinc coated steel.

3. Provide Armstrong Impact Clip System Item No. 414 system. Provide accessible type clips where access is required (coordinate with mechanical and electrical for locations)
5. Finish:
 1. Tees, edge mouldings, and exposed accessories shall be finished with baked, non-yellowing, low sheen colour to match colour of lay-in panels. Colour to be White.
6. Lay-in Panels:
 1. Install tile types where acoustic tile is indicated on room finish schedule. Mineral tile types are as listed below:

AT1: "Cortega" #824 - 24" x 24" x 5/8" (610mm x 610mm x 16mm) or 24" x 48" x 5/8" (610mm x 1220mm x 16mm) with square lay-in edge detail as manufactured by Armstrong.
7. Tie Wire: 1.2 mm galvanized annealed steel wire.
8. Inserts and attachments to Structure for Hanger Connections: to suit conditions and loadings, galvanized after fabrication.

PART 3 EXECUTION

1. WORKMANSHIP

1. Installation shall be by skilled mechanics and in strict accordance with system manufacturer's printed directions to produce a first class, flush finished surface in true plane and free from drooping, warped, uneven joints, damaged tile or panels. Butt joints tightly.
2. Consult with mechanical and electrical trades to co-ordinate and arrange work to accommodate recessed fixtures, diffusers, grilles, and other similar items, where indicated on mechanical and electrical drawings. Recessed items shall replace or be centred in acoustical units.
3. Frame around recessed fixtures, diffusers, grilles and openings and where normally required in good standard practice.
4. Provide all furring required and construct drywall bulkhead, incorporated as part of best standard practice to Architect's approval.
5. Provide and install protection panels and/or five-sided box enclosures at recessed lighting fixtures, speaker boxes, diffusers, duct openings, firestop flaps, etc. as specified in the applicable ULC assembly specification. Approval of enclosures and protection will be by Architect and/or Municipal Authorities.

2. ERECTION

1. Lay-in Tile System

1. Install ceiling suspension system to ASTM C636-76 and manufacturer's instructions, except where specified otherwise.
2. Supply hangers and inserts to support the grid in time to be installed in structural system if required.
3. Hangers for acoustic systems shall be spaced to comply to U.L.C. Design, approximately 4 ft. (1200 mm) centres both ways and where normally required in good standard practice.
4. Secure hangers firmly.
5. Erect carrying channels for suspended systems of required elevation and level to tolerance of 1/8" (3.2 mm) over 12 ft. (3650 mm). Frame around recessed fixtures, diffusers, grilles and openings and where normally required in good standard practice. Furr around ducts, beams, bulkheads or the like, as shown or required by U.L.C. Standard.
6. Ensure that the suspension system supports the completed assembly, including all superimposed loads, such as lighting fixtures, diffusers and grilles, with a maximum deflection of 1/360 of the span. Provide supplemental hangers within 6" (150 mm) of each corner and at maximum 2'-0" (610 mm) around perimeter of light fixtures.
7. Attach exposed tees at centres required in good standard practice.
8. Install expansion joints in all main beams as required by U.L.C.
9. Provide angle wall mouldings at junctions of ceilings and vertical surfaces.
10. Provide spring clips to ensure tight installation, in rooms having an area less than 20 sq. ft. (1800 mm²).
11. Provide lay-in tile and grid to meet fire rating at all fire rated ceilings.
12. Erect ceiling system at required elevation and level to tolerance of 1/8" (3 mm) in 12'-0" (3660 mm).
13. Cut reveal edges to match factory detail at all reveal edge lay-in ceiling that needs cutting to fit grid size.

3. FIXTURE SUSPENSION

1. Make provisions for carrying flush mounted and recessed fixtures on suspended ceilings, using 4 hangers per fixture. Consult and coordinate with Electrical and Mechanical Trades.
2. The suspended ceiling system must comply with the current bulletin from the Electrical Inspection Department of Ontario Hydro regarding "Lighting Fixtures in Suspended Ceilings".
3. It is the responsibility of this contractor to supply the Architect with a letter stating that the suspension system is capable of holding the electrical fixtures as shown on the electrical drawings and as required by the above bulletin of the Electrical Inspection Department of Ontario Hydro.
4. MITRED JOINTS
 1. "T" bar ceiling grid to be mitred at the outside corners.
5. ACOUSTICAL UNITS
 1. Install acoustical units parallel to building lines to produce uniform borders and with edge units not less than 50% of unit width.
 2. Accurately scribe and cut acoustical units to fit recessed items and adjacent work. Butt joints tight; terminate edges with moulding.
6. SPECIAL CLEANING
 1. Keep acoustical panel installation and all components clean.
 2. Remove and replace damaged or improperly installed units.
7. MECHANICAL EQUIPMENT ACCESS
 1. Install "T" bar system to allow it to be removed easily at areas where mechanical units occur to allow units to be easily removed. NOTE: Stop main "T" on each side of equipment access.
8. IMPACT CLIPS
 1. Install Impact Clip System at all acoustic tile ceiling areas.
9. CERTIFICATION
 1. Provide at completion of work a written certification that all ceiling conforms to the requirements of the ULC design criteria for fire rated assemblies and that the suspended ceiling will provide adequate support electrical fixtures as per current bulletin of the ESA of Ontario Hydro.

END OF SECTION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1. Division 1 General Requirements are a part of this Section and shall apply as if repeated here.

1.2 WORK INCLUDED

1. Provide rubber sports flooring for locations as shown on the Drawings.

1.3 QUALITY ASSURANCE

1. Employ fully trained mechanics who are regularly employed in this field.

1.4 REJECTIONS

1. Defective materials or workmanship whenever found at any time prior to final acceptance of the work shall be rejected regardless of previous inspection. Inspection will not relieve responsibility but is a precaution against oversight and error.
2. Remove and replace defective materials and work of other trades affected by this replacement, at no additional cost to the Owner.

1.5 EXAMINATION

1. Report to the Architect, in writing, all defects of surfaces or work prepared by other trades and on unsatisfactory site conditions.
2. This Contractor shall report in writing to the General Contractor and to the Architect any defects of surfaces or work prepared by other trades and on unsatisfactory site conditions, which affect the quality or dimensions of this Contractor's work. Commencement of this Contractor's work shall imply complete acceptance of all work by other trades.
3. Thoroughly examine all surfaces scheduled to receive work of this Section to see that they are secure, rigid, true and not liable to impair performance or appearance.
4. Commencement of work shall imply total acceptance of surface and site conditions.

1.6 MATERIAL DELIVERY AND STORAGE

1. Deliver and store all flooring and required installation materials in original wrappings, cartons or containers clearly marked as to type, colour and manufacturer.
2. Store in a dry area under cover.

.7 JOB CONDITIONS

1. Co-operate in co-ordinating work of other Sections with work of this Section, in order that the work may proceed in an orderly and effective manner.

1.8 MAINTENANCE INSTRUCTIONS & MATERIALS

1. Deliver 3 sets of maintenance instructions to the General Contractor for the manuals.
2. Provide 2% of total area of rubber tile for Owner's future maintenance use.

1.9 WARRANTY

1. Provide a written wear warranty of work of this Section against defects in material and workmanship for a period of five (5) years from the date of publication of the Certificate of Substantial Performance as per G.C. 12.3 of CCDC Document 2 – 2008.

1.10 SAMPLES

1. Submit duplicate 300 x 300 mm sample pieces of sheet material in accordance with Section 01300 – Submittals.

1.11 ENVIRONMENTAL REQUIREMENTS

1. Maintain air temperature and structural base temperature at flooring installation area above 21°C (70° F.) for 72 hours before, during and maintain temperature after installation until occupied by Owner.

PART 2 PRODUCTS

2.1 GENERAL

1. Materials shall be new and in perfect condition, free from defects impairing physical or appearance performance.

2.2 MATERIALS

1. **V-SPORT 710** "LESS GLUE" as manufactured by Caliber Sport Systems. Colour – to be selected.
- 2.
3. **OmniSports 7.1** Greenlay as manufactured by **Tarkett. Colour – to be selected.**
3. Adhesives: Amtico adhesive No. 529 or No. 530 as recommended by flooring manufacturer for specific material on applicable substrate.
4. Sub-floor filler and leveller: as recommended by sports flooring manufacturer for use with their product.
5. Metal edge strips: aluminium extruded, smooth, mill finish with lip to extend under floor finish, shoulder flush with top of adjacent floor finish.

PART 3 EXECUTION

3.1 SUB-FLOOR TREATMENT

1. Remove sub-floor ridges and bumps. Fill low spots, cracks, control and expansion joints, holes and other defects with sub-floor filler.
2. Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured and dry.
3. Machine sand concrete smooth then dry vacuum clean entire floor area.

3.2 FLOORING APPLICATION

1. Apply adhesive uniformly using recommended trowel. Do not spread more adhesive than can be covered by flooring before initial set takes place.
2. Lay flooring with seams parallel to building lines to produce symmetrical tile pattern. Border widths minimum 1/2 width of full material.
3. Set tile in pattern as directed by Architect. Distribute tiles having various tones or texture evenly over entire floor area to avoid patches or streaks and to produce a homogenous blend.
4. Make tile joints flush, uniform, in straight lines and as inconspicuous as possible.
5. Cut tile and fit neatly around fixed or excessively heavy objects.

-
6. As installation progresses roll flooring with a 100 lb. (45 kg) min. steel roller, pushing to ensure full adhesion.
 7. Check and immediately wipe off any excess adhesive oozing through the seams.
 8. Terminate flooring at centre line of door in openings where adjacent floor finish or colour is dissimilar.
 9. Install metal edge strips at unprotected or exposed edges where flooring terminates.

3.3 CLEANING

1. As work progresses, remove excess adhesive from floor, base, and wall surfaces without damage.
2. Clean floor surface to flooring manufacturer's printed instructions.

3.4 PROTECTION OF FINISHED WORK

1. Protect new floors with heavy cotton reinforced paper or polyethylene sheets with taped joints from time of final set of adhesive until final inspection.
2. Prohibit traffic on floor for 48 hours after installation.

END OF SECTION

PART 1 GENERAL

1. GENERAL REQUIREMENTS:
 1. Division One is a part of this Section and shall apply as if repeated here.
2. SAMPLES:
 1. Submit full size tiles in duplicate, in each colour or design to be used, for approval of the Architect.
3. MAINTENANCE INSTRUCTIONS:
 1. Submit 3 copies maintenance manual at completion of work in accordance with Section 01015.
4. DELIVERY, STORAGE AND HANDLING:
 1. Deliver materials in original containers with manufacturer's seals and labels intact. Maintain temperature of storage area at 70°F (21°C) for 48 hours prior to installation.
5. ENVIRONMENTAL REQUIREMENTS:
 1. Maintain minimum 70°F (21°C) air temperature at flooring installation area during installation and for 72 hours prior to and until floor area is occupied by Owner.
6. MAINTENANCE MATERIALS:
 1. Leave 2% of each colour, type and size of tile installed, with Owner for replacement purposes. Clearly mark containers. Material shall be from same production run as the material installed.
7. PROTECTION:
 1. General Contractor's Responsibility: In each location immediately following installation, protect new floors, if work is to be done after flooring installed with heavy cotton reinforced paper or polyethylene taped at joints and maintain in place until Architect gives instructions for the removal of temporary protection. Work shall be handed over to the Owner free of blemishes and in perfect condition.

PART 2 PRODUCTS

1. MATERIALS:

1. Primers and Adhesives: Environmentally friendly materials as recommended in writing by Flooring and base manufacturer, and approved by the Architect before application, to suit type of sub floor and wall finish for this project. Adhesive shall produce good and waterproof bond between applicable substrate and flooring.
1. Sub-Floor Filler: Adrex SD-F Feather Finish portland cement-based filler by Ardex Engineered Cements and distributed by Brolain Distributors Ltd. (519-740-9311). Levelrock brand Super Smooth Patching Compound by C.G.C. is an approved alternative product. Coordinate with flooring manufacturer for compatibility.
2. Sheet Flooring: 'IQ Granit' by Tarkett conforming to C.S.A. A126-1984. Provide in roll size suitable for minimum number of seams. All seams to be welded.
Note colors below to be confirmed with Architect prior to ordering for installation:
 1. Colour: Granit ACORN 0428.
 2. Acceptable Alternates: Armstrong Medintone/Medintech, PolyFlor Palletone.
3. Rubber Base: 1/8" (3.2 mm) thick, 4" (100 mm) as indicated, rubber cove base at resilient locations by Johnsonite. Colour to be Pebble 32 by Johnsonite/Tarkett. Use continuous coil rubber base not 4'-0" (1220 mm) lengths. Approved alternate manufacturers are Amtico and Roppe.
4. Cleaner: Neutral chemical compound as approved by tile manufacturers that will not damage tile or affect its colour.
5. Sealers and Waxes: Type recommended by flooring manufacturers for material type and location and shall be compatible with Owner's sealer and wax. Obtain Owner's approval of sealer and wax product prior to installing VCT.
6. Reducing Strip: strips in thickness as required. Colour as selected by Architect.
7. Metal Edge Trim: Aluminum or brass alloy with lip of edge extending under and with shoulder finishing flush with top of resilient flooring.
8. Concrete Floor Sealer: to C.G.S.B. 25-GP-20m Type 1.
9. Reducers / Transitions: One-piece homogeneous polyvinyl chloride, installed using materials and methods per Manufacturer's written installation instructions. Colour: from Manufacturer's complete line. Style: SSR-XX-B by Johnsonite Inc.

PART 3 EXECUTION

1. INSPECTION:

1. Ensure floor surfaces are smooth and flat to plus or minus 1/8" (3.2 mm) over 10 ft. (3050 mm).
2. Ensure concrete floors are dry by using test methods recommended by manufacturer, and exhibit negative alkalinity, carbonization or dusting. Ascertain nature of curing and/or sealing compound used on concrete and its compatibility with flooring adhesive. Take all required remedial measures. Remove compounds if necessary to ensure that adhesive bonds to concrete.
3. Installation of any part shall constitute acceptance of these surfaces as satisfactory.

2. PREPARATION:

1. Remove sub floor ridges and bumps by light buff grind. Fill low spots, cracks, joints, holes and other defects with sub floor filler.
2. Clean floor and apply trowel and float filler to leave smooth, flat hard surface. Prohibit traffic until filler cured.
3. Split, bumpy or otherwise deformed tile resulting from improperly prepared base, will not be accepted.
4. Prime/seal concrete slab to resilient floor tile manufacturer's printed instructions.
5. Fill all low spots in flooring with high grade latex cement base flashing compound and gently blend in floor level at a rate of 1/8" per 1'-0" (10.5 mm per 100000 mm) to flush resilient flooring with ceramic tile, quarry tile, etc.
6. Power sand concrete floor smooth then dry vacuum clean entire floor area.

3. INSTALLATION - RESILIENT FLOOR TILES:

1. Apply adhesive uniformly to tile manufacturer's directions. Do not spread more adhesive than can be covered by tile before initial set takes place.

2. Lay flooring with joints and seams parallel to building lines to produce a symmetrical tile pattern unless noted otherwise. Tile pattern as indicated on drawings.
 3. Install flooring with minimum tile width half full sizes
 4. Distribute tiles having varying tones or texture evenly over entire floor area to avoid patches or streaks, and to produce homogeneous blend. Reject tiles having undue variations in colour, shade and texture.
 5. Make tile joints flush, uniform, in straight lines and as inconspicuous as possible.
 6. Install tile and colours to form patterns indicated on 9 series drawings.
 7. Set flooring in place, press with 100 lb. (45 kg.) minimum roller to ensure full adhesion.
 8. Cut tile and fit neatly around fixed or excessively heavy objects.
 9. Terminate flooring at centre line of door in door openings where adjacent floor finish is dissimilar.
 10. Install metal edge strips at unprotected edges of flooring.
 11. Use reducing strips at centre line below doors where resilient flooring meets concrete floor or quarry tile.
 12. Allow for random pattern and border in each classroom
4. INSTALLATION – BASE:
1. Layout base to keep number of joints to a minimum.
 2. Install straight and level to variation of plus or minus 1/8" (3.2 mm) over 10'0" (3050 mm) straight edge.
 3. Fill cracks and level irregularities of surfaces to which base is to be applied with filler approved by adhesive manufacturer so as to provide solid backing over entire area behind base. Cement cove base to vertical surfaces so that gaps do not occur behind base, so that front lip of base cove bears firmly and uniformly on floor surface, and so that good and permanent bond is produced between base and surface to which it is applied. Set base tightly in adhesive by using a 7 lb. (3 kg.) roller against wall and floor surfaces. Make end joints flush with gap.
 4. Scribe and fit to door frames and other obstructions.

5. Cope internal corners.
 6. Use full length pieces where possible. Accumulated short lengths at base not permitted.
 7. Supply rubber base for all millwork bases.
 8. Gaps below bottom edge of base will not be accepted.
5. SPECIAL CLEANING:
1. Clean off excess adhesive as work progresses from floor, base and wall surfaces without damage. Upon completion, remove all markings and heel scuffs.
 2. Upon completion, clean floors in accordance with manufacturer's printed instructions.
6. PROTECTION OF FINISHED WORK:
1. Prohibit traffic on floor for 48 hours after installation.
 2. Protect floors as per item 1.7.1 in this Section.
 3. Clean floors and wax during final cleaning just prior to Owner occupying building.
7. WARRANTY
1. Provide minimum 2 year material and installation warranty.

END OF SECTION

PART 1 GENERAL

1. GENERAL REQUIREMENTS

1. Division One, General Requirements, is a part of this Section and shall apply as if repeated here.

2. SUBMITTALS

1. Samples

1. Prepare samples of various finishes for Architect's approval either on site or by submitting samples as directed, at least thirty days before materials are required. Submit samples in triplicate on 8" x 12" (200 mm x 300 mm) material. Identify each sample as to job, finish, formula, colour name, number, sheen name and gloss units, date and name of Subcontractor.

3. PRODUCT HANDLING

1. Delivery and Storage

1. Deliver materials to site in their original containers with label intact and store in spaces directed by Architect. Keep stored materials covered at all times and take all necessary precaution against fire.
2. Provide CO2 fire extinguisher of minimum 20 lbs. (9 kg.) capacity in storage area.

4. ENVIRONMENTAL CONDITIONS

1. Do not paint or finish in unclean or improperly ventilated areas. Do not paint in temperatures lower than 50 degrees F. (10 degrees C.) or varnish in temperatures lower than 65 degrees F. (18 degrees C.) for 24 hours before, during and 48 hours after application.
2. Do not undertake exterior painting at temperatures under 50 degrees F. (10 degrees C.) for 24 hours before, during and 48 hours after application or immediately following rain, frost or dew. Safe levels shall be determined by use of an electronic metre.
3. Test for moisture content in each location immediately before commencing application of paint. Do not apply paint on surfaces where moisture content exceeds 14%. Promptly notify Consultant if such conditions are encountered.
4. Provide approved equipment for testing moisture content of surfaces to

receive paint finishes and have available on Site at all times during Work of this Section.

5. Do not apply paint finish in areas where dust is being generated.

5. PROTECTION

1. Provide metal pans or adequate tarpaulin to protect floors in areas assigned for the storage and mixing of paints.
2. Use sufficient drop cloths and protective coverings for the full protection of floors, furnishings and work not being painted.
3. Leave above areas clean and free from evidence of occupancy upon completion of painting.
4. Protect paint materials from fire and freezing.
5. Keep waste rags in metal drums containing water and remove from building at end of each working shift.

6. FINISH CARPENTRY & ARCHITECTURAL MILLWORK

1. All cabinet millworks must be finished in the shop by Section 06400. All other finish carpentry materials (including miscellaneous brackets for benches) to be finished by Section 09900.

7. SCOPE OF WORK

1. With exceptions noted above or specifically called for in other Sections of the Specification, all paintwork is included in the scope of this Section.
2. NOTE: In locations where Drawings do not call for paint or similar finish on walls and/or ceilings, the intent of this Specification is that all exposed unpainted metal surfaces shall be painted.
3. Paint exposed drywall and the like in locations where finish is not otherwise specified or noted. Do not paint such surfaces in mechanical shafts, unless specifically noted.
4. In locations where Drawings do not call for paint or similar finish on walls and/or ceilings, the intent of this Specification is that items such as new work, including miscellaneous metal work, shall be painted.
5. Paint pipes, conduit, ducts and related thermal insulation and all prime painted mechanical and electrical equipment and supports located in mechanical and electrical storage and maintenance rooms in allocations

where Drawings call for paint or similar finish on walls and/or ceilings.

6. Do not paint pipe, conduit, ducts, insulation and the like where concealed above ceilings (except louvred type ceilings) or in-service shafts.
7. Make good paint finish on shop coated work where damaged.
8. Paint visible portions of steel shelf angles, lintels and structural steel.
9. Paint all edges and all faces of doors where primed for paint supplied.
10. Stain all top, bottom and side edges of all plastic laminate doors.
11. Interior of ducts and diffusers visible from exterior on room side.
12. Paint all roof top equipment, stairs, pipes, conduit, vents, ducts, pipe insulation, etc. exposed on roofs (including primed and prefinished items).
13. Allow for three (3) different paint colours to be used in the building - including field, accent walls and bulkheads

5. QUALITY ASSURANCE AND REFERENCES

1. Paint work shall meet or exceed standards set out in C.G.S.B. Specification No.'s 85-GP-1M to 85-GP-33A and C.P.C.A. Canadian Painting Contractors Association - Painting Manual.
2. Employ fully trained workers who are regularly employed in this field.
3. Manufacturer's sales representative shall perform inspections on the Owner's behalf in order to ensure compliance with product specifications.

6. RETOUCHING

1. Do all retouching, etc. to ensure that the building may be handed over to the Owner in perfect condition, free of spatter, fingerprints, rust, watermarks, scratches, blemishes or other disfiguration.

11. TEST AREA

1. A room or area in the building will be designated by the Architect as a test area to establish standard of workmanship, texture, gloss and coverage.
2. Prior to any painting being started, request a meeting on Site between Architect, Contractor, Subcontractor and Material Manufacturer's Representative to review conditions, surfaces, anticipated problems and to clarify quality of workmanship acceptable to Architect. Apply finishes to

each type of surface within room with correct material, coats, colour, texture and degree of gloss in sample area and have same approved prior to providing Work of this Section.

3. Retain test area until after completion of Work. Test area to be minimum standard for the Work.
4. Failure to comply with the above will be cause for Architect to request all Work previously painted to be repainted.

PART 2 PRODUCTS

1. MATERIALS
 1. "Top Line" products only are acceptable. Use only products of manufacturers whose best quality lines meet or exceed CGSB Specifications for the particular type of material required. Approved manufacture and product unless specifically indicated otherwise in specification:
 1. Paints, stains and varnish:
 - a) General Paint
 - b) Benjamin Moore
 - c) Sherwin Williams
 - d) Zinsser
 - e) Glidden/Devoe Coatings
 2. Latex Water Based Epoxy
 - Sherwin Williams B70W00211 - Waterbased catalyzed epoxy extra white/
Tint base A/B60V00025 - Waterbased Catalyzed epoxy Semi-Gloss Hardner Part B
 - Glidden - 4420 - True Glaze Waterborn epoxy / 4426 True Glaze semi-gloss converter
 3. Latex Supper Adherent Primer,
 - General Paint 51-050 Premium Latex Plastic Primer
 - Benjamin Moore #23-00 Freshstart Acrylic Primer Sealer
 - Zinsser 1-2-3 Acrylic Primer Sealer
 - Sherwin-Williams - B51WQ8850 - Adhesion Prm White
 - Glidden Latex super undercoat 94280
 4. Interior Latex Block Filler, C.G.S.B. Standard #-GP-188M
 - General Paint 70-224 Premium Latex Block Filler
 - Benjamin Moore #595-01 Latex Block Filler
 - Glidden #362650 Concrete Block Filler
 - Sherwin-Williams B42W00046 Heavy Duty Block Filler

5. Stain Suppressant Sealer/Primer Hi-Hide, C.G.S.B. #1-GP-119M (where required)
 - General Paint 60-200 X-Terminator 2 Latex Sealer
 - Zinsser BIN Primer, hi-hide (spot prime only)
 - Zinsser Bullseye Odourless
 - Sherwin-Williams - B49WQ8820 Multipur LTX Pr Wh
 - Glidden/Jammer 200
6. Thinners, cleaners: Type and brand recommended by the paint manufacturer.
7. Materials to be new and first line of manufacturer.
8. Deliver materials to site in original unbroken containers bearing brand and manufacturer's name.

PART 3 EXECUTION

1. CONDITION OF SURFACES
 1. Check all surfaces with electric moisture metre and do not proceed if reading is higher than 12-15 without written permission from Architect.
 2. Proceed with work only when surfaces and conditions are satisfactory for production of a first-class job.
 3. Clean and remove dust, grease, rust and extraneous matter from all surfaces (except that rust occurring on items specified to be primed under other sections shall be removed and worked reprimed under these sections).
 3. The commencing of work in a specific area shall be construed as acceptance of the surfaces, and thereafter the contractor shall be fully responsible for satisfactory work as required herein.
 5. All surfaces shall be prepared in accordance with Chapter 2 for Interior Work of the Master Painters and Decorators Association Painting Manual latest edition.
 6. Prepare surfaces in accordance with paint covering manufacturer's instructions.
2. PREPARATION
 1. Concrete and Masonry
 1. Test surfaces for alkalinity with pink litmus paper or other recognized

method.

2. Where extreme alkalinity occurs, wash surface with 4% solution tetrapotassium pyrophosphate (5 oz. per gallon (31 ml./l.) of water) where latex base paint is to be used and with zinc sulphate solution (3 lbs. per gallon (300 g./l.) of water where other paint bases are to be used.)
3. Etch normal concrete surfaces to receive alkyd paint with muriatic acid solution (1 part commercial) 31.45% to 3 parts water. Neutralize and allow to dry before painting.
4. Prepare masonry concrete surfaces to CGSB 85-GP-31M.

2. Metal

1. All metal surfaces to receive coatings shall be cleaned to SSPC-SP1 (solvent washing) prior to painting as specified herein.
2. Touch-up shop primed metal after first removing loose primer, rust, oil, grease and other contaminants.
3. All metal surfaces exposed and/or exhibiting rust shall be cleaned to SSPC-SP2 or SSPC-SP3 standards and primed with an approved rust inhibitive primer prior to recoating as specified.
4. Feather edges to make touch-up inconspicuous when applying new primer.
5. Conform to CGSB 1-GP40d.M to CGSB 85-GP-14M.

3. Galvanized Surfaces

1. For Primer Application Type C Corrosive ensure that all surfaces to be painted are clean, dry, and free of all contaminants.
2. Cleaning of existing surfaces to be conducted according to SSPC-SP-4 Flame Cleaning procedure. Pass high temperature, high velocity, oxyacetylene flames over entire surface and then wire brushing. Primer is to be applied before surface is cool.
3. Phosphatize galvanized metal surfaces using CGSB 31-GP-105M pretreatment or prime with galvanized metal primer.

4. Hardware

1. Remove finishing hardware, electric cover plates and accessories,

mask any that are not removable. Replace these when paint is dry and clean them. Do not clean hardware with solvent that will remove permanent lacquer finish.

5. Gypsum Wallboard

1. For small holes, scratches or other surface marks fill with patching compound and sand smooth.
2. For larger holes or damaged areas do not proceed until trade for original work has filled or repaired surfaces to acceptable levels.
3. Prepare wallboard surfaces to CGSB-85-GP-33M.

6. Copper

1. Prepare copper piping and accessories to CGSB 85-GP-20M.

7. General

1. Mask specification plates occurring on equipment, switch boxes, and similar items requiring painting.
2. Protect, remove and replace hardware, accessories, lighting fixtures and similar items as required.
3. Conform with Architect's colour schedules and exactly match approved samples.

3. APPLICATION

1. Finishes and number of coats specified in the schedule are intended to cover surfaces perfectly. If they do not, apply further coats until perfect coverage and colour are achieved as required.
2. Any areas exhibiting incomplete or unsatisfactory coverage shall have the entire plane painted. Patching will not be acceptable.
3. Walls needing repainting, entire wall (plane) shall be painted to the satisfaction of the Architect. See drawings for extent of work.
4. Spray painting will not be permitted (except at metal deck and joist areas) unless specifically approved in writing by the Architect in each instance. Architect may withdraw approval at any time and prohibit spray painting for reasons such as carelessness, poor masking or protection measures drifting paint fog, disturbance to other Trades or failure to obtain a dense, even, opaque finish. Spray painting shall be full double coat, i.e., at

least two passes for each coat. Do not use spray or roller on wood or metal surfaces, brush only unless approved in writing by Architect. Spray painting and backroll may be permitted on concrete blocks.

5. Arrange to have traffic barred from completed areas wherever possible.
6. Apply materials in strict accordance with manufacturer's directions and specifications and be familiar with these directions and specifications.
7. Apply primer-sealer coats by brush or roller method. All primers and undercoats to be tinted to no more than 25% of intensity of the finish colour.
8. Permit paint to dry before applying succeeding coats, touch up suction spots and sand between coats with No. 00 sandpaper.
9. Where two coats of the same paint are to be applied, the first coat shall be the same colour as the finish coat and be inspected by the Architect before application of final coat, to allow the Architect to make reasonable modification of colour if necessary. Furnish Architect with a schedule showing expected completion of the respective coats of paint for the various areas and surfaces. Keep this schedule current as the job progresses.
10. Exterior paints and deep/intense interior and exterior colours shall be from the nearest factory premixed colour selection and shall be alterable to match required colours.
11. Flat and semi-gloss finishes on gypsum wall board, block and other surfaces of large areas shall be applied by roller and to all other surfaces applied by brush.
12. Paint shall be uniform in sheen, colour and texture, free from brush or roller marks, sags, runs or other defects.
13. Finish edges of doors (top, bottom, sides and cutouts) with paint or stain treatment as required to match face of door. Stain top and bottom edges a different colour and seal with one coat of shellac and one coat gloss varnish or two coats paint. Refinish tops and edges of wood doors after fitting.
14. Even up stained woodwork in colour as required by nature of wood and as directed by Architect. Apply same finish on trim, fitments, cupboards and other protecting ledges as on surrounding work, disregard sight lines.
15. Carefully hand smooth and sandpaper wood between coats (including

priming). Apply one coat sealer before applying first coat paint filler to knots or sap blemishes on wood surfaces to receive paint or stain finish.

16. Remove rust, oil, grease and loose shop paint from metal work by brushing or with wire brushes and make good shop coat before proceeding with final finish. Feather out edges to make touch up patches inconspicuous.
17. After first coat, fill nail holes, splits, and scratches, using putty coloured to match finish.
18. Clean castings with wire brush before application of first paint coat.
19. Do not etch galvanized metal. Prepare prime and paint elsewhere in this section. This includes metal door frames and the like with wiped zinc coating.
20. Remove form oil or parting compounds from concrete surfaces. Use Xylol or approved compound.
21. Paint interior of pipe spaces, ducts, etc. visible through grilles or through metal ceilings in black matt finish.
22. Conform with Architect's colour schedule and exactly match approved samples.
23. Mechanical and Electrical Materials
 1. Refer to Mechanical and Electrical Sections of the Specifications and note the instructions regarding painting and finishing of materials and equipment supplied and installed by those trades.
 2. Remove grilles, covers, access panels for mechanical and electrical systems from location and paint separately, if these items are not factory finished.
 3. Paint work to match adjacent walls and ceilings unless directed otherwise. Note: This includes trim on fixtures exposed, speaker covers, emergency lights, grilles, diffusers, louvres, vents, fire extinguisher cabinets, electrical panels, etc.
 4. Paint interior surfaces that are visible through grilles and louvres with one coat of flat black metal paint to limit of sight line.
 5. Where walls and ceilings are not scheduled to be painted, the work described above shall be painted a colour selected by Architect.

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6. Unless factory painted, all exposed piping, conduits, ductwork hangers, insulation and mechanical equipment shall be painted.
 24. Rooms without finished ceilings will have decks, joists, beams, ducts, etc., painted.
 25. Paint graphics as shown on drawings. All graphics to be semi-gloss minimum two coat application.
4. ADJUST AND CLEAN
1. Cracks occurring in walls or ceilings requiring patching during "warranty period" shall be repainted in such a way that the patch is not visible at a distance of 5'-0" (1500 mm).
 2. If patch painting not acceptable repaint entire wall or ceiling surface.
 3. At completion clean entire area of surplus materials and equipment.
5. FIELD QUALITY CONTROL
1. Locate testing area in building to establish standard of workmanship, texture, gloss and coverage where designated.
 2. Apply samples of all finishes on each type of surface to be coated with correct material, number of coats, colour, texture and degree of gloss required.
 3. Retain test area until completion of work. Use approved work in test areas as standard for corresponding work throughout building. Correct and refinish work which does not compare with approved finishes.
6. FINISH SCHEDULE
1. General
 1. Finish the listed exposed surfaces, wherever they occur unless such surfaces are specifically noted to be left unfinished.
 2. Exposed means visible in the completed work and includes the interior of closets, cabinets and drawers.
 3. The Architect shall have the option of having wood painted or with transparent finish and of which finish shall be used.
 4. In instances where materials specified are not suitable for a particular job application or are contrary to manufacturer's

recommendations for use on a particular surface, such condition shall immediately be brought to the attention of the Architect for clarification and instructions.

5. Finishes shall match approved samples, but Architect reserves the right to make reasonable changes to finish specifications to obtain desired results without additional cost or obligation of Owner.
6. Where surfaces have been disturbed the entire plane shall be painted.

2. Exterior Schedule

1. Metal (Ferrous): One coat rust inhibitive primer (metal surfaces already primed need not receive a field prime coat except for touch up). Two coats exterior Aura paint by Benjamin Moore.

Note: All roof top equipment, pipes, conduit, vents, ducts, grilles, pipe insulation, etc. to be painted.

2. Galvanized Steel: One coat galvanized primer. Use a Polyamide converted epoxy primer by Devoe Coatings, "4170-1000 with 4170-999 - catalyst". Two coats of galvanized Finish Coat. Use a single package tough, durable alkyd modified urethane coating with water, chemical and solvent resistance by Devoe Coatings "Devoe" Glid Shield Urethane Gloss Enamel No. 4328-0100 Series (installation within 72 hours of installing primer).

Note: All exterior areas are to be painted including stairs, masonry lintels, etc.

3. Painted Wood Surfaces: One coat wood primer. Two coats exterior Aura paint by Benjamin Moore.
4. Stained Pressure Treated Wood or Cedar: Two coats solid hide Aborite stain and one Clear Topcoat both by Benjamin Moore.

3. Interior Schedule

1. Metal (Ferrous): One coat latex super adherent primer (metal surfaces already primed need not receive a field prime coat except for touch up). Apply two coats latex water-based epoxy 2 coats.
2. Hot Ferrous Metal - (Valve bodies, strainers, etc., on high temperature lines.) - One coat primer, latex super adherent heat

resistant - Two coats latex water-based epoxy.

3. Galvanized Steel: One coat galvanized primer. Use a Polyamide converted epoxy by Devoe Coatings "4170-1000 with 4170-9999-catalyst". Two coats of galvanized Finish Coat. Use a single package tough, durable alkyd modified urethane coating with water, chemical and solvent resistance by Devoe Coatings "Devoe Glid Shield Urethane Gloss Enamel No. 4328-0100 Series (install within 72 hours of installing primer).
4. Woodwork Painted: One coat super adherent primer. Two coats latex Ultra "94800" by Glidden.
5. Natural or Stained Close Grain Wood: One coat non-bleeding alkyd stain. One coat sanding sealer. Approved Finish Clear Coats are as follows:
 - .1 General Paint 25-011 Urethane Semi-Gloss. Apply two coats: spread rate, 350 square feet per 3.78 litre container. Each coat wet film thickness: 4.0 mils. Each coat dry thickness: 1.5 mils.

OR
 - .2 Benjamin Moore & Co. Ltd. #435 Low Lustre Alkyd Urethane. Apply two coats: spread rate, 575 square feet per 3.79 litre container. Each coat wet thickness: 2.8 mils. Each coat dry thickness: 1.1 mils.

OR
 - .3 Glidden #90333 Urethane Varnish. Apply two coats: spread rate, 638 square feet per 3.78 litre container. Each coat wet thickness: 2.5 mils. Each coat dry thickness: 1.0 mils.
6. Natural Cedar Slat Ceilings: natural finish.
7. Natural or Stained Open Grain Wood: One coat stain filler. One coat sanding sealer. Approved Finish Clear Coats are as follows:
 - .1 General Paint 25-011 Urethane Semi-Gloss. Apply two coats: spread rate, 350 square feet per 3.78 litre container. Each coat wet film thickness: 4.0 mils. Each coat dry thickness: 1.5 mils.

OR

- .2 Benjamin Moore & Co. Ltd. #435 Low Lustre Alkyd Urethane. Apply two coats: spread rate, 575 square feet per 3.79 litre container. Each coat wet thickness: 2.8 mils. Each coat dry thickness: 1.1 mils.

OR

- .3 Glidden #90333 Urethane Varnish. Apply two coats: spread rate, 638 square feet per 3.78 litre container. Each coat wet thickness: 2.5 mils. Each coat dry thickness: 1.0 mils.

8. Concrete Block: One coat latex block filler, applied at the minimum rate of 80 sq. ft per gallon (1.63 m² per litre), or as required by block texture to completely fill block. **Pinholes will not be accepted.** Apply more block filler if necessary to completely fill the block before applying finish coats. Note that lightweight block requires more block filler to fill than standard weight block does and adjust application rate as required. Two coats interior Latex Semi-Gloss "Ultra 94800" by Glidden.
9. Exposed Insulated Pipes and Ductwork: One coat size. One coat super adherent primer undercoat. Two coats Ultra "94800" by Glidden eggshell.
10. Gypsum Wallboard: One coat of Latex super adherent primer. Two coats semi-gloss Ultra "94800" by Glidden. Velvet or eggshell at walls and Low gloss at ceilings.
11. Surfaces Behind Grilles and Duct Work Where Visible Within 12' (300 mm) of Grille:
1. Two coats vinyl latex matt black.
12. Painted Light Trims, Emergency Lights, Louvres, Diffusers, Vents, Concealed Sprinkler Covers, Fire Extinguisher Cabinets, and Electrical Panels, Etc.
1. One coat super adherent primer. Two coats Ultra "94800" by Glidden to match surrounding wall and ceiling colours or as specified by Architect.
13. Exposed Sealed Concrete Floors to be Painted

1. One coat Sikafloor 2001 Primer
2. One coat Sikafloor polyurethane UV in colour as selected by Architect from complete colour range.
3. Install floor primer and finish coat as per manufacturer's printed installation instructions.

14. General Notes

1. See drawings for locations of areas where more than one colour occurs on one wall and one ceiling plane.
2. Each ceiling bulkhead section or level may be a different colour.
3. At stairwells and metal railings, allow for flat bars, pickets and stringers at stairs to be each painted a different colour. Maximum three colours to be chosen by Architect. Clarification detail will be issued with colour schedule after tender.
4. Door frames may be one colour and door another colour.

7. MAINTENANCE MATERIAL

1. Provided one sealed can of four litre capacity, of each product in each colour used in the Work for Owner's use in maintenance work.
2. Container to be new fully labelled with manufacturer's name, type of paint, and colour.
3. Provide Owner 3 copies of paint formula for each colour and type of paint for Owner's maintenance manual.

END OF SECTION

CREVIEWPART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1. Division One, General Requirements, is part of this Section and shall apply as if repeated here.

1.2 SHOP DRAWINGS

1. Submit shop drawings in electronic PDF format.
2. Submit catalogue illustrations as required by Architect.
3. Indicate size and description of components, base material, surface finish inside and out, hardware and locks, attachment devices, description of rough-in-frame, building-in details anchors for grab bars.

1.3 SUBMITTALS

1. Submit samples of all accessories for approval by the Architect.
2. Approved manufacturers are American Specialties, Inc. (ASI).

1.4 DELIVERY, STORAGE AND HANDLING

1. Package accessories and label with description of contents and installation location. Each accessory to be individually wrapped complete with all fixings as required.
2. Deliver accessories where designated at Site by Contractor.

1.5 MAINTENANCE AND OPERATING INSTRUCTIONS

1. Provide for inclusion in data book, three (3) printed copies of maintenance and operating instructions of all accessories.

PART 2 PRODUCTS

2.1 MATERIALS

1. Sheet Steel: Commercial grade, stretcher levelled sheet steel to ASTM A526-71 (1975) with G90 zinc coating to ASTM A525-79.
2. Stainless Steel Sheet: To ASTM A666-72 (1979) type 302 with No. 4 finish, minimum 0.9 mm (0.036"/20 gauge).

3. Stainless Steel Tubing: AISI Type 304, commercial grade, seamless welded, 1.2mm (0.047") wall thickness.
4. Fasteners: Screws and bolts hot dip galvanized. Expansion shields fibre lead or rubber as recommended by fixture manufacturer for component and its intended use.
5. Fasteners: Screws and bolts stainless steel. Expansion shields lead or rubber as recommended by fixture manufacturer for component and its intended use.

2.2 FINISHES

1. Chrome and Nickel Plating: to ASTM B456-79 satin finish.
2. Stainless Steel: to AISI No. 4 satin lustre finish.
3. Baked enamel: condition metal by applying one coat of metal conditioner to CGSB 31-GP-107a, apply one coat Type 2 primer to CGSB 1GP-81M and bake apply two coats Type 2 enamel to CGSB 1-GP-88e and bake to hard, durable finish. Sand between final coats. Colour selected from standard range by Architect.

2.3 KEYING

1. All accessories to be keyed alike. Provide six keys.

2.4 TRADEMARKS AND LABELS

1. Trademarks and labels shall not be visible in the finish exposed surfaces.

2.5 MANUFACTURER

1. Provide accessory items manufactured by companies as noted or approved equal; Bobrick, Frost and ASI are approved manufacturers.

2.6 ACCESSORIES

1. Toilet paper, paper towel dispensers and soap dispensers will be supplied by the board but installed by the contractor. All other items to be supplied by contractor and installed by them.
2. **CCH** - Collapsible Coat Hooks: Bobrick Model No. B-983 surface mounted collapsible coat hook, satin finished stainless steel. Provide one in each universal washroom, barrier free washroom and unisex / single washroom unless otherwise indicated on drawings.
3. Grab Bars: Refer to Architectural drawings for locations.

4. At Barrier Free Accessible Water Closets:
 1. 1 1/2" (38 mm) dia. peened satin finished stainless steel, 24" (610 mm) long straight bar, standard flange position at back of water closet.
 2. L-shaped bar 1 1/2" (38 mm) dia. peened satin finished stainless steel, 30" (760 mm) long horizontal and vertical 30" (760 mm) at side of water closet.
 3. Install item 1 and 2 grab bars noted above at each universal / barrier free water closets.
5. Mirrors: Provide at least one for every lavatory. Provide one fixed mirror mounted at 1000mm AFF in every washroom with a handicapped accessible water closet. All mirrors to be tempered glass. Install one per each washroom lavatory location unless otherwise indicated on drawings.
 - a. Fixed Mirror (M): Bobrick Model No. B-165-1836, stainless Steel Channel Frame Mirror, 18" (456mm) wide x 36" (914mm) high.
 - b. Fixed Mirror (M2): Bobrick Model No. B-165-1848, stainless Steel Channel Frame Mirror, 18" (456mm) wide x 48" (914mm) high.
6. SHF - Shelf: Equal to Franke shelf STRX624. Wall mounted stainless steel shelf 4-1/4" x 24" (110mm x 600mm). Provide one in each Barrier Free Washroom stall unless otherwise indicated on drawings.
7. GD - Surface Mounted Waste Receptacle: To be provided and installed by this contractor. Install where indicated on drawings; minimum one in each washroom.
8. Deodorizer: Model 1100 by Frost. One will be provided in each universal washroom, barrier free washroom, unisex washrooms and for female and male gang washrooms unless otherwise indicated on drawings.

2.7 FABRICATION

1. Weld, ground flush and smooth joints of fabricated components. Use mechanical fasteners only when approved.
2. Form exposed surfaces from one sheet of stock, free of joints.
3. Brake form sheet metal with 2 mm radius bends.

4. Form flat surfaces without distortion. Maintain flat surfaces without scratches or dents.
5. Paint back of components where contact is made with building finishes to prevent electrolysis.
6. Hot dip ferrous metal anchors and fastening devices to conform with CGSB G164.
7. Shop assemble, and package components complete with anchors and fittings.
8. Deliver inserts and rough-in frames to site at appropriate time for building in. Provide templates or rough-in measurements as required.
9. Provide steel anchor plates and components for installation on studding and building framing.
10. All exposed stainless steel edges to be hemmed.
11. All stainless steel units to be double panned.

PART 3 EXECUTION

3.1 INSTALLATION

1. Installation of all miscellaneous specialties by this Section. Install all items to secure backing.
2. Securely fasten accessories level and plumb in the locations shown on the drawings and as specified herein. Mounting heights as shown on drawings, or as directed by Architect.
3. Co-ordinate installation with the work of trades providing adjacent construction as required to achieve the reveals or other edge conditions shown where front faces of units are flush with the finished wall surfaces.
4. Perform drilling of steel, masonry and concrete necessary to install the accessories.
5. Insulate accessory surfaces to prevent electrolysis due to contact with masonry, concrete or dissimilar metal surfaces. Use bituminous paint, building paper or other approved means.
6. Clean all accessories in conformance with Division 1.

3.2 LOCATION AND QUANTITY

Waterloo District School Board

WRDSB No. 23-7360-RFT

Crestview Public School

Library, Gym, and Vestibules Renovation. New Univ. WR

&Room Renumbering

153 Montcalm Drive Kitchener, Ontario

+VG Project No. 22057

Section 10800

WASHROOM ACCESSORIES

Page 5 of 5

1. Provide washroom accessories as noted as indicated on drawings and/or called for within this section. Installations shall meet the minimum requirements of the OBC, as currently amended.

END OF SECTION

1. GENERAL

1. GENERAL REQUIREMENTS

1. Division One, General Requirements is a part of this Section and shall apply as if repeated here.

2. SHOP DRAWINGS

1. Submit Shop Drawings in reproducible vellum form in accordance with GC. 311 of CCDC Document 2 - 2008.
2. Clearly indicate fabrication details, plans, deviations, hardware and installation details in wall padding layout and locations.
3. Take measurements on site of spaces and conditions to which work must conform.

3. RELATED WORK SPECIFIED ELSEWHERE

1. Concrete Work - Section 03300
2. Masonry - Section 04200
3. Structural Metal Framing - Section 05120
4. Steel Roof Deck - Section 05300
5. Finish Carpentry - Section 06200
6. Gym Sports Flooring - Section 09624
7. Electrical Disconnects - Division 16

4. PROTECTION

1. Protect work from damage during storage, handling, installation and until building is turned over to the Owner.

2. PRODUCTS

1. MATERIALS

1. BASKETBALL BACKBOARDS: Provide 2 (two) new backboards for main gym courts equipped with backboards, goals and nets as specified herein.
 1. Basketball backboard Type: Model BB-29-RGII or BB-29-RG1 backboard supplied by Gymnasium & Health.

All steel and wood members to be painted to special colours selected by Architect. New backboards to be mounted on existing framing and swing mechanism. Site verify adaptability of new backboards on existing mechanism before ordering.

2. FLOOR SOCKETS:

1. Model FS-5 supplied by Gym and Health floor socket and a heavy duty plated steel socket to receive 1.9" O.D. volleyball and badminton posts.

Socket locations based on gym floor line layout,

2. Confirm diameter of sockets prior to shipping.

4. Removable Wall Padding mounted on Velcro Strips: equal to Gymnasium & Health WP-2002 (4' x 6' x 2") Velcro 2 sides. Velcro strips to be site cut and installed. Note that there is to be velcro strips installed for attaching at the top and the bottom of each pad location. Removable wall padding is included in contract to be supplied by Gym and Health. Final location of Velcro strips to be confirmed on site by Architect and Owner prior to installation.

5. Permanent Wall Padding: WP – 2009 supplied by Gym and Health. Mechanically fastened in place complete with Velcro pad covers and openings for any electrical outlets or switches. Mats to be located centered between available space limited by existing doors and openings. Refer to drawing A7.1 and to be Coordinate openings with Electrical contractor.

3. EXECUTION

1. FABRICATION

1. Fix and assemble work in shop where possible.
2. File and grind exposed welds, smooth and flush. Make exposed welds continuous.

3. Workmanship shall be best grade of modern shop and field practice known to recognized manufacturers specializing in this work. Accurately fit joints and intersecting members and made in true planes with adequate fastening.

2. INSTALLATION

1. Install work square, plumb, straight, true and accurately fitted.
2. Included anchors, dowels and fastenings necessary to anchor work together or to work of other trades.
3. Where installing in masonry, centre equipment between masonry block joints. Verify location mounting heights, and dimensions of all units before installation. Anchor in accordance with manufacturer's printed instructions. Co-ordinate with Section 04200.
4. Insulate where necessary to prevent electrolysis between dissimilar materials.
5. Co-ordinate installation of floor sockets with Flooring.

End of Section



July 15, 2021

MTE File No.: C34532-921

Waterloo Region District School Board
51 Ardelt Avenue
Kitchener, Ontario N2C 2R5

**RE: 2021 Asbestos Audit Update – Crestview Public School
153 Montcalm Drive, Kitchener, Ontario**

1.0 Introduction

MTE Consultants Inc. (MTE) was authorized by the Waterloo Region District School Board (WRDSB) to conduct the 2021 Asbestos Audit Update for the subject building.

The purpose of the assignment was to re-assess and document the location, type, and condition of identified asbestos-containing materials (ACM) present within the building and make appropriate recommendations for management, abatement or remedial activities, as required.

The audit was conducted in accordance with the Ontario Ministry of Labour, *Regulation 278/05- Designated Substance-Asbestos on Construction Projects and in Buildings and Repair Operations* (O. Reg. 278/05). This report shall replace previous audit reports.

2.0 Scope of Work

The Scope of Work for this assessment was completed by MTE and included the following activities:

- Review of existing and historical reports and documentation pertaining to ACM within the building;
- Visual inspection to assess the condition of previously identified ACM, excluding portable structures;
- Collection of building material samples that are suspect ACM, as applicable;
- Submission of samples to an accredited laboratory, as applicable;
- Photographic log of damaged materials; and
- Preparation of this report with findings and recommendations.

3.0 Methodology and Assessment Criteria

This inspection was conducted by visual and laboratory identification methods for the assessment of ACM and their corresponding location, use, condition, and friability. The areas outlined in Section 2.0 were inspected limited to building components, materials and service connections. Notwithstanding that reasonable attempts were made to identify all ACMs, the possibility of concealed material exists and may not become visible until substantial demolition has occurred and therefore are currently undocumented and did not include the following.

- Locations that may be hazardous to the surveyor, such as electrical equipment;
- Where invasive inspection could cause consequential damage to the property or impair the integrity of the equipment, such as roof systems, underground services or components of mechanical equipment;
- Locations concealed by building finishes that require substantial demolition or removal for access or determination of quantities;
- Materials that is present in such an inconsistent fashion that without complete removal of finishes, the extent cannot be determined.
- Non-permanent items or personal contents, furnishings; and
- Settled dust or airborne agents unless otherwise stated.

3.1 Condition of ACM

During the audit process the general condition of ACMs were observed and noted. Materials which are damaged can pose an increased exposure risk to workers, building occupants and the public. While assessing damage can be subjective, abatement items were grouped into two categories to aid in remedial prioritization.

Monitor Annually

These are items which display minor isolated damage; however, do not pose an immediate risk to workers from exposure to asbestos fibres due to the current condition of the material and/or location. No remediation is required at this time; however, these items should be monitored on a yearly basis for evidence of continued degradation. Should the condition of the material change, an evaluation should be completed by a competent person to determine remedial action.

Abatement Action Required

These are items which display damage and may pose potential risk to workers from exposure to asbestos fibres due to the physical condition and/or location of the material. Clean-up, repair or removal of these materials is required as soon as reasonably possible.

4.0 Findings

An inspection of the building was conducted by MTE on July 8, 2021. The single-storey school was constructed in 1966 with additions in 1968 and 1991. The inspection did not include areas of post 1990 construction or renovation (where all building finishes have been removed and replaced), as applicable.

The Asbestos Management Database is provided in **Appendix A** and associated Figures are provided in **Appendix B**. These together provide a current summary of the ACM identified throughout the building.

A summary of the damaged ACM identified at the time of the inspection is provided in **Appendix C**.

The bulk asbestos sample location and analytical summary is provided in **Appendix C**.

4.1 Analytical Results

During this inspection, no samples were collected.

4.2 Removed ACM

A summary of ACM that has been removed since the previous audit/inspection is provided below:

WRDSB Room 66.

- Asbestos pipe fittings (2).

WRDSB Room 73.

- All asbestos-containing mechanical insulation from mechanical piping and one hot water tank.

4.3 Discovery of Additional ACM

No additional ACM or suspect ACM was identified.

4.4 Damaged ACM

Damaged ACM was identified. Refer to **Appendix C, Tables 1 and 2** for a detailed summary of required actions, specific to each material. At the time of the audit, all other ACM at the building was noted to be in good condition.

5.0 Recommendations

5.1 Remedial

Damaged ACM was identified. Refer to Appendix C, Tables 1 and 2 for a detailed summary of required actions, specific to each material. At the time of the audit, all other ACM at the building was noted to be in good condition.

Type 1 abatement Operations may be conducted internally by trained and qualified WRDSB staff. All other abatement work must be conducted by certified asbestos contractors trained and qualified to conduct the type of work required.

All asbestos work must be conducted by staff and/or contractors who are trained and experienced in the type of asbestos operations required, and should be overseen by a qualified third party Health, Safety and Environmental professional. In order to conduct Type 3 asbestos operations, contractors must be certified as Asbestos Abatement Workers AAW (Trade code 253W) and Asbestos Abatement Supervisors AAS (Trade code 253S) by The Ministry of Training, Colleges and Universities (Ministry of Advanced Education and Skills Development) as prescribed by Section 20 of O. Reg. 278/05.

5.2 Long Term Management

This audit was conducted for the long term management of ACM within the building. Prior to future construction or renovation projects, additional assessments and/or sampling may be required.

There are no requirements under current legislation to remove ACM from a building simply because it is present. However, O. Reg. 278/05 requires that an Asbestos Management Plan be implemented and maintained. Asbestos awareness training should be provided for staff that may come in contact with ACM during routine duties or in emergency situations.

ACM that will be disturbed, or will likely be disturbed, during building maintenance, renovations, construction, or demolition activities must be handled and disposed of in accordance with the procedures prescribed by O. Reg. 278/05.

ACM may also be present in concealed locations. If any construction, renovation, alteration, or maintenance activities are required or planned, invasive inspections of concealed locations for potential ACM must be performed prior to such activities. Should any suspect ACM be discovered, work should cease and the materials should not be disturbed. Suspect ACM must be treated as asbestos-containing or sampled and proven to not contain asbestos. Any activities that require disturbance of ACM must be performed in accordance with O. Reg. 278/05.

6.0 Limitations

Services performed by **MTE Consultants Inc.** (MTE) were conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the Environmental Engineering & Consulting profession. No other representation expressed or implied as to the accuracy of the information, conclusions or recommendations is included or intended in this report.

This report was completed for the sole use of MTE and the Client. It was completed in accordance with the approved Scope of Work referred to in Section 0. As such, this report may not deal with all issues potentially applicable to the site and may omit issues that are or may be of interest to the reader. MTE makes no representation that the present report has dealt with all-important environmental features, except as provided in the Scope of Work. All findings and conclusions presented in this report are based on site conditions, as they existed during the time period of the investigation. This report is not intended to be exhaustive in scope or to imply a risk-free facility.

Any use which a third party makes of this report, or any reliance on, or decisions to be made based upon it, are the responsibility of such third parties. MTE accepts no responsibility for liabilities incurred by or damages, if any, suffered by any third party as a result of decisions made or actions taken, based upon this report. Others with interest in the site should undertake their own investigations and studies to determine how or if the condition affects them or their plans.

It should be recognized that the passage of time might affect the views, conclusions and recommendations (if any) provided in this report because environmental conditions of a property can change. Should additional or new information become available, MTE recommends that it be brought to our attention in order that we may re-assess the contents of this report.

All of which is respectfully submitted,

MTE Consultants Inc.



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Attach.

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Appendix A

Asbestos Management Database





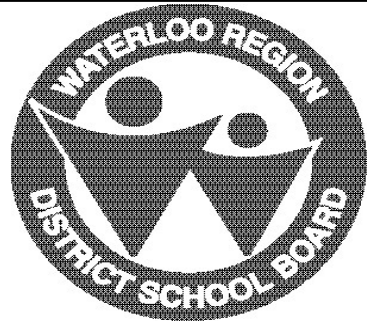
School Name Crestview Public School Date Built: Original: 1966 Addition(s): 1968, 1991	Legend: HM - Homogenous Material - homogeneous with previously sampled material SL - Sample Location - Material Sampled VC - Visually Confirmed - Material not sampled, deemed ACM NF - Non-Friable F- Friable	Notes: All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM.
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WRDSB Fixed Reference Number	Room Description	Inspected Item	Inspected Material	Material Description	Friability	Asbestos Classification	Sample / Identification Summary	Sample ID	Sample Date	% Asbestos & Fibre Type
Structure/Additions										
	Original Building	Structure	Deck	Steel	-	Non ACM	-	-	-	-
	Original Building	Structure	Concrete	Concrete	-	Non ACM	-	-	-	-
	Original Building	Façade	Brick Veneer	Brick and Mortar	-	Non ACM	-	-	-	-
	Original Building	Not Inspected	Not Inspected	Roofing Materials	NF	Suspect ACM	VC	-	-	-
	Original Building	Windows	Frames	White Sealant	NF	ACM	HM	S06	25-Sep-18	2% Chrysotile
	Original Building	Doors	Frames	Black Sealant	NF	ACM	HM	S05	25-Sep-18	1% Chrysotile
	Original Building	Mastic	Mastic	Yellow Carpet Mastic	NF	ACM	HM	S02	8-Jan-14	0.55% Chrysotile
	Original Building	Mastic	Mastic	Floor Tile Mastic	NF	ACM	HM	S03	28-Apr-18	3% Chrysotile
	1968 Addition	Structure	Deck	Steel	-	Non ACM	-	-	-	-
	1968 Addition	Structure	Concrete	Concrete	-	Non ACM	-	-	-	-
	1968 Addition	Façade	Brick Veneer	Brick and Mortar	-	Non ACM	-	-	-	-
	1968 Addition	Not Inspected	Not Inspected	Roofing Materials	NF	Suspect ACM	VC	-	-	-
	1968 Addition	Windows	Frames	Silicon Sealant	-	Non ACM	-	-	-	-
	1968 Addition	Doors	Frames	Black Sealant	NF	ACM	HM	S05	25-Sep-18	1% Chrysotile
	1968 Addition	Mastic	Mastic	Floor Tile Mastic	-	Non ACM	HM	S07	25-Sep-18	ND
Level 1										
1	Classroom	Floor	Vinyl Floor Tile 12"x 12"	Mottled Beige	-	Non ACM	HM	S10	9-Dec-09	ND
1	Classroom	Wall	Plaster	-	-	Non ACM	HM	S04	28-Apr-18	-
1	Classroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
1	Classroom	Ceiling	Concrete	-	-	Non ACM	-	-	-	-
1	Classroom	Piping	Pipe Insulation	Fibreglass insulation	-	Non ACM	-	-	-	-
1	Classroom	Ceiling	Transite	Transite	NF	ACM	HM	S07	9-Dec-09	1.4% Chrysotile; 20% Amosite
2	Classroom	Floor	Vinyl Floor Tile 12"x 12"	Mottled Beige	-	Non ACM	HM	S10	9-Dec-09	ND
2	Classroom	Wall	Plaster	-	-	Non ACM	HM	S04	28-Apr-18	-
2	Classroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
2	Classroom	Ceiling	Concrete	-	-	Non ACM	-	-	-	-



	School Name	Legend:	Notes:
	Crestview Public School	HM - Homogenous Material - homogeneous with previously sampled material	All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM.
	Date Built:	SL - Sample Location - Material Sampled	
	Original: 1966	VC - Visually Confirmed - Material not sampled, deemed ACM	
Addition(s): 1968, 1991	NF - Non-Friable F- Friable		

WRDSB Fixed Reference Number	Room Description	Inspected Item	Inspected Material	Material Description	Friability	Asbestos Classification	Sample / Identification Summary	Sample ID	Sample Date	% Asbestos & Fibre Type
2	Classroom	Piping	Pipe Insulation	Fibreglass insulation	-	Non ACM	-	-	-	-
2	Classroom	Ceiling	Transite	Transite	NF	ACM	HM	S07	9-Dec-09	1.4% Chrysotile; 20% Amosite
3	Classroom	Floor	Vinyl Floor Tile 12"x 12"	Mottled Beige	-	Non ACM	HM	S10	9-Dec-09	ND
3	Classroom	Wall	Plaster	-	-	Non ACM	HM	S04	28-Apr-18	-
3	Classroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
3	Classroom	Ceiling	Concrete	-	-	Non ACM	-	-	-	-
3	Classroom	Piping	Pipe Insulation	Fibreglass insulation	-	Non ACM	-	-	-	-
3	Classroom	Ceiling	Transite	Transite	NF	ACM	HM	S07	9-Dec-09	1.4% Chrysotile; 20% Amosite
4	Classroom	Floor	Vinyl Floor Tile 12"x 12"	Mottled Beige	-	Non ACM	HM	S10	9-Dec-09	ND
4	Classroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
4	Classroom	Wall	Plaster	-	-	Non ACM	SL	S04E	28-Apr-18	-
4	Classroom	Ceiling	Concrete	-	-	Non ACM	-	-	-	-
4	Classroom	Piping	Pipe Insulation	Fibreglass insulation	-	Non ACM	-	-	-	-
4	Classroom	Ceiling	Transite	Transite	NF	ACM	HM	S07	9-Dec-09	1.4% Chrysotile; 20% Amosite
5	Classroom	Floor	Vinyl Floor Tile 12"x 12"	Beige with Beige and Brown Flecks	-	Non ACM	HM	S04	9-Dec-09	ND
5	Classroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
5	Classroom	Wall	Plaster	-	-	Non ACM	HM	S04	28-Apr-18	-
5	Classroom	Ceiling	Concrete	-	-	Non ACM	-	-	-	-
5	Classroom	Piping	Pipe Insulation	Fibreglass insulation	-	Non ACM	-	-	-	-
5	Classroom	Ceiling	Transite	Transite	NF	ACM	HM	S07	9-Dec-09	1.4% Chrysotile; 20% Amosite
6	Classroom	Floor	Vinyl Floor Tile 12"x 12"	Grey with Grey and White Flecks	-	Non ACM	HM	S08	9-Dec-09	ND
6	Classroom	Wall	Drywall	Drywall Joint Compound	NF	ACM	SL	S02E	28-Apr-18	2% Chrysotile
6	Classroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
6	Classroom	Ceiling	Ceiling Tile 2' x 4'	Fibreglass	-	Non ACM	-	-	-	-
6	Classroom	Deck	Metal Pan	Steel	-	Non ACM	-	-	-	-
7	Classroom	Floor	Vinyl Floor Tile 12"x 12"	Grey with Grey and White Flecks	-	Non ACM	HM	S08	9-Dec-09	ND
7	Classroom	Wall	Drywall	Drywall Joint Compound	NF	ACM	SL	S02D	28-Apr-18	2% Chrysotile
7	Classroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
7	Classroom	Ceiling	Ceiling Tile 2' x 4'	Fibreglass	-	Non ACM	-	-	-	-
7	Classroom	Deck	Metal Pan	Steel	-	Non ACM	-	-	-	-
8	Classroom	Floor	Vinyl Floor Tile 12"x 12"	Grey with Grey and White Flecks	-	Non ACM	HM	S08	9-Dec-09	ND



	School Name	Legend:	Notes:
	Crestview Public School	HM - Homogenous Material - homogeneous with previously sampled material	All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM.
	Date Built:	SL - Sample Location - Material Sampled	
	Original: 1966	VC - Visually Confirmed - Material not sampled, deemed ACM	
Addition(s): 1968, 1991	NF - Non-Friable F- Friable		

WRDSB Fixed Reference Number	Room Description	Inspected Item	Inspected Material	Material Description	Friability	Asbestos Classification	Sample / Identification Summary	Sample ID	Sample Date	% Asbestos & Fibre Type
8	Classroom	Wall	Drywall	Drywall Joint Compound	NF	ACM	HM	S02	28-Apr-18	2% Chrysotile
8	Classroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
8	Classroom	Ceiling	Ceiling Tile 2' x 4'	Fibreglass	-	Non ACM	-	-	-	-
8	Classroom	Deck	Metal Pan	Steel	-	Non ACM	-	-	-	-
8	Classroom	Ducting	Duct Insulation	Fibreglass insulation	-	Non ACM	-	-	-	-
8	Classroom	Piping	Pipe Insulation	Fibreglass insulation	-	Non ACM	-	-	-	-
8	Classroom	Piping	Pipe Fitting	Parged Cement	F	ACM	HM	1680.198-03A	23-Mar-90	50-75% Chrysotile
10	Classroom	Floor	Vinyl Floor Tile 12"x 12"	Beige with Beige and Brown Flecks	-	Non ACM	HM	S04	9-Dec-09	ND
10	Classroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
10	Classroom	Wall	Plaster	-	-	Non ACM	HM	S04	28-Apr-18	-
10	Classroom	Ceiling	Concrete	-	-	Non ACM	-	-	-	-
10	Classroom	Piping	Pipe Insulation	Fibreglass insulation	-	Non ACM	-	-	-	-
10	Classroom	Ceiling	Transite	Transite	NF	ACM	HM	S07	9-Dec-09	1.4% Chrysotile; 20% Amosite
11	Classroom	Floor	Vinyl Floor Tile 12"x 12"	Beige with Beige and Brown Flecks	-	Non ACM	HM	S04	9-Dec-09	ND
11	Classroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
11	Classroom	Wall	Plaster	-	-	Non ACM	HM	S04	28-Apr-18	-
11	Classroom	Ceiling	Concrete	-	-	Non ACM	-	-	-	-
11	Classroom	Piping	Pipe Insulation	Fibreglass insulation	-	Non ACM	-	-	-	-
11	Classroom	Ceiling	Transite	Transite	NF	ACM	HM	S07	9-Dec-09	1.4% Chrysotile; 20% Amosite
12	Classroom	Floor	Vinyl Floor Tile 12"x 12"	Mottled Beige	-	Non ACM	HM	S10	9-Dec-09	ND
12	Classroom	Wall	Plaster	-	-	Non ACM	HM	S04	28-Apr-18	-
12	Classroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
12	Classroom	Ceiling	Concrete	-	-	Non ACM	-	-	-	-
12	Classroom	Piping	Pipe Insulation	Fibreglass insulation	-	Non ACM	-	-	-	-
12	Classroom	Ceiling	Transite	Transite	NF	ACM	HM	S07	9-Dec-09	1.4% Chrysotile; 20% Amosite
13	Classroom	Floor	Vinyl Floor Tile 12"x 12"	Mottled Beige	-	Non ACM	HM	S10	9-Dec-09	ND
13	Classroom	Wall	Plaster	-	-	Non ACM	SL	S04D	28-Apr-18	-
13	Classroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
13	Classroom	Ceiling	Concrete	-	-	Non ACM	-	-	-	-
13	Classroom	Piping	Pipe Insulation	Fibreglass insulation	-	Non ACM	-	-	-	-
13	Classroom	Ceiling	Transite	Transite	NF	ACM	HM	S07	9-Dec-09	1.4% Chrysotile; 20% Amosite



School Name Crestview Public School Date Built: Original: 1966 Addition(s): 1968, 1991	Legend: HM - Homogenous Material - homogeneous with previously sampled material SL - Sample Location - Material Sampled VC - Visually Confirmed - Material not sampled, deemed ACM NF - Non-Friable F- Friable	Notes: All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM.
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WRDSB Fixed Reference Number	Room Description	Inspected Item	Inspected Material	Material Description	Friability	Asbestos Classification	Sample / Identification Summary	Sample ID	Sample Date	% Asbestos & Fibre Type
14	Classroom	Floor	Vinyl Floor Tile 12"x 12"	Grey with Grey and White Flecks	-	Non ACM	SL	S08bc	9-Dec-09	ND
14	Classroom	Wall	Plaster	-	-	Non ACM	SL	S04B	28-Apr-18	-
14	Classroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
14	Classroom	Deck	Concrete	-	-	Non ACM	-	-	-	-
14	Classroom	Ceiling	Formed Insulation	White Insulation	F	ACM	HM	S07	9-Dec-09	1.4% Chrysotile; 20% Amosite
15	Classroom	Floor	Vinyl Floor Tile 12"x 12"	Grey with Grey and White Flecks	-	Non ACM	SL	S08bc	9-Dec-09	ND
15	Classroom	Wall	Plaster	-	-	Non ACM	HM	S04	28-Apr-18	-
15	Classroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
15	Classroom	Deck	Concrete	-	-	Non ACM	-	-	-	-
15	Classroom	Ceiling	Formed Insulation	White Insulation	F	ACM	HM	S07	9-Dec-09	1.4% Chrysotile; 20% Amosite
16	Classroom	Floor	Vinyl Sheet Flooring	Faux Wood Pattern (Post 2013)	-	Non ACM	-	-	-	-
16	Classroom	Wall	Plaster	-	-	Non ACM	HM	S04	28-Apr-18	-
16	Classroom	Wall	Drywall	Drywall Joint Compound (Post 2013)	-	Non ACM	-	-	-	-
16	Classroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
16	Classroom	Ceiling	Concrete Block	-	-	Non ACM	-	-	-	-
16A	Washroom	Floor	Ceramic Tile	-	-	Non ACM	-	-	-	-
16A	Washroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
16A	Washroom	Ceiling	Drywall	Drywall Joint Compound (Post 2013)	-	Non ACM	-	-	-	-
18	Classroom	Floor	Vinyl Sheet Flooring	Faux Wood Pattern (Post 2013)	-	Non ACM	-	-	-	-
18	Classroom	Wall	Plaster	-	-	Non ACM	HM	S04	28-Apr-18	-
18	Classroom	Wall	Drywall	Drywall Joint Compound (Post 2013)	-	Non ACM	-	-	-	-
18	Classroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
18	Classroom	Ceiling	Concrete Block	-	-	Non ACM	-	-	-	-
18A	Washroom	Floor	Ceramic Tile	-	-	Non ACM	-	-	-	-
18A	Washroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
18A	Washroom	Ceiling	Drywall	Drywall Joint Compound (Post 2013)	-	Non ACM	-	-	-	-
19	Classroom	Floor	Vinyl Floor Tile 12"x 12"	Beige with Beige and Grey Fleck	-	Non ACM	HM	S04	9-Dec-09	ND
19	Classroom	Wall	Drywall	Drywall Joint Compound	NF	ACM	HM	S02	28-Apr-18	2% Chrysotile
19	Classroom	Wall	Drywall	No Drywall Joint Compound	-	Non ACM	-	-	-	-
19	Classroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
19	Classroom	Ceiling	Ceiling Tile 2' x 4'	Fibreglass	-	Non ACM	-	-	-	-



School Name Crestview Public School Date Built: Original: 1966 Addition(s): 1968, 1991	Legend: HM - Homogenous Material - homogeneous with previously sampled material SL - Sample Location - Material Sampled VC - Visually Confirmed - Material not sampled, deemed ACM NF - Non-Friable F- Friable	Notes: All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM.
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WRDSB Fixed Reference Number	Room Description	Inspected Item	Inspected Material	Material Description	Friability	Asbestos Classification	Sample / Identification Summary	Sample ID	Sample Date	% Asbestos & Fibre Type
19	Classroom	Deck	Metal Pan	Steel	-	Non ACM	-	-	-	-
19	Classroom	Piping	Pipe Fitting	Parged Cement	F	ACM	HM	1680.198-03A	23-Mar-90	50-75% Chrysotile
20	Classroom	Floor	Vinyl Floor Tile 12"x 12"	Beige with Beige and Grey Fleck	-	Non ACM	HM	S04	9-Dec-09	ND
20	Classroom	Wall	Drywall	Drywall Joint Compound	NF	ACM	HM	S02	28-Apr-18	2% Chrysotile
20	Classroom	Wall	Drywall	No Drywall Joint Compound	-	Non ACM	-	-	-	-
20	Classroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
20	Classroom	Ceiling	Ceiling Tile 2' x 4'	Fibreglass	-	Non ACM	-	-	-	-
20	Classroom	Deck	Metal Pan	Steel	-	Non ACM	-	-	-	-
20	Classroom	Piping	Pipe Fitting	Parged Cement	F	ACM	HM	1680.198-03A	23-Mar-90	50-75% Chrysotile
21	Classroom	Floor	Carpet	-	-	Non ACM	-	-	-	-
21	Classroom	Wall	Drywall	Drywall Joint Compound	NF	ACM	HM	S02	28-Apr-18	2% Chrysotile
21	Classroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
21	Classroom	Ceiling	Ceiling Tile 2' x 4'	Fibreglass	-	Non ACM	-	-	-	-
22	Classroom	Floor	Vinyl Sheet Flooring	Faux Wood Pattern (Post 2013)	-	Non ACM	-	-	-	-
22	Classroom	Wall	Plaster	-	-	Non ACM	HM	S04	28-Apr-18	-
22	Classroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
22	Classroom	Ceiling	Concrete Block	-	-	Non ACM	-	-	-	-
22A	Washroom	Floor	Ceramic Tile	-	-	Non ACM	-	-	-	-
22A	Washroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
22A	Washroom	Ceiling	Drywall	Drywall Joint Compound (Post 2013)	-	Non ACM	-	-	-	-
22B	Washroom	Floor	Ceramic Tile	-	-	Non ACM	-	-	-	-
22B	Washroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
22B	Washroom	Ceiling	Drywall	Drywall Joint Compound (Post 2013)	-	Non ACM	-	-	-	-
23	Classroom	Interior Finishes	-	-	-	Non-ACM	-	-	-	-
23	Classroom	Floor	Vinyl Sheet Flooring	Faux Wood Pattern (Post 2013)	-	Non ACM	-	-	-	-
23	Classroom	Wall	Plaster	-	-	Non ACM	HM	S04	28-Apr-18	-
23	Classroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
23	Classroom	Ceiling	Concrete Block	-	-	Non ACM	-	-	-	-
23A	Washroom	Floor	Ceramic Tile	-	-	Non ACM	-	-	-	-
23A	Washroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
23A	Washroom	Ceiling	Drywall	Drywall Joint Compound (Post 2013)	-	Non ACM	-	-	-	-



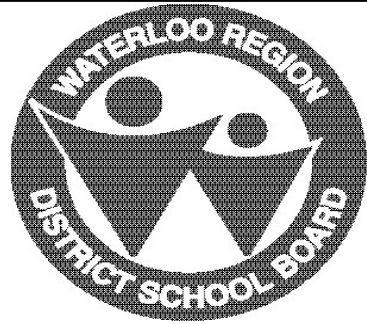
	School Name	Legend:	Notes:
	Crestview Public School	HM - Homogenous Material - homogeneous with previously sampled material	All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM.
	Date Built:	SL - Sample Location - Material Sampled	
	Original: 1966	VC - Visually Confirmed - Material not sampled, deemed ACM	
Addition(s): 1968, 1991	NF - Non-Friable F- Friable		

WRDSB Fixed Reference Number	Room Description	Inspected Item	Inspected Material	Material Description	Friability	Asbestos Classification	Sample / Identification Summary	Sample ID	Sample Date	% Asbestos & Fibre Type
23B	Washroom	Floor	Ceramic Tile	-	-	Non ACM	-	-	-	-
23B	Washroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
23B	Washroom	Ceiling	Drywall	Drywall Joint Compound (Post 2013)	-	Non ACM	-	-	-	-
24	Classroom	Floor	Vinyl Floor Tile 12"x 12"	Mottled Beige	-	Non ACM	HM	S10	9-Dec-09	ND
24	Classroom	Wall	Plaster	-	-	Non ACM	SL	S04C	28-Apr-18	-
24	Classroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
24	Classroom	Ceiling	Ceiling Tile 2' x 4'	Fibreglass	-	Non ACM	-	-	-	-
24	Classroom	Deck	Metal Pan	Steel	-	Non ACM	-	-	-	-
24	Classroom	Ceiling	Transite	Transite	NF	ACM	SL	S07	9-Dec-09	1.4% Chrysotile; 20% Amosite
24	Classroom	Piping	Pipe Insulation	Fibreglass insulation	-	Non ACM	-	-	-	-
24	Classroom	Piping	Pipe Fitting	Fibreglass/PVC	-	Non ACM	-	-	-	-
24	Classroom	Piping	Pipe Insulation	Sweat Wrap (Cellulose)	-	Non ACM	-	-	-	-
25	Classroom	Floor	Vinyl Floor Tile 12"x 12"	Grey with Grey and White Flecks	-	Non ACM	HM	S08	9-Dec-09	ND
25	Classroom	Wall	Plaster	-	-	Non ACM	SL	S04A	28-Apr-18	-
25	Classroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
25	Classroom	Ceiling	Ceiling Tile 2' x 4'	Fibreglass	-	Non ACM	-	-	-	-
25	Classroom	Deck	Metal Pan	Steel	-	Non ACM	-	-	-	-
25	Classroom	Ceiling	Transite	Transite	NF	ACM	HM	S07	9-Dec-09	1.4% Chrysotile; 20% Amosite
40	Custodial	Floor	Terrazzo	-	-	Non ACM	-	-	-	-
40	Custodial	Wall	Concrete	-	-	Non ACM	-	-	-	-
40	Custodial	Ceiling	Concrete	-	-	Non ACM	-	-	-	-
42	Washroom	Floor	Terrazzo	-	-	Non ACM	-	-	-	-
42	Washroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
42	Washroom	Deck	Concrete	-	-	Non ACM	-	-	-	-
42	Washroom	Ceiling	Drywall	Drywall Joint Compound	NF	ACM	HM	S02	28-Apr-18	2% Chrysotile
42	Pipe Shaft	Piping	Pipe Fitting	Parged Cement	F	ACM	HM	1680.198-03A	23-Mar-90	50-75% Chrysotile
43	Corridor	Floor	Vinyl Floor Tile 12"x 12"	Grey with Grey and White Flecks	-	Non ACM	HM	S08	9-Dec-09	ND
43	Corridor	Wall	Drywall	Drywall Joint Compound	NF	ACM	HM	S02	28-Apr-18	2% Chrysotile
43	Corridor	Wall	Concrete	-	-	Non ACM	-	-	-	-
43	Corridor	Ceiling	Ceiling Tile 2' x 4'	Fibreglass	-	Non ACM	-	-	-	-
43	Corridor	Deck	Metal Pan	Steel	-	Non ACM	-	-	-	-



	School Name	Legend:	Notes:
	Crestview Public School	HM - Homogenous Material - homogeneous with previously sampled material	All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM.
	Date Built:	SL - Sample Location - Material Sampled	
	Original: 1966	VC - Visually Confirmed - Material not sampled, deemed ACM	
Addition(s): 1968, 1991	NF - Non-Friable F- Friable		

WRDSB Fixed Reference Number	Room Description	Inspected Item	Inspected Material	Material Description	Friability	Asbestos Classification	Sample / Identification Summary	Sample ID	Sample Date	% Asbestos & Fibre Type
44	Corridor	Floor	Vinyl Floor Tile 12"x 12"	Grey with Grey and White Flecks	-	Non ACM	HM	S08	9-Dec-09	ND
44	Corridor	Wall	Drywall	Drywall Joint Compound	NF	ACM	HM	S02	28-Apr-18	2% Chrysotile
44	Corridor	Wall	Concrete	-	-	Non ACM	-	-	-	-
44	Corridor	Ceiling	Ceiling Tile 2' x 4'	Fibreglass	-	Non ACM	-	-	-	-
44	Corridor	Deck	Metal Pan	Steel	-	Non ACM	-	-	-	-
45	Washroom	Floor	Terrazzo	-	-	Non ACM	-	-	-	-
45	Washroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
45	Washroom	Deck	Concrete	-	-	Non ACM	-	-	-	-
45	Washroom	Ceiling	Drywall	Drywall Joint Compound	NF	ACM	HM	S02	28-Apr-18	2% Chrysotile
45	Pipe Shaft	Piping	Pipe Fitting	Parged Cement	F	ACM	HM	1680.198-03A	23-Mar-90	50-75% Chrysotile
46	Washroom	Floor	Terrazzo	-	-	Non ACM	-	-	-	-
46	Washroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
46	Washroom	Deck	Concrete	-	-	Non ACM	-	-	-	-
46	Washroom	Ceiling	Drywall	Drywall Joint Compound	-	Non ACM	HM	S01	28-Apr-18	ND
47	Washroom	Floor	Terrazzo	-	-	Non ACM	-	-	-	-
47	Washroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
47	Washroom	Deck	Concrete	-	-	Non ACM	-	-	-	-
47	Washroom	Ceiling	Drywall	Drywall Joint Compound	-	Non ACM	HM	S01	28-Apr-18	ND
47	Pipe Shaft	Piping	Pipe Fitting	Parged Cement	F	ACM	HM	1680.198-03A	23-Mar-90	50-75% Chrysotile
48	Washroom	Floor	Ceramic Tile	-	-	Non ACM	-	-	-	-
48	Washroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
48	Washroom	Ceiling	Drywall	Drywall Joint Compound	-	Non ACM	HM	S01	28-Apr-18	ND
49	Storage	Floor	Ceramic Tile	-	-	Non ACM	-	-	-	-
49	Storage	Wall	Concrete	-	-	Non ACM	-	-	-	-
49	Storage	Ceiling	Drywall	Drywall Joint Compound	-	Non ACM	HM	S01	28-Apr-18	ND
50	Staff Room	Floor	Vinyl Floor Tile 12"x 12"	Mottled Beige	-	Non ACM	HM	S10	9-Dec-09	ND
50	Staff Room	Wall	Concrete	-	-	Non ACM	-	-	-	-
50	Staff Room	Ceiling	Ceiling Tile 2' x 4'	Short Fissure Random Pinhole (1993)	-	Non ACM	-	-	-	-
50	Staff Room	Ceiling	Ceiling Tile 2' x 4'	Deep Fissure Random Pinhole	-	Non ACM	HM	S06	9-Dec-09	ND
51	Office	Floor	Carpet	-	-	Non ACM	-	-	-	-
51	Office	Wall	Concrete	-	-	Non ACM	-	-	-	-



School Name Crestview Public School Date Built: Original: 1966 Addition(s): 1968, 1991	Legend: HM - Homogenous Material - homogeneous with previously sampled material SL - Sample Location - Material Sampled VC - Visually Confirmed - Material not sampled, deemed ACM NF - Non-Friable F- Friable	Notes: All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM.
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WRDSB Fixed Reference Number	Room Description	Inspected Item	Inspected Material	Material Description	Friability	Asbestos Classification	Sample / Identification Summary	Sample ID	Sample Date	% Asbestos & Fibre Type
51	Office	Wall	Drywall	Drywall Joint Compound	-	Non ACM	HM	S01	28-Apr-18	ND
51	Office	Ceiling	Ceiling Tile 2' x 4'	Short Fissure Random Pinhole (2007)	-	Non ACM	-	-	-	-
51	Office	Ceiling	Concrete	-	-	Non ACM	-	-	-	-
52	Office	Floor	Vinyl Floor Tile 12"x 12"	Mottled Beige	-	Non ACM	HM	S10	9-Dec-09	ND
52	Office	Wall	Concrete	-	-	Non ACM	-	-	-	-
52	Office	Wall	Drywall	Drywall Joint Compound	-	Non ACM	HM	S01	28-Apr-18	ND
52	Office	Wall	Wood Panel	-	-	Non ACM	-	-	-	-
52	Office	Ceiling	Ceiling Tile 2' x 4'	Short Fissure Random Pinhole (1993)	-	Non ACM	-	-	-	-
52	Office	Ceiling	Ceiling Tile 2' x 4'	Textured (1991)	-	Non ACM	-	-	-	-
52	Office	Ceiling	Concrete	-	-	Non ACM	-	-	-	-
53	Office	Floor	Carpet	-	-	Non ACM	-	-	-	-
53	Office	Wall	Concrete	-	-	Non ACM	-	-	-	-
53	Office	Wall	Drywall	Drywall Joint Compound	-	Non ACM	HM	S01	28-Apr-18	ND
53	Office	Ceiling	Ceiling Tile 2' x 4'	Short Fissure Random Pinhole (2007)	-	Non ACM	-	-	-	-
53	Office	Ceiling	Concrete	-	-	Non ACM	-	-	-	-
54	Office	Floor	Vinyl Floor Tile 12"x 12"	Mottled Beige	-	Non ACM	HM	S10	9-Dec-09	ND
54	Office	Wall	Concrete	-	-	Non ACM	-	-	-	-
54	Office	Wall	Drywall	Drywall Joint Compound	-	Non ACM	HM	S01	28-Apr-18	ND
54	Office	Wall	Wood Panel	-	-	Non ACM	-	-	-	-
54	Office	Ceiling	Ceiling Tile 2' x 4'	Short Fissure Random Pinhole (1993)	-	Non ACM	-	-	-	-
54	Office	Ceiling	Ceiling Tile 2' x 4'	Textured (1991)	-	Non ACM	-	-	-	-
54	Office	Ceiling	Concrete	-	-	Non ACM	-	-	-	-
55	Storage	Floor	Vinyl Floor Tile 9"x 9"	Beige with Brown Streak	NF	ACM	SL	S03abc	9-Dec-09	1.3% Chrysotile
55	Storage	Wall	Concrete	-	-	Non ACM	-	-	-	-
55	Storage	Ceiling	Concrete	-	-	Non ACM	-	-	-	-
55	Storage	Piping	Pipe Insulation	Fibreglass insulation	-	Non ACM	-	-	-	-
55	Storage	Piping	Pipe Fitting	Parged Cement	F	ACM	HM	1680.198-03A	23-Mar-90	50-75% Chrysotile
56	General Purpose Room	Floor	Vinyl Floor Tile 12"x 12"	Beige with Grey Fleck	-	Non ACM	SL	S01abc	9-Dec-09	ND
56	General Purpose Room	Wall	Concrete	-	-	Non ACM	-	-	-	-
56	General Purpose Room	Deck	Concrete	-	-	Non ACM	-	-	-	-
56	General Purpose Room	Deck	Drywall	Drywall Joint Compound	-	Non ACM	HM	S01	28-Apr-18	ND



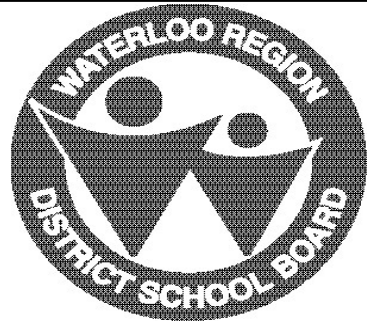
School Name Crestview Public School Date Built: Original: 1966 Addition(s): 1968, 1991	Legend: HM - Homogenous Material - homogeneous with previously sampled material SL - Sample Location - Material Sampled VC - Visually Confirmed - Material not sampled, deemed ACM NF - Non-Friable F- Friable	Notes: All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM.
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WRDSB Fixed Reference Number	Room Description	Inspected Item	Inspected Material	Material Description	Friability	Asbestos Classification	Sample / Identification Summary	Sample ID	Sample Date	% Asbestos & Fibre Type
56	General Purpose Room	Piping	Pipe Insulation	Fibreglass insulation	-	Non ACM	-	-	-	-
56	General Purpose Room	Piping	Pipe Fitting	Fibreglass/PVC	-	Non ACM	-	-	-	-
56C	Office	Floor	Vinyl Rolled Flooring	Grey with Grey Spots	-	Non ACM	SL	S02abc	9-Dec-09	ND
56C	Office	Wall	Concrete	-	-	Non ACM	-	-	-	-
56C	Office	Ceiling	Drywall	Drywall Joint Compound	-	Non ACM	HM	S01	28-Apr-18	ND
56B	Office	Floor	Vinyl Rolled Flooring	Grey with Grey Spots	-	Non ACM	HM	S02	9-Dec-09	ND
56B	Office	Wall	Concrete	-	-	Non ACM	-	-	-	-
56B	Office	Ceiling	Drywall	Drywall Joint Compound	-	Non ACM	HM	S01	28-Apr-18	ND
58	Copy Room	Floor	Vinyl Floor Tile 9"x 9"	Beige with Brown Streak	NF	ACM	HM	S03	9-Dec-09	1.3% Chrysotile
58	Copy Room	Wall	Concrete	-	-	Non ACM	-	-	-	-
58	Copy Room	Ceiling	Drywall	Drywall Joint Compound	-	Non ACM	SL	S01A	28-Apr-18	ND
58	Copy Room	Deck	Concrete	-	-	Non ACM	-	-	-	-
59	Changeroom	Floor	Vinyl Floor Tile 12"x 12"	Beige with Beige and Grey Fleck	-	Non ACM	SL	S04abc	9-Dec-09	ND
59	Changeroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
59	Changeroom	Deck	Concrete	-	-	Non ACM	-	-	-	-
59	Changeroom	Ceiling	Drywall	Drywall Joint Compound	-	Non ACM	HM	S01	28-Apr-18	ND
60	Storage	Ceiling	Drywall	Drywall Joint Compound	-	Non ACM	SL	S01C	28-Apr-18	ND
60	Storage	Floor	Vinyl Floor Tile 9"x 9"	Beige with Brown Streak	NF	ACM	HM	S03	9-Dec-09	1.3% Chrysotile
60	Storage	Wall	Concrete	-	-	Non ACM	-	-	-	-
60	Storage	Ceiling	Concrete	-	-	Non ACM	-	-	-	-
60	Storage	Ceiling	Drywall	Drywall Joint Compound	-	Non ACM	SL	S01B	28-Apr-18	ND
60	Storage	Piping	Pipe Insulation	Fibreglass insulation	-	Non ACM	-	-	-	-
61	Changeroom	Floor	Vinyl Floor Tile 12"x 12"	Beige with Beige and Grey Fleck	-	Non ACM	HM	S04	9-Dec-09	ND
61	Changeroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
61	Changeroom	Deck	Concrete	-	-	Non ACM	-	-	-	-
61	Changeroom	Ceiling	Drywall	Drywall Joint Compound	-	Non ACM	HM	S01	28-Apr-18	ND
61	Changeroom	Piping	Pipe Insulation	Fibreglass insulation	-	Non ACM	-	-	-	-
63	Staff Lounge	Floor	Vinyl Floor Tile 9"x 9"	Beige with Brown Streak	NF	ACM	HM	S03	9-Dec-09	1.3% Chrysotile
63	Staff Lounge	Floor	Ceramic Tile	-	-	Non ACM	-	-	-	-
63	Staff Lounge	Wall	Concrete	-	-	Non ACM	-	-	-	-
63	Staff Lounge	Ceiling	Ceiling Tile 2' x 4'	Deep Fissure Random Pinhole	-	Non ACM	HM	S06	9-Dec-09	ND



School Name Crestview Public School Date Built: Original: 1966 Addition(s): 1968, 1991	Legend: HM - Homogenous Material - homogeneous with previously sampled material SL - Sample Location - Material Sampled VC - Visually Confirmed - Material not sampled, deemed ACM NF - Non-Friable F- Friable	Notes: All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM.
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WRDSB Fixed Reference Number	Room Description	Inspected Item	Inspected Material	Material Description	Friability	Asbestos Classification	Sample / Identification Summary	Sample ID	Sample Date	% Asbestos & Fibre Type
63	Staff Lounge	Deck	Metal Pan	Steel	-	Non ACM	-	-	-	-
63	Staff Lounge	Piping	Pipe Fitting	Parged Cement	F	ACM	HM	1680.198-03A	23-Mar-90	50-75% Chrysotile
64	Storage	Floor	Vinyl Floor Tile 12"x 12"	Beige with Beige and Grey Fleck	-	Non ACM	HM	S04	9-Dec-09	ND
64	Storage	Wall	Drywall	Drywall Joint Compound	NF	ACM	HM	S02	28-Apr-18	2% Chrysotile
64	Storage	Wall	Concrete	-	-	Non ACM	-	-	-	-
64	Storage	Wall	Brick	-	-	Non ACM	-	-	-	-
64	Storage	Ceiling	Ceiling Tile 2' x 4'	Fibreglass	-	Non ACM	-	-	-	-
64	Storage	Deck	Metal Pan	Steel	-	Non ACM	-	-	-	-
65	Storage	Floor	Vinyl Floor Tile 12"x 12"	Beige with Beige and Grey Fleck	-	Non ACM	HM	S04	9-Dec-09	ND
65	Storage	Wall	Drywall	Drywall Joint Compound	NF	ACM	SL	S02B	28-Apr-18	2% Chrysotile
65	Storage	Wall	Concrete	-	-	Non ACM	-	-	-	-
65	Storage	Wall	Brick	-	-	Non ACM	-	-	-	-
65	Storage	Ceiling	Ceiling Tile 2' x 4'	Fibreglass	-	Non ACM	-	-	-	-
65	Storage	Deck	Metal Pan	Steel	-	Non ACM	-	-	-	-
65A	Office	Floor	Vinyl Floor Tile 12"x 12"	Beige with Beige and Grey Fleck	-	Non ACM	HM	S04	9-Dec-09	ND
65A	Office	Wall	Drywall	Drywall Joint Compound	NF	ACM	SL	S02A	28-Apr-18	2% Chrysotile
65A	Office	Wall	Concrete	-	-	Non ACM	-	-	-	-
65A	Office	Wall	Brick	-	-	Non ACM	-	-	-	-
65A	Office	Ceiling	Ceiling Tile 2' x 4'	Fibreglass	-	Non ACM	-	-	-	-
65A	Office	Deck	Metal Pan	Steel	-	Non ACM	-	-	-	-
66	Library	Floor	Vinyl Floor Tile 12"x 12"	Beige with Beige and Grey Fleck	-	Non ACM	HM	S04	9-Dec-09	ND
66	Library	Floor	Carpet	-	-	Non ACM	-	-	-	-
66	Library	Wall	Drywall	Drywall Joint Compound	NF	ACM	HM	S02	28-Apr-18	2% Chrysotile
66	Library	Wall	Concrete	-	-	Non ACM	-	-	-	-
66	Library	Ceiling	Ceiling Tile 2' x 4'	Fibreglass	-	Non ACM	-	-	-	-
66	Library	Deck	Metal Pan	Steel	-	Non ACM	-	-	-	-
66	Library	Piping	Pipe Insulation	Fibreglass insulation	-	Non ACM	-	-	-	-
66	Library	Piping	Pipe Fitting	Parged Cement	F	ACM	HM	1680.198-03A	23-Mar-90	50-75% Chrysotile
67	Washroom	Floor	Terrazzo	-	-	Non ACM	-	-	-	-
67	Washroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
67	Washroom	Deck	Concrete	-	-	Non ACM	-	-	-	-



School Name Crestview Public School Date Built: Original: 1966 Addition(s): 1968, 1991	Legend: HM - Homogenous Material - homogeneous with previously sampled material SL - Sample Location - Material Sampled VC - Visually Confirmed - Material not sampled, deemed ACM NF - Non-Friable F- Friable	Notes: All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM.
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WRDSB Fixed Reference Number	Room Description	Inspected Item	Inspected Material	Material Description	Friability	Asbestos Classification	Sample / Identification Summary	Sample ID	Sample Date	% Asbestos & Fibre Type
67	Washroom	Ceiling	Drywall	Drywall Joint Compound	-	Non ACM	HM	S01	28-Apr-18	ND
67A	Pipe Chase	Floor	Concrete	-	-	Non ACM	-	-	-	-
67A	Pipe Chase	Wall	Concrete	-	-	Non ACM	-	-	-	-
67A	Pipe Chase	Deck	Concrete	-	-	Non ACM	-	-	-	-
67A	Pipe Chase	Piping	Pipe Insulation	Fibreglass insulation	-	Non ACM	-	-	-	-
67A	Pipe Chase	Piping	Pipe Fitting	Parged Cement	F	ACM	HM	1680.198-03A	23-Mar-90	50-75% Chrysotile
67A	Pipe Shaft	Floor	Concrete	-	-	Non ACM	-	-	-	-
67A	Pipe Shaft	Wall	Concrete	-	-	Non ACM	-	-	-	-
67A	Pipe Shaft	Deck	Concrete	-	-	Non ACM	-	-	-	-
68	Washroom	Floor	Terrazzo	-	-	Non ACM	-	-	-	-
68	Washroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
68	Washroom	Deck	Concrete	-	-	Non ACM	-	-	-	-
68	Washroom	Ceiling	Drywall	Drywall Joint Compound	-	Non ACM	HM	S01	28-Apr-18	ND
69	Storage	Floor	Vinyl Floor Tile 12"x 12"	Beige with Grey Fleck	-	Non ACM	HM	S01	9-Dec-09	ND
69	Storage	Wall	Concrete	-	-	Non ACM	-	-	-	-
69	Storage	Deck	Concrete	-	-	Non ACM	-	-	-	-
69	Storage	Piping	Pipe Fitting	Parged Cement	F	ACM	HM	1680.198-03A	23-Mar-90	50-75% Chrysotile
70A	Fan Room	Floor	Concrete	-	-	Non ACM	-	-	-	-
70A	Fan Room	Wall	Concrete	-	-	Non ACM	-	-	-	-
70A	Fan Room	Deck	Concrete	-	-	Non ACM	-	-	-	-
70A	Fan Room	Ducting	Duct Insulation	Fibreglass insulation	-	Non ACM	-	-	-	-
70A	Fan Room	Piping	Pipe Insulation	Fibreglass insulation	-	Non ACM	-	-	-	-
72	Outdoor Storage	Not Inspected								
73	Boiler Room	Floor	Terrazzo	Green	-	Non ACM	-	-	-	-
73	Boiler Room	Wall	Concrete	-	-	Non ACM	-	-	-	-
73	Boiler Room	Ceiling	Concrete	-	-	Non ACM	-	-	-	-
73	Boiler Room	Piping	Pipe Insulation	Fibreglass insulation	-	Non ACM	-	-	-	-
73	Boiler Room	Doors	Fire Doors	Core Insulation	F	ACM	VC	-	-	-
75	Fan Room	Floor	Concrete	-	-	Non ACM	-	-	-	-
75	Fan Room	Wall	Concrete	-	-	Non ACM	-	-	-	-
75	Fan Room	Deck	Concrete	-	-	Non ACM	-	-	-	-



School Name Crestview Public School Date Built: Original: 1966 Addition(s): 1968, 1991	Legend: HM - Homogenous Material - homogeneous with previously sampled material SL - Sample Location - Material Sampled VC - Visually Confirmed - Material not sampled, deemed ACM NF - Non-Friable F- Friable	Notes: All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM.
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WRDSB Fixed Reference Number	Room Description	Inspected Item	Inspected Material	Material Description	Friability	Asbestos Classification	Sample / Identification Summary	Sample ID	Sample Date	% Asbestos & Fibre Type
75	Fan Room	Piping	Pipe Insulation	Fibreglass insulation	-	Non ACM	-	-	-	-
75	Fan Room	Piping	Pipe Fitting	Parged Cement	F	ACM	HM	1680.198-03A	23-Mar-90	50-75% Chrysotile
75	Fan Room	Ducting	Flex Joint	-	NF	ACM	-	-	-	-
75	Fan Room	Piping	Pipe Insulation	Tar Paper Insulation	-	Non ACM	SL	S05abc	9-Dec-09	ND
78	Storage	Floor	Vinyl Floor Tile 9"x 9"	Beige with Brown Streak	NF	ACM	HM	S03	9-Dec-09	1.3% Chrysotile
78	Storage	Wall	Concrete	-	-	Non ACM	-	-	-	-
78	Storage	Ceiling	Concrete	-	-	Non ACM	-	-	-	-
79	Custodial Office	Floor	Vinyl Floor Tile 12"x 12"	Mottled Beige	-	Non ACM	HM	S10	9-Dec-09	ND
79	Custodial Office	Wall	Concrete	-	-	Non ACM	-	-	-	-
79	Custodial Office	Ceiling	Concrete	-	-	Non ACM	-	-	-	-
79	Custodial Office	Piping	Pipe Insulation	Fibreglass insulation	-	Non ACM	-	-	-	-
79	Custodial Office	Piping	Pipe Fitting	Parged Cement	F	ACM	SL	1680.198-03A	23-Mar-90	50-75% Chrysotile
80	Washroom	Floor	Terrazzo	-	-	Non ACM	-	-	-	-
80	Washroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
80	Washroom	Ceiling	Ceiling Tile 2' x 4'	Deep Fissure Random Pinhole	-	Non ACM	HM	S06	9-Dec-09	ND
81	Outdoor Courtyard									
82	Washroom	Floor	Ceramic Tile	-	-	Non ACM	-	-	-	-
82	Washroom	Wall	Concrete	-	-	Non ACM	-	-	-	-
82	Washroom	Ceiling	Drywall	Drywall Joint Compound (Post 2013)	-	Non ACM	-	-	-	-
801	Corridor	Floor	Terrazzo	-	-	Non ACM	-	-	-	-
801	Corridor	Wall	Concrete	-	-	Non ACM	-	-	-	-
801	Corridor	Wall	Brick	-	-	Non ACM	-	-	-	-
801	Corridor	Ceiling	Ceiling Tile 2' x 4'	Short Fissure Random Pinhole (1993)	-	Non ACM	-	-	-	-
801	Corridor	Ceiling	Ceiling Tile 2' x 4'	Deep Fissure Random Pinhole	-	Non ACM	SL	S06abc	9-Dec-09	ND
801	Corridor	Deck	Metal Pan	Steel	-	Non ACM	-	-	-	-
801	Corridor	Piping	Pipe Fitting	Parged Cement	F	ACM	HM	1680.198-03A	23-Mar-90	50-75% Chrysotile
801A	Corridor	Floor	Terrazzo	-	-	Non ACM	-	-	-	-
801A	Corridor	Wall	Concrete	-	-	Non ACM	-	-	-	-
801A	Corridor	Wall	Brick	-	-	Non ACM	-	-	-	-
801A	Corridor	Ceiling	Ceiling Tile 2' x 4'	Short Fissure Random Pinhole (1993)	-	Non ACM	-	-	-	-
801A	Corridor	Ceiling	Ceiling Tile 2' x 4'	Deep Fissure Random Pinhole	-	Non ACM	SL	S06abc	9-Dec-09	ND



	School Name	Legend:	Notes:
	Crestview Public School	HM - Homogenous Material - homogeneous with previously sampled material	All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM.
	Date Built:	SL - Sample Location - Material Sampled	
	Original: 1966	VC - Visually Confirmed - Material not sampled, deemed ACM	
Addition(s): 1968, 1991	NF - Non-Friable F- Friable		

WRDSB Fixed Reference Number	Room Description	Inspected Item	Inspected Material	Material Description	Friability	Asbestos Classification	Sample / Identification Summary	Sample ID	Sample Date	% Asbestos & Fibre Type
801A	Corridor	Deck	Metal Pan	Steel	-	Non ACM	-	-	-	-
801A	Corridor	Overhang	Transite	Transite	NF	ACM	SL	S07	9-Dec-09	1.4% Chrysotile; 20% Amosite
801B	Corridor	Floor	Terrazzo	-	-	Non ACM	-	-	-	-
801B	Corridor	Wall	Concrete	-	-	Non ACM	-	-	-	-
801B	Corridor	Wall	Brick	-	-	Non ACM	-	-	-	-
801B	Corridor	Ceiling	Ceiling Tile 2' x 4'	Short Fissure Random Pinhole (1993)	-	Non ACM	-	-	-	-
801B	Corridor	Ceiling	Ceiling Tile 2' x 4'	Deep Fissure Random Pinhole	-	Non ACM	SL	S06abc	9-Dec-09	ND
801B	Corridor	Deck	Metal Pan	Steel	-	Non ACM	-	-	-	-
801B	Corridor	Piping	Pipe Fitting	Parged Cement	F	ACM	HM	1680.198-03A	23-Mar-90	50-75% Chrysotile
801B	Corridor	Overhang	Transite	Transite	NF	ACM	SL	S07	9-Dec-09	1.4% Chrysotile; 20% Amosite
802	Corridor	Floor	Terrazzo	-	-	Non ACM	-	-	-	-
802	Corridor	Wall	Concrete	-	-	Non ACM	-	-	-	-
802	Corridor	Wall	Brick	-	-	Non ACM	-	-	-	-
802	Corridor	Ceiling	Ceiling Tile 2' x 4'	Deep Fissure Random Pinhole	-	Non ACM	HM	S06	9-Dec-09	ND
802	Corridor	Piping	Pipe Insulation	Fibreglass insulation	-	Non ACM	-	-	-	-
802	Corridor	Piping	Pipe Fitting	Parged Cement	F	ACM	HM	1680.198-03A	23-Mar-90	50-75% Chrysotile
802	Corridor	Deck	Metal Pan	Steel	-	Non ACM	-	-	-	-
803	Corridor	Floor	Terrazzo	-	-	Non ACM	-	-	-	-
803	Corridor	Wall	Concrete	-	-	Non ACM	-	-	-	-
803	Corridor	Ceiling	Ceiling Tile 2' x 2'	Textured (1991)	-	Non ACM	-	-	-	-
803	Corridor	Ceiling	Ceiling Tile 2' x 4'	Deep Fissure Random Pinhole	-	Non ACM	HM	S06	9-Dec-09	ND
803	Corridor	Piping	Pipe Fitting	Parged Cement	F	ACM	HM	1680.198-03A	23-Mar-90	50-75% Chrysotile
803A	Corridor	Floor	Terrazzo	-	-	Non ACM	-	-	-	-
803A	Corridor	Wall	Concrete	-	-	Non ACM	-	-	-	-
803A	Corridor	Ceiling	Ceiling Tile 2' x 2'	Textured (1991)	-	Non ACM	-	-	-	-
803A	Corridor	Ceiling	Ceiling Tile 2' x 4'	Deep Fissure Random Pinhole	-	Non ACM	HM	S06	9-Dec-09	ND
803A	Corridor	Piping	Pipe Fitting	Parged Cement	F	ACM	HM	1680.198-03A	23-Mar-90	50-75% Chrysotile
803B	Corridor	Floor	Terrazzo	-	-	Non ACM	-	-	-	-
803B	Corridor	Wall	Concrete	-	-	Non ACM	-	-	-	-
803B	Corridor	Wall	Brick	-	-	Non ACM	-	-	-	-
803B	Corridor	Ceiling	Ceiling Tile 2' x 4'	Short Fissure Random Pinhole (1993)	-	Non ACM	-	-	-	-



School Name Crestview Public School Date Built: Original: 1966 Addition(s): 1968, 1991	Legend: HM - Homogenous Material - homogeneous with previously sampled material SL - Sample Location - Material Sampled VC - Visually Confirmed - Material not sampled, deemed ACM NF - Non-Friable F- Friable	Notes: All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM.
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WRDSB Fixed Reference Number	Room Description	Inspected Item	Inspected Material	Material Description	Friability	Asbestos Classification	Sample / Identification Summary	Sample ID	Sample Date	% Asbestos & Fibre Type
803B	Corridor	Ceiling	Ceiling Tile 2' x 4'	Deep Fissure Random Pinhole	-	Non ACM	HM	S06	9-Dec-09	ND
803B	Corridor	Piping	Pipe Fitting	Parged Cement	F	ACM	HM	1680.198-03A	23-Mar-90	50-75% Chrysotile
803B	Corridor	Overhang	Transite	Transite	NF	ACM	HM	S07	9-Dec-09	1.4% Chrysotile; 20% Amosite
803C	Corridor	Floor	Terrazzo	-	-	Non ACM	-	-	-	-
803C	Corridor	Wall	Concrete	-	-	Non ACM	-	-	-	-
803C	Corridor	Ceiling	Ceiling Tile 2' x 4'	Short Fissure Random Pinhole (1993)	-	Non ACM	-	-	-	-
803C	Corridor	Ceiling	Ceiling Tile 2' x 4'	Deep Fissure Random Pinhole	-	Non ACM	HM	S06	9-Dec-09	ND
803C	Corridor	Piping	Pipe Fitting	Parged Cement	F	ACM	HM	1680.198-03A	23-Mar-90	50-75% Chrysotile
803D	Corridor	Floor	Terrazzo	-	-	Non ACM	-	-	-	-
803D	Corridor	Wall	Concrete	-	-	Non ACM	-	-	-	-
803D	Corridor	Wall	Brick	-	-	Non ACM	-	-	-	-
803D	Corridor	Ceiling	Ceiling Tile 2' x 4'	Short Fissure Random Pinhole (1993)	-	Non ACM	-	-	-	-
803D	Corridor	Ceiling	Ceiling Tile 2' x 4'	Deep Fissure Random Pinhole	-	Non ACM	HM	S06	9-Dec-09	ND
803D	Corridor	Piping	Pipe Fitting	Parged Cement	F	ACM	HM	1680.198-03A	23-Mar-90	50-75% Chrysotile
803D	Corridor	Overhang	Transite	Transite	NF	ACM	HM	S07	9-Dec-09	1.4% Chrysotile; 20% Amosite
807	Corridor	Floor	Vinyl Floor Tile 12"x 12"	Mottled Beige	-	Non ACM	HM	S10	9-Dec-09	ND
807	Corridor	Wall	Concrete	-	-	Non ACM	-	-	-	-
807	Corridor	Ceiling	Ceiling Tile 2' x 4'	Short Fissure Random Pinhole (1993)	-	Non ACM	-	-	-	-
807	Corridor	Ceiling	Ceiling Tile 2' x 4'	Deep Fissure Random Pinhole	-	Non ACM	HM	S06	9-Dec-09	ND
808	Corridor	Floor	Terrazzo	-	-	Non ACM	-	-	-	-
808	Corridor	Wall	Concrete	-	-	Non ACM	-	-	-	-
808	Corridor	Wall	Brick	-	-	Non ACM	-	-	-	-
808	Corridor	Ceiling	Ceiling Tile 2' x 4'	Short Fissure Random Pinhole (1993)	-	Non ACM	-	-	-	-
808	Corridor	Deck	Metal Pan	Steel	-	Non ACM	-	-	-	-
808	Corridor	Piping	Pipe Insulation	Fibreglass insulation	-	Non ACM	-	-	-	-
808	Corridor	Piping	Pipe Fitting	Parged Cement	F	ACM	HM	1680.198-03A	23-Mar-90	50-75% Chrysotile
808	Corridor	Overhang	Transite	Transite	NF	ACM	HM	S07	9-Dec-09	1.4% Chrysotile; 20% Amosite
809	Corridor	Floor	Vinyl Floor Tile 12"x 12"	Grey with Grey and White Flecks	-	Non ACM	HM	S08	9-Dec-09	ND
809	Corridor	Wall	Drywall	Drywall Joint Compound	NF	ACM	SL	S02C	28-Apr-18	2% Chrysotile
809	Corridor	Wall	Concrete	-	-	Non ACM	-	-	-	-
809	Corridor	Ceiling	Ceiling Tile 2' x 4'	Fibreglass	-	Non ACM	-	-	-	-

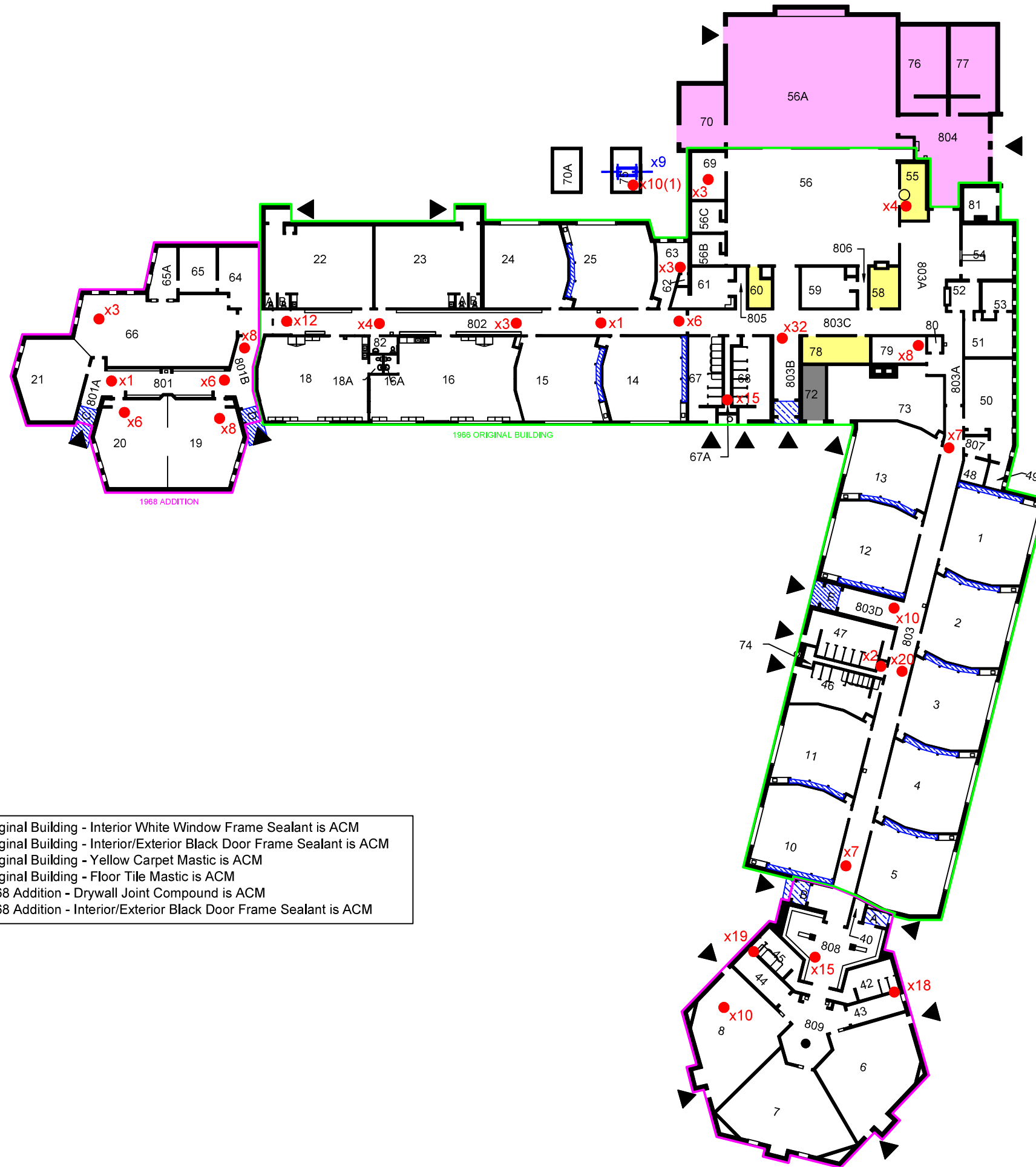


School Name Crestview Public School Date Built: Original: 1966 Addition(s): 1968, 1991	Legend: HM - Homogenous Material - homogeneous with previously sampled material SL - Sample Location - Material Sampled VC - Visually Confirmed - Material not sampled, deemed ACM NF - Non-Friable F- Friable	Notes: All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM.
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WRDSB Fixed Reference Number	Room Description	Inspected Item	Inspected Material	Material Description	Friability	Asbestos Classification	Sample / Identification Summary	Sample ID	Sample Date	% Asbestos & Fibre Type
809	Corridor	Deck	Metal Pan	Steel	-	Non ACM	-	-	-	-
Summary of Potential ACM Hidden or Not Assessed										
73	Boiler Room	Boiler Refractory	Not Inspected							
	Throughout Building	Not Inspected	Not Inspected	Wall Cavity Insulation						
	Throughout Building	Not Inspected	Not Inspected	Door Core Insulation						

Appendix B

Figures



Original Building - Interior White Window Frame Sealant is ACM
 Original Building - Interior/Exterior Black Door Frame Sealant is ACM
 Original Building - Yellow Carpet Mastic is ACM
 Original Building - Floor Tile Mastic is ACM
 1968 Addition - Drywall Joint Compound is ACM
 1968 Addition - Interior/Exterior Black Door Frame Sealant is ACM

NOTES:
 ALL DRAWINGS TO BE REFERENCED WITH THE ASSOCIATED REPORT, LOCATIONS AND QUANTITIES ARE APPROXIMATE.
 ALL KNOWN OR SUSPECT ASBESTOS-CONTAINING MATERIALS AND/OR DESIGNATED MATERIALS ARE NOT DEPICTED ON THIS DRAWING. REFER TO THE REPORT FOR A COMPLETE LIST OF IDENTIFIED MATERIALS.
 THIS FIGURE IS COLOUR DEPENDENT. PHOTOCOPIES MAY ALTER INTERPRETATION OF THE FIGURE. ALWAYS REFER TO ORIGINAL DRAWINGS AND REPORT.

Legend
 13 Fixed Reference Number
 No Access
 Post 1986 Construction

Asbestos-Containing Materials (ACM):

- Floor Tile
- Rolled Flooring
- Ceiling Tile
- Friable Soft Textured Ceiling
- Non-Friable Hard Textured Ceiling
- Spray-On Fire Proofing
- Transite (Asbestos Cement) Paneling
- Duct Insulation
- x2(1) Pipe Fitting Insulation w Quantity (Brackets Indicate # of Damaged Fittings)
- Pipe Insulation (Vertical and Horizontal)
- Transite (Asbestos Cement) Pipe (Vertical and Horizontal)
- x2(1) Duct Expansion Joints w Quantity (Brackets Indicate # of Damaged Joints)
- Friable Debris



CLIENT
 WATERLOO REGION DISTRICT SCHOOL BOARD

PROJECT
 2021 ASBESTOS AUDIT UPDATE

DRAWING
 CRESTVIEW PUBLIC SCHOOL

Project Manager	P. Semeniuk	Date	November 2021
Design By	WRDSB	Project No.	34532-921
Drawn By	P. Semeniuk	Drawing No.	1.0
Scale	N.T.S.		

Appendix C

Tables

TABLE 1 - INTERNAL ABATEMENT MANAGEMENT



Crestview Public School

Material	WRDSB Fixed Reference Number	Material Description	Approximate Quantity	Photograph - Context	Photograph - Detail	Required Action
Asbestos Friable	55	9"x9" Beige with Brown Streak Vinyl Floor Tile	4 Tiles			Repair/Removal in accordance with O. Reg. 278/05 < 1m ² as a Type 1 Operation - Hand tools only in conjunction with dust suppression

Notes:
 1) A copy of this report should be provided to all prospective contractors prior to tender or quotation, in accordance with Section 30 of the Occupational Health and Safety Act.
 2) Recommended actions are the minimum required actions, as prescribed by the appropriate Acts, regulations, guidelines, standards, codes and general best practice measures. The Contractor may choose to alter the approach and combine or break out sections of work. This is acceptable provided that the appropriate Acts, regulations, guidelines, standards and codes are followed and afford protection for the health and safety of workers, occupants and the public that is at least equal to the protection that would be provided by complying with the minimum requirements.
 3) All waste generated is subject to characterization and disposal in accordance with Ontario Regulation 347.

TABLE 2 - EXTERNAL ABATEMENT MANAGEMENT

Crestview Public School

Material	WRDSB Fixed Reference Number	Material Description	Approximate Quantity	Photograph - Context	Photograph - Detail	Required Action
Asbestos Friable	75	Insulation on Pipe fitting	1 Fitting			Repair in accordance with O. Reg. 278/05 as a Type 2/Type 2 Glove Bag Operation

Notes:
 1) A copy of this report should be provided to all prospective contractors prior to tender or quotation, in accordance with Section 30 of the Occupational Health and Safety Act.
 2) Recommended actions are the minimum required actions, as prescribed by the appropriate Acts, regulations, guidelines, standards, codes and general best practice measures. The Contractor may choose to alter the approach and combine or break out sections of work. This is acceptable provided that the appropriate Acts, regulations, guidelines, standards and codes are followed and afford protection for the health and safety of workers, occupants and the public that is at least equal to the protection that would be provided by complying with the minimum requirements.
 3) All waste generated is subject to characterization and disposal in accordance with Ontario Regulation 347.

TABLE 3: BULK ASBESTOS SAMPLING SUMMARY					
Sample #	Location	Material Description	Asbestos Content (%)	Fibre Type	Is Material ACM
2009 Asbestos Audit Update					
CPS-S01A	1044	12" x 12" Floor Tile - Beige with grey fleck	ND	-	No
CPS-S01B			ND	-	No
CPS-S01C			ND	-	No
CPS-S02A	1047	Vinyl Sheet Flooring - Grey spots with grey	ND	-	No
CPS-S02B			ND	-	No
CPS-S02C			ND	-	No
CPS-S03A	1035	9" x 9" Floor Tile - Beige with brown fleck	1.3	Chrysotile	Yes
CPS-S03B			NA	Chrysotile	Yes
CPS-S03C			NA	Chrysotile	Yes
CPS-S04A	1036	12" x 12" Floor Tile - Beige with beige & brown fleck	ND	-	No
CPS-S04B			ND	-	No
CPS-S04C			ND	-	No
CPS-S05A	1057	Tar paper	ND	-	No
CPS-S05B			ND	-	No
CPS-S05C			ND	-	No
CPS-S06A	1066	2; x 4' Ceiling Tile - Deep fissure random pinhole	ND	-	No
CPS-S06B			ND	-	No
CPS-S06C			ND	-	No
CPS-S07A	1056	Overhang board (Transite)	1.4	Chrysotile	Yes
CPS-S07B		Overhang board	20	Amosite	Yes
CPS-S07C		Overhang board	NA	Chrysotile	Yes
CPS-S08A	1072	12" x 12" Floor Tile - Grey with grey & white fleck	ND	-	No
CPS-S08B			ND	-	No
CPS-S08C			ND	-	No
CPS-S09A	1070	12" x 12" Floor Tile - Grey with black streak	0.75	Chrysotile	Yes
CPS-S09B			NA	Chrysotile	Yes
CPS-S09C			NA	Chrysotile	Yes
CPS-S10A	1009	12" x 12" Floor Tile - Beige dense fleck	ND	-	No
CPS-S10B			ND	-	No
CPS-S10C			ND	-	No
CPS-S11A	1042	Texture coat	ND	-	No
CPS-S11B			ND	-	No
CPS-S11C			ND	-	No
CPS-S12A	-	Exterior texture	ND	-	No
CPS-S12B	-		ND	-	No
CPS-S12C	-		ND	-	No
CPS-S13A	1040	Fire spray	ND	-	No
CPS-S13B			ND	-	No
CPS-S13C			ND	-	No
2013 - Limited Designated Substance Audit					
S01A	1032	Black Mastic	ND	-	No
S01B			ND	-	No
S01C			ND	-	No
S02A	1031	Yellow Carpet Mastic	ND	Chrysotile	Yes
S02B			<0.5	Chrysotile	Yes
S02C			0.55	Chrysotile	Yes
S03A	1031	Drywall Joint Compound	ND	-	No
S03B			ND	-	No
S03C			ND	-	No
S04A	1071	Plaster and Skim Coat	ND	-	No
S04B	1070		ND	-	No
S04C	1069		ND	-	No
S05A	1060	Drywall Joint Compound	1	Chrysotile	Yes
S05B			NA	Chrysotile	Yes
S05C			NA	Chrysotile	Yes

Table 3 - Sample Summary Table - Crestview PS

TABLE 3: BULK ASBESTOS SAMPLING SUMMARY					
Sample #	Location	Material Description	Asbestos Content (%)	Fibre Type	Is Material ACM
2018 Asbestos Audit Update					
S01A	1037	DWJC - Ceiling - 1966 Original Building	ND	-	No
S01B	1049	DWJC - Ceiling - 1966 Original Building	ND	-	No
S01C	1046	DWJC - Wall - 1966 Original Building	ND	-	No
S02A	1063	DWJC - Ceiling - 1968 Addition	2	Chrysotile	Yes
S02B	1062	DWJC - Ceiling - 1968 Addition	NA	Chrysotile	Yes
S02C	1003	DWJC - Wall - 1968 Addition	NA	Chrysotile	Yes
S02D	1000	DWJC - Wall - 1968 Addition	NA	Chrysotile	Yes
S02E	1001	DWJC - Wall - 1968 Addition	NA	Chrysotile	Yes
S03A	1047	Floor Tile Mastic - 1966 Original Building	3	Chrysotile	Yes
S03B	1036	Floor Tile Mastic - 1966 Original Building	NA	Chrysotile	Yes
S03C	1049	Floor Tile Mastic - 1966 Original Building	NA	Chrysotile	Yes
S03D	1044	Floor Tile Mastic - 1966 Original Building	NA	Chrysotile	Yes
S03E	1044	Floor Tile Mastic - 1966 Original Building	NA	Chrysotile	Yes
S04A	1055	Plaster - Wall - 1966 Original Building	ND	-	No
S04B	1073	Plaster - Wall - 1966 Original Building	ND	-	No
S04C	1056	Plaster - Wall - 1966 Original Building	ND	-	No
S04D	1020	Plaster - Wall - 1966 Original Building	ND	-	No
S04E	1012	Plaster - Wall - 1966 Original Building	ND	-	No
S05A	1008	Black Interior/Exterior Door Frame Sealant	1	Chrysotile	Yes
S05B	1008	Black Interior/Exterior Door Frame Sealant	NA	Chrysotile	Yes
S05C	1008	Black Interior/Exterior Door Frame Sealant	NA	Chrysotile	Yes
S06A	1005	White Interior Window Sealant	2	Chrysotile	Yes
S06B	1005	White Interior Window Sealant	NA	Chrysotile	Yes
S06C	1005	White Interior Window Sealant	NA	Chrysotile	Yes
S07A	1002	12"x12" Floor Tile Mastic - 1968 Addition	ND	-	No
S07B	1002	12"x12" Floor Tile Mastic - 1968 Addition	ND	-	No
S07C	1002	12"x12" Floor Tile Mastic - 1968 Addition	ND	-	No
NA: Not Analyzed due to stop positive method ND: No asbestos fibres detected above the laboratory minimum detection limit					
<p>A bulk material sample containing 0.5% or more asbestos therefore establishes that material as asbestos-containing. In accordance with Table 1 of O. Reg. 278/05, a minimum number of samples for the material to be classified as non asbestos. A homogeneous material is defined by O. Reg. 278/05 "as material that is uniform in colour and texture". Homogeneous samples are identified by an alphabetical suffix to sample names to represent multiple samples of a homogeneous material. When a homogeneous material is analysed it is determined to be asbestos-containing upon the first positive detection of asbestos equal to or greater than 0.5%. Subsequent samples of the same material are therefore not analysed. Some bulk samples are comprised of multiple layers and as such will require multiple analysis. In such cases each layer is isolated at the laboratory and analysed individually to determine asbestos content. As a result the laboratory may report additional samples beyond the submitted number of samples or include multiple analyses as subsets within a sample.</p>					

Table 3 - Sample Summary Table - Crestview PS



November 14, 2022

RE: Paint and Coatings Bulk Sampling – Letter of Findings

**CRESTVIEW PS, 153 Montcalm Dr, Kitchener, ON N2B 2R6
Project-Specific Work Areas**

1. INTRODUCTION

Paint and coatings samples were collected for lead content analysis within Crestview PS – Library. The samples were collected from surfaces within project-specific locations and submitted to ALS Canada laboratory for the determination of lead content.

The extent of our paint sample collection and assessment area is outlined on the floor plan attached in Appendix A.

2. METHODOLOGY

An assessment for lead in paint was conducted by retrieving paint chip samples from representative surfaces within the areas assessed that were deemed to have a potential to be disturbed as part of the planned renovation activities. The condition of painted surfaces from which samples were taken were also visually assessed for signs of deterioration such as cracking, chipping, flaking, bubbling and deterioration due to friction. The condition of these surfaces was assessed as good, fair or poor based on the degree and extent of deterioration.

The number of paint chip samples retrieved for analysis was based on the number of surface colours observed and the approximate surface area of the paint within each assessment location. Samples were not retrieved from paint finishes with limited application. All paint chip samples were retrieved by scraping the paint down to the base material substrate to ensure collection of all layers of paint. Additional care was taken to avoid collection of the underlying substrate to reduce analytical substrate matrix interference.

Paint chip sample was submitted to a laboratory (ALS Canada Ltd) for the determination of lead content. Analysis was conducted by the laboratory following the EPA Method 6010. Result of analysis was reported by the laboratory in milligrams per kilogram (mg/kg), same as micrograms per gram ($\mu\text{g/g}$). The Laboratory Certificate of Analysis is included in Appendix B.

3. RESULTS

Results of analysis for the determination of lead content are summarized in Table 1, below. The Laboratory Certificate of Analysis is included as Appendix B.

TABLE 1: Summary of Lead-in-Paint Analytical Results

Sample No.	Location	Surface	Condition	Colour	Lead Conc. (mg/kg)	EACC Classification
SA1	Library	Concrete Block	Good	Beige	38.2	'De Minimis' Level of Lead

Note: 1 mg/kg = 1 µg/g

4. CONCLUSIONS

'De Minimis' Level of Lead in Paint

Paint samples collected were determined to have a lead content below 1000 µg/g Lead by Weight, which is considered a "de minimis" (i.e. virtually safe) level of lead in paint as per the EACC Lead Guideline for Construction, Renovation, Maintenance or Repair. Provided these materials are disturbed in a non-aggressive manner and the work is performed using normal dust control procedures, the worker protection from the inhalation of lead is not required. General health and safety precautions must still be implemented, such as prohibiting eating, drinking, smoking, and chewing in the work area, implementing dust suppression techniques and providing washing facilities for workers to wash hands and face.

Appendix A

Extent of Assessment Area & Paint Sample Locations

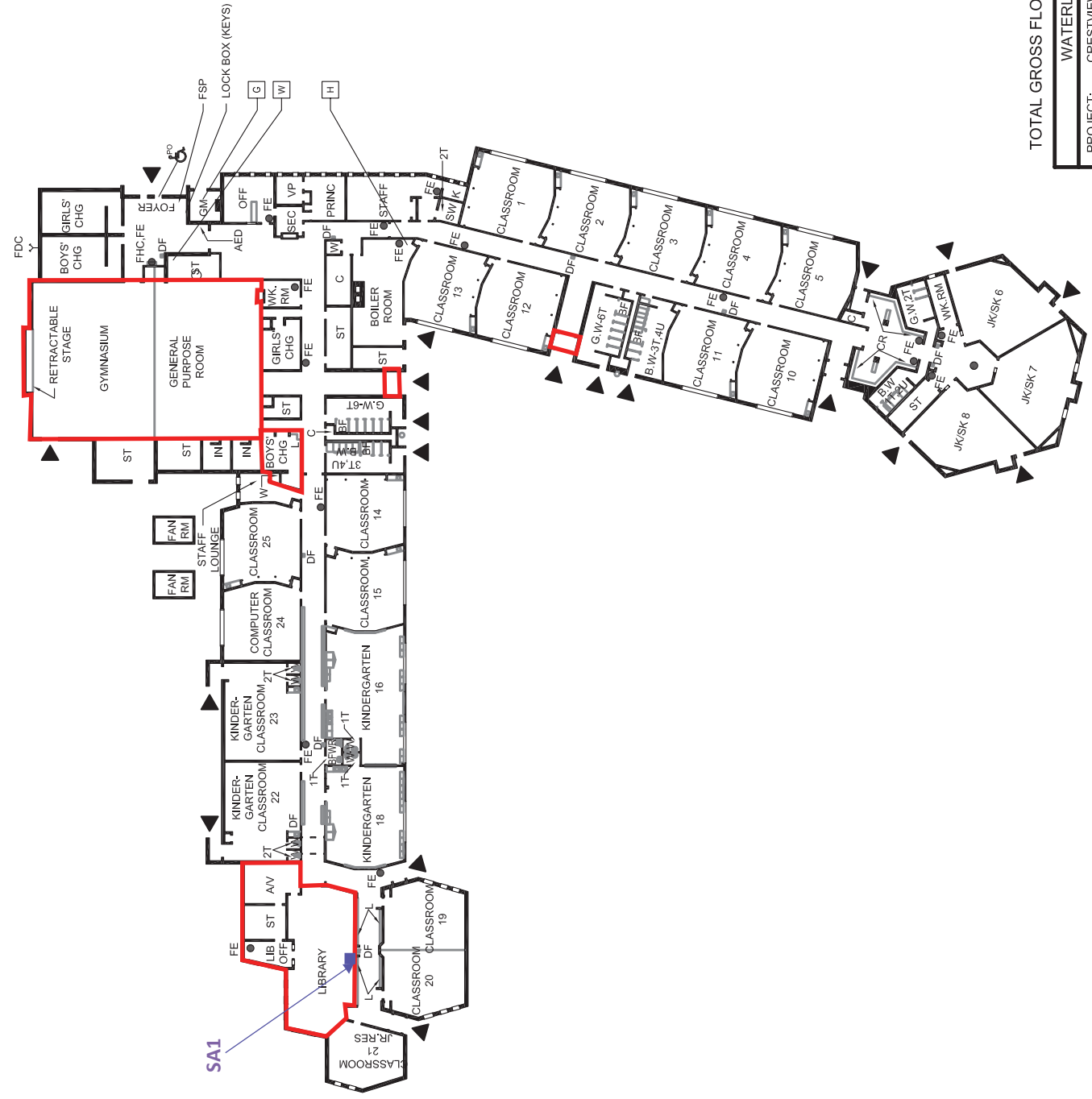
LEGEND

Extent of Assessment
 Location of Paint Sample and
 Sample Identification Number



SYMBOL LEGEND

- W WATER SHUTOFF VALVE
- G GAS SHUTOFF VALVE
- H HYDRO SHUT OFF
- FE FIRE EXTINGUISHERS



TOTAL GROSS FLOOR AREA : 47 165 SQ.FT. (4 381.62m²)

PROJECT: WATERLOO REGION DISTRICT SCHOOL BOARD	
TITLE: CRESTVIEW PUBLIC SCHOOL - KITCHENER	
FLOOR PLAN	
Date: OCT 2014	Drawn by: ADO
Prev. Rev: AUG 2013 ADO	Scale: 1" = 60'-0"
	Appr.: [Signature]
	Dwg.No: 2 OF 2

Appendix B

Laboratory Certificate of Analysis



CERTIFICATE OF ANALYSIS

<p>Work Order : WT2219253</p> <p>Client : Waterloo Region District School Board</p> <p>Contact : Jeff Cull</p> <p>Address : 51 Ardelt Avenue Kitchener ON Canada N2C 2E1</p> <p>Telephone : 519 502 8343</p> <p>Project : CRESTVIEW-LIBRARY RENO 2023</p> <p>PO : ----</p> <p>C-O-C number : ----</p> <p>Sampler : J. CULL</p> <p>Site : ----</p> <p>Quote number : Non - Regulated Standing SOA</p> <p>No. of samples received : 1</p> <p>No. of samples analysed : 1</p>	<p>Page : 1 of 3</p> <p>Laboratory : Waterloo - Environmental</p> <p>Account Manager : Candice Hunter</p> <p>Address : 60 Northland Road, Unit 1 Waterloo ON Canada N2V 2B8</p> <p>Telephone : +1 519 886 6910</p> <p>Date Samples Received : 24-Oct-2022 10:40</p> <p>Date Analysis Commenced : 25-Oct-2022</p> <p>Issue Date : 26-Oct-2022 10:35</p>
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Jon Fisher	Department Manager - Inorganics	Metals, Waterloo, Ontario



General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
 LOR: Limit of Reporting (detection limit).

Unit	Description
mg/kg	milligrams per kilogram

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Workorder Comments

<1 or Not Detected with LOR of 1 equals Zero (0).

Analytical Results

Sub-Matrix: Paint Chips

(Matrix: Soil/Solid)

					Client sample ID	SA1-LIBRARY WALL	----	----	----	----
					Client sampling date / time	21-Oct-2022 12:00	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit	WT2219253-001	-----	-----	-----	-----	
						Result	----	----	----	----
Metals										
lead	7439-92-1	E494.Pb	5.0	mg/kg	38.2	----	----	----	----	

Please refer to the General Comments section for an explanation of any qualifiers detected.





QUALITY CONTROL INTERPRETIVE REPORT

<p>Work Order : WT2219253</p> <p>Client : Waterloo Region District School Board</p> <p>Contact : Jeff Cull</p> <p>Address : 51 Ardelt Avenue Kitchener ON Canada N2C 2E1</p> <p>Telephone : 519 502 8343</p> <p>Project : CRESTVIEW-LIBRARY RENO 2023</p> <p>PO : ----</p> <p>C-O-C number : ----</p> <p>Sampler : J. CULL</p> <p>Site : ----</p> <p>Quote number : Non - Regulated Standing SOA</p> <p>No. of samples received : 1</p> <p>No. of samples analysed : 1</p>	<p>Page : 1 of 5</p> <p>Laboratory : Waterloo - Environmental</p> <p>Account Manager : Candice Hunter</p> <p>Address : 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8</p> <p>Telephone : +1 519 886 6910</p> <p>Date Samples Received : 24-Oct-2022 10:40</p> <p>Issue Date : 26-Oct-2022 10:35</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

- Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
- CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
- DQO: Data Quality Objective.
- LOR: Limit of Reporting (detection limit).
- RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Soil/Solid**

Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Metals : Lead in Paint by CRC ICPMS										
LDPE bag SA1-LIBRARY WALL	E494.Pb	21-Oct-2022	25-Oct-2022	----	----		25-Oct-2022	180 days	4 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).



Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Duplicates (DUP)							
Lead in Paint by CRC ICPMS	E494.Pb	713069	1	12	8.3	5.0	✔
Laboratory Control Samples (LCS)							
Lead in Paint by CRC ICPMS	E494.Pb	713069	2	12	16.6	10.0	✔
Method Blanks (MB)							
Lead in Paint by CRC ICPMS	E494.Pb	713069	1	12	8.3	5.0	✔



Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Lead in Paint by CRC ICPMS	E494.Pb Waterloo - Environmental	Soil/Solid	EPA 200.2/6020B (mod)	This analysis is carried out using procedures adapted from EPA Method 200.2. The sample is manually homogenized and a representative subsample of the dry material is weighed. The sample is then digested at 95 degrees Celsius for 2 hours by block digester using concentrated nitric and hydrochloric acids. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020B).
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Digestion for Metals and Mercury in Paint Chips	EP494 Waterloo - Environmental	Soil/Solid	EPA 200.2 (mod)	This analysis is carried out using procedures adapted from EPA Method 200.2. The sample is manually homogenized and a representative subsample of the dry material is weighed. The sample is then digested at 95 degrees Celsius for 2 hours by block digester using concentrated nitric and hydrochloric acids.



QUALITY CONTROL REPORT

Work Order	: WT2219253	Page	: 1 of 3
Client	: Waterloo Region District School Board	Laboratory	: Waterloo - Environmental
Contact	: Jeff Cull	Account Manager	: Candice Hunter
Address	: 51 Ardelt Avenue Kitchener ON Canada N2C 2E1	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	:	Telephone	: +1 519 886 6910
Project	: CRESTVIEW-LIBRARY RENO 2023	Date Samples Received	: 24-Oct-2022 10:40
PO	: ----	Date Analysis Commenced	: 25-Oct-2022
C-O-C number	: ----	Issue Date	: 26-Oct-2022 10:35
Sampler	: J. CULL 519 502 8343		
Site	: ----		
Quote number	: Non - Regulated Standing SOA		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Jon Fisher	Department Manager - Inorganics	Waterloo Metals, Waterloo, Ontario



General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

- Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
- CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
- DQO = Data Quality Objective.
- LOR = Limit of Reporting (detection limit).
- RPD = Relative Percent Difference
- # = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Soil/Solid

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Metals (QC Lot: 713069)											
TY2202961-047	Anonymous	lead	7439-92-1	E494.Pb	5.0	mg/kg	22200	22100	0.197%	40%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 713069)						
lead	7439-92-1	E494.Pb	5	mg/kg	<5.0	----



Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Soil/Solid

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 713069)									
lead	7439-92-1	E494.Pb	5	mg/kg	50 mg/kg	100	70.0	130	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 713069)									
	RM	lead	7439-92-1	E494.Pb	267 mg/kg	102	70.0	130	----



www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: _____

Page _____

Environmental Division
Waterloo
Work Order Reference
WT2219253



Telephone : +1 519 686 6910

Report To Contact and company name below will appear on the final report		Report Format / Distribution			Select Service Level Below - Contact your AM to															
Company:	WRDSB	Select Report Format: <input checked="" type="checkbox"/> PDF <input type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			Regular [R] <input type="checkbox"/> Standard TAT if received by 3 pm															
Contact:	JEFF CULL	Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO			PRIORITY (Business Days)	4 day [P4-20%] <input type="checkbox"/>	EMERGENCY 1 Business Same Day, (Laboratory)													
Phone:	519-502-8373	<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked				3 day [P3-25%] <input type="checkbox"/>														
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX				2 day [P2-50%] <input checked="" type="checkbox"/>														
Street:	51 Ardeit Ave	Email 1 or Fax			Date and Time Required for all EXP-TATs:															
City/Province:	Kitchener, ON	Email 2 JEFF CULL			For tests that can not be performed according to the service level set															
Postal Code:		Email 3			Analysis Request															
Invoice To	Same as Report To <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Invoice Distribution			NUMBER OF CONTAINERS Lead content	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below												SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)	
	Copy of Invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO	Select Invoice Distribution: <input type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX																		
Company:		Email 1 or Fax jeff-cull@wrdsb.ca																		
Contact:		Email 2 finance-app@wrdsb.ca																		
Project Information		Oil and Gas Required Fields (client use)																		
ALS Account # / Quote #:		AFE/Cost Center:		PO#																
Job #: Crostview - Library Reno 2013		Major/Minor Code:		Routing Code:																
PO / AFE:		Requisitioner:																		
LSD:		Location:																		
ALS Lab Work Order # (lab use only): WT2219253		ALS Contact: Candice Hunter		Sampler: J. Cull																
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mm-yy)	Time (hh:mm)	Sample Type																
	Sal - Library wall -	21-10-22	pm	Paint	1	✓														
Drinking Water (DW) Samples' (client use)		Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)			SAMPLE CONDITION AS RECEIVED (lab use only)															
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO					Frozen <input type="checkbox"/>		SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>													
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO					Ice Packs <input type="checkbox"/> Ice Cubes <input type="checkbox"/>		Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>													
					Cooling Initiated <input type="checkbox"/>															
		INITIAL COOLER TEMPERATURES °C		FINAL COOLER TEMPERATURES °C																
				17.6																
SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)														
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:												
JEFF CULL	24-10-22					AP	24-10-22	1040												

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

NOV 2018 PRINT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

506-800

Appendix C

Pictures



Gym



Bathroom

Division 20 Common Requirements for Mechanical

20 00 01	Mechanical Specification Index
	Common Contract Requirements for Mechanical
20 02 51	Mechanical Contract Requirements
	Common Work Results for Mechanical
20 05 11	Mechanical General Work Requirements
20 05 21	Demolition and Renovation
20 05 31	Expansion Fittings and Loops
20 05 32	Thermometers and Pressure Gauges
20 05 34	Bases, Hangers and Supports (Indoor)
20 05 35	Bases, Hangers, and Supports (Outdoor)
20 05 49	Vibration Control Measures
20 05 53	Identification of Mechanical Services
	Testing, Adjusting, and Balancing
20 06 11	Testing, Adjusting, and Balancing (TAB) of Mechanical Systems

Division 22 Plumbing

	Plumbing Insulation
22 07 19	Plumbing Piping Insulation
	Facility Water Distribution
22 11 16	Domestic Water Piping - Copper
22 11 31	Potable Water Auxiliary Equipment
	Facility Sanitary Sewerage
22 13 13	Sanitary Drains
22 13 16	Sanitary Waste and Vent Piping – Cast Iron and Copper
22 13 17	Sanitary Waste and Vent Piping – Plastic
	Fire Extinguishers
22 37 13	Portable Fire Extinguishers

Division 23 Heating, Ventilating, and Air Conditioning (HVAC)

	HVAC Insulation
23 07 13	Duct Insulation
23 07 19	HVAC Piping Insulation
	Hydronic Piping and Pumps
23 21 11	Hydronic Accessories
23 21 13	Hydronic Piping - Screwed/Welded
	Refrigerant Piping
23 23 13	Refrigerant Piping and Specialties

HVAC Water Treatment

23 25 13 Water Treatment for Closed-Loop Hydronic Systems

HVAC Ducts and Casings

23 31 13 Metal Ducts

Air Duct Accessories

23 33 13 Duct Accessories

23 33 13.13 Volume-Control Dampers

23 33 18 Operating Dampers

23 33 53 Duct Liners

Air Outlets and Inlets

23 37 13 Diffusers, Registers, and Grilles

23 37 23 Louvres and Vents for Intake and Exhaust

Decentralized Unitary HVAC Equipment

23 81 26 Split System Air Conditioning

Convection Heating and Cooling Units

23 82 23 Hydronic Unit Ventilators

23 82 29 Radiators, Convectors, and Cabinet Heaters

Division 25 Integrated Automation

Control Systems

25 40 11 Building Control System

Sequence of Operation

END OF SECTION

Part 1 General

1.1 GENERAL PROVISIONS

- .1 This section covers items common to all sections of Mechanical Division.
- .2 Conform to Division 1 General Conditions.
- .3 Furnish labour, materials, and equipment necessary for completion of work as described in contract documents.
- .4 Unless specifically indicated, all materials and equipment provided under this contract shall be new and shall be manufactured in the project year.

1.2 INTENT

- .1 Mention herein or indication on Drawings of articles, materials, operations or methods requires: supply of each item mentioned or indicated, of quality, or subject to qualifications noted; installation according to conditions stated: and, performance of each operation prescribed with furnishing of necessary labour, equipment, and incidentals for mechanical work.
- .2 Where used, words “Section” and “Division” shall also include other Subcontractors engaged on site to perform work to make building and site complete in all respects.
- .3 Where used, word “supply” shall mean furnishing to site in location required or directed complete with accessory parts.
- .4 Where used, word “install” shall mean secured in place and connected up for operation as noted or directed.
- .5 Where used, word “provide” shall mean supply and install as each is described above.

1.3 REGULATIONS, PERMITS AND FEES

- .1 All materials and quality of work shall meet all current and latest Provincial, Municipal and Fire Marshall requirements, regulations, codes, and by-laws in force in the area of the project.
- .2 Each contractor shall give all necessary notices, obtain all necessary permits, and pay all fees in order that the work shown or specified may be carried out. Each contractor shall furnish any certificates necessary as evidence that the work installed conforms with the laws and regulations of all authorities having jurisdiction.
- .3 In the event that changes, or alterations are required on completed work by authorized inspectors, these changes shall be made at the contractor’s expense.
- .4 Special equipment which does not have a standard CSA label shall be inspected by the local electrical authority having jurisdiction and the Approval Certificate shall be submitted to the Consultant as soon as possible. All costs and fees for inspections shall be borne by this contractor.
- .5 Submit a copy of all final certificates in the maintenance manuals.

1.4 DRAWINGS

- .1 Mechanical Drawings do not show structural and related details. Take information involving accurate measurement of building from building drawings, or at building. Make, without additional charge, any necessary changes, or additions to runs of piping, conduits, and ducts to accommodate structural conditions. Location of pipes, ducts, conduits and other equipment may be altered by Consultant without extra charge provided change is made before installation and does not necessitate major additional material.
- .2 As work progresses and before installing piping, ductwork, heating units, registers, diffusers, fixtures and any other fittings and equipment which may interfere with interior treatment and use of building, provide detail drawings, or obtain directions for exact location of such equipment and fittings.
- .3 Mechanical Drawings indicate general location and route of pipes, ducts and conduits which are to be installed. Where required work is not shown or only shown diagrammatically, install same at maximum height in space to conserve head room (minimum 2200 mm (88") clear) and interfere as little as possible with free use of space through which they can pass. Follow building lines, conceal piping, conduits and ducts in furred spaces, ceilings and walls unless specifically shown otherwise. Install work close to structure so furring will be small as practical.
- .4 Install piping and ductwork to clear structural members and any fireproofing. Locate mechanical work to permit installation of specified insulation. Do not remove or damage structural fireproofing. Leave space to permit fireproofing and insulation to be inspected and repaired.
- .5 Before commencing work, check and verify all sizes, locations, grade and invert elevations, levels, and dimensions to ensure proper and correct installation. Verify existing/municipal services.
- .6 Locate all mechanical and electrical equipment in such a manner as to facilitate easy and safe access to and maintenance and replacement of any part.
- .7 In every place where there is indicated space reserved for future or other equipment, leave such space clear, and install piping and other work so that necessary installation and connections can be made for any such apparatus. Obtain instructions whenever necessary for this purpose.
- .8 Relocate equipment and/or material installed but not coordinated with work of other Sections and/or installed incorrectly as directed, without extra charge.
- .9 Where drawings are done in metric and product not available in metric, the corresponding imperial trade size shall be utilized.

1.5 INTERFERENCE AND COORDINATION DRAWINGS

- .1 Prepare interference and equipment placing drawings to ensure that all components will be properly accommodated within the constructed spaces provided.
- .2 Prepare drawings to indicate coordination and methods of installation of a system with other systems where their relationship is critical. Ensure that all details of equipment apparatus, and connections are coordinated.
- .3 Ensure that clearances required by jurisdictional authorities and clearances for proper maintenance are indicated on drawings.
- .4 Upon consultant's request submit copies of interference drawings to consultant.
- .5 Due to the nature of the building and the complexity of the building systems provide the following:
 - .1 Interference drawings, showing coordination of architectural, structural, mechanical, and electrical systems for the consultant's review prior to fabrication.
 - .2 Detailed layout drawings, clearly showing fasteners and hangers.
- .6 Provide CAD drawings (minimum release AutoCAD 2007) in addition to hard copies.

1.6 QUALITY ASSURANCE

- .1 Perform work in accordance with applicable provisions of local Plumbing Code, Gas Ordinances, and adoptions thereof for all mechanical systems. Provide materials and labor necessary to comply with rules, regulations, and ordinances.
- .2 In case of differences between building codes, provincial laws, local ordinances, utility company regulations, and Contract Documents, the most stringent shall govern. Promptly notify Consultant in writing of such differences.

1.7 ALTERNATES AND SUBSTITUTIONS

- .1 Throughout Division 15 are lists of "Alternate and equal Equipment" manufacturers acceptable to Consultant if their product meets characteristics of specified described equipment.
- .2 Each bidder may elect to use "Alternate or equal Equipment" manufacturers from lists of Alternates where listed. Include for any additional costs including all costs for revisions to electrical contract to suit Alternate used. Prices are not required in Tender for Alternates listed except where specifically noted as "Separate Price" in which case contractor will complete the Supplementary Tender Form.
- .3 It is responsibility of this Division to ensure "Alternate Equipment" fits space allocated and gives performance specified. If an "Alternate Equipment" nor "equal" specified product unit is proposed and does not fit space allotted in Consultant's opinion, supply of specified described equipment will be required without change in Contract amount. Should electrical characteristics for "alternate" or "equal" equipment differ from equipment specified it shall be the responsibility of the equipment manufacturer to pay all costs associated with the revisions to the electrical contract. Only manufacturers listed will be accepted for their product listing. All other manufacturers shall be quoted as substitution stating conditions and credit amount.

- .4 If pipe or item, of size or weight indicated, is unobtainable, supply next larger size or heavier weight without additional charge.

1.8 EXAMINATION

- .1 Site Inspection
 - .1 Examine premises to understand conditions, which may affect performance of work of this Division before submitting proposals for this work.
 - .2 No subsequent allowance for time or money will be considered for any consequence related to failure to examine site conditions.
- .2 Drawings:
 - .1 Mechanical Drawings show general arrangement of piping, ductwork, equipment, etc. Follow as closely as actual building construction and work of other trades will permit.
 - .2 Consider Architectural and Structural Drawings part of this work insofar as these drawings furnish information relating to design and construction of building. These drawings take precedence over Plumbing, Mechanical, and Fire Protection Drawings.
 - .3 Because of small scale of Drawings, it is not possible to indicate all offsets, fittings, and accessories, which may be required. Investigate structural and finish conditions affecting this work and arrange work accordingly, providing such fittings, valves, and accessories required to meet conditions.
- .3 Ensure that items to be furnished fit space available. Make necessary field measurements to ascertain space requirements including those for connections and furnish and install equipment of size and shape so final installation shall suit true intent and meaning of Contract Documents. If approval is received by Addendum or Change Order to use other than originally specified items, be responsible for specified capacities and for ensuring that items to be furnished will fit space available.

1.9 SEQUENCING SCHEDULING AND COORDINATION

- .1 It is understood that while Drawings are to be followed as closely as circumstances permit, this Division will be held responsible for installation of systems according to the true intent and meaning of Contract Documents. Anything not clear or in conflict will be explained by making application to Consultant. Should conditions arise where certain changes would be advisable, secure Consultant's approval of these changes before proceeding with work.
- .2 Coordinate work of various trades in installing interrelated work. Before installation of mechanical items, make proper provision to avoid interferences in a manner approved by Consultant. Each Contractor shall refer to all sections of the specification for their responsibilities with other trades. Changes required in work specified in Mechanical Division caused by neglect to do so shall be made at no cost to Owner.
- .3 Arrange pipes, ducts, and equipment to permit ready access to valves, unions, traps, starters, motors, control components, and to clear openings of doors and access panels.

- .4 Furnish and install inserts and supports required by Mechanical Division unless otherwise noted. Furnish sleeves, inserts, supports, and equipment that are an integral part of other Divisions of the Work to Sections involved in sufficient time to be built into construction as the Work proceeds. Locate these items and see that they are properly installed. Expense resulting from improper location or installation of items above shall be borne by Mechanical Division.
- .5 Be responsible for required excavation, backfilling, cutting, and patching incident to work of this Division and make required repairs afterwards to satisfaction of Consultant. Cut carefully to minimize necessity for repairs to existing work. Do not cut beams, columns, or trusses.
 - .1 Patch and repair walls, floors, ceilings, and roofs with materials of same quality and appearance as adjacent surfaces unless otherwise shown. Surface finishes shall exactly match existing finishes of same materials.
 - .2 Each Section of this Division shall bear expense of cutting, patching, repairing, and replacing of work of other Sections required because of its fault, error, tardiness, or because of damage done by it.
 - .3 Cutting, patching, repairing, and replacing pavements, sidewalks, roads, and curbs to permit installation of work of this Division is responsibility of Section installing work.
- .6 Adjust locations of pipes, ducts, equipment, fixtures, etc, to accommodate work from interferences anticipated and encountered. Determine exact route and location of each pipe and duct prior to fabrication.
 - .1 Make offsets, transitions, and changes in direction of pipes, ducts, and electrical raceways as required to maintain proper head room and pitch of sloping lines whether or not indicated on Drawings.
 - .2 Furnish and install traps, air vents, sanitary vents, pull boxes, etc, as required to effect these offsets, transitions, and changes in direction.
- .7 Slots and openings through floors, walls, ceilings, and roofs shall be provided by this contractor but performed by a trade specializing in this type of work. This Division shall see that they are properly located and do any cutting and patching caused by its neglect to do so.

1.10 CONTRACT BREAKDOWN

- .1 Provide breakdown of contract exclusive of HST to acceptance of consultants prior to first draw submission.
- .2 Provide labour and material cost for each item.
- .3 Breakdown shall indicate total contract amount.

- .4 Contract breakdown shall be as follows as a minimum.
 - Mobilization and shop drawings (max. \$2000.00)
 - Demolition
 - Inside buried plumbing and drainage
 - Above grade rough-in plumbing and drainage
 - Plumbing Fixtures
 - Specialty Piping
 - Heating piping
 - Piping Insulation
 - Ductwork
 - Duct Insulation
 - Grilles and Diffusers
 - Unit Ventilators
 - Split AC unit
 - Condensing Units
 - Fire Stopping
 - Building Automation Systems
 - Testing Adjusting and Balancing
 - Mechanical contractor closeout requirements (min. of 3% but not less than \$5,000.00)
- .5 Progress claims, when submitted are to be itemized against each item of the contract breakdown, this shall be done in table form showing contract amount, work complete to date, previous draw, amount this draw and balance.

1.11 SHOP DRAWINGS AND PRODUCT DATA

- .1 Refer to section 23 82 23 'Hydronic Unit Ventilators' for specific unit ventilator shop drawing/delivery requirements.
- .2 Furnish complete catalog data for manufactured items of equipment to be used in the Work to Consultant for review within 14 days after award of Contract.
- .3 Provide a complete list of shop drawings to be submitted prior to first submission.
- .4 Before submitting to the Consultant, review all shop drawings to verify that the products illustrated therein conform to the Contract Documents. By this review, the Contractor agrees that it has determined and verified all field dimensions, field construction criteria, materials, catalogue numbers, and similar data and that it has checked and coordinated each shop drawing with the requirements of the work and of the Contract Documents. The Contractor's review of each shop drawings shall be indicated by stamp, date and signature of a qualified and responsible person possessing by the appropriate authorization.
- .5 If material or equipment is not as specified or submittal is not complete, it will be rejected by Consultant.
- .6 Additional shop drawings required by the contractor for maintenance manuals, site copies etc., shall be photocopies of the "reviewed" shop drawings. All costs to provide additional copies of shop drawings shall be borne by the contractor.
- .7 **Submit all shop drawings for the project as a package. Partial submittals will not be accepted.**

- .8 Catalog data or shop drawings for equipment, which are noted as being reviewed by Consultant or their Engineer shall not supersede Contract Documents.
- .9 Review comments of Consultant shall not relieve this Division from responsibility for deviations from Contract Documents unless Consultant's attention has been called to such deviations in writing at time of submission, nor shall they relieve this Division from responsibility for errors in items submitted.
- .10 Check work described by catalog data with Contract Documents for deviations and errors.
- .11 Shop drawings and product data shall show:
 - .1 Mounting arrangements.
 - .2 Operating and maintenance clearances. e.g., access door swing spaces.
- .12 Shop drawings and product data shall be accompanied by:
 - .1 Detailed drawings of bases, supports, and anchor bolts.
 - .2 Acoustical sound power data, where applicable.
 - .3 Points of operation on performance curves.
 - .4 Manufacturer to certify as to current model production.
 - .5 Certification of compliance to applicable codes.
- .13 State sizes, capacities, brand names, motor HP, accessories, materials, gauges, dimensions, and other pertinent information. List on catalog covers page numbers of submitted items. Underline applicable data.
- .14 Shop drawings shall be submitted electronically as per the following directions:
 - .1 Electronic Submissions:
 - .1 Electronically submitted shop drawings shall be prepared as follows:
 - .1 Use latest software to generate PDF files of submission sheets.
 - .2 Scanned legible PDF sheets are acceptable. Image files are not acceptable.
 - .3 PDF format shall be of sufficient resolution to clearly show the finest detail.
 - .4 PDF page size shall be standardized for printing to letter size (8.5"x11"), portrait with no additional formatting required by the consultant. Submissions requiring larger detail sheets shall not exceed 11"x17".
 - .5 Submissions shall contain multiple files according to section names as they appear in Specification.
 - .6 File names shall include consultant project number and description of shop drawing section submitted.
 - .7 Each submission shall contain an index sheet listing the products submitted, indexed in the same order as they appear in the Specification. Include associated PDF file name for each section.

- .8 On the shop drawing use an “electronic mark” to indicate what is being provided.
- .9 **Each file shall bear an electronic representation of the “company stamp” of the contractor. If not stamped the file submission will not be reviewed.**
- .2 Email submissions shall include subject line to clearly identify the consultants project number and the description of the shop drawings submitted.
- .3 Electronic attachments via email shall not exceed 10MB. For submissions larger than 10MB, multiple email messages shall be used. Denote related email messages by indicating “1 of 2” and “2 of 2” in email subject line for the case of two messages.
- .4 Electronic attachments via web links (URL) shall directly reference PDF files. Provide necessary access credentials within link or as username/password clearly identified within body of email message.
- .5 On site provide one copy of the “reviewed” shop drawings in a binder as noted above.
- .6 Contractor to print copies of “reviewed” shop drawings and compile into maintenance manuals in accordance with requirements detailed in this section.

1.12 OPERATION AND MAINTENANCE MANUAL

- .1 Provide operation and maintenance data for incorporation into manual as in submittals’ requirements.
- .2 Operation and maintenance manual to be approved by, and final copies deposited with, Consultant before final inspection.
- .3 Operation data to include:
 - .1 Control schematics for each system including environmental controls.
 - .2 Description of each system and its controls.
 - .3 Description of operation of each system at various loads together with reset schedules and seasonal variances.
 - .4 Operation instruction for each system and each component.
 - .5 Description of actions to be taken in event of equipment failure.
 - .6 Valves schedule and flow diagram.
 - .7 Colour coding chart.
 - .8 Spare parts equipment list.
 - .9 Manufacturers standard or extended warranty information.
- .4 Maintenance data shall include:
 - .1 Servicing, maintenance, operation, and trouble-shooting instructions for each item of equipment.
 - .2 Data to include schedules of tasks, frequency, tools required and task time.

- .5 Performance data to include:
 - .1 Equipment manufacturer's performance data sheets with point of operation as left after commissioning is complete.
 - .2 Equipment performance verification test results.
 - .3 Special performance data as specified elsewhere.
 - .4 Testing, adjusting and balancing reports as specified in Testing, Adjusting and Balancing Section.
- .6 Miscellaneous data to include:
 - .1 Letter of contractor's warranty and guarantee.
 - .2 Index sheet.
 - .3 Tabbed format for each section.
 - .4 Manufacturers approved shop drawings.
 - .5 Spare parts list and source.
 - .6 List of Manufacturers and suppliers address for each piece of equipment.
- .7 Approvals:
 - .1 Submit 1 copy of Operation and Maintenance Manual to Consultant for approval. Submission of individual data will not be accepted unless so directed by Consultant.
 - .2 Make changes as required and re-submit as directed by Consultant.
 - .3 Provide two (2) copies of final operation maintenance manuals, as well as a PDF file of the entire approved manual on a USB stick. Only one USB stick is to be provided containing both the approved manual and as-built drawings.
- .8 Additional data:
 - .1 Prepare and insert into operation and maintenance manual when need for same becomes apparent during demonstrations and instructions specified above.

1.13 AS-BUILT DRAWINGS

- .1 Site records:
 - .1 Contractor shall provide 2 sets of reproducible mechanical drawings. Provide sets of white prints as required for each phase of the work. Mark thereon all changes as work progresses and as changes occur. This shall include changes to existing mechanical systems, control systems and low voltage control wiring.
 - .2 On a weekly basis, transfer information to reproducibles, revising reproducibles to show all work as actually installed.
 - .3 Use different colour waterproof ink for each service.
 - .4 Make available for reference purposes and inspection at all times.

- .2 As-Built drawings:
 - .1 Prior to start of Testing, Adjusting and Balancing (TAB), finalize production of as-built drawings.
 - .2 Identify each drawing in lower right hand corner in letters at least 3 mm (1/8") high as follows: - "AS-BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (date).
 - .3 TAB to be performed using as-built drawings.
 - .1 Submit hard copy to Consultant for approval. When returned, make corrections as directed.
 - .2 Once approved, submit completed reproducible paper as-built drawings as well as a scanned pdf file copy on USB stick with Operating and Maintenance Manuals.

1.14 WARRANTIES

- .1 In addition to guarantee specified in General Conditions, guarantee heating, cooling, and plumbing systems to be free from noise in operation that may develop from failure to construct system in accordance with Contract Documents.
- .2 Provide certificates of warranty for each piece of equipment made out in favor of Owner. Clearly record "start-up" date of each piece of equipment on certificate. Include certificates as part of Operation & Maintenance Manual.
- .3 Contractor shall rectify any installation deficiencies in the boiler or pressurized other systems identified by a TSSA Inspector for a period of three (3) years from substantial completion.
- .4 Warranty period shall start from date of substantial completion.

1.15 SUBSTANTIAL PERFORMANCE

- .1 Complete the following to the satisfaction of the consultant prior to request for submission of substantial performance.
 - .1 As-Built Drawings.
 - .2 Maintenance Manuals
 - .3 System Start up
 - .4 TAB Reports
 - .5 HVAC System Commissioning
 - .6 Instructions to Owners
 - .7 Final Certificates (required prior to consultant's release of conformance letter).
 - .1 Potable Water Test (Refer to domestic water piping – Copper section – Part 3)
 - .2 Backflow Test Certificate (for all testable devices)

1.16 OCCUPANCY REQUIREMENTS

- .1 The contractor shall provide the following documentation to the consultant prior to receiving occupancy. Failure to provide the proper documentation will result in the occupancy not being granted. List of required documentation:
 - .1 Final Certificates (required prior to consultant’s release of conformance letter).
 - .1 Potable Water Test (Refer to domestic water piping – Copper section – Part 3).
 - .2 Backflow Test Certificate (for all testable devices).

1.17 REVISION TO CONTRACT

- .1 Provide the following:
 - .1 Itemized list of material with associated costs.
 - .2 Labour rate and itemized list of labour for each item.
 - .3 Copy of manufacturers/supplier’s invoice if requested.

1.18 DELIVERY STORAGE AND HANDLING

- .1 Follow Manufacturer's directions in delivery, storage, and protection, of equipment and materials.
- .2 Deliver equipment and material to site and tightly cover and protect against dirt, water, and chemical or mechanical injury but have readily accessible for inspection. Store items subject to moisture damage (such as controls) in dry, heated space.

1.19 TSSA INSPECTION

- .1 Prior to final completion of the project, this contractor shall make application, arrange, and pay for a TSSA inspection of all piping systems and equipment installations, including, but not limited to medical gasses, refrigeration, fuel piping, compressed air, heating plant, cooling plant, and associated equipment installed under the contract.
- .2 Provide a copy of the TSSA report in the maintenance manuals for each system.

1.20 ENERGY EFFICIENCY

- .1 The mechanical systems of this building must achieve the energy efficiency levels by conforming to ANSI/ASHRAE/IESNA 90.1 “Energy Standard for Buildings Except Low-Rise Residential Buildings” and Chapter 2 of Division 3 of SB-10 prescriptive method from the Ontario Building Code.
- .2 All equipment, products, and installations must conform to the Codes and Standards.

END OF SECTION

Part 1 General

1.1 TESTS

- .1 Give 48 hours written notice of date for tests.
- .2 Insulate or conceal work only after testing and approval by Consultant.
- .3 Conduct tests in presence of Consultant.
- .4 Bear costs including retesting and making good.
- .5 Piping:
 - .1 General: maintain test pressure without loss for 4 h unless otherwise specified.
 - .2 Hydraulically test steam and hydronic piping systems at 1-1/2 times system operating pressure or minimum 860 kPa, whichever is greater.
 - .3 Test natural gas systems to CSA-B149.1-00, TSSA requirements and requirements of authorities having jurisdiction.
 - .4 Test fuel oil systems to CSA B139 1976, CSA B139S1-1982 and authorities having jurisdiction.
 - .5 Test drainage, waste and vent piping to Ontario Building Code and authorities having jurisdiction.
 - .6 Test domestic hot, cold and recirculation water piping at 1-1/2 times system operating pressure or minimum 860 kPa (124.8 psi), whichever is greater.
 - .7 Test fire systems in accordance with authorities having jurisdiction and as specified elsewhere.
- .6 Equipment: test as specified in relevant sections.
- .7 Prior to tests, isolate all equipment or other parts which are not designed to withstand test pressures or test medium.

1.2 SYSTEM START UP

- .1 **Provide adjusting testing and start up of all equipment prior to testing and balancing (TAB) specified elsewhere.**
- .2 **Provide consultant with written notice verifying all equipment operation and installation is complete.**
- .3 **Start up shall be in presence of the following: owner or representative, contractor, building automation systems (BAS) contractor, and manufacturer's representative. Each person shall witness and sign off each piece of equipment. Consultant's attendance will be determined by consultant.**
- .4 Simulate system start up and shut down and verify operation of each piece of equipment.
- .5 Arrange with all parties and provide 72 hours notice for start up procedure.
- .6 Arrange with building automation systems contractor to sequence all components and ensure system operation.

1.3 COMMISSIONING

- .1 Coordinate and direct each step of the commissioning process and recommend acceptance or non-acceptance to the Owner/Owner's Representative.**
- .2 Prepare, in writing, documentation of any deficiencies discovered during the commissioning process. Submit to consultant and Owner/Owner's Representative.**
- .3 The Commissioning Process is detailed in *ASHRAE Guideline 1-1996 HVAC Commissioning Process*. The commissioning plan may be modified to reflect the actual construction schedule and design.**
- .4 Provide a pre-functional test of all HVAC mechanical system and sub-system elements, including control devices, shall be checked for the following:**
 - .1 Verify that each element has been properly installed, properly identified, and that all connections (including electrical) have been made correctly.**
 - .2 Verify that each element has been checked for proper lubrication, drive rotation, belt tension, control sequence, flow direction, or other conditions which may cause damage or reduce system performance.**
 - .3 Verify that tests, meter readings, and specific mechanical/electrical performance characteristics agree with those required by equipment or system manufacturer.**
 - .4 Controls calibration to be completed in accordance with the specification.**
 - .5 The TAB shall be done in accordance with the specifications.**
- .5 A functional performance testing shall be done during two separate periods – one during the cooling season and one during the heating season. The first (cooling) testing period shall occur as soon after completion of installation as practical. The heating testing period shall occur as soon as weather conditions make it practical to test warm-up, zone heating and economizer functions. These tests ensure that all equipment and systems operate in accordance with design intent. The tests are dynamic tests, and test the systems through all possible modes of operation.**
- .6 Reports:**
 - .1 The contractor shall be responsible for recording, documenting, and maintaining detailed inspection and testing data on the test documentation reports. The data record shall be comprehensive and concise.**
 - .2 All data must be recorded as soon as possible during the course of the inspection and testing.**
 - .3 All documentation shall have the date, time, and names of persons participating in the inspection and testing.**
 - .4 All test instruments shall be documented for valid calibration.**
 - .5 The recording work sheets, inspection check lists, and Performance Testing plans must all be approved by the Engineer and the owner's representative prior to the start of the testing.**
 - .6 Include all commissioning documentation in the maintenance manuals.**

- .7 Mechanical System Execution:**
- .1 Operate equipment and systems shall be tested in the presence of the owner’s representative and the consultant to demonstrate compliance with specified requirements. To minimize the time of Commissioning Team members, testing shall be done in four seasonal single blocks of time insofar as possible.**
 - .2 Notify the consultant, in writing, fourteen (14) days prior to tests scheduled under requirements of this Section.**
 - .3 Testing shall be conducted under specified design operating conditions as recommended or approved by the consultant.**
 - .4 All elements of systems shall be tested to demonstrate that total systems satisfy all requirements of these Specifications. Testing shall be accomplished on hierarchical basis. Test each piece of equipment for proper operation, followed by each sub-system, followed by entire system, followed by any inter-ties of other major systems.**
 - .5 All special testing materials and equipment shall be provided by the appropriate contractor.**
 - .6 Provide three copies of all test reports and records to the consultant.**

- .8 The verification testing procedures shall address all operating characteristics of all mechanical equipment and systems, including:**

Equipment Checklist	System Checklist
Exhaust Fans	
Controllers/Valves/Dampers	
Relays/Sensors/Transducers	
Unit Ventilators	Unit Ventilators

1.4 DEMONSTRATION AND OPERATING AND MAINTENANCE INSTRUCTION

- .1 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.**
- .2 Mechanical contractor to schedule and coordinate the demonstration all on the same day, starting at a pre-approved time and continuing consequently until complete.**
- .3 Where specified elsewhere in Mechanical Division, qualified manufacturers’ representatives who are knowledgeable about the project to provide demonstrations and instructions.**
- .4 Use operation and maintenance manual, as-built drawings, audio visual aids, etc. as part of instruction materials.**
- .5 Instruction duration time requirements as specified in appropriate sections.**
- .6 Where deemed necessary, Consultants may record these demonstrations on video tape for future reference.**

1.5 TRIAL USAGE

- .1 Consultant or owner may use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.
- .2 Trial usage to apply to following equipment and systems:
 - .1 HVAC
 - .2 Exhaust air
 - .3 Domestic water
 - .4 Plumbing and drainage.

1.6 DEFICIENCIES

- .1 During the course of construction, the consultants will monitor construction and provide written reports of work progress, discussions, and instruction to correct work.
- .2 Instruction to correct work shall be done within the work period before the next review.
- .3 The contractor shall not conceal any work until inspected.
- .4 The contractor shall expedite 100% complete rough-in work and have inspected prior to concealing services and equipment especially above ceiling.
- .5 Upon completion of the project the consultant will do a final review. Upon receiving the final inspection report, the contractor must correct and sign back the inspection report indicating the deficiencies are completed. A re-inspection will only be done once consultant receives this in writing.

1.7 EQUIPMENT INSTALLATIONS

- .1 Unions or flanges: provide for ease of maintenance and disassembly.
- .2 Space for servicing, disassembly and removal of equipment and components: provide as recommended by manufacturer or as indicated.
- .3 Equipment drains: pipe to floor drains.
- .4 Install equipment, rectangular cleanouts, and similar items parallel to or perpendicular to building lines.

1.8 MOUNTING HEIGHTS

- .1 Mounting height of equipment is from finished floor to equipment unless specified or indicated otherwise. Coordinate with block coursing (if applicable).
- .2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.

- .3 Install mechanical equipment at following heights unless indicated otherwise.
- | | | |
|----|--------------------------------------|---|
| .1 | Barrier-free water closets | 400 (16") to top of bowl |
| .2 | Barrier-free water closets | 450 (18") to top of seat lid |
| .3 | Barrier-free wall hung lavatory | 840 (33") max to top of rim
737 (29") min underside of rim front
685 (27") clear at 400 (8") from basin front
350 (14") min clear under waste trap |
| .4 | Shower heads (Standard) | 2.0 m (6' – 6") to bottom of head |
| | Shower heads (Barrier-free) | adjustable from 1200 (48") to 2030 (80") |
| .5 | Barrier-free shower seat | +/- 470 (18.5") |
| .6 | Hydronic heating elements | 200 mm (8") to bottom of cabinet |
| .7 | Backflow preventors | 900 – 1200 (3'– 4') to centerline of unit |
| .8 | Thermostats: Barrier Free (operable) | 1200 mm (47.25") |
| | Non Barrier Free | 1500 mm (59") |

Also follow direction of architectural drawings and where discrepancies occur clarify prior to rough-in.

1.9 ANCHOR BOLTS AND TEMPLATES

- .1 Supply anchor bolts and templates for installation by other divisions.

1.10 PROTECTION OF OPENINGS

- .1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

1.11 ELECTRICAL

- .1 Electrical work to conform to Electrical Division including the following:
- .1 Supplier and installer responsibility and related mechanical responsibility is indicated in Equipment Schedule on mechanical and/or electrical drawings
 - .2 Power wiring and conduit is specified in Electrical Division except for conduit, wiring and connections below 50 V which are related to control systems specified in Mechanical Division. Follow Electrical Division for quality of materials and workmanship.
 - .3 Electrically operated equipment shall be C.S.A. approved label. Special Inspection Label of Provincial Authority having jurisdiction will be accepted in lieu of C.S.A. approval. Each motor shall have an approved starter. Starter will be supplied and installed by Electrical Division unless otherwise indicated.

1.12 CONTROL WIRING

- .1 Furnish and install all components, devices, and control wiring for all plumbing, fire protection, HVAC equipment, HVAC systems, lighting, and other electrical loads to make all equipment operable to satisfaction of owner and consultant and to manufacturer's requirements and recommendations.
- .2 All electrical wiring, mechanical wiring and installations shall comply with local and national electrical and mechanical codes.
- .3 Supply and install wiring as required for all devices and systems. Install wiring in EMT conduit and otherwise comply with all requirements of the Electrical Division. Approved plenum wire may be used for sensor and network communication wiring where it complies with appropriate building codes and regulatory authorities.
- .4 All wiring concealed in walls and chases, and all exposed wiring shall be run in conduit.
- .5 Provide recessed conduit and backer boxes where controls are wall mounted. Surface mounted boxes and conduit are acceptable in mechanical or service rooms.
- .6 Free-run plenum rated cable shall be run in cable hangers where provided by electrical division or tied neatly to pipe and duct hangers in the ceiling. Avoid wiring that droops. Follow building lines and do not run wiring "as the crow flies".

1.13 PIPING AND EQUIPMENT SUPPORTS

- .1 Equipment supports supplied by equipment manufacturer: specified elsewhere in Mechanical Division.
- .2 Piping and equipment supports not supplied by equipment manufacturer: fabricate from structural grade steel meeting requirements of - Structural Steel Section. Submit structural calculations with shop drawings.
- .3 Mount base mounted equipment on chamfered edge housekeeping pads, minimum of 100 mm (4") high and 150 mm (6") larger than equipment dimensions all around. Concrete specified elsewhere.
- .4 Where housekeeping pads incorporate existing pads provide 10 mm dowels into existing pads. New pad height shall match existing.

1.14 SLEEVES

- .1 Pipe sleeves: at points where pipes pass through masonry, concrete or fire rated assemblies and as indicated. Grout sleeves in place.
- .2 Schedule 40 steel pipe.
- .3 Sleeves with annular fin continuously welded at midpoint:
 - .1 Through foundation walls.
 - .2 Where sleeve extends above finished floor.
 - .3 Through fire rated walls and floors.
- .4 Sizes: minimum 6 mm (1/4") clearance all around, between sleeve and uninsulated pipe or between sleeve and insulation.

- .5 Terminate sleeves flush with surface of concrete and masonry walls, concrete floors on grade and 25 mm (1") above other floors.
- .6 Fill voids around pipes:
 - .1 Caulk between sleeve and pipe in foundation walls and below grade floors with waterproof fire retardant non-hardening mastic.
 - .2 Where sleeves pass through walls or floors, provide space for firestopping. Where pipes/ducts pass through fire rated walls, floors and partitions, maintain fire rating integrity.
 - .3 Ensure no contact between copper tube or pipe and ferrous sleeve.
 - .4 Fill future-use sleeves with lime plaster or other easily removable filler.
 - .5 Coat exposed exterior surfaces of ferrous sleeves with heavy application of zinc rich paint to CGSB 1-GP-181M+Amdt-Mar-78.
- .7 Provide minimum 20 gauge duct sleeves where ducts pass through masonry concrete or fire rated assemblies. Maintain minimum 25 mm clearance all around or to the requirements of the authority having jurisdiction. Seal at wall as indicated.

1.15 FIRE STOPPING

- .1 This contractor shall work with all other contractors on the project in providing one common method of fire stopping all penetrations made in fire rated assemblies.
- .2 Approved fire stopping and smoke seal material in all fire separations and fire ratings within annular space between pipes, ducts, insulation, and adjacent fire separation and/or fire rating.
- .3 Do not use cementitious or rigid seals around penetrations for pipe, ductwork, or other mechanical items.
- .4 Insulated pipes and ducts: ensure integrity of insulation and vapour barrier at fire separation.
- .5 Provide materials and systems capable of maintaining effective barrier against flame, smoke, and gases. Ensure continuity and integrity of fire separation.
- .6 Comply with the requirements of CAN4-S115-M35, and do not exceed opening sized for which they have been tested.
- .7 Systems to have an F or FT rating (as applicable) not less than the fire protection rating required for closures in a fire separation. Provide "fire wrap" blanket around services penetrating fire walls. Extent of blanket must correspond to ULC recommendations.
- .8 The fire stopping materials are not to shrink, slump or sag and to be free of asbestos, halogens, and volatile solvents.
- .9 Firestopping materials are to consist of a component sealant applied with a conventional caulking gun and trowel.
- .10 Fire stop materials are to be capable of receiving finish materials in those areas which are exposed and scheduled to receive finishes. Exposed surfaces are to be acceptable to consultant prior to application of finish.

- .11 Firestopping shall be inspected and approved by local authority prior to concealment or enclosure.
- .12 Install material and components in accordance with ULC certification, manufacturer's instructions, and local authority.
- .13 Submit product literature and installation material on fire stopping in shop drawing and product data manual. Maintain copies of these on site for viewing by installers and consultant.
- .14 Manufacturer of product shall provide certification of installation. Submit letter to the consultant.
- .15 Acceptable Alternate Manufacturers to approval of local authority:
Minnesota Mining and Manufacturing
- .16 Fryesleeve Industries Inc.
General Electric Pensil Firestop Systems
International Protective Coatings Corp.
Rectorseal Corporation (Metacaulk)
Proset Systems
3M
AD Systems
Hilti
- .17 Ensure firestop manufacturer representative performs on site inspections and certifies installation. Submit inspection reports/certification at time of substantial completion.

1.16 ESCUTCHEONS

- .1 On pipes and ductwork passing through walls, partitions, floors and ceilings in exposed finished areas and on water and drain pipes inside millwork and cabinets.
- .2 Chrome or nickel plated brass or Type 302 stainless steel, one piece type with set screws.
- .3 Outside diameter to cover opening or sleeve.
- .4 Inside diameter to fit around finished pipe.

1.17 PAINTING

- .1 Refer to Section Interior Painting and specified elsewhere.
- .2 Apply at least one coat of corrosion resistant primer paint to ferrous supports and site fabricated work.
- .3 Apply two coats of paint to exposed piping service in mechanical room, base colour as specified in Mechanical Identification Section.
- .4 Prime and touch up marred finished paintwork to match original.
- .5 Restore to new condition, or replace equipment at discretion of consultant, finishes which have been damaged too extensively to be merely primed and touched up.

1.18 SPARE PARTS

- .1 Furnish spare parts in accordance with general requirements and as follows:
 - .1 One set of packing/mechanical seals for each pump.
 - .2 One casing joint gasket for each size pump.
 - .3 One head gasket set for each heat exchanger.
 - .4 One glass for each gauge glass.
 - .5 One set of belts for each type or each size of machinery.
 - .6 One filter cartridge or set of filter media for each filter or filter bank in addition to final operating set.
- .2 Provide list of equipment in maintenance manuals indicating corresponding spare parts required. List of spare parts to be signed off by receiving personnel.

1.19 SPECIAL TOOLS

- .1 Provide one set of special tools required to service equipment as recommended by manufacturers and in accordance with Maintenance Materials Special Tools and Spare Parts.

1.20 ACCESS DOORS

- .1 Provide access doors to concealed mechanical equipment for operating, inspecting, adjusting, and servicing.
- .2 Flush mounted 600 x 600 mm (24" x 24") for body entry and 300 x 300 mm (12" x 12") for hand entry unless otherwise noted. Doors to open 180°, have rounded safety corners, concealed hinges, screwdriver latches and anchor straps.
- .3 Material:
 - .1 Special areas such as tiled or marble surfaces: use stainless steel with brushed satin or polished finish as directed by Consultant.
 - .2 Remaining areas: use prime coated steel.
 - .3 Fire rated areas: provide ULC listed access doors.
 - .4 Washrooms or high moisture area ceilings: Aluminum with mill finish suitable for painting.
- .4 Installation:
 - .1 Locate so that concealed items are accessible.
 - .2 Locate so that hand or body entry (as applicable) is achieved.
- .5 Acceptable materials:
Le Hage
Zurn
Acudor
Nailor Industries Inc.

1.21 DIELECTRIC COUPLINGS

- .1 General:
 - .1 To be compatible with and to suit pressure rating of piping system.
 - .2 Where pipes of dissimilar metals are joined.
- .2 Pipes NPS 50 mm (2") and under: isolating unions.
- .3 Pipes NPS 65 mm (2 1/2") and over: isolating flanges.

1.22 DRAIN VALVES

- .1 Locate at low points and at section isolating valves unless otherwise specified.
- .2 Minimum NPS 20 mm (3/4") unless otherwise specified: bronze, with hose end male thread and complete with cap and chain.
- .3 Drain valves on potable water systems shall be complete with vacuum breaker.

1.23 REPAIRS, CUTTING, AND RESTORATION

- .1 Patch and repair walls, floors, ceilings, and roofs with materials of same quality and appearance as adjacent surfaces unless otherwise shown. Surface finishes shall exactly match existing finishes of same materials.
- .2 Each Section of this Division shall bear expense of cutting, patching, and repairing to install their work and/or replacing of work of other Sections required because of its fault, error, tardiness, or because of damage done by it.
- .3 Cutting, patching, repairing, and replacing pavements, sidewalks, roads, and curbs to permit installation of work of this Division is responsibility of Section installing work.
- .4 All patching, painting and making good of the existing walls, floors, ceilings, partitions and roof will be at the expense of this Contractor but performed by the Contractor specializing in the type of work involved unless otherwise noted.

1.24 EXISTING SYSTEMS

- .1 Connections into existing systems to be made at time approved by Consultant. Request written approval of time when connections can be made.
- .2 Be responsible for damage to existing plant by this work.

1.25 CLEANING

- .1 Clean interior and exterior of all systems including strainers. Vacuum interior of ductwork and air handling units prior to turn over to owner.
- .2 In preparation for final acceptance, clean and refurbish all equipment and leave in operating condition including replacement of all filters in all air and piping systems.

1.26 DISCONNECTION AND REMOVAL

- .1 Disconnect and/or remove equipment, piping, ductwork, etc. as indicated.
- .2 Cap and conceal all redundant and obsolete connections.

- .3 Provide a list of equipment to be removed to the owner, for his acceptance of same. Remove all equipment from site, which the owner does not retain.
- .4 Store equipment to be retained by owner on site where directed by consultant.

1.27 OWNER SUPPLIED EQUIPMENT

- .1 Connect to equipment supplied by the owner and make operable.

1.28 LOCATION OF EXISTING UNDERGROUND SERVICES

- .1 **This contractor shall locate existing services prior to starting any work in the affected area.**
- .2 **This contractor shall use a video camera for the existing storm and/or sanitary drainage at the indicated connection point to confirm location, size, and invert of the existing piping.**

1.29 EXISTING CONCRETE SLAB X-RAY/SCANNING

- .1 This contractor shall retain the services of a qualified company to provide and X-Ray and/or scan of the existing buried services in wall and/or floors prior to starting any work in the affected area.
- .2 Failure to locate existing piping, conduit rebar etc., shall not relieve this contractor of repair of same prior to installing his service.
- .3 This contractor shall be responsible for all repairs and/or replacement of existing services caused by cutting the existing concrete slabs and/or walls.

1.30 EXCAVATING AND BACKFILLING

- .1 Provide all excavating and backfilling inside and outside the building for plumbing pipes, drains and equipment. All backfilling shall be new clean granular 'A' fill brought in specifically for the purpose of backfilling to the underside of floor slab. All backfilling shall be compacted at intervals not more than 150 mm (6") layer to the satisfaction of the Consultant.
- .2 Provide excavating and backfilling outside the building with granular A brought in specifically for backfilling to a minimum of 450 mm (18") over the pipe. Backfilling outside building over and above the 450 mm (18") backfill as previously specified herein shall be by the Mechanical Contractor as specified under Division 2. Where backfilling outside the building is not specified under Division 2 the mechanical contractor shall provide new clean granular 'A' fill to grade level.
- .3 Bottoms of trenches shall be excavated so that the pipe will be supported on a 150 mm (6") compacted bed of clean granular 'A' fill. Provide all necessary pumping to maintain excavation free of water.
- .4 Should water be encountered during excavation, the mechanical contractor shall provide all labour and material, including all equipment required for dewatering the excavation. After the water has been removed, this Contractor shall install a 300 mm (12") base of compacted 50 mm (2") clear stone covered with filter cloth before installing backfill as detailed and/or as specified.

- .5 Be responsible for all weather protection required to install piping and/or equipment to the satisfaction of the Consultant.
- .6 Be responsible for providing all clear stone or granular 'A' material suitable for application to replace existing soil not suitable for backfilling above the 450 mm (18") bedding material.

1.1 TSSA INSPECTION

- .1 Prior to final completion of the project, this contractor shall make application, arrange, and pay for a TSSA inspection of all piping systems and equipment installations, including, but not limited to medical gasses, refrigeration, fuel piping, compressed air, heating plant, cooling plant, and associated equipment installed under the contract.
- .2 Provide a copy of the TSSA report in the maintenance manuals for each system.

END OF SECTION

Part 1 General

1.1 GENERAL PROVISIONS

- .1 Conform to the General Provisions of General Requirements Section.
- .2 This project is one of a retrofit nature in part, and which will require some demolition.
- .3 Allow for all remedial work in areas indicated on the drawings and as generally defined in the relevant sections of the specifications.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- .1 Electrical Division.

1.3 SCOPE OF WORK

- .1 The scope of work is essentially the selected disconnection and/or removal of services and/or equipment, piping ductwork etc. as indicated or required to complete the work.

Part 2 Products

2.1 GENERAL

- .1 This Division is to liaise with the Owners or Consultant for equipment being removed that may be suitable for reuse to that specified or handed over to the owner.
- .2 This Division to take full responsibility for any special tools or equipment required to disassemble or remove material from building.

Part 3 Execution

3.1 GENERAL

- .1 The general requirements are indicated on the drawings and on the outline specification in Division 1.
- .2 The general execution of the demolition is to be carried out in a clean and efficient manner.
- .3 Demolition of existing ceiling, walls etc., to facilitate removal of existing services or equipment or installation of new to be kept to a minimum and then restored to match existing.
- .4 All openings or holes created by removal of existing mechanical systems which are not being reused are to be patched with the same material surrounding surfaces.
- .5 All new holes and openings to facilitate mechanical systems are to be patched to match surrounding surfaces.

- .6 Protect all existing furnishings materials and equipment. Any damage occurring as a result of the work of this Division shall be repaired or replaced at the expense of this Division.
- .7 Where work involves breaking into or connecting to existing services, carry out work at times directed by the Owners in an expedient manner with minimum disruption to the facility and systems downtime.
- .8 Where unknown services are encountered, immediately advise Consultant and confirm findings in writing.
- .9 Where the location of any services has been shown on the plans, such information is not guaranteed. It is this Division's responsibility to verify locations, invert elevations, etc., immediately after moving on site. Should for any reason the information obtained necessitates changes in procedure or design, advise the Consultant at once. If verification of existing conditions is not done at the outset and any problems arise, the responsibility for same is entirely this Division's.
- .10 Disconnect and/or remove equipment piping, ductwork, etc. as indicated.
- .11 Cap and conceal all redundant and obsolete connections.
- .12 Provide a list of equipment to be removed to the owner, for his acceptance of same. Remove all equipment from site which the owner does not retain.
- .13 Maintain equipment to be retained by owner on site where directed by consultant.
- .14 Demolition of all parts of the work must be completed within the confines of the work area and in such a way as the dust produced and risk to injury of will not adversely affect the building users.
- .15 Demolished areas of the existing building will remain in their current use in some cases. Demolition in these areas must be kept to the minimum required to complete the work.
- .16 Demolition shall take place within areas isolated from all other areas with appropriate hoarding, scaffolding, netting, fencing or other means of security between building users and the work.
- .17 Co-ordinate making safe electrical devices, capping plumbing and removal of fixtures prior to commencement of demolition.
- .18 All piping and equipment to be removed and/or abandoned shall be drained prior to capping and/or abandoning. Disposal of all liquids shall be to the approval of authority of having jurisdiction and/or provincial regulations.

3.2 EXISTING SYSTEM DRAINAGE

- .1 Drain all existing piping and drainage systems including all related equipment as required to facilitate system renovations.
- .2 Disposal of existing system shall be to the requirements of the local and/or provincial regulations.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 American Society for Testing and Materials
 - .1 ASTM A53/A53M, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .2 ASTM A105/A105M, Specification for Carbon Steel Forgings for Piping Applications.

1.2 PRODUCT DATA

- .1 Submit product data in accordance with general requirements.
- .2 Indicate for each item as applicable:
 - .1 Manufacturer, model number, line contents, pressure, and temperature rating.
 - .2 Movement handled; axial, lateral, angular and the amounts of each.
 - .3 Nominal size and dimensions including details of construction and assembly.

1.3 CLOSEOUT SUBMITTALS

- .1 Submit maintenance data in accordance with general requirements.
- .2 Data to include:
 - .1 Servicing requirements, including any special requirements, stuffing box packing, lubrication, and recommended procedures.

Part 2 Products

2.1 SLIP TYPE EXPANSION JOINTS

- .1 Application: for axial pipe movement, as indicated.
- .2 Repacking: under full line pressure.
- .3 Body and packing housings: Class 150, 1Mpa carbon steel pipe to ASTM A53/A53M, Grade B. Wall thickness to match pipe and with raised face slip-on flanges to match pipe.
- .4 Slip or traverse sleeves: carbon steel pipe to ASTM A53/A53M, Grade B, hard chrome plated.
- .5 Anchor base: construction steel, welded to body.
- .6 Guides (internal and external): embody into packing housing with concentric alignment of slip or traverse sleeve with packing housing.

- .7 Extension limit stop: stainless steel, to prevent over-extension with accessible and removable pins.
- .8 Packing rings: 6 minimum, P7FE (teflon) or graphite impregnated non-asbestos fiber.
- .9 Thermal plastic packing: P7FE (teflon) or graphite impregnated non-asbestos fiber slug supplied loose.
- .10 Lubricating fittings: pet cocks with grease nipple.
- .11 Plunger body and plunger:
 - .1 Plunger body: heavy wall carbon steel welded to body.
 - .2 Plunger: carbon steel with hex head for use with socket wrench.
- .12 Lubricant: to manufacturer's recommendations.
- .13 Lubricant gun: complete with hose assembly.
- .14 Drip connection: 20 MPa (2900 psi) forged steel to ASTM A105. Include half coupling with drain plug.
- .15 Lubricant fittings, plunger, gun not required for low friction self lubricating packing.

2.2 FLEXIBLE CONNECTION

- .1 Application: to suit motion.
- .2 Minimum length in accordance with manufacturer's recommendations to suit offset.
- .3 Inner hose: stainless steel corrugated.
- .4 Braided wire mesh stainless steel outer jacket.
- .5 Diameter and type of end connection: as indicated.
- .6 Operating conditions:
 - .1 Working pressure: 1034 kPa (150 psi).
 - .2 Working temperature: 250°C (482°F).
 - .3 To match system requirements.

2.3 ANCHORS AND GUIDES

- .1 Anchors:
 - .1 Provide as indicated.
- .2 Alignment guides:
 - .1 Provide as indicated.
 - .2 To accommodate specified thickness of insulation.
 - .3 Vapour barriers, jackets to remain uninterrupted.

2.4 EXPANSION COMPENSATORS (EXP) (2"-4")

- .1 All welded packless guided construction complete with multi ply stainless steel bellows.
- .2 Operating temperature (700°F).
- .3 Provide model HP3 for steel pipe and model HBFF3 for copper pipe.
- .4 Movement capability of 4" axial. Welded ends.
- .5 Material to match piping system.
- .6 Acceptable materials:
Metraflex HP
Mark David Canada
Senior Flexonics

Part 3 Execution

3.1 INSTALLATION

- .1 Install expansion joints with cold setting, as indicated as instructed by Consultant. Make record of cold settings.
- .2 Install expansion joints and flexible connections in accordance with manufacturer's instructions.
- .3 Install pipe anchors and guides as indicated. Anchors to withstand 150% of axial thrust.

3.2 APPLICATION

- .1 Provide on all vibration isolated equipment.
- .2 Provide where requested by equipment manufacturers installation manuals.
- .3 Install in accordance with manufacturer's recommendations.
- .4 Provide expansion compensators (exp.) on radiation heating element exceeding 3.6 M (12' – 0") in length. Provide one expansion compensators on each length of return piping in cabinet.

3.3 THERMAL EXPANSION

- .1 Provide in long runs of heating mains exceeding 100 ft. in length.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 ANSI/ASME B40.100, Pressure Gauges and Gauge Attachments.
- .3 CAN/CGSB-14.4, Thermometers, Liquid-in-Glass, Self-Indicating, Commercial/Industrial Type.
- .4 CAN/CGSB-14.5, Thermometers, Bimetallic, Self-Indicating, Commercial/Industrial Type.

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with general requirements.
- .2 Submit manufacturer's product data for following items:
 - .1 Thermometers.
 - .2 Pressure gauges.
 - .3 Stop cocks.
 - .4 Syphons.
 - .5 Wells.

Part 2 Products

2.1 GENERAL

- .1 Design point to be at mid point of scale or range.
- .2 Ranges: suitable for application.

2.2 DIRECT READING THERMOMETERS

- .1 Industrial, variable angle type, liquid filled, 225 mm (9") scale length: to CAN/CGSB 14.4.
 - .1 Acceptable materials:
 - .1 Trerice
 - .2 Winters 91T
 - .3 Wiess

2.3 THERMOMETER WELLS

- .1 Copper pipe: copper or bronze.
- .2 Steel pipe: brass or stainless steel.

2.4 PRESSURE GAUGES

- .1 115 mm (4 1/2"), dial type: to ANSI/ASME B40.100, Grade 2A, stainless steel phosphor bronze bourdon tube having 0.5% accuracy full scale unless otherwise specified.
 - .1 Acceptable materials:
 - .1 Winters
 - .2 Trerice
 - .3 Wiess
 - .2 Provide:
 - .1 Siphon for steam service.
 - .2 Snubber for pulsating operation.
 - .3 Diaphragm assembly for corrosive service.
 - .4 Gasketed pressure relief back with solid front.
 - .5 Bronze stop cock.

Part 3 Execution

3.1 GENERAL

- .1 Install so they can be easily read from floor or platform. If this cannot be accomplished, install remote reading units.
- .2 Install between equipment and first fitting or valve.

3.2 THERMOMETERS

- .1 Install in wells on all piping. Provide heat conductive material inside well.
- .2 Install in locations as indicated and on inlet and outlet of:
 - .1 In other locations indicated.
- .3 Install wells as indicated only for balancing purposes.
- .4 Use extensions where thermometers are installed through insulation.

3.3 PRESSURE GAUGES

- .1 Install in following locations:
 - .1 Upstream and downstream of control valves.
 - .2 Inlet and outlet of coils.
 - .3 Inlet and outlet of backflow prevention.
 - .4 In other locations as indicated.
- .2 Install gauge cocks for balancing purposes, elsewhere as indicated.
- .3 Use extensions where pressure gauges are installed through insulation.

3.4 NAMEPLATES

- .1 Install engraved lamicaid nameplates as specified elsewhere identifying medium.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 American National Standards Institute/ American Society of Mechanical Engineers (ANSI/ASME)
 - .1 ANSI/ASME B31.1, Power Piping, (SI Edition).
- .3 American Society for Testing and Materials (ASTM)
 - .1 ASTM A 125, Specification for Steel Springs, Helical, Heat-Treated.
 - .2 ASTM A 307, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - .3 ASTM A 563, Specification for Carbon and Alloy Steel Nuts.
- .4 Manufacturer's Standardization Society of the Valves and Fittings Industry (MSS)
 - .1 MSS SP-58, Pipe Hangers and Supports - Materials, Design, Manufacture Selection, Application, and Installation.

1.2 DESIGN REQUIREMENTS

- .1 Construct pipe hanger and support to manufacturer's recommendations utilizing manufacturer's regular production components, parts, and assemblies.
- .2 Base maximum load ratings on allowable stresses prescribed by ASME B31.1 or MSS SP-58.
- .3 Ensure that supports, guides, anchors do not transmit excessive quantities of heat to building structure.
- .4 Design hangers and supports to support systems under all conditions of operation, allow free expansion and contraction, prevent excessive stresses from being introduced into pipework or connected equipment.
- .5 Provide for vertical adjustments after erection and during commissioning. Amount of adjustment to be in accordance with MSS SP-58.

1.3 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with general requirements.
- .2 Submit shop drawings and product data for following items:
 - .1 All bases, hangers and supports.
 - .2 Connections to equipment and structure.
 - .3 Structural assemblies.

1.4 MAINTENANCE DATA

- .1 Provide maintenance data for incorporation into manual specified in general requirements.

Part 2 Products

2.1 GENERAL

- .1 Fabricate hangers, supports and sway braces in accordance with ANSI B31.1 and MSS-SP-58.
- .2 Use components for intended design purpose only. Do not use for rigging or erection purposes.

2.2 PIPE HANGERS

- .1 Finishes:
 - .1 Pipe hangers and supports: to ANSI & ULC requirements
 - .2 Ensure steel hangers in contact with copper piping are copper plated.
- .2 Upper attachment structural: Suspension from upper flange of I-Beam or joist.
 - .1 Cold piping NPS 50 mm (2") maximum: Ductile iron C-clamp with hardened steel cup point setscrew, locknut, and carbon steel retaining clip.
 - .1 Rod: 10 mm (3/8") UL listed
 - .2 Cold piping NPS 65 mm (2 1/2") or greater, all hot piping: Malleable iron beam clamp, eye rod, jaws and extension with carbon steel retaining clip, tie rod, nuts and washers, UL listed & FM approved.
- .3 Upper attachment structural: Suspension from upper flange of I-Beam.
 - .1 Cold piping NPS 50 mm (2") maximum: Ductile iron top-of-beam C-clamp with hardened steel cup point setscrew, locknut and carbon steel retaining clip, UL listed.
 - .2 Cold piping NPS 65 mm (2 1/2") or greater, all hot piping: Malleable iron top-of-beam jaw-clamp with hooked rod, spring washer, plain washer, and nuts.
- .4 Upper attachment to concrete.
 - .1 Ceiling: Carbon steel welded eye rod, clevis plate, clevis pin and cotters with weldless forged steel eye nut. Ensure eye 6 mm (1/4") minimum greater than rod diameter.
 - .2 Concrete inserts: wedge shaped body with knockout protector plate ULC listed. Note: Rapidex and Siporex are not considered concrete. Should one of these systems be encountered, piping/ductwork and/or equipment shall be supported from adjacent walls or from supplemental steel provided by this contractor attached to the adjacent walls/structure.

- .5 Shop and field-fabricated assemblies.
 - .1 Trapeze hanger assemblies: ASME B31.1.
 - .2 Steel brackets: ASME B31.1.
- .6 Hanger rods: threaded rod material to MSS SP-58.
 - .1 Ensure that hanger rods are subject to tensile loading only.
 - .2 Provide linkages where lateral or axial movement of pipework is anticipated.
- .7 Pipe attachments: material to MSS SP-58.
 - .1 Attachments for steel piping: carbon steel.
 - .2 Attachments for copper piping: copper plated black steel.
 - .3 Use insulation shields for all piping.
 - .4 Oversize pipe hangers and supports to accommodate thermal insulation. Provide 1.5 mm (16 gauge) saddles.
- .8 Adjustable clevis: material to MSS SP-58 UL listed, clevis bolt with nipple spacer and vertical adjustment nuts above and below clevis.
 - .1 Ensure "U" has hole in bottom for riveting to insulation shields.

2.3 RISER CLAMPS

- .1 Steel or cast iron pipe: black carbon steel to MSS-SP-58, type 42, UL listed.
- .2 Copper pipe: carbon steel copper plated to MSS-SP-58, type 42.
- .3 Bolts: to ASTM A 307.
- .4 Nuts: to ASTM A 563.

2.4 INSULATION PROTECTION SHIELDS

- .1 Insulated cold piping:
 - .1 64 kg/m² (13.12 lbs/ft²) density insulation plus insulation protection shield to: MSS SP-69, galvanized sheet carbon steel. Length designed for maximum 3 m (10') span.
- .2 Insulated hot piping:
 - .1 Curved plate 300 mm (12") long, with edges turned up, welded-in centre plate for pipe sizes NPS 300 mm (12") and over, carbon steel to comply with MSS SP-58.

2.5 EQUIPMENT SUPPORTS

- .1 Fabricate equipment supports not provided by equipment manufacturer from structural grade steel meeting requirements of miscellaneous metals, specified herein. Submit calculations with shop drawings.

2.6 EQUIPMENT ANCHOR BOLTS AND TEMPLATES

- .1 Provide templates to ensure accurate location of anchor bolts.

2.7 OTHER EQUIPMENT SUPPORTS

- .1 From structural grade steel meeting requirements of structural steel section specified herein.
- .2 Submit structural calculations with shop drawings.

2.8 MANUFACTURER

- .1 Acceptable materials:
 - .1 Grinnell
 - .2 Anvil
 - .3 Myatt
 - .4 Taylor

Part 3 Execution

3.1 INSTALLATION

- .1 Install in accordance with:
 - .1 Manufacturer's instructions and recommendations.
- .2 Vibration Control Devices:
 - .1 Install on piping systems at pumps, boilers, chillers, cooling towers, elsewhere as indicated.
- .3 Clamps on riser piping:
 - .1 Support independent of connected horizontal pipework using riser clamps and riser clamp lugs welded to riser.
 - .2 Bolt-tightening torques to be to industry standards.
 - .3 Steel pipes: Install below coupling or shear lugs welded to pipe.
 - .4 Cast iron pipes: Install below joint.
- .4 Clevis plates:
 - .1 Attach to concrete with 4 minimum concrete inserts at each corner.
- .5 Provide supplementary structural steelwork where structural bearings do not exist or where concrete inserts are not in correct locations.

3.2 HANGER SPACING

- .1 Plumbing piping: most stringent requirements of Canadian Plumbing Code, Provincial Code, or authority having jurisdiction.
- .2 Fire protection: to applicable fire code.
- .3 Gas and fuel oil piping: up to NPS 15 mm (1/2"): every 1.8 m (6').
- .4 Copper piping: up to NPS 15 mm (1/2"): every 1.5 m (5').
- .5 Flexible joint roll groove pipe: in accordance with table below, but not less than one hanger at joints.**
- .6 Within 300 mm (12") of each elbow and:

Maximum Pipe Size: NPS	Spacing Steel	Maximum Spacing Copper
up to 32 mm (1 1/4")	2.1 m (7')	1.8 m (6')
40 mm (1 1/2")	2.7 m (9')	2.4 m (8')
50 mm (2")	3.0 m (10')	2.7 m (9')
65 mm (2 1/2")	3.6 m (12')	3.0 m (10')
80 mm (3")	3.6 m (12')	3.0 m (10')
90 mm (3 1/2")	3.9 m (13')	3.3 m (11')
100 mm (4")	4.2 m (14')	3.6 m (12')
125 mm (5")	4.8 m (16')	
150 mm (6")	5.1 m (17')	
200 mm (8")	5.7 m (19')	
250 mm (10")	6.6 m (22')	
300 mm (12")	6.9 m (23')	

- .7 Pipework greater than NPS 300 mm (12"): to MSS SP-69.

3.3 HANGER INSTALLATION

- .1 Install hanger so that rod is vertical under operating conditions.
- .2 Adjust hangers to equalize load.
- .3 Support from structural members. Where structural bearing does not exist or inserts are not in suitable locations, provide supplementary structural steel members.
- .4 Do "NOT" support piping, ductwork, and equipment from roof deck, on bottom chord of floor and/or roof joist and/or from OWSJ bridging. Provide structural member between joist.

3.4 HORIZONTAL MOVEMENT

- .1 Angularity of rod hanger resulting from horizontal movement of pipework from cold to hot position not to exceed 4mm (5/32") from vertical.
- .2 Where horizontal pipe movement is less than 15 mm (1/2"), offset pipe hanger and support so that rod hanger is vertical in the hot position.

3.5 FINAL ADJUSTMENT

- .1 Adjust hangers and supports:
 - .1 Ensure that rod is vertical under operating conditions.
 - .2 Equalize loads.
- .2 Adjustable clevis:
 - .1 Tighten hanger load nut securely to ensure proper hanger performance.
 - .2 Tighten upper nut after adjustment.
- .3 C-clamps:
 - .1 Follow manufacturer's recommended written instructions and torque values when tightening C-clamps to bottom flange of beam.
- .4 Beam clamps:
 - .1 Hammer jaw firmly against underside of beam.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 American National Standards Institute/ American Society of Mechanical Engineers (ANSI/ASME)
 - .1 ANSI/ASME B31.1, Power Piping, (SI Edition).
- .3 American Society for Testing and Materials (ASTM)
 - .1 ASTM A 125, Specification for Steel Springs, Helical, Heat-Treated.
 - .2 ASTM A 307, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - .3 ASTM A 563, Specification for Carbon and Alloy Steel Nuts.
- .4 Manufacturer's Standardization Society of the Valves and Fittings Industry (MSS)
 - .1 MSS SP-58, Pipe Hangers and Supports - Materials, Design, Manufacture Selection, Application, and Installation.
- .5 CSA B272-93 – Prefabricated Self-Sealing Roof Vent Flashings
- .6 CRCA (Canadian Roofing Contractor’s Association)
- .7 SPRI (Single Ply Roofing Institute)
- .8 CUFCA (Canadian Urethane Foam Contractor’s Association) and CGSB-51-GP-46MP, Manual for “Installers of Spray Polyurethane Foam Thermal Insulation”
- .9 CSA G40.21-M1987, M350W, and M300W (Structural Quality Steels)
- .10 CSA W47.1-1983 (Certificate of Companies for Fusion Welding of Structural Steel)
- .11 CSA W59-M1989 (Welded Steel Construction – Metal Arc Welding)
- .12 CSA G164-M1981 (Hot Dip Galvanizing of Irregularly Shaped Articles)

1.2 RELATED SECTIONS

- .1 Section 03300 – Cast-in-place Concrete
- .2 Section 05210 – Steel Joists
- .3 Section 05300 – Metal Deck
- .4 Section 06100 – Rough Carpentry
- .5 Section 07200 – Thermal Protection
- .6 Section 07500 – Membrane Roofing
- .7 Section 07900 – Joint Sealers

1.3 DESIGN REQUIREMENTS

- .1 Construct support systems to manufacturer's recommendations utilizing manufacturer's regular production components, parts, and assemblies.
- .2 Base maximum load ratings on allowable stresses prescribed by ASME B31.1 or MSS SP-58.
- .3 Design supports to support systems under all conditions of operation, allow free expansion and contraction, prevent excessive stresses from being introduced into pipework or connected equipment.
- .4 Provide for vertical adjustments after erection and during commissioning. Amount of adjustment to be in accordance with MSS SP-58.

1.4 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with general requirements.
- .2 Submit shop drawings and product data for following items:
 - .1 All bases, hangers and supports.
 - .2 Connections to equipment and structure.
 - .3 Structural assemblies.
- .3 Manufacturer's installation instruction.

1.5 MAINTENANCE DATA

- .1 Provide maintenance data for incorporation into manual specified in general requirements.

1.6 QUALITY ASSURANCE

- .1 Roof accessories manufacturers to have minimum five (5) years documented experience in the design and fabrication of roofing specialties and accessories.

1.7 SPECIAL WARRANTY

- .1 Warrant products installed under this section of work to be free of leaks, condensation, and defects in materials and/or manufacture for a period of twenty (20) years when installed in accordance with the manufacturer's written instructions.

Part 2 Products

2.1 PIPE/SUPPORT

- .1 Pipe/Support:
 - .1 Adjustable height 6061-T6, hollow aluminum with mill finish, urethane insulated supports, 2" (51mm) diameter.

- .2 Stack Jack Flashing:
 - .1 Height to suit application.
 - .2 Fully urethane insulated.
 - .3 Aluminum construction.
 - .4 Complete with EPDM triple pressure grommet seal and EPDM base seal and other accessories as required to suit roof type.
- .3 Provide appropriate stainless steel mounting hardware to suit supported pipe/equipment.
- .4 Provide appropriate system support as specified in this section to suit application.
 - .1 Single Plain Pipe: Type 304 stainless steel pipe roller assembly to suite actual O.D pipe.
 - .2 Double Plain Pipe: Type 304 stainless steel pipe roller assemblies sized to suit actual O.D pipe.
 - .3 Single Insulated Pipe: Type 304 stainless steel pipe cradle assembly sized to suit actual O.D of insulated pipe.
 - .4 Double insulated Pipe: Type 304 stainless steel pipe cradle assemblies sized to suit actual O.D of insulated pipe.
- .5 Basis of design/Acceptable Manufacturer
 - .1 Thaler MERS 600 series.
 - .2 Acceptable equals if submitted during tender period.

2.2 EQUIPMENT ANCHOR BOLTS AND TEMPLATES

- .1 Provide templates to ensure accurate location of anchor bolts.

2.3 ROOF MOUNTED PIPE SUPPORT

- .1 Provide zero penetration pipe support on roof where indicated.
- .2 Base shall be made of high density polypropylene with UV protection. Maximum loading shall be 50 lb/sq.ft.
- .3 Frames shall be galvanized. All fastenings, rods, nuts, washers, hangers, etc. shall be stainless steel.
- .4 Provide shop drawings as specified. Install to manufacturers recommendations.
- .5 Acceptable material:
 - Portable pipe hanger
 - Bigfoot systems
 - Miro rooftop supports
 - Walravin BIS Yeti
 - Ecofoot

Part 3 Execution

3.1 INSTALLATION

- .1 Roof support install in accordance with:
 - .1 Manufacturer's instructions and recommendations.
 - .2 Provide protection against deterioration due to contact of dissimilar metals.
- .2 Flashing Installation:
 - .1 Install roof support flashing in accordance with manufacturer's printed instructions.
- .3 Vibration Control Devices:
 - .1 Install as indicated and at all roof mounted mechanical equipment that is not internally isolated.
- .4 Clevis plates:
 - .1 Attach to concrete with 4 minimum concrete inserts at each corner.
- .5 Provide supplementary structural steelwork where structural bearings do not exist or where concrete inserts are not in correct locations.

3.2 PIPE SUPPORT SPACING

- .1 Plumbing piping: most stringent requirements of Canadian Plumbing Code, Provincial Code, or authority having jurisdiction.
- .2 Gas and fuel oil piping: every 1.8 m (6').
- .3 Copper piping: up to NPS 15 mm (1/2"): every 1.5 m (5').
- .4 Within 300 mm (12") of each elbow and:

Maximum Pipe Size: NPS	Spacing Steel	Maximum Spacing Copper
up to 32 mm (1 1/4")	2.1 m (7')	1.8 m (6')
40 mm (1 1/2")	2.7 m (9')	2.4 m (8')
50 mm (2")	3.0 m (10')	2.7 m (9')
65 mm (2 1/2")	3.6 m (12')	3.0 m (10')
80 mm (3")	3.6 m (12')	3.0 m (10')
90 mm (3 1/2")	3.9 m (13')	3.3 m (11')
100 mm (4")	4.2 m (14')	3.6 m (12')
125 mm (5")	4.8 m (16')	
150 mm (6")	5.1 m (17')	
200 mm (8")	5.7 m (19')	
250 mm (10")	6.6 m (22')	
300 mm (12")	6.9 m (23')	

- .5 Pipework greater than NPS 300 mm (12"): to MSS SP-69.

3.3 EXAMINATION

- .1 Report to the contractor in writing, defects of work prepared by other trades and other unsatisfactory site conditions. Verify site dimensions. Commencement of work will imply acceptance of prepared work.

3.4 ADJUSTING

- .1 Verify that all manufactured units have been installed in accordance with specifications and details and will function as intended. Adjust any items where necessary to ensure proper operation.

3.5 CLEANING

- .1 Clean manufactured units using materials and methods approved by manufacturer. Do not use cleaners or techniques which could impair performance of the roofing system.

END OF SECTION

Part 1 General

1.1 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with general requirements.
- .2 Provide separate shop drawings for each isolated system complete with performance and product data.

Part 2 Products

2.1 GENERAL

- .1 Size and shape of bases type and performance of vibration isolation to be as indicated.
- .2 To be of the same manufacturer for all isolation.
- .3 Acceptable materials:
 Korfund
 Vibro-Acoustics
 Vibron

2.2 ELASTOMERIC PADS

- .1 Type EP1 - neoprene waffle or ribbed; 10 mm (3/8") minimum thick; 50 durometer; maximum loading 350 kPa (50.8 psi).
- .2 Type EP2 - rubber waffle or ribbed; 10 mm (3/8") minimum thick; 30 durometer natural rubber; maximum loading 415 kPa (60.2 psi).
- .3 Type EP3 - neoprene-steel-neoprene; 10 mm (3/8") minimum thick neoprene bonded to 1.5 mm (16 gauge) steel plate; 50 durometer neoprene, waffle or ribbed; holes sleeved with isolation washers; maximum loading 350 kPa (50.8 psi).
- .4 Type EP4 - rubber-steel-rubber; 10 mm (3/8") minimum thick rubber bonded to 1.5 mm (16 gauge) steel plate; 30 durometer natural rubber, waffle or ribbed; holes sleeved with isolation washers; maximum loading 415 kPa (60.2 psi).
- .5 Acceptable materials:
 Korfund
 IAC Acoustics
 Vibro-Acoustics
 Vibron

2.3 ELASTOMERIC MOUNTS

- .1 Type M1 - colour coded; neoprene in shear; maximum durometer of [60]; threaded insert and two bolt-down holes; ribbed top and bottom surfaces.

Acceptable materials:
Vibro-Acoustics
Korfund
IAC Acoustics
Vibron

2.4 HANGERS

- .1 Colour coded springs, rust resistant, painted box type hangers. Arrange to permit hanger box or rod to move through a 30° arc without metal to metal contact.
- .2 Type H1 - neoprene - in-shear, molded with rod isolation bushing, which passes through hanger box.
- .3 Type H2 - stable spring, elastomeric washer, cup with molded isolation bushing which passes through hanger box.
- .4 Type H3 - stable spring, elastomeric element with pre-compression washer and nut [with deflection indicator].
- .5 Performance as indicated.

- .6 Acceptable materials:
Vibron
IAC Acoustics
Korfund
Vibro-Acoustics

Part 3 Execution

3.1 INSTALLATION

- .1 Install vibration isolation equipment in accordance with manufacturers instructions and adjust mountings to level equipment.
- .2 Ensure piping, ducting and electrical connections to isolated equipment do not reduce system flexibility and that piping, conduit and ducting passage through walls and floors do not transmit vibrations.
- .3 Unless indicated otherwise, support piping connected to isolated equipment with spring mounts or spring hangers with 25 mm (1") minimum static deflection as follows:
 - .1 Up to NPS 100 mm (4"): first 3 points of support. NPS 125 mm (5") to NPS 200 mm (8"): first 4 points of support. NPS 250 mm (10") and Over: first 6 points of support.
 - .2 First point of support shall have a static deflection of twice deflection of isolated equipment, but not more than 50 mm (2").

- .4 Where isolation is bolted to floor use vibration isolation rubber washers.
- .5 Block and shim level bases so that ductwork and piping connections can be made to a rigid system at the operating level before isolator adjustment is made. Ensure that there is no physical contact between isolated equipment and building structure.

3.2 SITE VISIT

- .1 Manufacturer to visit site and provide written certification that installation is in accordance with manufacturer's instructions and submit report to Consultant.
- .2 Provide Consultant with notice 24 h in advance of visit.
- .3 Make adjustments and corrections in accordance with written report.

3.3 TESTING

- .1 Experienced and competent sound and vibration testing professional engineer to take vibration measurement for HVAC systems after start up and TAB of systems to Testing Adjusting and Balancing Section.
- .2 Vibration measurements shall be taken for equipment-listed below:
- .3 Provide Consultant with notice 48 h in advance of commencement of tests.
- .4 Establish adequacy of equipment isolation and acceptability of noise levels in occupied areas and where appropriate, remedial recommendations including sound curves.
- .5 Submit complete report of test results including sound curves.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-1.60, Interior Alkyd Gloss Enamel.
 - .2 CAN/CGSB-24.3, Identification of Piping Systems.
- .3 Canadian Standards Association (CSA).
 - .1 Natural Gas and Propane Installation Code CSA B149.1.
- .4 National Fire Protection Association
 - .1 NFPA 13, Installation of Sprinkler Systems.
 - .2 NFPA 14, Standpipe and Systems.

1.2 PRODUCT DATA

- .1 Submit product data in accordance with General Requirements.
- .2 Product data to include paint colour chips, all other products specified in this section.

1.3 PRODUCT LITERATURE

- .1 Submit product literature in accordance with General Requirements.
- .2 Product literature to include nameplates, labels, tags, lists of proposed legends.

Part 2 Products

2.1 MANUFACTURER'S EQUIPMENT NAMEPLATES

- .1 Metal or plastic lamicoid nameplate mechanically fastened to each piece of equipment by manufacturer.
- .2 Lettering and numbers to be raised or recessed.
- .3 Information to include, as appropriate:
 - .1 Equipment: Manufacturer's name, model, size, serial number, capacity.
 - .2 Motor: voltage, Hz, phase, power factor, duty, frame size.

2.2 SYSTEM NAMEPLATES

- .1 Colours:
 - .1 Hazardous: red letters, white background.
 - .2 Elsewhere: black letters, white background (except where required otherwise by applicable codes).

- .2 Construction:
- .1 3 mm (1/8") thick laminated plastic, matte finish, with square corners, letters accurately aligned, and machine engraved into core.
- .3 Sizes:
- .1 Conform to following table:
- | Size | No. of
Sizes mm (") | Height of
Line mm (") | Letters mm (") |
|------|------------------------|--------------------------|----------------|
| 1 | 10 x 50 (3/8" x 2") | 1 (3/64") | 3 (1/8") |
| 2 | 15 x 75 (1/2" x 3") | 1 (3/64") | 6 (1/4") |
| 3 | 15 x 75 (1/2" x 3") | 2 (5/64") | 3 (1/8") |
| 4 | 20 x 100 (3/4" x 4") | 1 (3/64") | 10 (3/8") |
| 5 | 20 x 100 (3/4" x 4") | 2 (6/64") | 6 (1/4") |
| 6 | 20 x 200 (3/4" x 8") | 1 (3/64") | 10 (3/8") |
| 7 | 25 x 125 (1" x 5") | 1 (3/64") | 15 (1/2") |
| 8 | 25 x 125 (1" x 5") | 2 (5/64") | 10 (3/8") |
| 9 | 32 x 200 (1¼" x 8") | 1 (3/64") | 20 (3/4") |
- .2 Use maximum of 25 letters/numbers per line.
- .4 Locations:
- .1 Terminal cabinets, control panels: Use size #5.
- .2 Equipment in Mechanical Rooms: Use size #9.
- .3 Roof top equipment: use size #9.
- .4 Equipment above ceiling: use size #1 riveted to ceiling suspension system.

2.3 FIRE DAMPER/FIRE STOP FLAP NAMEPLATES/FIRE SMOKE DAMPER

- .1 Colours:
- .1 Black letters, yellow background.
- .2 Construction:
- .1 Self adhesive 50 mm x 25 mm, matte finish, with round corners.
- .3 Locations:
- .1 Install on adjacent ceiling grid. Where fire stop flap is installed in gypsum ceiling install on diffuser/grille frame. Where fire damper is installed above gypsum ceiling install on adjacent wall.

2.4 EXISTING IDENTIFICATION SYSTEMS

- .1 Apply existing identification system to new work.
- .2 Where existing identification system does not cover for new work, use identification system specified this section.
- .3 Before starting work, obtain written approval of identification system from Consultant.

- .4 Upon completion of this project all references to room names and numbering shall be to the Owner's requirements which may or may 'NOT' be the numbering system used on the drawings. Each contractor shall verify the proper numbering scheme to be used prior to project completion.
- .5 All equipment shall be identified in sequence from the existing equipment and "NOT" duplicate numbering of equipment.

2.5 PIPING SYSTEMS GOVERNED BY CODE

- .1 Identification:
 - .1 Natural and propane gas: To CSA B149.1-00 and authority having jurisdiction and as indicated elsewhere.
 - .2 Sprinklers: To NFPA 13.
 - .3 Standpipe and hose systems: To NFPA 14.

2.6 IDENTIFICATION OF PIPING SYSTEMS

- .1 Identify contents by background colour marking, pictogram (as necessary), legend; direction of flow by arrows. To CAN/CGSB 24.3 except where specified otherwise.
- .2 Legend:
 - .1 Block capitals to sizes and colours listed in CAN/CGSB-24.3.
- .3 Arrows showing direction of flow:
 - .1 Outside diameter of pipe or insulation less than 75 mm (3"): 100 mm (4") long x 50 mm (2") high.
 - .2 Outside diameter of pipe or insulation 75 mm (3") and greater: 150 mm (6") long x 50 mm (2") high.
 - .3 Use double-headed arrows where flow is reversible.
- .4 Extent of background colour marking:
 - .1 To full circumference of pipe or insulation.
 - .2 Length to accommodate pictogram, full length of legend and arrows.
- .5 Materials for background colour marking, legend, arrows:
 - .1 Pipes and tubing 20 mm (3/4") and smaller: Waterproof and heat-resistant pressure sensitive plastic marker tags.
 - .2 All other pipes: Pressure sensitive vinyl with protective overcoating, waterproof contact adhesive undercoating, suitable for ambient of 100% RH and continuous operating temperature of 150°C (300°F) and intermittent temperature of 200°C (395°F).

- .6 Colours and Legends:
- .1 Where not listed, obtain direction from Consultant.
 - .2 Colours for legends, arrows: To following table:

Background colour:	Legend:	Arrows:
Yellow	White	Black
Green	White	Black
Red	White	Black
- .7 Background colour marking and legends for piping systems:

CONTENTS	BACKGROUND COLOUR MARKING	LEGEND
Hot water heating supply	Yellow	HEATING SUPPLY
Hot water heating return	Yellow	HEATING RETURN
Domestic hot water supply	Green	DOM. HW SUPPLY
Dom. HW recirculation	Green	DOM. HW CIRC
Domestic cold water supply	Green	DOM. CWS
Domestic tempered supply	Green	DOM. TEMPERED
Trap Primer	Green	TRAP PRIMER
Sanitary	Green	SAN
Plumbing vent	Green	SAN. VENT
Condensate	Green	CONDENSATE
Refrigeration suction	Yellow	REF. SUCTION
Refrigeration liquid	Yellow	REF. LIQUID
Refrigeration hot gas	Yellow	REF. HOT GAS
Control wiring	White	CONTROL WIRING ___ VOLTS

2.7 IDENTIFICATION DUCTWORK SYSTEMS

- .1 50 mm (2") high stencilled letters and directional arrows 150 mm (6") long x 50 mm (2") high.
- .2 Colours: Black, or co-ordinated with base colour to ensure strong contrast.

2.8 VALVES, CONTROLLERS

- .1 Brass tags with 15 mm (1/2") stamped identification data filled with black paint.
- .2 Include flow diagrams for each system, of approved size, showing charts and schedules with identification of each tagged item, valve type, service, function, normal position, location of tagged item.
- .3 Provide adhesive coloured tab (max. size 15 mm) indication on ceiling to locate valves/equipment above. Same applies to grid. Colour to be approved by consultant.

2.9 CONTROLS COMPONENTS IDENTIFICATION

- .1 Identify all systems, equipment, components, controls, sensors with system nameplates specified in this section.
- .2 Inscriptions to include function and (where appropriate) fail-safe position.
- .3 Provide equipment identification and/or indication on ceiling to locate devices/equipment above ceiling. Install identification on grid. Colours to be approved by consultant.

2.10 LANGUAGE

- .1 Identification to be in English.

Part 3 Execution

3.1 TIMING

- .1 Provide identification only after all painting specified has been completed.

3.2 INSTALLATION

- .1 Perform work in accordance with CAN/CGSB-24.3 except as specified otherwise.
- .2 Provide ULC and/or CSA registration plates as required by respective agency.

3.3 NAMEPLATES

- .1 Locations:
 - .1 In conspicuous location to facilitate easy reading and identification from operating floor.
- .2 Standoffs:
 - .1 Provide for nameplates on hot and/or insulated surfaces.
- .3 Protection
 - .1 Do not paint, insulate or cover in any way.

3.4 LOCATION OF IDENTIFICATION ON PIPING AND DUCTWORK SYSTEMS

- .1 On long straight runs in open areas in boiler rooms, equipment rooms, galleries, tunnels not more than 1.7 m (5'-8") intervals and more frequently if required to ensure that at least one is visible from any one viewpoint in operating areas and walking aisles.
- .2 Adjacent to each change in direction.
- .3 At least once in each small room through which piping or ductwork passes.
- .4 On both sides of visual obstruction or where run is difficult to follow.
- .5 On both sides of separations such as walls, floors, partitions.
- .6 Where system is installed in pipe chases, ceiling spaces, galleries, other confined spaces, at entry and exit points, and at each access opening.

- .7 At beginning and end points of each run and at each piece of equipment in run.
- .8 At point immediately upstream of major manually operated or automatically controlled valves, dampers, etc. Where this is not possible, place identification as close as possible, preferably on upstream side.
- .9 Identification to be easily and accurately readable from usual operating areas and from access points.
 - .1 Position of identification to be approximately at right angles to most convenient line of sight, considering operating positions, lighting conditions, risk of physical damage or injury and reduced visibility over time due to dust and dirt.

3.5 VALVES, CONTROLLERS

- .1 Valves and operating controllers, except at plumbing fixtures, radiation, or where in plain sight of equipment they serve: Secure tags with non-ferrous chains or closed "S" hooks.
- .2 Install one copy of flow diagrams, valve schedules mounted in frame behind non-glare glass where directed by Consultant. Provide one copy (reduced in size if required) in each operating and maintenance manual.
- .3 Number valves in each system consecutively. Where existing numbering system is installed start new numbering system at 100.

END OF SECTION

Part 1 General

1.1 CONTRACT REQUIREMENTS

- .1 **TAB contractor will work for the owner from the cash allowance in the Mechanical Allowances section.**
- .2 **This contractor must coordinate their work with that of the TAB contractor.**
- .3 **Prequalified TAB contractors are to submit quotes to the engineers on or before the tender closing time specified in Division 1.**
- .4 **Should the Engineer's Office not receive the quotes it will be the successful mechanical contractor's responsibility to obtain the quotations.**
- .5 **If required, the successful mechanical contractor shall:**
 - .1 **Provide copies of specified drawings and addendums to the NEBB certified Testing and Balancing contractors listed below.**
 - .2 **Obtain quotations for Testing and Balancing services.**
 - .3 **Submit quotations to the engineer's office for review.**
- .6 **The Engineer's Office will issue required instruction for the initiation of Testing and Balancing agency's work.**

1.2 GENERAL

- .1 TAB means to test, adjust and balance to perform in accordance with requirements of Contract Documents and to do all other work as specified in this section including all air handling systems and equipment, all plumbing systems and equipment and all temperature controls system, building automation systems and equipment.
- .2 This contractor must co-ordinate their work with that of the TAB contractor.

1.3 QUALIFICATIONS OF TAB AGENCIES

- .1 Names of all personnel it is proposed to perform TAB to be submitted to and approved by Consultant within 30 days of start of work.
- .2 Provide documentation confirming qualifications, successful experience.
- .3 Only the following NEBB (National Environmental Balancing Bureau) TAB contractors may quote:
 - .1 Air Audit Inc.
110 Turnbull Court, Unit 11
Cambridge, Ontario
N1T 1K6
(519) 740-0871

- .2 Air Velocities Control Ltd.
100 Premium Way
Mississauga, Ontario
L5B 1A2
(905) 279-4433
- .3 Flowset Balancing Ltd.
431 Willis Dr.
Oakville, Ontario
L6L 4V6
(416) 410-9793

1.4 PURPOSE OF TAB

- .1 Test to verify proper and safe operation, determine actual point of performance, evaluate qualitative and quantitative performance of equipment, systems and controls at design, average (95% design) and low (75% of design) loads using actual or simulated loads. TAB contractor to perform equipment evaluation upon start up and once during each season in the first year of operation.
- .2 Adjust and regulate equipment and systems so as to meet specified performance requirements and to achieve specified interaction with all other related systems under all normal and emergency loads and operating conditions. Confirm all equipment interlocks and functions of associated systems.
- .3 Balance systems and equipment to regulate flow rates to match load requirements over full operating ranges and temperatures. Refer to BAS for system operating functions.

1.5 EXCEPTIONS

- .1 TAB of systems and equipment regulated by codes, standards to be to satisfaction of authority having jurisdiction.

1.6 COORDINATION

- .1 Schedule time required for TAB (including repairs, re-testing) into project construction and completion schedule so as to ensure completion before acceptance of project.
- .2 Do TAB of each system independently and subsequently, where interlocked with other systems, in unison with those systems. Coordinate with other trades to ensure all systems are interlocked as indicated elsewhere prior to TAB.

1.7 PRE-TAB REVIEW

- .1 Review contract documents before project construction is started and confirm in writing to Consultant adequacy of provisions for TAB and all other aspects of design and installation pertinent to success of TAB.
- .2 Review specified standards and report to Consultant in writing all proposed procedures which vary from standard.
- .3 During construction, co-ordinate location and installation of all TAB devices, equipment, accessories, measurement ports and fittings.

- .4 During construction indicate all tolerances of piping, ductwork etc conforms to specifications.

1.8 START-UP

- .1 Follow start-up procedures as recommended by equipment manufacturer unless specified otherwise.
- .2 Follow special start-up procedures specified elsewhere in the Mechanical Division.

1.9 OPERATION OF SYSTEMS DURING TAB

- .1 Operate systems for length of time required for TAB and as required by Consultant for verification of TAB reports.

1.10 START OF TAB

- .1 Notify Consultant in writing 3 days prior to start of TAB.
- .2 Start TAB only when building is essentially completed, including:
 - .1 Installation of ceilings, doors, windows, other construction affecting TAB.
 - .2 Application of weather-stripping, sealing, caulking.
 - .3 All pressure, leakage, other tests specified elsewhere in the Mechanical Division.
 - .4 All provisions for TAB installed and operational.
 - .5 Start-up, verification for proper, normal, and safe operation of all mechanical and associated electrical and control systems affecting TAB including but not limited to:
 - .1 Proper thermal overload protection in place for electrical equipment.
 - .2 Air systems:
 - .1 Filters in place, clean.
 - .2 Duct systems clean.
 - .3 Ducts, air shafts, ceiling plenums are airtight to within specified tolerances.
 - .4 Correct fan rotation.
 - .5 Fire, smoke, volume control dampers installed and open.
 - .6 Coil fins combed, clean.
 - .7 Access doors, installed, closed.
 - .8 All outlets installed, volume control dampers open.

- .3 Liquid systems:
 - .1 Flushed, filled, vented.
 - .2 Correct pump rotation.
 - .3 Strainers in place, baskets clean.
 - .4 Isolating and balancing valves installed, open.
 - .5 Calibrated balancing valves installed, at factory settings.
 - .6 Chemical treatment systems complete, operational.
 - .7 Control valves are properly piped.
 - .8 Coils and radiation are properly piped.
 - .9 BAS in operation.

1.11 APPLICATION TOLERANCES

- .1 Do TAB to following tolerances of design values:
 - .1 HVAC systems: plus 10%, minus 5%.
 - .2 Hydronic systems: plus or minus 10%.

1.12 ACCURACY TOLERANCES

- .1 Measured values to be accurate to within plus or minus 2% of actual values.

1.13 INSTRUMENTS

- .1 Prior to TAB, submit to Consultant list of instruments to be used together with serial numbers.
- .2 Calibrate in accordance with requirements of most stringent of referenced standard for either applicable system or HVAC system.
- .3 Calibrate within 3 months of TAB. Provide certificate of calibration to Consultant.

1.14 SUBMITTALS

- .1 Submit, prior to commencement of TAB:
 - .1 Proposed methodology and procedures for performing TAB if different from referenced standard.

1.15 PRELIMINARY TAB REPORT

- .1 Submit for checking and approval of Consultant, prior to submission of formal TAB report, sample of rough TAB sheets. Include:
 - .1 Details of instruments used.
 - .2 Details of TAB procedures employed.
 - .3 Calculations procedures.
 - .4 Summaries.

1.16 TAB REPORT

- .1 Format to be in accordance with NEBB, AABC, or SMACNA.

- .2 TAB report to show all results in SI or imperial units as indicated on plans and to include:
 - .1 Project as-built drawings.
 - .2 System schematics.

1.17 VERIFICATION

- .1 All reported results subject to verification by Consultant.
- .2 Provide manpower and instrumentation to verify up to 30% of all reported results.
- .3 Number and location of verified results to be at discretion of Consultant.
- .4 Bear costs to repeat TAB as required to satisfaction of Consultant.

1.18 SETTINGS

- .1 After TAB is completed to satisfaction of Consultant, replace drive guards, close all access doors, lock all devices in set positions, ensure sensors are at required settings. Replace all ceiling tile etc.
- .2 Permanently mark all settings to allow restoration at any time during life of facility. Markings not to be eradicated or covered in any way.

1.19 COMPLETION OF TAB

- .1 TAB to be considered complete only when final TAB Report received and approved by Consultant.

1.20 AIR SYSTEMS

- .1 Standard: TAB to be to most stringent of TAB standards of NEBB, AABC, SMACNA, ASHRAE.
- .2 Do TAB of all systems, equipment, components, controls specified in the Mechanical Division including but not limited to following:
 - .1 Air handling systems and equipment
 - .2 Duct testing to SMACNA standards.
- .3 Qualifications: personnel performing TAB to be current member in good standing of NEBB.
- .4 Quality assurance: Perform TAB under direction of qualified supervisor.

- .5 Measurements: to include, but not limited to, following as appropriate for systems, equipment, components, controls: air velocity, static pressure, flow rate, pressure drop (or loss), temperatures (dry bulb, wet bulb, dewpoint), duct cross-sectional area, RPM, electrical power, voltage, noise, vibration.
- .6 Locations of equipment measurements: To include, but not be limited to, following as appropriate:
 - .1 Inlet and outlet of each damper, filter, coil, humidifier, fan, and other equipment causing changes in conditions.
 - .2 At each controller, controlled device.
- .7 Locations of systems measurements to include, but not be limited to, following as appropriate: Each main duct, main branch, sub-branch, grille, register or diffuser.

1.21 HYDRONIC SYSTEMS

- .1 Definitions: for purposes of this section, to include low pressure hot water heating, chilled water, condenser water, glycol systems.
- .2 Standard: TAB to be the most stringent of TAB standards of NEBB, AABC, SMACNA, ASHRAE.
- .3 Do TAB of all systems, equipment, components, controls specified in Mechanical Division including but not limited to hydronic equipment testing.
- .4 Qualifications: personnel performing TAB to be current member in good standing of NEBB.
- .5 Quality assurance: perform TAB under direction of qualified supervisor.
- .6 Measurements: to include, but not limited to, following as appropriate for systems, equipment, components, controls: Flow rate, static pressure, pressure drop (or loss), temperature, specific gravity, density, RPM, electrical power voltage, noise, vibration.
- .7 Locations of equipment measurement: To include, but not be limited to, following as appropriate:
 - .1 Inlet and outlet of each heat exchanger (primary and secondary sides), boiler, chiller, coil, humidifier, cooling tower, condenser, pump, PRV, control valve, other equipment causing changes in conditions.
 - .2 At each controller, controlled device.
- .8 Locations of systems measurements to include, but not be limited to, following as appropriate: Supply and return of each primary and secondary loop (main, main branch, branch, sub-branch of all hydronic systems, inlet connection of make-up water.

1.22 DUCT LEAKAGE TESTING

- .1 Co-ordinate leakage testing with the sheet metal contractor. TAB contractor will be responsible for all duct testing.
- .2 Duct to be tested in accordance with SMACNA HVAC Duct Leakage Test Manual and as indicated.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 Canadian General Standards Board (CGSB)
 - .1 ASTM C553, Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
 - .2 CGSB 51-GP-52Ma, Vapour Barrier Jacket and Facing Material for Pipe, Duct and Equipment Thermal Insulation.
 - .3 CAN/CGSB-51.53, Poly (Vinyl Chloride) Jacketing Sheet, for Insulating Pipes, Vessels, and Round Ducts.
- .3 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102, Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
- .4 American Society for Testing and Materials (ASTM)
 - .1 ASTM C 335, Test Method for Steady State Heat Transfer Properties of Pipe Insulation.
 - .2 ASTM C 921, Practice for Determining the Properties Jacketing Materials for Thermal Insulation.
 - .3 ASTM B 209M, Specification for Aluminum and Aluminum Alloy Sheet and Plate.
- .5 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE).
 - .1 ASHRAE Standard 90.1.
- .6 Manufacturer's Trade Associations
 - .1 Thermal Insulation Association of Canada (TIAC): National Insulation Standards.

1.2 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with general requirements.
- .2 Submit for approval manufacturer's catalogue literature related to installation, fabrication for pipe, fittings, valves, and jointing recommendations.

1.3 INSTALLATION INSTRUCTIONS

- .1 Submit manufacturer's installation instructions in accordance with general requirements.
- .2 Installation instructions to include procedures to be used, installation standards to be achieved.

1.4 QUALIFICATIONS

- .1 Installer to be specialist in performing work of this section and have at least three (3) years successful experience in this size and type of project, qualified to standards of TIAC.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .2 Protect from weather, construction traffic.
- .3 Protect against damage from any source.
- .4 Store at temperatures and conditions required by manufacturer.

1.6 DEFINITIONS

- .1 For purposes of this section:
 - .1 "CONCEALED" - insulated mechanical services in suspended ceilings and non-accessible chases and furred-in spaces.
 - .2 "EXPOSED" - will mean "not concealed" as defined herein.

Part 2 Products

2.1 FIRE AND SMOKE RATING

- .1 In accordance with CAN/ULC-S102:
 - .1 Maximum flame spread rating: 25.
 - .2 Maximum smoke developed rating: 50.

2.2 INSULATION

- .1 Mineral fibre as specified herein includes glass fibre, rock wool, slag wool.
- .2 Thermal conductivity ("k" factor) not to exceed specified values at 24°C (75°F) mean temperature when tested in accordance with ASTM C 335.
- .3 Type A-1: Rigid moulded mineral fibre with factory applied vapour retarder jacket.
 - .1 Mineral fibre: to ASTM C553.
 - .2 Jacket: to CGSB 51-GP-52 Ma.
 - .3 Maximum "k" factor: to ASTM C553.
- .4 Materials:
 - .1 All materials must be supplied by the same manufacturer.
 - .2 Acceptable Materials:
 - Fibreglass Canada
 - Knauf
 - Manson
 - Pittsburgh Corning

2.3 INSULATION SECUREMENT

- .1 Tape: Self-adhesive, aluminum, reinforced, 50 mm (2") wide minimum.
- .2 Contact adhesive: Quick setting.
- .3 Canvas adhesive: Washable.

2.4 CEMENT

- .1 Thermal insulating and finishing cement:
 - .1 To ASTM C553.
 - .2 Hydraulic setting or Air drying on mineral wool, to ASTM C 449M.

2.5 VAPOUR RETARDER LAP ADHESIVE

- .1 Water based, fire retardant type, compatible with insulation.

2.6 INDOOR VAPOUR RETARDER FINISH

- .1 Vinyl emulsion type acrylic, compatible with insulation.

2.7 JACKETS

- .1 Polyvinyl Chloride (PVC):
 - .1 One-piece moulded type [and sheet] to CAN/CGSB-51.53 with pre-formed shapes as required.
 - .2 Colours: white.
 - .3 Minimum service temperatures: -20°C (-4°F).
 - .4 Maximum service temperature: 65°C (150°F).
 - .5 Moisture vapour transmission: 0.02 perm.
 - .6 Fastenings:
 - .1 Use solvent weld adhesive compatible with insulation to seal laps and joints.
 - .2 Tacks.
 - .3 Pressure sensitive vinyl tape of matching colour.
- .2 Aluminum:
 - .1 To ASTM B 209M.
 - .2 Thickness: 0.50 mm (26 gauge) sheet.
 - .3 Finish: Smooth.
 - .4 Joining: Longitudinal and circumferential slip joints with 50 mm (2") laps.
 - .5 Fittings: 0.50 mm (26 gauge) thick die-shaped fitting covers with factory-attached protective liner.
 - .6 Metal jacket banding and mechanical seals: stainless steel, 20 mm (3/4") wide, 0.50 mm (26 gauge) thick at 300 mm (12") spacing.

2.8 CAULKING FOR JACKETS

- .1 Caulking: Silicone clear caulking.

Part 3 Execution

3.1 PRE-INSTALLATION REQUIREMENT

- .1 Pressure testing of piping systems and adjacent equipment to be complete, witnessed and certified.
- .2 Surfaces to be clean, dry, free from foreign material.

3.2 INSTALLATION

- .1 Install in accordance with TIAC National Standards.
- .2 Apply materials in accordance with manufacturers' instructions and this specification.
- .3 Maintain uninterrupted continuity and integrity of vapour retarder jacket and finishes.
 - .1 Hangers, supports to be outside vapour retarder jacket.
- .4 Supports, Hangers:
 - .1 Apply high compressive strength insulation, suitable for service, at oversized saddles and shoes where insulation saddles have not been provided.

3.3 REMOVABLE, PREFABRICATED, INSULATION AND ENCLOSURES

- .1 Application: At expansion joints, valves, primary flow measuring elements, flanges, and unions at equipment.
- .2 Design: To permit movement of expansion joint and to permit periodic removal and replacement without damage to adjacent insulation.
- .3 Insulation:
 - .1 Insulation, fastenings, and finishes: same as system.
 - .2 Jacket: As per adjacent insulation.

3.4 INSTALLATION OF ELASTOMERIC INSULATION

- .1 Insulation to remain dry at all times. Overlaps to manufacturers instructions. Ensure tight joints.
- .2 Provide vapour retarder as recommended by manufacturer.

3.5 PIPING INSULATION SCHEDULES

- .1 Includes valves, valve bonnets, strainers, flanges, and fittings unless otherwise specified.
- .2 Install insulator and jackets to applicable TIAC codes.
- .3 Insulate ends of capped piping with type and thickness indicated for capped service.

- .4 Thickness of insulation to be as listed in following table.
 - .1 Do not insulate exposed runouts to plumbing fixtures, chrome plated piping, valves, fittings.
 - .2 All storm piping including all vertical and horizontal piping shall be insulated.

Application	Type	Pipe sizes through (NPS) and insulation thickness mm (")				
		to 25 (1")	32 (1¼") 40 (1½")	50 (2") 80 (3")	105 (4") 150 (6")	200 (8") & over
Domestic Water Piping	A-1	25 (1")	25 (1")	40 (1½")	40 (1½")	40 (1½")
Cooling Coil cond. Drain	A-1	25 (1")	25(1")	25 (1")	25 (1")	25 (1")
Horizontal Cast Iron	A-1	N/A	N/A	25 (1")	25 (1")	25 (1")
Sanitary Piping						
Trap Primer Piping	A-1	15 (½")	15 (½")	25 (1")		

- .5 Finishes: Conform to the following table:

<u>Application</u>	<u>Piping</u>	<u>Valves & Fittings</u>
Exposed indoors	PVC	PVC
Exposed in mech. rooms	PVC	PVC
Concealed indoors	N/A	PVC
Outdoors	Aluminum	Aluminum

- .6 Connection: To appropriate TIAC code.
- .7 Finish attachments: SS bands, @ 150 mm (6") oc. seals: closed.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 ANSI/ASME B16.15, Cast Copper Alloy Threaded Fittings, Classes 125 and 250.
- .3 ANSI B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.
- .4 ANSI/ASME B16.22, Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings.
- .5 ANSI B16.24, Cast Copper Alloy, Pipe Flanges and Flanged Fittings: Classes 150, 300, 600, 900, 1500, and 2500.
- .6 ASTM B88M, Specification for Seamless Copper Water Tube (Metric).
- .7 MSS-SP-70, Cast Iron Gate Valves, Flanged and Threaded Ends.
- .8 MSS-SP-71, Cast Iron Swing Check Valves, Flanged and Threaded Ends.
- .9 MSS-SP-80, Bronze Gate, Globe, Angle and Check Valves.

1.2 SHOP DRAWINGS

- .1 Submit shop drawing data in accordance with general requirements.

1.3 MAINTENANCE DATA

- .1 Provide maintenance data for incorporation into manual specified in general requirements.

Part 2 Products

2.1 PIPING

- .1 Domestic hot, cold and recirculation systems, within building.
 - .1 Above ground: copper tube, hard drawn, type L: to ASTM B88M.

2.2 FITTINGS

- .1 Bronze pipe flanges and flanged fittings, Class 150 and 300: to ANSI B16.24.
- .2 Cast bronze threaded fittings, Class 125 and 250: to ANSI/ASME B16.15.
- .3 Cast copper, solder type: to ANSI B16.18.
- .4 Wrought copper and copper alloy, solder type: to ANSI/ASME B16.22.
- .5 Tee drill NPS 25 mm (1") and larger.

2.3 JOINTS

- .1 Solder: 95/5.
- .2 Teflon tape: for threaded joints.
- .3 Dielectric connections between dissimilar metals: dielectric fitting to ASTM F1545, complete with thermoplastic liner.
- .4 Tee drill fittings shall be brazed with silver solder, 45% Ag - 15% Cu or copper phosphorous, 95% Cu, 5% P and non-corrosive flux.

2.4 VALVES

- .1 All valves shall be of commercial grade and of same manufacturer, Lead-Free.
- .2 Acceptable materials:
Milwaukee
Crane
Kitz

2.5 BALL VALVES

- .1 All valves shall be of commercial grade and of same manufacturer.
- .2 NPS 80 mm (3") and under, soldered:
 - .1 To ANSI B16.18, Class 150.
 - .2 Bronze body, full port stainless steel ball, PTFE Teflon adjustable packing, brass gland and PTFE Teflon seat, steel lever handle, with NPT to copper adaptors.

2.6 SWING CHECK VALVES

- .1 NPS 50 mm (2") and under, soldered:
 - .1 To MSS SP-80, Class 125, 860 kPa (125 psi), bronze body, bronze swing disc, screw in cap, regrindable seat.
- .2 NPS 50 mm (2") and under, screwed:
 - .1 To MSS SP-80, Class 125, 860 kPa (125 psi), bronze body, bronze swing disc, screw in cap, regrindable seat.
- .3 NPS 65 mm (2 1/2") and over, flanged:
 - .1 To MSS SP-71, Class 125, 860 kPa (125 psi), cast iron body, flat flange faces, [regrind] [renewable] seat, bronze disc, bolted cap.

Part 3 Execution

3.1 INSTALLATION

- .1 Install in accordance with Provincial Plumbing Code and local authority having jurisdiction.

- .2 Cut square, ream and clean tubing and tube ends, clean recesses of fittings and assemble without binding.
- .3 Assemble all piping using fittings manufactured to ANSI standards.
- .4 Install tubing close to building structure to minimize furring, conserve headroom and space. Group exposed piping and run parallel to walls.
- .5 Install CWS piping below and away from HWS and HWC and all other hot piping so as to maintain temperature of cold water as low as possible.
- .6 Connect to fixtures and equipment in accordance with manufacturers instructions unless otherwise indicated.
- .7 Bent tubing is not acceptable.

3.2 VALVES

- .1 Isolate equipment, fixtures and branches with ball valves.
- .2 Balance recirculation system using lockshield globe valves. Mark settings and record on as-built drawings on completion.

3.3 PRESSURE TESTS

- .1 Conform to requirements of general requirements.
- .2 Test pressure: greater of 1½ times maximum system operating pressure or 860 kPa (125 psi).

3.4 FLUSHING AND DISINFECTING

- .1 Maintain testable RP backflow preventor between municipal water and new plumbing system.
- .2 Ensure a minimum of 90% of plumbing fixtures are installed.
- .3 Flush water mains through available outlets with a sufficient flow of potable water to produce a velocity of 1.5 m/s, within pipe for 10 min, or until foreign materials have been removed and flushed water is clear with backflow protection.
- .4 Provide connections and pumps for flushing as required.
- .5 Open and close valves, and operate fixtures to ensure thorough flushing.
- .6 When flushing has been complete to satisfaction of Consultant introduce a strong solution of Chlorine into water system and ensure that it is distributed throughout entire system.
- .7 Rate of chlorine application to be proportional to rate of water entering pipe.
- .8 Chlorine injection to be close to point of filling water main or at building water service and to occur simultaneously.

- .9 Confirm adequate chlorine residual not less than 50 ppm has been obtained, leave system charged with chlorine solution for 24 h. After 24 h, further samples shall be taken to ensure that there is still not less than 10 ppm of chlorine residual remaining throughout system.
- .10 Upon 10 ppm confirmation and 24 hr elapsed time flush line to remove chlorine solution.
- .11 Measure chlorine residuals at extreme end of pipe-line being tested.
- .12 Perform bacteriological tests on water main, after chlorine solution has been flushed out. Take samples daily for minimum of two days. Should contamination remain or reoccur during this period, repeat disinfecting procedure. Specialist contractor shall submit certified copy of test results.
- .13 Take water samples at remote fixtures and service connections.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 ASTM A126, Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.
- .3 ASTM B62, Specification for Composition Bronze or Ounce Metal Castings.
- .4 PDI-WH201, Water Hammer Arresters.
- .5 CAN/CSA-B64 Series, Backflow Preventers and Vacuum Breakers.

1.2 SUBMITTALS

- .1 Submit shop drawings and product data in accordance with general requirements.
- .2 For shop drawings, indicate dimensions, construction details and materials.
- .3 For product data, indicate dimensions, construction details and materials for all items specified herein.

1.3 MAINTENANCE DATA

- .1 Provide maintenance data for incorporation into manual specified in general requirements.
- .2 Data to include:
 - .1 Description of plumbing specialties and accessories, giving manufacturers name, type, model, year, and capacity.
 - .2 Details of operation, servicing, and maintenance.
 - .3 Recommended spare parts list.

Part 2 Products

2.1 BACK FLOW PREVENTORS

- .1 The backflow preventor shall prevent backflow by either backpressure or back siphonage from a cross-connection between potable water lines and substances that are objectionable.
- .2 To CAN/CSA-B64.
- .3 Application: as indicated.

- .4 Reduced pressure principle type up to 50 mm (2") (RP):
Rated to 180°F and supplied with full port ball valves. The main body and access covers shall be bronze (ASTM B584), the seat ring and all internal polymers shall be NSF® Listed Noryl™ and the seat disc elastomers shall be SILICONE. The first and second check shall be orientated at a 45° angle up-wards and accessible for maintenance without removing the relief valve. Supplied with an air gap adapter.
 - .1 Acceptable materials:
Watts 009 ½" - 2"
Wilkins 975 XL ½" - 2"
Conbraco 40-200 Series

2.2 VACUUM BREAKERS

- .1 To CAN/CSA-B64 Series.
- .2 Atmospheric vacuum breaker (A-VB):
 - .1 Acceptable materials:
Watts 288A
Conbraco 38-103 Series
Wilkins 35
- .3 Hose connection vacuum breaker (HCVB):
 - .1 Acceptable materials:
Watts Series 8
Conbraco 38-304-AS
Wilkins BFP-8

2.3 PRESSURE REGULATORS

- .1 Capacity: as indicated.
 - .1 Inlet pressure: 1034 kPa (150 psi).
 - .2 Outlet pressure: 41 kPa (5.9 psi).
- .2 Up to NPS 40 mm (1 1/2") bronze bodies, screwed: to ASTM B62.
 - .1 Acceptable material:
Watts Series 25AUB (1/2" - 2")
- .3 NPS 50 mm (2") and over, semi-steel bodies, Class 125, flanged: to ASTM A126, Class [B].
 - .1 Acceptable materials:
Watts PV-10
Conbraco 36 Series
- .4 Semi-steel spring chambers with bronze trim.
 - .1 Acceptable materials:
Watts PV-10
Conbraco 36 Series

2.4 STRAINERS

- .1 860 kPa (125 psi), Y type with 20 mm (3/4") mesh, bronze or stainless steel removable screen.
- .2 NPS 50 mm (2") and under, bronze body, screwed ends, with brass cap.
 - .1 Acceptable materials:
Watts Series 777SI
Crane/Powers
Colton 125 YTB
Wilkins S Series
- .3 NPS 65 mm (2½") and over, cast iron body, flanged ends, with bolted cap.
 - .1 Acceptable materials:
Watts 77F-D (77F-D-FDA for water service)
Crane/Powers
Colton 125 YTB
Wilkins FS Series

2.5 SOLENOID VALVES

- .1 Two (2) way normally closed all bronze construction.
- .2 Voltage shall be suitable for controlling function.
- .3 Acceptable material:
Asco

2.6 OWNER SUPPLIED EQUIPMENT

- .1 The mechanical contractor shall supply and install all water, gas, condensate, and sanitary piping to the owner supplied equipment. Connection to equipment shall be by this contractor.
- .2 Provide flexible riser stops to all sinks and ball valves to all other equipment.
- .3 Provide backflow preventors on equipment required by the local plumbing inspector.
- .4 Provide flexible gas piping to all gas equipment.
- .5 All equipment in store equipment schedule will be supplied and set in place by Mechanical Contractor unless otherwise noted.
- .6 Coordinate all rough-ins and connection with the supplier on site.
- .7 Owner supplied equipment includes existing relocated equipment.

Part 3 Execution

3.1 INSTALLATION

- .1 Install in accordance with provincial codes, and local authority having jurisdiction.
- .2 Install in accordance with manufacturer's instructions and as specified.

3.2 BACK FLOW PREVENTORS

- .1 Install in accordance with CAN/CSA-B64 Series, where indicated and elsewhere as required by code.
- .2 Pipe discharge to terminate over nearest drain and or service sink.
- .3 Provide test results in manual and leave tag with test results on device.

3.3 STRAINERS

- .1 Install with sufficient room to remove basket.
- .2 Strainer size to match pipe size.

3.4 WATER MAKE-UP ASSEMBLY

- .1 Install with valved bypass.
- .2 Pipe discharge from relief valve to nearest floor drain.

3.5 COMMISSIONING

- .1 In context of this paragraph, "verify" to include "demonstrate" to Consultant.
- .2 Timing: commission only after start-up deficiencies rectified.
- .3 Access doors: verify size and location relative to items to be services.
- .4 Adjust to suit site conditions, including, but not necessarily limited to, following:
 - .1 Non-freeze wall, ground hydrants:
 - .1 Verify complete drainage.
 - .2 Verify operation of vacuum breaker.
 - .2 Water hammer arrestors:
 - .1 Verify accessibility.
 - .3 Backflow preventors, vacuum breakers:
 - .1 Verify installation of correct type to suit application.
 - .2 Adjust as necessary to ensure proper operation.
 - .3 Verify visibility of discharge.
 - .4 Pressure regulators:
 - .1 Adjust settings to suit installed locations, required flow rates.
 - .5 Hose bibbs, sediment faucets:
 - .1 Verify operation.
 - .6 Water make-up assembly:
 - .1 Verify operation.
 - .7 Water meters:
 - .1 Verify operation.
 - .8 Pipeline strainers:
 - .1 Verify accessibility of basket.
 - .2 Clean out during commissioning until system clean.

- .5 Commissioning reports:
 - .1 Record all results on approved report forms.
 - .2 Include signature of tester and supervisor.
 - .3 To be countersigned by Consultant.
- .6 Verification:
 - .1 Notify Consultant 48 h before commencing tests.
 - .2 All tests and procedures to be witnessed by Consultant.
 - .3 All reported results subject to verification by consultant.
- .7 Training:
 - .1 Train O&M personnel in start-up, operation, monitoring, servicing, maintenance and shut-down procedures.
- .8 Demonstrations:
 - .1 Demonstrate full compliance with Design Criteria.
 - .2 Demonstrations also to show completeness of O&M personnel training.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 ASTM A126, Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.
- .3 ASTM B62, Specification for Composition Bronze or Ounce Metal Castings.
- .4 CAN/CSA-B79, Commercial and Residential Drains and Cleanouts.

1.2 SUBMITTALS

- .1 Submit shop drawings and product data in accordance with general requirements.
- .2 For shop drawings, indicate dimensions, construction details and materials.
- .3 For product data, indicate dimensions, construction details and materials for all items specified herein.

1.3 MAINTENANCE DATA

- .1 Provide maintenance data for incorporation into manual specified in general requirements.
- .2 Data to include:
 - .1 Description of plumbing specialties and accessories, giving manufacturers name, type, model, year, and capacity.
 - .2 Details of operation, servicing, and maintenance.
 - .3 Recommended spare parts list.

Part 2 Products

2.1 FLOOR DRAINS

- .1 Floor drains and trench drains: to CAN/CSA-B79.
- .2 Refer to schedule on drawing.

2.2 CLEANOUTS

- .1 Cleanout plugs: heavy cast iron male ferrule with brass screws and threaded brass or bronze plug. Sealing-caulked lead seat or neoprene gasket.
- .2 Wall access: face or wall type, stainless steel round cover with flush head securing screws, bevelled edge frame complete with anchoring lugs.
 - .1 Acceptable material:
Zurn ZSS-1469
Mifab C1400-RD
Watts CO-480-RD-3
Jay R. Smith 4710

- .3 Floor access: rectangular, round, as indicated, cast iron body and frame with adjustable secured 15 mm (½") thick flush mounted heavy duty nickel bronze top and:
Plugs: bolted bronze with neoprene gasket.
 - .1 Cover for unfinished concrete floors: nickel bronze round, gasket, vandal-proof screws.
 - .1 Acceptable material:
Zurn ZN-1400 – HD or Zurn ZNX-1612
Mifab C1100-XR-6
Watts CO-200-RX-1-6
Jay R. Smith SQ-4-1753-XNBCO-SP-U
 - .2 Cover for terrazzo finish: round polished nickel bronze with recessed cover for filling with terrazzo, vandal-proof locking screws.
 - .1 Acceptable materials:
Zurn ZN-1400-Z
Mifab C1100-UR-6
Watts CO-200-U-1-6
Jay R. Smith SQ-4-1753-NBRT-SP-U
 - .3 Cover for VCT tile and linoleum floors: square polished nickel bronze with 15 mm (1/2") thick flush mounted heavy duty nickel bronze cover, complete with vandal-proof locking screws.
 - .1 Acceptable materials:
Zurn ZN-1400-T – HD
Mifab C1100-TS-6
Watts CO-200-TS-1-6
Jay R. Smith 4200-U
 - .4 Cover for ceramic tile floors: 15 mm (½") thick heavy duty nickel bronze square, cover complete with gasket, vandal-proof screws, for flush finish.
 - .1 Acceptable material:
Zurn ZN-1400 – T-HD or Zurn ZNX-1612
Mifab C1100-S-6
Watts CO-200-S-1-6
Jay R. Smith SQ-4-1753-NBCO-SP-U-Y
 - .5 Cover for carpeted floors: round polished nickel bronze with flush cover, complete with stainless steel carpet marker, vandal-proof locking screws.
 - .1 Acceptable materials:
Zurn ZN-1400-HD-CM or ZN-1612-CM
Mifab C1100C-S-1-6
Ancon CO-200-RC-1-6
Smith
Contour C3000RMNB

2.3 TRAP SEAL PRIMERS

- .1 All brass, with integral vacuum breaker, NPS 15 mm (1/2") solder ends, NPS 15 mm (1/2") drip line connection.
- .2 Acceptable materials:
Zurn Z-1022
Mifab
Watts MS-810
Jay R. Smith 2699

Part 3 Execution

3.1 INSTALLATION

- .1 Install in accordance with provincial codes, and local authority having jurisdiction.
- .2 Install in accordance with manufacturer's instructions and as specified.

3.2 CLEANOUTS

- .1 In addition to those required by code, and as indicated, install at base of all soil and waste stacks.
- .2 Bring cleanouts to wall or finished floor unless serviceable from below floor.
- .3 Building drain cleanout and stack base cleanouts: line size to maximum NPS 100 mm (4").

3.3 TRAP SEAL PRIMERS

- .1 Install for all floor, hub and trench drains and elsewhere, as indicated.
- .2 Install on cold water supply to nearest frequently used plumbing fixture, in concealed space, to approval of Consultant.
- .3 Install soft copper tubing to floor drains above grade and polyethylene piping to floor drains below grade.

3.4 COMMISSIONING

- .1 In context of this paragraph, "verify" to include "demonstrate" to Consultant.
- .2 Timing: commission only after start-up deficiencies rectified.
- .3 Access doors: verify size and location relative to items to be services.
- .4 Adjust to suit site conditions, including, but not necessarily limited to, following:
 - .1 Floor, hub, and trench drains:
 - .1 Verify proper operation of trap primer, flushing features.
 - .2 Verify security and removability of strainers.
 - .2 Cleanouts:
 - .1 Verify covers are gastight, secure, and easily removable.
 - .2 Verify that cleanout rods can probe as far as next cleanout.

- .3 Backwater valves:
 - .1 Verify accessibility of cover, valve.
- .4 Trap seal primers:
 - .1 Verify operation.
 - .2 Adjust flow rate to suit site conditions.
- .5 Acid dilution devices:
 - .1 Verify operation.
- .5 Commissioning reports:
 - .1 Record all results on approved report forms.
 - .2 Include signature of tester and supervisor.
 - .3 To be countersigned by Consultant.
- .6 Verification:
 - .1 Notify Consultant 48 h before commencing tests.
 - .2 All tests and procedures to be witnessed by Consultant.
 - .3 All reported results subject to verification by consultant.
- .7 Training:
 - .1 Train O&M personnel in start-up, operation, monitoring, servicing, maintenance, and shut-down procedures.
- .8 Demonstrations:
 - .1 Demonstrate full compliance with Design Criteria.
 - .2 Demonstrations also to show completeness of O&M personnel training.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 ASTM B32, Specification for Solder Metal.
- .3 ASTM B306, Specification for Copper Drainage Tube (DWV).
- .4 ASTM C564, Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
- .5 CAN/CSA-B70, Cast Iron Soil Pipe, Fittings and Means of Joining.
- .6 CAN/CSA-B125.3, Plumbing Fittings.

Part 2 Products

2.1 COPPER TUBE AND FITTINGS

- .1 Above ground sanitary, and vent, maximum 65 mm (2½") Type DWV copper to: ASTM B306.
 - .1 Fittings.
 - .1 Cast brass: to CAN/CSA B125.3.
 - .2 Wrought copper: to CAN/CSA B125.3.
 - .2 Solder: tin-lead, 50:50, to ASTM B32, type 50A.

2.2 CAST IRON PIPING AND FITTINGS

- .1 Above ground sanitary, and vent, minimum NPS 80 mm (3"), cast iron to: CAN/CSA-B70.
 - .1 Mechanical joints (vents)
 - .1 Neoprene or butyl rubber compression gaskets: to ASTM C564 or CAN/CSA-B70.
 - .2 Stainless steel clamps (2 band).
 - .2 Mechanical joints (sanitary)
 - .1 Heavy duty neoprene or butyl rubber compression gaskets to: ASTM C1540.
 - .2 Stainless steel clamps (4 band min).

2.3 VENT FLASHINGS

- .1 Thaler or equal spun aluminum complete with insulation, cap, and rubber gasket.

Part 3 Execution

3.1 INSTALLATION

- .1 Install in accordance with Provincial Plumbing Code and local authority having jurisdiction.
- .2 Install above ground piping parallel and close to walls and ceilings to conserve headroom and space, and to grade as indicated.
- .3 Place Cleanouts
 - .1 Where shown on Drawings and near bottom of each stack and riser.
 - .2 At every 90 degree change of direction for horizontal lines.
 - .3 Every 15 m (50') of horizontal run.
 - .4 Extend clean out to accessible surface. Do not place cleanouts in carpeted floors. In such locations, use wall type cleanouts.
- .4 Each fixture and appliance discharging water into sanitary sewer or building sewer lines shall have a seal trap in connection with a complete venting system so gases pass freely to atmosphere with no pressure or syphon condition on water seal.
- .5 Vent entire waste system to atmosphere.
 - .1 Discharge 500 mm (20") above roof. Join lines together in fewest practicable number before projecting above roof.
 - .2 Set back vent lines so they will not pierce roof near an edge or valley.
 - .3 Venting shall be 7.5 m (25'-0") from any outdoor air intakes.
 - .4 Provide copper vent piping through roof as per detail.
- .6 Use torque wrench to obtain proper tension in cinch bands when using hubless cast iron pipe. Butt ends of pipe against centering flange of coupling.
- .7 Flash pipes passing through roof with 453 g (16 oz) sheet copper flashing fitted snugly around pipes and caulk between flashing and pipe with flexible waterproof compound.
 - .1 Flashing base shall be at least 600 mm (24") square.
 - .2 Flashing may be a 24 kg/m² (5 lb/ft²) lead flashing fitted around pipes and turned down into pipe 15 mm (½") with turned edge hammered against pipe wall.
- .8 Before piping is covered, conduct tests in presence of Consultant and correct leaks or defective work. Conduct test prior to placing floor slab but after backfill is placed.
 - .1 Do not caulk threaded work.
 - .2 Fill waste and vent system to roof level [a minimum of 3,100 mm - (10')] with water and show no leaks for 2 hours.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 ASTM D2235, Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings.
- .3 ASTM D2564, Specification for Solvent Cements for Poly (Vinyl-Chloride) (PVC) Plastic Piping Systems.
- .4 CAN/CSA-B181.1, ABS Drain, Waste and Vent Pipe and Pipe Fittings.
- .5 CAN/CSA-B181.2, PVC and CPVC Drain, Waste and Vent Pipe and Pipe Fittings.
- .6 CAN/CSA-B182.1, Plastic Drain and Sewer Pipe and Pipe Fittings.

Part 2 Products

2.1 PIPING AND FITTINGS

- .1 Buried sanitary, and vent piping to:
 - .1 80 mm (3") and smaller: ABS drain waste and vent pipe to CAN/CSA-B181.1.
 - .2 100 mm (4") and larger: SDR-35 PVC drain waste and vent pipe to CAN/CSA-B181.2.
 - .3 Vent piping: any size, PVC-DWV plastic drain and sewer pipe and fittings CAN/CSA-B181.2.
- .2 Above grade sanitary and vent piping:
 - .1 80 mm (3") and smaller: IPEX: PVC-XFR drain waste and vent pipe to CAN/CSA-B181.2.
 - .2 100 mm (4") and larger: IPEX: PVC-XFR drain waste and vent pipe to CAN/CSA-B181.2.
 - .3 Vent piping: any size, IPEX: PVC-XFR plastic drain and sewer pipe and fittings CAN/CSA-B181.2.
- .3 Use plastic XFR – DWV in pipe chase for urinal piping to 1.5 M (5' –0") above finished floor.
- .4 Where piping pierces a fire separation an approved fire stop system to the approval of authority having jurisdiction shall be used.

2.2 JOINTS

- .1 Solvent weld for PVC: to ASTM D2564.
- .2 Solvent weld for ABS: to ASTM D2235.

2.3 EXPANSION

- .1 Provide solvent welded expansion joints as required by manufacturer's recommendations.

2.4 VENT FLASHINGS

- .1 Thaler Stack Jack spun aluminum complete with insulation, cap, and rubber gasket.

Part 3 Execution

3.1 INSTALLATION

- .1 Install in accordance with Provincial Plumbing Code and local authority having jurisdiction. Install in accordance with manufacturer's instructions.
- .2 Installation of underground pipe
 - .1 Provide all excavation, bedding, backfill, and compaction.
 - .2 Install materials in accordance with Manufacturer's instructions.
 - .3 Use jacks to make-up gasketed joints.
 - .4 Stabilize unstable trench bottoms.
 - .5 Bed pipe true to line and grade with continuous support from firm base.
 - .1 Bedding depth - 100 mm to 150 mm (4" to 6").
 - .2 Material and compaction to meet ASTM standard noted above.
 - .6 Excavate bell holes into bedding material so pipe is uniformly supported along its entire length. Blocking to grade pipe is forbidden.
 - .7 Trench width at top of pipe -
 - .1 Minimum 450 mm (18") or diameter of pipe plus 300 mm (12"), whichever is greater.
 - .2 Maximum - Outside diameter of pipe plus 600 mm (24").
 - .8 Piping and joints shall be clean and installed according to manufacturer's recommendations. Break down contaminated joints, clean seats and gaskets and reinstall.
 - .9 Do not use back hoe or power equipment to assemble pipe.
 - .10 Initial backfill shall be 300 mm (12") above top of pipe with material specified in referenced ASTM standard.
- .3 Place Cleanouts
 - .1 Where shown on Drawings and near bottom of each stack and riser.
 - .2 At every 90 degree change of direction for horizontal lines.
 - .3 Every 15 m (50 ft) of horizontal run.
 - .4 Extend clean out to accessible surface. Do not place cleanouts in carpeted floors. In such locations, use wall type cleanouts

- .4 Each fixture and appliance discharging water into sanitary sewer or building sewer lines shall have a seal trap in connection with a complete venting system so gases pass freely to atmosphere with no pressure or syphon condition on water seal.
- .5 Before piping is covered, conduct tests in presence of Consultant and correct leaks or defective work. Conduct test prior to placing floor slab but after backfill is placed.
 - .1 Fill waste and vent system a minimum of 1.8 m (6 ft) above finished floor with water and show no leaks for 2 hours.
 - .2 Conduct ball test in presence of consultant to ensure proper grade and clear of obstructions.
- .6 Install solvent welded expansion joints as per manufacturer's recommendation. Care is to taken to accommodate ambient temperatures at time of install.
- .7 Vent entire waste system to atmosphere.
 - .1 Discharge 350 mm (14") above roof. Join lines together in fewest practicable number before projecting above roof.
 - .2 Set back vent lines so they will not pierce roof near an edge or valley.
 - .3 Venting shall be 7.5 m (25'-0") from any outdoor air intakes.
- .8 Install above ground piping parallel and close to walls and ceilings to conserve headroom and space, and to grade as indicated.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

- .1 Conform to Sections of Division 1 and to General Mechanical Requirements Section.

1.2 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 Perform work in accordance with the recommendations of and the requirements of:
 - .1 Local and district bylaws and regulations.
 - .2 N.F.P.A.14 "Installation of Standpipe and Hose Systems".
 - .3 The Ontario Building Code.
 - .4 U.L.C. or Factory Mutual approval for hose, valve, and extinguisher requirements.
 - .5 N.F.P.A.10 "Standard for Portable Fire Extinguishers".
 - .6 The Ontario Fire Code.

1.3 SUBMITTALS

- .1 Submit shop drawings and maintenance data in accordance with general requirements.

1.4 COORDINATION

- .1 Confirm fire extinguisher cabinet locations and quantities from both architectural and mechanical drawings and report any discrepancies to consultant prior to bid close.
- .2 Coordinate location of cabinet with other trades and provide protection against damage during construction.

Part 2 Products

2.1 MULTI-PURPOSE DRY CHEMICAL EXTINGUISHERS (CLASS ABC)

- .1 Stored pressure rechargeable type with hose and shut off nozzle, ULC labelled for A, B and C class protection as indicated. Size of extinguishers shall be as follows:
 - .1 Corridor/Gym/Finished Areas 5 lb ABC rating complete with cabinet
 - .2 Acceptable materials:
 - .1 Wilson & Cousins
 - .2 National

2.2 IDENTIFICATION

- .1 Identify extinguishers in accordance with recommendations of NFPA 10.
- .2 Attach tag or label to extinguishers indicating month and year of installation and provide space for the addition of recording service dates.

Part 3 Execution

3.1 INSTALLATION

- .1 Provide portable fire extinguisher cabinets and mount in wall during construction. Cabinet to be surface or recessed mounted as indicated on the drawings. Install cabinets so that the door will not obstruct normal traffic when open.
- .2 Hang extinguishers in cabinets with wall mounting bracket.
- .3 Prior to installing the extinguisher cabinets, confirm the mounting height and exact location with the Consultant. Mount extinguisher so top of unit is not more than 1.5 m (5').
- .4 Install wall mounted fire extinguishers complete with wall mounting bracket where indicated and/or directed on site by consultant.
- .5 Caulk perimeter of fire extinguisher cabinets after acceptance.

3.2 TESTS

- .1 Fire protection equipment shall be tested to the requirements of NFPA10, NFPA13, NFPA14 and comply with the requirements of the authorities having jurisdiction.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 Canadian General Standards Board (CGSB)
 - .1 ASTM C553, Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
 - .2 CAN/ULC-S702, Mineral Fiber Thermal Insulation for Buildings.
 - .3 ASTM C612, Mineral Fiber Block and Board Thermal Insulation.
 - .4 CGSB 51-GP-52Ma-[89], Vapour Barrier Jacket and Facing Material for Pipe, Duct and Equipment Thermal Insulation.
- .3 Underwriters Laboratories of Canada (ULC).
 - .1 CAN/ULC-S102, Surface Burning Characteristics of Building Materials and Assemblies.
- .4 American Society for Testing and Materials (ASTM).
 - .1 ASTM C177 Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Mean of the Guarded Hot-Plate Apparatus.
 - .2 ASTM C518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
 - .3 ASTM C 449M, Standard Specification for Mineral Fiber-Hydraulic-Setting Thermal Insulating and Finishing Cement.
 - .4 ASTM C1729 Standard Specification for Aluminum Jacketing for Insulation.
 - .5 ASTM C1290 Standard Specification for Flexible Fibrous Glass Blanket Insulation Used to Externally Insulate HVAC Ducts.
 - .6 ASTM C1393 Standard Specification for Perpendicularly Oriented Mineral Fiber Roll and Sheet Thermal Insulation for Pipes and Tanks.
- .5 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE).
 - .1 ASHRAE Standard 90.1.
- .6 Manufacturer's Trade Associations.
 - .1 Thermal Insulation Association of Canada (TIAC)
 - .2 North American Commercial and Industrial Insulation Standards.

1.2 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with general requirements.
- .2 Submit for approval manufacturer's catalogue literature related to installation, fabrication for duct jointing recommendations.
- .3 Submit completed detail plates from the North American Commercial and Industrial Insulation Standards manual, applicable to installation types required by this specification section.

1.3 INSTALLATION INSTRUCTIONS

- .1 Submit manufacturer's installation instructions in accordance with general requirements.
- .2 Installation instructions to include procedures to be used, installation standards to be achieved.

1.4 QUALIFICATIONS

- .1 Installer to have successfully completed apprenticeship program.
- .2 Installer to be specialist in performing work of this section and have at least 3 years successful experience in this size and type of project, qualified to standards of TIAC.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver materials to site in original factory packaging, labeled with manufacturer's name, address.
- .2 Protect from weather and construction traffic.
- .3 Protect against damage from any source.
- .4 Store at temperatures and conditions required by manufacturer.

1.6 DEFINITIONS

- .1 For purposes of this section:
 - .1 "CONCEALED" - insulated mechanical services and equipment in suspended ceilings and non-accessible chases and furred-in spaces.
 - .2 "EXPOSED" - will mean "not concealed" as defined herein.
- .2 Insulation systems - insulation material, fasteners, jackets, and other accessories.

1.7 QUALITY ASSURANCE

- .1 Products shall not contain formaldehyde, asbestos, lead, mercury or mercury compounds or PBDE fire retardants.

Part 2

Products

2.1 LIMITATION ON MATERIALS

- .1 Products shall not contain formaldehyde, asbestos, lead, mercury or mercury compounds or PBDE fire retardants.

2.2 FIRE AND SMOKE RATING

- .1 In accordance with CAN/ULC S102:
 - .1 Maximum flame spread rating: 25.
 - .2 Maximum smoke developed rating: 50.

2.3 INSULATION

- .1 Mineral fibre as specified herein includes glass fibre, rock wool, slag wool.
- .2 Thermal conductivity ("k" factor) not to exceed specified values at 24°C (75°F) mean temperature when tested in accordance with ASTM C177 or ASTM C518.
- .3 Type C-1: Rigid mineral fibre board to ASTM C612, with factory applied vapour retarder jacket meeting the requirement of ASTM C1136 Type II and IV (FSK):
 - .1 Jacket: to ASTM C1136 Type II and IV (FSK)
 - .2 Maximum "k" value: .033 W/M•°C (.23 BTU•IN/HR•FT²•°F)

2.4 ACCESSORIES

- .1 Vapour retarder lap adhesive:
 - .1 Water based, fire retardant type, compatible with insulation.
- .2 Indoor Vapour Retarder Finish:
 - .1 Compatible with insulation.
- .3 Insulating Cement: hydraulic setting on mineral wool, to ASTM C 449.
- .4 ULC Listed Canvas Jacket:
 - .1 220 g/m² (6oz/yd²) cotton, plain weave, treated with dilute fire retardant lagging adhesive to ASTM C 921.
- .5 Tape: self-adhesive, aluminum, reinforced, 75 mm (3") wide minimum.
- .6 Contact adhesive: quick-setting Childers CP-82 or equal.
- .7 Canvas adhesive: washable.
- .8 Tie wire: 1.5 mm (16 gauge) stainless steel.
- .9 Facing: 25 mm (1") stainless steel hexagonal wire mesh stitched on one face of insulation
- .10 Fasteners: weld pins, length to suit insulation, with 40 mm (1½") diameter clips.

Part 3 Execution

3.1 PRE-INSTALLATION REQUIREMENTS

- .1 Pressure testing of ductwork systems to be complete, witnessed, and certified.
- .2 Surfaces to be clean, dry, free from foreign material.

3.2 INSTALLATION

- .1 Install in accordance with North American Commercial and Industrial Insulation Standards.
- .2 Apply materials in accordance with manufacturers instructions and this specification.
- .3 Maintain uninterrupted continuity and integrity of vapour retarder jacket and finishes.
 - .1 Hangers, supports to be outside vapour retarder jacket.
- .4 Supports, Hangers in accordance with general requirements.
 - .1 Apply high compressive strength insulation where insulation may be compressed by weight of ductwork.
- .5 Fasteners: At 300 mm (12") oc. in horizontal and vertical directions, minimum two rows each side.
- .6 Provide rigid insulation for exposed ductwork.

3.3 DUCTWORK INSULATION SCHEDULE

- .1 Insulation types and thicknesses conform to following table:

<u>Application</u>	<u>Type</u>	<u>Thickness</u>
Supply, return and fan exhaust ducts exposed (visible) in space being served	none	
Exhaust plenums dampers and louvres	C-1	25 mm (1")
Interior acoustically lined ducts	none	
Last 1.5m of Exhaust duct	C-1	25 mm (1")

- .2 Exposed round ducts 600 mm (24") and larger, smaller sizes where subject to abuse:
 - .1 Use TIAC code C-1 insulation, scored to suit diameter of duct or type C-6.
- .3 Finishes: Conform to following table:

<u>Application</u>	<u>Rectangular</u>	<u>Round</u>
Indoor, concealed	none	none

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.53, Poly (Vinyl Chloride) Jacketing Sheet, for Insulating Pipes, Vessels, and Round Ducts.
- .3 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102, Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
- .4 American Society for Testing and Materials (ASTM)
 - .1 ASTM C547, Type I and IV Standard Specification for Mineral Fiber Pipe Insulation.
 - .2 ASTM C177, Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
 - .3 ASTM C518, Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus to recognize the correct thermal insulation performance testing for blanket.
 - .4 ASTM C1393, Standard Specification for Perpendicularly Oriented Mineral Fiber Roll and Sheet Thermal Insulation for Pipes and Tanks
 - .5 ASTM C1695, Standard Specification for Fabrication of Flexible Removable and Reusable Blanket Insulation for Hot Service.
 - .6 ASTM C 335, Test Method for Steady State Heat Transfer Properties of Pipe Insulation.
 - .7 ASTM C 921, Practice for Determining the Properties Jacketing Materials for Thermal Insulation.
 - .8 ASTM C1729 Standard Specification for Aluminium Jacketing for Insulation.
 - .9 ASTM C553, Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
 - .10 CGSB 51-GP-52Ma, Vapour Barrier Jacket and Facing Material for Pipe, Duct and Equipment Thermal Insulation.
- .5 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE).
 - .1 ASHRAE Standard 90.1.
- .6 Manufacturer's Trade Associations
 - .1 Thermal Insulation Association of Canada (TIAC)
 - .2 North American Commercial and Industrial Insulation Standards

1.2 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with general requirements.
- .2 Submit properly completed detail plates from the North American Commercial and Industrial Insulation Standards manual, applicable to installation types required by this specific section.
- .3 Submit for approval manufacturer's catalogue literature related to installation, fabrication for pipe, fittings, valves, and jointing recommendations.

1.3 INSTALLATION INSTRUCTIONS

- .1 Submit manufacturer's installation instructions in accordance with general requirements.
- .2 Installation instructions to include procedures to be used, installation standards to be achieved.

1.4 QUALIFICATIONS

- .1 Installer to have successfully completed apprenticeship program.
- .2 Installer to be specialist in performing work of this section and have at least 3 years successful experience in this size and type of project, qualified to standards of TIAC.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .2 Protect from weather, construction traffic.
- .3 Protect against damage from any source.
- .4 Store at temperatures and conditions required by manufacturer.

1.6 DEFINITIONS

- .1 For purposes of this section:
 - .1 "CONCEALED" - insulated mechanical services in suspended ceilings and non-accessible chases and furred-in spaces.
 - .2 "EXPOSED" - will mean "not concealed" as defined herein.
 - .3 "PVC" – Poly Vinyl Chloride – polymer used to manufacture a non-metallic final protective finish jacket over insulation systems.

1.7 QUALITY ASSURANCE

- .1 Products shall not contain formaldehyde, asbestos, lead, mercury or mercury compounds or PBDE fire retardants.

Part 2

Products

2.1 MATERIAL LIMITATIONS

- .1 Products shall not contain formaldehyde, asbestos, lead, mercury or mercury compounds or PBDE fire retardants.

2.2 FIRE AND SMOKE RATING

- .1 In accordance with CAN/ULC-S102:
 - .1 Maximum flame spread rating: 25.
 - .2 Maximum smoke developed rating: 50.

2.3 INSULATION

- .1 Mineral fibre as specified herein includes glass fibre, rock wool, slag wool.
- .2 Thermal conductivity ("k" factor) not to exceed specified values at 24°C (75°F) mean temperature when tested in accordance with ASTM C335, ASTM C177 or ASTM C518.
- .3 Type A-1: Rigid moulded or wound mineral fibre with factory applied vapour retarder jacket.
 - .1 Mineral fibre: to ASTM C547 Type I and IV.
 - .2 Jacket: to ASTM C1136, Type I, II, III, IV, X.
 - .3 Maximum "k" factor: to ASTM C547.
- .4 Type A-3: Tubular flexible elastomeric closed cell foam:
 - .1 Insulation to ASTM C534 Type I.
 - .2 Maximum "k" factor: to ASTM C534.
 - .3 To be certified by manufacturer to be free of potential stress corrosion cracking corrodents.

2.4 INSULATION SECUREMENT

- .1 Tape: Self-adhesive, aluminum, reinforced, 50 mm (2") wide minimum.
- .2 Contact adhesive: Quick setting.
- .3 Canvas adhesive: Washable.

2.5 CEMENT

- .1 Thermal insulating and finishing cement:
 - .1 Air drying on mineral wool, to ASTM C 449M.
 - .2 Hydraulic setting on mineral wool, to ASTM C165

2.6 VAPOUR RETARDER LAP ADHESIVE

- .1 Water based, fire retardant type, compatible with insulation.

2.7 INDOOR VAPOUR RETARDER FINISH

- .1 Compatible with insulation.

2.8 OUTDOOR VAPOUR RETARDER FINISH

- .1 Compatible with insulation.
- .2 Reinforcing fabric: Open weave fibreglass fabric, with maximum weave of 10 x 10 squares per inch.

2.9 JACKETS

- .1 Polyvinyl Chloride (PVC):
 - .1 Minimum thickness: 20mil (0.020")
 - .2 One-piece moulded type [and sheet] to CAN/CGSB-51.53 with pre-formed shapes as required.
 - .3 Colours: white.
 - .4 Minimum service temperatures: -29°C (-20°F).
 - .5 Maximum service temperature: 65°C (150°F).
 - .6 Moisture vapour transmission: 0.05 perm.
 - .7 Fastenings:
 - .1 Use solvent weld adhesive compatible with insulation to seal laps and joints.
 - .2 Tacks (not to be used on below-ambient temperature systems)
 - .3 Pressure sensitive vinyl tape of matching colour.
- .2 Aluminum:
 - .1 To ASTM C1729.
 - .2 Thickness: 0.50 mm (0.020") sheet.
 - .3 Finish: Smooth.
 - .4 Joining: Longitudinal and circumferential slip joints with 50 mm (2") laps.
 - .5 Fittings: 0.50 mm (0.020") thick die-shaped fitting covers with factory-attached protective liner.
 - .6 Metal jacket banding and mechanical seals: stainless steel, 20 mm (3/4") wide, 0.50 mm (0.020") thick at 300 mm (12") spacing.

2.10 CAULKING FOR JACKETS

- .1 Caulking: Silicone clear caulking.

Part 3 Execution

3.1 PRE-INSTALLATION REQUIREMENT

- .1 Pressure testing of piping systems and adjacent equipment to be complete, witnessed, and certified.
- .2 Surfaces to be clean, dry, free from foreign material.

3.2 INSTALLATION

- .1 Install in accordance with North American Commercial and Industrial Insulation Standards.
- .2 Provide continuous insulation for complete systems including all valves, air separators, fittings, and other equipment.
- .3 Apply materials in accordance with manufacturers' instructions and this specification.
- .4 Maintain uninterrupted continuity and integrity of vapour retarder jacket and finishes.
 - .1 Hangers, supports to be outside vapour retarder jacket.
- .5 Supports, Hangers:
 - .1 Apply high compressive strength insulation, suitable for service, at oversized saddles and shoes where insulation saddles have not been provided.

3.3 REMOVABLE, PREFABRICATED, INSULATION AND ENCLOSURES

- .1 Application: At expansion joints, valves, primary flow measuring elements, flanges, and unions at equipment.
- .2 Flexible removable insulation covers are not acceptable for below-ambient (cold) operation piping systems. Rigid removable insulation jackets that are vapor retarder exterior material that can be vapor sealed at the seams, are acceptable on below-ambient (cold) operation piping systems.
- .3 Insulation:
 - .1 Insulation, fastenings, and finishes: same as system.
 - .2 Jacket: As per adjacent insulation.

3.4 PIPING INSULATION SCHEDULES

- .1 Includes valves, valve bonnets, strainers, flanges, air separators, and fittings unless otherwise specified.
- .2 Install insulator and jackets to applicable TIAC codes.
- .3 Insulate ends of capped piping with type and thickness indicated for capped service.

.4 Thickness of insulation to be as listed in following table.

.1 Do not insulate exposed runouts to plumbing fixtures, chrome plated piping, valves, fittings.

Application	Type	Pipe sizes through (NPS) and insulation thickness mm (")				
		to 25 (1")	32 (1¼") 40 (1½")	50 (2") 80 (3")	105 (4") 150 (6")	200 (8") & over
Condensate	A-1	40 (1½")	40 (1½")	50 (2")	50 (2")	50 (2")
Hot Water Heating	A-1	40 (1½")	50 (2")	50 (2")	50 (2")	50 (2")
Refrigerant piping	A-3	25 (1")	25 (1")	25 (1")	25 (1")	25 (1")

.5 Finishes: Conform to the following table:

Application	Piping	Valves & Fittings
Exposed indoors	PVC	PVC
Concealed indoors	N/A	PVC
Exterior refrigerant piping	Aluminum	Aluminum

.6 Connection: To appropriate TIAC code.

.7 Finish attachments: SS bands, @ 150 mm (6") oc. seals: closed.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 Canadian Standards Association (CSA).
 - .1 CSA B51, Boiler, Pressure Vessel, and Pressure Piping Code.
- .3 American Society for Testing and Materials (ASTM).
 - .1 ASTM A47/A47M, Specification for Ferritic Malleable Iron Castings.
 - .2 ASTM A278/A278M, Specification for Gray Iron Castings for Pressure-Containing Parts for Temperatures up to 650°F (350°C).
 - .3 ASTM A516/A516M, Specification for Pressure Vessel Plates, Carbon Steel, for Moderate - and Lower - Temperature Service.
 - .4 ASTM A536, Specification for Ductile Iron Castings.
 - .5 ASTM B62, Specification for Composition Bronze or Ounce Metal Castings.
- .4 American Society of Mechanical Engineers (ASME).
 - .1 ANSI/ASME, Boiler and Pressure Vessels Code (BPVC).

1.2 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with general requirements.
- .2 Indicate on manufacturers' catalogue literature the following:
 - .1 Sizes, orientation, capacities, performance, etc.
 - .2 Accessories

1.3 CLOSEOUT SUBMITTALS

- .1 Provide maintenance data for incorporation into manual specified in general requirements.

Part 2 Products

2.1 PIPE LINE STRAINER

- .1 NPS 15 mm to 50 mm (1/2" to 2"): bronze body to ASTM B62, screwed connections.
- .2 NPS 65 mm to 300 mm (2 1/2" to 12"): cast steel body to ASTM A278M, Class 30, flanged connections.
- .3 NPS 50 mm to 300 mm (2" to 12"): T type with malleable iron body to ASTM A47M, grooved ends.
- .4 Blowdown connection: NPS 25 mm (1").
- .5 Screen: stainless steel with 1.19 mm (50 mil) perforations.
- .6 Working pressure: 860 kPa (125 psi).

Part 3 Execution

3.1 GENERAL

- .1 Install as indicated and to manufacturer's recommendations.
- .2 Run drain lines (and blow off connections) to terminate above nearest drain.
- .3 Maintain proper clearance to permit service and maintenance.
- .4 Should deviations beyond allowable clearances arise, request and follow Consultant's directive.
- .5 Check shop drawings for conformance of all tapings for ancillaries and for equipment operating weights.

3.2 STRAINERS

- .1 Install in horizontal or down flow lines.
- .2 Ensure clearance for removal of basket.
- .3 Install ahead of each pump.
- .4 Install ahead of each automatic control valve and as indicated.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 Canadian Standards Association (CSA).
 - .1 CSA W47.1, Certification of Companies for Fusion Welding of Steel.
- .3 American National Standards Institute (ANSI).
 - .1 ANSI/ASME B16.1, Gray Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250 and 800.
 - .2 ANSI/ASME B16.3, Malleable-Iron Threaded Fittings, Classes 150 and 300.
- .4 American Society for Testing and Materials (ASTM).
 - .1 ASTM A47/A47M, Specification for Ferritic Malleable Iron Castings.
 - .2 ASTM A53/A53M, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless.
 - .3 ASTM A536, Specification for Ductile Iron Castings.
 - .4 ASTM B61, Specification for Steam or Valve Bronze Castings.
 - .5 ASTM B62, Specification for Composition Bronze or Ounce Metal Castings.
- .5 Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS).
 - .1 MSS-SP-67, Butterfly Valves.
 - .2 MSS-SP-70, Cast Iron Gate Valves, Flanged and Threaded Ends.
 - .3 MSS-SP-71, Cast Iron Swing Check Valves, Flanged and Threaded Ends.
 - .4 MSS-SP-80, Bronze Gate, Globe, Angle and Check Valves.
 - .5 MSS-SP-85, Cast Iron Globe and Angle Valves, Flanged and Threaded Ends.

1.2 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with general requirements.
- .2 Indicate on manufacturers' catalogue literature the following:
 - .1 Piping
 - .2 Valves
 - .3 Accessories

1.3 CLOSEOUT SUBMITTALS

- .1 Provide maintenance data for incorporation into manual specified in general requirements.

Part 2

Products

2.1

STEEL PIPE

- .1 Steel pipe: to ASTM A53/A53M, Grade B, as follows:
 - .1 NPS 40 mm (1.5") and larger: Victaulic.
- .2 Final connection to copper heating elements.
 - .1 Type "L" copper with 95/5 solder joints and dielectric couplings. Maximum length 600 mm (24").
- .3 Pipe Joints
 - .1 NPS 40 mm (1.5") and larger: Victaulic.
 - .2 NPS 65 mm (2½") and over: welding fittings and flanges to CSA W47.1.
 - .3 Flanges: plain or raised face, slip-on.
 - .4 Flange gaskets: suitable for hydronic heating up to 110°C (220°F).
 - .5 Pipe thread: taper.
 - .6 Bolts and nuts: to ANSI B18.2.1 and ANSI/ASME B18.2.2.
- .4 Fittings
 - .1 Screwed fittings: malleable iron, to ANSI/ASME B16.3, Class 150.
 - .2 Pipe flanges and flanged fittings:
 - .1 Cast iron: to ANSI/ASME B16.1, Class 125.
 - .2 Steel: to ANSI/ASME B16.5.
 - .3 Butt-welding fittings: steel, to ANSI/ASME B16.9.
 - .4 Unions: malleable iron, to ASTM A47/A47M and ANSI/ASME B16.3.

2.2

VALVES

- .1 Connections:
 - .1 NPS 40 mm (1.5") and larger: Victaulic.
 - .2 NPS 50 mm (2") and smaller: screwed ends.
 - .3 NPS 65 mm (2 ½") and larger: flanged ends.
- .2 Gate valves: Application: Isolating equipment, control valves, pipelines:
 - .1 NPS 50 mm (2") and under:
 - .1 Mechanical Rooms: Class 125, rising stem, solid wedge disc.
 - .2 Elsewhere: Class 125, non-rising stem, solid wedge disc.

- .2 NPS 65 mm (2 1/2") and over:
 - .1 Mechanical Rooms:
 - .1 Rising stem, solid wedge disc, bronze trim.
 - .1 Operators: handwheel.
 - .2 Non-rising stem, solid wedge disc, bronze trim.
 - .1 Operators: handwheel.
- .3 Butterfly valves: Application: Isolating each cell or section of multiple component equipment and where indicated.
 - .1 NPS 40 mm (1.5") and larger: Victaulic
 - .2 NPS 50 mm (2") and smaller: screwed ends.
 - .3 NPS 65 mm (2 1/2") and over: Flanged ends.
- .4 Globe valves: Application: Throttling, flow control, emergency bypass:
 - .1 NPS 32 mm (1 1/4") and under:
 - .1 With PTFE disc, as specified. Bronze.
 - .2 NPS 65 mm (2 1/2") and over:
 - .1 With solid bronze disc, bronze trim, cast iron body.
- .5 Drain valves: Gate, Class 125, non-rising stem, solid wedge disc, with chain and cap.
- .6 Swing check valves:
 - .1 NPS 32 mm (1 1/4") and under:
 - .1 Class 150, swing, with PTFE disc, as specified. Bronze. Jenkins 4475TJ.
 - .2 NPS 65 mm (2 1/2") and over:
 - .1 Flanged or Grooved ends, Bronze trim, Cast Iron: Gate, Globe, Check.
- .7 Ball valves:
 - .1 NPS 80 mm (3") and under:
 - .1 Body and cap: cast high tensile bronze to ASTM B62.
 - .2 Pressure rating: Class 125, 860 kPa (125 psi) steam, WP = 1.4 MPa (203 psi) WOG.
 - .3 Connections:
 - .1 NPS 32mm (1 ¼") and below
 - .2 NPS 65 mm (2½") and over flanged or grooved ends.
 - .4 Stem: stainless steel tamperproof ball drive.
 - .5 Ball and seat: replaceable stainless steel solid ball and teflon seats.
 - .6 Operator: removable lever handle.
 - .7 Extended handles on chilled water valves.
 - .8 Full port.

.8 All valves shall be of commercial grade and of same manufacturer.

.9 Acceptable Manufacturers:

- .1 Newman Hattersley Canada Ltd.
- .2 Jenkins/Crane
- .3 Milwaukee
- .4 Toyo
- .5 Kitz

2.3 BALANCING VALVES

- .1 Size 15 mm (1/2") to 32 mm (1 1/4"): Bronze body, brass ball, NPT connections and variable orifice.
- .2 Size 65 mm (2 1/2") to larger: Cast iron body, raised flange connections, glove style with brass plug.
- .3 Differential pressure readout ports with internal EPT inserts and check valves, 6 mm (1/4") NPT tapped drain/purge ports, memory stop and calibrated nameplate.
- .4 Acceptable materials:
 - .1 Bell & Gossett Circuit Setters
 - .2 Armstrong
 - .3 Taco
 - .4 Tour & Anderson
 - .5 Oventrop

2.4 AUTOMATIC AIR VENT

- .1 Industrial float vent: cast iron body and NPS 15 mm (1/2") connection and rated at 860 kpa (125 psi) working pressure.
- .2 Float: solid material suitable for 115°C (240°F) working temperature.
- .3 Plastic vents are not acceptable.
- .4 Acceptable materials:
 - .1 Maid-O-Mist No. 67
 - .2 Spirax Sarco

2.5 PIPING INSTALLATION

- .1 Installation shall be by a licensed pipe fitter.
- .2 Connect to equipment in accordance with manufacturer's instruction unless otherwise indicated.
- .3 Install concealed pipes close to building structure to keep furring space to minimum. Install to conserve headroom and space. Run exposed piping parallel to walls. Group piping wherever practical.

- .4 Slope piping in direction of drainage and for positive venting.
- .5 Use eccentric reducers at pipe size change installed to provide positive drainage or positive venting.
- .6 Provide clearance for installation of insulation and access for maintenance of equipment, valves, and fittings.
- .7 Ream pipes, clean scale, and dirt, inside and outside, before and after assembly.
- .8 Assemble piping using fittings manufactured to ANSI standards.
- .9 Saddle type branch fittings may be used on mains if branch line is no larger than half the size of main. Hole saw or drill and ream main to maintain full inside diameter of branch line prior to welding saddle.

2.6 VALVE INSTALLATION

- .1 Install rising stem valves in upright position with stem above horizontal.
- .2 Install butterfly valves on chilled water and condenser water lines only.
- .3 Install gate or ball valves at branch take-offs and to isolate each piece of equipment, and as indicated.
- .4 Install globe valves for balancing and in by-pass around control valves as indicated.
- .5 Provide silent check valves on discharge of pumps and in vertical pipes with downward flow and as indicated.
- .6 Provide swing check valves in horizontal lines as indicated.
- .7 Install chain operators on valves NPS 65 mm (2½") and over where installed more than 2400 mm (96") above floor in Boiler Rooms and Mechanical Equipment Rooms.
- .8 Provide ball valves for glycol service.

2.7 AIR VENTS

- .1 Install at high points of systems.
- .2 Install ball valve on automatic air vent inlet.
- .3 Extend vent lines in Mechanical Room with screwdriver stop at 1.8 m AFF.

2.8 CIRCUIT BALANCING VALVES

- .1 Install flow measuring stations and flow balancing valves as indicated.
 - .1 On return side of all heating devices (convectors, panels, force flows, radiation, coils, etc.).
 - .2 On return side of all water or glycol cooling coils.
 - .3 On return side of all reverse return piping loops and/or branch circuits.
- .2 Install to manufacturers requirements.

- .3 Minimum valve size shall be one pipe size smaller than piping or 20 mm ($\frac{3}{4}$ "), whichever is larger.
- .4 Refer to Testing Adjusting and Balancing Section for applicable procedures.

2.9 FILLING OF SYSTEM

- .1 Refill system with clean water adding water treatment as specified.
- .2 Coordinate filling of system with HVAC water treatment contractor.

2.10 TESTING

- .1 Test system in accordance with Mechanical General Requirements Section.
- .2 For glycol systems, retest with propylene glycol to ASTM E202, inhibited, for use in building system after cleaning. Repair any leaking joints, fittings or valves.

2.11 FLUSHING AND CLEANING

- .1 Scope:
 - .1 Flush new piping only.
- .2 Refer to Water Treatment Section

2.12 EXISTING SYSTEM DISPOSAL

- .1 Disposal of existing system shall be to the requirements of the local and/or provincial regulations.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 ANSI/ASME B16.22, Wrought Copper Alloy and Copper Alloy Solder - Joint Pressure Fittings: Classes 150, 300, 600, 900, 1500, and 2500.
- .3 ANSI/ASME B16.24, Cast Copper Pipe Flanges and Flanged Fittings.
- .4 ANSI/ASME B16.26, Cast Copper Alloy Fittings for Flared Copper Tubes.
- .5 ANSI/ASME B31.5, Refrigeration Piping and Heating Transfer Components.
- .6 ASTM A307, Specification for Carbon Steel Bolts and Studs, 413.5 mPa (60,000 psi) Tensile Strength.
- .7 ASTM B280, Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.
- .8 CSA B52, Mechanical Refrigeration Code.
- .9 EPS 1/RA/2, Environmental Code of Practice for Elimination of Fluorocarbon Emissions from Refrigeration and Air Conditioning Systems.

Part 2 Products

2.1 TUBING

- .1 Processed for refrigeration installations, deoxidized, dehydrated, and sealed.
 - .1 Hard copper: to ASTM B280, type ACR-B.

2.2 FITTINGS

- .1 Service: design pressure 2070 kPa (300 psi) and temperature 121°C (250°F).
- .2 Brazed:
 - .1 Fittings: wrought copper to ANSI/ASME B16.22.
 - .2 Joints: silver solder, 45% Ag-15% Cu or copper-phosphorous, 95% Cu-5%P and non-corrosive flux.
- .3 Flanged:
 - .1 Bronze or brass, to ANSI/ASME B16.24, Class 150 and Class 300.
 - .2 Gaskets: suitable for service.
 - .3 Bolts, nuts, and washers: to ASTM A307, heavy series.
- .4 Flared:
 - .1 Bronze or brass, for refrigeration, to ANSI/ASME 16.26.

2.3 PIPE SLEEVES

- .1 Hard copper or steel, sized to provide 6 mm (1/4") clearance all around between sleeve and uninsulated pipe or between sleeve and insulation.

2.4 VALVES

- .1 22 mm (7/8") and under: Class 500, 3.5 MPa (500 psi), globe or angle non-directional type, diaphragm, packless type, with forged brass body and bonnet, moisture proof seal for below freezing applications, brazed connections.
- .2 Over 22 mm (7/8"): Class 375, 2.5 MPa (375 psi), globe or angle type, diaphragm, packless type, back-seating, cap seal, with cast bronze body and bonnet, moisture proof seal for below freezing applications, brazed connections.

2.5 FILTER-DRIER

- .1 On lines 20 mm (3/4") outside diameter and larger, filter-drier shall be replaceable core type with Schraeder type valve.
- .2 On lines smaller than 20 mm (3/4") outside diameter, filter-drier shall be sealed type using flared copper fittings.
- .3 Size shall be full line size.
- .4 Approved manufacturers:
 - .1 Mueller
 - .2 Parker
 - .3 Sporlan
 - .4 Virginia

2.6 SIGHT GLASS

- .1 Combination moisture and liquid indicator with protection cap.
- .2 Sight glass shall be full line size.
- .3 Sight glass connections shall be solid copper or brass, no copper-coated steel sight glasses allowed.
- .4 Approved manufacturers:
 - .1 Mueller
 - .2 Henry
 - .3 Parker
 - .4 Superior

2.7 SUCTION LINE TRAP

- .1 Manufactured standard one-piece traps.

2.8 EXPANSION VALVES

- .1 For pressure type distributors, externally equalized with stainless steel diaphragm, and same refrigerant in thermostatic elements as in system.
- .2 Size valves to provide full rated capacity of cooling coil served. Co-ordinate selection with evaporator coil and condensing unit.
- .3 Approved manufacturers:
 - .1 Henry
 - .2 Mueller
 - .3 Parker
 - .4 Sporlan

2.9 FLEXIBLE CONNECTORS

- .1 Designed for refrigerant service with bronze seamless corrugated hose and bronze braiding.
- .2 Approved manufacturers:
 - .1 Anaconda “Vibration Eliminators” by Anamet
 - .2 Vibration Absorber Model VAF by Packless Industries
 - .3 Vibration Absorbers by Superior Valve Co
 - .4 Style “BF” Spring-flex freon connectors by Vibration Mountings.

2.10 ROOF FLASHING

- .1 Thaler or equal spun aluminum complete with insulation, cap, and rubber gasket.

2.11 PREFABRICATED PIPE ENTRY DOGHOUSE

- .1 Dog House and cover shall be fabricated from 2mm thick aluminum with UV protected powder coated finish is also acceptable.
- .2 Cover shall be gasketed to ensure air and water tightness.
- .3 Mount in curb shall be full insulated and supplied with Doghouse.
- .4 Curb shall be 610 mm (24") high with 89 mm (3.5") wide flange pre-punched for securement to roof deck.
- .5 Curb shall be insulated with 50 mm (2") thick glass fibre insulation.
- .6 Pipe entry openings shall be provided by the pipe entry chase manufacturer and be specifically made for the application. Minimum acceptable standard:
 - .1 Sigrist Exit Seal
 - .2 Vault Exit Seal
- .7 Cover shall be removable and be fastened to the curb/body with vandal resistant fasteners. Hardware shall be zinc plated or stainless steel.

- .8 Size: To suite required penetrations.
- .9 Acceptable Manufacturers
 - .1 Sigrist Alta Pipe Chase Housing
 - .2 Vault Roof Penetration Housing
 - .3 Other Acceptable Manufacturers if approved by Consultant prior to tender close.

2.12 PIPING SUPPORT ASSEMBLY

- .1 All channel members shall be fabricated from structural grade steel conforming to one of the following ASTM specifications: A1011/A1011M, A653/A653M.
- .2 All fittings shall be fabricated from steel conforming to one of the following ASTM specifications: A575, A36/A36M or A635/A635M.
- .3 Electro galvanized cush clamps with shoulder bolt and molded thermoplastic cushion, size to suit pipe.
- .4 Acceptable materials:
 - .1 Unistrut
 - .2 Or equal

Part 3 Execution

3.1 GENERAL

- .1 Hard copper to be used. Throughout the project, the use of annealed copper shall not be used without approval of the consultant.
- .2 Install in accordance with CSA B52, EPS 1/RA/2 and ANSI/ASME B31.5.
- .3 Connect to equipment with isolating valves and unions.
- .4 Provide space for servicing, disassemble, and removal of equipment and components all as recommended by manufacturer.
- .5 Protect all openings in piping against entry of foreign material.
- .6 Provide all necessary equipment including thermal expansion valve, sight glass, solenoid valve, filter dryer, etc., for a complete installed system. Pipe system as per manufacturer's recommendation and requirements.
- .7 Provide number of refrigerant circuits and appropriate corresponding piping as per manufacturer's recommendations and requirements.

3.2 BRAZING PROCEDURES

- .1 Bleed inert gas into pipe during brazing.
- .2 Remove valve internal parts, solenoid valve coils, sight glass.
- .3 Do not apply heat near expansion valve and bulb.

3.3 PIPING INSTALLATION

- .1 General:
 - .1 Hard drawn copper tubing: do not bend. Minimize use of fittings.
 - .2 Pitch at least 1:240 down in direction of flow to prevent oil return to compressor during operation.
 - .3 Provide trap at base of risers greater than 2.4m (8') high and at each 7.6m (25'-0") thereafter.
 - .4 Provide inverted deep trap at top of each riser.
 - .5 Provide double risers for compressors having capacity modulation.
 - .1 Large riser: install traps as specified above.
 - .2 Small riser: size for 5.1 m/s (1000 ft/min) at minimum load. Connect upstream of traps on large riser.

3.4 PRESSURE AND LEAK TESTING

- .1 Close valves on factory charged equipment and other equipment not designed for test pressures.
- .2 Leak test to CSA B52 before evacuation to 2 MPa (290 psi) and 1 MPa (145 psi) on high and low sides respectively.
- .3 Test Procedure: Build pressure up to 35 kPa (5 psi) with refrigerant gas on high and low sides. Supplement with nitrogen to required test pressure. Test for leaks with electronic or halide detector. Repair leaks and repeat tests.

3.5 DEHYDRATION AND CHARGING

- .1 Close service valves on factory charged equipment.
- .2 Ambient temperatures to be at least 13°C (55°F) for at least 12 h before and during dehydration.
- .3 Use copper lines of largest practical size to reduce evacuation time.
- .4 Use 2-stage vacuum pump with gas ballast on 2nd stage capable of pulling 5 Pa (0.02" WC) absolute and filled with dehydrated oil.
- .5 Measure system pressure with vacuum gauge. Take readings with valve between vacuum pump and system closed.
- .6 Triple evacuate all system components containing gases other than correct refrigerant or having lost holding charge as follows:
 - .1 Twice to 14 Pa (0.056" WC) absolute and hold for 4 h.
 - .2 Break vacuum with refrigerant to 14 kPa (0.056" WC).
 - .3 Final to 5 Pa (0.02" WC) absolute and hold for at least 12 h.
 - .4 Isolate pump from system, record vacuum and time readings until stabilization of vacuum.
 - .5 Submit all test results to Consultant.

- .7 Charging:
 - .1 Charge system through filter-drier and charging valve on high side. Low side charging not permitted.
 - .2 With compressors off, charge only amount necessary for proper operation of system. If system pressures equalize before system is fully charged, close charging valve and start up. With unit operating, add remainder of charge to system.
 - .3 Re-purge charging line if refrigerant container is changed during charging process.
- .8 Checks:
 - .1 Make all checks and measurements as per manufacturer's operation and maintenance instructions.
 - .2 Record and report all measurements to Consultant.

3.6 INSTRUCTIONS

- .1 Post instructions in frame with glass cover in accordance with Operation and Maintenance Manual Section and CSA B52.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Plumbing Specialties and Accessories.
- .2 Hydronic Systems – Steel.

1.2 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 American Society of Mechanical Engineers (ASME).
- .3 ANSI/ASME Boiler and Pressure Vessel Code, Section VI.

1.3 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with general requirements.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit operation and maintenance data for incorporation into manual specified in general requirements
- .2 Include following:
 - .1 Log sheets as recommended by manufacturer.
 - .2 Test reports.

Part 2 Products

2.1 MANUFACTURER

- .1 Equipment, chemicals, service by one supplier.
- .2 Acceptable manufacturer:
 - .1 **Aquarian Chemicals (905-825-3711) No alternates.**

2.2 SHIPPING/ FEEDING CHEMICAL CONTAINERS

- .1 High density moulded polyethylene, with liquid level graduations, cover.
- .2 Agitators: as required by manufacturer.

2.3 CONDUCTIVITY CONTROLLER

- .1 Fully transistorized, suitable for wall or flush panel mounting, linear over full measuring range of 0-5000 micro omhs.
- .2 Insensitive to phase angle shifts, capable of operating on 95-130 Volts without affecting accuracy, power, bleedoff status lights.

2.4 CONDUCTIVITY PROBES

- .1 Dual carbon elements in PVC holder, quick disconnect, self-locking connection.

2.5 WATER TREATMENT FOR HYDRONIC SYSTEMS

- .1 Hot water heating system: Pot feeder, 25 l (6.6 gal) or 19 l (5 gal).
- .2 Micron filter for each pot feeder:
 - .1 Capacity 2% of pump recirculating rate at operating pressure.
 - .2 Six (6) sets of filter cartridges for each type, size of micron filter.
- .3 Balancing valve set for 2% pump capacity.

2.6 CHEMICALS

- .1 Provide 1 year's supply.

2.7 TEST EQUIPMENT

- .1 Provide one set of test equipment for each system to verify performance.
- .2 Complete with carrying case, reagents for chemicals, all specialized or supplementary equipment.

2.8 CLEANING CHEMICALS

- .1 Provide as required to make system clean.
- .2 Cleaner chemical: compatible and of the same manufacturer of the water treatment supplier.

2.9 RECORD MANAGEMENT

- .1 Provide cards and card holder mounted on wall adjacent to each pot feeder.

Part 3 Execution

3.1 INSTALLATION

- .1 Install HVAC water treatment systems in accordance with ASME Boiler Code Section VII, and requirements and standards of authorities having jurisdiction, except where specified otherwise.
- .2 Ensure adequate clearances to permit performance of servicing and maintenance of equipment.

3.2 CHEMICAL FEED PIPING

- .1 Install crosses at all changes in direction. Install plugs in all unused connections.

3.3 WATER TREATMENT SERVICES

- .1 After entire new and existing system is cleaned as specified elsewhere, provide monthly water treatment monitoring and consulting services for period of one year after system start-up. Provide written report to consultant after each visit. Service to include:
 - .1 Initial water analysis and treatment recommendations.
 - .2 System start-up assistance.
 - .3 On site system testing and recording of treated hydronic system.
 - .4 Operating staff training.
 - .5 Visit plant every 7 days during first month of operation and as required until system stabilizes and advise consultant in writing on treatment system performance.
 - .6 Provide monthly visits with reports after system has stabilized to the satisfaction of the owner.
 - .7 Provide necessary monthly recording charts and log sheets for one year operation.
 - .8 Provide necessary laboratory and technical assistance.
 - .9 Instructions and advice to operating staff to be clear, concise and in writing.

3.4 START-UP

- .1 Start up water treatment systems in accordance with manufacturer's instructions.

3.5 SYSTEM COMMISSIONING AND TRAINING

- .1 Commissioning and training shall be provided by installing water treatment sub-contractor and water treatment supplier.
- .2 Timing:
 - .1 After start-up deficiencies rectified.
 - .2 After start-up and before TAB of connected systems.
- .3 Pre-commissioning Inspections:
 - .1 Verify:
 - .1 Presence of test equipment, reagents, chemicals, details of specific tests to be performed, operating instructions.
 - .2 Suitability of log book.
 - .3 Currency and accuracy of initial water analysis.
 - .4 Required quality of treated water.

- .4 Commissioning procedures - applicable to all Water Treatment Systems:
 - .1 Establish, adjust as necessary and record all automatic controls and chemical feed rates.
 - .2 Monitor performance continuously during commissioning of all connected systems and until acceptance of project.
 - .3 Establish test intervals, regeneration intervals.
 - .4 Record on approved report forms all commissioning procedures, test procedures, dates, times, quantities of chemicals added, raw water analysis, treated water analysis, test results, instrument readings, adjustments made, results obtained.
 - .5 Establish, monitor and adjust automatic controls and chemical feed rates as necessary.
 - .6 Visit project at monthly intervals after commissioning is satisfactorily completed to verify that performance remains as set during commissioning (more often as required until system stabilizes at required level of performance).
 - .7 Advise Engineer in writing on all matters regarding installed water treatment systems.
- .5 Training:
 - .1 Commission systems, perform tests in presence of, and using assistance of, assigned O&M personnel.
 - .2 Train O&M personnel in softener regeneration procedures.
- .6 Certificates:
 - .1 Upon completion, furnish certificates confirming satisfactory installation and performance.
- .7 Commissioning Reports:
 - .1 To include system schematics, test results, test certificates, raw and treated water analyses, design criteria, all other data required by Consultant.
- .8 Commissioning activities during Warranty Period:
 - .1 Check out water treatment systems on regular basis and submit written report to Consultant.

3.6 CLEANING OF MECHANICAL SYSTEM

- .1 Coordinate cleaning of mechanical systems with mechanical contractor.
- .2 Provide copy of recommended cleaning procedures and chemicals for approval by Consultant.

-
- .3 Procedure:
 - .1 Flushing and cleaning should only take place after successful piping pressure testing.
 - .2 Terminal device (reheat coils, heat pumps, perimeter radiation, etc.), air handling unit coils and their associated control and balancing valves should be bypassed during the preliminary flushing and cleaning process.
 - .3 Instruments such as flow meters, flow metering valves and orifice plates should only be installed after flushing and cleaning.
 - .4 Timing:
 - .1 The overall construction schedule identifies piping flushing and cleaning with realistic time allotments.
 - .2 The mechanical contractor is required to provide a detailed report outlining the processes and procedures for flushing and cleaning per piping system at least 4 to 6 weeks in advance of work.
 - .3 As a minimum, at least one piping flushing and cleaning procedure shall be witnessed, by the consultant and/or commissioning agent.
 - .5 The mechanical contractor shall to utilize a qualified water treatment specialist to supervise the flushing and cleaning process and provide the certified water analysis report certifying that the piping systems are clean.
 - .6 Coordinate flushing and cleaning of mechanical systems with HVAC water treatment contractor.
 - .7 Flush and clean new piping system in presence of Consultant.
 - .8 Flush after pressure test for a minimum of 4 hrs.
 - .9 Fill system with solution of water and non-foaming, phosphate-free detergent 3% solution by weight. Circulate for minimum of 8 hrs.
 - .10 Thoroughly flush all new mechanical systems and equipment with approved cleaning chemicals designed to remove deposition from construction such as pipe dope, oils, loose mill scale and other extraneous materials. Chemicals to inhibit corrosion of various system materials and be safe to handle and use.
 - .11 During circulation of cleaning solution, periodically examine and clean filters and screens and monitor changes in pressure drop across equipment.
 - .12 Refill system with clean water. Circulate for at least 2 hours. Clean out strainer screens/baskets regularly. Then drain.
 - .13 Drainage to include drain valves, dirt pockets, strainers, every low point in system.
 - .14 Drain and flush systems until alkalinity of rinse water is equal to make-up water. Refill with clean water treated to prevent scale and corrosion during system operation.
 - .15 Re-install strainer screens/baskets only after obtaining Consultant's approval and approval from HVAC water treatment contractor and board chemical treatment technician.

- .16 Repeat system drain and flush as often as necessary to have a clean system.
- .17 Disposal of cleaning solutions to be approved by authority having jurisdiction.
- .18 Isolate new piping system from existing system as required for system cleaning

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 SMACNA HVAC Duct Construction Standards, Metal and Flexible.
- .3 SMACNA HVAC Duct Leakage Test Manual.
- .4 ASTM A480/A480M, Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet and Strip.
- .5 ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process. (Metric).
- .6 ANSI/NFPA 90A, Installation of Air Conditioning and Ventilating Systems.
- .7 ANSI/NFPA 90B, Installation of Warm Air Heating and Air Conditioning Systems.

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with Section general requirements.
- .2 Indicate following:
 - .1 Sealants
 - .2 Tape
 - .3 Proprietary Joints
 - .4 Fittings

1.3 CERTIFICATION OF RATINGS

- .1 Catalogue or published ratings shall be those obtained from tests carried out by manufacturer or independent testing agency signifying adherence to codes and standards.

Part 2 Products

2.1 DUCTWORK

- .1 Galvanized Steel:
 - .1 Galvanized steel with Z90 designation zinc coating lock forming quality: to ASTM A653/A653M.

.2 Thickness:

Size Type	Class A Gauge	Class B Gauge	Class C Gauge
Square and Rectangular			
Up to 600 mm (24")	22	24	24
625 mm to 1000 mm (25" to 40")	20	22	24
1025 mm to 1800 mm (41" to 72")	18	20	22
1825 mm to 2400 mm (73" to 96")	16	18	20
2450 mm and over (97")	16	16	16
Round and Oval			
Up to 300 mm (12")	24	24	24
325 mm to 600 mm (13" to 24")	22	24	24
625 mm to 900 mm (25" to 36")	20	22	24
925 mm to 1200 mm (37" to 48")	18	20	22
1225 mm (49") and over	18	18	20

.3 All ductwork between HVAC unit connections and 3.0 m (10'-0") downstream or to silencers shall be 1.4 mm (18 gauge).

2.2 DUCT CONSTRUCTION

.1 Round and oval:

- .1 Ducts: factory fabricated, spiral wound, with matching fittings and specials to SMACNA.
- .2 Transverse joints up to 900 mm (36"): slip type with tape and sealants.
- .3 Transverse joints over 900 mm (36"): Ductmate or Exanno Nexus Duct System.

.2 Square and rectangular:

- .1 Ducts: to SMACNA.
- .2 Transverse joints, longest side:
up to and including 750 mm (30"): SMACNA proprietary duct joints.

.3 Ducts with sides over 750 mm (30") to 1200 mm (48"), transverse duct joint system by Ductmate/25, Nexus, or WDCI (Lite) (SMACNA "E" or "G" Type connection). Weld all corners.

.1 Acceptable materials:

- .1 Ductmate Canada Ltd.
- .2 Nexus, Exanno Corp.
- .3 WDCI

- .4 Ducts 1200 mm (48") and larger, Ductmate/35, Nexus, or WDCI (heavy) (SMACNA "J" Type connection). Weld all corners.
 - .1 Acceptable materials:
 - .1 Ductmate Canada Ltd.
 - .2 Nexus, Exanno Corp.
 - .3 WDCII.

2.3 FITTINGS

- .1 Fabrication: to SMACNA.
- .2 Radiused elbows:
 - .1 Rectangular: standard radius and or short radius with single thickness turning vanes Centreline radius: 1.5 times width of duct.
 - .2 Round:
 - .1 In exposed areas one-piece smooth radius, 1.5 times diameter.
 - .2 In concealed areas 3-piece adjustable, 1.5 times diameter.
- .3 Mitred elbows, rectangular:
 - .1 To 400 mm (16"): with double thickness turning vanes.
 - .2 Over 400 mm (16"): with double thickness turning vanes.
- .4 Branches:
 - .1 Rectangular main and branch: with 45° entry on branch.
 - .2 Round main and branch: enter main duct at 45° with conical connection.
 - .3 Provide volume control damper in branch duct near connection to main duct.
 - .4 Main duct branches: with splitter damper.
- .5 Diffuser connection to main:
 - .1 90° round spin in collars with balancing damper and locking quadrant.
- .6 Transitions:
 - .1 Diverging: 20° maximum included angle.
 - .2 Converging: 30° maximum included angle.
- .7 Offsets:
 - .1 Full short radiused elbows.
- .8 Obstruction deflectors: maintain full cross-sectional area.

2.4 SEAL CLASSIFICATION

- .1 Classification as follows:

Maximum Pressure Pa (" w.c.)	SMACNA Seal Class
2500 (10")	A
1500 (6")	A
1000 (4")	A
750 (3")	A
500 (2")	B
250 (1")	B
125 (0.5")	C

- .2 Seal classification:

- .1 Class A: longitudinal seams, transverse joints, duct wall penetrations and connections made airtight with sealant and tape.
- .2 Class B: longitudinal seams, transverse joints and connections made airtight with sealant.
- .3 Class C: transverse joints and connections made air tight with gaskets, or sealant or combination thereof. Longitudinal seams sealed with foil tape or sealant.

2.5 SEALANT

- .1 Sealant: oil resistant, polymer type flame resistant duct sealant. Temperature range of -30°C (-22°F) to plus 93°C (199°F).
- .1 Acceptable materials:
 - .1 Duro Dyne S-2
 - .2 Foster

2.6 TAPE

- .1 Tape: polyvinyl treated, open weave fiberglass tape, 50 mm (2") wide.
- .1 Acceptable material:
 - .1 Duro Dyne FT-2

2.7 DUCT LEAKAGE

- .1 In accordance with SMACNA HVAC Duct Leakage Test Manual.

2.8 FIRESTOPPING

- .1 40 mm x 40 mm x 3 mm (1½" x 1½" x 16ga) retaining angles all around duct, on both sides of fire separation.
- .2 Firestopping material and installation must not distort duct.
- .3 All ductwork passing through partition walls shall be firestopped.

2.9 HANGERS AND SUPPORTS

- .1 Band hangers: use on round and oval ducts only up to 500 mm (20") diameter, of same material as duct but next sheet metal thickness heavier than duct.
- .2 Trapeze hangers: ducts over 500 mm (20") diameter or longest side, to ASHRAE and SMACNA.
- .3 Hangers: galvanized steel angle with black steel rods to ASHRAE and SMACNA following table:

Duct Size mm (")	Angle Size mm (")	Rod Size mm (")
up to 750 (30)	25 x 25 x 3 (1 x 1 x 1/8)	6 (1/4)
>750 to 1050 (>30 to 42)	40 x 40 x 3 (1½ x 1½ x 1/8)	6 (1/4)
>1050 to 1500 (>42 to 60)	40 x 40 x 3 (1½ x 1½ x 1/8)	10 (3/8)
>1500 to 2100 (>60 x 84)	50 x 50 x 3 (2 x 2 x 1/8)	10 (3/8)
>2100 to 2400 (>84 x 96)	50 x 50 x 5 (2 x 2 x 1/8)	10 (3/8)
>2400 (96) and over	50 x 50 x 6 (2 x 2 x ¼)	10 (3/8)

- .4 Upper hanger attachments:
 - .1 For concrete: manufactured concrete inserts.
 - .1 Acceptable material:
 - .1 Myatt fig. 485
 - .2 For steel joist: manufactured joist clamp or steel plate washer.
 - .1 Acceptable material:
 - .1 Grinnell fig. 61 or 60
 - .3 For steel beams: manufactured beam clamps:
 - .1 Acceptable material:
 - .1 Grinnell Fig. 60

Part 3 Execution

3.1 GENERAL

- .1 The following systems shall conform to these requirements:

System	Class	Material
HVAC Supply and Return	B	Galvanized steel
General Exhaust	B	Galvanized steel
Individual Exhaust	C	Galvanized steel

- .2 Do work in accordance with ASHRAE and SMACNA.
- .3 Do not break continuity of insulation vapour barrier with hangers or rods.

- .4 Support risers in accordance with ASHRAE and SMACNA.
- .5 Install breakaway joints in ductwork on each side of fire separation.
- .6 Install proprietary manufactured flanged duct joints in accordance with manufacturer's instructions.
- .7 Manufacture duct in lengths to accommodate installation of acoustic duct lining.

3.2 HANGERS

- .1 Strap hangers: install in accordance with SMACNA.
- .2 Angle hangers: complete with locking nuts and washers.
- .3 Hanger spacing: in accordance with ASHRAE, SMACNA and as follows:

Duct Size	Spacing
mm (")	mm (")
to 1500 (60")	3000 (120")
over 1500 (60")	2500 (100")

- .4 Do not support ductwork over 250 mm x 250 mm (10" x 10") from roof deck.

3.3 SEALING

- .1 Apply sealant to outside of joint to manufacturer's recommendations.
- .2 Bed tape in sealant and recoat with minimum of 1 coat of sealant to manufacturers recommendations.

3.4 LEAKAGE TESTS

- .1 Coordinate leakage testing with TAB contractor. TAB contractor will be responsible for all duct testing.
- .2 Duct to be tested in accordance with SMACNA HVAC Duct Leakage Test Manual.
- .3 Leakage tests to be done in sections.
- .4 Trial leakage tests to be performed as instructed to demonstrate workmanship.
- .5 Install no additional ductwork until trial test has been passed.
- .6 Test section to be minimum of 15 m (50'-0") long with not less than 3 branch takeoffs and two 90° elbows. Maximum test length and area to be determined by BAS testing equipment. Allow for twelve (12) tests.
- .7 Complete test before insulation or concealment.
- .8 Provide all necessary end caps and fittings as required for the TAB contractor. Remove same after successful completion of duct test.
- .9 Pressure test ductwork to 1½ times operating pressure (minimum pressure 500 Pa (2" wc) all systems).

3.5 CLEANING

- .1 Keep ducts clear from dust and debris
- .2 Keep duct liner clean from dust, debris, and moisture.
- .3 At completion of project vacuum ducts if dirt or dust is present.
- .4 Where new systems connect into existing systems the existing systems shall be cleaned and vacuumed prior to reconnection.
- .5 Ensure all systems are clean prior to start up.

3.6 INSTALLATION REQUIREMENTS

- .1 All ductwork is to be protected from the weather and precipitation. The top and sides of all ductwork are to be completely covered with 6mil poly to the satisfaction of the consultant. Maintain protection of the ductwork until the building is made watertight and hollow cores drained. Tape all joints.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 SMACNA HVAC Duct Construction Standards, Metal and Flexible.
- .3 ANSI/NFPA 90B, Installation of Warm Air Heating and Air Conditioning Systems.
- .4 ANSI/NFPA 96, Ventilation Control and Fire Protection of Commercial Cooking Operations.
- .5 CSA B228.1, Pipes, Ducts and Fittings for Residential Type Air Conditioning.

1.2 PRODUCT DATA

- .1 Submit product data in accordance with general requirements.
- .2 Indicate the following:
 - .1 Flexible connections.
 - .2 Duct access doors.
 - .3 Turning vanes.
 - .4 Instrument test ports.

1.3 CERTIFICATION OF RATINGS

- .1 Catalogue or published ratings shall be those obtained from tests carried out by manufacturer or independent testing agency signifying adherence to codes and standards.

Part 2 Products

2.1 GENERAL

- .1 Manufacture in accordance with CSA B228.1.

2.2 FLEXIBLE CONNECTIONS

- .1 Frame: galvanized sheet metal frame with fabric clenched by means of double locked seams.
- .2 Material:
 - .1 Fire resistant, self extinguishing, neoprene coated glass fabric, temperature rated at -40°C (-40°F) to plus 90°C (194°F), density of 1.3 kg/m.

2.3 ACCESS DOORS IN DUCTS

- .1 Non-insulated ducts: sandwich construction of same material as duct, one sheet metal thickness heavier, minimum 0.6 mm (25 gauge) thick complete with sheet metal angle frame.
- .2 Insulated ducts: sandwich construction of same material as duct, one sheet metal thickness heavier, minimum 0.6 mm (24 gauge) thick complete with sheet metal angle frame and 25 mm (1") thick rigid glass fibre insulation.
- .3 Gaskets: neoprene
- .4 Hardware:
 - .1 Up to 300 mm (12"): 2 sash locks
 - .2 301 mm to 450 mm (13" to 18"): 4 sash locks Complete with safety chain.
 - .3 451 mm to 1000 mm (19" to 40"): piano hinge and minimum 2 sash locks.
 - .4 Doors over 1000 mm (40"): piano hinge and 2 handles operable from both sides.
 - .5 Hold open devices.
- .5 Acceptable materials:
 - Nailor
 - E. H. Price
 - Titus

2.4 INSTRUMENT TEST PORTS

- .1 1.6 mm (16 gauge) thick steel zinc plated after manufacture.
- .2 Cam lock handles with neoprene expansion plug and handle chain.
- .3 28 mm (1 1/8") minimum inside diameter. Length to suit insulation thickness.
- .4 Neoprene mounting gasket.
- .5 Acceptable material:
 - Duro Dyne IP1 or IP2
 - Duct mate

2.5 PREFABRICATED ROOF CURB

- .1 Construction: welded with exposed joints ground flush and smooth.
- .2 Material: 1.3 mm (18 gauge) galvanized steel with raised cant and wood nailer.
- .3 25 mm (1") insulation 3 lb density.
- .4 Acceptable materials:
 - Greenheck GPR – 600 mm (24") high
 - Penn

Part 3 Execution

3.1 INSTALLATION

- .1 Flexible connections:
 - .1 Install in following locations:
 - .1 Inlets and outlets to supply air units and fans. (Unless internally isolated)
 - .2 Inlets and outlets of exhaust and return air fans.
 - .3 As indicated.
 - .2 Length of connection: 100 mm (4").
 - .3 Minimum distance between metal parts when system in operation: 75 mm (3").
 - .4 Install in accordance with recommendations of SMACNA.
 - .5 When fan is running:
 - .1 Ducting on each side of flexible connection to be in alignment.
 - .2 Ensure slack material in flexible connection.
- .2 Access doors and viewing panels:
 - .1 Size:
 - .1 600 mm x 600 mm (24" x 24") for person size entry.
 - .2 600 mm x 1000 mm (24" x 40") for servicing entry.
 - .3 300 mm x 300 mm (12" x 12") for viewing.
 - .4 As indicated.
 - .2 Location:
 - .1 At fire and smoke dampers.
 - .2 At control dampers.
 - .3 At devices requiring maintenance.
 - .4 At locations required by code.
 - .5 At inlet and outlet of reheat coils.
 - .6 Elsewhere as indicated.
 - .7 Inlet and outlet of duct mounted coils.
- .3 Instrument test ports.
 - .1 General:
 - .1 Install in accordance with recommendations of SMACNA and in accordance with manufacturer's instructions.
 - .2 Locate to permit easy manipulation of instruments.
 - .3 Install insulation port extensions as required.

- .4 Locations.
 - .1 For traverse readings:
 - .1 At ducted inlets to roof and wall exhausters.
 - .2 At inlets and outlets of other fan systems.
 - .3 At main and sub-main ducts.
 - .4 And as indicated.
 - .2 For temperature readings:
 - .1 At outside air intakes.
 - .2 In mixed air applications in locations as approved by Consultant.
 - .3 At inlet and outlet of coils.
 - .4 Downstream of junctions of two converging air streams of different temperatures.
 - .5 And as indicated.
- .4 Turning vanes:
 - .1 Install in accordance with recommendations of SMACNA and as indicated.
 - .2 Install on supply ducts only.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 SMACNA HVAC Duct Construction Standards, Metal and Flexible.

1.2 PRODUCT DATA

- .1 Submit product data in accordance with general requirements
- .2 Indicate the following: performance data.

Part 2 Products

2.1 GENERAL

- .1 Manufacture to SMACNA standards.

2.2 SINGLE BLADE DAMPERS

- .1 Of same material as duct, but one sheet metal thickness heavier. V-groove stiffened, minimum 1.6 mm (16 gauge).
- .2 Size and configuration to recommendations of SMACNA, except maximum height 100 mm (4").
- .3 Shaft extension to accommodate insulation thickness and locking quadrant.
- .4 Inside and outside nylon end bearings.
- .5 Channel frame of same material as adjacent duct, complete with angle stop.

2.3 MULTI-BLADED DAMPERS

- .1 Factory manufactured of material compatible with duct.
- .2 Opposed blade: configuration, metal thickness and construction to recommendations of SMACNA.
- .3 Maximum blade height:
 - .1 50 mm (2") up to 375 mm (15") high duct.
 - .2 100 mm (4") max 400 mm (16") high duct and over.
- .4 Bearings: self-lubricating nylon.
- .5 Linkage: shaft extension with locking quadrant.
- .6 Channel frame of same material as adjacent duct, complete with angle stop.
- .7 Shaft extension to accommodate insulation thickness and locking quadrants.**

- .8 Acceptable materials:
 - .1 Duro Dyne
 - .2 E.H. Price
 - .3 Nailor
 - .4 T.A. Morrison
 - .5 Tamco
 - .6 Ruskin
 - .7 Ventex/Alumavent
 - .8 United Enertech

2.4 LOCKING QUADRANTS

- .1 6 mm (1/4") dial regulator with square bearing shaft.
 - .1 18 gauge oval frame, cadmium plated, clearly shows damper position.
 - .2 18 gauge formed handle for easy adjustment.
 - .3 Bolt and wing nut lock damper securely.
 - .4 Offset mounting holes avoid interference with damper movement and mechanical fastening to duct.
- .2 9 mm (3/8") and larger: clamp quadrant with square bearing shaft.
 - .1 Accommodates and securely locks square rod, bearing fitting and adaptor pins.
 - .2 Heavily ribbed 16 gauge steel frame, 3 mm (1/8") thick formed steel handle, cadmium-plated.
 - .3 By tightening nut, bearing is securely locked in handle, preventing slippage and rattle.
 - .4 Neoprene and steel washer assembly seals bearing opening to eliminate air-leakage.
 - .5 Screw holes for mechanically fastening to ductwork.
- .3 High pressure system locking quadrant:
 - .1 Airtight, rattle-proof regulator, designed for ZERO leakage at high pressure. Use for applications up to 500°F constant temperature.
 - .2 Handle design for easy recognition of damper position.
 - .3 Heavy-gauge, zinc-plated steel, 2 high temperature rubber seals and washers, end bearing support, and 2 end bearings. Pressure loss and damper rattle in ductwork has been a constant annoyance for as long as HVAC ductwork has been installed. Now, a truly air-tight, rattle-proof regulator is available. The SPEC-SEAL regulator utilizes a special high-temperature rubber seal to eliminate leakage and rattle even at many times the pressure found in high pressure.
 - .4 Soft, comfortable grip handle with a highly-visible, plastic cover which indicates the damper position.
 - .5 Handle to accommodate 9 mm (3/8") or 12 mm (1/2") to match damper shaft size, square and round bearing shafts.

- .4 Acceptable manufacturers:
 - Duro Dyne
 - Ductmate

Part 3 Execution

3.1 INSTALLATION

- .1 Install where indicated.
- .2 Install in accordance with recommendations of SMACNA and in accordance with manufacturer's instructions.
- .3 For supply, return and exhaust systems, locate balancing dampers in each branch duct.
 - .1 Single blade dampers up to 200 mm (8").
 - .2 Multi-blade dampers over 200 mm (8").
- .4 Runouts to registers and diffusers: install single blade damper located as close as possible to main ducts.
- .5 All dampers to be vibration free.
- .6 Leave all dampers in open position for T.A.B.
- .7 Fasten locking quadrants to ductwork and shaft.
- .8 Place locking quadrants on standoffs where ductwork insulated.
- .9 Lock down quadrant arm in the open position.

3.2 VOLUME EXTRACTOR

- .1 Install at branch take off connections where indicated.
- .2 Secure lever adjustment rod to inside duct collar after final adjustments.

END OF SECTION

Part 1 General

1.1 GENERAL

- .1 This section applies to operating dampers not specified in Controls Section.

1.2 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

1.3 PRODUCT DATA

- .1 Submit product data in accordance with general requirements.
- .2 Indicate the following:
 - .1 Performance data.

1.4 MAINTENANCE DATA

- .1 Provide maintenance data for incorporation into manual specified in general requirements.

1.5 CERTIFICATION OF RATINGS

- .1 Catalogue or published ratings shall be those obtained from tests carried out by manufacturer or those ordered by him from independent testing agency.

Part 2 Products

2.1 MOTORIZED DAMPERS

- .1 Opposed blade type.
- .2 Extruded aluminum, interlocking blades, complete with extruded vinyl seals, spring stainless steel side seals, extruded aluminum frame.
- .3 Pressure fit self-lubricated bronze bearings.
- .4 Linkage: plated steel tie rods, brass pivots and plated steel brackets, complete with plated steel control rod.
- .5 Operator: Refer to BAS Section.
- .6 Performance:
 - .1 Leakage: in closed position to be less than 2% of rated air flow at 250 Pa (1" w.c.) differential across damper.
 - .2 Pressure drop: at full open position to be less than 10 Pa (0.04" w.c.) differential across damper.

- .7 Insulated aluminum dampers:
 - .1 Frames: insulated with extruded polystyrene foam with R factor of 5.0.
 - .2 Blades: constructed from aluminum extrusions with internal hollows insulated with polyurethane or polystyrene foam, R factor of 5.0.
 - .3 Use on services to the exterior.
- .8 Acceptable materials:
 - Honeywell
 - Johnson
 - T. A. Morrison
 - E.H. Price
 - Tamco
 - Ruskin
 - Nailor
 - Henderson Industrial
 - Ventex/Alumavent

2.2 BACK DRAFT DAMPERS

- .1 Automatic gravity operated, multi leaf, aluminum construction with nylon bearings, centre pivoted or counterweighted, as indicated.
- .2 Acceptable materials:
 - T.A. Morrison
 - Tamco Series 7000
 - Ruskin
 - Nailor
 - E.H. Price
 - Henderson Industrial
 - Ventex/Alumavent

Part 3 Execution

3.1 INSTALLATION

- .1 Install where indicated.
- .2 Install in accordance with recommendations of SMACNA and manufacturer's instructions.
- .3 Seal multiple damper modules with silicon sealant.
- .4 Install access door adjacent to each damper. See Duct Accessories Section.
- .5 Insulated dampers on all outside air intake and exhaust damper.
- .6 Non-insulated dampers on all interior motorized dampers not exposed to outside air.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 SMACNA HVAC Duct Construction Standards, Metal and Flexible.
- .3 ASTM C553, Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
- .4 ANSI/NFPA 90A, Installation of Air Conditioning and Ventilating Systems.
- .5 ANSI/NFPA 90B, Installation of Warm Air Heating and Air Conditioning Systems.

1.2 PRODUCT DATA

- .1 Submit product data in accordance with general requirements.

Part 2 Products

2.1 DUCT LINER

- .1 General:
 - .1 Rigid fibrous glass duct liner: air stream side faced with mat facing.
 - .2 Flame spread rating shall not exceed 25. Smoke development rating shall not exceed 50 when tested in accordance with CAN/ULC-S102.
 - .3 Acceptable material:
 - .1 Johns Manville, Permacote Linacoustic R-300
 - .2 Owen Corning
- .2 Rigid:
 - .1 Use on flat surfaces.
 - .2 25 mm (1") thick, to CGSB 51-GP-10M, fibrous glass rigid board duct liner.
 - .3 Density: 36 kg/m² (7.4 lb/ft²).
 - .4 Thermal resistance to be minimum 750 mm (30") C/W for 25 mm (1") thickness
1150 mm (45") C/W for 40 mm (1½") thickness when tested in accordance with ASTM C177, at 24°C (75°F) mean temperature.

2.2 ADHESIVE

- .1 Meet requirements of ANSI/NFPA 90A and ANSI/NFPA 90B.
- .2 Flame spread rating shall not exceed 25. Smoke development rating shall not exceed 50. Temperature range -29°C (-20°F) to 93°C (200°F).
- .3 Acceptable material:
 - .1 Duro Dyne 1A-22
 - .2 Ductmate

2.3 FASTENERS

- .1 Weld pins 2.0 mm (14 gauge) diameter, length to suit thickness of insulation. Metal retaining clips, 32 mm (1¼") square.
- .2 Acceptable material:
 - .1 Duro Dyne
 - .2 Ductmate

2.4 JOINT TAPE

- .1 Poly-Vinyl treated open weave fiberglass membrane 50 mm (2") wide.
- .2 Acceptable materials:
 - .1 Duro Dyne FT2
 - .2 Ductmate

2.5 SEALER

- .1 Meet requirements of ANSI/NFPA 90A and ANSI/NFPA 90B.
- .2 Flame spread rating shall not exceed 25. Smoke development rating shall not exceed 50. Temperature range -68°C (-90F) to 93°C (200°F).
- .3 Acceptable materials:
 - .1 Duro Dyne 1A-94
 - .2 Ductmate

Part 3 Execution

3.1 GENERAL

- .1 Do work in accordance with recommendations of SMACNA duct liner standards as indicated in SMACNA HVAC Duct Construction Standards, Metal and Flexible, except as specified otherwise.
- .2 Line inside of ducts where indicated.
- .3 Duct dimensions, as indicated, are clear inside duct lining.
- .4 Provide an interior of ductwork from fans from minimum distance of 3 m (10'-0").

3.2 DUCT LINER

- .1 Install in accordance with manufacturer's recommendations, and as follows:
 - .1 Fasten to interior sheet metal surface with 100% coverage of adhesive.
 - .2 In addition to adhesive, install weld pins not less than 2 rows per surface and not more than 300 mm (12") on centres.
- .2 Weld pins are to have cupped or beveled heads to prevent damage to lining surface.
- .3 Store foam liners away from sunlight.

3.3 JOINTS

- .1 Seal all butt joints, exposed edges, weld pin and clip penetrations and all damaged areas of liner with joint tape and sealer. Install joint tape in accordance with manufacturer's recommendations, and as follows:
 - .1 Bed tape in sealer.
 - .2 Apply 2 coats of sealer over tape.
- .2 Replace damaged areas of liner at discretion of Consultant.
- .3 Protect leading and trailing edges of each duct section with sheet metal nosing having 15 mm (1/2") overlap and fastened to duct.

END OF SECTION

Part 1 General

1.1 PRODUCT DATA

- .1 Submit product data in accordance with general requirements.
- .2 Indicate the following:
 - .1 Capacity.
 - .2 Throw and terminal velocity.
 - .3 Noise criteria.
 - .4 Pressure drop.
 - .5 Neck velocity.

1.2 MAINTENANCE MATERIALS

- .1 Include:
 - .1 Keys for volume control adjustment.
 - .2 Keys for air flow pattern adjustment.

1.3 MANUFACTURED ITEMS

- .1 Grilles, registers and diffusers of same generic type to be product of one manufacturer.

1.4 CERTIFICATION OF RATINGS

- .1 Catalogued or published ratings shall be those obtained from tests carried out by manufacturer or those ordered by them from independent testing agency signifying adherence to codes and standards.

Part 2 Products

2.1 GENERAL

- .1 To meet capacity, pressure drop, terminal velocity, throw, noise level, neck velocity as indicated.
- .2 Frames:
 - .1 Full perimeter gaskets.
 - .2 Plaster frames where set into plaster or gypsum board and as specified.
 - .3 Concealed fasteners.
- .3 Concealed operators.
- .4 Colour and Finish: standard as directed by Consultant.
- .5 Acceptable materials: Refer to schedule on drawings.

2.2 TOE SPACE GRILLE

- .1 Punched steel at 25mm x 25mm (1"x1") spacing with 15m x 15m (1/2"x1/2") hole.
- .2 Screw fastening and finish selected by consultant.
- .3 Type, size and capacity: Refer to schedule on drawings.

2.3 OPEN MESH SCREEN

- .1 15 mm x 15 mm (½"x ½") open mesh screen fastened on 25 mm (1") border, screw fasten.
- .2 On all open ends of ductwork and where indicated.
- .3 Size: To match ductwork size.

Part 3 Execution

3.1 INSTALLATION

- .1 Install in accordance with manufacturer's instructions.
- .2 Install with flat head screws in countersunk holes where fastenings are visible.
- .3 Bolt grilles, registers, and diffusers, in place
- .4 Provide concealed safety chain on each grille, register and diffuser in gymnasium, similar game rooms, and on exposed diffusers, and elsewhere as indicated.
- .5 Clean grilles upon completion.
- .6 Paint ductwork beyond grilles, matte black where visible.
- .7 Ensure all grilles, diffusers, etc. match opening sizes as indicated on the drawings and as fabricated on site by the contractor.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 ASTM E90, Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions, and Elements.

1.2 PRODUCT DATA

- .1 Submit product data in accordance with general requirements.
- .2 Indicate the following:
 - .1 Pressure drop.
 - .2 Face area.
 - .3 Free area.
 - .4 Colour and finish.

1.3 CERTIFICATION OF RATINGS

- .1 Catalogued or published ratings shall be those obtained from tests carried out by manufacturer or those ordered by him from independent testing agency signifying adherence to codes and standards.

1.4 TEST REPORTS

- .1 Submit certified data from independent laboratory substantiating acoustic and aerodynamic performance to ASTM E90.

Part 2 Products

2.1 GRAVITY ROOF OUTSIDE AIR INTAKES AND RELIEF VENTS

- .1 Factory manufactured louvred penthouse.
 - .1 3 mm (1/8") thick stormproof extruded aluminum louvers with mitred corners. Brace and support louvres at 1500 mm (5') intervals.
 - .2 2 mm (0.081") thick insulated aluminum sheet roof.
 - .3 Constructed of 50 mm x 50 mm x 6 mm (2" x 2" x ¼") aluminum angles for roof support and corner angle.
 - .4 15 mm x 15 mm x 0.063 diameter (½" x ½" x 1.6" diameter) intercrimp aluminum screen on back of all sides.
- .2 Provide roof curb sized to suit penthouse or flat or sloped roof as required or indicated. Curb to place bottom louvre minimum 250 mm (10") above roof.
- .3 Maximum throat velocity 3.3 m/s (11 ft/s) intake.

- .4 Maximum loss through unit: 15 Pa (0.06" in w.c.) static pressure.
- .5 Finish: Powder Coated. Color selected by Consultant.
- .6 Shape and size as indicated.
- .7 Acceptable manufacturers:
Greenheck WRH
Nailor 1720
Carnes GLAB
Penn Barry
Ventex

2.2 FIXED LOUVRES – ALUMINUM

- .1 Construction: welded with exposed joints ground flush and smooth.
- .2 Material: extruded aluminum alloy 6063-T5.
- .3 Blade: stormproof pattern with centre watershed in blade, reinforcing bosses and maximum blade length of 1500 mm (60").
- .4 Frame, head, sill and jamb: 50 mm (2") deep, **50 mm (2") blade centers**, one piece extruded aluminum, minimum 3 mm (1/8") thick with approved caulking slot, integral to unit.
- .5 Mullions: at 1500 mm (60") maximum centres.
- .6 Fastenings: stainless steel (Society of Automotive Engineers) SAE-194-8F with SAE-194-SFB nuts and resilient neoprene washers between aluminum and head of bolt, or between nut, ss washer and aluminum body.
- .7 Screen: 15 mm (1/2") exhaust 20 mm (3/4") intake mesh, 2 mm (5/64") diameter wire aluminum birdscreen on inside face of louvres in formed U-frame.
- .8 Finish: Kynar 500
Colour: to Consultant's approval.
- .9 Acceptable materials:
United Eneritech FL-D-2 series
Greenheck
Construction Specialties
E.H. Price
Krueger
Ruskin
Ventmaster
Ventex
Nailor

2.3 THIN LINE FIXED LOUVRES – ALUMINUM

- .1 Construction: welded with exposed joints ground flush and smooth.
- .2 Material: extruded aluminum alloy 6063-T5.
- .3 Blade: stormproof pattern with centre watershed in blade, reinforcing bosses and maximum blade length of 1500 mm (60").
- .4 Perimeter flange frame, head, sill and jamb: 50 mm (2") deep one piece extruded aluminum, minimum 3 mm (1/8") thick with approved caulking slot, integral to unit
- .5 Fastenings: stainless steel (Society of Automotive Engineers) SAE-194-8F with SAE-194-SFB nuts and resilient neoprene washers between aluminum and head of bolt, or between nut, ss washer and aluminum body.
- .6 Screen: 20 mm (3/4"), 2 mm (5/64") diameter wire aluminum birdscreen on inside face of louvres in formed U-frame.
- .7 Finish: Kynar 500
Colour: to Consultants approval.
- .8 Acceptable materials:
Greenheck ESJ-150
Construction Specialties
E.H. Price
Krueger
Ruskin
Ventmaster

Nailor
Ventex

Part 3 Execution

3.1 INSTALLATION

- .1 In accordance with manufacturers and SMACNA recommendations.
- .2 Reinforce and brace air vents, intakes and goosenecks as indicated.
- .3 Anchor securely into opening.
- .4 Seal with caulking all around to ensure weather tightness.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 ASTM C553, Mineral Fiber Blanket, Thermal Insulation for Commercial and Industrial Applications.
- .3 CSA B52, Mechanical Refrigeration Code.
- .4 EPS 1/RA/2, Environmental Code of Practice for Elimination of Fluorocarbon Emissions from Refrigeration and Air Conditioning Systems.

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with general conditions.
- .2 Indicate major components and accessories including sound power levels of units.
- .3 Type of refrigerant used.

1.3 OPERATION AND MAINTENANCE DATA

- .1 Provide operation and maintenance data for incorporation into manual specified in general conditions.

1.4 WARRANTY

- .1 Contractor hereby warrants refrigeration compressors for 5 years.

Part 2 Products

2.1 GENERAL

- .1 System type:
 - .1 Air flow arrangement: horizontal
 - .2 Cooling: direct expansion
 - .3 Condensing: air cooled

2.2 OUTDOOR CONDENSING UNITS

- .1 General: Factory-assembled, single piece, air-cooled condensing unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, compressor, refrigerant holding charge, and special features required prior to field start-up. Unit shall be rated in accordance with ARI Standard and be CSA approved.

- .2 Unit Cabinet:
 - .1 Unit cabinet shall be constructed of galvanized steel, bonderized and coated with a prepainted baked enamel finish.
 - .2 A heavy gage roll-formed perimeter base rail with forklift slots and lifting holes shall be provided to facilitate rigging.
- .3 Fans:
 - .1 Condenser fans shall be direct driven, propeller-type, discharging air horizontally.
 - .2 Fan blades shall be balanced.
 - .3 Condenser fan discharge openings shall be equipped with PVC coated steel wire safety guards.
 - .4 Condenser fan and motor shaft shall be corrosion resistant.
- .4 Compressor:
 - .1 Compressor shall be mounted on vibration isolators.
 - .2 Compressors shall include overload protection.
- .5 Condenser Coil:
 - .1 Condenser coil shall be air-cooled and circuited for integral subcooler.
 - .2 Coil shall be constructed of aluminum fins (copper fins optional) mechanically bonded to internally grooved seamless copper tubes which are then cleaned, dehydrated, and sealed.
- .6 Refrigeration Components:
 - .1 Refrigeration circuit components shall include liquid line service valve, suction line service valve, liquid filter drier, a full charge of compressor oil, and a holding charge of refrigerant.
- .7 Controls and Safeties:
 - .1 Minimum control functions shall include:
 - .1 Control wire terminal blocks.
 - .2 Five-minute recycle protection to prevent compressor short-cycling.
 - .3 Compressor lockout on auto-reset safety until reset from thermostat.
 - .2 Minimum Safety devices which are equipped with automatic reset (after resetting first at thermostat), shall include:
 - .1 High discharge pressure cutout.
 - .2 Loss-of-charge cutout.
- .8 Electrical Requirements:
 - .1 Refer to schedule on drawings.
 - .2 Unit electrical power shall be single-point connection.
 - .3 Unit control circuit shall contain a 24-v transformer for unit control.
- .9 Capacity: Refer to schedule on drawings.

- .10 Provide the following:
 - .1 Hail Guard Package.
 - .2 Winter Start Package.
- .11 Acceptable materials: Refer to schedule on drawings.

2.3 WAY CEILING CASSETTE UNIT

- .1 Shall be designed for installation into ceiling cavity and shall be equipped with a white panel.
- .2 Unit shall provide up to four-way air distribution via motorized louvres which can be horizontally and vertically adjusted from 0° to 90°.
- .3 Cabinet shall be constructed with sound absorbing foamed polystyrene and polyethylene insulation. Unit's sound pressure shall range from 28 dB (A) to 33 dB (A) at low speed measured at 5 (five) feet below the unit.
- .4 Return air shall be through the concentric panel, which shall include a washable, resin net mould resistant filter. Return air thermistor shall be mounted inside concentric opening.
- .5 Units shall be provided with condensate drain pumps suitable for 21 inches of lift. Pump shall be located below the coil in the condensate pan with a built-in safety alarm.
- .6 Units shall be provided with (MERV 8) high efficiency air filters
- .7 Acceptable materials:
 - .1 LG
 - .2 Daikin
 - .3 Mitsubishi

2.4 REFRIGERANT

- .1 Holding charge of refrigerant applied at factory.

Part 3 Execution

3.1 GENERAL

- .1 Install as indicated, to manufacturers' recommendations.
- .2 Manufacturer to certify installation.
- .3 Run drain line from cooling coil condensate drain pan to terminate over nearest floor drain.
- .4 Provide concrete pad complete with 100 mm x 100 mm x 20 mm (4" x 4" x 3/4") neoprene type vibration isolation.

3.2 EQUIPMENT

- .1 Preparation and Start-Up
 - .1 Provide services of manufacturer’s authorized factory trained mechanic to set and adjust equipment for operation as specified.
 - .2 Provide results in operation and maintenance manuals.

END OF SECTION

Part 1 General

1.1 GENERAL

- .1 Conform to general provisions for mechanical division in General Requirements section.

1.2 SUBMITTAL

- .1 Submit shop drawings and product data in accordance with general requirements,
.2 Indicate the following: complete specifications, wiring diagrams (showing all interconnections); weight; performance details.
.3 Provide data for inclusion in the Operating and Maintenance manuals in accordance with general requirements,

1.3 SHOP DRAWING SUBMISSION/UNIT DELIVERY REQUIREMENTS

- .1 **Shop drawings shall be submitted to the Consultant within two (2) weeks of Award of Contract.**
.2 **Shop drawings shall be reviewed/returned by the Consultant within one (1) week of submission.**
.3 **Contractor to order equipment from manufacturer immediately upon returned/approved shop drawings.**
.4 **This Contractor shall co-ordinate with the manufacturer to ensure unit ventilator equipment is delivered to site (for installation) by July 17, 2022. Include in tender price for premium costs associated with manufacturer's rush/accelerated delivery.**
.5 **Unit ventilators shall be installed and 100% operational prior to end of December 2023 to account for any manufacturer/equipment delivery delays encountered.**

Part 2 Products

2.1 UNIT VENTILATOR

- .1 Exterior cabinet panels shall be constructed of heavy gauge steel. Units shall be constructed such that testing and troubleshooting can be accomplished in the end pockets of the unit without affecting the normal airflow pattern through the unit.
.2 Floor mounted units shall have an integral pipe tunnel for convenient crossover of piping or electrical wiring in accordance with local and National Electric Codes (NEC). The front surface shall consist of three separate, removable panels. Control compartment must be accessible without removing the entire front panel. Unit discharge grille shall be welded continuous bar type with round edged steel bars placed for a 10° vertical deflection. Adjustable side deflection vanes shall be located beneath the continuous bar grille for easy adjustment by maintenance personnel]. A 6 mm (1/4") painted galvanized mesh screen shall be furnished and located beneath the discharge grille. Unit top surface shall be supplied with a textured paint surface that resists scuffing and hides fingerprints.
Overall unit depth shall be 550 mm (21 7/8").

- .3 Motors shall be direct drive electronically commutated motors (ECM) and be mounted on rubber isolation. Blowers shall be designed specifically for unit ventilator operation. ECM motors shall be programmed to meet the scheduled airflow at the specified external static pressure with additional speed taps for manual adjustment on site during balancing. Motors shall consist of a brushless, permanently lubricated ball bearing construction for maintenance free operation.
- .4 Hydronic coils are to be constructed with copper tubes and mechanically bonded aluminum corrugated plate fins. Water coils shall be furnished with a threaded drain plug at the lowest point. A manual air vent shall be provided at the high point of the coil on all floor mounted units. An auto air vent shall be provided at the high point of the coil on all ceiling mounted units. Direct expansion coils (DX) - all DX coils must be supplied with a factory installed thermal expansion valve. The expansion valve must be sized for the manufacturer's matching remote condensing unit.
- .5 Air Cooled Condensing Units - The unit ventilator manufacturer shall provide remote air cooled condensing units where indicated on plans. The outdoor unit shall be factory precharged and shall be design matched to the indoor unit.

The installing contractor shall provide and install between indoor and outdoor unit the interconnecting refrigerant tubing of the size recommended by the unit manufacturer. The installing contractor shall evacuate the indoor coil and interconnection tubing and charge the system in accordance with manufacturer's instructions.

Condensing unit shall have corrosion resistant cabinet, with hermetically sealed compressor with internal spring isolation, external isolation, permanent split capacitor motor and overload protection, copper tube aluminum fin condenser coil, direct drive propeller fan with permanently lubricated ball bearing single phase motor with internal overload protection.

.1 Acceptable manufacturers: Refer to schedules on drawings.

- .6 Microprocessor-based control for each unit ventilator that must be adaptable to future network system. This control must be pre-engineered, preprogrammed and pretested and shall be factory installed before shipment. The microprocessor-based control shall monitor room conditions and automatically adjust unit operations to maintain these requirements. The control sequence shall be on the basis of [ASHRAE Cycle II. The manufacturer shall provide this DDC controller in each unit ventilator. Control shall modulate remote 3-way heating valve and sequence condensing unit to maintain setpoint.

The direct digital controller shall have the following tenant adjustments as an integral part of the device: room temperature setpoint, minimum percent outdoor air setting, and unoccupied setpoint (offset). Each controller shall be furnished with an LED status/fault indicator on board and a communication port to allow monitoring and adjustment from a portable computer.

- .7 Economizer Operation: The unit shall have the capacity for 100% outdoor air when outdoor conditions allow. Provide power vent operation.

- .8 Separate room air and outdoor air dampers. The room air damper shall be constructed of aluminum and shall be counterbalanced against back pressure. Outdoor air damper shall be two-piece double wall construction with 15 mm (1/2") thick, 1.5 lb. density fiberglass insulation sandwiched between welded 1.0 mm (20 Ga.) galvanized steel blades for rigidity and to inhibit corrosion. Dampers shall be fitted with blended mohair seals along all the sealing edges. Damper bearings shall be made of nylon or other material which does not require lubrication. Dampers shall be factory mounted complete with modulating spring return damper actuator for proportional damper control.
- .9 Integral factory installed face and bypass damper. The face and bypass damper shall be constructed of aluminum and have a dead air space to minimize pickup in the bypass position. The long sealing edges of the damper shall be fitted with silicone rubber impregnated glass cloth seals with blended mohair seals on the ends for long life and positive sealing.
- .10 Drain pan constructed of stainless steel and shall be insulated. A drain outlet shall be provided on both ends of the pan with one outlet capped. The drain hand of connection shall be easily field-reversed by relocating the cap to the opposite end.
- .11 Filters shall be MERV 13.
- .12 External intake louvers will be separately supplied by the mechanical contractor.
Louvers shall have 2" blade centers.
- .13 External decorative aluminum wall grille will be separately supplied by the mechanical contractor. Wall grille shall be of heavy gauge with rectangular holes to match louver blade spacing.
- .14 Unit manufacturer shall provide an external wall louvre for the outdoor air intake. The louvre and frame shall be of heavy gauge aluminum with 45 deg. blades. The blade profile shall be designed to prevent water penetration. The louvre shall have 1/2" birdscreen attached to the inner face and shall have a minimum free area of 1.1 sq. ft. The finish on the louver shall be: mill finish / primer coat / a color as per Architect's instruction.
- .15 Unit manufacturer shall provide a decorative exterior aluminum wall grille constructed of heavy gauge aluminum with rectangular holes to match louvre blade spacing to maximize the air opening. Grille to be secured to wall louvre/ exterior wall. The grille finish shall match the louvre above.
- .16 All internal line voltage wiring shall be by the unit manufacturer.
 - .1 A suitably rated unfused disconnect switch shall be factory installed within the unit.
- .17 Control Components
 - .1 Provide terminal strip ("digital-ready") for standard electric/mechanical controls per Energy Controls.
- .18 Unit capacity: As indicated.
- .19 Acceptable manufacturers: Refer to schedules on drawings.

2.2 SYSTEM CONTROL

- .1 Equipment control will be by the BAS system. Coordinate with controls contractor.

Part 3 Execution

3.1 INSTALLATION

- .1 Install in accordance with manufacturer's instructions.
- .2 Install equipment exposed to finished areas after walls and ceiling are finished and painted. Avoid damage.
- .3 Protection: Provide finished cabinet units with protective covers during balance of construction.
- .4 Unit Ventilators: Locate as indicated, level and shim units, and anchor to structure. Coordinate with existing wall louvre and radiation cabinet. Adjust existing adjacent surfaces as required for a complete finished installation.
- .5 Hydronic Units: Install with shut-off valve on supply and lockshield balancing valve on return piping. If not easily accessible, extend vent to exterior surface of cabinet for easy servicing.
- .6 Provide refrigerant piping, refrigerant accessories, and refrigerant from condensing unit to DX coil.
- .7 The mechanical contractor shall charge the refrigeration system after installation and ensure that the cooling system is operating correctly.

3.2 START UP AND INSTRUCTION

- .1 Unit Manufacturer shall provide start up and instruction to the owner and the installer.

END OF SECTION

Part 1 General

1.1 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with general requirements.
- .2 Indicate:
 - .1 Equipment, capacity, piping, and connections.
 - .2 Dimensions, internal and external construction details, recommended method of installation with proposed structural steel support, sizes and location of mounting bolt holes.
 - .3 Special enclosures.
- .3 Primer coat to be off white.
- .4 All hydronic heating shall be by a single manufacturer.

1.2 MAINTENANCE DATA

- .1 Provide maintenance data for incorporation into manual specified in general requirements.

Part 2 Products

2.1 DAMPERS

- .1 Factory built, internal damper, complete with operator, at enclosure air outlet grille for each convection type heating unit not thermostatically controlled. Refer to schedules on drawings.

2.2 CAPACITY

- .1 As indicated.

2.3 EXISTING WALL FIN CONVECTOR AND CABINET RADIATION (H-EX)

- .1 Remove existing cover, vacuum existing fin and components.
- .2 Replace damaged components including but not limited to hangers, wall mounting brackets.
- .3 Replace existing control valve where installed and ensure operation.
- .4 Replace isolating valves as indicated.
- .5 Replace existing cabinet. Provide new filler pieces etc., to match existing cabinet.

2.4 FINNED TUBE RADIATION (H-3) (ELEMENT WITHOUT ENCLOSURE)

- .1 Heating elements: NPS 32 mm (1 1/4") seamless copper tubing, 1.2 mm (18 gauge) minimum wall thickness, mechanically expanded into flanged collars of evenly spaced aluminum fins, 100 mm x 100 mm (4" x 4") nominal, 164 fins per meter (50 fins/ft.) suitable for sweat fittings.
- .2 Element hangers: cradle type providing unrestricted longitudinal movement on enclosure brackets. Space brackets 900 mm (36") centres maximum.
- .3 Provide for noiseless expansion of all components.
- .4 Expansion compensators: Flexonics at each section.
- .5 Coordinate installation of heating elements with millwork.
- .6 Acceptable materials: As indicated on drawings.

2.5 FINNED TUBE RADIATION (H-1)

- .1 Heating elements: NPS 32 mm (1 1/4") seamless copper tubing, 1.2 mm (18 gauge) minimum wall thickness, mechanically expanded into flanged collars of evenly spaced aluminum fins, 100 mm x 100 mm (4" x 4") nominal, 164 fins per meter (50 fins/ft.) suitable for sweat fittings.
- .2 Element hangers: cradle type providing unrestricted longitudinal movement on enclosure brackets. Space brackets 900 mm (36") centres maximum.
- .3 Standard enclosures: 600 mm (24") high, 1.6 mm (16 gauge) thick steel complete with stamped grille, components for wall-to-wall or complete with die formed end caps having no knock-outs, with inside corners, outside corners, as indicated. Provide full length channel and sealer strip at top of wall edge. Height as indicated. Joints and filler pieces to be flush with cabinet. Support rigidly top and bottom, on wall mounted brackets. Joints and filler pieces to be clear of grilles located to provide easy access to valves and vents. Provide access doors for valves. Finish cabinet with factory applied baked primer coat. Enclosure height as indicated. Sloping (flat) top open (sloping) bottom.
- .4 Special enclosures: as indicated.
- .5 Dimensions for enclosures: measure site conditions. Do not scale from drawing.
- .6 Provide for noiseless expansion of all components.
- .7 Expansion compensators: Flexonics at each section by mechanical contractor as specified elsewhere.
- .8 Acceptable materials: As indicated on drawings.

2.6 FINNED TUBE RADIATION (H-2)

- .1 Heating elements: NPS 32 mm (1 1/4") seamless copper tubing, 1.2 mm (18 gauge) minimum wall thickness, mechanically expanded into flanged collars of evenly spaced aluminum fins, 100 mm x 100 mm (4" x 4") nominal, 164 fins per meter (50 fins/ft.) suitable for sweat fittings.

- .2 Element hangers: cradle type providing unrestricted longitudinal movement on enclosure brackets. Space brackets 900 mm (36") centres maximum.
- .3 Standard enclosures: 450 mm (18") high, 1.6 mm (16 gauge) thick steel complete with stamped grille, components for wall-to-wall or complete with die formed end caps having no knock-outs, with inside corners, outside corners, as indicated. Provide full length channel and sealer strip at top of wall edge. Height as indicated. Joints and filler pieces to be flush with cabinet. Support rigidly top and bottom, on wall mounted brackets. Joints and filler pieces to be clear of grilles located to provide easy access to valves and vents. Provide access doors for valves. Finish cabinet with factory applied baked primer coat. Enclosure height as indicated. Sloping top, sloping bottom.
- .4 Special enclosures: as indicated.
- .5 Dimensions for enclosures: measure site conditions. Do not scale from drawing.
- .6 Provide for noiseless expansion of all components.
- .7 Expansion compensators: Flexonics at each section by mechanical contractor as specified elsewhere.
- .8 Acceptable materials: As indicated on drawings.

Part 3 Execution

3.1 INSTALLATION

- .1 Install in accordance with manufacturer's instructions.
- .2 Install in accordance with piping layout and reviewed shop drawings.
- .3 Provide for pipe movement during normal operation.
- .4 Maintain sufficient clearance to permit performance of service maintenance.
- .5 Check final location with Consultant if different from that indicated prior to installation. Should deviations beyond allowable clearances arise, request and follow Consultant's directive.
- .6 Valves
 - .1 Install valves with stems upright or horizontal unless approved otherwise.
 - .2 Install isolating gate valves on inlet and balancing valves on outlet of each unit.
- .7 Venting:
 - .1 Install screwdriver vent on cabinet convactor, terminating flush with surface of cabinet.
 - .2 Install standard air vent with cock on continuous finned tube radiation.
- .8 Clean finned tubes and comb straight.
- .9 Install flexible expansion compensators as indicated.

- .10 Mount wall mounted convectors at 200 mm (8") above finish floor.
- .11 Mount wall mounted radiation at 200 mm (8") above finish floor unless otherwise indicated.
- .12 On units fed from below floor provide factory manufactured piping shrouds on the exposed piping between base of the radiation cabinet and finished floor. Shroud shall be manufactured by the radiation manufacturer. Shroud shall match finish of the radiation cabinet.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

- .1 Conform to General Conditions for Mechanical Trades.
- .2 Related Work Specified Elsewhere.
 - .1 General Conditions for Mechanical Trades
 - .2 Plumbing & Drainage
 - .3 Heating, Ventilation & Air Conditioning
 - .4 Heating, Ventilation & Air Conditioning Equipment
 - .5 Electrical

1.2 DESCRIPTION OF SYSTEM

- .1 Furnish and install all components, devices and control wiring for a fully integrated Energy Management and Environmental Control System incorporating Direct Digital Control (DDC), and equipment monitoring. The system shall control/monitor HVAC and plumbing equipment and systems as specified in this section. The work shall include but is not limited to the following:
 - .1 All necessary hardware, software, control panels, control wiring, field devices, installation, documentation, and owner training as specified.
 - .2 The installed system shall incorporate electronic and digital control devices to perform the control sequences and monitoring outlined herein. Specific control sequence requirements are as detailed elsewhere in this Section of the specification.
 - .3 Control and monitoring of the equipment and systems shown on the drawings (refer also to 'Sequence of Operation' for additional details).
 - .4 Control valves shall be supplied by this Trade but installed in the piping system by the Mechanical Trade complete with transitions and unions as required.
 - .5 Testing, debugging, calibrating, adjustment, programming and confirmation of total system operation.

1.3 MANUFACTURER AND INSTALLING CONTRACTOR

- .1 The temperature control manufacturer shall be Energy Controls.
- .2 The local Energy Controls contractor is available at phone 519-893-2638.
- .3 Any new building must be a seamless extension of the current Energy Management and Building Control System.
 - .1 The existing Energy Controls Vista software is, and shall continue to be, the only head-end BAS server for the entire School Board.

- .2 The head-end server contains the secure Energy Management Settings (i.e. Master Setpoints & Schedules) that are sent to all schools in real-time. The control system must be an extension of the head-end server and be able to be managed exclusively through the Vista head-end server.
- .3 Monitoring of all school board control systems are done in real-time and must be presented at the exclusive Vista head-end server as first-priority data.
- .4 The Vista head-end server has all the required controller databases and software to be able to centrally maintain and modify network configuration and controller software for the entire School Board. The Vista head-end server is the only system that can access the LacNet programming variables inside the controllers for real-time configuration of setpoint and time scheduling parameters.
- .5 The graphics and controller database must be presented inside the Vista head-end server in its native format in order to preserve the real-time speed, integrity and multi-site administration of the entire system.

1.4 SCOPE OF WORK

- .1 Refer to drawings and specification for complete scope.
- .2 Unit ventilator control (heating, cooling, free cooling, outdoor air ventilation).

1.5 QUALITY OF ASSURANCE

- .1 The system components shall be listed by Underwriters Laboratories Inc. and Canadian Standards Association.
- .2 The system control products shall be stored and handled according to manufacturer' recommendations.
- .3 The work shall be performed by skilled technicians all of whom shall be properly trained and qualified for this work.

1.6 SUBMITTALS

- .1 Prior to the installation of any equipment, the Contractor shall provide the Consultant with shop drawings and specifications for all devices and equipment used for the complete system installation. Shop drawings shall include the following:
 - .1 Identified schematic control diagrams for all systems, each diagram indicating or referencing input / output connection points, control components, component catalogue numbers, operation sequence, interlocking and RPU's to which they are connected.
 - .2 Complete network schematic indicating all programmable controllers and data connections.
 - .3 Detailed listing of inputs and outputs of each programmable controller.
 - .4 Control damper schedule indicating damper size, required torque and blade type.
 - .5 Technical data sheets / manufacturer application manuals of each system component.

- .2 Upon completion of the installation and prior to acceptance and Owner training, the Contractor shall furnish the Consultant with three copies of installation and operation manuals for the system. Each manual shall include:
 - .1 Record drawings, including plan layout indicating major device locations and wiring diagrams as finally installed.
 - .2 All shop drawings, incorporating all required revisions to reflect as-built conditions.
 - .3 The Contractor shall also keep one copy of backup programs for the system archived in a software storage vault at their business location.

Part 2 Products

2.1 GENERAL

- .1 The control system shall be a Tour Andover (TAC) Xenta/Distech building automation system (BAS).
- .2 The system shall integrate the operation of intelligent building management controllers distributed into the network.
- .3 The DDC System shall be generally comprised of the following devices to achieve the control functions described in this section:
 - .1 Xenta/Distech programmable controllers
 - .2 Distech input/ output programmable I/O modules.
 - .3 Control relays.
 - .4 Control dampers and valves.
 - .5 Sensors, actuators, and other input/output devices.
- .4 Controllers shall execute the application programs, calculations, and commands to provide the control function specified for that unit. Each controller shall include its own micro-computer controller, power supply, input/output modules, termination modules and real time clock.
- .5 Controllers shall be capable of full control functionality and alarm reporting independently or as a part of the DDC network.
- .6 The system shall be stored in flash ram, so no batteries are required.
- .7 Each control device shall be modular and expandable to provide additional inputs and outputs and control functionality for that device.
- .8 Each controller shall be able to transfer and receive data via the network for performance of control functions.
- .9 The system shall be modular, permitting expansion by adding hardware and software without changes in communication or processing equipment.
- .10 The complete system shall be capable of communication over a LonWorks network.
- .11 The controllers shall monitor the status of all overrides and include this information in logs and summaries to inform the operator that automatic control has been inhibited.

-
- .12 Controllers shall continuously perform self-diagnostics, communication diagnosis and diagnosis of all subsidiary equipment and provide both local and remote annunciation of any component failures.
 - .13 Controllers shall activate an orderly shutdown of their operation in the event of loss of normal electrical power. Non-volatile memory shall be incorporated for all controller configuration data. The controllers shall automatically resume full operation without manual intervention.
 - .14 The controllers shall have sufficient memory to support their own operating system and data bases including:
 - .1 control processes
 - .2 energy management applications
 - .3 alarm management
 - .4 trend data
 - .5 operator input/output
 - .6 remote communications
 - .7 manual override monitoring
 - .15 Controllers shall incorporate the following software features:
 - .1 Energy management:
 - .1 Time of Day Scheduling
 - .2 Calendar Based Scheduling
 - .3 Holiday Scheduling
 - .4 Optimal Start and Stop
 - .5 Demand Limiting
 - .6 Heating/Cooling Interlock
 - .2 Alarm Management:
 - .1 Alarm Management shall be provided to monitor, buffer and direct alarm reports to operator devices and memory files. The controllers shall perform alarm analysis and filtering to minimize operator interruptions due to non-critical alarms, minimize network traffic and prevent alarms from being lost.
 - .2 All alarm or point change report shall include the points English language description and the time and date of occurrence.
 - .3 The user shall be able to define the specific reaction for each point, the priority level (3 in total) and ability to inhibit alarm reporting for each point.
 - .4 The user shall be able to define conditions under which point changes need to be acknowledged by an operator and logged for analysis at a later date.

- .5 The user shall be able to print, display or store a unique 60 character alarm message to more fully describe the alarm condition or direct operator response. The message shall be customizable to describe each individual alarm.
- .6 In web access applications only critical alarms shall initiate a call to a remote operator device, otherwise call activity shall be minimized by time stamping and saving reports until a manual request is received or until the buffer space (minimum 50 alarms) is full.
- .3 Trend Logs:
 - .1 Controllers shall provide an automatic roll-over trend log, which stores records up to an operator-selected number at an operator-selected sampling rate and then overwrites the oldest record with each new record.
 - .2 Sample intervals shall be from 1 minute to 24 hours.
 - .3 Provide graphical and tabular displays.
- .4 Runtime Totalization:
 - .1 The controllers shall automatically accumulate and store runtime hours for binary points with a sampling resolution of 1 minute. The user shall have the ability to define a warning limit to trigger maintenance or user-defined messages.
- .5 Custom Programming:
 - .1 The controllers shall permit user defined custom control processes based on:
 - .1 Any system measured data or status
 - .2 Any calculated data
 - .3 Any results from other processes
 - .4 Boolean logic
 - .2 The custom processes may be triggered by:
 - .1 Time-of-day
 - .2 Calendar date
 - .3 Events (point alarm etc.)
- .16 The control strategy for each control loop shall be performed by software within the controller. The sequence of events required for each control loop is described for each system in the control sequence.
- .17 Outdoor air temperature indication shall be available at each controller as an integral part of the control strategies for that controller. Should the network transmission of the common outdoor air temperature (or any other common value) fail, then each controller shall use the last good value received.
- .18 Controls and Requirements for VVT Systems
 - .1 Where VVT controls are specified, units are to operate as part of a Variable Volume/Variable Temperature System complete with all necessary controls including zone dampers, temperature sensors, static pressure sensor probes and bypass damper.

2.2 NETWORK ARCHITECTURE

- .1 The controllers on the local network shall communicate via a two wire LonTalk TP/FT-10 network.

2.3 CONTROL PANELS

- .1 Control panels shall be fully enclosed cabinets with all steel construction. Cabinets shall have a hinged door with locking latch or bolt-on cover plate. All cabinet locks shall be common keyed. Cabinets shall be finished with two coats of paint.

2.4 TEMPERATURE SENSORS

- .1 Provide thermistor temperature sensors, not requiring transmitters, to measure temperature.
- .2 Accuracy shall be +/-0.2°C from 0 to 70°C.
- .3 Temperature sensors shall be Greystone EC200 series.
- .4 Space sensors in occupied areas shall be type AE or equal having an integral push button for unoccupied override and an integral slider to adjust set point (LED display not required).
- .5 In corridors and where noted on the drawings, provide stainless steel plate type sensors (push button override and LED display not required), type AS.
- .6 Duct temperature sensors shall be type B having a stainless steel probe length to suit application and ABS enclosure. Duct averaging temperature sensors shall be type FD having an element length to suit application, copper probe and ABS enclosure.
- .7 Immersion temperature sensors shall be type C having a ¼" OD stainless steel probe, 4" long and ABS enclosure. Immersion sensors shall be complete with thermowells. Thermal conductive compound shall be added inside the thermowell to provide optimum thermal transfer from the fluid to sensor. Stainless steel thermowells shall be used for steel pipe and brass thermowells shall be used in copper pipe.

2.5 CARBON DIOXIDE SENSORS

- .1 Sensors shall Greystone CDD series or equal having the following features:
 - .1 0-2000 ppm factory default detection range, field adjustable.
 - .2 Non-dispersive infrared sensing element with self-calibration algorithm.
 - .3 Guaranteed 5 year calibration interval.
 - .4 Powered by either AC or DC source.
 - .5 Accuracy: within 50 ppm or 3% of reading (whichever is greater).
 - .6 Operating humidity range: 0-95% RH.
 - .7 Operating temperature range: 0 to 50°C or greater.
 - .8 Stability: less than 2% full scale in 15 years
 - .9 Response time: less than 2 minutes for 90% step change.

- .2 Duct mounted sensors shall be complete with ABS enclosure complete with sampling tube.
- .3 Space mounted sensors shall be executive space type without LCD display.

2.6 MOTORIZED CONTROL DAMPERS

- .1 Control dampers shall be the parallel or opposed blade type as below or as scheduled on drawings.
 - .1 Outdoor and/or return air mixing dampers and face and bypass (F & BP) dampers shall be parallel blade, arranged to direct air-streams toward each other.
 - .2 Other modulating dampers shall be the opposed blade type.
 - .3 Two-position shutoff dampers may be parallel or opposed blade type with blade and side seals.
- .2 Damper frames shall be 13 gauge galvanized steel channel or 1/8 in. extruded aluminum with reinforced corner bracing.
- .3 Damper blades shall not exceed 20 cm (8 in.) in width or 125 cm (48 in.) in length. Blades are to be suitable for medium velocity performance (10 m/s [2000 fpm]). Blades shall be not less than 16 gauge.
- .4 Damper shaft bearings shall be as recommended by manufacturer for application, oil impregnated sintered bronze or better.
- .5 All blade edges and top and bottom of the frame shall be provided with replaceable butyl rubber or neoprene seals. Side seals shall be spring-loaded stainless steel. The blade seals shall provide for a maximum leakage rate of 50 L/s m² (10 cfm per ft²) at 1000 Pa (4 in. w.g.) differential pressure. Provide air foil blades suitable for a wide-open face velocity of 7.5 m/s (1500 fpm).
- .6 Individual damper sections shall not be larger than 125 cm x 150 cm (48 in. x 60 in.). Provide a minimum of one damper actuator per section.
- .7 Modulating dampers shall provide a linear flow characteristic where possible.
- .8 Dampers shall have exposed linkages.

2.7 WATER CONTROL VALVES

- .1 Heating and cooling control valves shall be Belimo CCV series characterized ball valves, complete with chrome plated brass trim and NPT female pipe connections. Radiation valves shall be complete with non-spring return modulating actuators. Control valves for coils heating a portion of outdoor air shall have spring return modulating actuators.
- .2 Control valves shall be sized to provide approximately one half the circuit branch pressure drop to obtain good modulation control but they shall be no smaller than two pipe sizes less than the pipe they are installed in.

Part 3 Execution

3.1 INSTALLATION

- .1 Installation
 - .1 All controllers and components in the system and on the network shall be installed according to manufacturer recommendations, general installation standards for digital controls and in accordance with the approved shop drawings.
 - .2 Locate room sensors in the locations shown on the mechanical drawings. All sensors shall be mounted at barrier free height (3'-11" (1175 mm) above finished floor).
 - .3 All control components for off site system access shall be located where noted on the drawings. The Electrical Contractor shall provide all required connections / cabling for off site access to the web access components.
 - .4 All programmable controllers, web access components, relays and other control components shall be located within control panels. Control Panels shall be wall mounted and shall be located within suspended ceiling spaces or other locations approved by the Consultant.
 - .5 The Electrical Contractor will provide hand-off-auto switches in all starters controlled by the BAS.
- .2 Generally, duct mount carbon dioxide sensors shall be used where specified for air handling units; but, for gyms and single zone libraries, a wall mount carbon dioxide sensor shall be mounted next to the room temperature sensor.
- .3 All carbon dioxide levels which are measured by the carbon dioxide sensors shall be made available to the Owner in the form of trend logs. Record readings at 10 minute intervals and keep them for at least 30 days.
- .4 Freeze-stats shall be installed so that their sensing element runs horizontally across the coil face (not diagonally) with no more than 12" vertical drops at the outside coil frame. The full face of the coil shall be covered with no horizontal runs being more than 12" apart. The top and bottom horizontal run shall be within 6" of the coil frame. If more than one freezestat is required, they shall be wired in series in order to detect a low temperature in portion of the coil. The sensing elements shall be firmly secured in place to avoid vibration without added air restriction.

3.2 SYSTEM START-UP AND ACCEPTANCE

- .1 Upon completion of installation, test, adjust and calibrate controls provided under this Section.
- .2 On system completion, a demonstration of complete system operation shall be made to the Owner's authorized representative and Consultant.
- .3 The Consultant shall verify through the Owners representatives that the entire system is complete and operating to the satisfaction of the Owner before final acceptance is approved.

3.3 TRAINING

- .1 The Contractor shall provide competent instructors to give full instruction to designated personnel in the adjustment, operation and maintenance of the system installed rather than a general training course. Instructors shall be thoroughly familiar with all aspects of the subject matter they are to teach. All training shall be held during normal work hours of 8:00 a.m. to 4:30 p.m. weekdays as follows:
- .2 Provide 4 hours of training for Owner’s operating personnel. Training shall include:
 - .1 Explanation of drawings, operations, and maintenance manuals
 - .2 Explanation of web access program
 - .3 Explanation of adjustment procedures
 - .4 Trend Analysis

3.4 WARRANTY

- .1 Equipment, material, and software shall be unconditionally guaranteed for a period of two years from the date of substantial completion.
- .2 Provide warranty service at no cost to the Owner for the guarantee period, which shall include but not be limited to the following:
 - .1 Emergency repair service on regular working hour basis during warranty.
 - .2 Replacing defective parts and components as required.
 - .3 System software support.

3.5 IDENTIFICATION

- .1 Provide system identification and provide nameplates identifying the following (nameplates shall be keyed to the wiring diagrams):
 - .1 Duct mounted sensors.
 - .2 Control panels (identify as to equipment / systems controlled). Each panel shall include an as-built drawing showing all the connected control points.

3.6 TESTING AND BALANCING

- .1 During the system testing and balancing by the Testing and Balancing Agency, demonstrate the operation of all controls. During balancing procedures, set controls to a fixed mode (bypass damper locked fully closed and all zone dampers locked fully open) to prevent any changes during the balancing procedure.

3.7 ELECTRICAL WIRING

- .1 All wiring shall be installed to the standards specified in the Electrical Division.
- .2 Use Echelon recommended orange jacket cable for all network wiring.

- .3 Run all wiring in EMT conduit where exposed, where running within concrete block walls and where required by the Ontario Electrical Code. Plenum rated cable shall be used in return air ceiling plenums.
- .4 Control relays necessary for BAS operation shall be provided by the Temperature Control Contractor but all contactors and their power supplies handling power wiring to the equipment shall be by the Electrical Contractor.

Part 4 Sequence of Operation

4.1 GENERAL

- .1 All setpoints shall be adjustable.
- .2 Outdoor air temperature shall be broadcasted to all controllers.
- .3 Heating mode: Heating is enabled between October 15 and April 15 or if the outdoor air temperature is below 10°C. This heating mode is used in all controllers for the building.
- .4 Cooling Mode: Mechanical cooling is enabled if the outdoor air temperature is above 18°C.
- .5 Occupancy mode shall be determined by a weekly schedule with an annual holiday schedule. Each system shall have this schedule but there shall be provision for operating under a general (to the building) schedule as well. An adjustable parameter shall be available to select the local or general schedule for each system.
- .6 Lead/lag: Devices designed for lead lag operation shall operate in automatic lead/lag mode to equalize run time. If the lead unit fails the lag shall automatically start and an alarm shall be generated. The lead unit shall be advanced through the series of devices in sequence every Tuesday at noon.

4.2 EQUIPMENT SERVICES

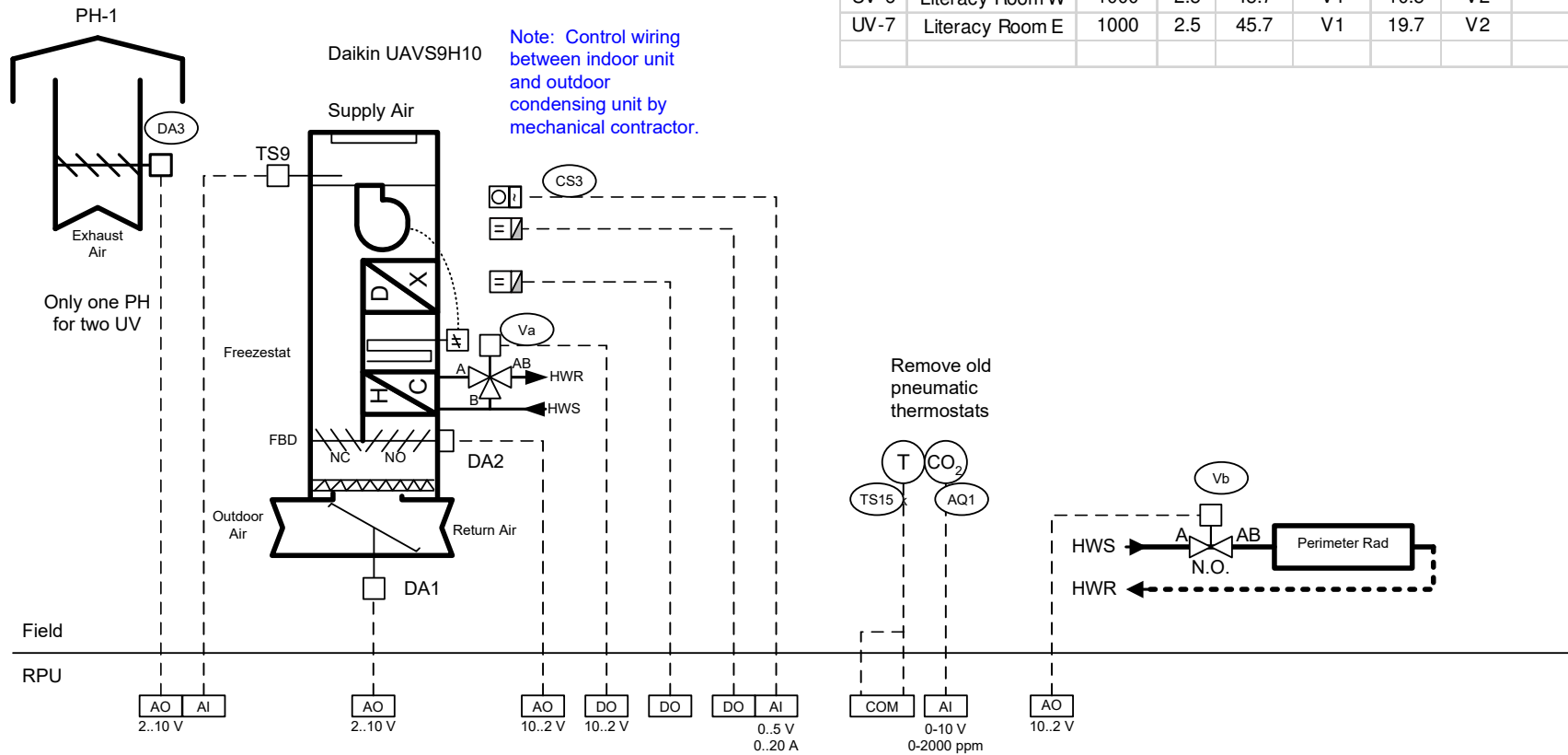
- .1 Graphical sequence of operations will be provided by BAS contractor.

END OF SECTION

Notes:

- 1) 120V power for controls is provided by Div. 16.
- 2) Freezestat is factory wired to shut down fan, open heating valve and close outside air damper.
- 3) DA1: Belimo actuator supplied with unit (SR) "A1", 2 V = OA closed
- 4) DA2: Belimo actuator supplied with unit (NSR) "A2", 2 V = bypass, 10 V = open to coil.
- 5) TS9: Supply air sensor supplied with unit (10 k).
- 6) 3-speed ECM fan motor set to medium speed.

2 Systems As Shown								
UV	Room	Supply (cfm)	DX (tons)	Htg (MBh)	Htg Vlv (Va)	Rad (MBh)	Rad (Vb)	Notes
UV-6	Literacy Room W	1000	2.5	45.7	V1	10.5	V2	
UV-7	Literacy Room E	1000	2.5	45.7	V1	19.7	V2	



Job #:	Owner: Waterloo Region District School Board	Drawn By:	Title: Unit Ventilator Controls Schematic	1

SEQUENCE OF OPERATION

Unoccupied Mode

The fan is off, the face & bypass damper is in the face position, the DX cooling is off and the mixing dampers are in the 0% outside air position. The rad valve modulates first, then the fan cycles with full heating to maintain the unoccupied heating setpoint (initially 17.5°C). If the pushbutton on the room sensor is pressed, the system will revert to occupied mode for a period of 2 hours.

Occupied Mode

An optimized start routine for heating advances the system start time when morning warm-up is required. The fan runs continuously on low or high speed as needed to maintain temperature (but is locked on low speed during “teaching” hours). Room temperature sensor TS15 modulates the mixing dampers in sequence with the DX cooling to maintain the cooling setpoint, and modulates the face & bypass dampers in sequence with the heating and rad valves to maintain the heating setpoint. The rad valve is the first stage of heat. The setpoint can be adjusted +/-2°C at the room sensor. Fan status is monitored by a current sensor.

Limits and Safeties

- 1) If the outside air temperature exceeds the building’s free cooling setpoint, the mixing dampers return to minimum position.
- 2) Mixed air damper minimum position control is provided when the global ventilation schedule is on (initially 10% OA).
- 3) The fan must be running before the mixing dampers and DX cooling will operate.
- 4) The supply air temperature sensor acts as a low limit to ensure temperature does not fall below setpoint (initially 16°C, reset to 13°C on a call for free cooling).
- 5) A software freezestat on the supply air temperature shuts the fan down and closes the outdoor air damper when the supply air temperature is below 3°C for 30s (resets at 6°C with 5 minute delay before restart).
- 6) If the hard-wired freezestat trips, the fan shuts down, outside air damper closes, the heating valve opens and an alarm is generated at the BAS.
- 7) DX cooling is disabled when the outside air temperature falls below the global mechanical cooling disable setpoint (initially 18°C).
- 8) DX cooling has a minimum off time of 5 minutes.
- 9) DX cooling has a supply air temperature low limit (6/12°C).
- 10) When DX cooling is on, the face & bypass damper is in the face position and the heating valve is closed.
- 11) Heating is disabled when the outside air temperature is above the global heating disable setpoint (typically 16°C).
- 12) The heating valve min. position increases from 0 to 60% as the outside air temperature falls from 3°C to -3°C to reduce the likelihood of coil freeze.

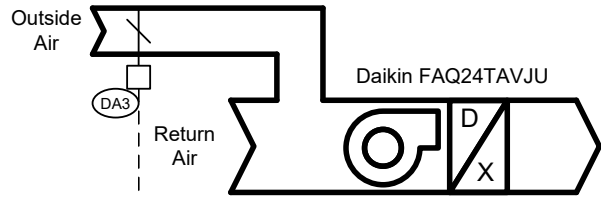
Alarms

An alarm is indicated at the operator’s terminal if any of the following occur:

- 1) Fan status does not match fan start/stop signal.
- 2) Room temperature too high (36/34°C) or too low (14/15°C).
- 3) Supply air temperature too high (65/60°C) or too low (8/10°C).
- 4) Software or hard-wired freezestat tripped.
- 5) Fan runtime exceeded weekly runtime setpoint.

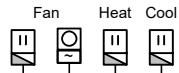
	Job #:	Owner: Waterloo Region District School Board	Drawn By:	Title: Unit Ventilator Sequence of Operation	
	Job Name: Crestview Public School HVAC Renovation		Revision Date: March 3, 2023		2

DUCTLESS SPLIT HEAT PUMP UNIT

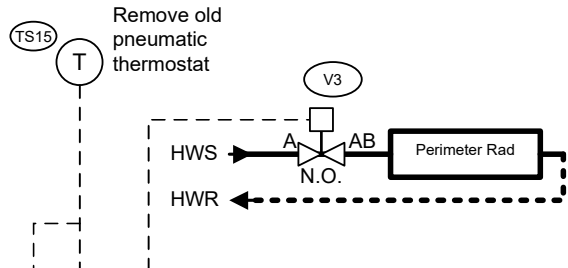


Install wall controller high on the wall near the indoor unit (for service use only). Set local controls for low setpoint (19°C) with "always on" time schedule.

Control wiring between indoor unit and outdoor unit by refrigeration contractor.



2 Systems As Show n				
UV	Room	DX (tons)	Rad (MBh)	Notes
DS-1	Meeting Room	1	-	no rad
DS-2	Quiet Room	1	7.57	Concealed SS Stat



SEQUENCE OF OPERATION

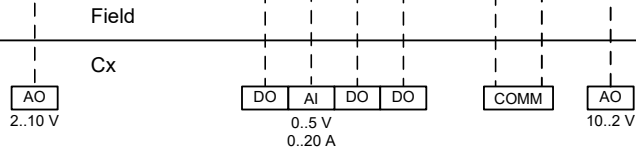
Unoccupied mode: The room temperature sensor modulates the rad valve to maintain the unoccupied heating setpoint. The outdoor air damper is closed.

Occupied mode: The fan runs continuously. The outdoor air damper opens when the minimum outdoor air schedule is on.

The room temperature sensor modulates the rad valve for heating to maintain the heating setpoint. If the rad cannot maintain the heating setpoint after a 10 minute delay, the ductless split cycles on in heating mode.

When cooling is enabled, the ductless split is cycled on to maintain the cooling setpoint which is a minimum of 2°C higher than the heating setpoint and is 23.5°C or higher.

An alarm is generated at the BAS if the room temperature is too cold (14/16°C) or too hot (38/36°C).



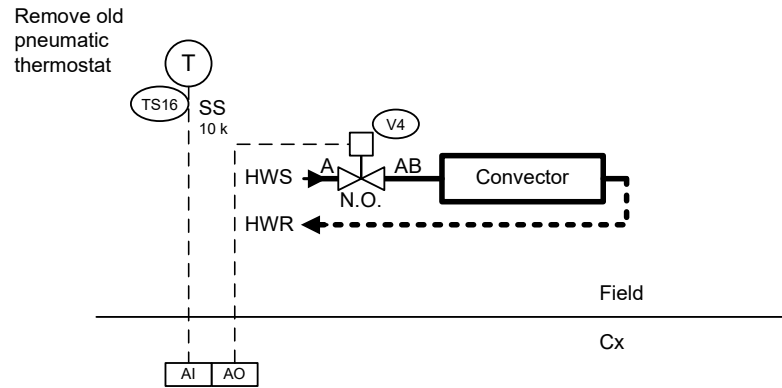
Job #:
Job Name: Crestview Public School HVAC Renovation

Owner:
Waterloo Region District School Board

Drawn By:
Revision Date:
March 3, 2023

Title: Ductless Split HeatPump Controls

PERIMETER RADIATION



	<u>One System As Show n</u>		
<u>Room</u>	<u>Pipe Size</u>	<u>Valve Size</u>	<u>Notes</u>
Boys Change Room	3/4"	4.62 MBh	

SEQUENCE OF OPERATION

The room temperature sensor modulates the valve for heating to maintain setpoint, which is reduced during unoccupied hours.

An alarm is generated at the BAS if the room temperature is too cold (14/16°C) or too hot (38/36°C).

	Job #:	Owner: Waterloo Region District School Board	Drawn By:	Title: Perimeter Radiation Controls	4
	Job Name: Crestview Public School HVAC Renovation		Revision Date: March 3, 2023		

Division 26 Common Requirements for Electrical

26 00 11	Electrical Specification Index
	Common Contract Requirements for Electrical
26 01 13	Electrical Supplemental Tender Form
26 01 14	Electrical Identified Prices
26 01 15	Allowances and Fees
26 01 16	Electrical General Requirements
	Common Work Results for Electrical
26 05 19	Wires and Cables
26 05 20	Junction, and Pull Boxes
26 05 21	Outlet Boxes, Conduit Boxes and Fittings
26 05 22	Wire and Box Connectors – 0 –1000 V
26 05 33	Conduits, Conduit Fastenings and Conduit Fittings
26 05 75	Auxiliary Systems
	Switchboard and Panelboards
26 24 16	Panelboards
26 24 17	Moulded Case Circuit Breakers
	Low-Voltage Distribution Equipment
26 27 26	Wiring Devices
	Low-Voltage Circuit Protective Devices
26 28 16	Disconnect Switches
	Interior Lighting
26 51 13	Lighting Equipment
26 51 16	Digital Occupancy & Daylight Control Systems

Division 28 Electronic Safety and Security

	Fire Detection and Alarm
28 31 25	Fire Alarm System (Addressable)

END OF SECTION

Part 1 General

1.1 INSTRUCTIONS TO BIDDERS

- .1 The Electrical Supplemental Tender Form must be submitted to the architect and consultant (dei@deassociates.ca) within 2 hours of tender closing. Electrical contractors shall identify all sub-contractors he/she intends to use and must complete all information requested. The requisite information shall be given at the office of the Consultant. Contractor shall sign and date this page and initial and date each page thereafter.
- .2 Should the Electrical Supplemental Form not be submitted then the contractor shall use Basis of Design manufacturers as listed.
- .3 CONTRACTOR
I/We certify that I/We have the authority to bind the company.

_____	_____
COMPANY NAME	AUTHORIZED SIGNATURE
_____	_____
ADDRESS	PRINTED SIGNATURE
_____	_____
CITY	TITLE
_____	_____
TELEPHONE NUMBER	DATE

FAX	

- .4 The Stipulated Bid Sum shall be for the basis of design manufacturer or supplier equipment only, unless otherwise indicated. Where a choice of this equipment is given, this Contractor shall indicate the supplier or manufacturer he intends to use. Where no choice is indicated, the basis of design supplier or equipment shall be used.
- .5 Equipment or materials manufactured by firms named in the following listing only shall be deemed equal to the equipment or material specified, provided the equipment or material will have capacity, performance, rating, construction, physical dimensions, accessories and features which, in the opinion of the Consultant, are equal to those of the specified equipment or material. The Electrical Contractor shall not indicate equipment, materials or suppliers which are not listed.

CONTRACTOR'S NAME: _____ DATE: _____

1.2 ELECTRICAL TENDER PRICE (EXCLUDING HST)

.1 Having carefully examined all Drawings and Specifications and the Addenda to the Drawings and Specifications, and having carefully examined the sites and all conditions affecting the work, we, the undersigned thereby offer to provide all plant, labour, materials and incidentals required to complete the work of all trades for: All the work specified for herein for

the Total Stipulated Price of: \$_____

(in writing)

in lawful money of Canada; included in which are all applicable excise taxes, custom duties, freight, exchange, and all other charges. HST is not included.

END OF SECTION

CONTRACTOR'S NAME: _____ DATE: _____

Part 1 General

1.1 GENERAL

- .1 The following Electrical Identified Prices Form must be submitted to the architect and consultant (dei@deiassociates.ca) within 2 hours of tender closing. Electrical contractors must complete all information requested or tenders may be considered null and void. Should any uncertainty arise as to the proper manner of submitting tenders, the requisite information will be given at the office of the Consultant. Contractor shall sign and date this page and initial and date each page thereafter.

1.2 CONTRACTOR

I/We certify that I/We have the authority to bind the company.

_____	_____
COMPANY NAME	AUTHORIZED SIGNATURE
_____	_____
ADDRESS	PRINTED SIGNATURE
_____	_____
CITY	TITLE
_____	_____
TELEPHONE NUMBER	DATE

FAX	

CONTRACTOR'S NAME: _____ DATE: _____

1.3 RELATED SECTIONS

- .1 This section must be read in association with the following: Division 1, mechanical and electrical divisions.

1.4 ALTERNATE PRICES (EXCLUDING HST)

- .1 Alternate prices are for work which is not included in the bid price listed on the Official Tender Form. Each alternate price may be substituted by the Owner for work which is included in the amount indicated. If no price is listed then this substitution shall mean no change in cost.

- .1 To change type B light fixture from suspended type to recessed including material and labour. Alternate catalog number and equals shall be:
 - .1 MARK LIGHTING CAT. #SL4L-LOP-XFT-FLP-XX-80CRI-35K-400LMF-MIN1-120-ZT
 - .2 COOPER CAT. #S124DR-S575D58035-ETGXFO-1-U-D0-F-XX
 - .3 LUMENWERX CAT. #VIA4R-D-HLO-FH-SW-80-750-35-XFT-UNV-D1-1C-XX

	Add to	Deduct from
	Bid price	bid price
_____	\$ _____	\$ _____

(Dollar amount in writing)

END OF SECTION

Part 1 General

1.1 GENERAL INSTRUCTIONS

- .1 Comply with the General Conditions, Supplementary Conditions, and all of General Requirements, Mechanical and Electrical Divisions.

1.2 CASH ALLOWANCES (HST EXCLUDED)

- .1 Refer to Division 1 specifications for cash allowances.
- .2 Electrical contractor shall be responsible for coordinating a service agreement with the local electrical utility.

1.3 FEES

- .1 The contractor is to determine general inspection fees with Electrical Safety Authority and include as part of tender.

END OF SECTION

Part 1 General

1.1 GENERAL

- .1 This Section covers items common to Electrical Divisions.**
- .2 This section supplements requirements of Division 1.
- .3 Furnish labour, materials, and equipment necessary for completion of work as described in contract documents.

1.2 INTENT

- .1 Mention herein or indication on Drawings of articles, materials, operations, or methods requires: supply of each item mentioned or indicated, of quality, or subject to qualifications noted; installation according to conditions stated: and, performance of each operation prescribed with furnishing of necessary labour, equipment, and incidentals for electrical work.
- .2 Where used, words “Section” and “Division” shall also include other Subcontractors engaged on site to perform work to make building and site complete in all respects.
- .3 Where used, word “supply” shall mean furnishing to site in location required or directed complete with accessory parts.
- .4 Where used, word “install” shall mean secured in place and connected up for operation as noted or directed.
- .5 Where used, word “provide” shall mean supply and install as each is described above.

1.3 TENDERS

- .1 Complete Supplemental Tender Form including list of equipment and materials to be used on this project and forming part of tender documents.
- .2 Submit Supplemental Tender Form as noted.
- .3 Submit tender based on specified described equipment or Alternates listed.
- .4 State in Tender, names of all Subcontractors proposed for work under this Division.

1.4 LIABILITY INSURANCE

- .1 This contractor must maintain and produce at the request of the consultant proof of proper insurance to fully protect the Owner, the Consultant and the Contractor from any and all claims due to accidents, misfortunes, acts of God, etc.

1.5 DRAWINGS

- .1 Electrical Drawings do not show structural and related details. Take information involving accurate measurement of building from building drawings, or at building. Make, without additional charge, any necessary changes or additions to runs of conduits and ducts to accommodate structural conditions. Location of conduits and other equipment may be altered by Consultant without extra charge provided change is made before installation and does not necessitate major additional material.
- .2 As work progresses and before installing fixtures and other fittings and equipment which may interfere with interior treatment and use of building, provide detail drawings or obtain directions for exact location of such equipment and fitments.
- .3 Electrical drawings are diagrammatic. Where required work is not shown or only shown diagrammatically, install same at maximum height in space to conserve head room (minimum 2200 mm (88") clear) and interfere as little as possible with free use of space through which they can pass. Conceal wiring, conduits and ducts in furred spaces, ceilings and walls unless specifically shown otherwise. Install work close to structure so furring will be small as practical.
- .4 Before commencing work, check and verify all sizes, locations, grades, elevations, levels and dimensions to ensure proper and correct installation. Verify existing/municipal services.
- .5 Locate all electrical equipment in such a manner as to facilitate easy and safe access to and maintenance and replacement of any part.
- .6 In every place where there is indicated space reserved for future or other equipment, leave such space clear, and install services so that necessary installation and connections can be made for any such apparatus. Obtain instructions whenever necessary for this purpose.
- .7 Relocate equipment and/or material installed but not co-ordinated with work of other Sections as directed, without extra charge.
- .8 Where drawings are done in metric and product not available in metric, the corresponding imperial trade size shall be utilized.

1.6 INTERFERENCE AND COORDINATION DRAWINGS

- .1 Prepare interference and equipment placing drawings to ensure that all components will be properly accommodated within the constructed spaces provided.
- .2 Prepare drawings to indicate coordination and methods of installation of a system with other systems where their relationship is critical. Ensure that all details of equipment apparatus, and connections are co-ordinated.
- .3 Ensure that clearances required by jurisdictional authorities and clearances for proper maintenance are indicated on drawings.
- .4 Upon consultant's request submit copies of interference drawings to consultant.

1.7 QUALITY ASSURANCE

- .1 The installations of the division must conform to the latest edition of the Electrical Safety Code as well as its supplemental bulletins and instructions. Provide materials and labour necessary to comply with rules, regulations, and ordinances.
- .2 Complete underground systems in accordance with CSA C22.3 No. 7-94 except where specified otherwise.
- .3 Abbreviations for electrical terms: to CSA Z85-1983.
- .4 In case of differences between building codes, provincial laws, local ordinances, utility company regulations, and Contract Documents, the most stringent shall govern. Promptly notify Consultant in writing of such differences.

1.8 ALTERNATES AND SUBSTITUTIONS

- .1 Throughout these sections are lists of “Alternate Equipment” manufacturers acceptable to Consultant if their product meets characteristics of specified described equipment.
- .2 Each bidder may elect to use “Alternate Equipment” from lists of Alternates where listed. Include for any additional costs to suit Alternated used. Prices are not required in Tender for Alternates listed except where specifically noted as “Separate Price”. Complete the Supplementary Tender Form.
- .3 It is responsibility of this Division to ensure “Alternate Equipment” fits space allocated and gives performance specified. If an “Alternate Equipment” unit is proposed and does not fit space allotted nor equal specified product in Consultant’s opinion, supply of specified described equipment will be required without change in Contract amount. Only manufacturers listed will be accepted for their product listing. All other manufacturers shall be quoted as substitution stating conditions and credit amount.
- .4 If item of material specified is unobtainable, state in Tender proposed substitute and amount added or deducted for its use. Extra monies will not be paid for substitutions after Contract has been awarded.

1.9 EXAMINATION

- .1 Site Inspection
 - .1 Examine premises to understand conditions, which may affect performance of work of this Division before submitting proposals for this work.
 - .2 No subsequent allowance for time or money will be considered for any consequence related to failure to examine site conditions.
- .2 Drawings:
 - .1 Electrical Drawings show general arrangement of fixtures, power devices, equipment, etc. Follow as closely as actual building construction and work of other trades will permit.
 - .2 Consider Architectural, Mechanical, and Structural Drawings part of this work insofar as these drawings furnish information relating to design and construction of building. These drawings take precedence over Electrical Drawings.

- .3 Because of small scale of Drawings, it is not possible to indicate all offsets, fittings, and accessories, which may be required. Investigate structural and finish conditions affecting this work and arrange work accordingly, providing such fittings, valves, and accessories required to meet conditions.
- .3 Ensure that items to be furnished fit space available. Make necessary field measurements to ascertain space requirements including those for connections and furnish and install equipment of size and shape so final installation shall suit true intent and meaning of Contract Documents. If approval is received by Addendum or Change Order to use other than originally specified items, be responsible for specified capacities and for ensuring that items to be furnished will fit space available.

1.10 SEQUENCING AND SCHEDULING

- .1 It is understood that while Drawings are to be followed as closely as circumstances permit, this Division will be held responsible for installation of systems according to the true intent and meaning of Contract Documents. Anything not clear or in conflict will be explained by making application to Consultant. Should conditions arise where certain changes would be advisable, secure Consultant's approval of these changes before proceeding with work.
- .2 Coordinate work of various trades in installing interrelated work. Before installation of electrical items, make proper provision to avoid interferences in a manner approved by Consultant. Changes required in work specified in these sections caused by neglect to do so shall be made at no cost to Owner.
- .3 Arrange fixtures, conduit, ducts, and equipment to permit ready access to junction boxes, starters, motors, control components, and to clear openings of doors and access panels.
- .4 Furnish and install inserts and supports required by these sections unless otherwise noted. Furnish sleeves, inserts, supports, and equipment that are an integral part of other Divisions of the Work to Sections involved in sufficient time to be built into construction as the Work proceeds. Locate these items and see that they are properly installed. Expense resulting from improper location or installation of items above shall be borne by the electrical trade.
- .5 Adjust locations of ducts, conduits, equipment, fixtures, etc, to accommodate work from interferences anticipated and encountered. Determine exact route and location of each conduit and duct prior to installation.
 - .1 Make offsets, transitions, and changes in direction of ducts, and electrical raceways as required to maintain proper head room and pitch of sloping lines whether or not indicated on Drawings.
 - .2 Supply and install pull boxes, etc, as required to effect these offsets, transitions, and changes in direction.

1.11 DRAW BREAKDOWN

- .1 This Contractor **MUST** submit a breakdown of the tender price into classifications to the satisfaction of the Consultant, with the aggregate of the breakdown totaling the total contract amount. **Each item must be broken out into material and labour costs.** Progress claims, when submitted are to be itemized against each item of the draw breakdown. This shall be done in table form showing contract amount, amount this draw, total to date, % complete and balance.
- .2 Breakdown shall be as follows:
 - .1 Permits and fees
 - .2 Mobilization (maximum 1%)
 - .3 Demolition
 - .4 Panelboards
 - .5 Feeder conduits
 - .6 Branch conduits
 - .7 Feeder cables
 - .8 Branch wiring
 - .9 Lighting fixtures (interior)
 - .10 Emergency lighting
 - .11 Exterior lighting
 - .12 Fire alarm system
 - .13 Wiring for mechanical equipment
 - .14 Electrical contractor closeout requirements (minimum of 3% but not less than \$2,500.00)
- .3 The breakdown must be approved by the Consultant prior to submission of the first draw.
- .4 Breakdowns not complying to the above will not be approved.
- .5 Breakdown must indicate total contract amount.
- .6 **Mobilization amount may only be drawn when all required shop drawings have been reviewed by the consultant.**

1.12 SHOP DRAWINGS AND PRODUCT DATA

- .1 General
 - .1 Furnish complete catalog data for manufactured items of equipment to be used in the Work to Consultant for review within 30 days after award of Contract.
 - .2 Provide a complete list of shop drawings to be submitted prior to first submission.

- .3 Before submitting to the Consultant, review all shop drawings to verify that the products illustrated therein conform to the Contract Documents. By this review, the Contractor agrees that it has determined and verified all field dimensions, field construction criteria, materials, catalogue numbers, and similar data and that it has checked and coordinated each shop drawing with the requirements of the work and of the Contract Documents. The Contractor's review of each shop drawings shall be indicated by stamp, date and signature of a qualified and responsible person possessing by the appropriate authorization.
- .4 If material or equipment is not as specified or submittal is not complete, it will be rejected by Consultant.
- .5 Additional shop drawings required by the contractor for maintenance manuals, site copies etc., shall be photocopies of the "reviewed" shop drawings. All costs to provide additional copies of shop drawings shall be borne by the contractor.
- .6 **Submit all shop drawings for the project as a package. Partial submittals will not be accepted.**
- .7 Catalog data or shop drawings for equipment, which are noted as being reviewed by Consultant or his Engineer shall not supersede Contract Documents.
- .8 Review comments of Consultant shall not relieve this Division from responsibility for deviations from Contract Documents unless Consultant's attention has been called to such deviations in writing at time of submission, nor shall they relieve this Division from responsibility for errors in items submitted.
- .9 Check work described by catalog data with Contract Documents for deviations and errors.
- .10 Shop drawings and product data shall show:
 - .1 Mounting arrangements.
 - .2 Operating and maintenance clearances. e.g. access door swing spaces.
- .11 Shop drawings and product data shall be accompanied by:
 - .1 Detailed drawings of bases, supports, and anchor bolts.
 - .2 Manufacturer test data where requested.
 - .3 Manufacturer to certify as to current model production.
 - .4 Certification of compliance to applicable codes.
- .12 State sizes, capacities, brand names, motor HP, accessories, materials, gauges, dimensions, and other pertinent information. List on catalog covers page numbers of submitted items. Underline applicable data.

- .13 Once these shop drawings are returned “reviewed” or “reviewed as noted” fabrication, production, and installation may commence. **NOTE: If a shop drawing is returned “reviewed as noted” this Contractor must provide written indication that the comments have been complied with.**

A partial list of shop drawings includes:

- .1 Panelboards
- .2 Fire alarm system
- .3 Luminaires
- .4 Emergency battery units and fixtures
- .5 Firestopping materials
- .6 Wiring devices
- .7 Lighting controls and occupancy sensors
- .8 Destratification Fans and controls

- .2 Submissions shall be submitted electronically as per the following directions:

- .1 Electronic Submissions:

- .1 Electronically submitted shop drawings shall be prepared as follows:

- .1 Use latest software to generate PDF files of submission sheets.
- .2 Scanned legible PDF sheets are acceptable. Image files are not acceptable.
- .3 PDF format shall be of sufficient resolution to clearly show the finest detail.
- .4 PDF page size shall be standardized for printing to letter size (8.5"x11"), portrait with no additional formatting required by the consultant. Submissions requiring larger detail sheets shall not exceed 11"x17".
- .5 Submissions shall contain multiple files according to section names as they appear in Specification.
- .6 File names shall include consultant project number and description of shop drawing section submitted.
- .7 Each submission shall contain an index sheet listing the products submitted, indexed in the same order as they appear in the Specification. Include associated PDF file name for each section.
- .8 On the shop drawing use an “electronic mark” to indicate what is being provided.
- .9 **Each file shall bear an electronic representation of the “company stamp” of the contractor. If not stamped the file submission will not be reviewed.**

- .2 Email submissions shall include subject line to clearly identify the consultants’ project number and the description of the shop drawings submitted.

- .3 Electronic attachments via email shall not exceed 10MB. For submissions larger than 10MB, multiple email messages shall be used. Denote related email messages by indicating “1 of 2” and “2 of 2” in email subject line for the case of two messages.
- .4 Electronic attachments via web links (URL) shall directly reference PDF files. Provide necessary access credentials within link or as username/password clearly identified within body of email message.
- .5 On site provide one copy of the “reviewed” shop drawings in a binder as noted above.
- .6 Contractor to print copies of “reviewed” shop drawings and compile into maintenance manuals in accordance with requirements detailed in this section.

1.13 CARE, OPERATION, AND START-UP

- .1 Instruct Consultant and operating personnel in the operation, care, and maintenance of equipment.
- .2 Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance, and calibrate components.
- .3 Provide these services for such period, and for as many visits as necessary to put equipment in operation and ensure that operating personnel are conversant with all aspects of its care and operation.

1.14 VOLTAGE RATINGS

- .1 Operating voltages: to CAN3-C235-83.
- .2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard. Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

1.15 PERMITS, FEES, AND INSPECTION

- .1 A submission has been made (if required by this scope of project) by the consultant to the Electrical Safety Authority for review of this project. The payment of the required review costs will be co-ordinated by the consultant. A copy of the Electrical Safety Authority review report will be forwarded to the successful contractor for information and action.
- .2 The contractor is required to include in his tender all required inspection costs by the Electrical Safety Authority. Permit application is the responsibility of the contractor.
- .3 Reproduce drawings and specifications required by Electrical Safety Authority at no cost.
- .4 Notify Consultant of changes required by Electrical Safety Authority prior to making changes.

- .5 Furnish Certificates of Acceptance to Engineer from Electrical Safety Authority and other authorities having jurisdiction upon completion of work.
- .6 This contractor must furnish any certificates required to indicate that the work completed conforms with laws and regulations of authorities having jurisdiction.

1.16 MATERIALS AND EQUIPMENT

- .1 Equipment and material to be CSA certified. Where there is no alternative to supplying equipment which is not CSA certified, obtain special approval from Electrical Safety Authority.
- .2 Factory assemble control panels and component assemblies.

1.17 ELECTRIC MOTORS, EQUIPMENT, AND CONTROLS

- .1 Supplier and installer responsibility is indicated in the Equipment Wiring Schedule on electrical drawings.
- .2 Control wiring and conduit is specified in the Electrical specifications except for conduit, wiring and connections below 50 V, which are related to control systems specified in the Mechanical specifications.

1.18 FINISHES

- .1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.
 - .1 Paint outdoor electrical equipment "equipment green" finish.
 - .2 Paint indoor switchgear and distribution enclosures light grey.
- .2 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.
- .3 Clean and prime exposed non-galvanized hangers, racks, fastenings, and conduits etc. to prevent rusting.

1.19 EQUIPMENT IDENTIFICATION

- .1 Identify electrical equipment with nameplates as follows:
- .2 Nameplates:
 - .1 Lamicoïd 3 mm (1/8") thick plastic engraving sheet, black face, white core, mechanically attached with self tapping screws.

NAMEPLATE SIZES

Size 1	9 mm x 50 mm (3/8" x 2")	1 line	3 mm (1/8") high letters
Size 2	12 mm x 70 mm (1/2" x 2 1/2")	1 line	5 mm (3/16") high letters
Size 3	12 mm x 70 mm (1/2" x 2 1/2")	2 lines	3 mm (1/8") high letters
Size 4	20 mm x 90 mm (3/4" x 3 1/2")	1 line	9 mm (3/8") high letters
Size 5	20 mm x 90 mm (3/4" x 3 1/2")	2 lines	5 mm (3/16") high letters
Size 6	25 mm x 100 mm (1" x 4")	1 line	12 mm (1/2") high letters
Size 7	25 mm x 100 mm (1" x 4")	2 lines	6 mm (1/4") high letters

- .3 Wording on nameplates labels to be approved by Consultant prior to manufacture.

- .4 Allow for average of twenty-five (25) letters per nameplate.
- .5 Identification to be English.
- .6 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.
- .7 Nameplates for disconnects, starters and contactors must indicate equipment being controlled and voltage.
- .8 Nameplates for transformers must indicate transformer label as indicated and capacity, primary, and secondary voltages.

1.20 WIRING IDENTIFICATION

- .1 Identify wiring with permanent indelible identifying markings, either numbered or coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.
- .2 Maintain phase sequence and colour coding throughout.
- .3 Colour code: to CSA C22.1.
- .4 Use colour coded wires in communication cables, matched throughout system.

1.21 CONDUIT AND CABLE IDENTIFICATION

- .1 Colour code conduits, boxes, and metallic sheathed cables.
- .2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m (45') intervals.
- .3 Colour bands must be 25 mm (1") wide.

	<u>Prime</u>
up to 208 V	yellow
Fire alarm	red
Emergency lighting	pink
- .4 This contractor must paint all system junction boxes and covers in conformance with the above schedule.

1.22 PROTECTION OF OPENINGS

- .1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

1.23 WIRING TERMINATIONS

- .1 Lugs, terminals, screws used for termination of wiring to be suitable for either copper or aluminum conductors.

1.24 MANUFACTURERS AND CSA LABELS

- .1 All labels must be visible and legible after equipment is installed.

1.25 WARNING SIGNS

- .1 To meet requirements of Electrical Safety Authority and Consultant.
- .2 Provide porcelain enamel signs, with a minimum size of 175 mm x 250 mm (7" x 10").

1.26 LOCATION OF OUTLETS

- .1 Do not install outlets back-to-back in wall; allow minimum 150 mm (6") horizontal clearance between boxes.
- .2 Change location of outlets at no extra cost or credit, providing distance does not exceed 3 m (10'), and information is given before installation.
- .3 Locate light switches on latch side of doors. Locate disconnect devices in mechanical rooms on latch side of door.

1.27 MOUNTING HEIGHTS

- .1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise. Coordinate with block coursing (if applicable).
- .2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.
- .3 Install electrical equipment at following heights unless indicated otherwise.
 - .1 Local switches: 1100 mm (43.3").
 - .2 Wall receptacles:
 - .1 General: 400 mm (16").
 - .2 Above top of continuous baseboard heater: 200 mm (8").
 - .3 Above top of counters or counter splash backs: 100 mm (4").
 - .3 Panelboards: as required by Code or 1400mm (48")
 - .4 Voice/Data outlets: At height of adjacent outlet or at 400 mm (16").
 - .5 Fire alarm visual and signal devices: 2250 mm (88 ½").
 - .6 Television outlets: 400 mm (16").

1.28 LOAD BALANCE

- .1 Measure phase current to panelboards with normal loads (lighting) operating at time of acceptance. Adjust branch circuit connections as required to obtain best balance of current between phases and record changes.
- .2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.
- .3 Submit, at completion of work, report listing phase and neutral currents on panelboards, dry-core transformers, and motor control centres, operating under normal load. State hour and date on which each load was measured, and voltage at time of test.

1.29 CONDUIT AND CABLE INSTALLATION

- .1 Install conduit and sleeves prior to pouring of concrete. Sleeves through concrete shall be schedule 40 steel pipe, sized for free passage of conduit, and protruding 50 mm (2") beyond either side.
- .2 Install cables, conduits, and fittings to be embedded or plastered over, neatly and close to building structure so furring can be kept to minimum.

1.30 FIELD QUALITY CONTROL

- .1 Conduct and pay for following tests:
 - .1 Power distribution system including phasing, voltage, grounding, and load balancing.
 - .2 Circuits originating from branch distribution panels.
 - .3 Lighting and its control.
 - .4 Motors, heaters, and associated control equipment including sequenced operation of systems where applicable.
 - .5 Systems: fire alarm system, communications, security.
- .2 Furnish manufacturer's certificate or letter confirming that entire installation as it pertains to each system has been installed to manufacturer's instructions.
- .3 Insulation resistance testing.
 - .1 Megger circuits, feeders, and equipment up to 350 V with a 500 V instrument.
 - .2 Megger 350-600 V circuits, feeders, and equipment with a 1000 V instrument.
 - .3 Check resistance to ground before energizing.
- .4 Carry out tests in presence of Consultant.
- .5 Provide instruments, meters, equipment, and personnel required to conduct tests during and at conclusion of project.
- .6 Submit test results for Consultant's review.

1.31 GUARANTEE AND WARRANTY

- .1 At the substantial completion stage of this project this Contractor must provide a written guarantee indicating that any defects, not due to ordinary wear and tear or improper use which occur within the first two (2) years from the date of substantial completion will be corrected at the contractor's expense.
- .2 **If the electrical sub-contractor's office is 50 kilometers (30 miles) or more from the project site, the sub-contractor is to provide a service/warranty work agreement for warranty period with a local electrical sub-contractor approved by Consultant. Include copy of service/warranty agreement in warranty section of operation and maintenance manual.**
- .3 Warranty period shall start from date of substantial completion.
- .4 Refer to individual specification sections for information on any special manufacturer's equipment warranties.

1.32 SYSTEM START UP

- .1 Provide consultant with written notice verifying all equipment operation and installation is complete prior to scheduled start-up period.
- .2 Start up shall be in presence of the following: owner or representative, contractor, and manufacturer's representative. Each person shall witness and sign off each piece of equipment. Consultant's attendance will be determined by consultant.
- .3 Arrange with all parties and provide 72 hours notice for start up procedure.
- .4 Simulate system start up and shut down and verify operation of each piece of equipment.
- .5 These tests are to demonstrate that the systems and equipment installed are operational as specified.
- .6 The contractor must describe during the start up session the required maintenance for each piece of equipment according to the manufacturer.
- .7 The contractor must provide all necessary tools (including a digital multimeter) to successfully complete the start up procedure.

1.33 OPERATION AND MAINTENANCE MANUAL

- .1 Provide operation and maintenance data for incorporation into manual as specified in other Sections of this Division.
- .2 Operation and maintenance manual to be approved by, and final copies deposited with, Consultant before final inspection. Make changes as requested and re-submit as directed by Consultant.
- .3 Submit one manual for approval. Two manuals will be required at project completion. Each of which shall be in a three ring binder (minimum 50 mm (2") ring) labelled:
 - .1 Operation and Maintenance Manual.
 - .2 Project Name.
 - .3 Location.
- .4 Each manual must include (in "tabbed" sections) the following:
 - .1 Index
 - .2 List of General, Mechanical, Electrical Contractors and all associated sub-contractor names, addresses and contact numbers.
 - .3 List of suppliers and equipment wholesalers local to the project.
 - .4 Two (2) year warranty letter for all parts, equipment, and workmanship.
 - .5 List of manufacturers, spare parts list, and source.
 - .6 Copy of typewritten schedules for all new and renovated panels.
 - .7 Receipt of turned over keys for electrical panels.
 - .8 Final certificate from the Electrical Safety Authority.
 - .9 Final Fire alarm verification certificate including field technician device sheets.
 - .10 Certificate of exit/emergency lighting testing as per the specification.

- .11 Copy of electrical shop drawings which have been stamped and reviewed by Consultant.
- .12 Electrical As-built drawings including contractor company's as built stamp.
- .13 Any special warranties on equipment required (i.e. LED lighting, digital lighting control).
- .14 Certificate of completion from all associated sub-contractors.
- .15 Lighting control system commissioning certificate and report.
- .5 Upon acceptance of Operation and Maintenance Manual by the consultant, a pdf file of the entire manual is to be provided on a USB stick. Only one USB stick is to be provided containing both the approved manuals and as-built drawings.

1.34 AS-BUILT DRAWINGS

- .1 Site records:
 - .1 Contractor shall provide two (2) sets of reproducible electrical drawings. Provide sets of white prints as required for each phase of the work. Mark thereon all changes as work progresses and as changes occur. This shall include field and contract changes to electrical systems.
 - .2 On a weekly basis, transfer information to reproducibles, revising reproducibles to show all work as actually installed.
 - .3 Use different colour waterproof ink for each service.
 - .4 Make available for reference purposes and inspection at all times.
- .2 As-built drawings:
 - .1 Identify each drawing in lower right hand corner in letters at least 3 mm (1/8") high as follows: - "AS-BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW ELECTRICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (date).
 - .2 Submit hard copy to Consultant for approval. When returned, make corrections (if any) as directed.
 - .3 Once approved, submit completed reproducible paper as-built drawings as well as a scanned pdf file copy on USB stick with Operating and Maintenance Manuals.

1.35 DEMONSTRATION AND OPERATING AND MAINTENANCE INSTRUCTIONS

- .1 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.
- .2 Manufacturers or their representatives are to provide demonstrations and instructions.
- .3 Use operation and maintenance manual, As-built drawings, audio visual aids, etc. as part of instruction materials.
- .4 Instruction duration time requirements as specified in appropriate sections.
- .5 Where deemed necessary, Consultants may record these demonstrations on video tape for future reference.

1.36 SUBSTANTIAL PERFORMANCE

- .1 Complete the following to the satisfaction of the consultant prior to submission of substantial performance.
 - .1 As-built Drawings.
 - .2 Maintenance Manuals.
 - .3 System Start up.
 - .4 Instructions to Owners.
 - .5 Final Certificates (Electrical Safety Authority, Fire Alarm, Emergency Lighting2029).

1.37 TRIAL USAGE

- .1 Consultant or owner may use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.

1.38 REVISION TO CONTRACT

- .1 Provide the following for each item in a given change notice:
 - .1 Itemized list of material with associated costs.
 - .2 Labour rate and itemized list of labour for each item.
 - .3 Copy of manufacturer's/supplier's invoice if requested.

1.39 EQUIPMENT SUPPORTS

- .1 Equipment supports supplied by equipment manufacturer: shall be installed by the electrical contractor.
- .2 Equipment supports not supplied by equipment manufacturer: fabricate from structural grade steel meeting requirements of - Structural Steel Section. Submit structural calculations with shop drawings if necessary.
- .3 Mount base mounted equipment on chamfered edge housekeeping pads, minimum of 100 mm (4") high and 150 mm (6") larger than equipment dimensions all around. This installation of this pad shall be the responsibility of the electrical contractor.
- .4 This contractor shall be responsible for providing all anchor bolts and associated formed concrete bases for lighting standards as detailed.

1.40 SLEEVES

- .1 Pipe sleeves: at points where pipes pass through masonry, concrete, or fire rated assemblies and as indicated.
- .2 Schedule 40 steel pipe.
- .3 Sleeves with annular fin continuously welded at midpoint:
 - .1 Through foundation walls.
 - .2 Where sleeve extends above finished floor.
- .4 Sizes: minimum 6 mm (1/4") clearance all around, between sleeve and conduit.

- .5 Terminate sleeves flush with surface of concrete and masonry walls, concrete floors on grade and 25 mm (1") above other floors.
- .6 Through foundation walls PVC sleeves are acceptable.
- .7 Fill voids around pipes:
 - .1 Caulk between sleeve and pipe in foundation walls and below grade floors with waterproof fire retardant non-hardening mastic.
 - .2 Where sleeves pass through walls or floors, provide space for firestopping. Where pipes/ducts pass through fire rated walls, floors and partitions, maintain fire rating integrity.
 - .3 Fill future-use sleeves with easily removable filler.

1.41 FIRESTOPPING

- .1 Firestopping material and installation within annular space between conduits, ducts, and adjacent fire separation.
- .2 Provide materials and systems capable of maintaining effective barrier against flame, smoke, and gases.
- .3 Comply with the requirements of CAN4-S115-M35, and do not exceed opening sized for which they have been tested.
- .4 Systems to have an F or FT rating (as applicable) not less than the fire protection rating required for closures in a fire separation.
- .5 The firestopping materials are not to shrink, slump or sag and be free of asbestos, halogens and volatile solvents.
- .6 Firestopping materials are to consist of a component sealant applied with a conventional caulking gun and trowel.
- .7 Firestop materials are to be capable of receiving finish materials in those areas, which are exposed and scheduled to receive finishes.
- .8 Firestopping shall be inspected and approved by local authority prior to concealment or enclosure.
- .9 Install material and components in accordance with ULC certification, manufacturers instructions and local authority.
- .10 Submit product literature and installation material on firestopping in shop drawing and product data manual.**

- .11 Acceptable manufacturers:
 - .1 Rectorseal Corporation (Metacaulk)
 - .2 Proset Systems
 - .3 3M
 - .4 Hilti
 - .5 STI Firestop

Note: Fire stop material must conform to requirements of local authorities having jurisdiction. Contractor to confirm prior to application and ensure material used is compatible with that used by other trades on site.

- .12 Ensure firestop manufacturer representative performs on site inspections and certifies installation. Submit inspection reports/certification at time of substantial completion.

1.42 PAINTING

- .1 Refer to Section Interior Painting and specified elsewhere.
- .2 Apply at least one coat of corrosion resistant primer paint to ferrous supports and site fabricated work.
- .3 Prime and touch up marred finished paintwork to match original.
- .4 Restore to new condition, or replace equipment at discretion of consultant, finishes which have been damaged too extensively to be merely primed and touched up.

1.43 ACCESS DOORS

- .1 Supply access doors to concealed electrical equipment for operating, inspecting, adjusting, and servicing.
- .2 Flush mounted 600 mm x 600 mm (24" x 24") for body entry and 300 mm x 300 mm (12" x 12") for hand entry unless otherwise noted. Doors to open 180°, have rounded safety corners, concealed hinges, screwdriver latches and anchor straps.
- .3 Material:
 - .1 Special areas such as tiled or marble surfaces: use stainless steel with brushed satin or polished finish as directed by Consultant.
 - .2 Remaining areas: use prime coated steel.
 - .3 Fire rated areas: provide ULC listed access doors.
- .4 Installation:
 - .1 Locate so that concealed items are accessible.
 - .2 Locate so that hand or body entry (as applicable) is achieved.
 - .3 Installation is specified in applicable sections.
- .5 Acceptable materials:
 - .1 Le Hage
 - .2 Zurn
 - .3 Acudor
 - .4 Nailor Industries Inc.

1.44 DELIVERY STORAGE, AND HANDLING

- .1 Follow Manufacturer's directions in delivery, storage, and protection, of equipment and materials.
- .2 Deliver equipment and material to site and tightly cover and protect against dirt, water, and chemical or mechanical injury, but have readily accessible for inspection. Store items subject to moisture damage (such as controls) in dry, heated space.

1.45 REPAIR, CUTTING, CORING, AND RESTORATION

- .1 Be responsible for required digging, cutting, and patching incident to work of this Division and make required repairs afterwards to satisfaction of Consultant. Cut carefully to minimize necessity for repairs to existing work. Do not cut beams, columns, or trusses.
- .2 Patch and repair walls, floors, ceilings, and roofs with materials of same quality and appearance as adjacent surfaces unless otherwise shown. Surface finishes shall exactly match existing finishes of same materials.
- .3 Each Section of this Division shall bear expense of cutting, patching, repairing, and replacing of work of other Sections required because of its fault, error, tardiness, or because of damage done by it.
- .4 Cutting, patching, repairing, and replacing pavements, sidewalks, roads, and curbs to permit installation of work of this Division is responsibility of Section installing work.
- .5 Slots, cores and openings through floors, walls, ceilings, and roofs shall be provided by this contractor but performed by a trade specializing in this type of work. This Division shall see that they are properly located and do any cutting and patching caused by its neglect to do so.

1.46 EXISTING SYSTEMS

- .1 Connections into existing systems to be made at time approved by Consultant. Request written approval of time when connections can be made.
- .2 Be responsible for damage to existing plant by this work.

1.47 CLEANING

- .1 Clean interior and exterior of all electrical equipment provided including light fixture lenses.
- .2 In preparation for final acceptance, clean and refurbish all equipment and leave in operating condition.

1.48 ASBESTOS

- .1 If asbestos is suspected or identified cease all work in the immediate area in accordance with OHSA and notify consultant.
- .2 Each contractor and on site employee of the contractor shall have "asbestos awareness training".

- .3 The Contractor shall ensure that employees who may come into contact with asbestos due to the nature of the work that they perform, have received training that enables them to recognize asbestos and that enables them to react in accordance with the Occupational Health and Safety Act and regulations thereto should contact with asbestos occur during the course of their work.
- .4 **It is the responsibility of the contractor to review the asbestos book in the building prior to starting any work.**
- .5 Existing occupied buildings (depending upon their age) may contain asbestos in thermal insulating materials and some manufactured products, such as vinyl asbestos floor tile. Any insulating materials, on pipes, fittings, boilers, tanks, ductwork, etc. may contain asbestos and shall not be disturbed.
- .6 **A survey of each building documenting the location and condition of asbestos-containing materials is available for your mandatory review prior to commencing any work on premises.**

1.49 DISCONNECTION AND REMOVAL

- .1 Disconnect and/or remove equipment as indicated.
- .2 Cap and conceal all redundant and obsolete connections.
- .3 Provide a list of equipment to be removed to the owner, for his acceptance of same. Remove all equipment from site, which the owner does not retain.
- .4 Store equipment to be retained by owner on site where directed by consultant.

1.50 OWNER SUPPLIED EQUIPMENT

- .1 Connect to equipment supplied by the owner and make operable.

1.51 ENCLOSURES

- .1 This contractor must ensure that all electrical equipment mounted in sprinklered areas is provided with an enclosure in conformance with the Electrical Safety Code.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 CSA C22.2 No.0.3-92, Test Methods for Electrical Wires and Cables.

1.2 PRODUCT DATA

- .1 Submit product data in accordance with Electrical General Requirements Section.

Part 2 Products

2.1 BUILDING WIRES

- .1 Conductors: stranded for 10 AWG and larger.
- .2 Minimum size: 12 AWG.
- .3 Copper conductors: size as indicated, with 600 V insulation of chemically cross-linked thermosetting polyethylene material 90°C (194°F) rated T90 for indoor above grade installations and RW90 for below grade installations.

2.2 ARMoured CABLES

- .1 Conductors: insulated, copper minimum size as indicated above.
- .2 Type: AC90 (minimum size 12 AWG).
- .3 Armour: interlocking type fabricated from aluminum strip.
- .4 Connectors must be suitable for installed environment and approved for use with armoured cable.

Part 3 Execution

3.1 INSTALLATION OF BUILDING WIRES

- .1 Install wiring from source to load through raceways as specified.
- .2 Provide separate neutral conductors for all lighting circuits and circuits originating from surge protected panels. Size raceways accordingly.

3.2 INSTALLATION OF ARMOURED CABLES

- .1 Group cables wherever possible.
- .2 Terminate cables in accordance with Wire and Box Connectors - 0 - 1000 V Section.
- .3 These cables are to be installed in concealed locations only. These concealed locations are considered to be stud walls and “drops” to stud walls, lighting fixtures, and ceiling mounted devices.
- .4 **These “drops” shall not be permitted to exceed 2.4 m (8'-0"). To limit these “drops” to lengths noted above provide additional branch wiring in conduit.**

END OF SECTION

Part 1 General

1.1 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data for cabinets in accordance with Electrical General Requirements Section.

Part 2 Products

2.1 MATERIALS

- .1 Junction and pull boxes must conform to CSA C22.2 No. 40 (latest edition)

2.2 JUNCTION AND PULL BOXES

- .1 Welded steel construction with screw-on flat covers for surface mounting.
- .2 Covers with 25 mm (1") minimum extension all around, for flush-mounted pull and junction boxes.

Part 3 Execution

3.1 JUNCTION AND PULL BOXES INSTALLATION

- .1 Install pull boxes in inconspicuous but accessible locations.
- .2 Install junction and pull boxes so as not to exceed 30 m (100') of conduit run between pull boxes and in conformance with the Electrical Safety Code.

3.2 IDENTIFICATION

- .1 Provide equipment identification in accordance with General Electrical Requirements Section.
- .2 Install size 2 identification labels indicating system name, voltage, and phase.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Outlet boxes, conduit boxes, and fittings must conform to CSA C22.2 No. 18 (latest edition).

Part 2 Products

2.1 OUTLET AND CONDUIT BOXES GENERAL

- .1 Size boxes in accordance with CSA C22.1.
- .2 102 mm (4") square or larger outlet boxes as required for special devices.
- .3 Gang boxes where wiring devices are grouped.
- .4 Blank cover plates for boxes without wiring devices.
- .5 Combination boxes with barriers where outlets for more than one system are grouped.

2.2 SHEET STEEL OUTLET BOXES

- .1 Electro-galvanized steel single and multi gang flush device boxes for flush installation, minimum size 76 mm x 50 mm x 64 mm (3" x 2" x 2½") or as indicated. 102 mm (4") square outlet boxes when more than one conduit enters one side with extension and plaster rings as required. Iberville 1104 Series.
- .2 Electro-galvanized steel utility boxes for outlets connected to surface-mounted EMT conduit **in utility rooms**, minimum size 102 mm x 57 mm x 38 mm (4" x 2¼" x 1½"). Iberville 1110 Series.
- .3 102 mm (4") square or octagonal outlet boxes for lighting fixture outlets.
- .4 102 mm (4") square outlet boxes with extension and plaster rings for flush mounting devices in finished tile walls.

2.3 MASONRY BOXES

- .1 Electro-galvanized steel masonry single and multi gang boxes for devices flush mounted in exposed block walls.

2.4 CONCRETE BOXES

- .1 Electro-galvanized sheet steel concrete type boxes for flush mount in concrete with matching extension and plaster rings as required.

2.5 CONDUIT BOXES

- .1 Cast FS or FD ferrous alloy boxes with factory-threaded hubs and mounting feet for surface wiring of switches and receptacle **in areas (other than utility rooms) where surface conduit is used.**

2.6 OUTLET BOXES FOR NON-METALLIC SHEATHED CABLE

- .1 Electro-galvanized, sectional, screw ganging steel boxes, minimum size 76 mm 50 mm x 63 mm (3" x 2" x 2-1/2") with two double clamps to take non-metallic sheathed cables.

2.7 FITTINGS- GENERAL

- .1 Bushing and connectors with nylon insulated throats.
- .2 Knock-out fillers to prevent entry of debris.
- .3 Conduit outlet bodies for conduit up to 32 mm (1- 1/4") and pull boxes for larger conduits.
- .4 Double locknuts and insulated bushings on sheet metal boxes.

Part 3 Execution

3.1 INSTALLATION

- .1 Support boxes independently of connecting conduits.
- .2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.
- .3 For flush installations mount outlets flush with finished wall using plaster rings to permit wall finish to come within 6 mm (1/4") of opening.
- .4 Provide correct size of openings in boxes for conduit, mineral insulated and armoured cable connections. Reducing washers are not allowed.
- .5 Outlets if unwired are to be provided with blank coverplates to suit related sections of this specification.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 CSA C22.2 No.65-1956(R1965) Wire Connectors.

Part 2 Products

2.1 MATERIALS

- .1 Pressure type wire connectors: with current carrying parts of copper sized to fit copper conductors as indicated.
- .2 Fixture type splicing connectors: with current carrying parts of copper sized to fit copper conductors 10 AWG or less.
- .3 Clamps or connectors for armoured cable and flexible conduit, as required.

Part 3 Execution

3.1 INSTALLATION

- .1 Remove insulation carefully from ends of conductors and:
 - .1 Apply coat of zinc joint compound on aluminum conductors prior to installation of connectors.
 - .2 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CSA C22.2 No.65.
 - .3 Install fixture type connectors and tighten. Replace insulating cap.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA C22.2 No.18-92, Outlet Boxes, Conduit Boxes, and Fittings.
 - .2 CSA C22.2 No.56-1977(R1977), Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
 - .3 CSA C22.2 No.83-M1985(R1992), Electrical Metallic Tubing.

Part 2 Products

2.1 CONDUITS

- .1 Epoxy coated conduit: to CSA C22.2 No.45, with zinc coating and corrosion resistant epoxy finish inside and outside.
- .2 Electrical metallic tubing (EMT) with couplings: to CSA C22.2 No.83.
- .3 Flexible metal conduit: to CSA C22.2 No.56, aluminum and liquid-tight flexible metal.

2.2 CONDUIT FASTENINGS

- .1 One hole steel straps to secure surface conduits 53 mm (2") and smaller. Two hole steel straps for conduits larger than 53 mm (2").
- .2 Beam clamps to secure conduits to exposed steel work.
- .3 Channel type supports for two or more conduits at 1.5 m (5'0") oc.
- .4 Threaded rods, 6 mm (1/4") diameter, to support suspended channels.

2.3 CONDUIT FITTINGS

- .1 EMT fittings shall be set screw style (zinc alloy).
- .2 Flexible metal conduit fittings shall be screw-in type.
- .3 Liquid type flexible metal conduit fittings shall be sealtite type.
- .4 Coating: same as conduit.
- .5 Factory "ells" where 90° bends are required for 27 mm (1") and larger conduits.
- .6 Where bushings are noted to be provided they must be "screwed" type fastened to a conduit connector. Push-fit or glued in place bushings will NOT be accepted.

2.4 FISH CORD

- .1 Nylon twine.

Part 3 Execution

3.1 INSTALLATION

- .1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.
- .2 Conceal conduits except in mechanical/ electrical service rooms and in unfinished areas.
- .3 Use electrical metallic tubing (EMT) for all branch circuits unless specified otherwise.**
- .4 Use flexible metal conduit for connection to motors in dry areas, connection to recessed fixtures without a prewired outlet box, connection to surface or recessed fixtures, work in movable metal partitions.
- .5 Use liquid tight flexible metal conduit for connection to motors or vibrating equipment in damp, wet or corrosive locations and for connections to kitchen equipment.
- .6 Conduits terminating at electrical equipment in sprinklered areas are to be provided with insulated compression style connectors equal to Thomas & Betts Cat. #TC8XXSC or approved equal.
- .7 **Minimum conduit size for branch circuits shall be 21 mm (3/4").** Single drops from ceiling mounted junction boxes down to a light switch or duplex receptacle may be reduced to 16 mm (1/2").
- .8 Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its original diameter.
- .9 Mechanically bend steel conduit over 27 mm (1") diameter.
- .10 Install fish cord in empty conduits.
- .11 Run 2- 27 mm (1") spare conduits up to accessible ceiling space from each flush panel. Terminate these conduits in 152 mm x 152 mm x 102 mm (6" x 6" x 4") junction boxes in ceiling space.
- .12 Remove and replace blocked conduit sections. Do not use liquids to clean out conduits.
- .13 Dry conduits out before installing wire.

3.2 SURFACE CONDUITS

- .1 Run parallel or perpendicular to building lines.
- .2 Locate conduits behind infrared or gas fired heaters with 1.5 m (5') clearance.
- .3 Run conduits in flanged portion of structural steel.
- .4 Group conduits wherever possible on suspended or surface channels.
- .5 Do not pass conduits through structural members except as indicated.
- .6 Do not locate conduits less than 75 mm (3") parallel to steam or hot water lines with minimum of 25 mm (1") at crossovers.
- .7 Do not fasten surface conduit to roof deck. Provide standoffs or supports as manufactured by Caddy or use unistrut trapeze fastened to structure.**

3.3 CONCEALED CONDUITS

- .1 Do not install horizontal runs in masonry walls.

END OF SECTION

Part 1 General

1.1 SHOP DRAWINGS

- .1 Submit shop drawings for each system in Conformance with The Electrical General Requirements Section.

1.2 PRODUCT/MAINTENANCE DATA

- .1 Submit product/maintenance data for each system for inclusion in maintenance manual conforming to The General Electrical Requirements Section.

1.3 SCOPE

- .1 The scope of this Section will include the following systems.
 - .1 Telecommunication network system rough-in.
 - .2 Occupancy Sensors

Part 2 Products

2.1 TELECOMMUNICATION NETWORK SYSTEM ROUGH-IN

- .1 Outlets where noted shall be single gang flush mounted in wall or surface raceways.
- .2 Outlets if unwired are to be provided with blank coverplates to suit related sections of this specification.
- .3 Provide a #6 insulated green ground conductor from main service ground to voice equipment backboard located on drawings.
- .4 Refer to Telecommunication Network Installations section for additional requirements.

2.2 OCCUPANCY SENSORS

- .1 Where noted on the drawings, the wall mounted switch style occupancy sensor used in Washrooms shall be a dual technology switch with either single or double relay (circuit) as noted on the drawings. Colour to suit architect.

Note: For dual relay switches, program the sensor for 30 minute off delay, enabled walk-thru, audible alert enabled, relay 1 on mode: auto on, relay 2 on mode: manual on.

- .1 Single relay (circuit): Wattstopper Cat. #DW-100
- .2 Dual relay (circuit): Wattstopper Cat. #DW-200
- .3 Approved equal:
 - .1 Hubbell.
 - .2 Leviton.
 - .3 Sensor switch.
 - .4 Cooper Controls (Greengate).

- .2 Provide other occupancy sensors to suit the detail on the drawings.
- .3 All sensors shall be set to 20 minutes “delay to off” unless otherwise directed.

Part 3 Execution

3.1 TELECOMMUNICATION NETWORK SYSTEM ROUGH-IN

- .1 Conduits terminated into ceiling spaces must be within 3m (10') of zone conduits (if applicable).
- .2 Outlets are to be installed complete with 25 mm (1") conduit to corridor ceiling space or nearest zone conduit (if applicable).
- .3 Provide insulated bushings on all conduits terminated in ceiling space.

END OF SECTION

Part 1 General

1.1 PRODUCT DATA

- .1 Submit product data in accordance with Electrical General Requirements Section.
- .2 Drawings to include electrical detail of panel, branch breaker or switch type, quantity, ampacity, and enclosure dimension.

Part 2 Products

2.1 PANELBOARDS

- .1 Panel boards must conform to CSA C22.2 No. 29 (latest edition).
- .2 Panelboards: product of one manufacturer.
- .3 Install circuit breakers in panelboards before shipment.
- .4 In addition to CSA requirements manufacturer's nameplate must show fault current that panel including breakers has been built to withstand. **Series rating is acceptable – submit information with shop drawings.**
- .5 Bus and breakers/switches must be rated for symmetrical interrupting capacity as indicated.
- .6 Sequence phase bussing with odd numbered breakers on left and even on right, with each breaker identified by permanent number identification as to circuit number and phase.
- .7 Panelboard mains, number of circuits, and number and size of branch circuit breakers as indicated.
- .8 Two keys for each panelboard and key panelboards alike.
- .9 Aluminum bus with neutral of same ampere rating as mains.
- .10 Mains must be suitable for bolt-on breakers. Provide main (if applicable) and branch breakers as bolt-on style.
- .11 Trim with concealed front bolts and hinges.
- .12 Trim and door finish must be baked grey enamel.
- .13 All panels regardless of voltage and amperage must be provided with a lockable door.
- .14 Branch circuit panelboards (250 AMP or smaller) must be one of the following:
 - .1 Eaton Cat # POW-R-LINE-C PRL-1 or PRL-2,
 - .2 Schneider Electric Cat # NQ Series
 - .3 Siemens Cat #Sentron P1 Series

2.2 BREAKERS

- .1 Breakers: to Moulded Case Circuit Breakers Section.
- .2 Breakers with thermal and magnetic tripping in panelboards except as indicated otherwise.
- .3 Main breaker (as specified) must be separately mounted on top or bottom of panel to suit cable entry. When mounted vertically, down position should open breaker.
- .4 Lock-on devices for fire alarm, stairway, exit and night light circuits.

2.3 EQUIPMENT IDENTIFICATION

- .1 Provide equipment identification in accordance with Electrical General Requirements Section.
- .2 Nameplate for each panelboard size 4 engraved description as indicated. In finished areas install label on inside of panel, and in service areas install label on exterior of panel.
- .3 Nameplate for each circuit in distribution panelboards size 2 engraved “name of load” as indicated.
- .4 Complete circuit directory with typewritten legend showing location of each circuit.
Include a copy of the directories in the maintenance manuals.

Part 3 Execution

3.1 INSTALLATION

- .1 Locate panelboards as indicated and mount securely, plumb, true and square, to adjoining surfaces.
- .2 Install surface mounted panelboards on plywood backboards. Where practical, group panelboards on common backboard. Plywood shall be 21mm (3/4”) fire rated or painted with intumescent fire block paint having a minimum of 1h rating, unless noted otherwise.
- .3 Mount panelboards to height specified in Electrical General Requirements Section or as indicated.
- .4 Connect loads to circuits.
- .5 Connect neutral conductors to common neutral bus.

END OF SECTION

Part 1 General

1.1 PRODUCT DATA

- .1 Submit product data in accordance with Electrical General Requirements Section.

Part 2 Products

2.1 BREAKERS GENERAL

- .1 Moulded case circuit breakers must conform to CSA C22.1 No.5.1-M91 (latest edition.)
- .2 Bolt-on moulded case circuit breaker quick-make, quick-break type, for manual and automatic operation.
- .3 Common-trip breakers: with single handle for multi-pole applications.
- .4 Unless otherwise indicated moulded case circuit breaker to operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping and instantaneous tripping for short circuit protection.
- .5 Moulded case circuit breakers 250 Amps and above are to operate by means of a solid-state trip unit with associated current monitors and self-powered shunt trip to provide inverse time current trip under overload condition, and long time, short time, instantaneous tripping for phase and ground fault short circuit protection (if indicated or applicable by the Electrical Safety Code versus the breaker amperage). Unless otherwise specified, complete system selective co-ordination shall be provided by the individually adjustable time/current curve shaping elements as following:
 - .1 Breakers shall have fixed rating plug determining breaker continuous current rating.
 - .2 All breakers shall have adjustable long delay pickup and time, L.
 - .3 All breakers shall have individual adjustments for short delay pickup and time, S; including I2t settings in time adjustment.
 - .4 Breakers shall have adjustable instantaneous pickup, I; that if required by co-ordination study can be turned off, (I).
 - .5 If required by Electrical Safety Code breakers shall have individually adjustable ground fault current pick-up and time, G; including I2t settings in time adjustment.

Part 3 Execution

3.1 INSTALLATION

- .1 Install circuit breakers as indicated complete with all necessary mounting hardware and filler panels if necessary.

END OF SECTION

Part 1 General

1.1 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with Electrical General Requirements Section.

Part 2 Products

2.1 SWITCHES

- .1 General purpose AC switches must conform to CSA C22.2 No. 111 (latest edition).
- .2 15 or 20 A, 120 V, single pole, three-way, four-way, keyed, or motor rated switches complete with pilot light.
- .3 Manually operated general purpose ac switches with following features:
 - .1 Terminal holes approved for No. 10 AWG wire.
 - .2 Silver alloy contacts.
 - .3 Urea or melamine molding for parts subject to carbon tracking.
 - .4 Suitable for back and side wiring.
 - .5 Toggle style (Rocker style) (architect to select colour).
- .4 Toggle operated fully rated for tungsten filament and fluorescent lamps, and up to 80% of rated capacity of motor loads.
- .5 Switches of one manufacturer throughout project.
- .6 Acceptable materials:
 - single pole: Hubbell Cat # HBL1201 [HBL2101 (decora)] Series
 - Keyed: Hubbell Cat. #HBL1221 Series complete with 2 keys per switch
 - (Keys): Hubbell Cat. #HBL1209
- .7 Acceptable alternate manufacturers include:
 - .1 Pass & Seymour
 - .2 Leviton.

2.2 RECEPTACLES

- .1 Receptacles, plugs, and other similar wiring devices must conform to CSA 22.2 No 42 (latest edition).
- .2 Duplex receptacles, CSA type 5-15 R, 125 V, 15 A, U ground, with following features (20A where noted):
 - .1 Urea molded housing (Colour by architect).
 - .2 Suitable for No. 10 AWG for back and side wiring.

- .3 Break-off links for use as split receptacles.
- .4 Eight back wired entrances, four side wiring screws.
- .5 Triple wipe contacts and rivetted grounding contacts.
- .3 Other receptacles with ampacity and voltage as indicated.
- .4 Receptacles of one manufacturer throughout project.
- .5 Acceptable materials:

Tamper resistant receptacle	Hubbell Cat # BR15TR
Tamper resistant T-slot receptacle	Hubbell Cat. #BR20TR
Tamper resistant ground fault protected T-slot receptacle	Hubbell Cat. #GFTR20 complete with Decora style coverplate to suit specification below

- .6 Acceptable alternate manufacturers include:
 - .1 Pass & Seymour
 - .2 Leviton

2.3 COVER PLATES

- .1 Cover plates from one manufacturer throughout project.
- .2 Sheet steel utility box cover for wiring devices installed in surface-mounted utility boxes.
- .3 Stainless steel, brushed, 1 mm (1/32") thick cover plates for wiring devices mounted in flush-mounted outlet box.
- .4 Sheet metal cover plates for wiring devices mounted in surface-mounted FS or FD type conduit boxes.
- .5 Weatherproof cover plates complete with gaskets and "heavy-duty in use" covers in conformance with the Electrical Safety Authority. Provide product equal to Intermatic Cat. #WP5100C.

Part 3 Execution

3.1 INSTALLATION

- .1 Switches:
 - .1 Install single throw switches with handle in "UP" position when switch closed.
 - .2 Install switches in gang type outlet box when more than one switch is required in one location.
 - .3 Mount toggle switches at height specified in Electrical General Requirements Section or as indicated.

- .2 Receptacles:
 - .1 Install receptacles in gang type outlet box when more than one receptacle is required in one location.
 - .2 Mount receptacles at height specified in Electrical General Requirements Section or as indicated.
 - .3 Where split receptacle has one portion switched mount vertically and switch upper portion.
- .3 Cover plates:
 - .1 Protect stainless steel cover plate finish with paper or plastic film until painting and other work is finished.
 - .2 Install suitable common cover plates where wiring devices are grouped.
 - .3 Do not use cover plates meant for flush outlet boxes on surface-mounted boxes.

END OF SECTION

Part 1 General

1.1 PRODUCT DATA

- .1 Submit product data in accordance with Electrical General Requirements Section.

Part 2 Products

2.1 DISCONNECT SWITCHES

- .1 Enclosed manual air break switches must conform to CSA C22.1 No.4 (latest edition).
- .2 Fuseholder assemblies must conform to CSA C22.2 No.39 (latest edition).
- .3 Fusible, and/or non-fusible, horsepower rated disconnect switches, size as indicated.
- .4 Provision for padlocking in off switch position by three locks.
- .5 Mechanically interlocked door to prevent opening when handle in ON position.
- .6 Fuses: size as indicated, to Fuses - Low Voltage Section.
- .7 Fuseholders: relocatable and suitable without adaptors, for type and size of fuse indicated.
- .8 Quick-make, quick-break action.
- .9 ON-OFF switch position indication on switch enclosure cover.

2.2 EQUIPMENT IDENTIFICATION

- .1 Provide equipment identification in accordance with Electrical General Requirements Section.
- .2 Indicate name of load controlled on size 4 nameplate.

2.3 ACCEPTABLE MANUFACTURERS

<u>Manufacturer</u>	<u>General Purpose</u>	<u>Weather Proof</u>
Eaton	IHD Series	3HD Series
Schneider Electric	Type A Series	Type R Series
Siemens	ID Series	NFR/FR Series

Part 3 Execution

3.1 INSTALLATION

- .1 Install disconnect switches complete with fuses if applicable.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE)
 - .1 ANSI/IEEE C62.41- 1991, Recommended Practices for Surge Voltages in Low-Voltage AC Power Circuits.
- .2 American Society for Testing and Materials (ASTM)
 - .1 ASTM F1137- 88 (1993), Specification for Phosphate/Oil and Phosphate/Organic Corrosion Protective Coatings for Fasteners.
- .3 United States of America, Federal Communications Commission (FCC)
 - .1 FCC (CFR47) EM and RF Interference Suppression.
- .4 IESNA LM-79-08, IES Electrical Method for the Electrical and Photometric Measurements of Solid State Lighting Products.

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings in accordance with Electrical General Requirements Section for all light fixtures supplied under this contract.
- .2 Submit complete photometric data prepared by independent testing laboratory for luminaires where specified, for review by Consultant.
- .3 Photometric data to include: VCP Table spacing criterion.

1.3 SCOPE

- .1 This contractor is responsible to supply and install all lighting fixtures as scheduled and/or indicated including lamp and those accessories required for a complete lighting system. This contractor must coordinate lighting installations with all other Divisions of this project.
- .2 All fixtures must be CSA approved or approved at this contractor's expense by the Special Inspection Division of the Electrical Safety Authority.

1.4 GUARANTEE

- .1 Guarantees for materials replacement shall be as follows from date of substantial completion.
 - .1 LED fixtures, and driver: 5 years.
- .2 The labour required to replace these ballasts, lamps or drivers must be included in the above guarantee, however only for the extent of the contract guarantee and warranty period as noted in Electrical General Requirements.

Part 2 Products

2.1 FIXTURE CONSTRUCTION

- .1 Fixtures must be constructed of 20 gauge (minimum) cold rolled steel. All metal edges require smooth finish.
- .2 Light leaks must be prevented by providing gasketing, stops, and barriers.
- .3 Fixtures must be finished in high reflective baked white enamel. This surface must have a reflectance of not less than 85%.

2.2 FIXTURE LENS

- .1 Unless otherwise noted fixture lenses shall be as follows:
 - .1 Lens thickness: 3.2 mm (1/8")
 - .2 Material: injection moulded clear prismatic virgin acrylic
 - .3 Frame: hinged, latched, steel.

2.3 LED FIXTURES

- .1 Fixture LED's must be tested in conformance with IESNA LM80 standard.
- .2 LED's must be selected using a binning algorithm to ensure colour and lumen output of a given fixture are consistent, as well as meet or surpass ANSI C78.377 specification for the rated lifetime of the fixture. Colour accuracy between products must be within a 2-step MacAdam ellipse.
- .3 Luminaires must be tested to IESNA LM79 by an independent approved laboratory.
- .4 Luminaires must be tested prior to shipping.
- .5 Luminaires must be ULC certified and approved for use in Canada.
- .6 Fixtures must maintain a minimum of 90% of their initial light output for 60,000 hours. Submit test results upon request.
- .7 Lumen values indicated for fixtures in the project documents are to be considered as "absolute" or "delivered" values.
- .8 Other than for specialty fixtures, and unless otherwise indicated, the maximum driver current is to be 750 mA.

2.4 SELF-POWERED COMBINATION EXIT/EMERGENCY LIGHTING UNITS

- .1 Exit lighting units must conform to CSA C860, CSA 22.2 No. 141 (latest edition).
- .2 Housing: extruded aluminum housing. White Finish.
- .3 Face and back plates: extruded aluminum.
- .4 Lamps 2W LED (EXIT).
- .5 Operation: 25 year life.
- .6 Units are to be provided with three (3) pictogram legends indicating "left from here", "straight from here", and "right from here".

- .7 Face plate to remain captive for relamping.
- .8 Supply voltage: as noted on drawings.
- .9 Output voltage: 12 V DC.
- .10 Battery: sealed maintenance free 10 year life.
Note: Battery must be capable of supplying the wattage indicated for a minimum of 30 minutes.
- .11 Charger: solid state, voltage/current regulated, inverse temperature compensated, short circuit protected, with regulated output of plus or minus 0.01 V for plus or minus 10% V input variation.
- .12 Solid state transfer circuit.
- .13 Signal lights: “AC Power On” condition and “charging” condition.
- .14 Lamp heads: integral on unit, 345° horizontal and 180° vertical adjustment. Lamp type: minimum 4 watt LED.
- .15 Mounting: suitable for universal mounting directly on junction box and complete with knockouts for conduit. Removable or hinged front panel for easy access to batteries.
- .16 Cabinet: finish: white.
- .17 Auxiliary equipment:
 - .1 Test switch.

2.5 EMERGENCY LIGHTING UNITS (self contained)

- .1 Emergency lighting units must conform to CSA C22.2 No 141 (latest edition).
- .2 Supply voltage: as noted on drawings.
- .3 Battery: sealed, maintenance free, 10 year life.
Note: Battery units must be capable of supplying the wattage indicated for a minimum of 90 minutes or as specified.
- .4 Charger: solid state, multi rate, voltage/current regulated, inverse temperature compensated, short circuit protected with regulated output of plus or minus 0.01 V for plus or minus 10% input variations.
- .5 Solid state transfer circuit. EM backup AC fail operation.
- .6 Low voltage disconnect: solid state, modular, operates at 80% battery output voltage.
- .7 Signal lights: “AC Power ON” condition and “charging” condition.
- .8 Lamp type: integral high output LED, 100,000 hours at L70.
- .9 Ceiling mount brackets and recessed mounting kit as required to suit installation.
- .10 Auxiliary equipment:
 - .1 Test switch.

2.6 ACCEPTABLE LIGHTING MANUFACTURERS

- .1 Refer to the light fixture schedule as indicated on drawings.

Part 3 Execution

3.1 INSTALLATION

- .1 Locate and install luminaires as indicated. Luminaires are not to be supported from the roof deck. Provide additional unistrut support channel and/or support from structure. Co-ordinate with consultant on site.
- .2 Ball align hangers must be provided for rod suspended fixtures.
- .3 Fixtures surface mounted to suspended ceilings must be secured through ceiling assembly to cross member supports. These supports are to be steel channels or angles independently secured **to structure** using # 12 “jack” chain. Each chain must be secured so no fixture weight is added to the ceiling assembly.
- .4 Plaster frames/flange kits must be provided by this Division for fixtures recessed in plaster and/or drywall ceilings.
- .5 Where specified, fixtures to be chain hung shall be hung using “jack” chain with a capacity to suit the fixture weight. Branch circuit wiring feeding these fixtures shall be AC90 cable “ty-wrapped” at 900mm (36”) intervals along length of drop. Final appearance must be neat and professional.
- .6 Install exit lighting units with illuminated faces and chevrons/arrows indicating path(s) of exit as indicated. Unless otherwise noted install exit fixtures at 2400 mm (8' 0”) above finished floor.
- .7 Install emergency lighting units and associated remote mounted fixtures as indicated.
- .8 Direct “heads” on units and remote mounted fixtures to illuminate path(s) of exit.
- .9 Install emergency lighting units and remote fixtures at 300mm (12”) below finished ceiling, unless indicated otherwise.
- .10 Provide a 15 A 120 V duplex receptacle (connected to circuit indicated) adjacent to unit. **This receptacle connection is to be no lower than 8' 0" (2400 mm) AFF.**
- .11 **Special installation: Secure fixtures to structure to conform to the Electrical Safety Code using “jack chain” NOT ceiling suspension wire. Where coreslab is used, suspension point must be independent of the one used for suspension of the ceiling assembly. As an alternate to jack chain the contractor may use a pre-manufactured aircraft cable suspension and fastening system as manufactured by Gripple (Gripple Cat. #HF02-10F2). Provide minimum 2 per fixture.**
- .12 All battery units are to be provided with a visible lamicoid label indicating the unit number as per drawings.

3.2 WIRING

- .1 Connect luminaires to lighting circuits as indicated.
- .2 Connect exit fixtures to exit lighting circuits and unit equipment (if applicable).
- .3 Connect unit equipment to circuits as indicated.
- .4 All wiring of remote emergency fixtures shall be minimum #10 T90 for each circuit and run in conduit. Wiring must be sized in conformance with manufacturer's recommendations for distances required.

3.3 LUMINAIRE ALIGNMENT

- .1 Align luminaires mounted in continuous rows to form straight uninterrupted line.
- .2 Align luminaires mounted individually parallel or perpendicular to building grid lines.

3.4 DELIVERIES

- .1 Fixtures are to be completely assembled at the manufacturer's plant and delivered to the project site in original unitized containers. Ensure that a dry, protected, and secure space is available for proper storage before scheduling delivery of fixtures.

3.5 TESTING/CERTIFICATION

- .1 At the completion of the project and in the presence of the consultant, test all exit and emergency fixtures. On company letterhead, the contractor is to prepare a chart indicating:
 - .1 project
 - .2 date
 - .3 equipment type
 - .4 certification of correct connection
 - .5 certification of correct operation
 - .6 duration of test in minutes (minimum 30)
 - .7 actual period of testing (time of day)

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 American National Standards Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE).
- .2 Underwriter Laboratories of Canada (ULC).
- .3 International Electrotechnical Commission.
- .4 International Organization for Standardization (ISO).
- .5 National Electrical Manufacturers Association (NEMA).

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings in accordance with Section 26 01 16.
- .2 Submit composite wiring diagrams and control schedule for each room control circuit type as proposed to be installed. Include load type, sequence of operation, sensor parameters, time delays, sensitivities and daylighting set points.
- .3 Catalog cut sheets with performance specifications demonstrating compliance with specified requirements.

1.3 SCOPE

- .1 This contractor is responsible to supply and install all equipment and control wiring as specified for the digital occupancy and daylight control systems. This contractor must coordinate these control systems with the lighting fixtures being supplied for the project to ensure intended function as specified.
- .2 Control Intent: Control Intent includes, but is not limited to:
 - .1 Defaults and initial calibration settings for such items as time delay, sensitivity, fade rates, etc.
 - .2 Initial sensor and switching zones.
- .3 All equipment must be CSA approved or approved at this contractor's expense by the Special Inspection Division of the Electrical Safety Authority.
- .4 Reference section 26 51 13 for Lighting information.

1.4 SYSTEM DESCRIPTION AND OPERATION

- .1 The Digital Lighting Control (room level) as defined under this section covers the following equipment:
 - .1 Digital Room Controllers – Self-configuring, digitally addressable one, two or three relay controllers.

- .2 Digital Occupancy Sensors – Self-configuring, digitally addressable and calibrated occupancy sensors with LCD display and two-way active infrared (IR) communications.
- .3 Digital Switches – Self-configuring, digitally addressable pushbutton switches, dimmers, and scene switches with two-way active infrared (IR) communications.

1.5 LIGHTING CONTROL APPLICATIONS

- .1 Provide a minimum application of intended lighting control functions as detailed on design drawings and specified herein. Control functions shall include the following:
 - .1 Space Control Requirements – Provide occupancy/vacancy sensors with Manual-ON functionality in all spaces except toilet rooms, storerooms, or other applications where hands-free operation is desirable and Automatic-ON occupancy sensors are more appropriate. For spaces with multiple occupants, or where line-of-sight may be obscured, provide ceiling- or corner-mounted sensors.
 - .2 Bi-Level Lighting – Provide single zone, multi-level controls in any enclosed office, conference room, meeting room, and training room in all enclosed spaces except where variable dimming or multi-zone switching is used.
 - .3 Daylit Areas – All luminaires closest to the daylight source, and zoned separately from other fixtures in the space, shall be controlled separately from luminaires outside of daylit zones. Multiple-leveled switched daylight harvesting controls may be utilized for areas marked on drawings.

1.6 WARRANTY

- .1 Provide a five-year complete manufacturer’s warranty on all products to be free of manufacturers’ defects.
- .2 The labour required to replace these products must be included in the above warranty, however only for the extent of the contract guarantee and warranty period as noted in Electrical General Requirements.

1.7 QUALITY ASSURANCE

- .1 Manufacturer: Minimum 10-years experience in manufacture of lighting controls.

Part 2 Products

2.1 MANUFACTURERS

- .1 Basis of design product: WattStopper Digital Lighting Management (DLM). Acceptable alternates are subject to compliance and prior approval with specified requirements of this section, as one of the following:
 - .1 Cooper Controls (Greengate).
 - .2 Acuity Controls (nlight).

- .2 Substitutions:
 - .1 All proposed substitutions (clearly delineated as such) must be submitted in writing for approval by the design professional a minimum of 7 working days prior to the bid date and must be made available to all bidders.
 - .2 By using pre-approved substitutions, the contractor accepts responsibility and associated costs for all required modifications to circuitry, devices, and wiring.

2.2 DIGITAL WALL OR CEILING MOUNTED OCCUPANCY SENSOR SYSTEM

- .1 Wall or ceiling mounted (to suit installation) passive infrared (PIR), ultrasonic or dual technology digital (passive infrared and ultrasonic) occupancy sensor. Furnish the Company's system which accommodates the square-foot coverage requirements for each area controlled, utilizing room controllers, digital occupancy sensors and accessories which suit the lighting and electrical system parameters.
- .2 Digital Occupancy Sensors shall provide calibration and electronic documentation for the following features:
 - .1 Digital calibration and pushbutton programming for the following variables:
 - .1 Sensitivity – 0-100% in 10% increments
 - .2 Time delay – 1-30 minutes in 1 minute increments
 - .3 Test mode – Five second time delay
 - .4 Detection technology – PIR, Ultrasonic or Dual Technology activation and/or re-activation.
 - .5 Walk-through mode
 - .6 Load parameters including Auto/Manual-ON, blink warning, and daylight enable/disable when photosensors are included in the DLM local network.
 - .2 Two-way infrared (IR) transceiver to allow remote programming through handheld commissioning tool and control by remote personal controls.
 - .3 Device Status LEDs including:
 - .1 PIR Detection
 - .2 Ultrasonic detection
 - .3 Configuration mode
 - .4 Load binding
 - .4 Manual override of controlled loads.
 - .5 One or two RJ-45 port(s) for connection to DLM local network.
- .3 Multiple occupancy sensors may be installed in a room by simply connecting them to the free topology DLM local network. No additional configuration will be required.

WattStopper product numbers: LMPX, LMDX, LMPC, LMUC, LMDC

2.3 DIGITAL WALL SWITCHES

- .1 Low voltage momentary pushbutton switches in 1, 2, 3, 4, 5, and 8 button configuration; colour per architect, compatible with wall plates with decorator opening. Wall switches shall include the following features:
 - .1 Two-way infrared (IR) transceiver for use with personal and configuration remote controls.
 - .2 Removable buttons for field replacement with engraved buttons and/or alternate color buttons. Button replacement may be completed without removing the switch from the wall.
- .2 Multiple digital wall switches may be installed in a room by simply connecting them to the free topology DLM local network. No additional configuration will be required to achieve multi-way switching.
- .3 The following switch attributes may be changed or selected using a wireless configuration tool:
 - .1 Load and Scene button function may be reconfigured for individual buttons (from Load to Scene, and vice versa).
 - .2 Individual button function may be configured to Toggle, On only or Off only.
 - .3 Individual scenes may be locked to prevent unauthorized change.
 - .4 Switch buttons may be bound to any load on a room controller and are not load type dependent; each button may be bound to multiple loads.
- .4 Two RJ-45 ports for connection to DLM local network.
- .5 Multiple digital wall switches may be installed in a room by simply connecting them to the free topology DLM local network. No additional configuration will be required to achieve multi-way switching.
- .6 WattStopper product numbers: LMSW-101, LMSW-102, LMSW-103, LMSW-104, LMSW-105, LMSW-108, LMDM-101.

2.4 DIGITAL POWER PACKS (ROOM CONTROLLERS)

- .1 Room Controllers automatically bind the room loads to the connected devices in the space without commissioning or the use of any tools. Room Controllers shall be provided to match the room lighting load and control requirements. The controllers will be simple to install and will not have, dip switches, potentiometers or require special configuration. The control units will include the following features:
 - .1 Automatic room configuration to the most energy-efficient sequence of operation based upon the devices in the room.
 - .2 Simple replacement – Using the default automatic configuration capabilities, a room controller may be replaced with an off-the-shelf unit without requiring any configuration or setup.

- .3 Device Status LEDs to indicate:
 - .1 Data transmission
 - .2 Device has power
 - .3 Status for each load
 - .4 Configuration status
- .4 Quick installation features including:
 - .1 Standard junction box mounting
 - .5 Plenum rated
 - .6 Manual override and LED indication for each load
 - .7 120 VAC, 60 Hz operation.
 - .8 Zero cross circuitry for each load.
- .2 On/Off Room/Dimming enhanced Room Controllers shall include:
 - .1 One or multiple relay configuration to suit control details.
 - .2 Efficient 250 mA switching power supply.
 - .3 One 0-10 volt analog output per relay for control of compatible ballasts and LED drivers.
 - .4 The following dimming attributes may be changed or selected using a wireless configuration tool:
 - .1 Establish preset level for each load from 0-100%.
 - .2 Set high and low trim for each load.
 - .3 Set lamp burn in time for each load up to 100 hours.
 - .5 Four RJ-45 DLM local network ports.
 - .6 Optional Network Bridge for BACnet MS/TP communications.
 - .7 WattStopper product numbers: LMRC-211, LRMC-212, LRMC-213, LMPL-201, LMRC-311, LMRC-312, LMRC-313.

2.5 DIGITAL ROOM CONTROL SYSTEMS

- .1 Digital occupancy and daylight control system designed to control a small area of a building (room level). Digital devices connect to the room controller(s) using CAT 5e cables (LMRJ) with RJ-45 connectors which provide both data and power to room devices. Features of the system shall include:
 - .1 Plug n' Go automatic configuration and binding of occupancy sensors, switches and lighting loads to the most energy-efficient sequence of operation based upon the device attached.
 - .2 Simple replacement of any device in the system with a standard off the shelf unit without requiring commissioning, configuration or setup.

- .3 Push n' Learn configuration to change the automatic configuration, including binding and load parameters without tools, using only the buttons on the digital devices which are part of the local system.
- .4 Two-way infrared communications for control by handheld remotes, and configuration by a handheld tool including adjusting load parameters, sensor configuration and binding, within a line of sight of up to 30 feet from a sensor, wall switch or IR receiver.

2.6 CONFIGURATIONS TOOLS

- .1 A configuration tool facilitates optional customization of digital lighting control system featuring infrared communications.
- .2 Features and functionality of the wireless configuration tool shall include:
 - .1 Two-way infrared (IR) communication with DLM IR-enabled devices within a range of approximately 30 feet.
 - .2 Read, modify and send parameters for occupancy sensors, daylighting sensors, room controllers and buttons on digital wall switches.
 - .3 Save up to nine occupancy sensor setting profiles, and apply profiles to selected sensors.
- .3 WattStopper Product Numbers: LMCT-100, LMCI-100/LMCS-100

Part 3 Execution

3.1 INSTALLATION

- .1 Install the work of this Section in accordance with manufacturer's printed instructions unless otherwise indicated.
- .2 When using wire for connections other than the DLM local network (LMRJ Cat 5e with RJ-45 connectors), provide detailed point to point wiring diagrams for every termination. Provide wire specifications and wire colors to simplify contactor termination requirements.
- .3 Calibrate all sensor time delays and sensitivity to guarantee proper detection of occupants and energy savings.
 - .1 Adjust time delay so that controlled area remains lighted for 5 minutes after occupant leaves area.
- .4 Install power packs in accessible maintenance areas unless noted otherwise. Provide access doors if power packs are installed above drywall ceilings.

- .5 It shall be the contractor's responsibility to locate and aim sensors in the correct location required for complete and proper coverage within the range of coverage as per the manufacturer's recommendations. The locations and quantities of sensors shown on the drawings are diagrammatic and indicate only the rooms which are to be provided with sensors. The contractor shall provide additional sensors if required to properly and completely cover the respective rooms.
- .6 Provide written or computer-generated documentation on the commissioning of the system including room by room description including:
 - .1 Sensor parameters, time delays, sensitivities, and daylighting setpoints.
 - .2 Sequence of operation, (e.g. manual ON, Auto OFF. etc.)
 - .3 Load Parameters (e.g. blink warning, etc.)
- .7 Re-commissioning – After 30 days from occupancy re-calibrate all sensor time delays and sensitivities to meet the Owner's Project Requirements. Provide a detailed report to the Architect / Owner of re-commissioning activity.

3.2 FACTORY COMMISSIONING

- .1 Upon completion of the installation, the system shall be commissioned by the manufacturer's factory authorized representative who will verify a complete fully functional system.
- .2 The electrical contractor shall provide both the manufacturer and the electrical engineer with ten working days written notice of the system startup and adjustment date.
- .3 Upon completion of the system commissioning the factory-authorized technician shall provide the proper training to the owner's personnel on the adjustment and maintenance of the system.
- .4 Factory commissioning shall include functional testing and documentation of the control system conforming to the "Functional Testing" requirements included in the current ASHRAE standard. This cost shall be included in the Tender Price.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 CAN/ULC-S524 (latest edition), Installation of Fire Alarm Systems.
- .2 CAN/ULC-S526 (latest edition), Visual Signal Appliances, Fire Alarm.
- .3 CAN/ULC-S536 (latest edition), Inspection and Testing of Fire Alarm Systems.
- .4 CAN/ULC-S537 (latest edition), Verification of Fire Alarm Systems.
- .5 OBC-2012, Ontario Building Code.

1.2 DESCRIPTION OF SYSTEM

- .1 System includes:
 - .1 Existing control panel.
 - .2 Trouble signal devices.
 - .3 Power supply facilities.
 - .4 Addressable manual alarm stations.
 - .5 Addressable and conventional automatic alarm initiating devices.
 - .6 Audible and visual signal devices.
 - .7 End-of-line devices.
 - .8 Annunciators.
 - .9 Ancillary devices.
 - .10 Interface and zone modules.
 - .11 Remote trouble indicator.

1.3 REQUIREMENTS OF REGULATORY AGENCIES

- .1 This system is subject to review by local building department officials, local fire department officials. **Therefore, submission of verification certificate and field technician device verification sheets is required prior to inspection by these officials. Schedule accordingly.**

1.4 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Electrical General Requirements Section.
- .2 Include:
 - .1 Layout of equipment.
 - .2 Zoning.
 - .3 Complete wiring diagram.

1.5 OPERATION AND MAINTENANCE DATA

- .1 Provide operation and maintenance data for Fire Alarm System for incorporation into manual specified in Electrical General Requirements Section.
- .2 Include:
 - .1 Operation and maintenance instructions for complete fire alarm system to permit effective operation and maintenance.
 - .2 Technical data - illustrated parts lists with parts catalogue numbers.
 - .3 Copy of approved shop drawings.
 - .4 List of recommended spare parts for system.

1.6 MAINTENANCE MATERIALS

- .1 Include:
 - .1 10% spare glass rods for total number of manual pull box stations if applicable.

1.7 QUALITY ASSURANCE

- .1 Each and all items of the fire alarm system shall be listed as the products of a single manufacturer under the appropriate category by the Underwriter's Laboratories of Canada and shall bear the "U.L.C." label.
- .2 Each and all items of the fire alarm system shall be covered by a one year parts and labour warranty covering defects resulting from faulty workmanship and materials. The warranty shall be deemed to begin on the date the system is accepted by the Project Manager on issuance of the substantial performance certificate for the project.
- .3 All control equipment must have Transient Protection Devices to comply with U.L.C. requirements.

Part 2 Products

2.1 GENERAL

- .1 The existing fire alarm system is a hybrid conventional and addressable system as manufactured by Edwards.

2.2 AUDIBLE/VISUAL SIGNAL DEVICES

- .1 150 mm (6") Bells: surface mounted bell, vibration type 24Vdc, 150 mm (6"), 92dBA rating at 3 m (10'), red finish, FM and ULC listed.
- .2 Strobe: semi-recessed, 24Vdc operation, complete with selectable 15/30/75/110 candela output (unless otherwise noted set at 75 cd), synchronized strobe, red finish, FM and ULC listed. Suitable for mounting on a single gang box.

2.3 END OF LINE RESISTORS

- .1 End-of-line resistors for signalling circuits shall be sized to ensure the correct supervisory current flows in each circuit.
- .2 End-of-line resistors shall be mounted on a stainless steel plate for mounting on a standard single gang box and bear the ULC label.

2.4 SYSTEM WIRING

- .1 The system wiring must be FSA rated in conformance with the Electrical Safety Code to suit the type of installation.
- .2 Wiring shall be minimum #18 AWG twisted shielded pair in conduit. “Securex 2” armoured cable will be permitted to be used for “drops” to devices on accessible ceilings.
- .3 As indicated on system riser diagram initiating device wiring shall be run in a loop with a home run from the last device to the control panel (Class ‘A’ configuration).Wiring from the “loop” module to conventional devices must be supervised, run in conduit, and conform to the standards of the Electrical Safety Code.
- .4 Signal wiring is to be cross connected in a class ‘B’ configuration.
- .5 Install isolator modules and end of line resistors in service rooms no higher than 2.4 M AFF. Provide location of these devices at the time of shop drawing submission.
- .6 **These are the basic wiring requirements for system operation. Prior to tender close manufacturer and contractor are to confirm all necessary wiring specifications and requirements.**

2.5 APPROVED EQUIPMENT

<u>DEVICE</u>	<u>EDWARDS</u>
<u>Control Panel</u>	
Existing	EST
<u>Conventional and Auxiliary Devices</u>	
150mm (6") Bells	439D Series or MB Series
Strobe	G1R-VM

Part 3 Execution

3.1 INSTALLATION

- .1 Additional components shall be installed in accordance with CAN/ULC-S524 (latest edition) and approved manufacturers manuals and wiring diagrams. The contractor shall furnish all conduit, wiring, outlet boxes, junction boxes, cabinets and similar devices necessary for the complete installation, All wiring shall be of the type recommended by the Electrical Safety Code, approved by local authorities having jurisdiction for the purpose, and shall be installed in dedicated conduit throughout.
- .2 Install end-of-line devices at end of applicable alarm and signalling circuits.

3.2 FIELD QUALITY CONTROL

- .1 The system shall be installed and fully tested under the supervision of trained manufacturer's representative. The system shall be demonstrated to perform all the functions as specified.

3.3 ACCEPTABLE INSTALLER

- .1 The fire alarm / life safety system specified herein shall be installed by an Authorized Electrical Contractor who is CFAA certified.

3.4 EXAMINATION

- .1 Prior to the commencement of any of the work detailed herein, an examination and analysis of the area(s) where the Fire Alarm / Life Safety System and all associated components are to be installed shall be made.
- .2 Any of these area(s) which are found to be outside the manufacturers' recommended environments for the particular specified products shall be noted on a Site Examination Report which shall be given to the Building Owners Representative, and the Consultant.
- .3 Any shorts, opens, or grounds found on existing wiring shall be corrected prior to the connection of these wires to any panel component or field device.

3.5 DEMONSTRATION

- .1 Each of the intended operations of the installed Fire Alarm / Life Safety System shall be demonstrated to the Building Owners' Representative and the Consultant.

3.6 SYSTEM TEST

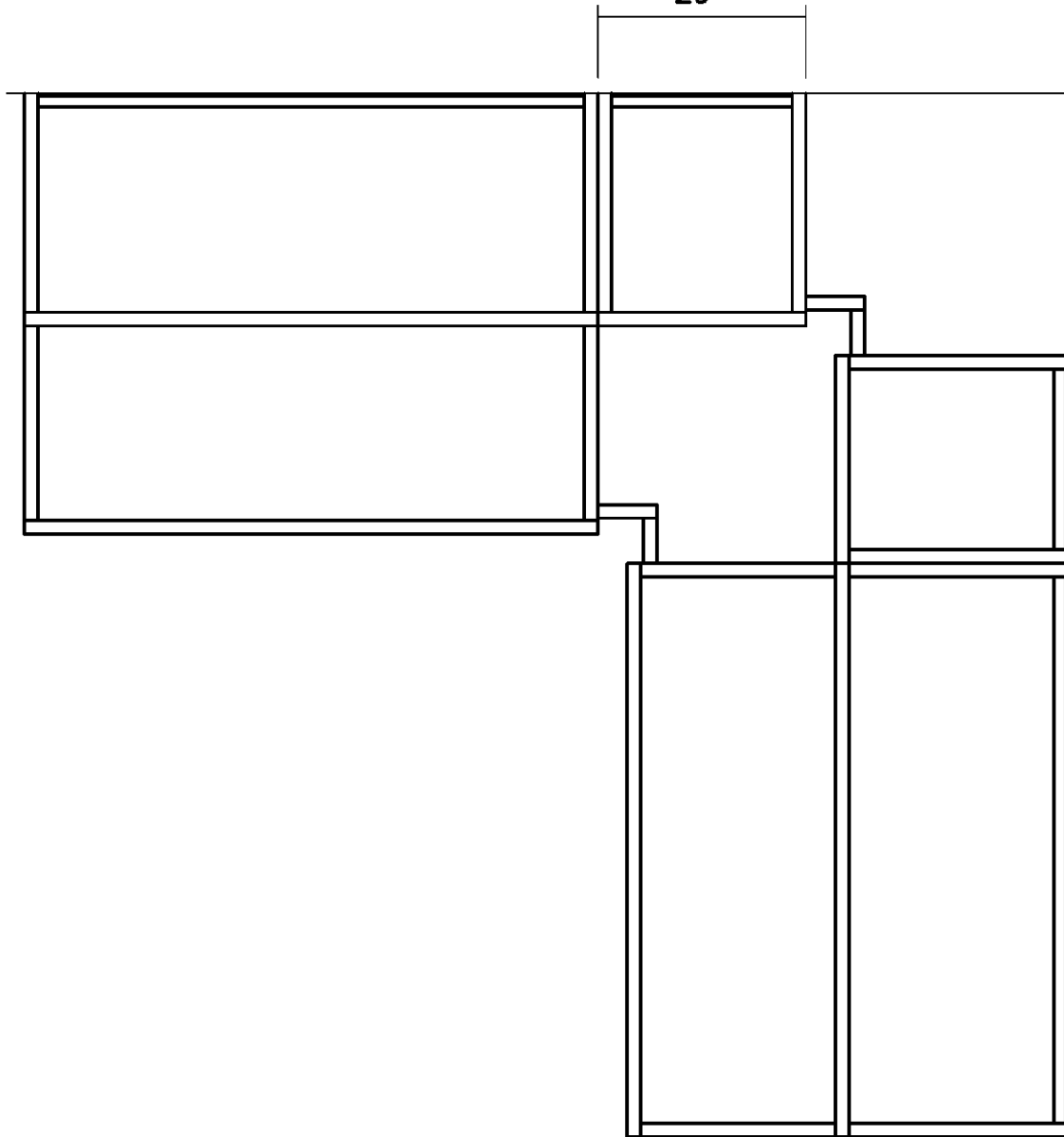
- .1 Perform tests in accordance with General Electrical Requirements Section and CAN/ULC-S537 (latest edition) Standard for the Verification of Fire Alarm Systems.

3.7 AUDIBILITY TESTING

- .1 Audibility Testing:
 - .1 The contractor is to coordinate an audibility test prior to occupancy of the facility. The test is to be performed by the representatives of the fire alarm manufacturer in the presence of the consultant. The test report is to be in chart form indicating:
 - .1 Project
 - .2 Date of test
 - .3 Room name and number
 - .4 Ambient dB level
 - .5 Alarm dB level
 - .6 Name of testing technician
 - .2 The test results are to be submitted to the consultant for review prior to issuing to owner's representatives and/or authorities having jurisdiction.

END OF SECTION

29



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FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



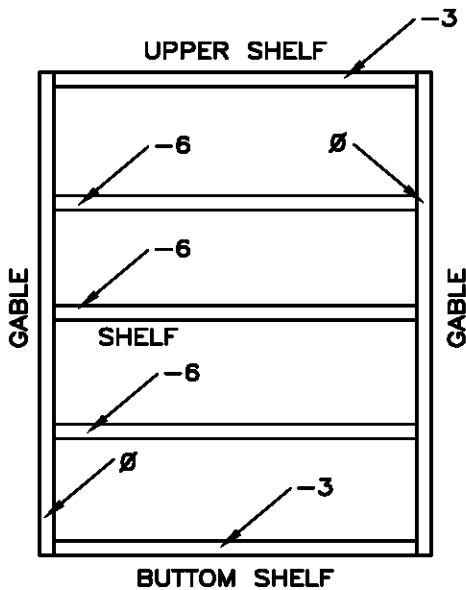
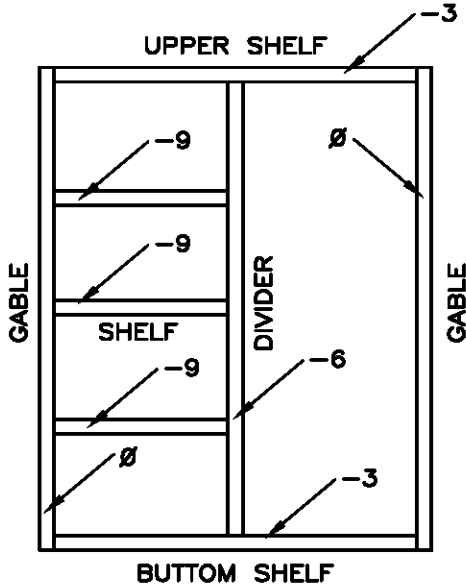
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FILLERS

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Date February 2015
Last Plot 6/2/2016 8:44 AM
Job No.

AW002

**SAMPLE SETBACKS OF
PANELS AND SHELVES
(STEPPED TO MATCH PVC
EDGING)**



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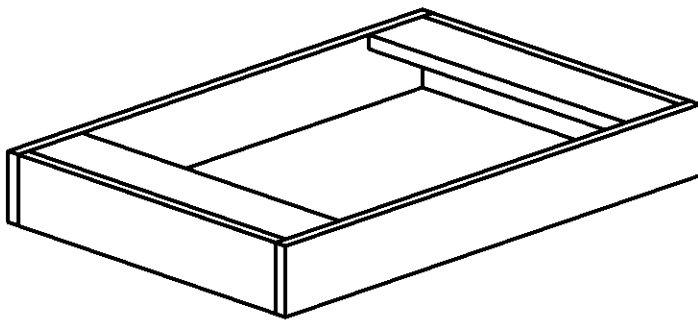
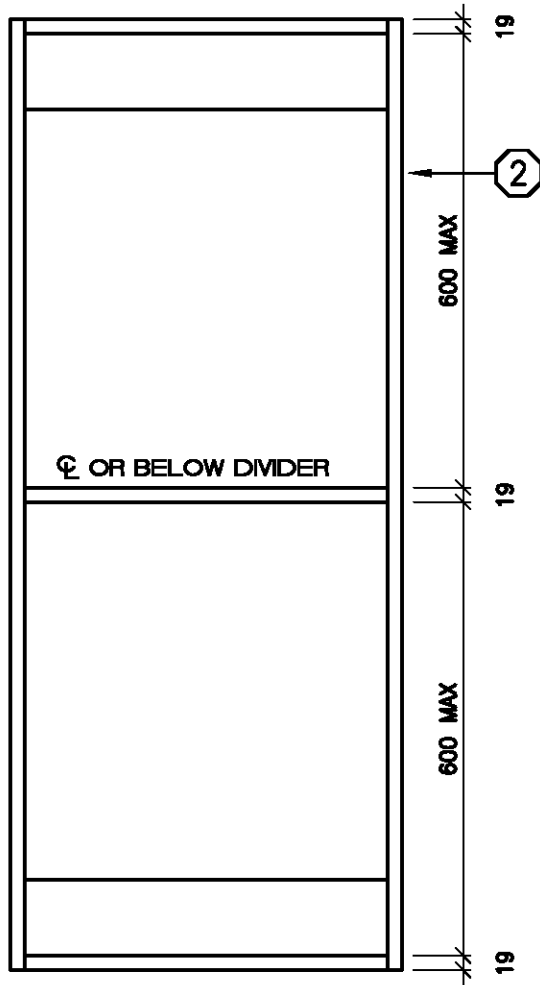
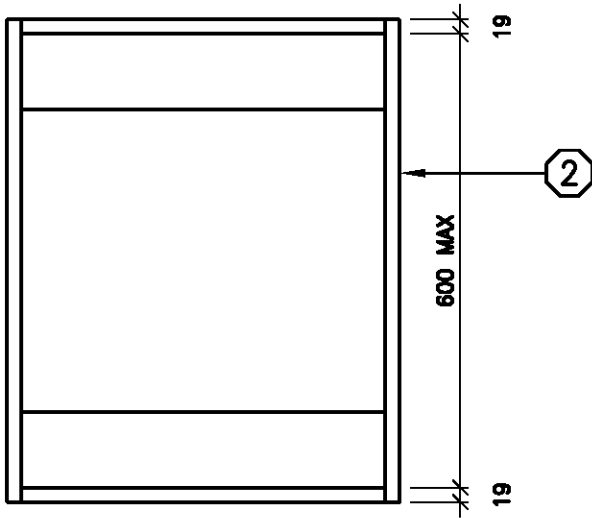


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SAMPLE SETBACKS OF PANELS AND SHELVES

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AW003



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AW004

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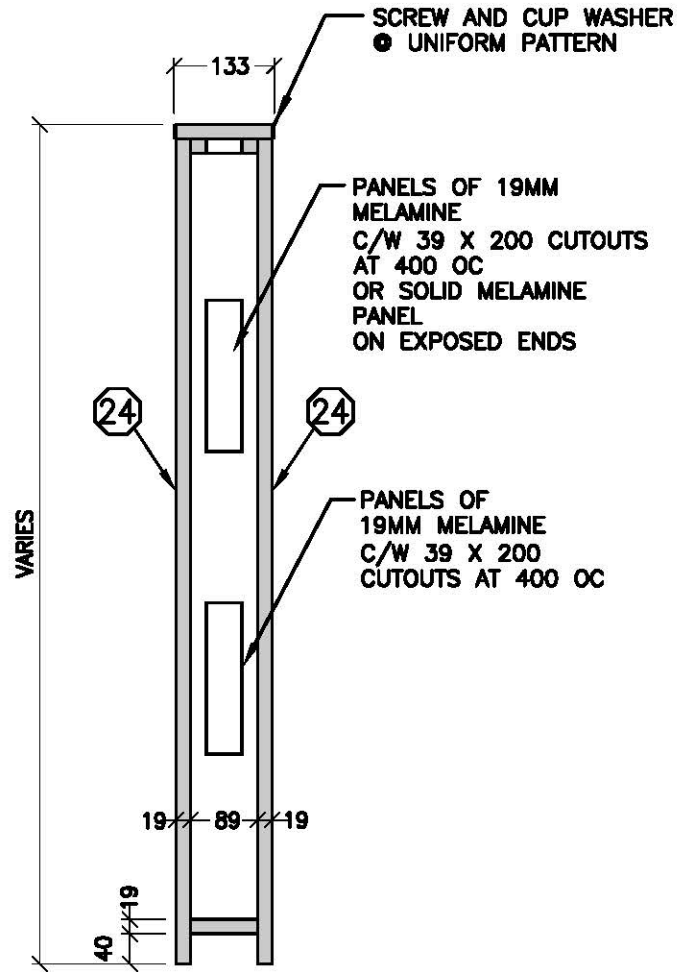
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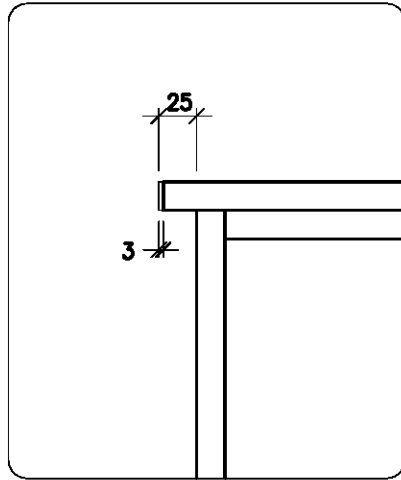
MELAMINE PANEL WALL

ADD MID HEIGHT BLOCKING C/W CUTOUTS IF WALL TO SUPPORT LOADS

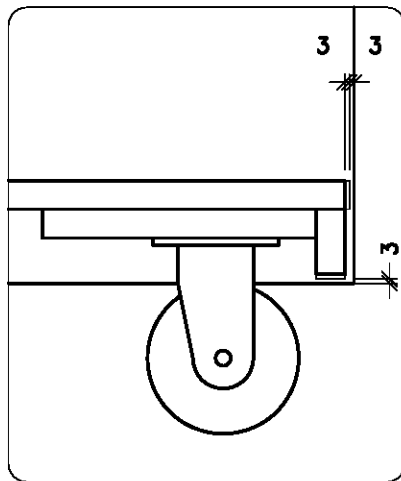


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AW005



DETAIL 1



DETAIL 2

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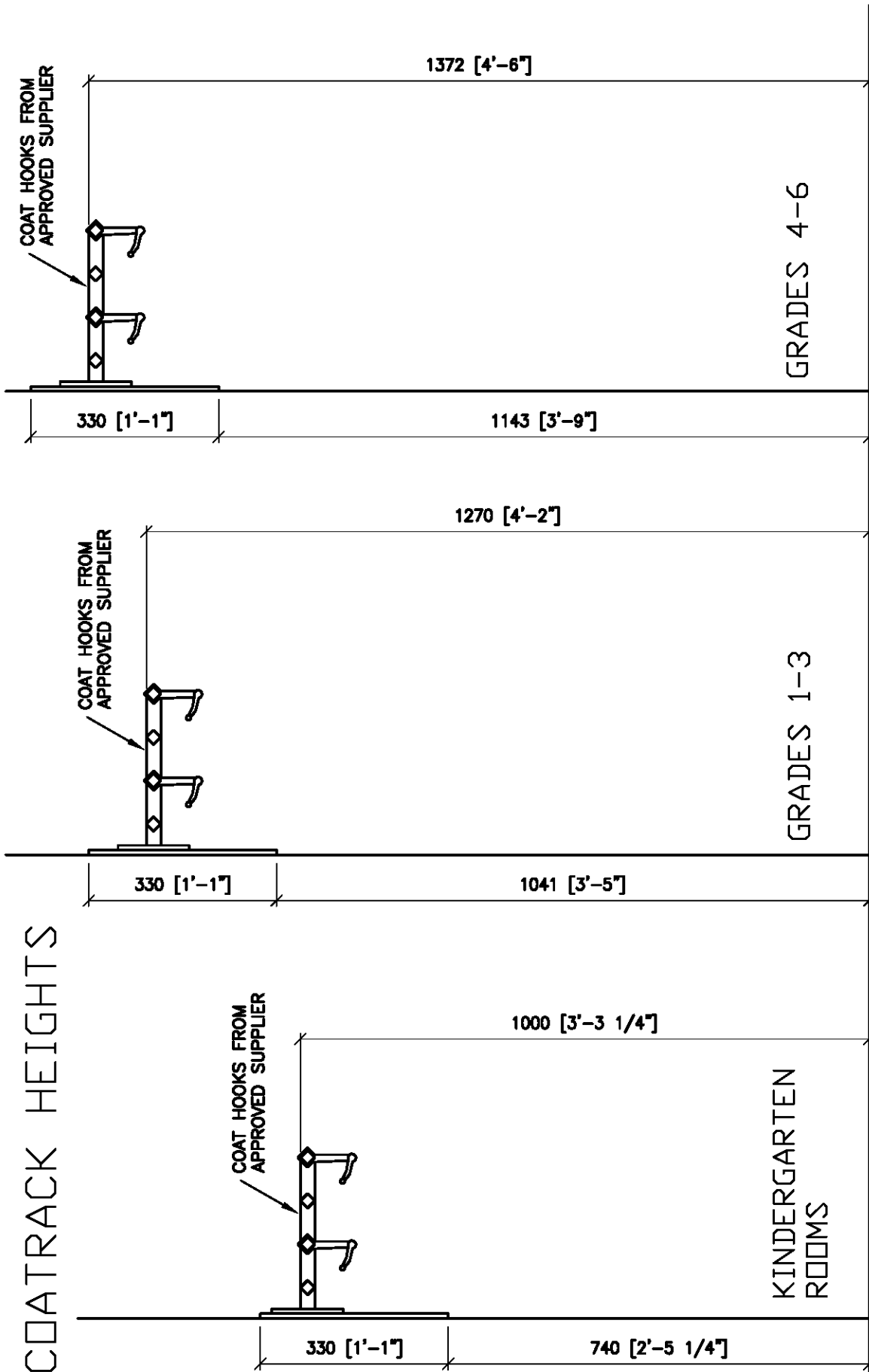
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CART DETAILS

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AW006

COATRACK HEIGHTS



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COATRACK HEIGHTS

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AW007

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REPRODUCTION OF DIMS. AND RELATED DOCUMENTS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE WRDS'S WRITTEN PERMISSION.

GENERAL NOTES:

ON ALL DIMS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.

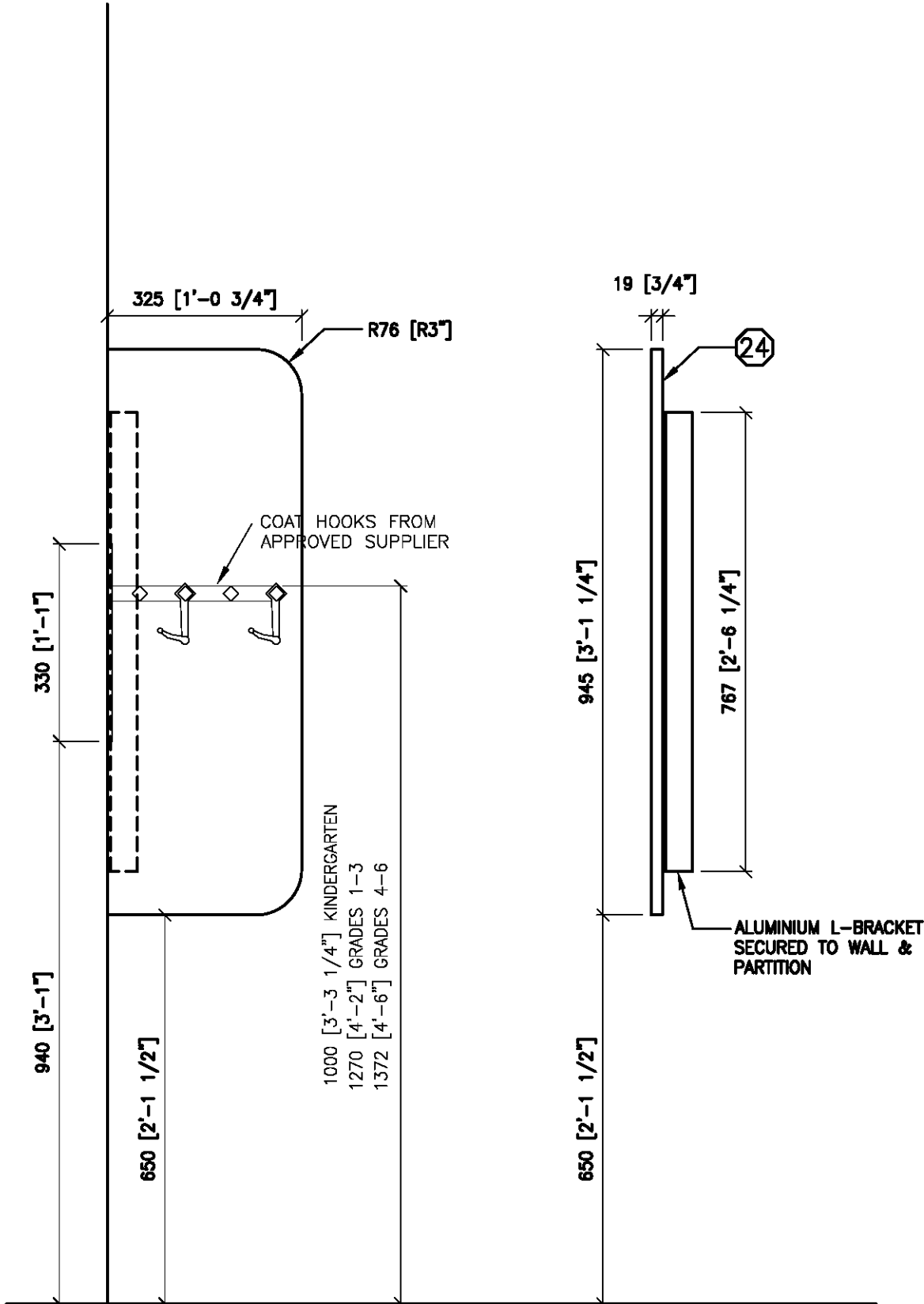


ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

COATRACK END PANEL

Status	
Folder	AW0008_MLW008 MLW008
File	AW008.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	September 2015
Last Plot	6/2/2016 8:44 AM
Job No.	
Sheet No.	

AW008



**END PANEL
SIDE VIEW**
SCALE: AS NOTED

**END PANEL
FRONT VIEW**
SCALE: AS NOTED

THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRDS BEFORE PROCEEDING WITH WORK.

ALL DWGS. AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF THE WRDS, AND MUST BE RETURNED UPON REQUEST.

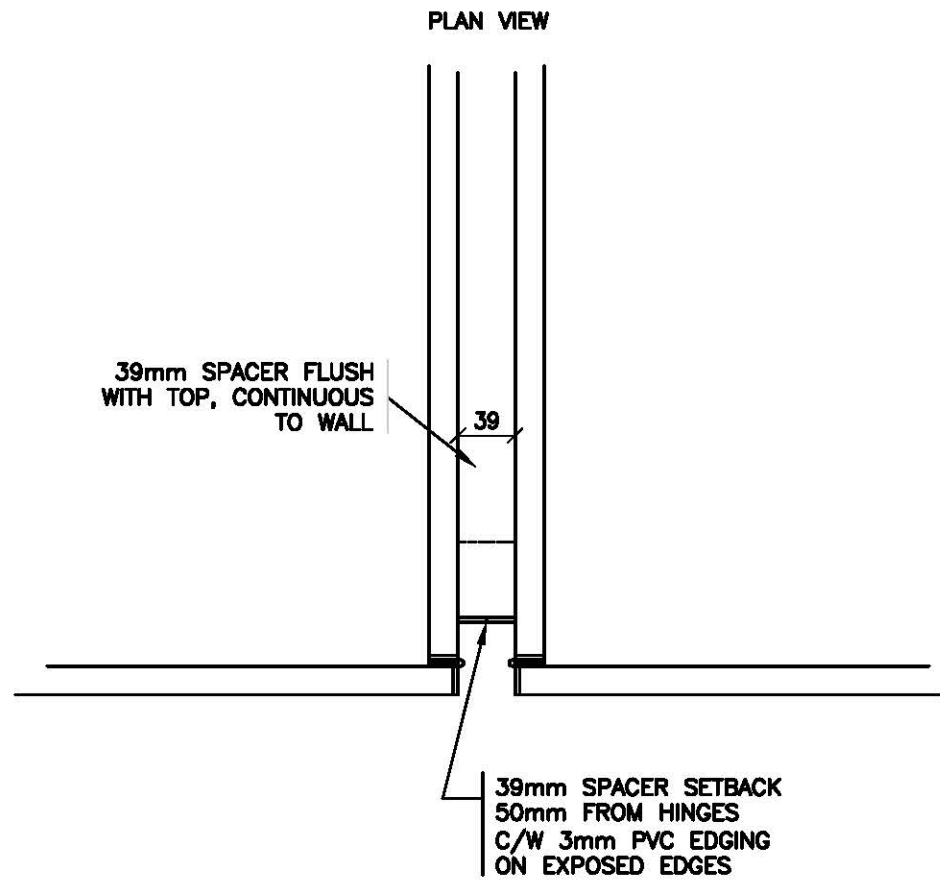
REPRODUCTION OF DWGS. AND RELATED DOCUMENTS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE WRDS'S WRITTEN PERMISSION.

GENERAL NOTES:

ON ALL DWGS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



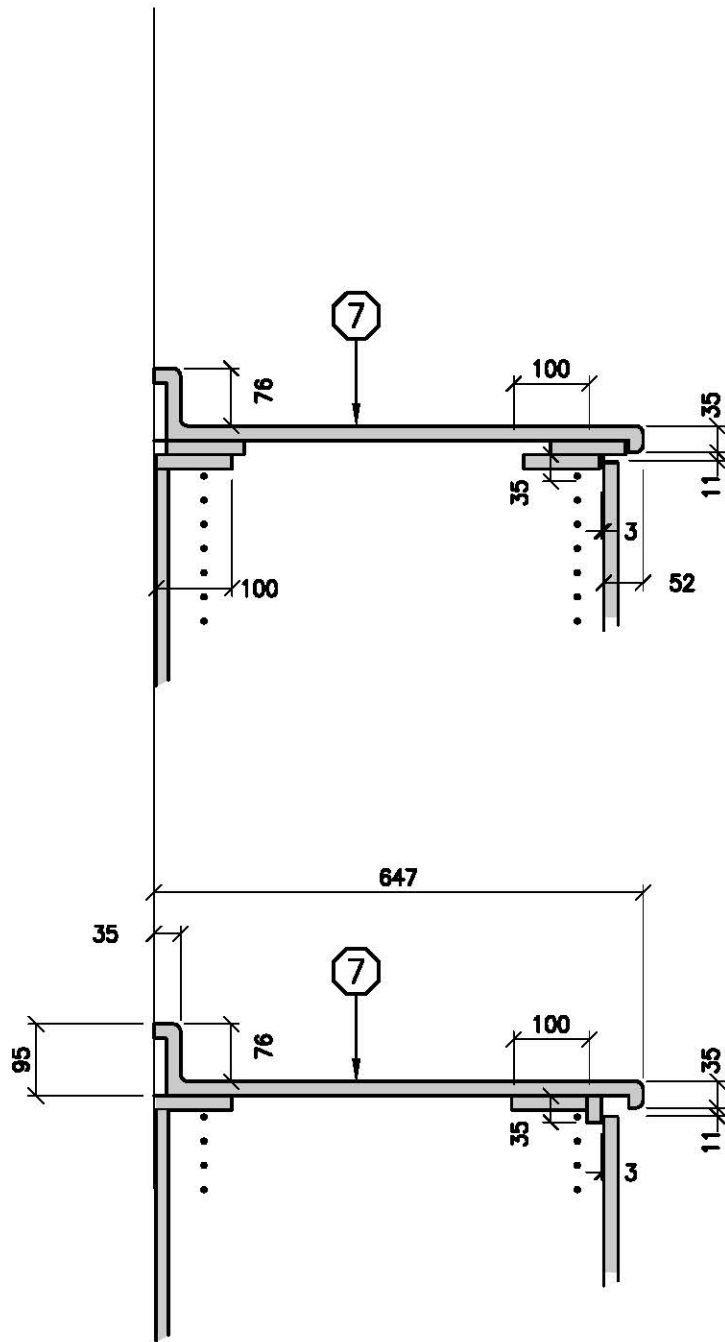
DETAIL TO BE USED WHEN TEACHERS CLOSETS ARE PLACED SIDE BY SIDE

ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

TEACHERS CLOSET SPACER DETAIL

Status	
Folder	G:\WORK\DOCUMENTS\PROPOSAL\WOOD MILLWORK
File	AW009.DWG
Drawn By	NST
Check By	SKA
Scale	1:10
Date	November 15
Last Plot	6/2/2016 9:25 AM
Job No.	
Sheet No.	

AW009



THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

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REPRODUCTION OF DWGS. AND RELATED DOCUMENTS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE WRDSB'S WRITTEN PERMISSION.

GENERAL NOTES:

ON ALL DWGS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS

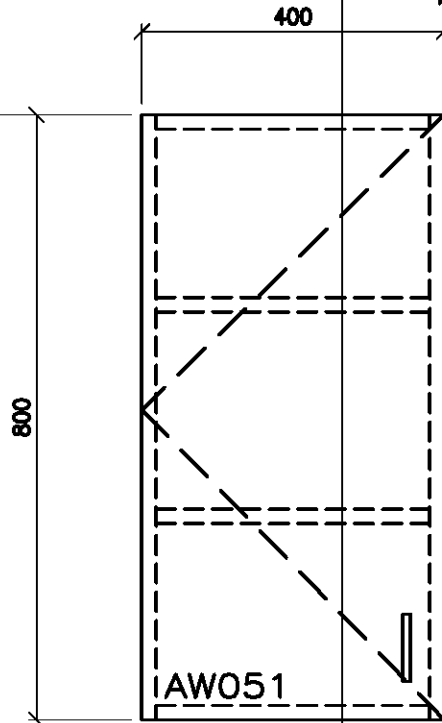
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

CABINET/COUNTERTOP - ACCEPTABLE CONSTRUCTION DETAIL

Status	
Folder	G:\UNITS\DOWN\PROPOS\WOOD MILLWORK
File	AW010.DWG
Drawn By	SKA
Check By	SKA
Scale	
Date	November 2015
Last Plot	6/2/2016 9:25 AM
Job No.	
Sheet No.	

AW010

2200 AFF



SEE LIST

AW053 - 305 **
AW056 - 355

** ONLY USE 305 DEPTH CABINETS TO MATCH EXISTING MILLWORK

THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

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GENERAL NOTES:

ON ALL DIMS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



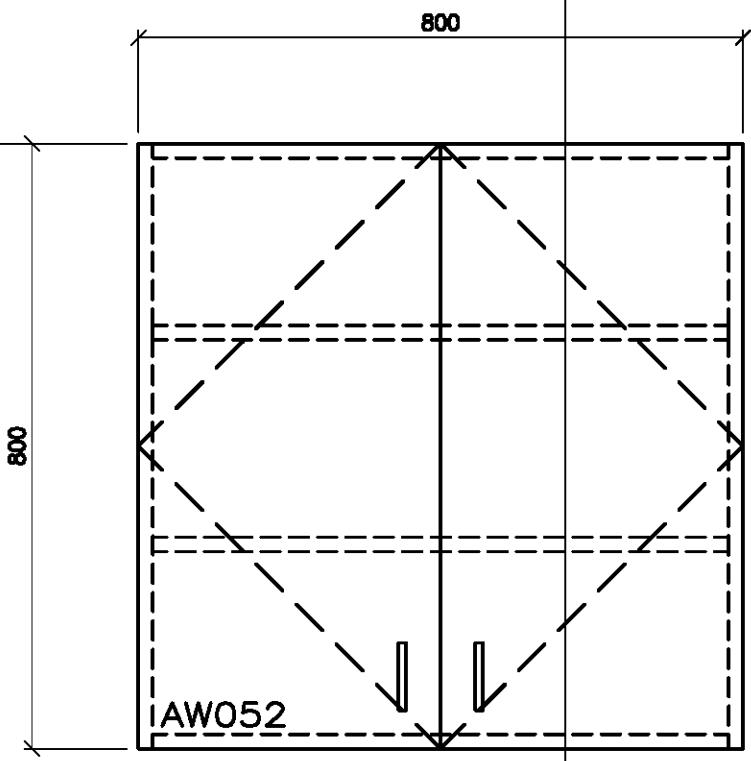
ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

UPPER CABINET - 400 - ELEVATION

Status
Folder \AW051\AW051.MILLWORK
File AW051.DWG
Drawn By NST
Check By SKA
Scale 1:10
Date April 15
Last Plot 6/2/2016 8:44 AM
Job No.
Sheet No.

AW051

2200 AFF



SEE LIST

AW053 - 305 **
AW056 - 355

** ONLY USE 305 DEPTH CABINETS TO MATCH EXISTING MILLWORK

THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRDS BEFORE PROCEEDING WITH WORK.

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GENERAL NOTES:

ON ALL DIMS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW025 TO AW020 FOR ADDITIONAL DETAILS.



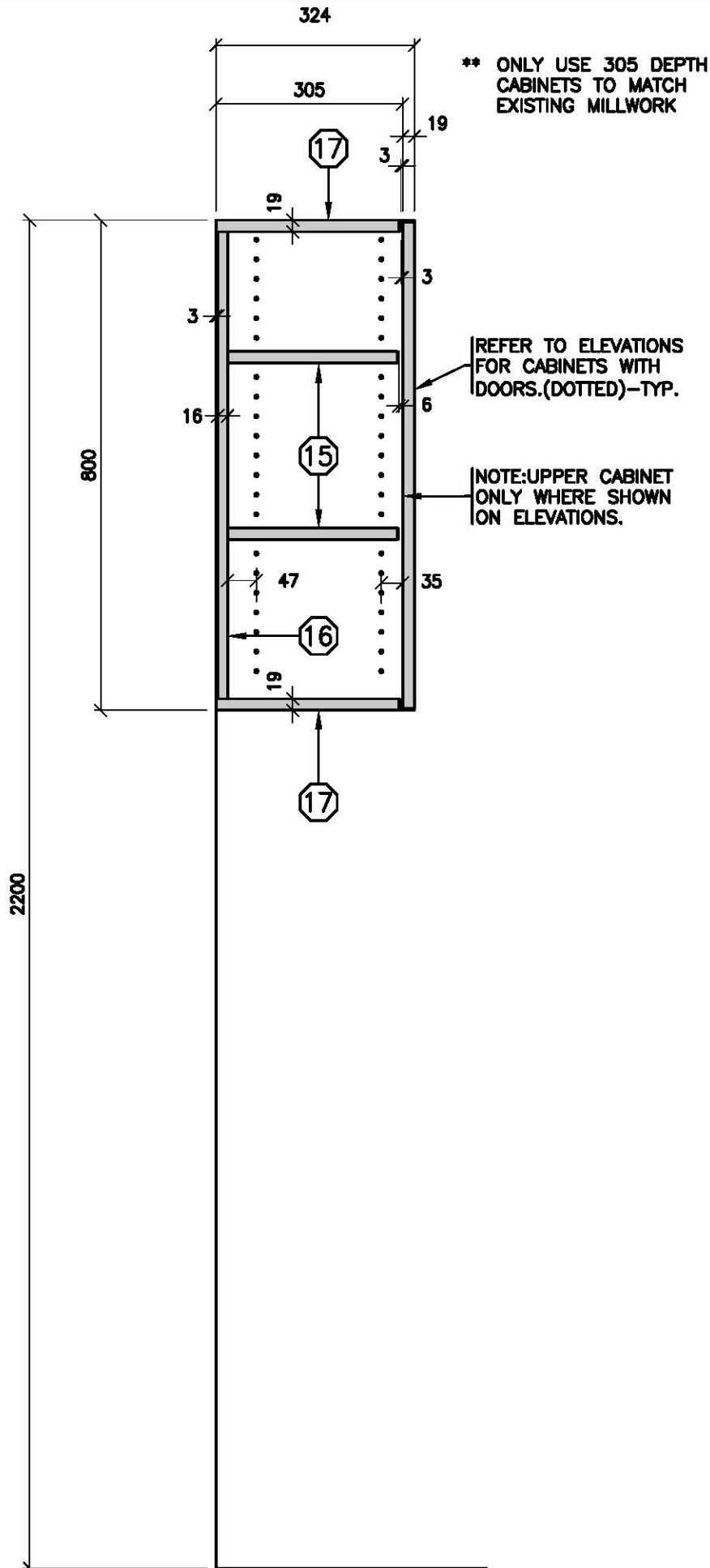
ARCHITECTURAL WOODWORK STANDARDS

FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

UPPER CABINET - 400 - ELEVATION

Status
Folder #NORTHEND_MILLWORK
File AW052.DWG
Drawn By NST
Check By SKA
Scale 1:10
Date April 15
Last Plot 6/2/2016 8:45 AM
Job No.
Sheet No.

AW052



**** ONLY USE 305 DEPTH CABINETS TO MATCH EXISTING MILLWORK**

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FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

UPPER CABINET - SECTION

Status	
Folder	AW053_MILLWORK
File	AW053.DWG
Drawn By	NST
Check By	SKA
Scale	1:10
Date	April 15
Last Plot	6/2/2016 8:45 AM
Job No.	
Sheet No.	

AW053

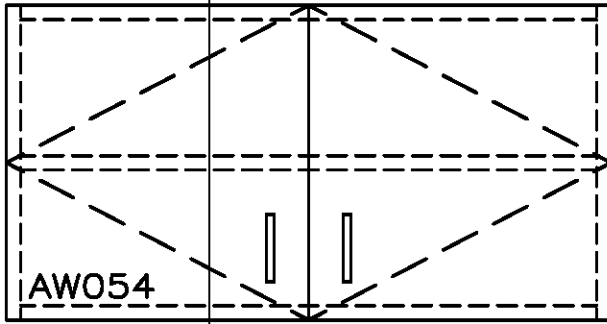
2200 AFF

416

900 - 800



AW055 - 305 **
AW057 - 355



AW054

** ONLY USE 305 DEPTH
CABINETS TO MATCH
EXISTING MILLWORK

THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRDS BEFORE PROCEEDING WITH WORK.

ALL DWG. AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF THE WRDS, AND MUST BE RETURNED UPON REQUEST.

REPRODUCTION OF DWG. AND RELATED DOCUMENTS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE WRDS WRITTEN PERMISSION.

GENERAL NOTES:

ON ALL DWG. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.

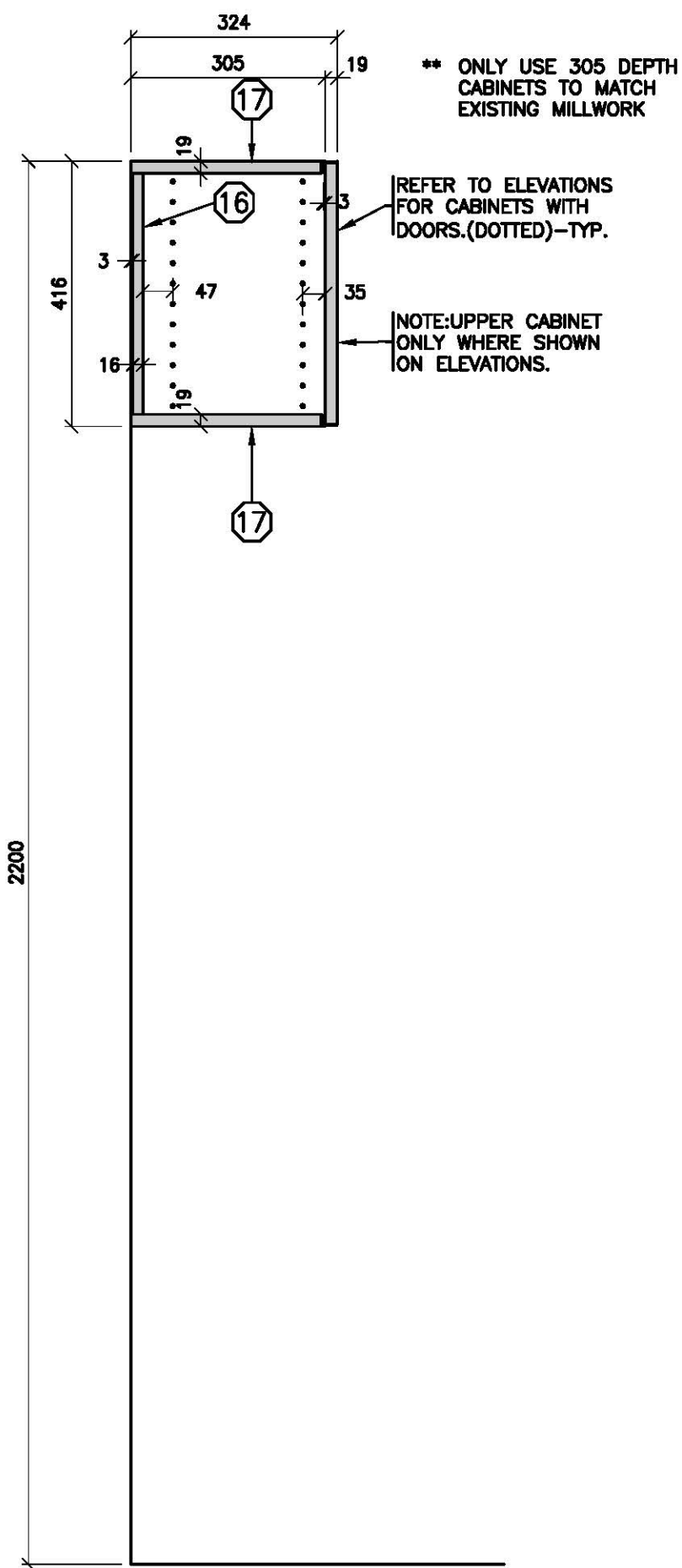


ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

SMALL UPPER CABINET - ELEVATION

Status
Folder #NORTHEND_MILLWORK
File AW054.DWG
Drawn By NST
Check By SKA
Scale 1:10
Date April 15
Last Plot 6/2/2016 8:45 AM
Job No.
Sheet No.

AW054



THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRDS BEFORE PROCEEDING WITH WORK.

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ON ALL DIMS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.

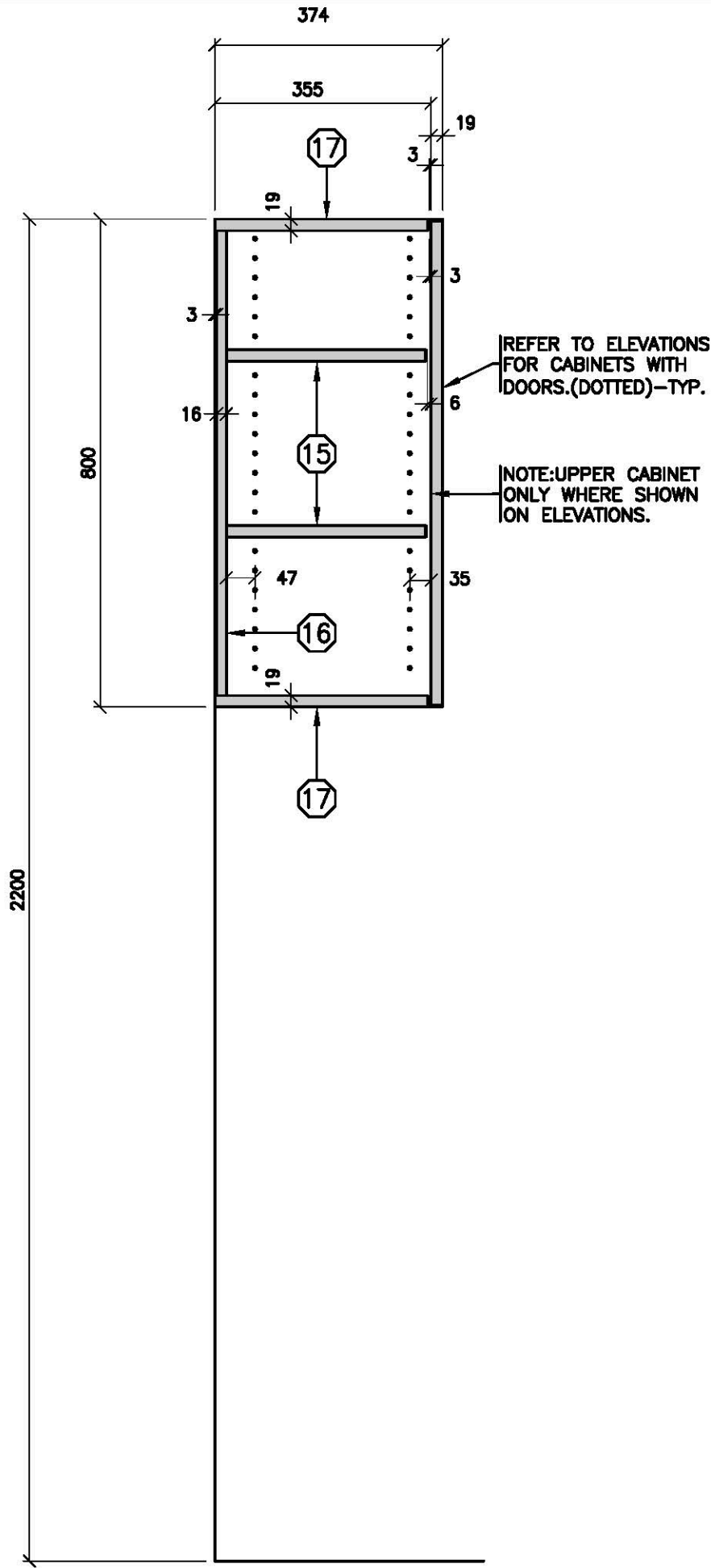


ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

SMALL UPPER CABINET - SECTION

Status
Folder #AW055_MILLWORK
File AW055.DWG
Drawn By NST
Check By SKA
Scale 1:10
Date April 15
Last Plot 6/2/2016 8:45 AM
Job No.
Sheet No.

AW055



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GENERAL NOTES:

ON ALL DIMS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



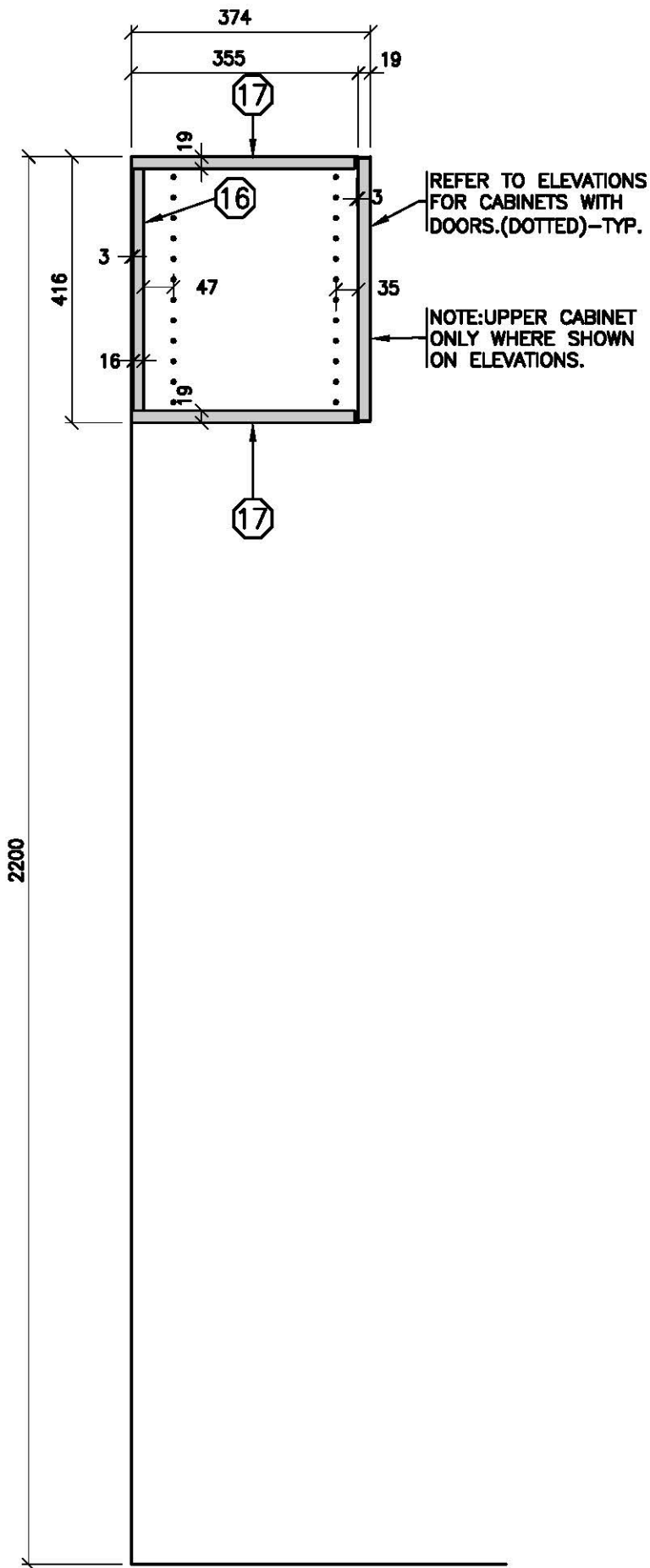
ARCHITECTURAL WOODWORK STANDARDS

FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

UPPER CABINET - SECTION - 355 DEEP

Status	
Folder	G:\WORK\DOWN\PROJ\WOOD MILLWORK
File	AW056.DWG
Drawn By	NST
Check By	SKA
Scale	1:10
Date	April 15
Last Plot	6/2/2016 9:26 AM
Job No.	
Sheet No.	

AW056



THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRDS BEFORE PROCEEDING WITH WORK.

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GENERAL NOTES:

ON ALL DWG. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS
 FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

SMALL UPPER CABINET - SECTION

Status	
Folder	G:\UNIVERSITY\DOWN\PROPOS\WOOD MILLWORK
File	AW057.DWG
Drawn By	NST
Check By	SKA
Scale	1:10
Date	April 15
Last Plot	6/2/2016 9:26 AM
Job No.	
Sheet No.	

AW057

ADJUST WIDTH FOR
CHOSEN
MICROWAVE UNIT

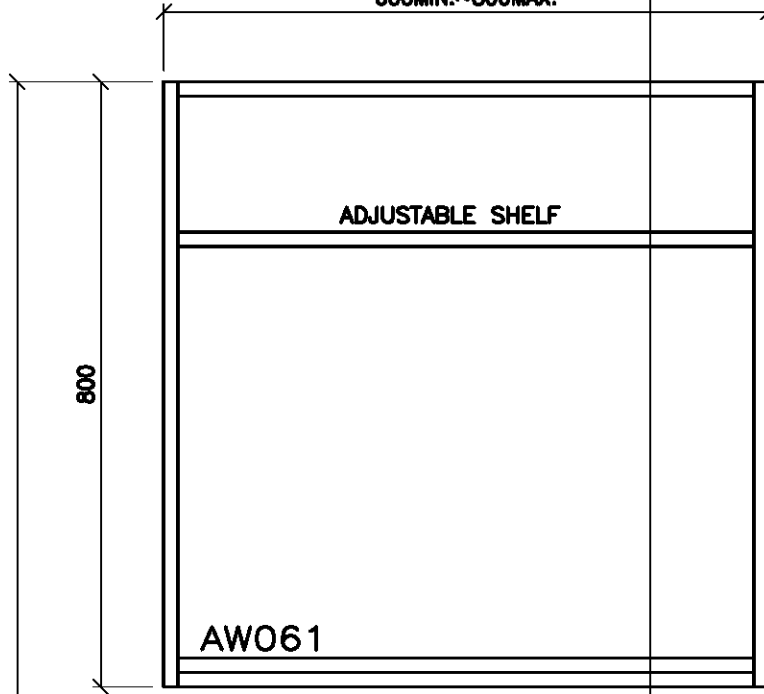
UPPER AND LOWER
UNIT WIDTHS TO
MATCH



SEE
LIST

AW062 - 305 **
AW063 - 355

600MIN.~800MAX.



2200 AFF

800

ADJUSTABLE SHELF

AW061

** ONLY USE 305 DEPTH
CABINETS TO MATCH
EXISTING MILLWORK

THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRDS BEFORE PROCEEDING WITH WORK.

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GENERAL NOTES:

ON ALL DIMS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



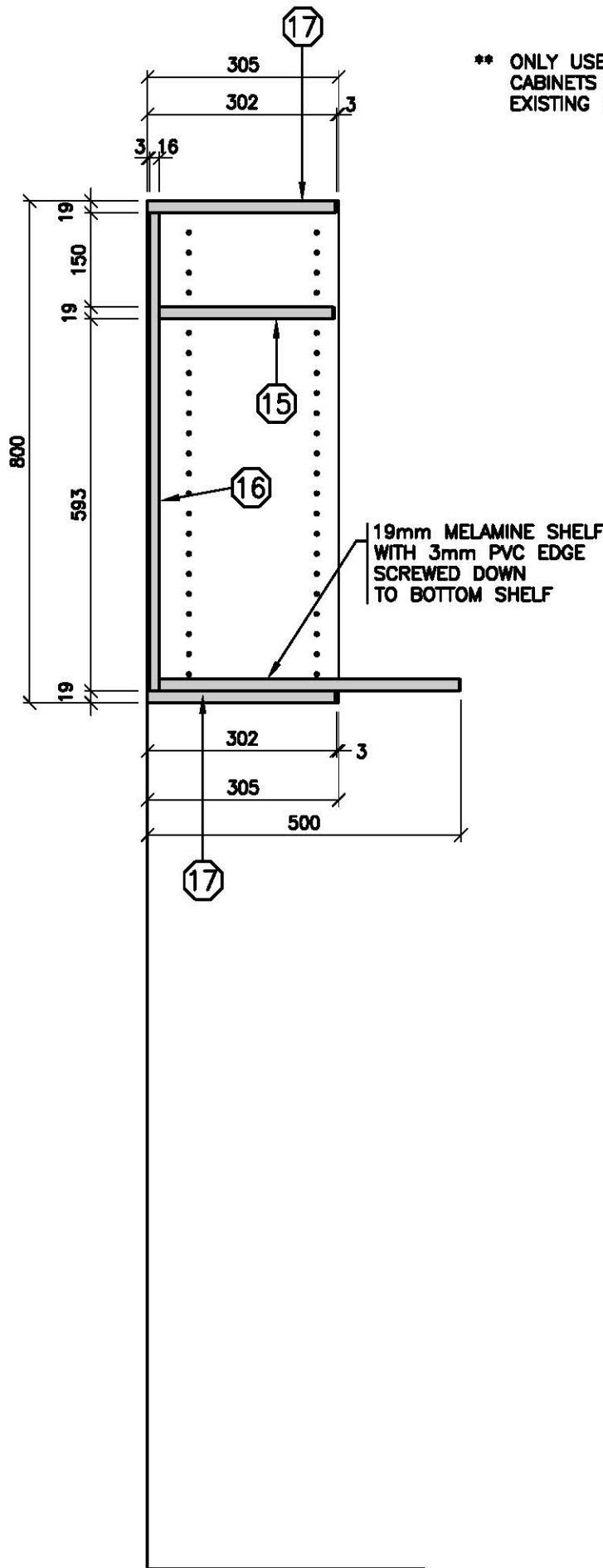
ARCHITECTURAL WOODWORK STANDARDS

FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

MICROWAVE SHELF - ELEVATION

Status
Folder #\DRAWING\WOOD MILLWORK
File AW061.DWG
Drawn By NST
Check By SKA
Scale 1:10
Date April 15
Last Plot 6/2/2016 8:45 AM
Job No.
Sheet No.

AW061



**** ONLY USE 305 DEPTH CABINETS TO MATCH EXISTING MILLWORK**

THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRDS BEFORE PROCEEDING WITH WORK.

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GENERAL NOTES:

ON ALL DIMS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.

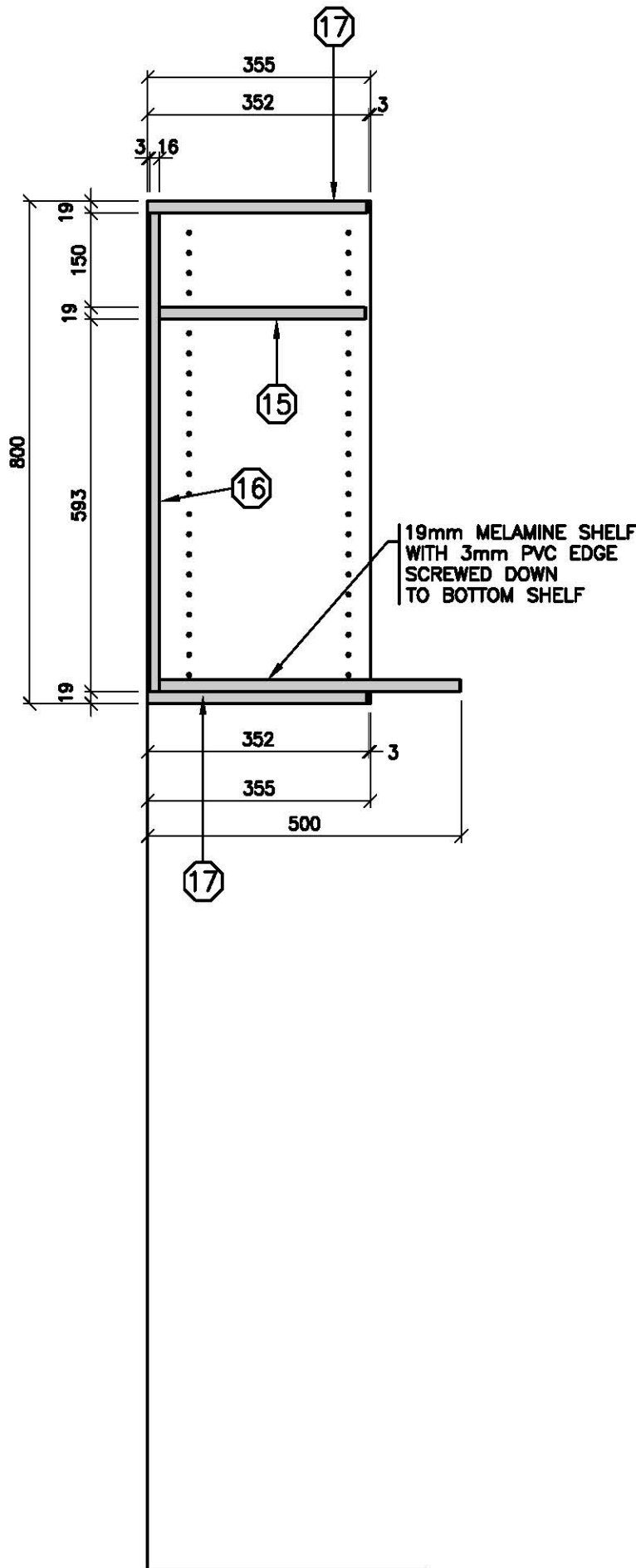


ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

MICROWAVE SHELF - SECTION

Status	
Folder	AW062.MILLWORK
File	AW062.DWG
Drawn By	NST
Check By	SKA
Scale	1:10
Date	April 15
Last Plot	6/2/2016 8:45 AM
Job No.	
Sheet No.	

AW062



THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRDS BEFORE PROCEEDING WITH WORK.

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GENERAL NOTES:

ON ALL DIMS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.

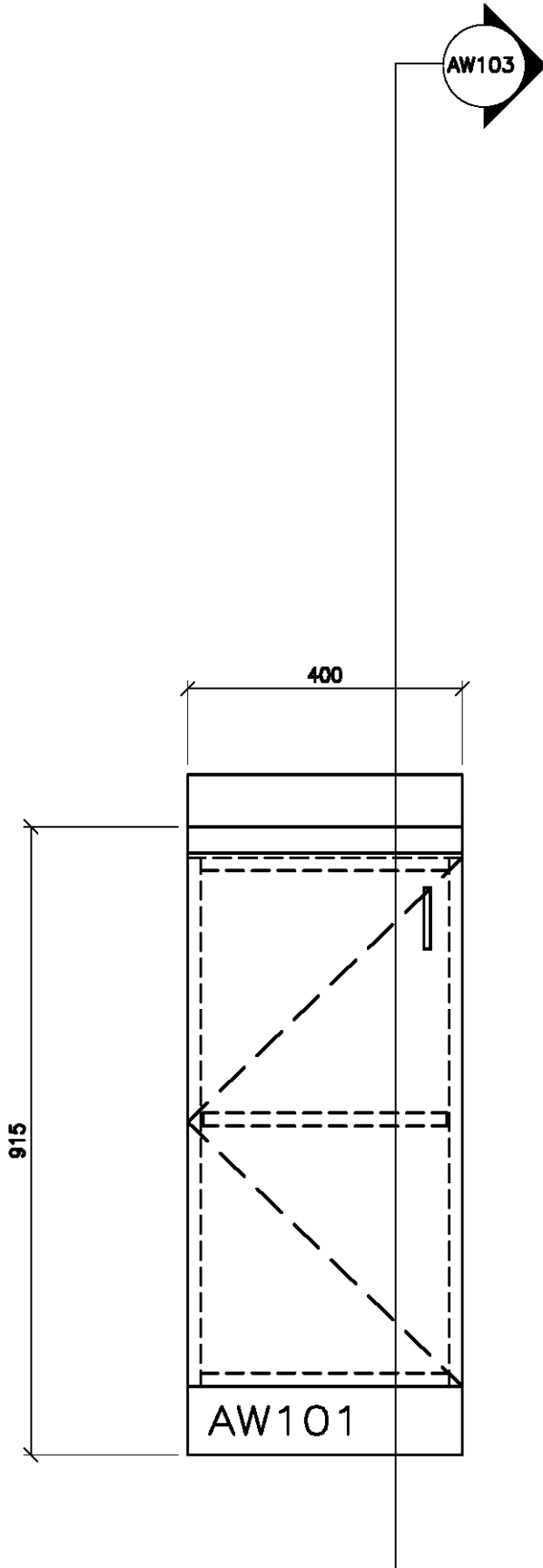


ARCHITECTURAL WOODWORK STANDARDS
 FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

MICROWAVE SHELF - SECTION

Status	
Folder	G:\ARCHITECTURE\PROPOSAL\WOOD MILLWORK
File	AW063.DWG
Drawn By	NST
Check By	SKA
Scale	1:10
Date	April 15
Last Plot	6/2/2016 9:26 AM
Job No.	
Sheet No.	

AW063



THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRDS BEFORE PROCEEDING WITH WORK.

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GENERAL NOTES:

ON ALL DIMS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.

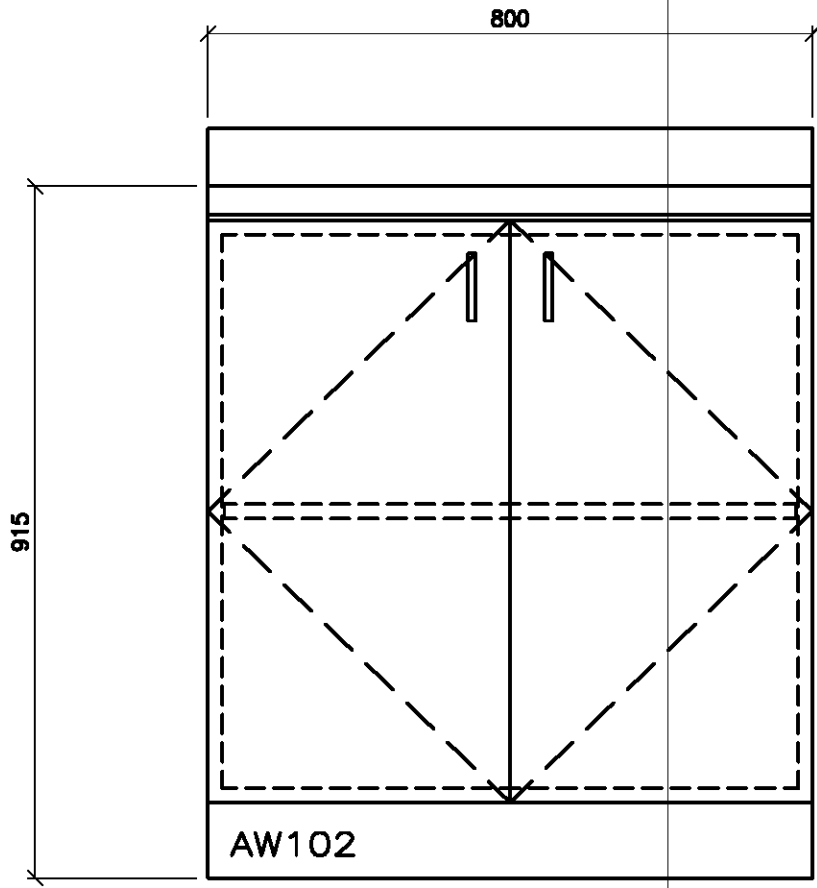


ARCHITECTURAL WOODWORK STANDARDS
 FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER CABINET-400 WIDE- ELEVATION

Status	
Folder	AW101-400 WIDE MLW001
File	AW101.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:45 AM
Job No.	
Sheet No.	

AW101



THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

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GENERAL NOTES:

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FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER CABINET-800 WIDE - ELEVATION

Status	
Folder	AW102\AW102.MLK
File	AW102.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	November 2015
Last Plot	6/2/2016 8:45 AM
Job No.	
Sheet No.	

AW102

THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

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GENERAL NOTES:

ON ALL DIMS. AW REFERS TO ARCHITECTURAL WOODWORK.

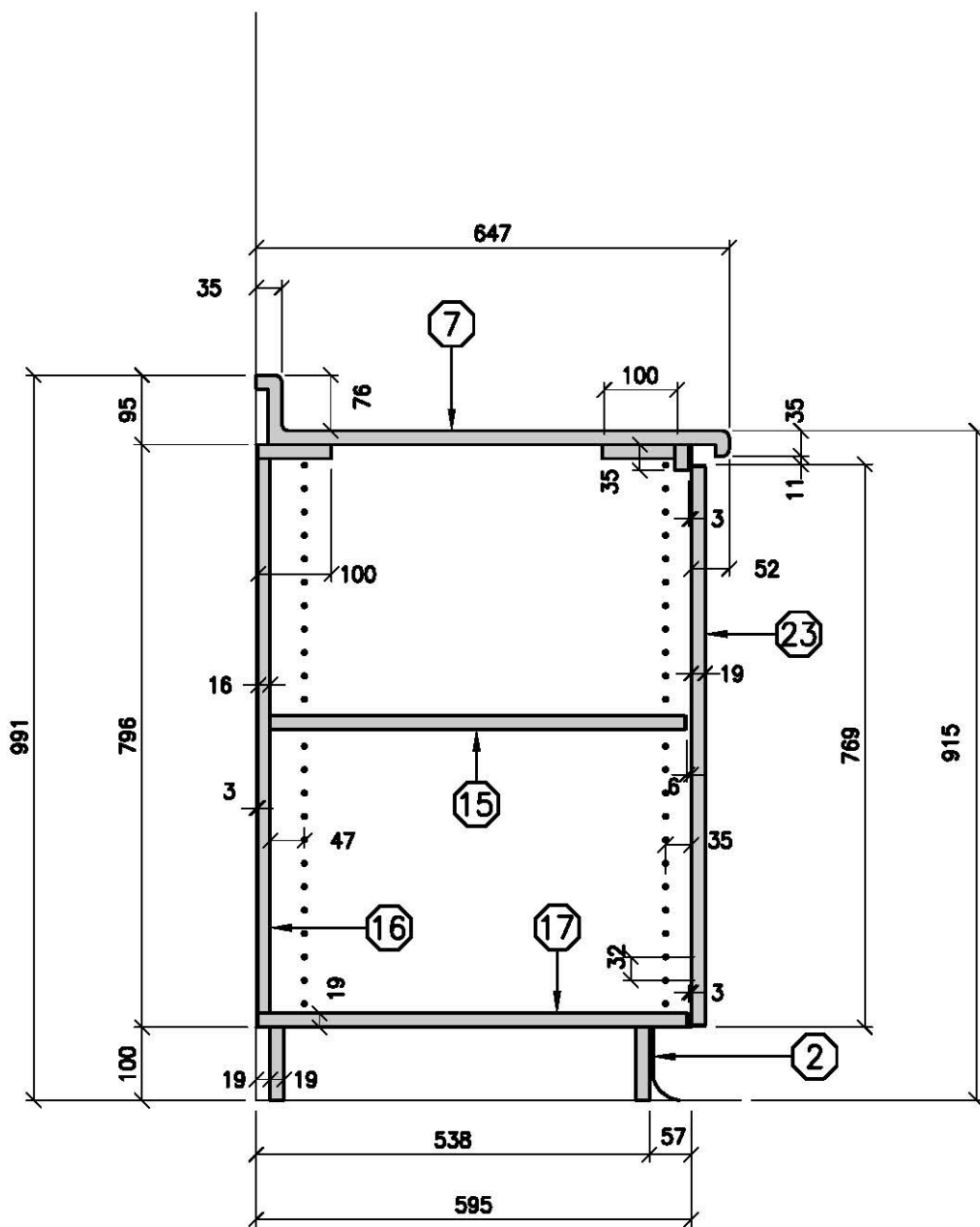
FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS
 FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER CABINET - SECTION

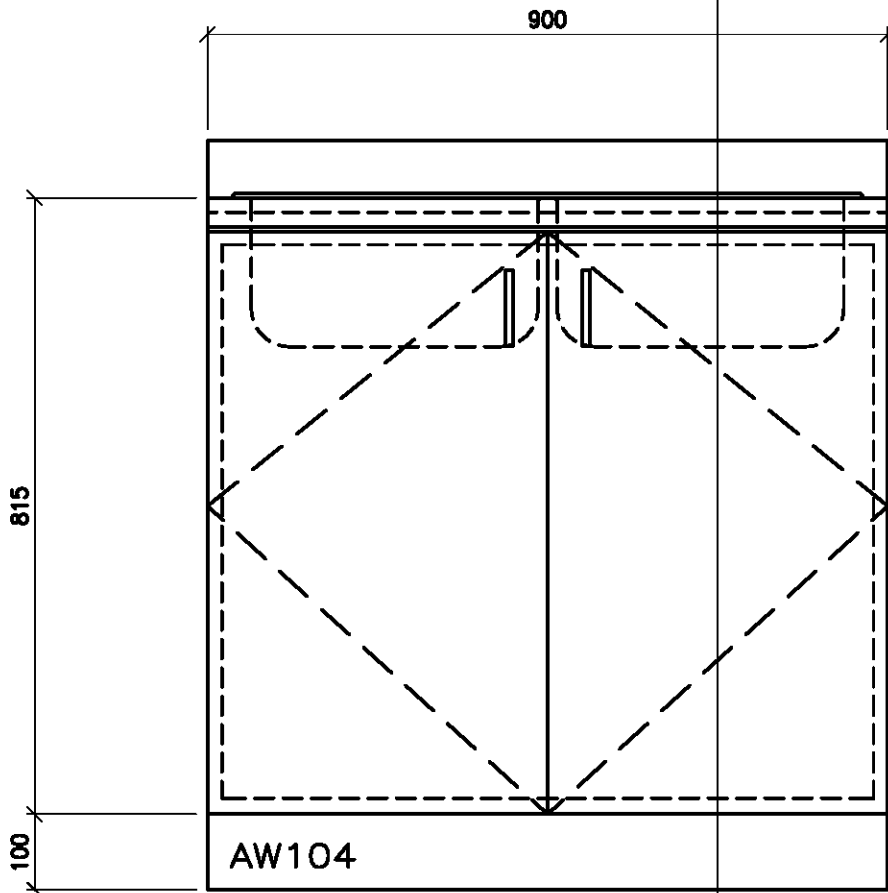


Status	
Folder	AW\WOODWORK\MILWORK
File	AW103.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	November 2015
Last Plot	6/2/2016 8:45 AM
Job No.	
Sheet No.	

AW103

- SINGLE SINK: 800 WIDE
- DOUBLE SINK: 863 WIDE MIN USE 900 WIDE
- UPPER CABINET TO HAVE A DIVIDER

AW106



THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

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GENERAL NOTES:

ON ALL DIMS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

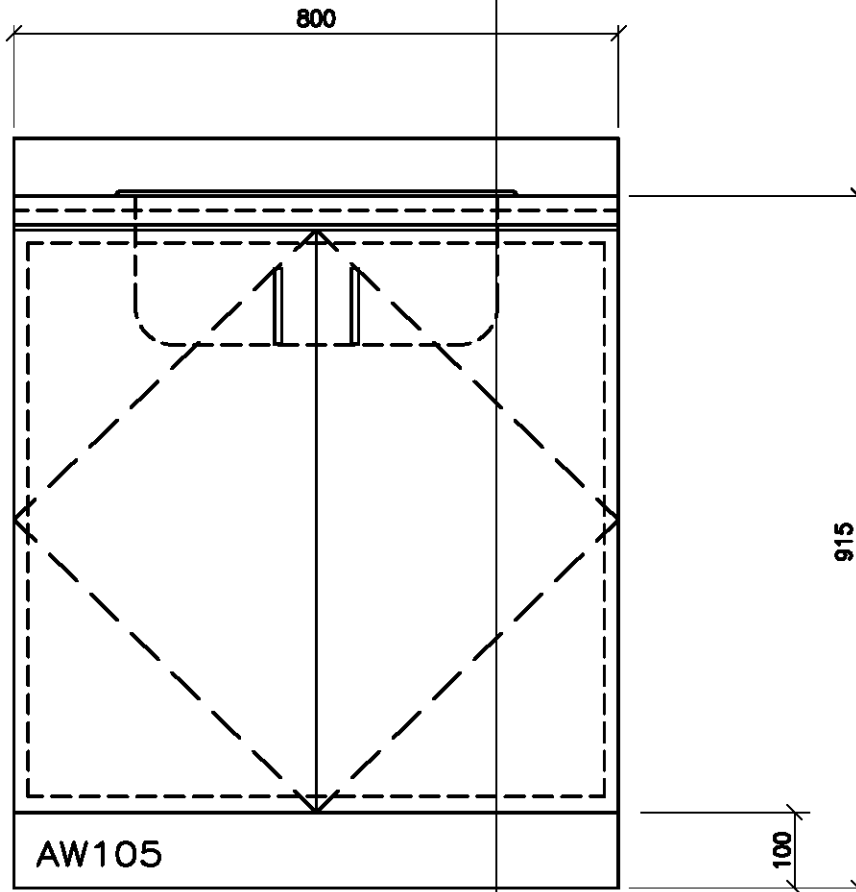
LOWER CABINET WITH DOUBLE SINK - ELEVATION

Status	
Folder	AW104\AW104.MLKWORK
File	AW104.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:46 AM
Job No.	
Sheet No.	

AW104

- SINGLE SINK: 800 WIDE
- DOUBLE SINK: 863 WIDE MINIMUM,
USE 900 WIDE CABINET
- UPPER CABINET TO HAVE A DIMDER
- COUNTERTOP TO HAVE CLASSIC
NO-DRIP PROFILE

AW106



THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

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GENERAL NOTES:

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FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



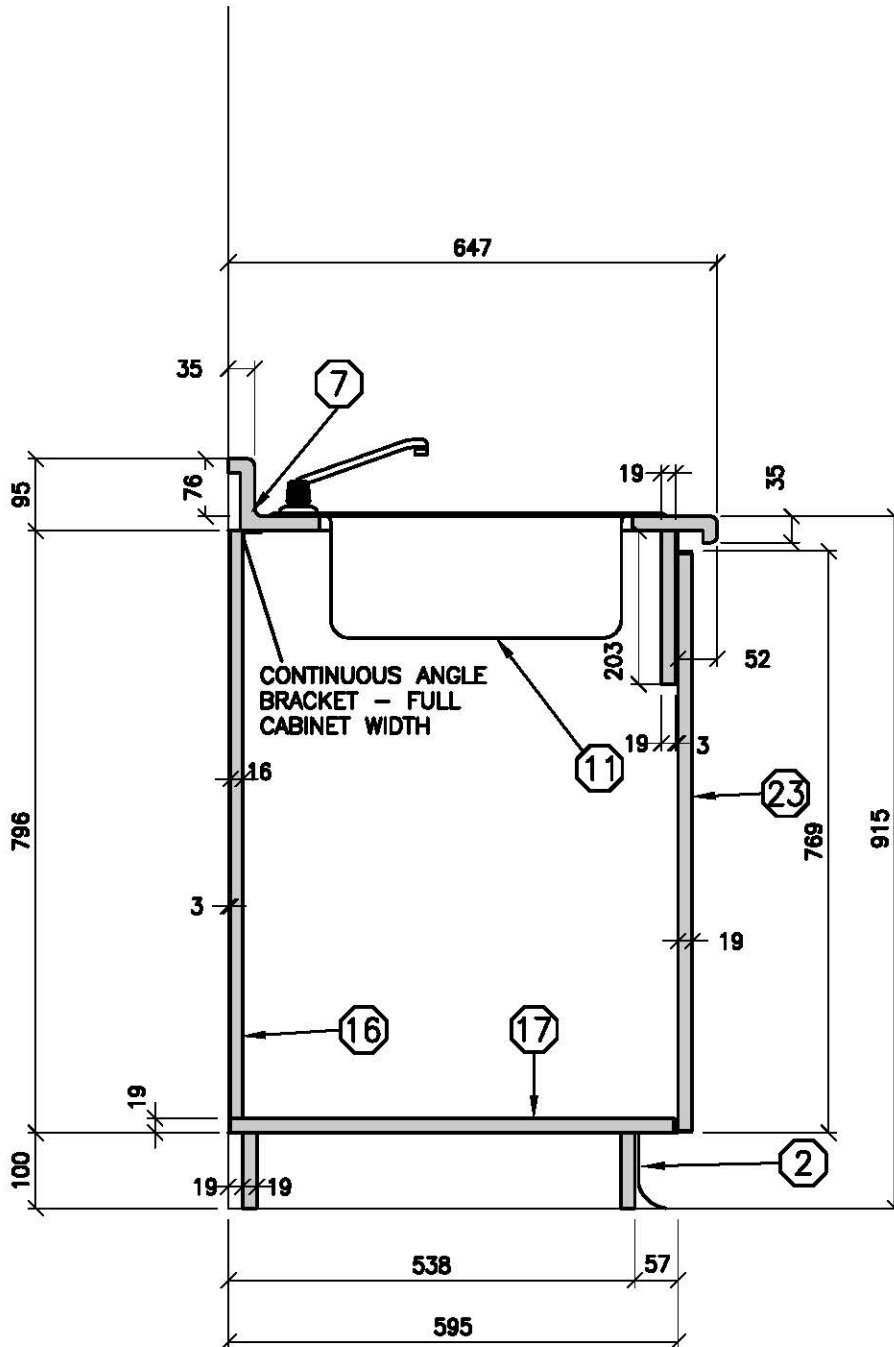
ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER CABINET WITH SINGLE SINK - ELEVATION

Status	
Folder	AW\WOODWORK ML\WORK
File	AW105.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	November 2015
Last Plot	6/2/2016 8:46 AM
Job No.	
Sheet No.	

AW105

- SINGLE SINK: 800 WIDE
- DOUBLE SINK: 863 WIDE MINIMUM,
USE 900 WIDE CABINET
- UPPER CABINET TO HAVE A DIVIDER
- COUNTERTOP TO HAVE CLASSIC
NO-DRIP PROFILE



THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

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FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.

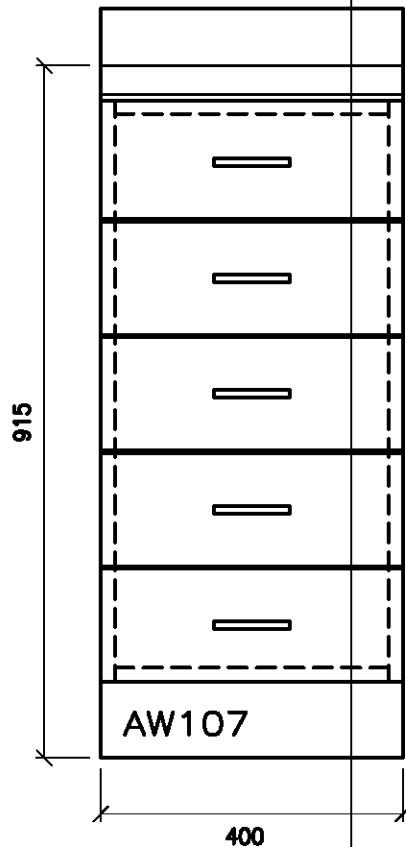


ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER CABINET WITH SINK - SECTION

Status	
Folder	AW106_MLWORK
File	AW106.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	November 2015
Last Plot	8/2/2016 8:46 AM
Job No.	
Sheet No.	

AW106



THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

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REPRODUCTION OF DIMS. AND RELATED DOCUMENTS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE WRDSB'S WRITTEN PERMISSION.

GENERAL NOTES:

ON ALL DIMS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER CABINET WITH DRAWERS - 5D c/w DL - ELEVATION

Status	
Folder	AW\WOODWORK
File	AW107.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:46 AM
Job No.	
Sheet No.	

AW107

THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

ALL DIMS. AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF THE WRDSB, AND MUST BE RETURNED UPON REQUEST.

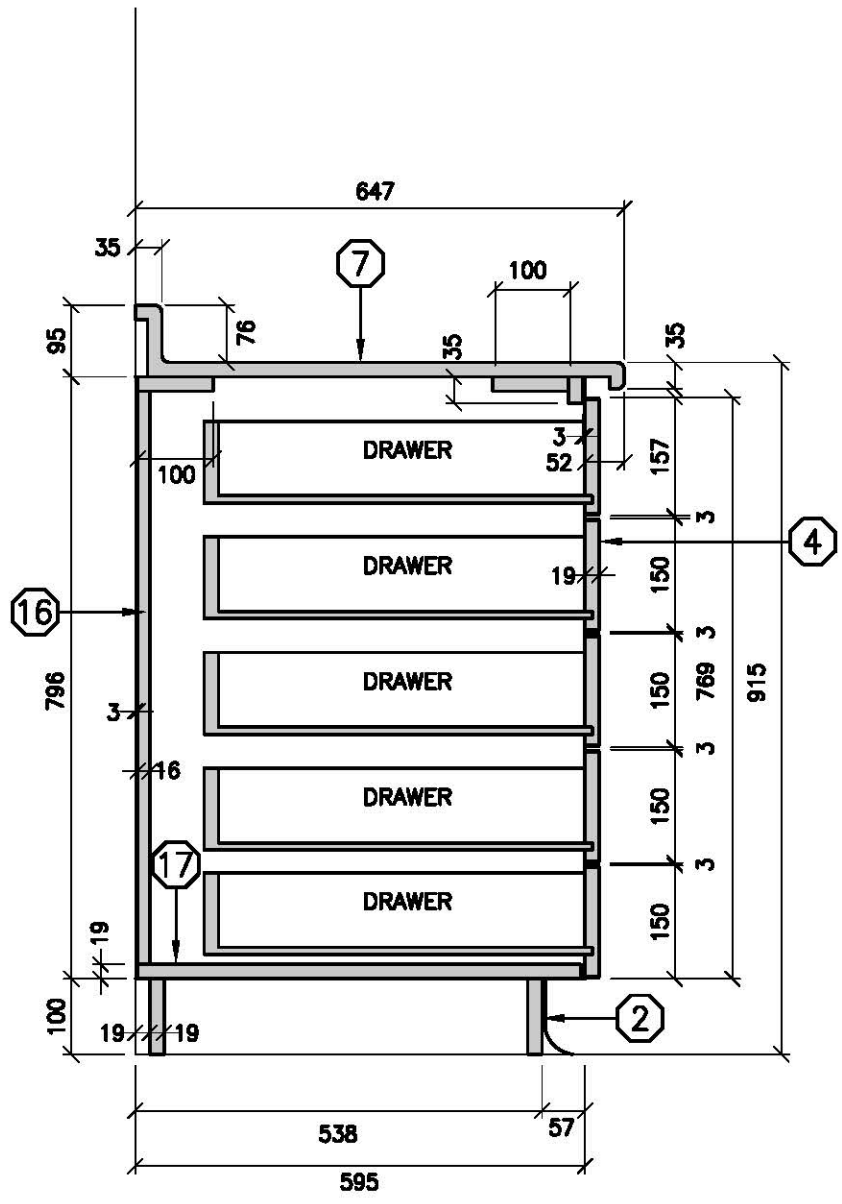
REPRODUCTION OF DIMS. AND RELATED DOCUMENTS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE WRDSB'S WRITTEN PERMISSION.

GENERAL NOTES:

ON ALL DIMS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER CABINET WITH DRAWERS - 5D c/w DL - SECTION

Status	
Folder	AW108_MLW008 MLW008
File	AW108.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:46 AM
Job No.	
Sheet No.	

AW108

THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRDS BEFORE PROCEEDING WITH WORK.

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REPRODUCTION OF DWG. AND RELATED DOCUMENTS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE WRDS WRITTEN PERMISSION.

GENERAL NOTES:

ON ALL DWG. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.

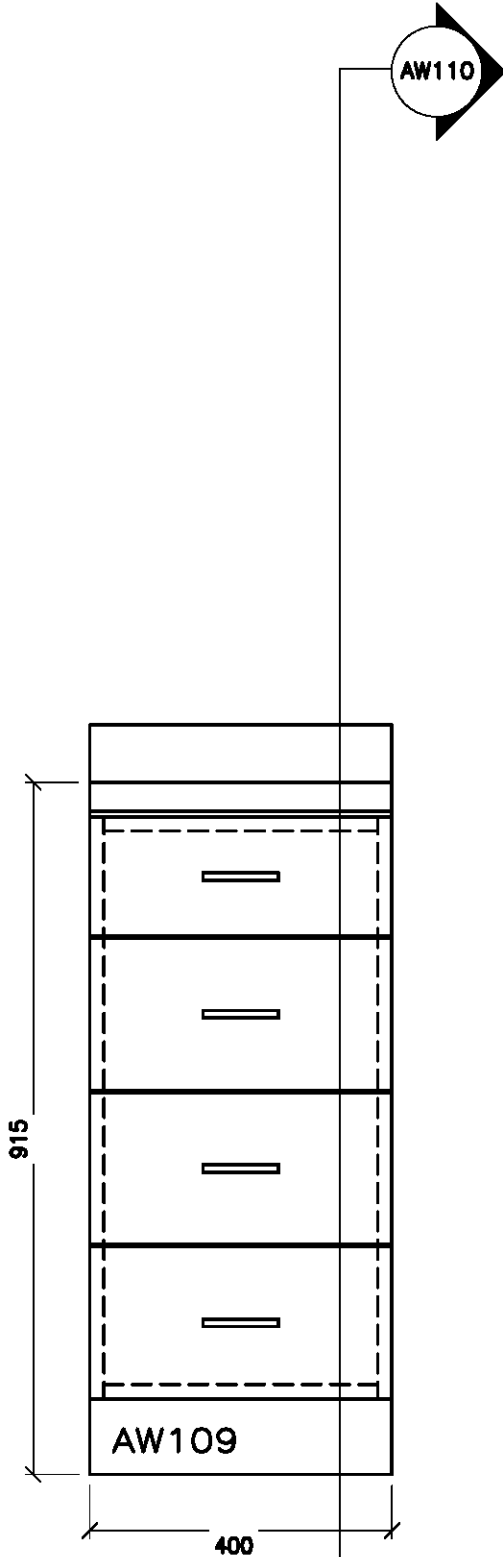


ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER CABINET WITH DRAWERS-4D C/W DL - ELEVATION

Status
Folder #NORTHEND_WOOD MLWORK
File AW109.DWG
Drawn By NST
Check By SKA
Scale
Date February 2015
Last Plot 6/2/2016 8:46 AM
Job No.
Sheet No.

AW109



THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

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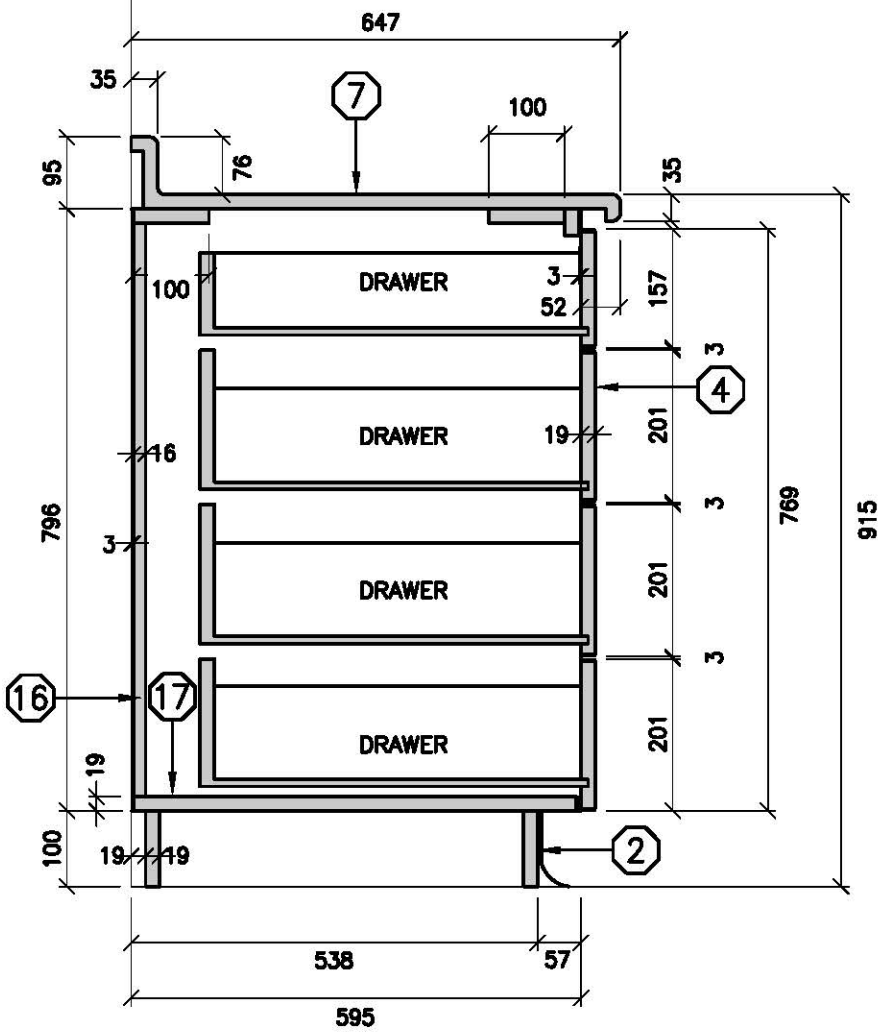
REPRODUCTION OF DIMS. AND RELATED DOCUMENTS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE WRDSB'S WRITTEN PERMISSION.

GENERAL NOTES:

ON ALL DIMS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.

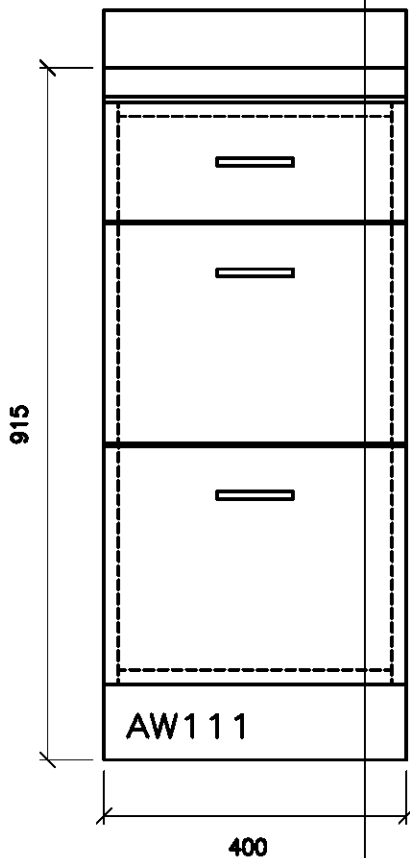


ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER CABINET WITH DRAWERS-4D c/w DL - SECTION

Status	
Folder	AW110\AW110.DWG
File	AW110.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:46 AM
Job No.	
Sheet No.	

AW110



AW112

THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRITER BEFORE PROCEEDING WITH WORK.

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GENERAL NOTES:

ON ALL DIMS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER CABINET WITH DRAWERS - 3D c/w DL+ FD - ELEVATION

Status	
Folder	AW\WOOD\MILWORK
File	AW111.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	November 2015
Last Plot	6/2/2016 8:46 AM
Job No.	
Sheet No.	

AW111

THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

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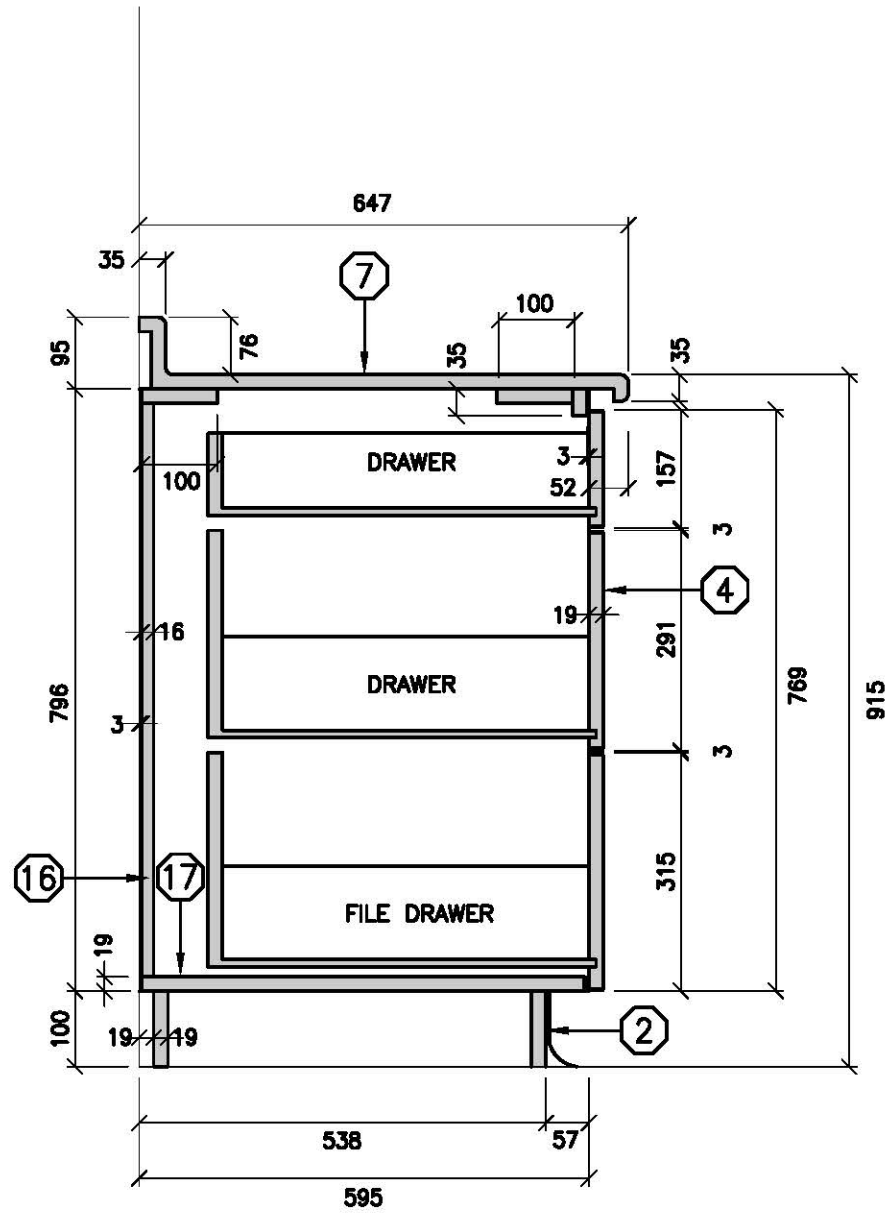
REPRODUCTION OF DIMS. AND RELATED DOCUMENTS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE WRDSB'S WRITTEN PERMISSION.

GENERAL NOTES:

ON ALL DIMS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.

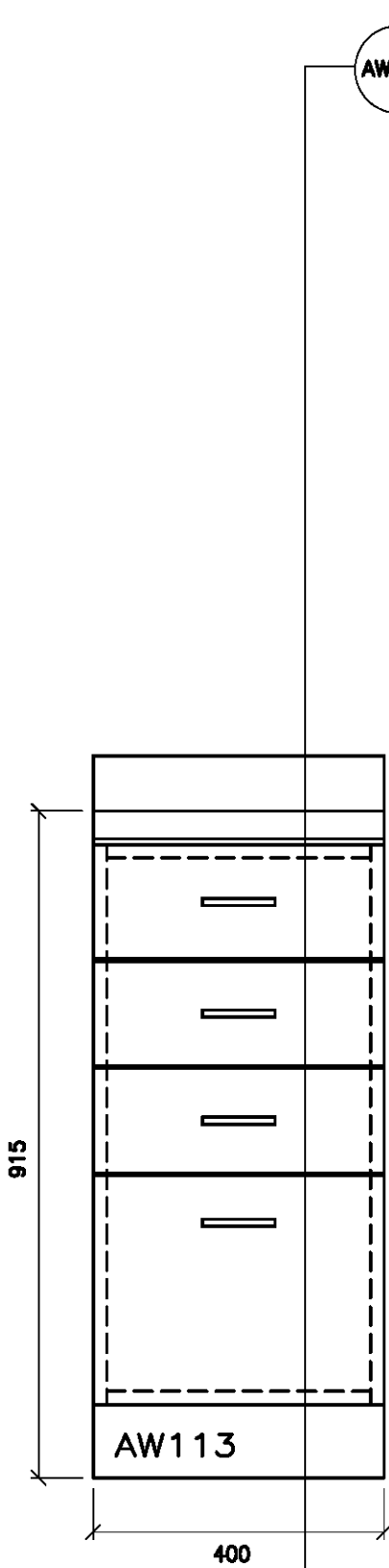


ARCHITECTURAL WOODWORK STANDARDS
 FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER CABINET WITH DRAWERS - SD c/w DL + FD - SECTION

Status	
Folder	AW00000000_MLWORK
File	AW112.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	November 2015
Last Plot	6/2/2016 8:46 AM
Job No.	
Sheet No.	

AW112



THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRITER BEFORE PROCEEDING WITH WORK.

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GENERAL NOTES:

ON ALL DIMS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER CABINET WITH DRAWERS - 4D c/w DL:FD - ELEVATION

Status	
Folder	AW\WOOD\MILWORK
File	AW113.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:47 AM
Job No.	
Sheet No.	

AW113

THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRDS BEFORE PROCEEDING WITH WORK.

ALL DIMS. AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF THE WRDS, AND MUST BE RETURNED UPON REQUEST.

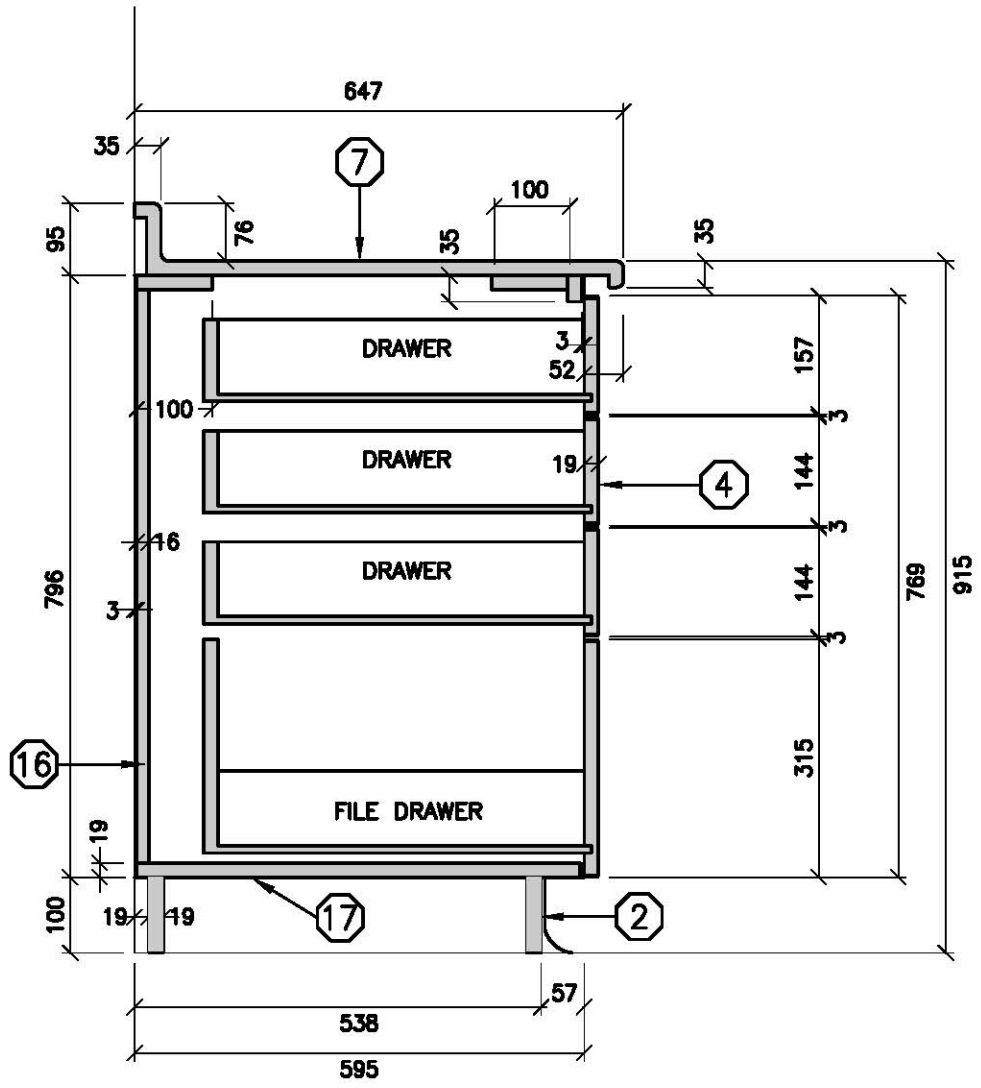
REPRODUCTION OF DIMS. AND RELATED DOCUMENTS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE WRDS'S WRITTEN PERMISSION.

GENERAL NOTES:

ON ALL DIMS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.

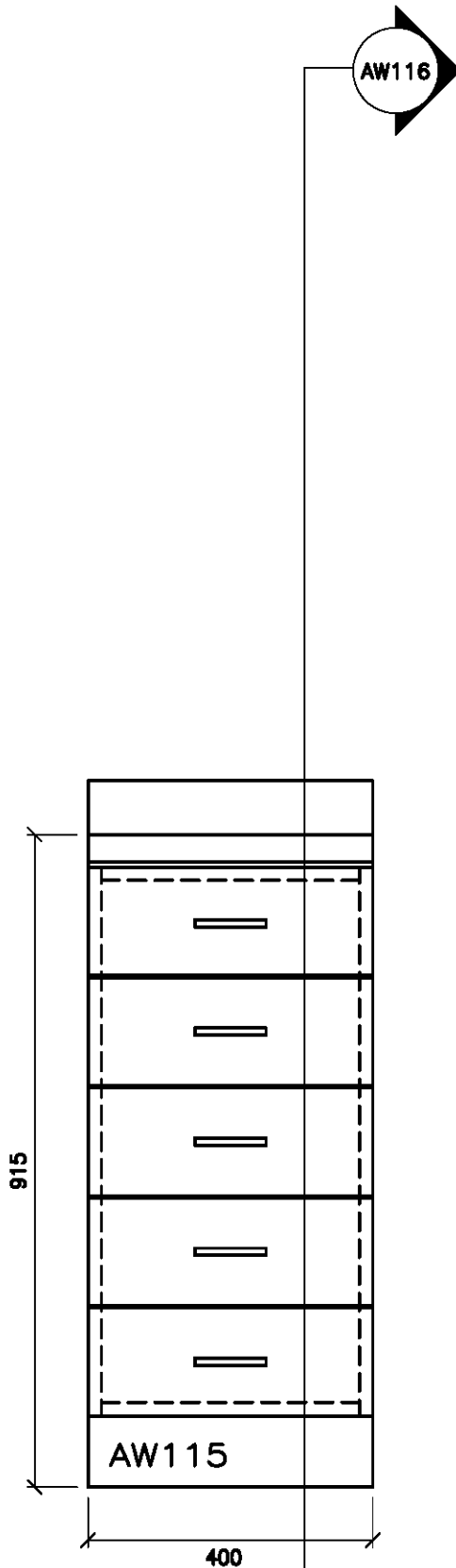


ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER CABINET WITH DRAWERS - 4D C/W DL + FD - Section

Status	
Folder	AW114_ARCHITECTURAL WOODWORK
File	AW114.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:47 AM
Job No.	
Sheet No.	

AW114



THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRITER BEFORE PROCEEDING WITH WORK.

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GENERAL NOTES:

ON ALL DIMS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER CABINET WITH DRAWERS - 5D - ELEVATION

Status	
Folder	AW\WOOD\WOOD ML\WORK
File	AW115.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:47 AM
Job No.	
Sheet No.	

AW115

THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

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GENERAL NOTES:

ON ALL DIMS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.

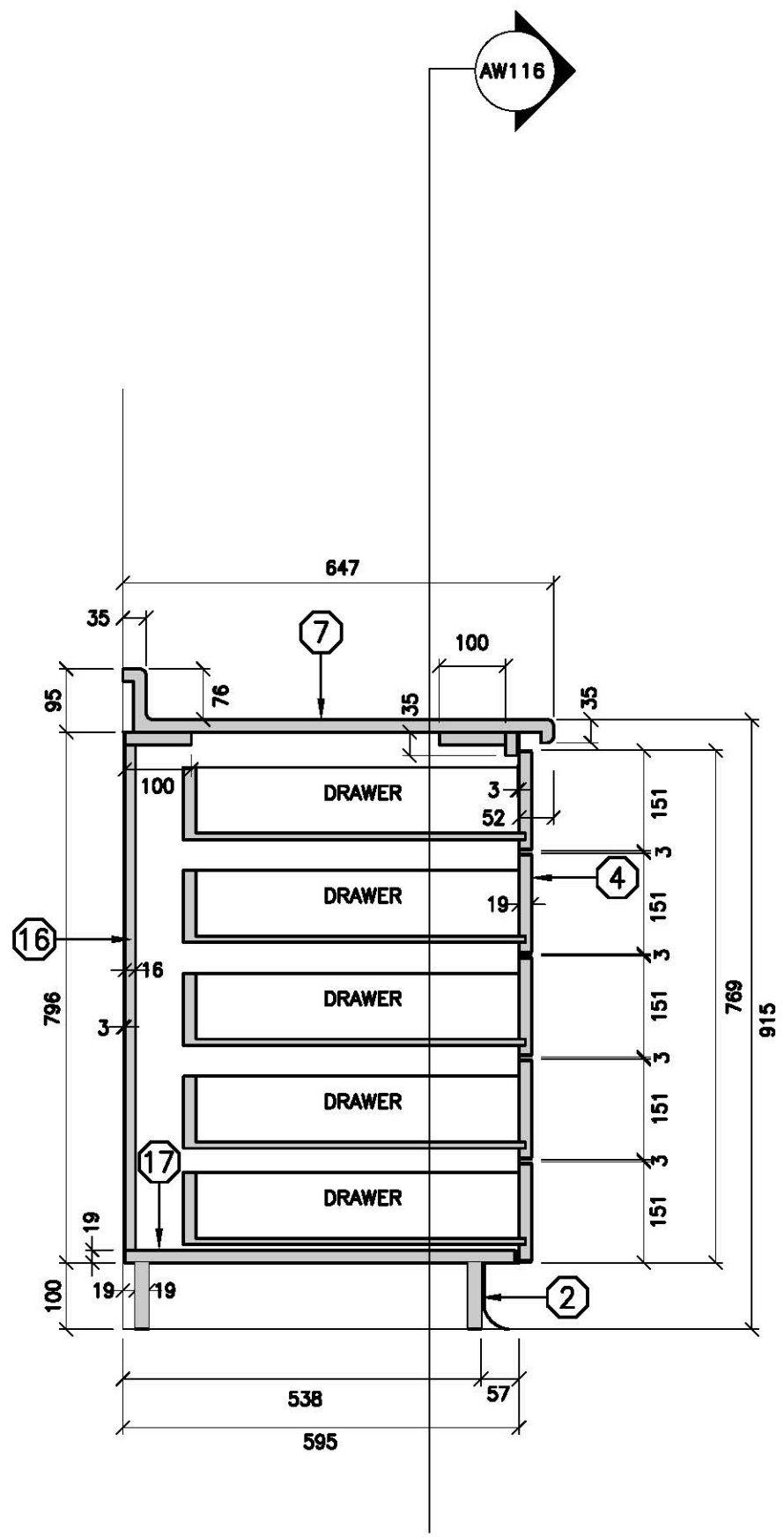


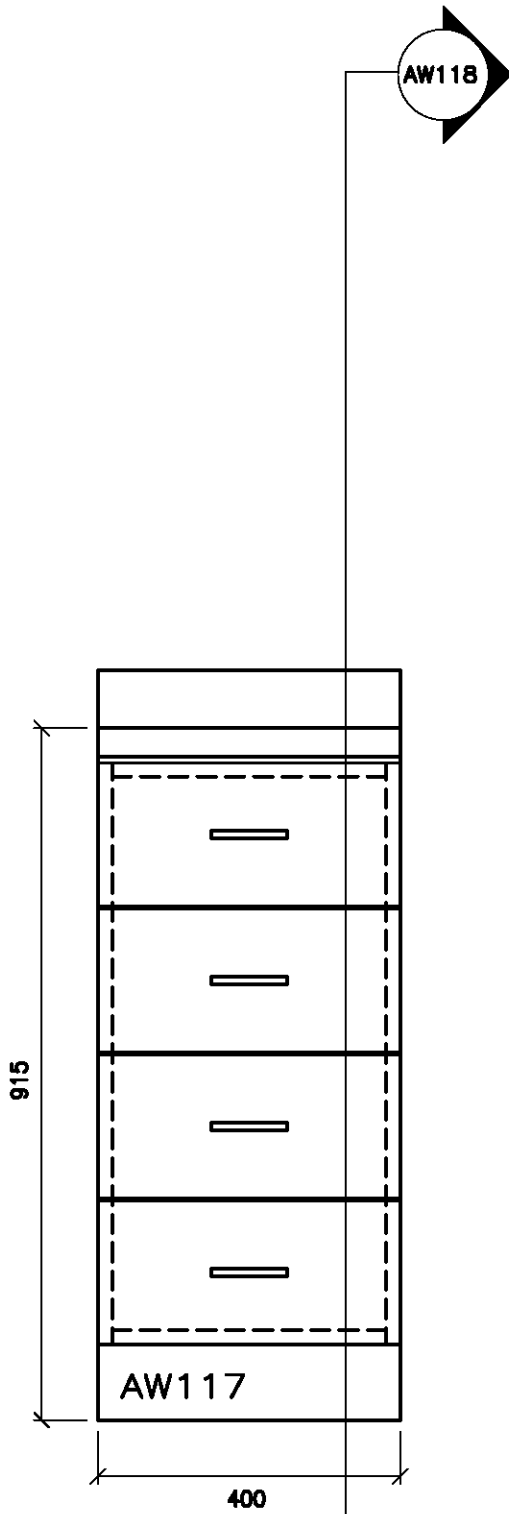
ARCHITECTURAL WOODWORK STANDARDS
 FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER CABINET WITH DRAWERS -SD - SECTION

Status	
Folder	AW116_ARCHITECTURAL WOODWORK
File	AW116.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:47 AM
Job No.	
Sheet No.	

AW116





THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRITER BEFORE PROCEEDING WITH WORK.

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GENERAL NOTES:

ON ALL DIMS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS
 FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER CABINET WITH DRAWERS - 4D - ELEVATION

Status	
Folder	AW117\AW117.DWG
File	AW117.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:47 AM
Job No.	
Sheet No.	

AW117

THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

ALL DIMS. AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF THE WRDSB, AND MUST BE RETURNED UPON REQUEST.

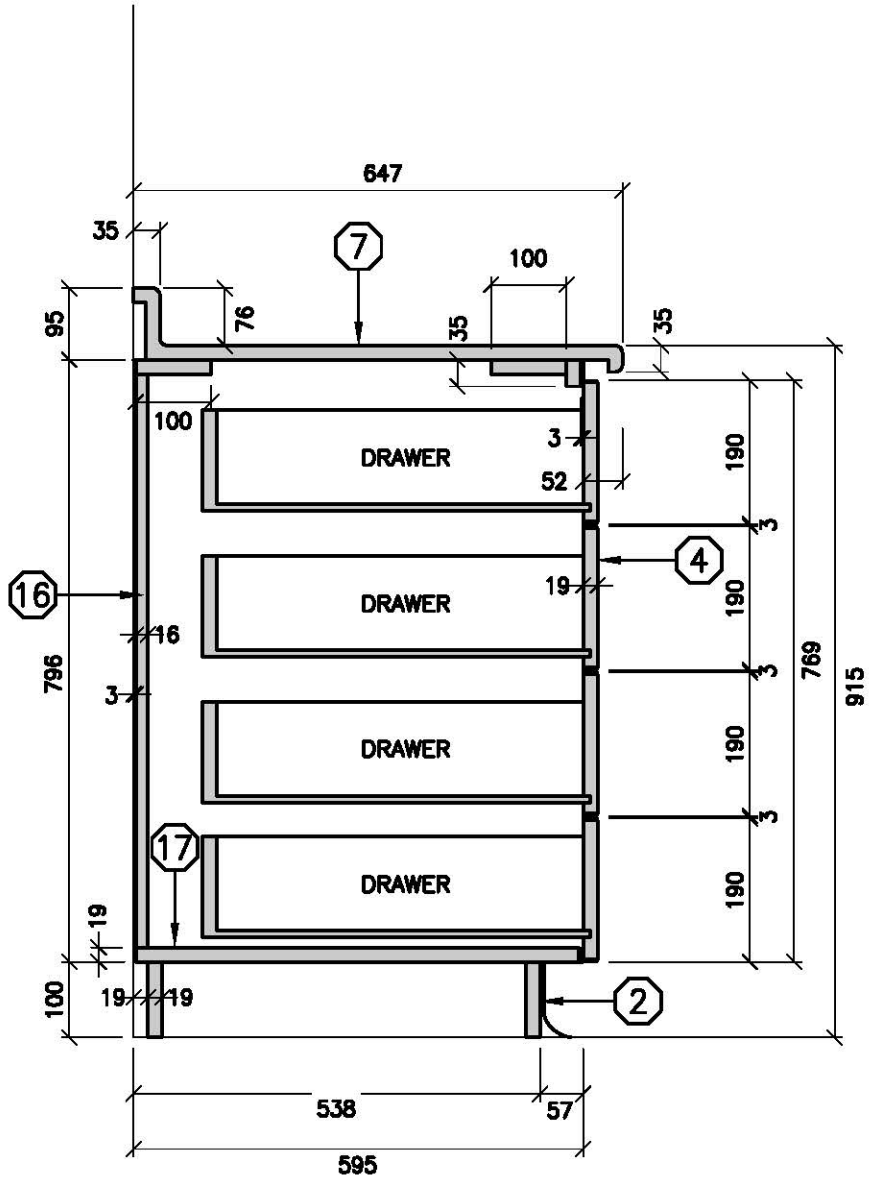
REPRODUCTION OF DIMS. AND RELATED DOCUMENTS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE WRDSB'S WRITTEN PERMISSION.

GENERAL NOTES:

ON ALL DIMS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



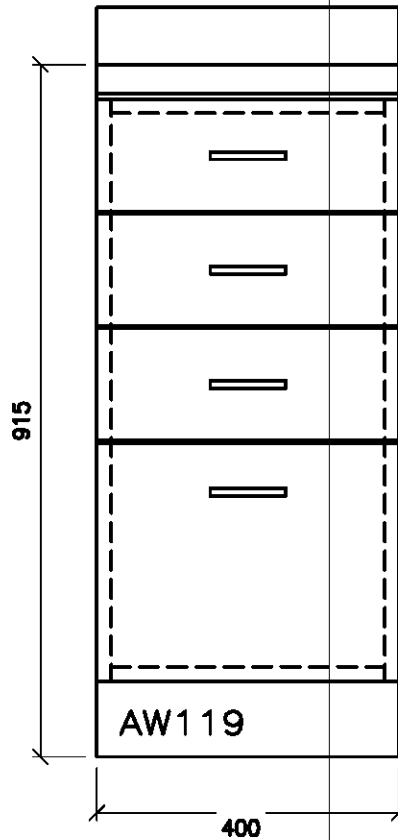
ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER CABINET WITH DRAWERS - 4D - SECTION

Status	
Folder	AW118\AW118.MLWORK
File	AW118.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:47 AM
Job No.	
Sheet No.	

AW118

AW120



THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

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GENERAL NOTES:

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FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER CABINET WITH DRAWERS - 4D C/W FD - ELEVATION

Status

Folder #NORTHEND_WOOD MLWORK

File AW119.DWG

Drawn By NST

Check By SKA

Scale

Date February 2015

Last Plot 6/2/2016 8:47 AM

Job No.

Sheet No.

AW119

THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

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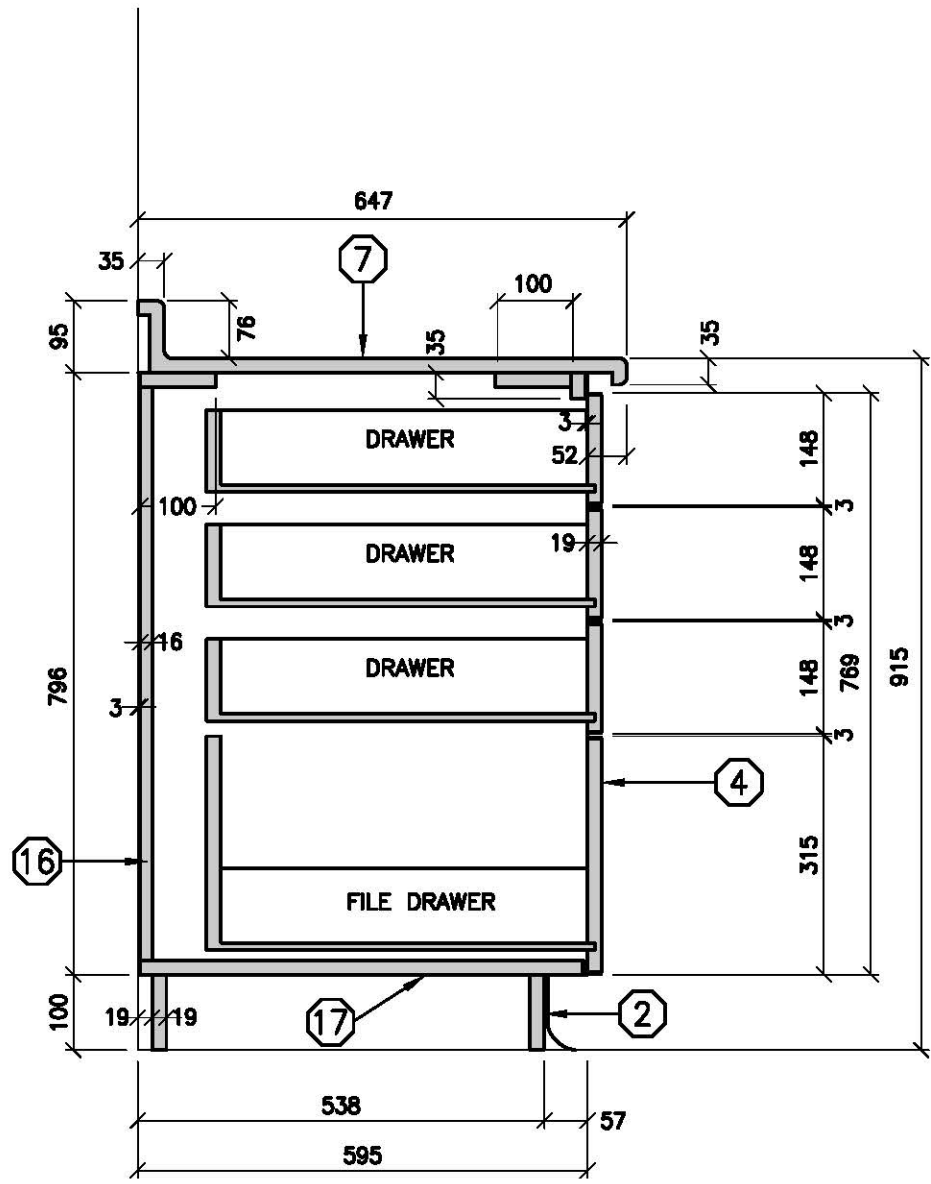
REPRODUCTION OF DIMS. AND RELATED DOCUMENTS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE WRDSB'S WRITTEN PERMISSION.

GENERAL NOTES:

ON ALL DIMS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER CABINET WITH DRAWERS - 4D C/W FD - SECTION

Status	
Folder	AW120\AW120.MLK\WORK
File	AW120.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:47 AM
Job No.	
Sheet No.	

AW120

THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

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GENERAL NOTES:
 ON ALL DIMS. AW REFERS TO ARCHITECTURAL WOODWORK.
 FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.
 REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.

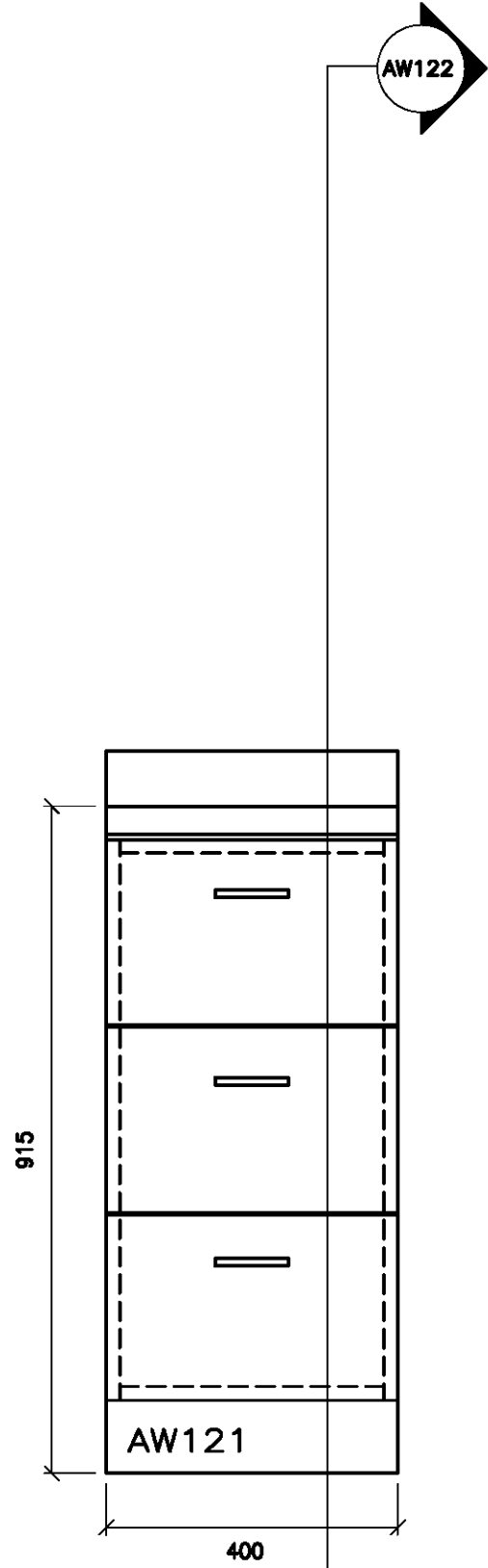


ARCHITECTURAL WOODWORK STANDARDS
 FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER CABINET WITH DRAWERS - 3D - ELEVATION

Status	
Folder	AW\WOOD\MILWORK
File	AW121.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:47 AM
Job No.	
Sheet No.	

AW121



THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

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GENERAL NOTES:

ON ALL DIMS. AW REFERS TO ARCHITECTURAL WOODWORK.

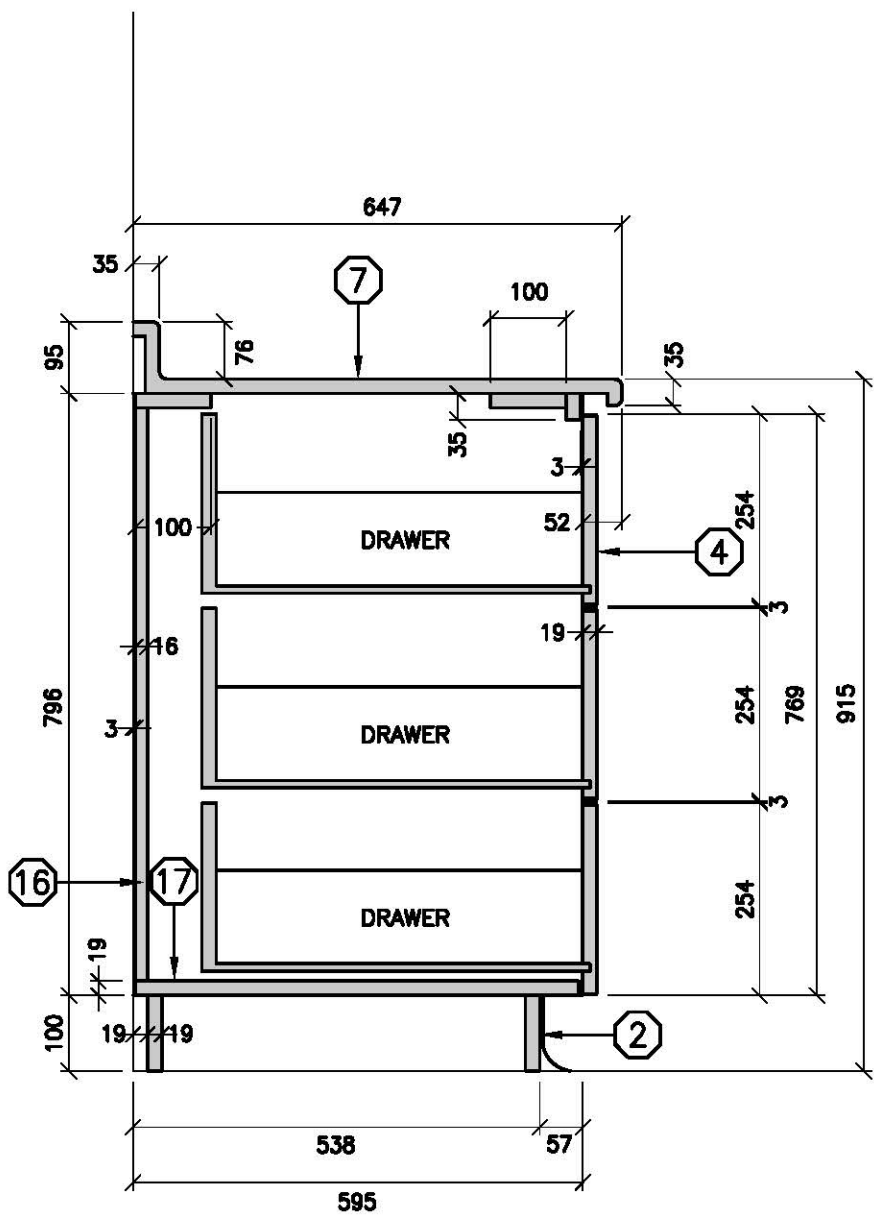
FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



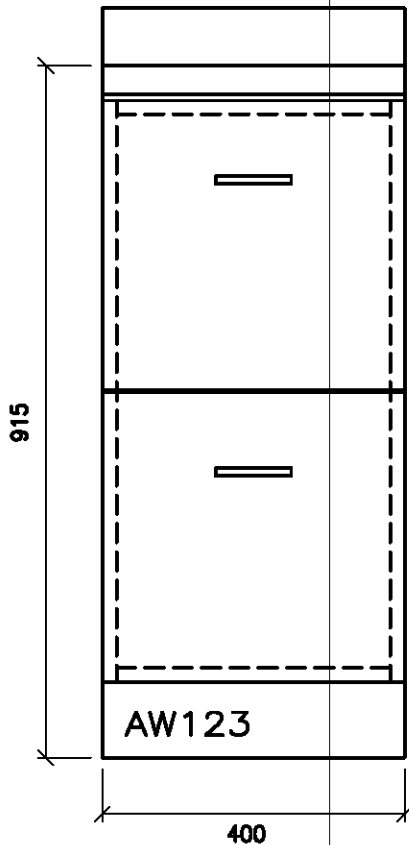
ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER CABINET WITH DRAWERS - 3D - SECTION



Status	
Folder	AW122_ARCHITECTURAL WOODWORK
File	AW122.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:48 AM
Job No.	
Sheet No.	

AW122



AW124

THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

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GENERAL NOTES:

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FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER CABINET WITH DRAWERS - 2 FD - ELEVATION

Status

Folder #NDR\FINA_M0000 MLW00K

File AW123.DWG

Drawn By NST

Check By SKA

Scale

Date February 2015

Last Plot 6/2/2016 8:48 AM

Job No.

Sheet No.

AW123

THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

ALL DWGS. AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF THE WRDSB, AND MUST BE RETURNED UPON REQUEST.

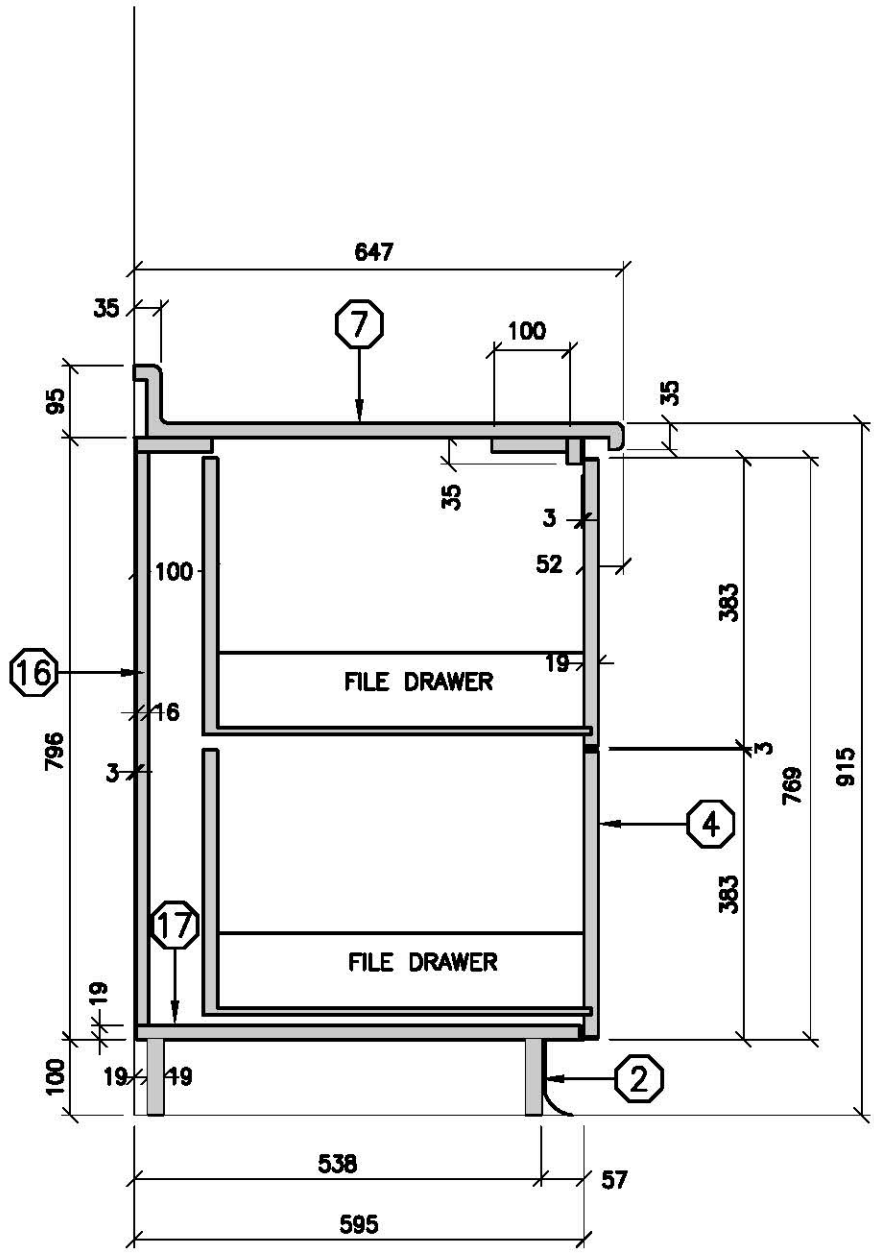
REPRODUCTION OF DWGS. AND RELATED DOCUMENTS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE WRDSB'S WRITTEN PERMISSION.

GENERAL NOTES:

ON ALL DWGS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER CABINET WITH DRAWERS - 2 FD - Section

Status	
Folder	AW124.MLWORK
File	AW124.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:48 AM
Job No.	
Sheet No.	

AW124

THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

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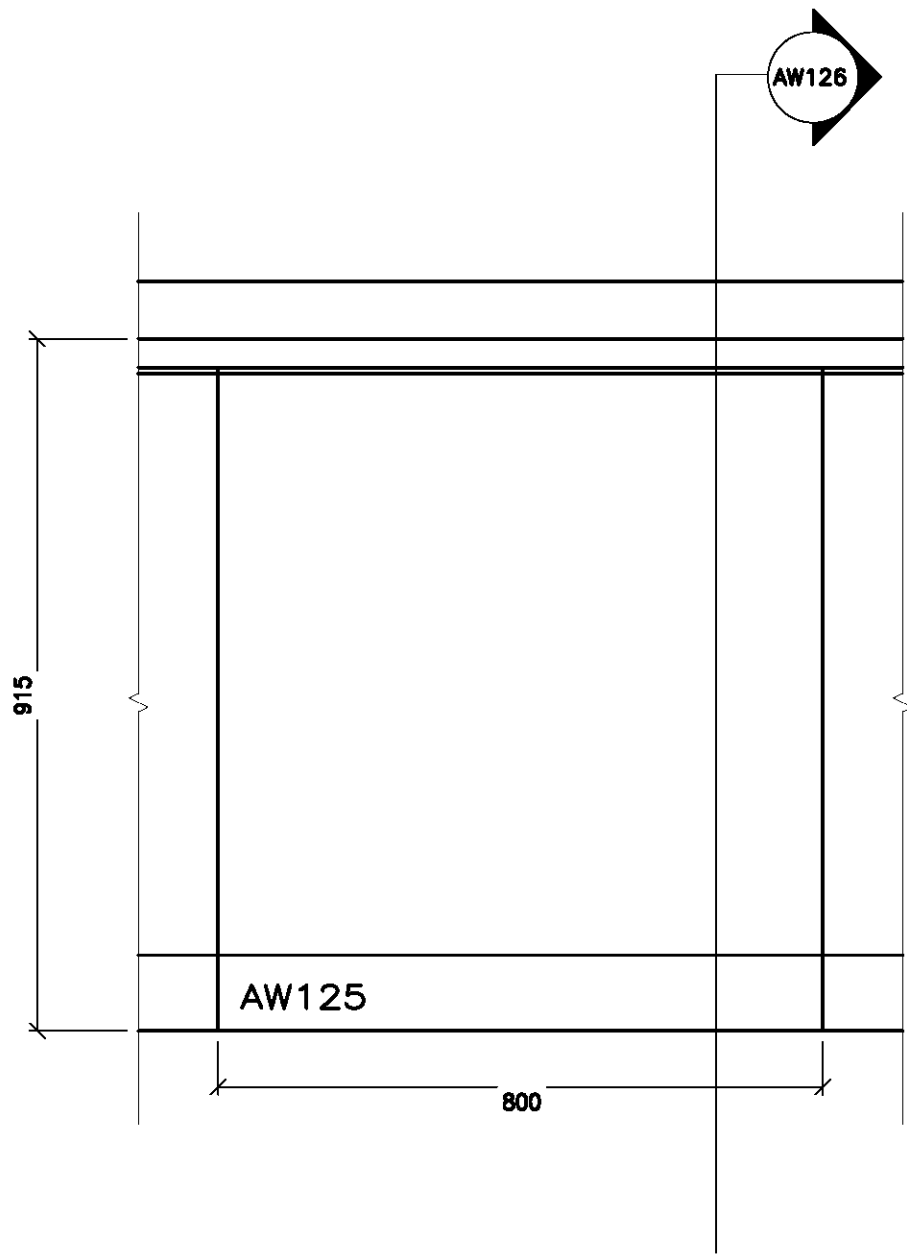
REPRODUCTION OF DIMS. AND RELATED DOCUMENTS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE WRDSB'S WRITTEN PERMISSION.

GENERAL NOTES:

ON ALL DIMS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS
 FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER COUNTER - ELEVATION

Status	
Folder	AW125\AW125.MLKWORK
File	AW125.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:48 AM
Job No.	
Sheet No.	

AW125

THE CONTRACTOR SHALL VERIFY ALL DIMS. AGAINST THE ARCHITECTURAL WOODWORK DIMS, AND MUST REPORT ANY INCONSISTENCIES TO THE WRDS BEFORE PROCEEDING WITH WORK.

ALL DWG. AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF THE WRDS, AND MUST BE RETURNED UPON REQUEST.

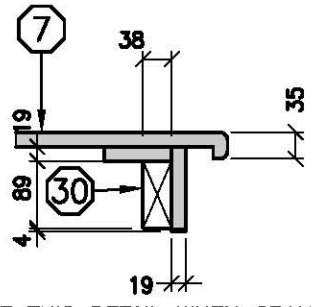
REPRODUCTION OF DWG. AND RELATED DOCUMENTS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE WRDS WRITTEN PERMISSION.

GENERAL NOTES:

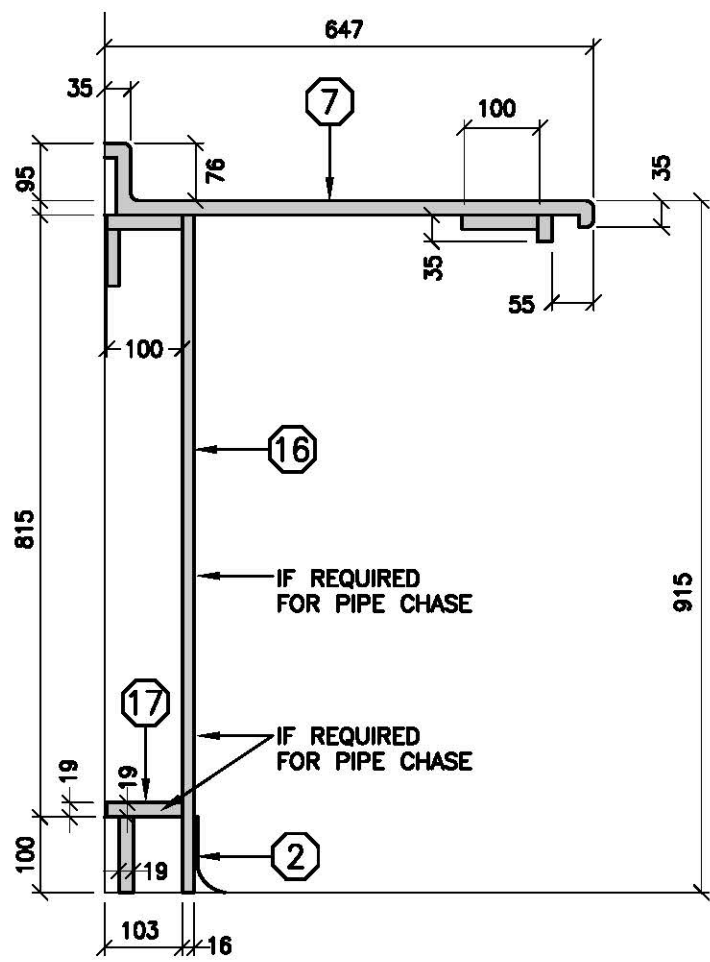
ON ALL DWG. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



USE THIS DETAIL WHEN SPAN OVER 800 OR FOR POSSIBLE HEAVY LOAD SITUATIONS



ARCHITECTURAL WOODWORK STANDARDS
 FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER COUNTER -SECTION

Status	
Folder	AW126_ARCHITECTURAL WOODWORK
File	AW126.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:48 AM
Job No.	
Sheet No.	

AW126

THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

ALL DWGS. AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF THE WRDSB. AND MUST BE RETURNED UPON REQUEST.

REPRODUCTION OF DWGS. AND RELATED DOCUMENTS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE WRDSB'S WRITTEN PERMISSION.

GENERAL NOTES:

ON ALL DWGS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS

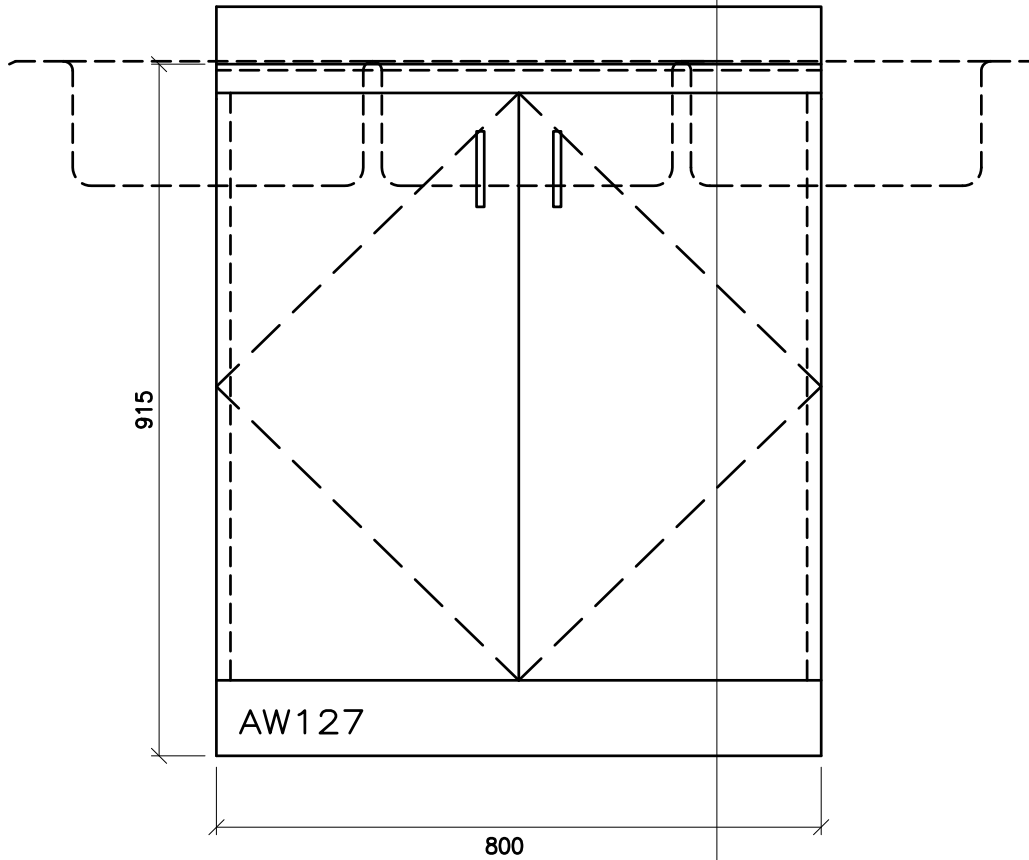
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER CABINET WITH OVERSIZED SINK - ELEVATION

Status
Folder I:\DRAFTING\WRDSB MILLWORK
File AW127.DWG
Drawn By NST
Check By SKA
Scale
Date February 2015
Last Plot 6/2/2016 8:48 AM
Job No.
Sheet No.

AW127

AW128



THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

ALL DWGS. AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF THE WRDSB. AND MUST BE RETURNED UPON REQUEST.

REPRODUCTION OF DWGS. AND RELATED DOCUMENTS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE WRDSB'S WRITTEN PERMISSION.

GENERAL NOTES:

ON ALL DWGS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.

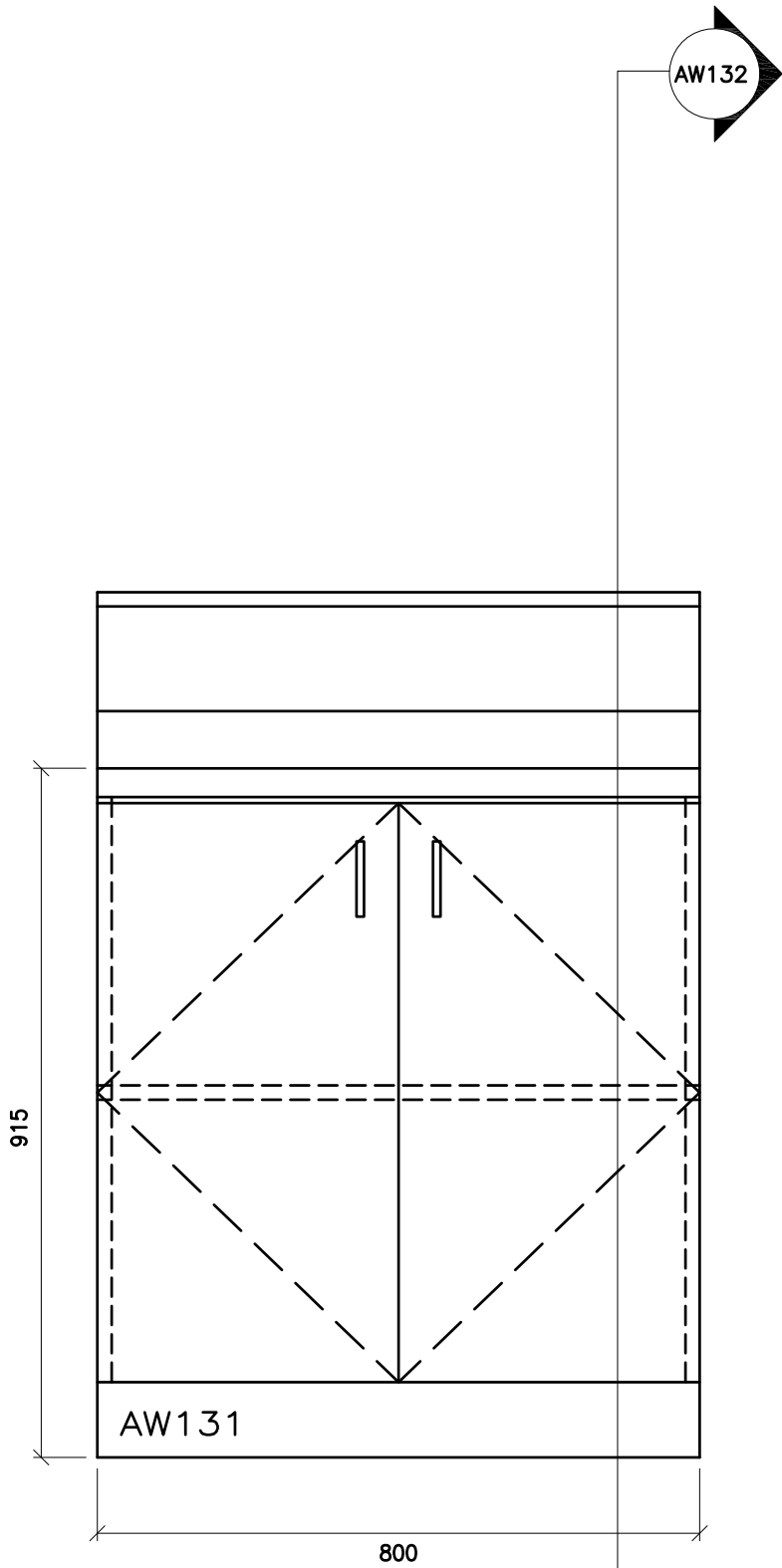


ARCHITECTURAL WOODWORK STANDARDS
 FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER CABINET WITH MELAMINE WALL - ELEVATION

Status	
Folder	\\DRAFTING\WRDSB MILLWORK
File	AW131.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:48 AM
Job No.	
Sheet No.	

AW131



THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSS BEFORE PROCEEDING WITH WORK.

ALL DWGS. AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF THE WRDSS. AND MUST BE RETURNED UPON REQUEST.

REPRODUCTION OF DWGS. AND RELATED DOCUMENTS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE WRDSS'S WRITTEN PERMISSION.

GENERAL NOTES:

ON ALL DWGS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

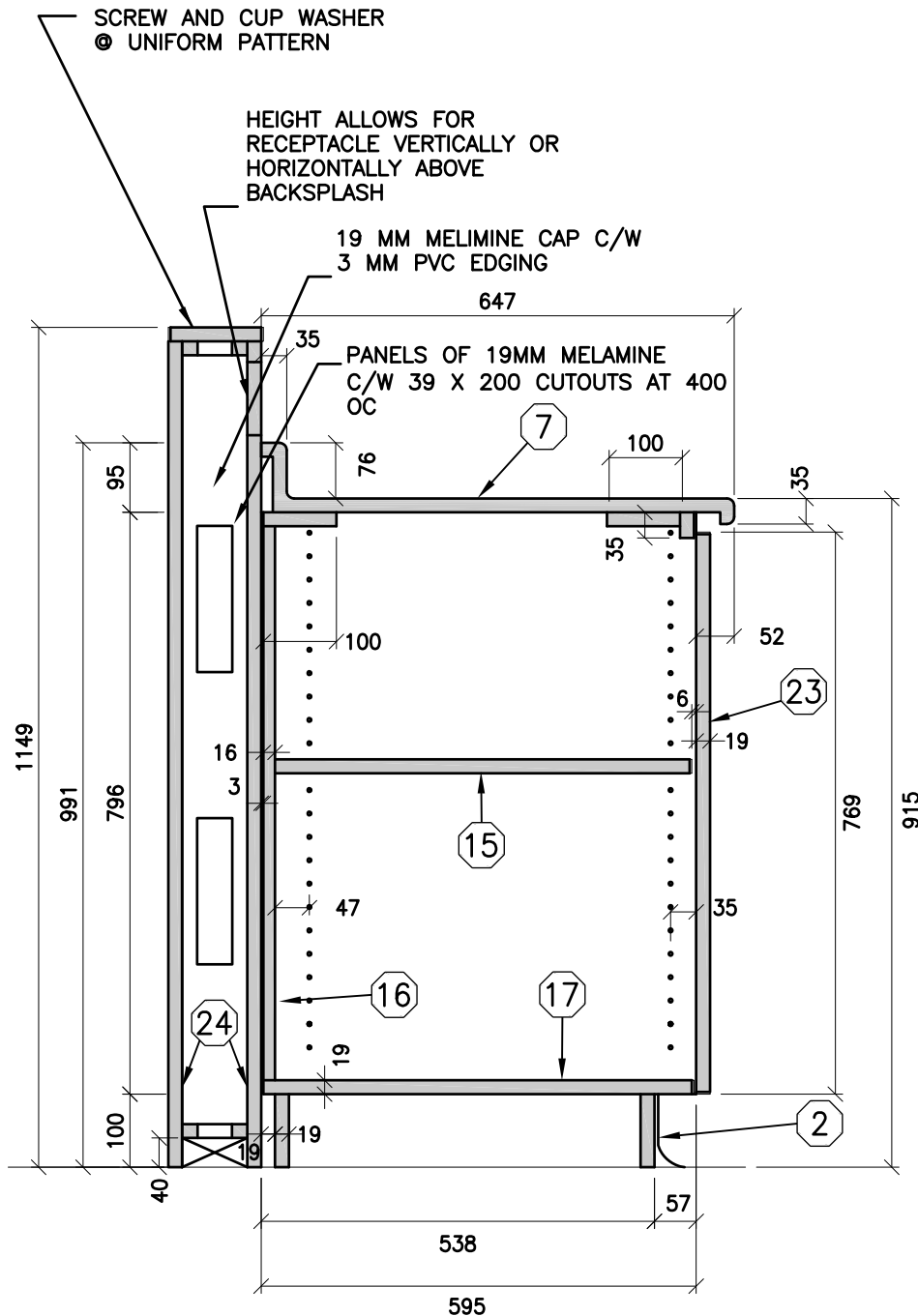
REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS

FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER CABINET WITH MELAMINE PANEL WALL - SECTION



Status	
Folder	\\DRAWING\WRDSS MILLWORK
File	AW132.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:48 AM
Job No.	
Sheet No.	

AW132

THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

ALL DWGS. AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF THE WRDSB. AND MUST BE RETURNED UPON REQUEST.

REPRODUCTION OF DWGS. AND RELATED DOCUMENTS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE WRDSB'S WRITTEN PERMISSION.

GENERAL NOTES:

ON ALL DWGS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS

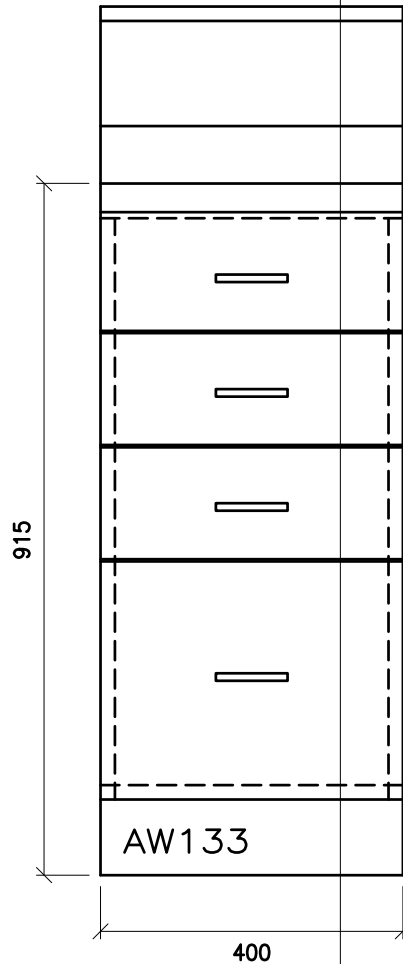
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER CABINET WITH MELAMINE WALL - 4D C/W FD - ELEVATION

Status
Folder I:\DRAFTING\WRDSB MILLWORK
File AW133.DWG
Drawn By NST
Check By SKA
Scale
Date February 2015
Last Plot 6/2/2016 8:49 AM
Job No.
Sheet No.

AW133

AW134



THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

ALL DWGS. AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF THE WRDSB. AND MUST BE RETURNED UPON REQUEST.

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GENERAL NOTES:

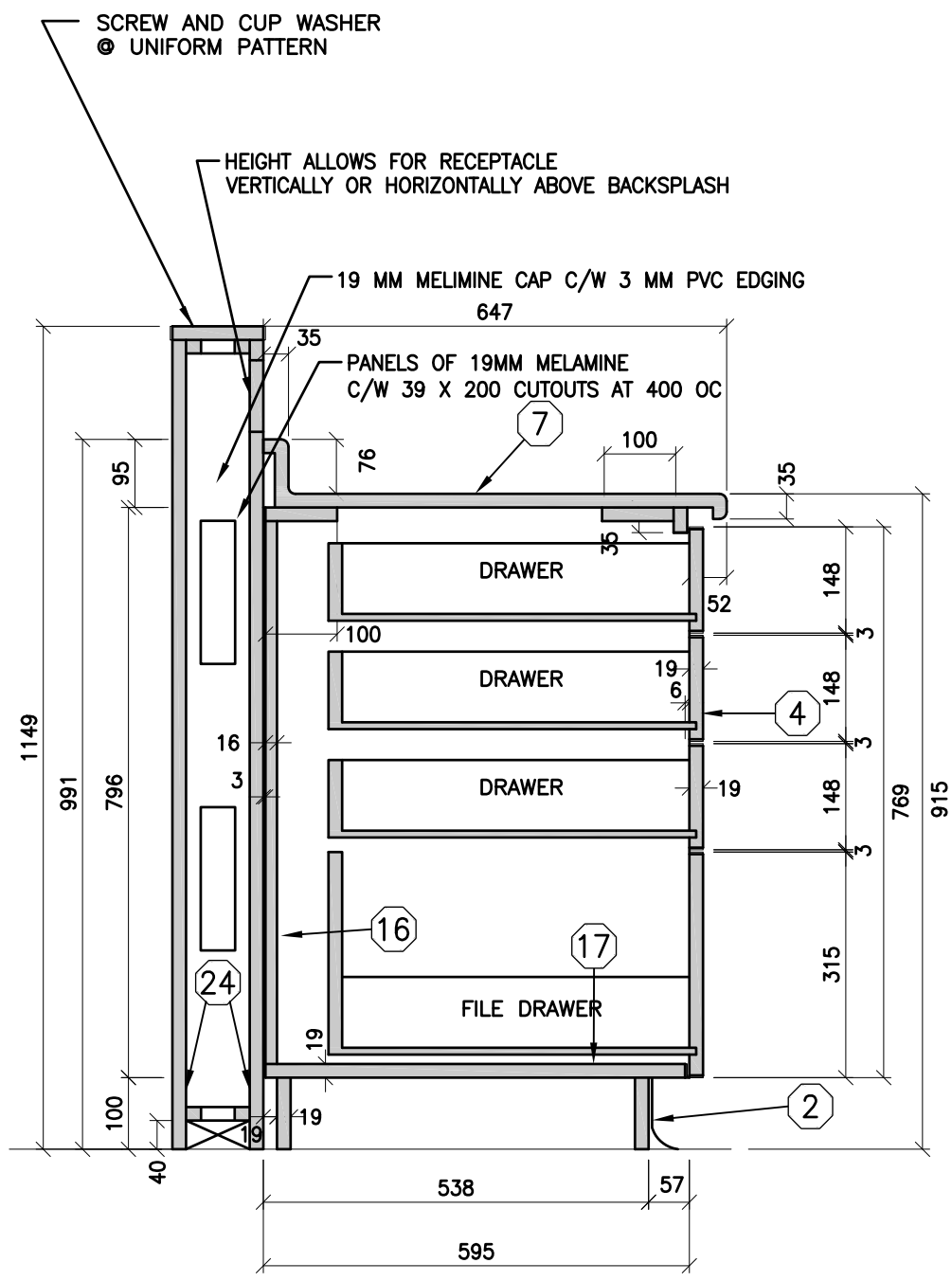
ON ALL DWGS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.

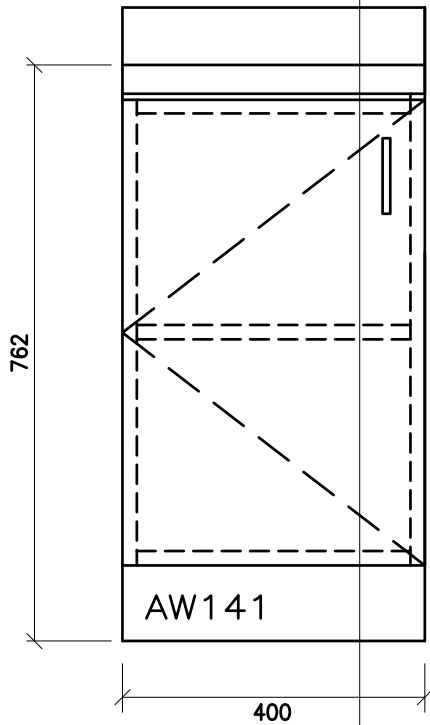


ARCHITECTURAL WOODWORK STANDARDS
 FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD
 LOWER CABINET WITH MELAMINE PANEL WALL - 4D C/W FD - SECTION



Status	
Folder	\\DRAFTING\WRDSB MILLWORK
File	AW134.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:49 AM
Job No.	
Sheet No.	

AW134



AW143

THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

ALL DWGS. AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF THE WRDSB. AND MUST BE RETURNED UPON REQUEST.

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GENERAL NOTES:

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REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.

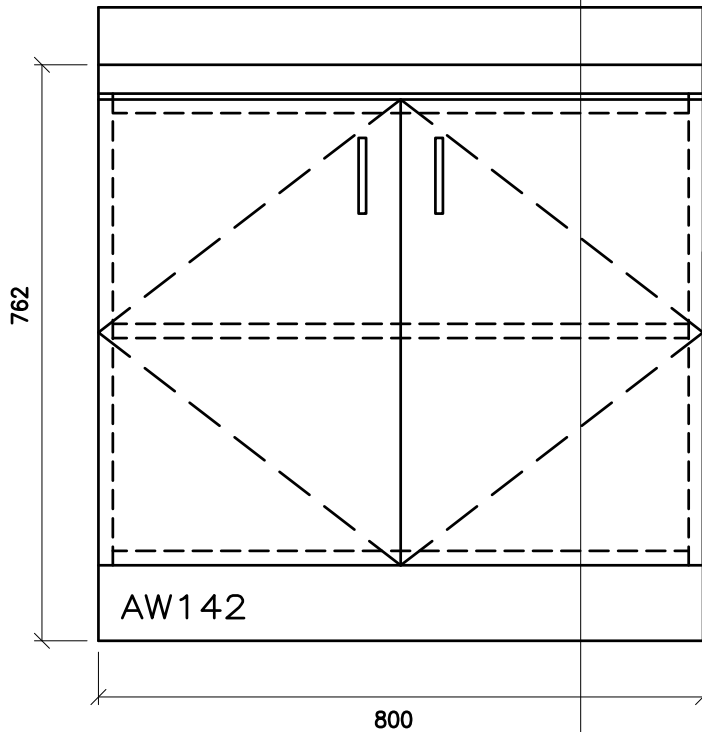


ARCHITECTURAL WOODWORK STANDARDS
 FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOW CABINE - 400 - ELEVATION

Status	
Folder	I:\DRAFTING\WRDSB MILLWORK
File	AW141.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:49 AM
Job No.	
Sheet No.	

AW141



THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

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GENERAL NOTES:

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FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS

FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOW CABINET - 800 - ELEVATION

Status

Folder I:\DRAFTING\WRDSB MILLWORK

File AW142.DWG

Drawn By NST

Check By SKA

Scale

Date February 2015

Last Plot 6/2/2016 8:49 AM

Job No.

Sheet No.

AW142

THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSS BEFORE PROCEEDING WITH WORK.

ALL DWGS. AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF THE WRDSS. AND MUST BE RETURNED UPON REQUEST.

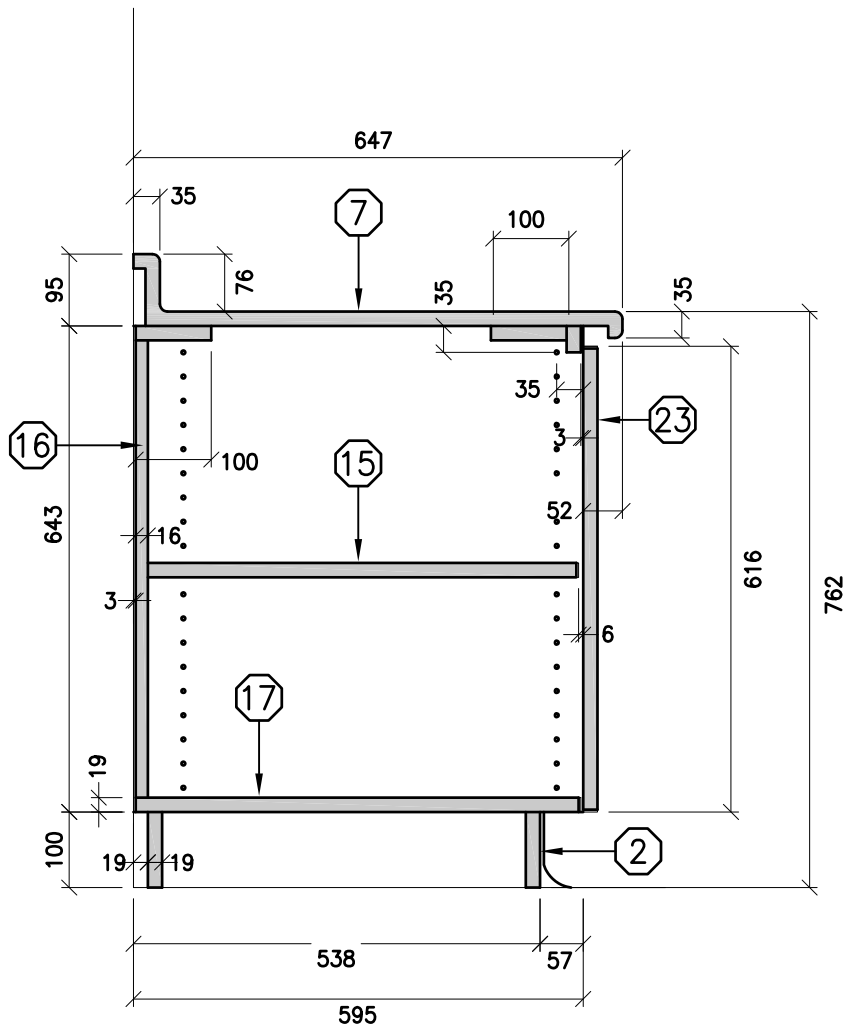
REPRODUCTION OF DWGS. AND RELATED DOCUMENTS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE WRDSS'S WRITTEN PERMISSION.

GENERAL NOTES:

ON ALL DWGS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.

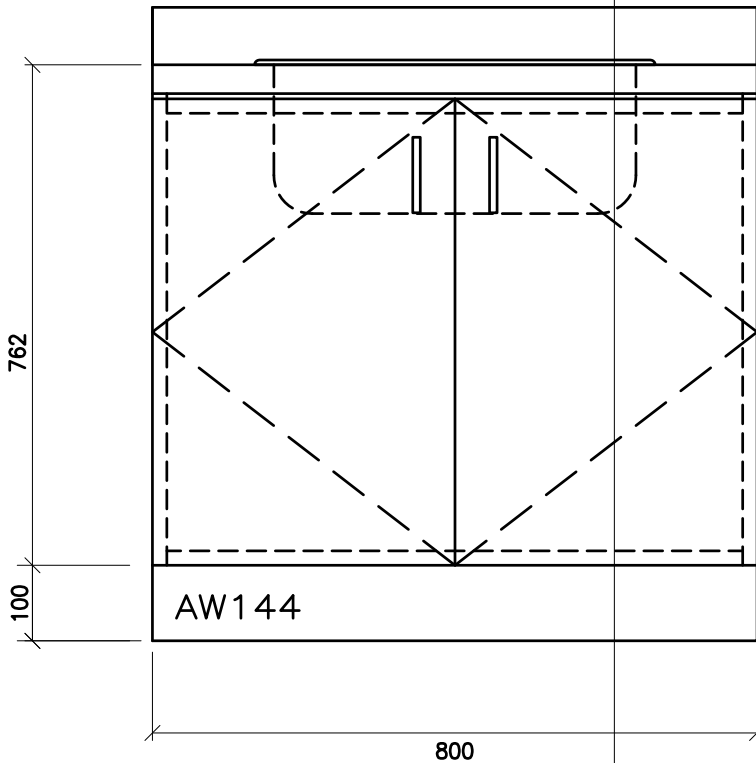


ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOW CABINET - SECTION

Status	
Folder	\\DRAFTING\WRDSS MILLWORK
File	AW143.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:49 AM
Job No.	
Sheet No.	

AW143



AW146

THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

ALL DWGS. AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF THE WRDSB. AND MUST BE RETURNED UPON REQUEST.

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GENERAL NOTES:

ON ALL DWGS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



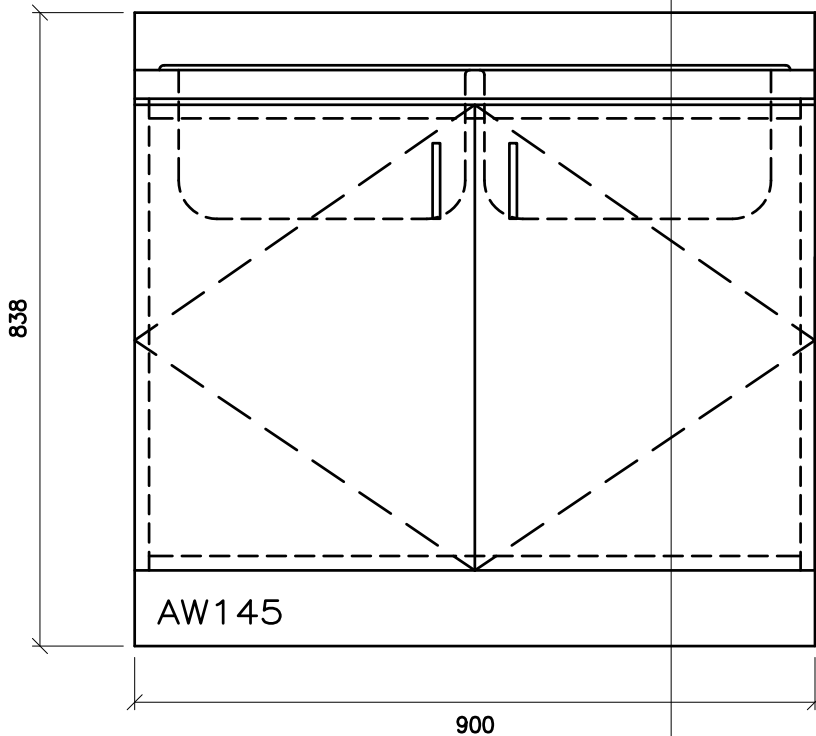
ARCHITECTURAL WOODWORK STANDARDS

FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOW CABINET WITH SINGLE SINK - ELEVATION

Status	
Folder	\\DRAFTING\WRDSB MILLWORK
File	AW144.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:49 AM
Job No.	
Sheet No.	

AW144



AW146

THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

ALL DWGS. AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF THE WRDSB. AND MUST BE RETURNED UPON REQUEST.

REPRODUCTION OF DWGS. AND RELATED DOCUMENTS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE WRDSB'S WRITTEN PERMISSION.

GENERAL NOTES:

ON ALL DWGS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS

FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOW CABINET WITH DOUBLE SINK - ELEVATION

Status	
Folder	\\DRAFTING\WRDSB MILLWORK
File	AW145.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:49 AM
Job No.	
Sheet No.	

AW145

THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDDB BEFORE PROCEEDING WITH WORK.

ALL DWGS. AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF THE WRDDB. AND MUST BE RETURNED UPON REQUEST.

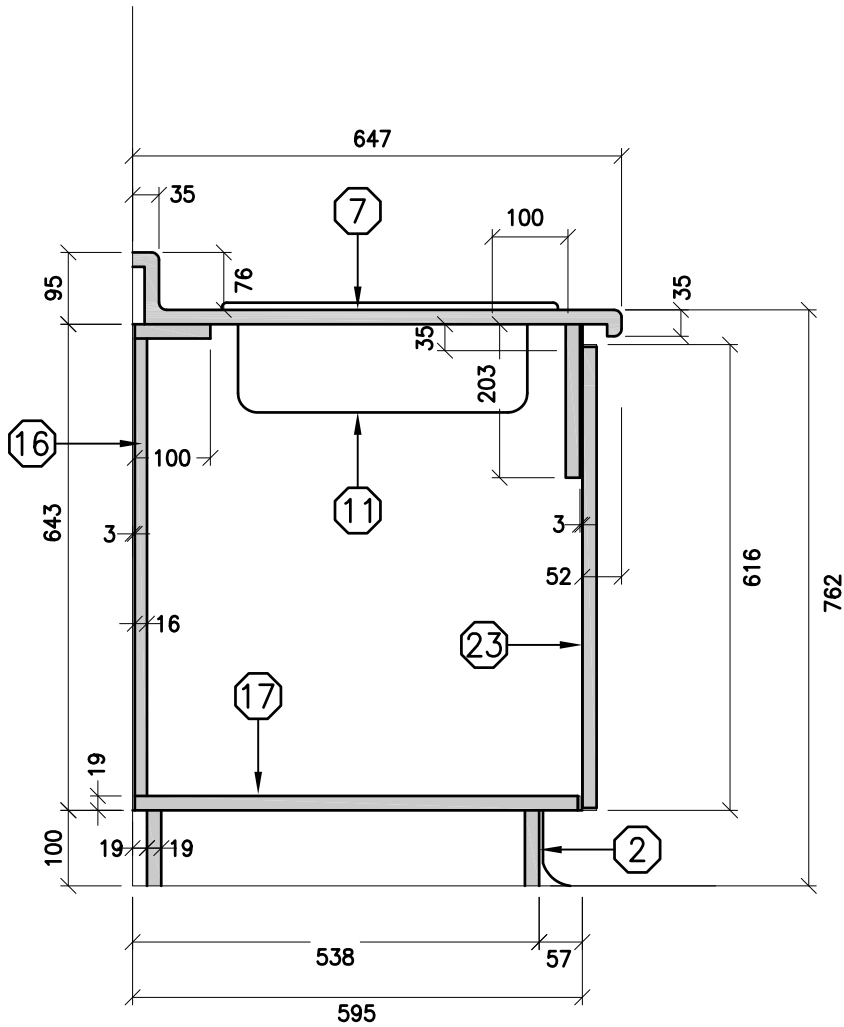
REPRODUCTION OF DWGS. AND RELATED DOCUMENTS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE WRDDB'S WRITTEN PERMISSION.

GENERAL NOTES:

ON ALL DWGS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOW CABINET WITH SINK - SECTION

Status	
Folder	I:\DRAFTING\WRDDB MILLWORK
File	AW146.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:49 AM
Job No.	
Sheet No.	

AW146

THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

ALL DWGS. AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF THE WRDSB. AND MUST BE RETURNED UPON REQUEST.

REPRODUCTION OF DWGS. AND RELATED DOCUMENTS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE WRDSB'S WRITTEN PERMISSION.

GENERAL NOTES:

ON ALL DWGS. AW REFERS TO ARCHITECTURAL WOODWORK.

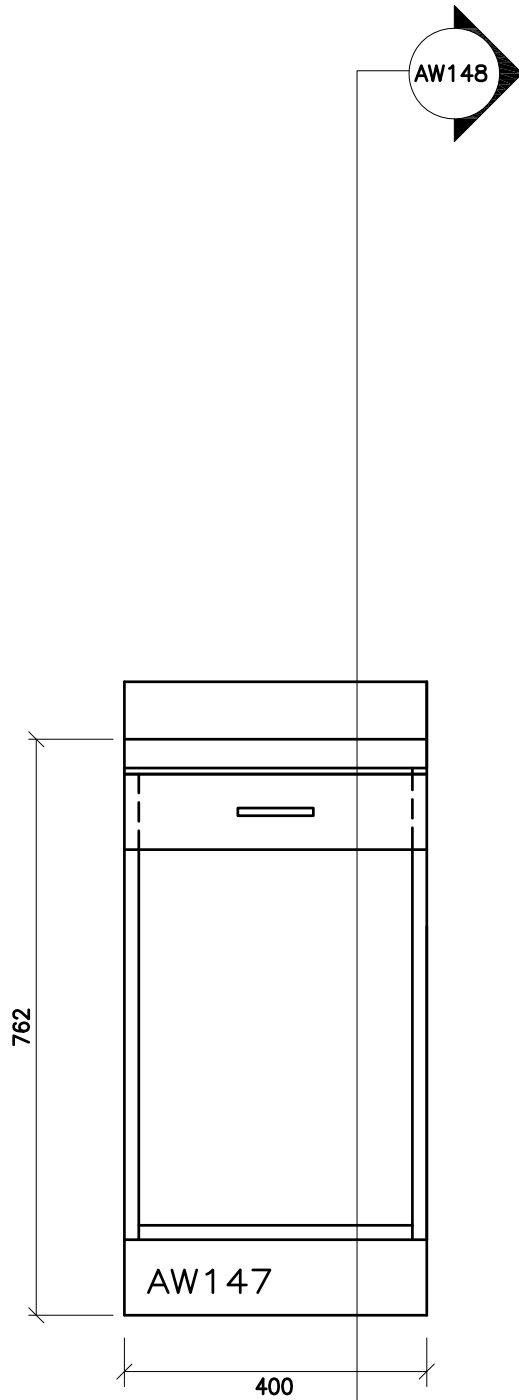
FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOW CABINET WITH PENCIL DRAWER - ELEVATION



Status
Folder I:\DRAFTING\WRDSB MILLWORK
File AW147.DWG
Drawn By NST
Check By SKA
Scale
Date February 2015
Last Plot 6/2/2016 8:49 AM
Job No.
Sheet No.

AW147

THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

ALL DWGS. AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF THE WRDSB. AND MUST BE RETURNED UPON REQUEST.

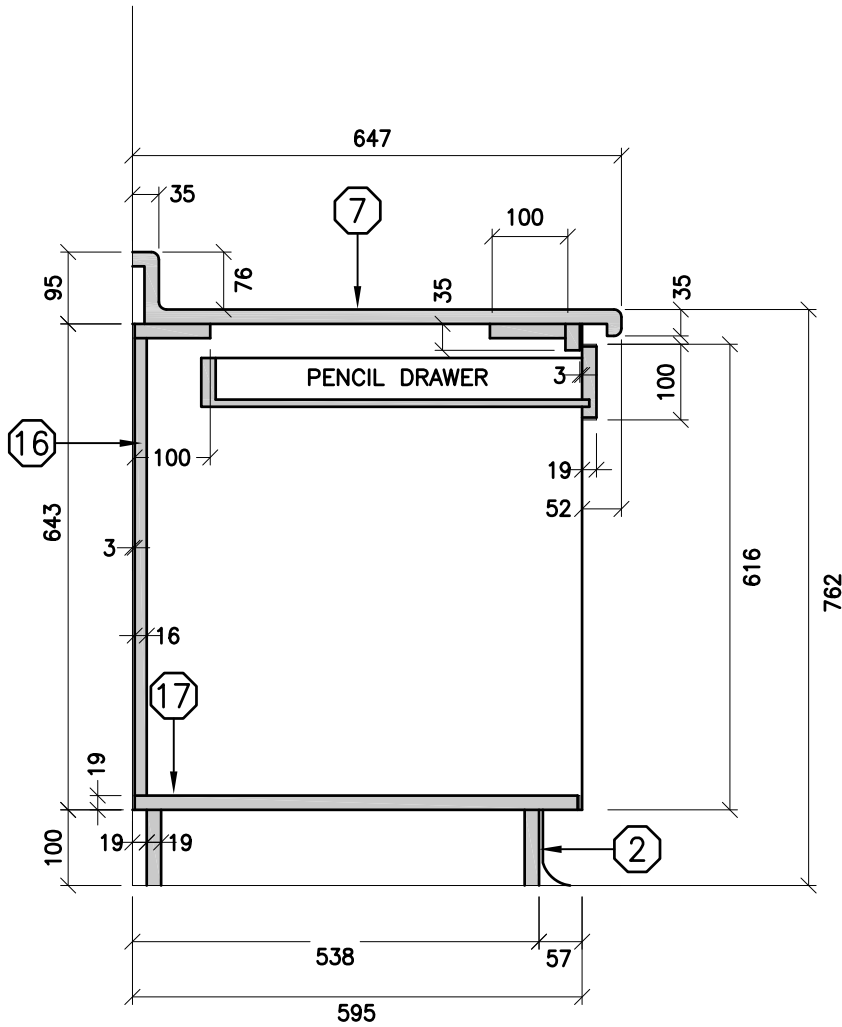
REPRODUCTION OF DWGS. AND RELATED DOCUMENTS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE WRDSB'S WRITTEN PERMISSION.

GENERAL NOTES:

ON ALL DWGS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.

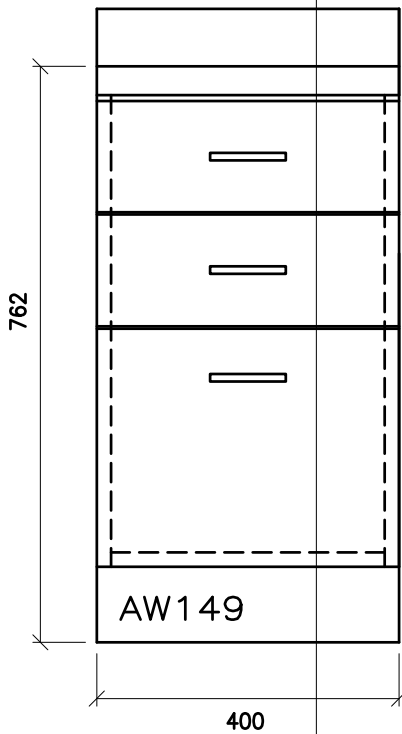


ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOW CABINET WITH PENCIL DRAWER - SECTION

Status	
Folder	\\DRAFTING\WRDSB MILLWORK
File	AW148.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:50 AM
Job No.	
Sheet No.	

AW148



THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

ALL DWGS. AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF THE WRDSB. AND MUST BE RETURNED UPON REQUEST.

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GENERAL NOTES:

ON ALL DWGS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOW CABINET - 3D c/w FD - ELEVATION

Status	
Folder	\\DRAFTING\WRDSB MILLWORK
File	AW149.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:50 AM
Job No.	
Sheet No.	

AW149

THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSS BEFORE PROCEEDING WITH WORK.

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GENERAL NOTES:

ON ALL DWGS. AW REFERS TO ARCHITECTURAL WOODWORK.

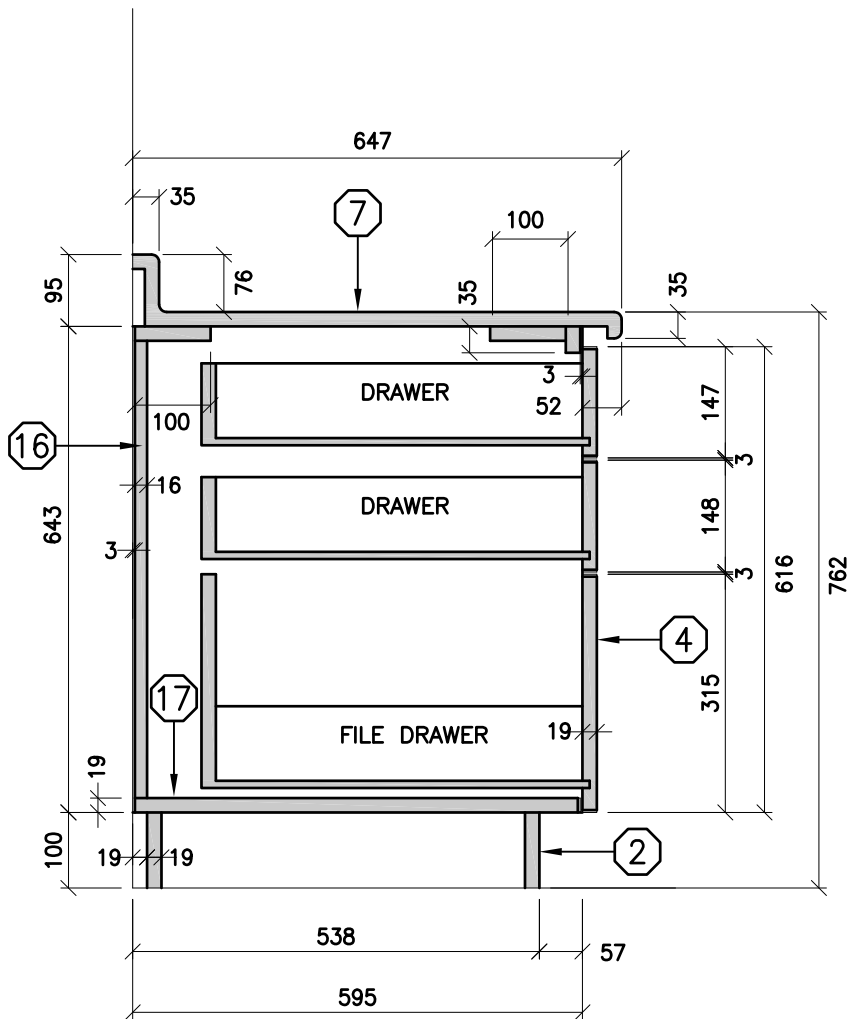
FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOW CABINET - 3D c/w FD - SECTION



Status	
Folder	\\DRAFTING\WRDSS MILLWORK
File	AW150.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:50 AM
Job No.	
Sheet No.	

AW150

THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

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GENERAL NOTES:

ON ALL DWGS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

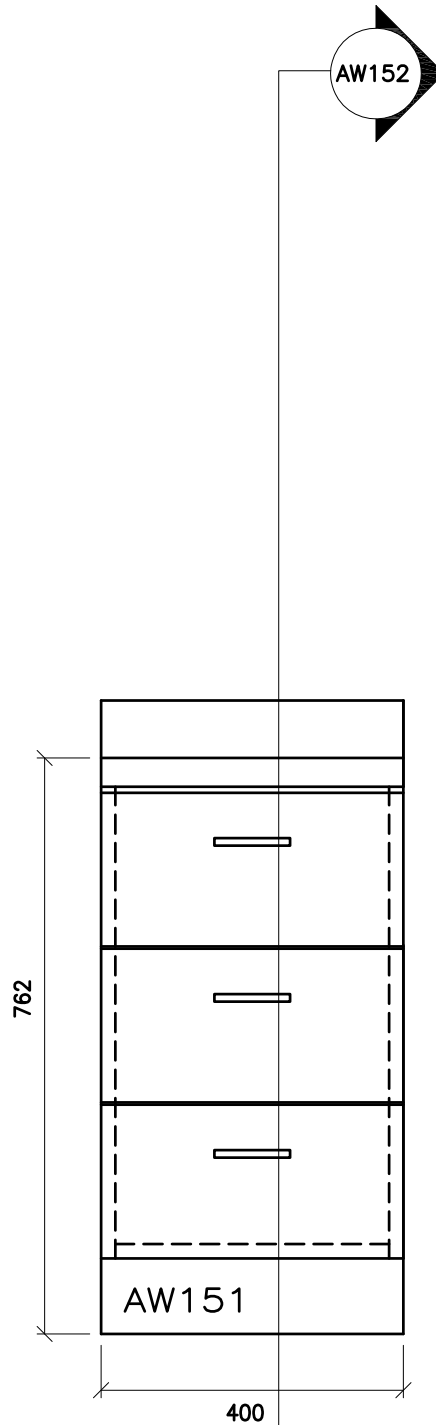
REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS

FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOW CABINET - 3D - ELEVATION



Status
Folder I:\DRAFTING\WRDSB MILLWORK
File AW151.DWG
Drawn By NST
Check By SKA
Scale
Date February 2015
Last Plot 6/2/2016 8:50 AM
Job No.
Sheet No.

AW151

THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

ALL DWGS. AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF THE WRDSB. AND MUST BE RETURNED UPON REQUEST.

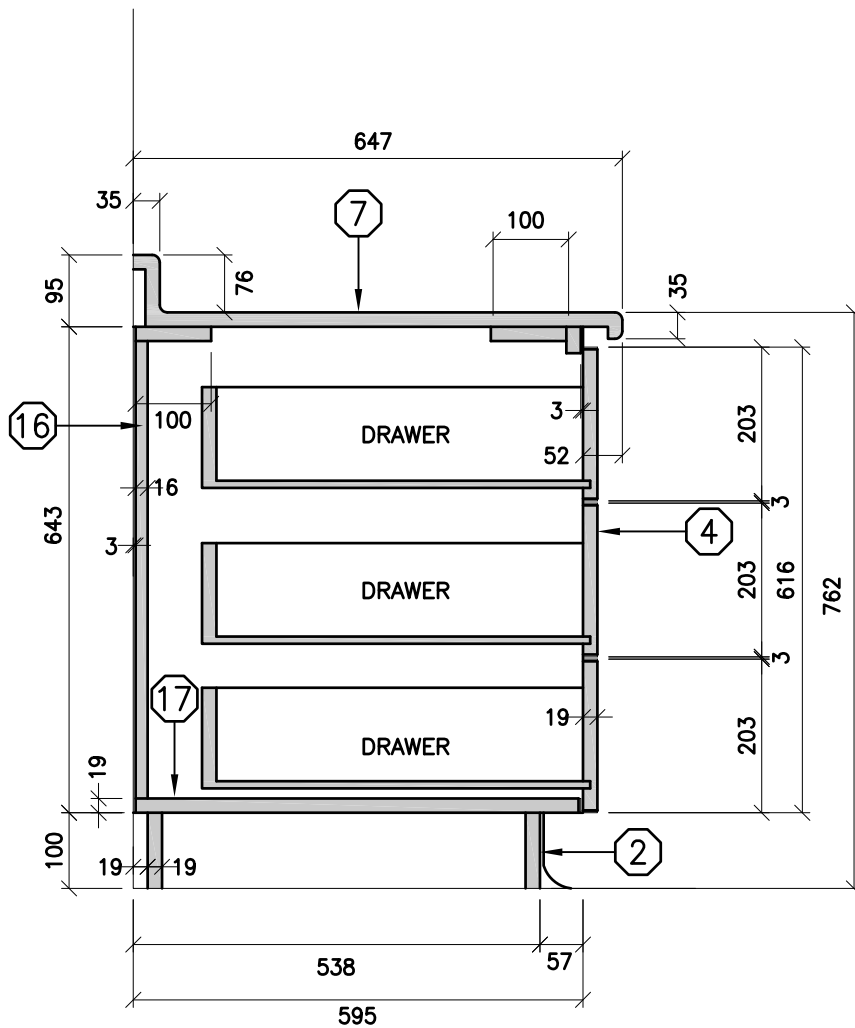
REPRODUCTION OF DWGS. AND RELATED DOCUMENTS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE WRDSB'S WRITTEN PERMISSION.

GENERAL NOTES:

ON ALL DWGS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOW CABINET - 3D - SECTION

Status	
Folder	\\DRAFTING\WRDSB MILLWORK
File	AW152.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:50 AM
Job No.	
Sheet No.	

AW152

THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

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GENERAL NOTES:

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FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS

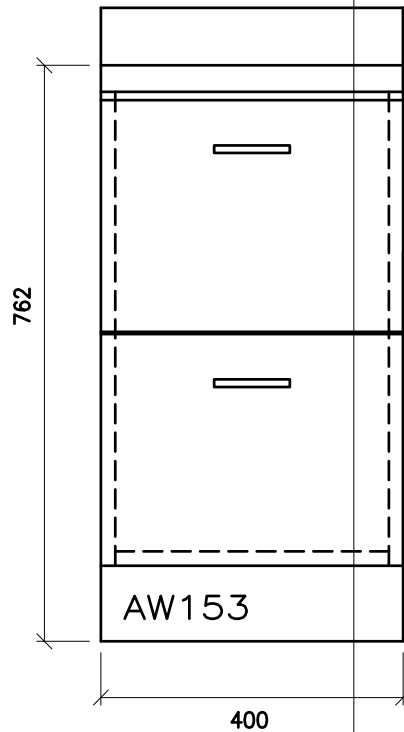
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOW CABINET - 2 FD - ELEVATION

Status
Folder I:\DRAFTING\WRDSB MILLWORK
File AW153.DWG
Drawn By NST
Check By SKA
Scale
Date February 2015
Last Plot 6/2/2016 8:50 AM
Job No.
Sheet No.

AW153

AW154



THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

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REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.

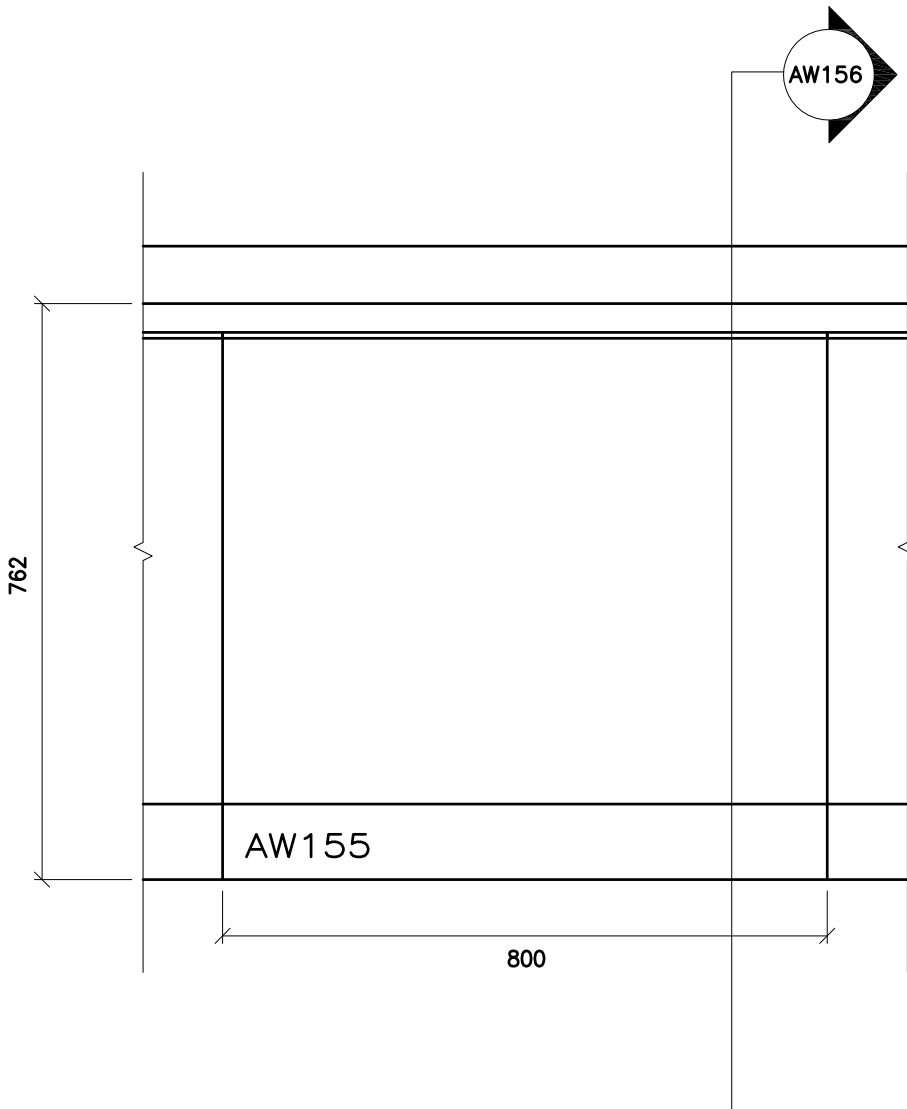


ARCHITECTURAL WOODWORK STANDARDS
 FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER COUNTER - ELEVATION

Status
Folder I:\DRAFTING\WRDSB MILLWORK
File AW155.DWG
Drawn By NST
Check By SKA
Scale
Date February 2015
Last Plot 6/2/2016 8:50 AM
Job No.
Sheet No.

AW155



THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

ALL DWGS. AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF THE WRDSB. AND MUST BE RETURNED UPON REQUEST.

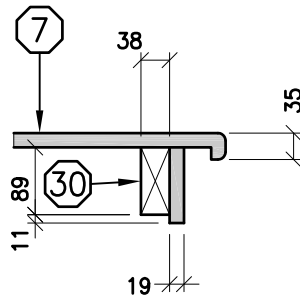
REPRODUCTION OF DWGS. AND RELATED DOCUMENTS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE WRDSB'S WRITTEN PERMISSION.

GENERAL NOTES:

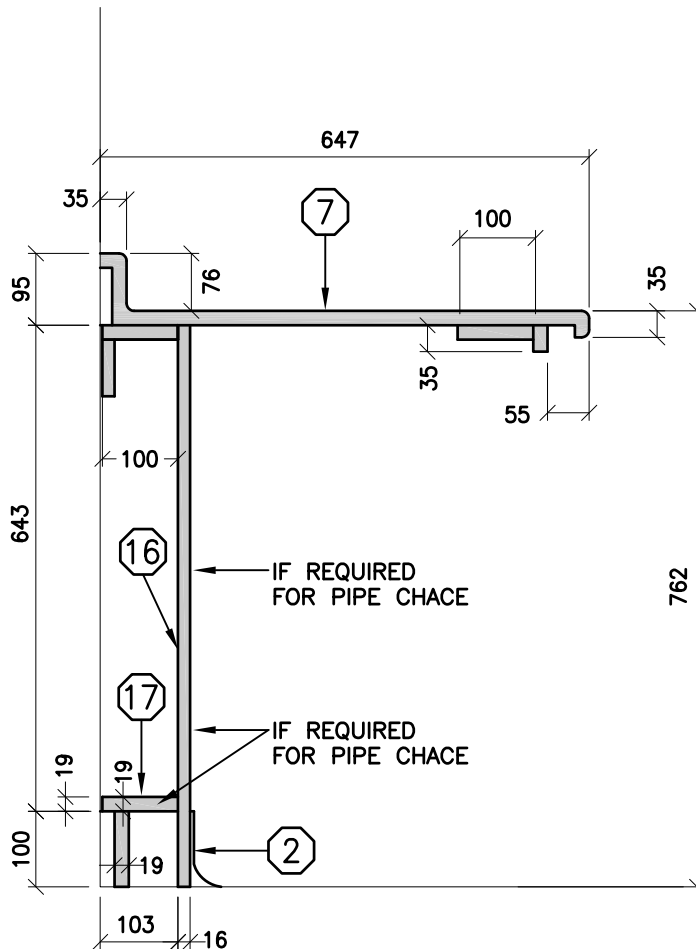
ON ALL DWGS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



USE THIS DETAIL WHEN SPAN OVER 800 OR FOR POSSIBLE HEAVY LOAD SITUATIONS

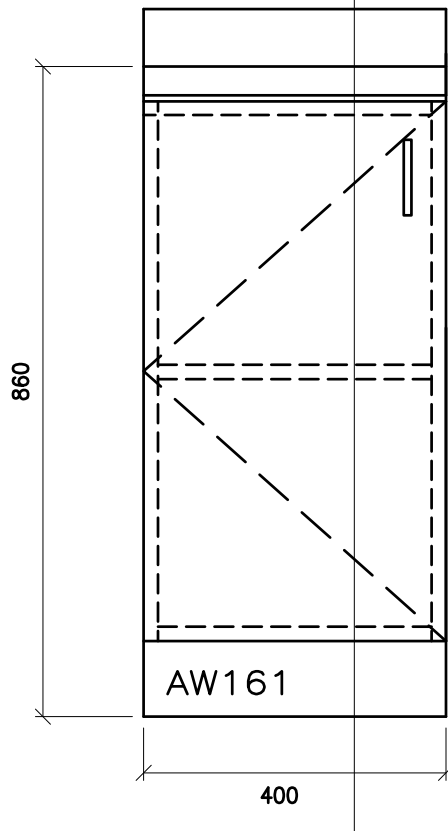


ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOW COUNTER - SECTION

Status	
Folder	\\DRAFTING\WRDSB MILLWORK
File	AW156.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:50 AM
Job No.	
Sheet No.	

AW156



AW163

THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

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GENERAL NOTES:

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FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



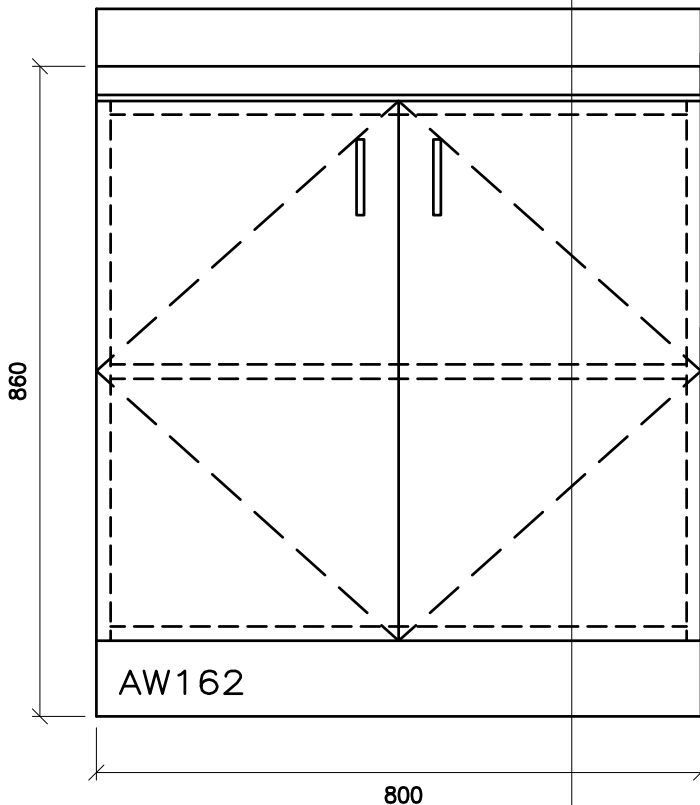
ARCHITECTURAL WOODWORK STANDARDS

FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER CABINET - 400 - ELEVATION

Status	
Folder	\\DRAFTING\WRDSB MILLWORK
File	AW161.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:51 AM
Job No.	
Sheet No.	

AW161



AW163

THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

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FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS

FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER CABINET - 800 - ELEVATION

Status

Folder \\DRAFTING\WRDSB MILLWORK

File AW162.DWG

Drawn By NST

Check By SKA

Scale

Date February 2015

Last Plot 6/2/2016 8:51 AM

Job No.

Sheet No.

AW162

THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

ALL DWGS. AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF THE WRDSB. AND MUST BE RETURNED UPON REQUEST.

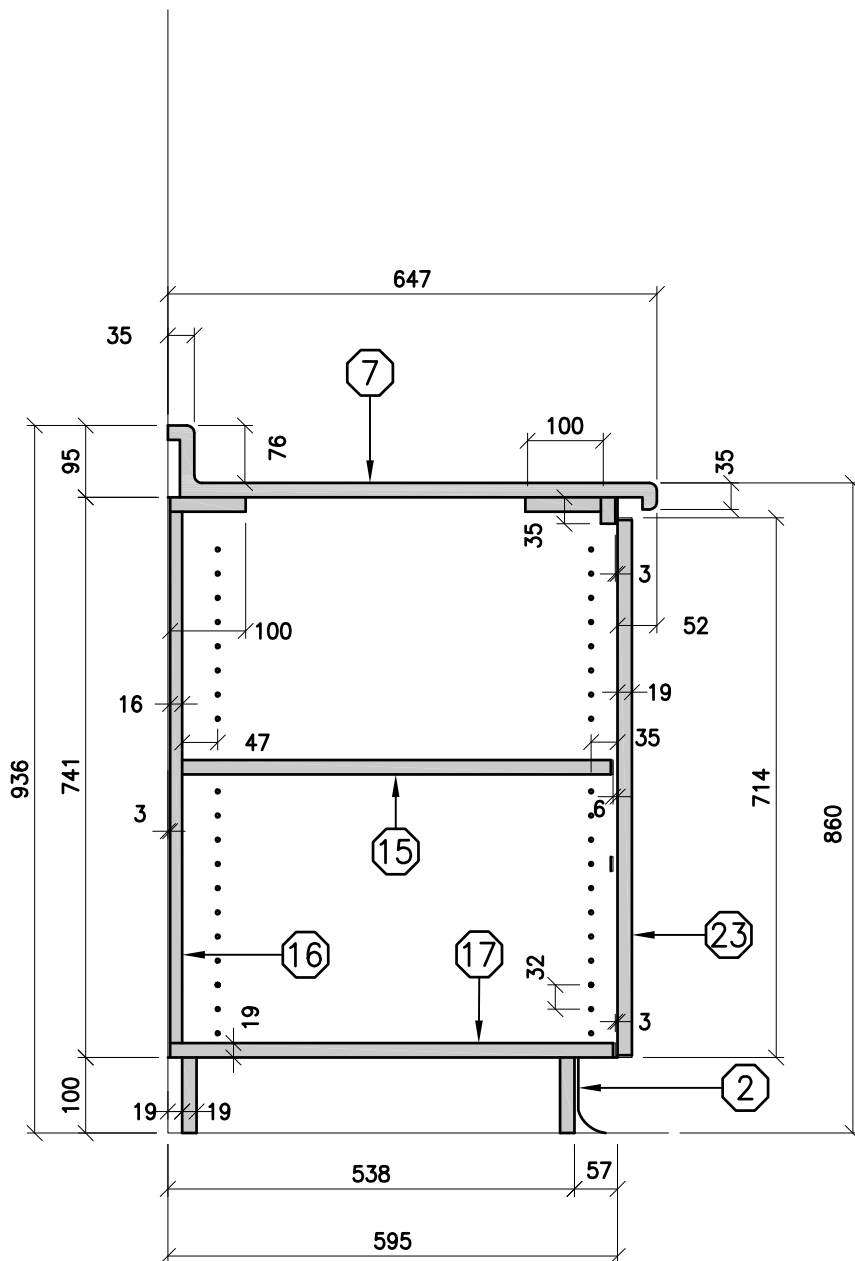
REPRODUCTION OF DWGS. AND RELATED DOCUMENTS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE WRDSB'S WRITTEN PERMISSION.

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FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER CABINET - SECTION

Status	
Folder	\\DRAFTING\WRDSB MILLWORK
File	AW163.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:51 AM
Job No.	
Sheet No.	

AW163

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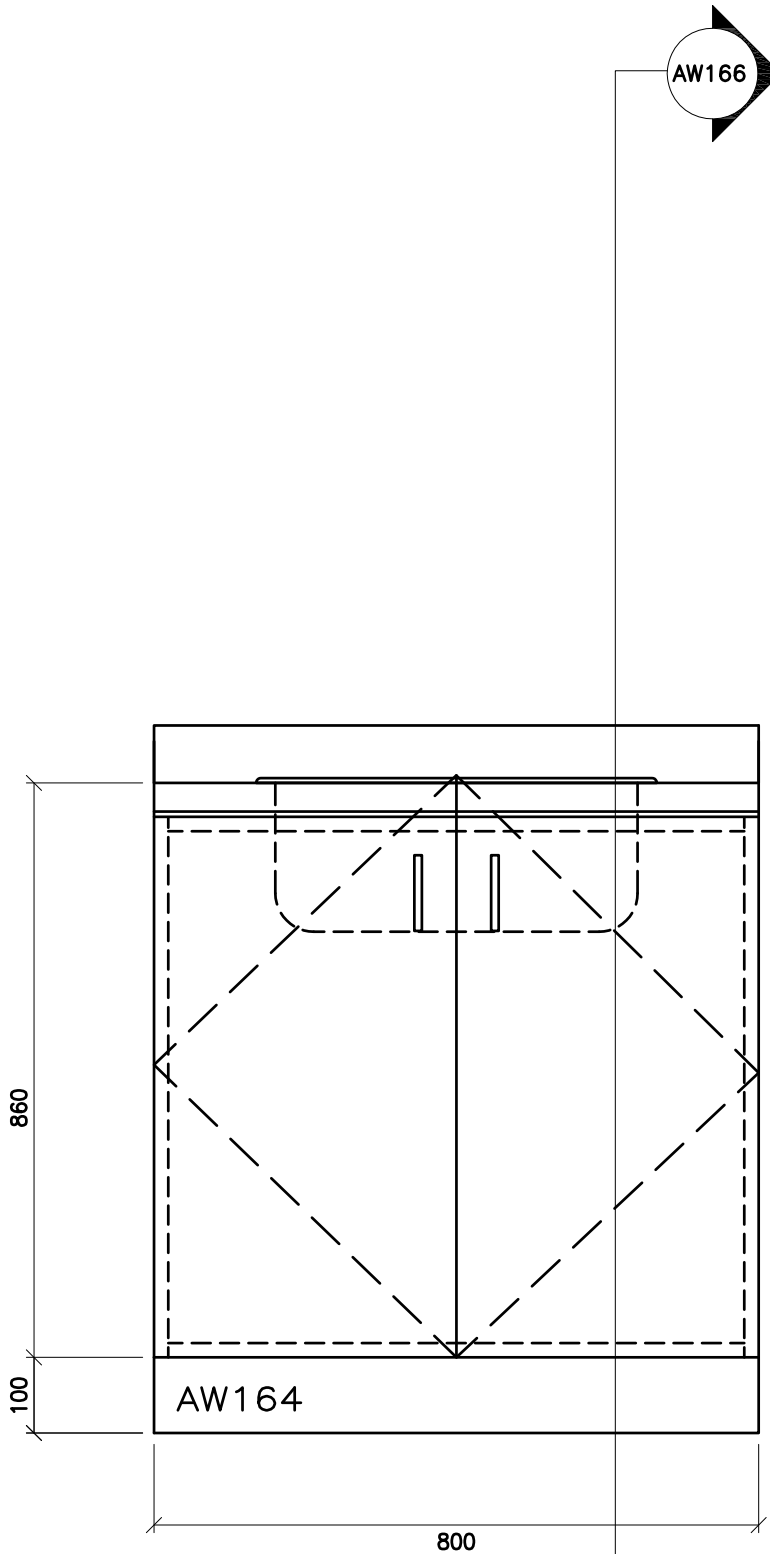
REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS

FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER CABINET WITH SINK - ELEVATION



Status
Folder I:\DRAFTING\WRDSB MILLWORK
File AW164.DWG
Drawn By NST
Check By SKA
Scale
Date February 2015
Last Plot 6/2/2016 8:51 AM
Job No.
Sheet No.

AW164

THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

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FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

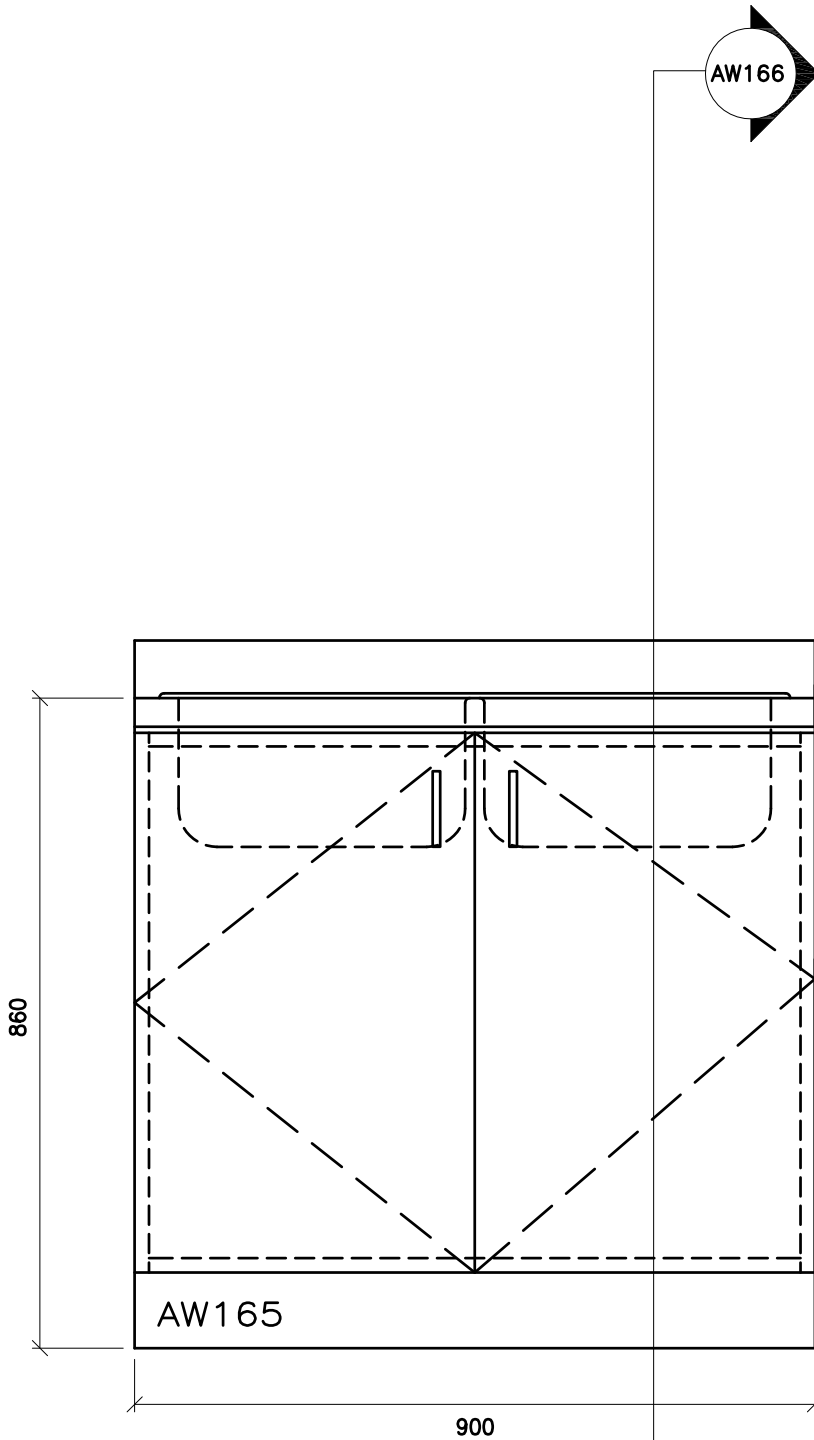
REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS

FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER CABINET WITH SINK - ELEVATION



Status
Folder I:\DRAFTING\WRDSB MILLWORK
File AW165.DWG
Drawn By NST
Check By SKA
Scale
Date February 2015
Last Plot 6/2/2016 8:51 AM
Job No.
Sheet No.

AW165

THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSS BEFORE PROCEEDING WITH WORK.

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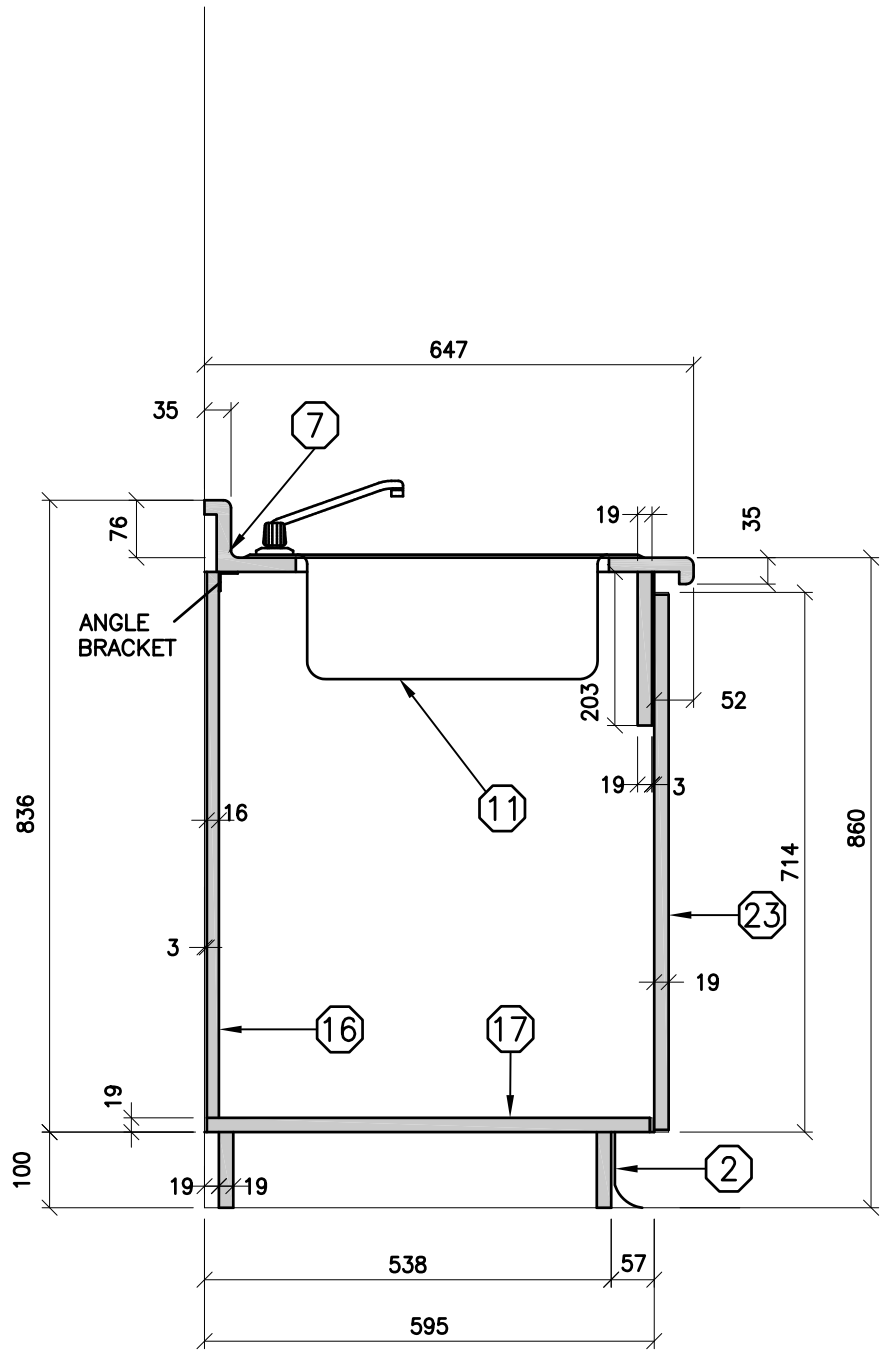
GENERAL NOTES:
 ON ALL DWGS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



-SINGLE SINK: 800 WIDE
 -DOUBLE SINK: 863 WIDE MIN
 USE 900 WIDE
 -UPPER CABINET TO HAVE A DIVIDER

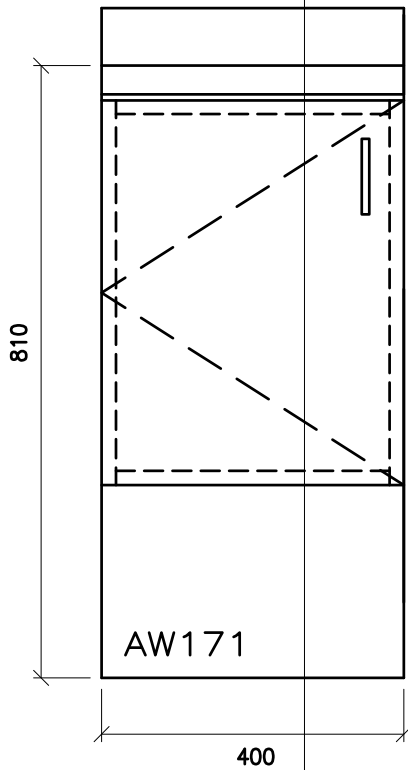


ARCHITECTURAL WOODWORK STANDARDS
 FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOWER CABINET WITH SINK - SECTION

Status	
Folder	\\DRAFTING\WRDSS MILLWORK
File	AW166.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:51 AM
Job No.	
Sheet No.	

AW166



AW173

AW171

400

810

THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

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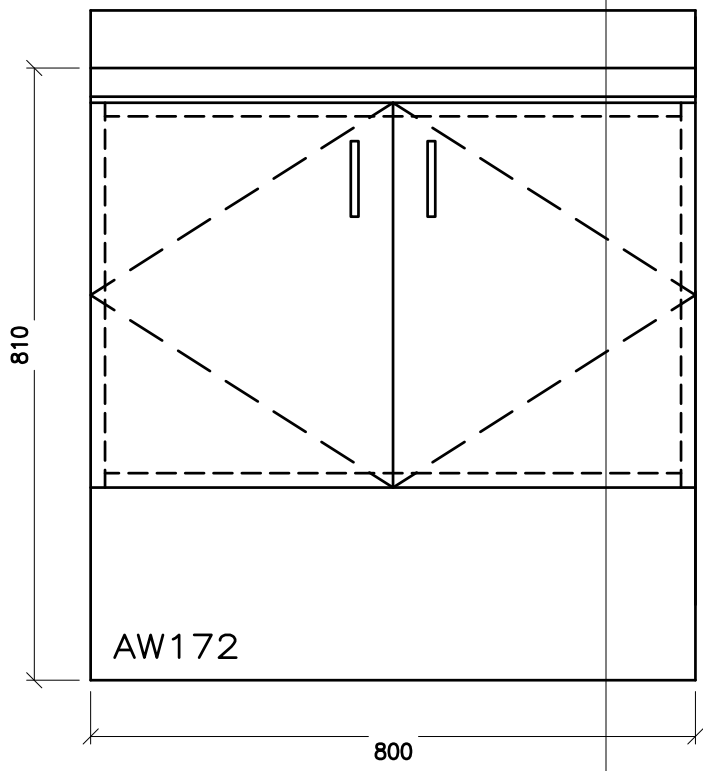


ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

B/F LOWER CABINET - 400 - ELEVATION

Status	
Folder	I:\DRAFTING\WRDSB MILLWORK
File	AW171.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:51 AM
Job No.	
Sheet No.	

AW171



AW173

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REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS
 FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

B/F LOWER CABINET - 800 - ELEVATION

Status	
Folder	\\DRAFTING\WRDSB MILLWORK
File	AW172.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:51 AM
Job No.	
Sheet No.	

AW172

THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDDB BEFORE PROCEEDING WITH WORK.

ALL DWGS. AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF THE WRDDB. AND MUST BE RETURNED UPON REQUEST.

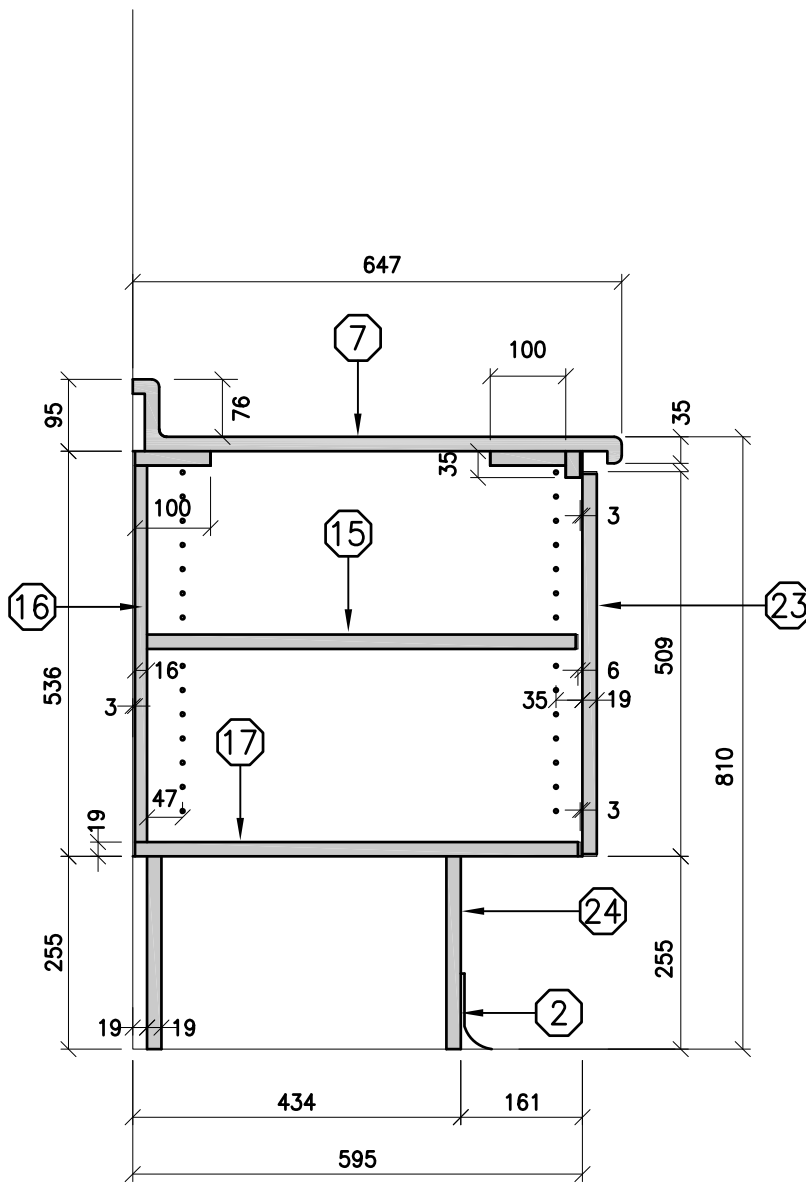
REPRODUCTION OF DWGS. AND RELATED DOCUMENTS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE WRDDB'S WRITTEN PERMISSION.

GENERAL NOTES:

ON ALL DWGS. AW REFERS TO ARCHITECTURAL WOODWORK.

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REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

B/F LOWER CABINET - SECTION

Status	
Folder	\\DRAFTING\WRDDB MILLWORK
File	AW173.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:51 AM
Job No.	
Sheet No.	

AW173

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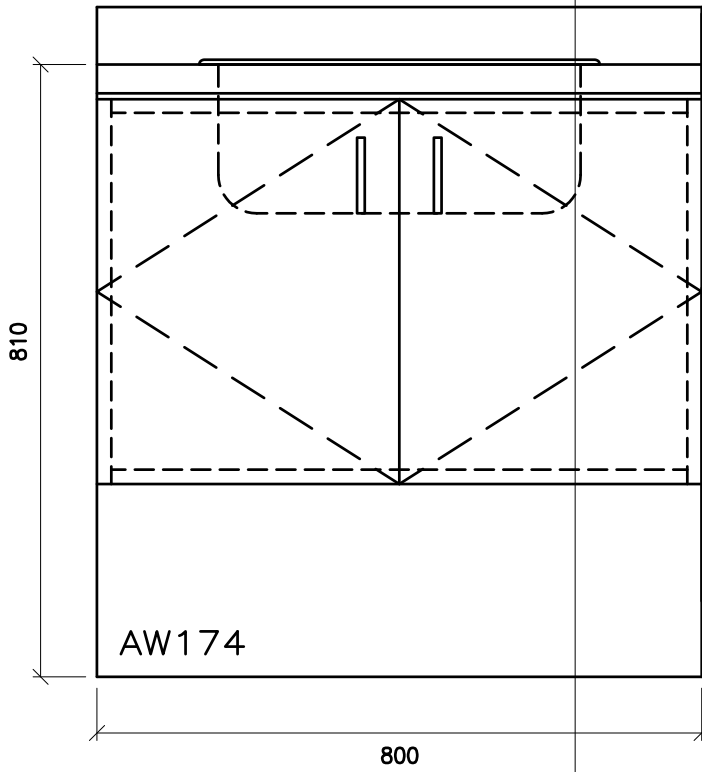
REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS

FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

B/F LOWER CABINET WITH SINGLE SINK - ELEVATION



AW176

AW174

810

800

Status

Folder I:\DRAFTING\WRDSB MILLWORK

File AW174.DWG

Drawn By NST

Check By SKA

Scale

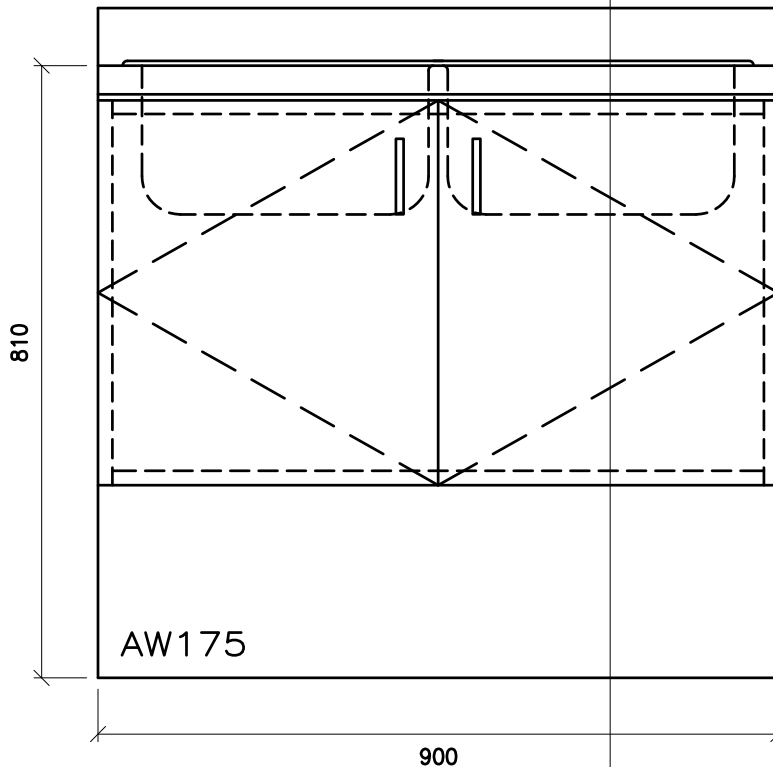
Date February 2015

Last Plot 6/2/2016 8:52 AM

Job No.

Sheet No.

AW174



THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

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GENERAL NOTES:

ON ALL DWGS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS

FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

B/F LOWER CABINET WITH SINGLE SINK - ELEVATION

Status

Folder \\DRAFTING\WRDSB MILLWORK

File AW175.DWG

Drawn By NST

Check By SKA

Scale

Date February 2015

Last Plot 6/2/2016 8:52 AM

Job No.

Sheet No.

AW175

THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

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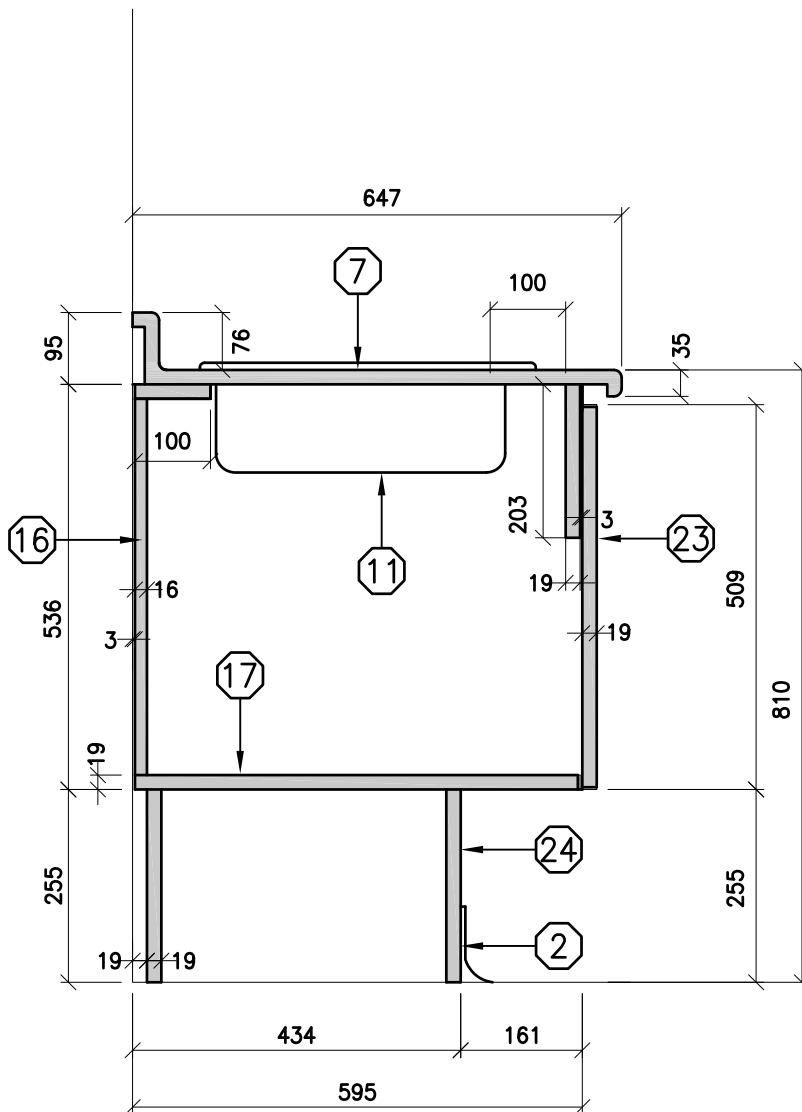
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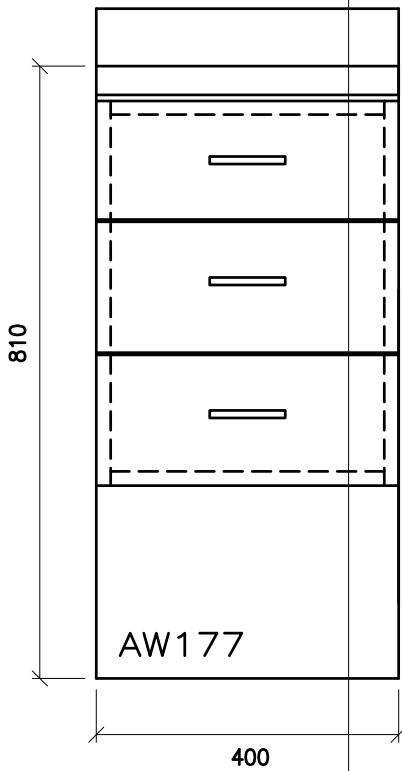


ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

B/F LOWER CABINET WITH SINK - SECTION

Status	
Folder	\\DRAFTING\WRDSB MILLWORK
File	AW176.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:52 AM
Job No.	
Sheet No.	

AW176



AW178

THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

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ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

B/F LOWER CABINET - ELEVATION

Status	
Folder	\\DRAFTING\WRDSB MILLWORK
File	AW177.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:52 AM
Job No.	
Sheet No.	

AW177

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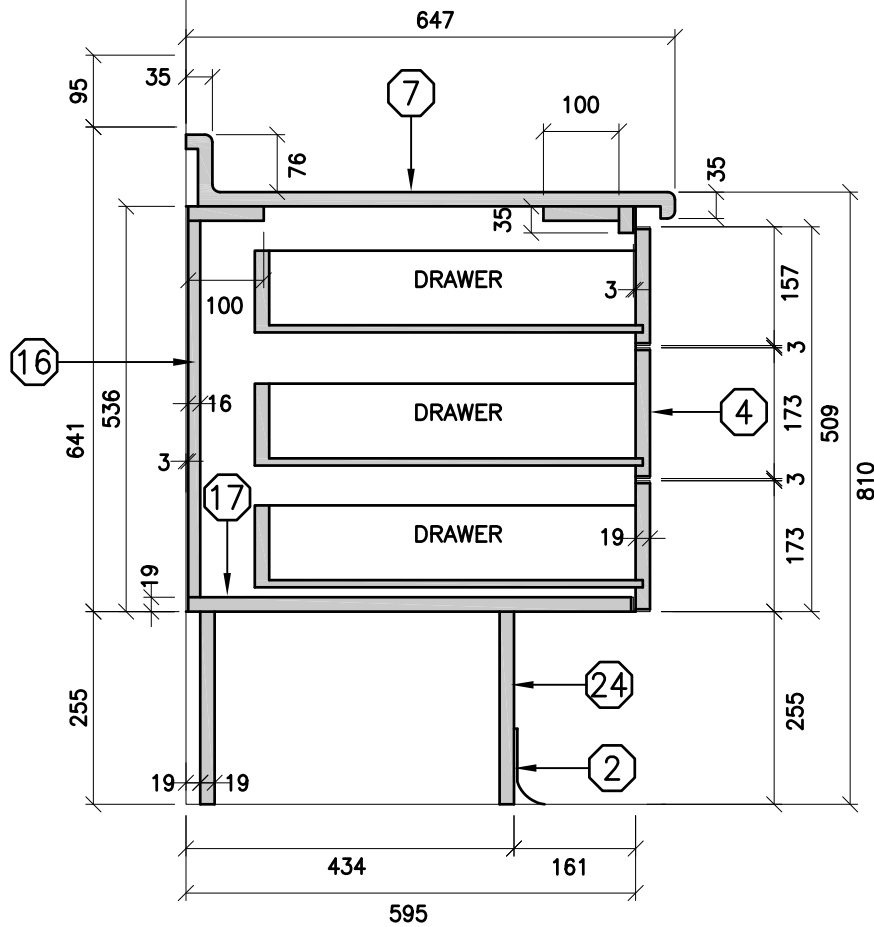
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REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.

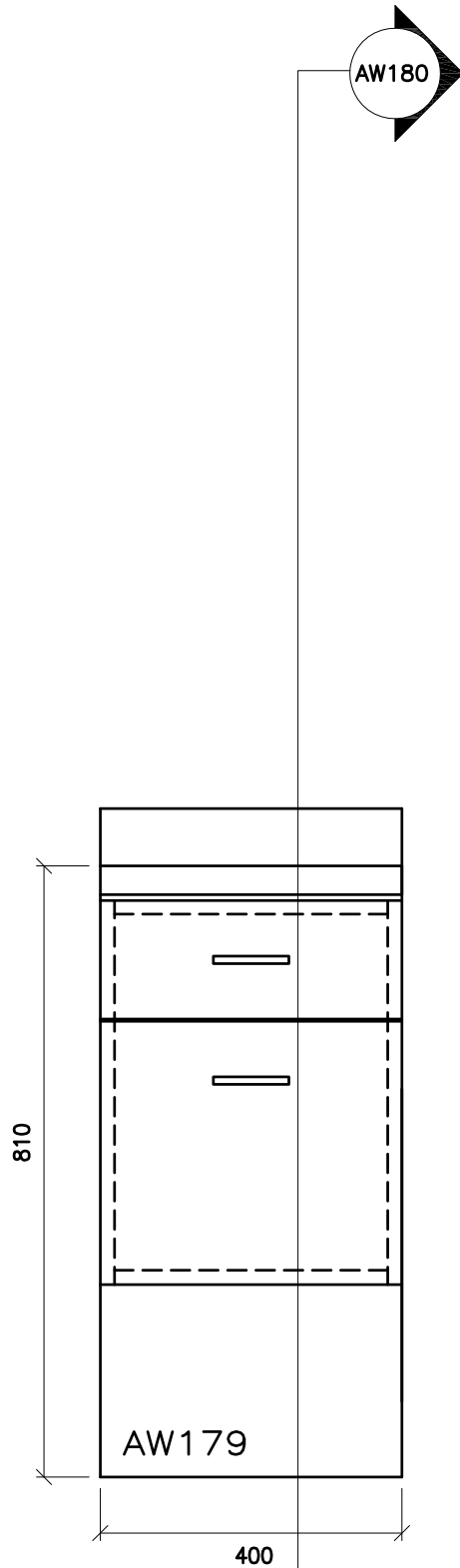


ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

B/F LOWER CABINET WITH DRAWERS - 3D - SECTION

Status	
Folder	\\DRAFTING\WRDSS MILLWORK
File	AW178.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:52 AM
Job No.	
Sheet No.	

AW178



THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

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REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS

FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

B/F LOWER CABINET WITH DRAWERS - 2D C/W - FD- Elevation

Status	
Folder	\\DRAFTING\WRDSB MILLWORK
File	AW179.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:52 AM
Job No.	
Sheet No.	

AW179

THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

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REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS

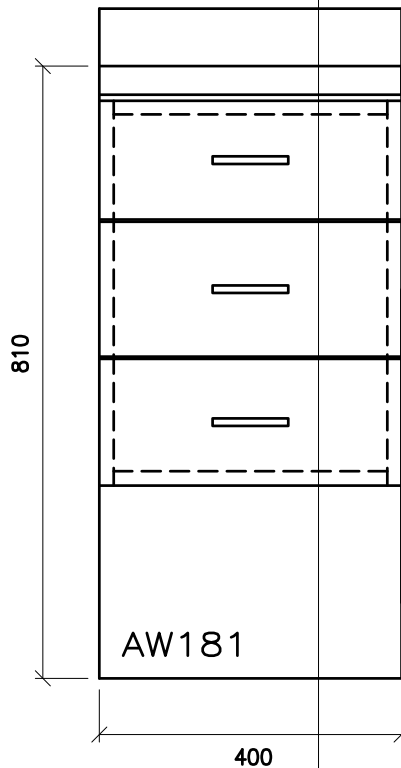
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

B/F LOWER CABINET WITH DRAWERS-3D - ELEVATION

Status	
Folder	\\DRAFTING\WRDSB MILLWORK
File	AW181.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:52 AM
Job No.	
Sheet No.	

AW181

AW182



THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDDB BEFORE PROCEEDING WITH WORK.

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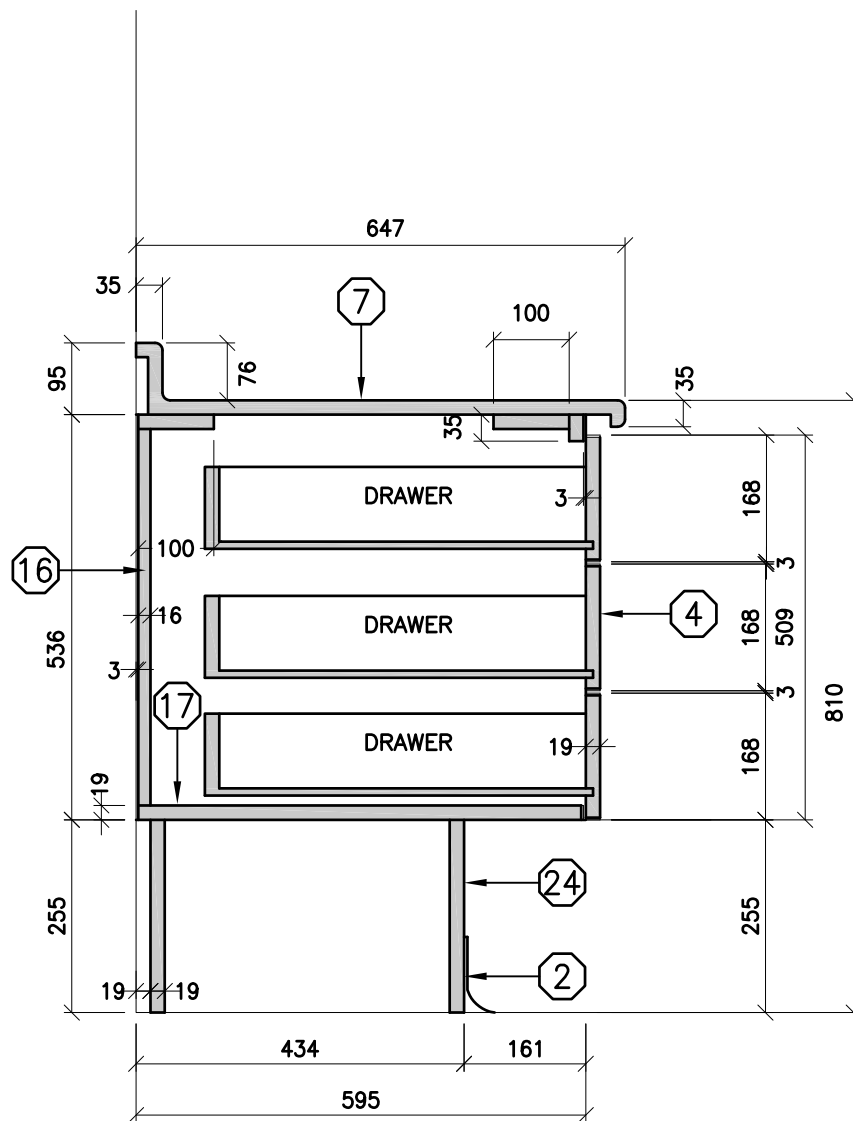
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REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

B/F LOWER CABINET WITH DRAWERS - 3D - SECTION

Status	
Folder	\\DRAFTING\WRDDB MILLWORK
File	AW182.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:52 AM
Job No.	
Sheet No.	

AW182

THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

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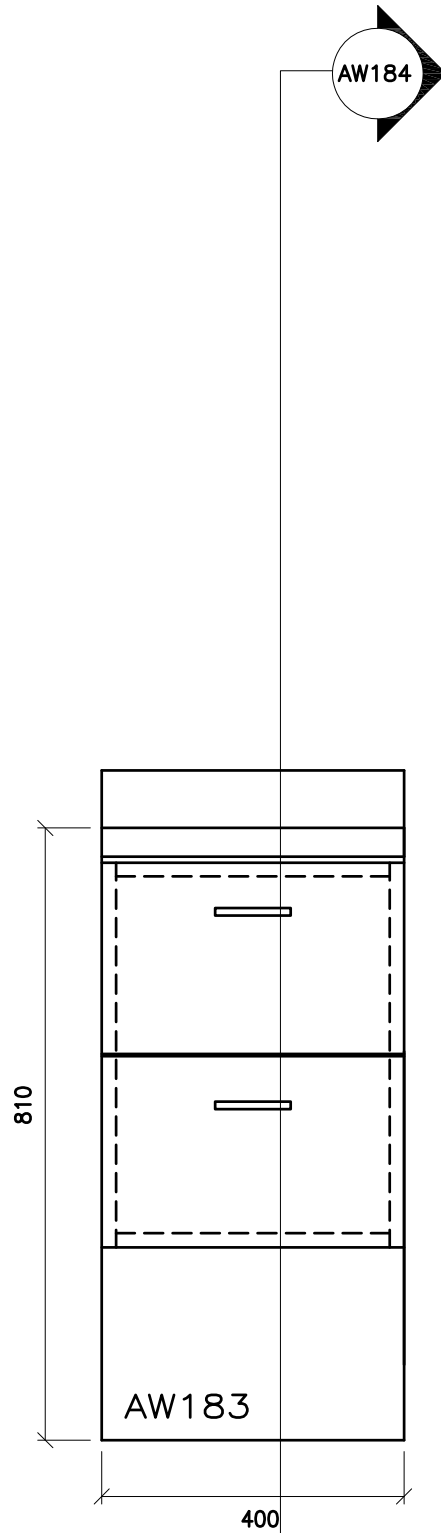
REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS

FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

B/F LOWER CABINET WITH DRAWERS 2D - ELEVATION



Status
Folder I:\DRAFTING\WRDSB MILLWORK
File AW183.DWG
Drawn By NST
Check By SKA
Scale
Date February 2015
Last Plot 6/2/2016 8:53 AM
Job No.
Sheet No.

AW183

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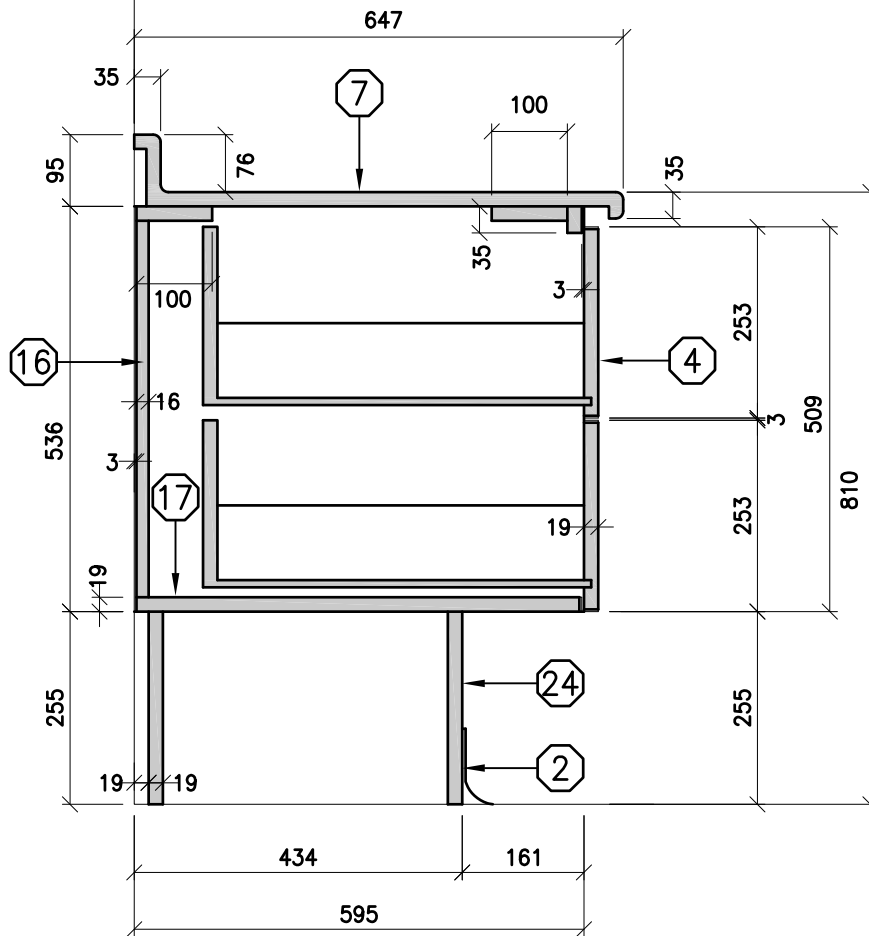
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GENERAL NOTES:

ON ALL DWGS. AW REFERS TO ARCHITECTURAL WOODWORK.

FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



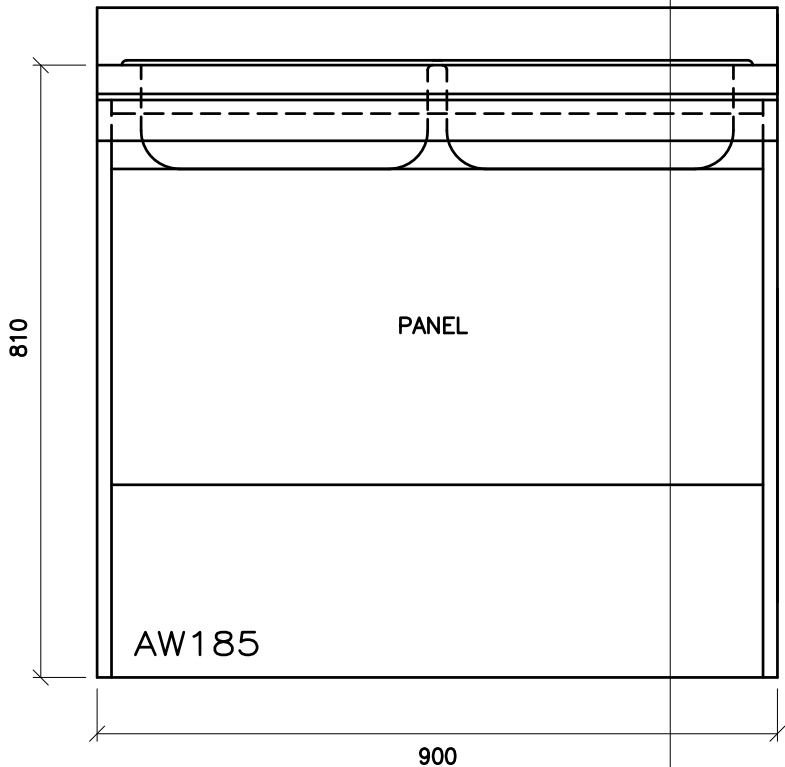
ARCHITECTURAL WOODWORK STANDARDS

FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

B/F LOWER CABINET WITH DRAWERS - 2D - SECTION

Status	
Folder	\\DRAFTING\WRDSB MILLWORK
File	AW184.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:53 AM
Job No.	
Sheet No.	

AW184



THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSS BEFORE PROCEEDING WITH WORK.

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GENERAL NOTES:

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REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

B/F LOWER CABINET - ELEVATION

Status	
Folder	\\DRAFTING\WRDSS MILLWORK
File	AW185.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:53 AM
Job No.	
Sheet No.	

AW185

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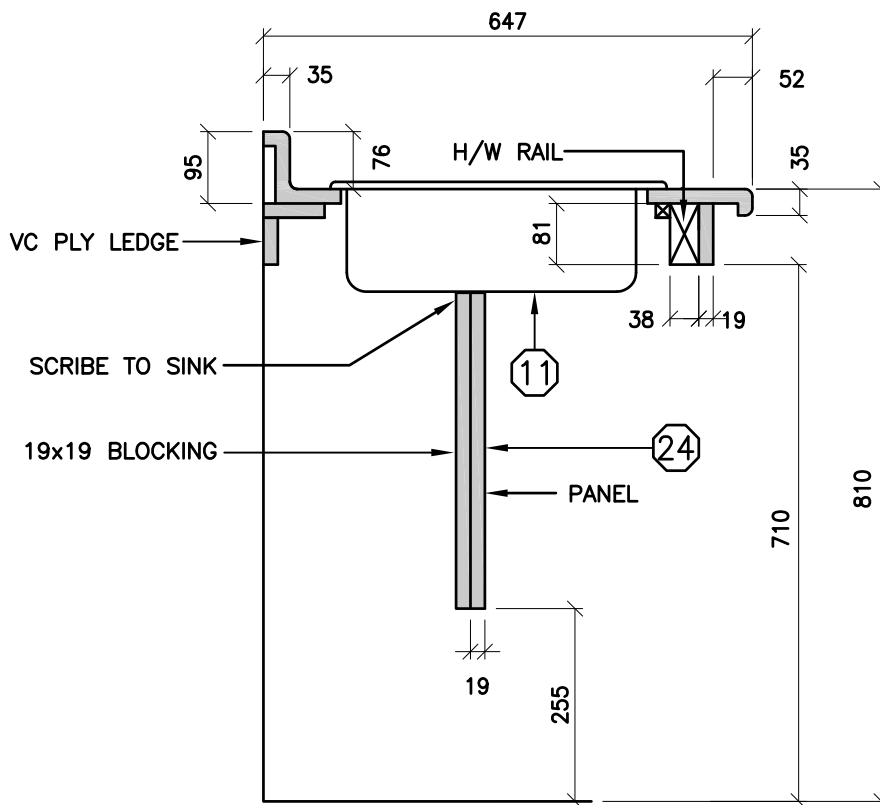
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REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

B/F SINK - SECTION

Status	
Folder	\\DRAFTING\WRDSB MILLWORK
File	AW186.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:53 AM
Job No.	
Sheet No.	

AW186

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REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS

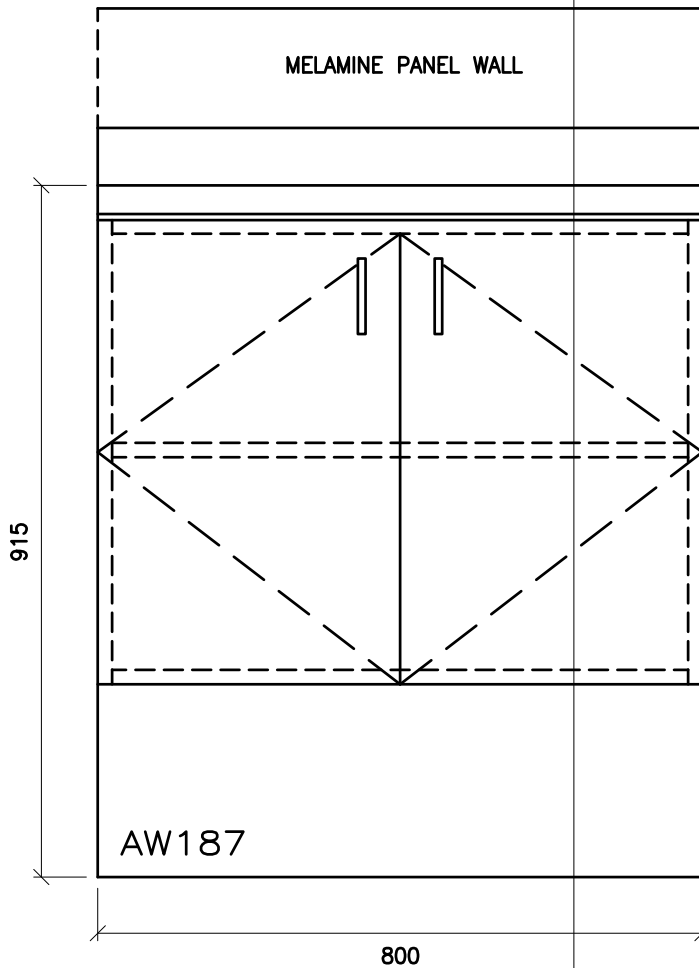
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

B/F LOWER CABINET WITH MELAMINE WALL - ELEVATION

Status	
Folder	\\DRAFTING\WRDSB MILLWORK
File	AW187.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:53 AM
Job No.	
Sheet No.	

AW187

AW188



THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

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FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

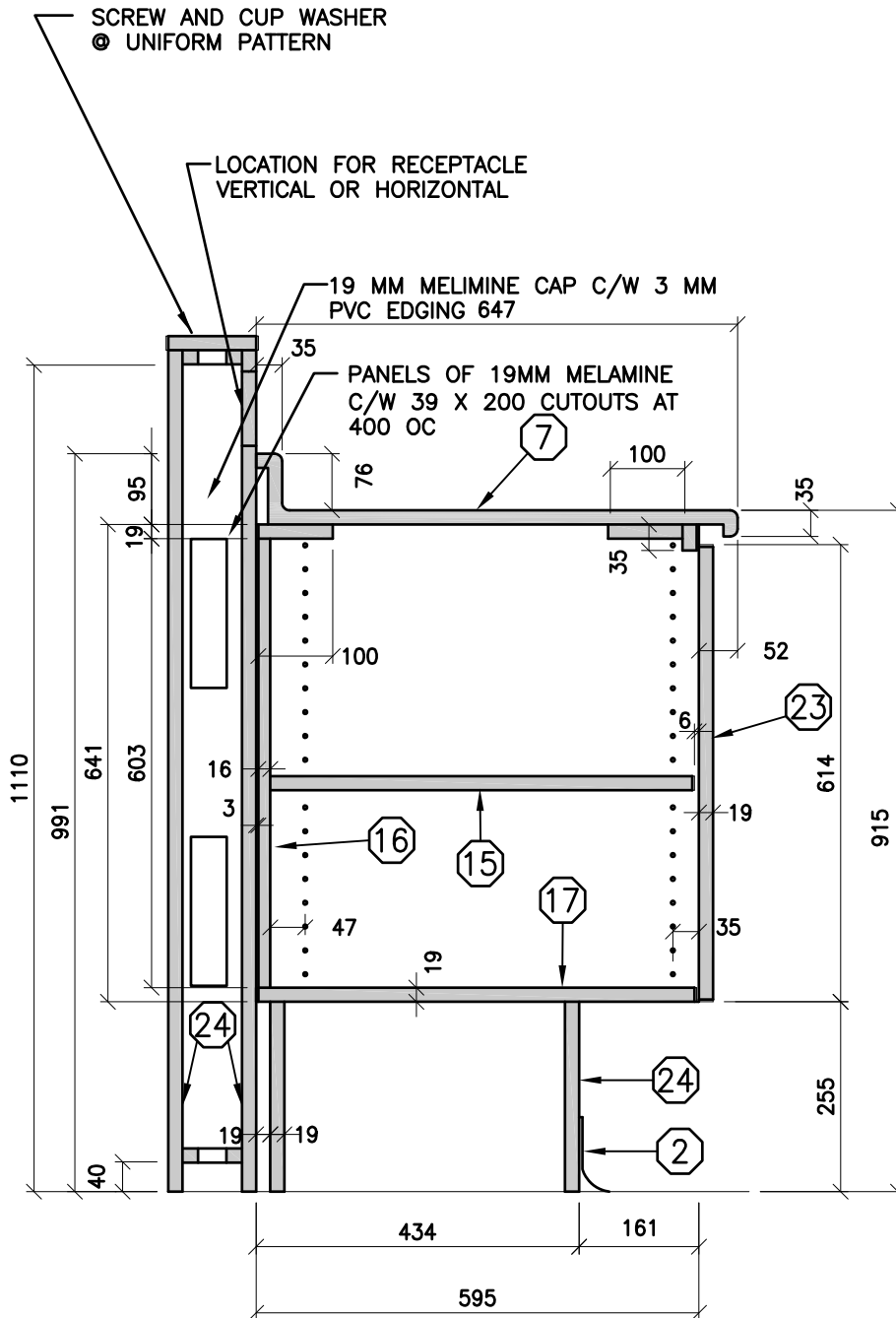
REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS

FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

B/F LOWER CABINET WITH MELAMINE WALL - SECTION



Status	
Folder	\\DRAFTING\WRDSB MILLWORK
File	AW188.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:53 AM
Job No.	
Sheet No.	

AW188

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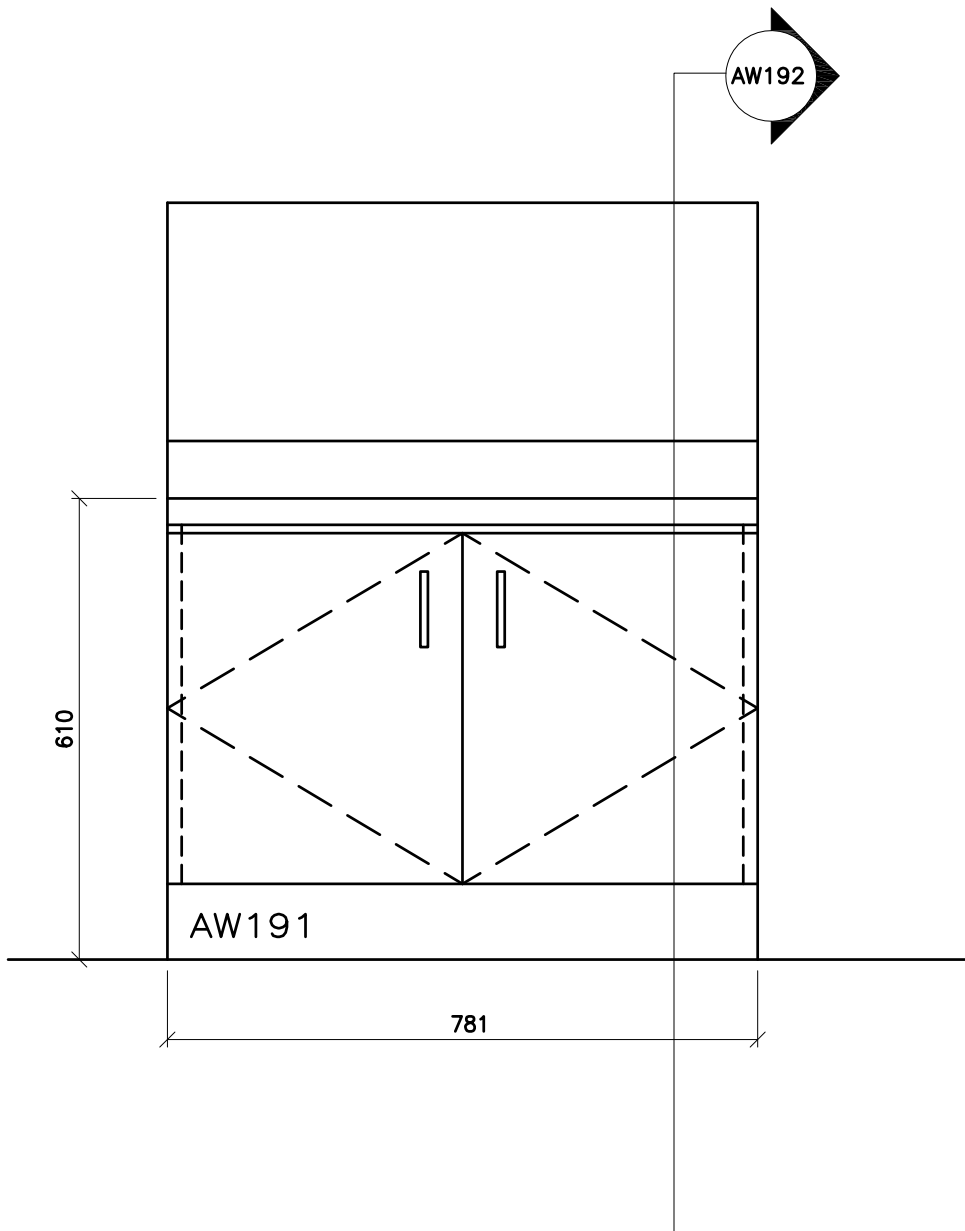
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REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS

FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

JK/SK LOWER CABINET - ELEVATION

Status
Folder I:\DRAFTING\WRDSB MILLWORK
File AW191.DWG
Drawn By NST
Check By SKA
Scale
Date February 2015
Last Plot 6/2/2016 8:53 AM
Job No.
Sheet No.

AW191

THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSS BEFORE PROCEEDING WITH WORK.

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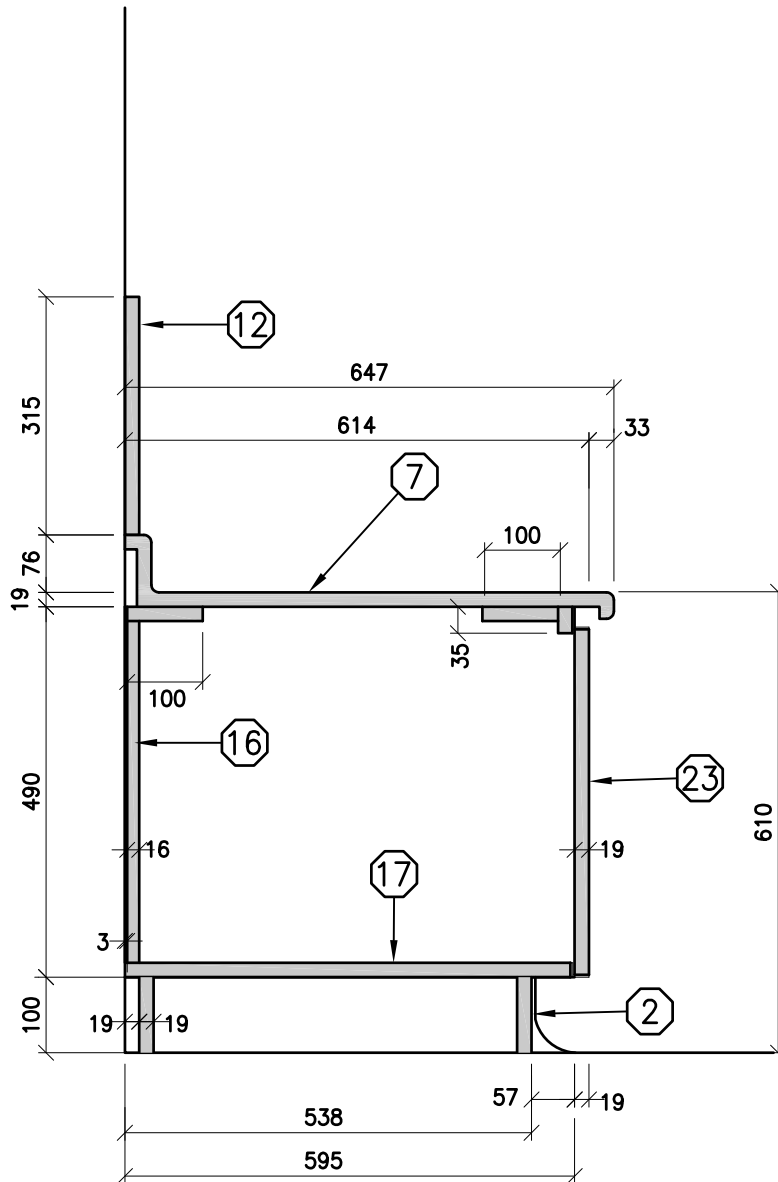
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REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS

FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

JK/SK LOWER CABINET - SECTION

Status	
Folder	I:\DRAFTING\WRDSS MILLWORK
File	AW192.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:53 AM
Job No.	
Sheet No.	

AW192

THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDDB BEFORE PROCEEDING WITH WORK.

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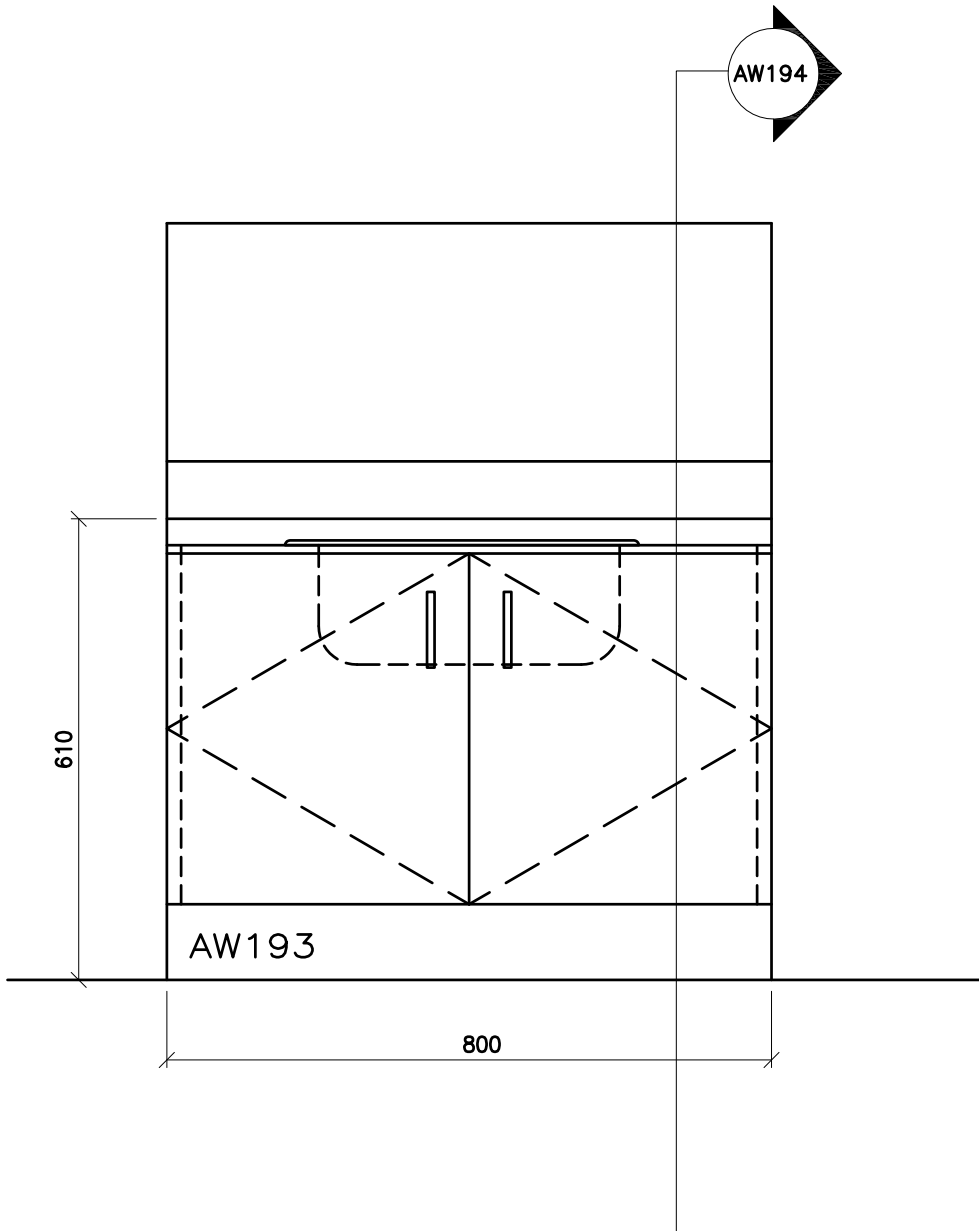
REPRODUCTION OF DWGS. AND RELATED DOCUMENTS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE WRDDB'S WRITTEN PERMISSION.

GENERAL NOTES:

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FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS

FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

JK/SK LOWER CABINET WITH SINK - ELEVATION

Status
Folder I:\DRAFTING\WRDDB MILLWORK
File AW193.DWG
Drawn By NST
Check By SKA
Scale
Date February 2015
Last Plot 6/2/2016 8:53 AM
Job No.
Sheet No.

AW193

THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSS BEFORE PROCEEDING WITH WORK.

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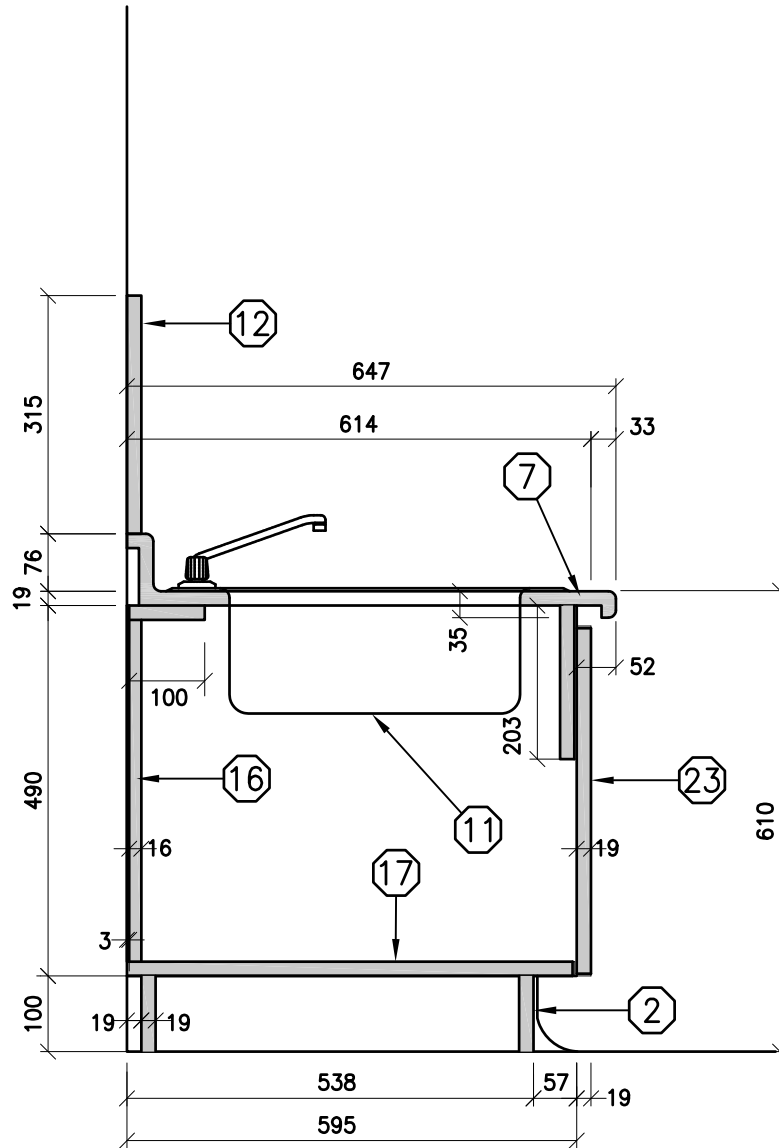
REPRODUCTION OF DWGS. AND RELATED DOCUMENTS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE WRDSS'S WRITTEN PERMISSION.

GENERAL NOTES:

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REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS

FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

JK/SK LOWER CABINET WITH SINK - SECTION

Status	
Folder	\\DRAFTING\WRDSS MILLWORK
File	AW194.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	February 2015
Last Plot	6/2/2016 8:54 AM
Job No.	
Sheet No.	

AW194

THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSS BEFORE PROCEEDING WITH WORK.

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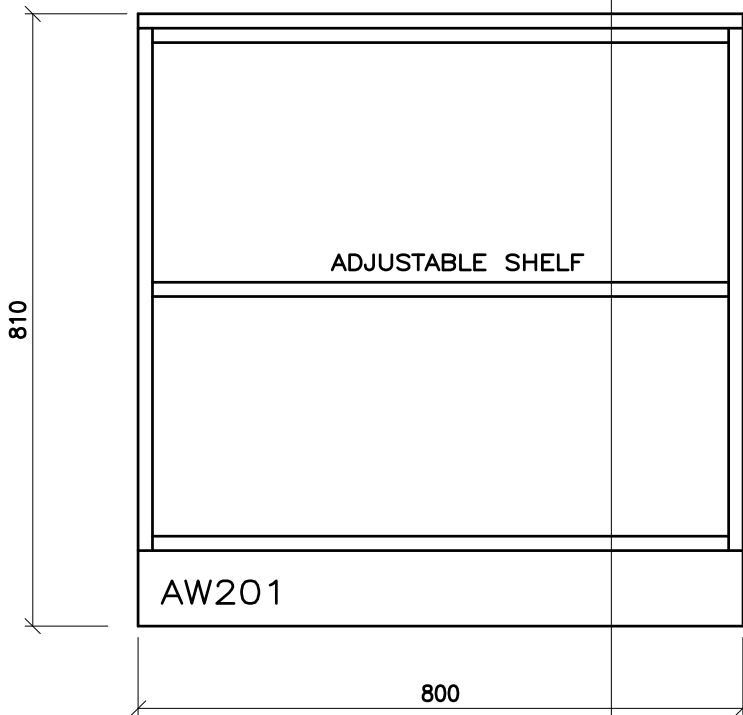
FOR APPROPRIATE PRODUCTS REFER TO AW001 AND THE SPECIFICATIONS.

REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



SEE LIST

- AW202 - 253
- AW203 - 305
- AW204 - 405



ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOW BOOKSHELF - 810 - ELEVATION

Status
Folder I:\DRAFTING\WRDSS MILLWORK
File AW201.DWG
Drawn By NST
Check By SKA
Scale
Date November 2015
Last Plot 6/2/2016 8:54 AM
Job No.
Sheet No.

AW201

THE CONTRACTOR SHALL VERIFY ALL DWGS. AGAINST THE ARCHITECTURAL WOODWORK DWGS. AND MUST REPORT ANY INCONSISTENCIES TO THE WRDSB BEFORE PROCEEDING WITH WORK.

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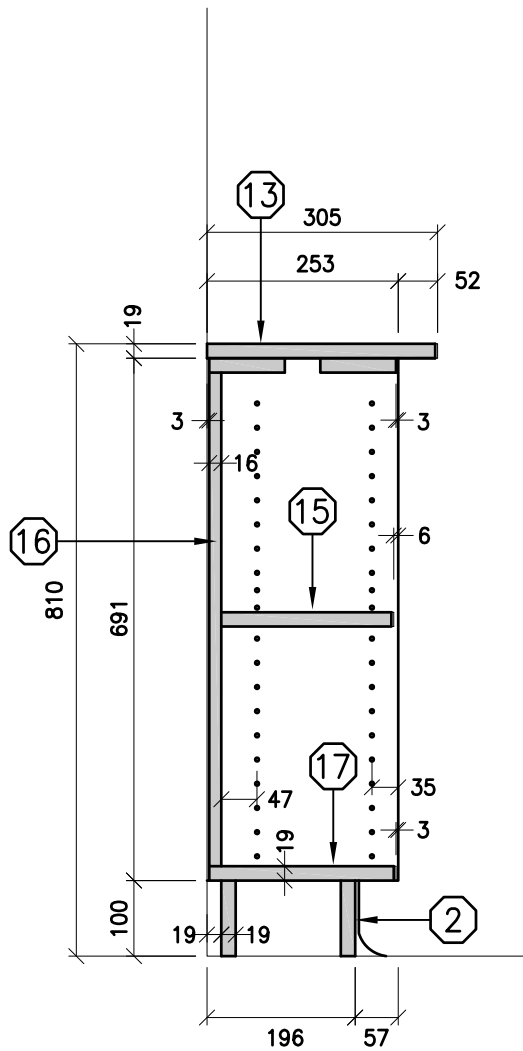
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GENERAL NOTES:

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REFER TO AW002 TO AW020 FOR ADDITIONAL DETAILS.



ARCHITECTURAL WOODWORK STANDARDS

FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOW BOOKSHELF 810 - SECTION

Status	
Folder	\\DRAFTING\WRDSB MILLWORK
File	AW202.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	November 2015
Last Plot	6/2/2016 8:54 AM
Job No.	
Sheet No.	

AW202

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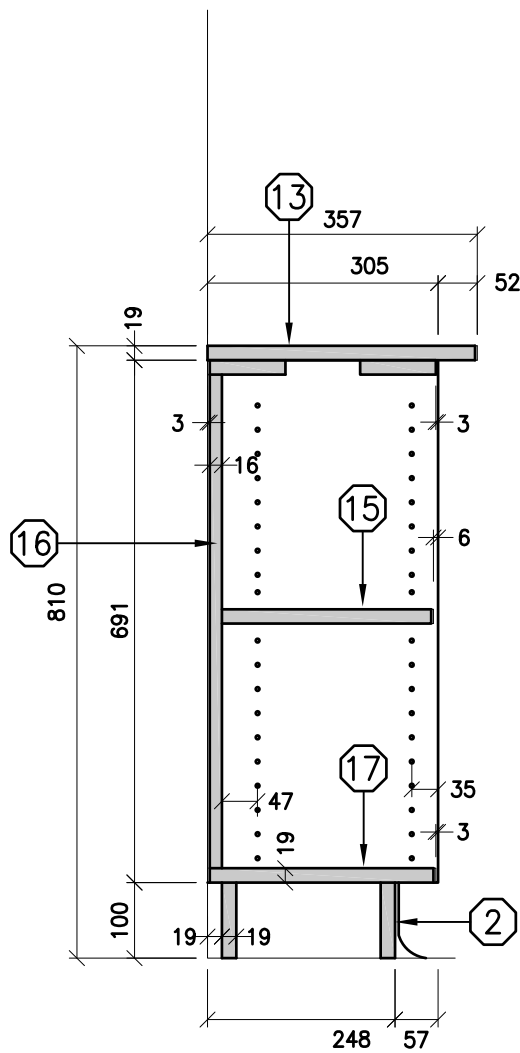
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ARCHITECTURAL WOODWORK STANDARDS

FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOW BOOKSHELF 810 - SSECTION

Status	
Folder	\\DRAFTING\WRDDB MILLWORK
File	AW203.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	November 2015
Last Plot	6/2/2016 8:54 AM
Job No.	
Sheet No.	

AW203

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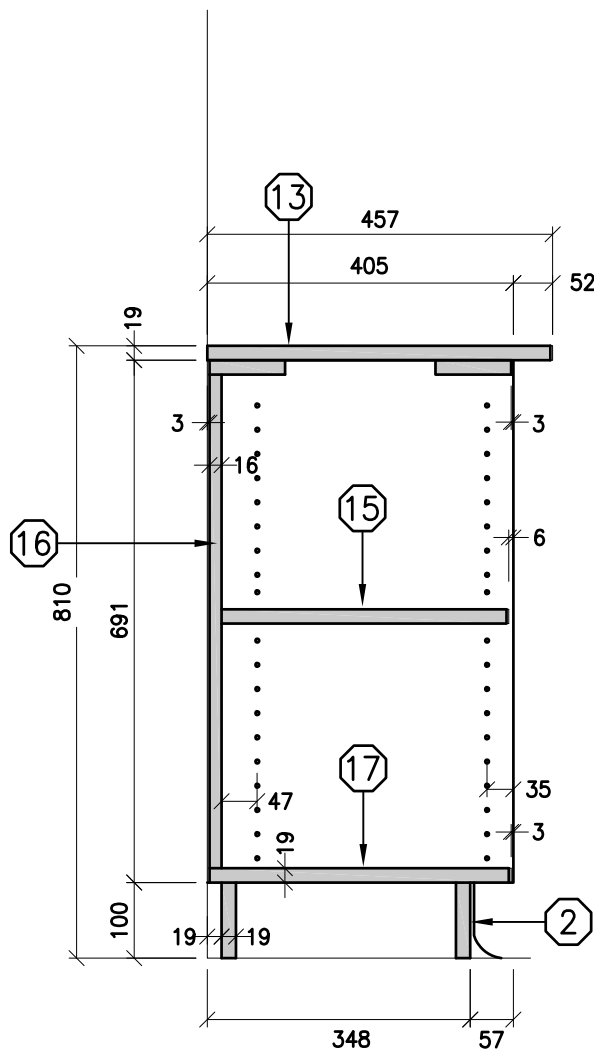
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ARCHITECTURAL WOODWORK STANDARDS
FOR THE WATERLOO REGION DISTRICT SCHOOL BOARD

LOW BOOKSHELF 810 - SECTION

Status	
Folder	\\DRAFTING\WRDSB MILLWORK
File	AW204.DWG
Drawn By	NST
Check By	SKA
Scale	
Date	November 2015
Last Plot	6/2/2016 8:54 AM
Job No.	
Sheet No.	

AW204