



FACILITIES MANAGEMENT
OPEN CALL FOR BIDS
FOR
OSC-149-22
OSC LAB LIFE SAFETY UPGRADES

Request for Open Call Number: **TFM-030-25**

Issued: **June 24, 2025**

Submission Deadline: **Thursday, July 17, 2025**
@ 3:00PM NDT

REQUEST FOR OPEN CALL FOR BIDS INFORMATION SHEET

Request for Open Call			
Title:	OSC-149-22 OSC Lab Life Safety Upgrades		
Open Call #:	TFM-030-25	Issue Date:	June 24, 2025
Site Visit:	Details regarding the official site visit will be provided in an upcoming addendum.		
Questions Deadline:	Eight (8) days prior to closing time, at 3:00pm (NST).	Closing Date & Time:	Thursday July 17, 2025 @ 3:00 pm NDT
		Bid Submission Format:	opencalls@mun.ca
		Opening Date, Time & Location:	Thursday, July 17, 2025 @ 3:30 pm NDT Via Conference line: 1-416-915-6530 (toll free) Access Code: 2772 215 2217 Attendee ID: Please press Pound(#)
Bids Irrevocable Period after Submission Deadline:			45 days (See section 1.6)
Bid Submission: Responses to this solicitation must be submitted by email to opencalls@mun.ca Email subject line must read: BID SUBMISSION: TFM-030-25 OSC-149-22 OSC Lab Life Safety Upgrades			
Inquiries and Communication			

Inquiries and communication: Strategic Procurement Office, Memorial University of Newfoundland, opencalls@mun.ca. Inquiries accepted only via email. No phone calls will be accepted. **Please reference open call Title and Open Call # from above, ie: TFM-030-25 OSC-149-22 OSC Lab Life Safety Upgrades in subject line. Emails not containing this required information in the subject line will NOT receive a response.**

Bids submitted by fax, mail, courier, drop off or by any other means of delivery other than by email stated above shall not be accepted.

ABOUT MEMORIAL UNIVERSITY

As Newfoundland and Labrador's only university, Memorial has a special obligation to the people of this province. Established as a memorial to the Newfoundlanders who lost their lives on active service during the First and Second World Wars, Memorial University draws inspiration from these shattering sacrifices of the past as we help to build a better future for our province, our country and our world.

We are a multi-campus, multi-disciplinary, public university committed to excellence in teaching and learning, research and scholarship, and to public engagement and service. We strive to have national and global impact, while fulfilling our social mandate to provide access to university education for the people of the province and to contribute to the social, cultural, scientific and economic development of Newfoundland and Labrador and beyond.

The Memorial experience goes beyond academics; it invites a discovery of self, community and place. At Memorial, we celebrate our unique identity through the stories of our people – the work of scholars and educators, the ingenuity of students, the achievements of alumni – and the impact we collectively make in the province, the country and the world. Memorial is the natural place where people and ideas become.

Memorial University has more than 18,500 students and 3,600 faculty and staff spread across four campuses and nearly 100,000 alumni active throughout the world. From local endeavors to research projects of national importance, Memorial's impact is felt far and wide.

Mission, Vision and Values

Vision

Memorial University will be one of the most distinguished public universities in Canada and beyond, and will fulfill its special obligation to the people of Newfoundland and Labrador.

Mission

Memorial University is an inclusive community dedicated to innovation and excellence in teaching and learning, research, scholarship, creative activity, service and public engagement.

Memorial welcomes and supports students and scholars from all over the world and contributes knowledge and expertise locally, nationally and internationally.

Values

Excellence: Encouraging and promoting excellence through innovation and creativity, rigor and pragmatism.

Integrity: Being honest and ethical in all interactions, maintaining the highest ethical standards in teaching, research, public engagement and service.

Collegiality: Engaging others with respect, openness and trust in pursuit of a common purpose, having regard for individuals, ideals and the institution as a whole.

Inclusiveness and diversity: Embracing and acting on responsibility to guarantee diversity and equity.

Responsiveness: Being receptive to individuals and communities.

Accountability: Accepting responsibility for achievement of common goals and objectives.

Freedom and Discovery: Supporting the freedom to pursue knowledge that is based on individual and collective intelligence, curiosity, ingenuity and creativity.

Recognition: Acknowledging, tangibly, all aspects of university enterprise including teaching and learning, research, scholarship, creative activity and public engagement.

Responsibility to place: Valuing and fulfilling the special obligation to the people of Newfoundland and Labrador by supporting and building capacity for excellence that:

- addresses needs and opportunities for Newfoundland and Labrador;
- engages the university community on matters of national and international significance;
- produces and delivers academic programs of national and international calibre; and,
- Recognizes the dynamic opportunities presented by a multi-campus institution.

Responsibility to learners: Recognizing students as a first priority and providing the environment and support to ensure their academic and personal success.

Interdisciplinary collaboration: Supporting overarching themes in all pursuits that cut across academic units and address significant opportunities and challenges for which Memorial is particularly well positioned to build nationally and internationally recognized capacity.

Sustainability: Acting in a manner that is environmentally, economically and socially sustainable in administration, academic and research programs.

Memorial's exceptional staff and students contribute to the vitality and positive environment of the university through active community engagement. Memorial University has always been a publicly engaged institution. Since the founding of the University in 1949, the work of many of Memorial's students, faculty and staff has emphasized the importance of strong, sustained partnerships with members of the public of Newfoundland and Labrador and beyond.

Faculty and Staff

Memorial is one of the largest employers in the province, with approximately 3,600 faculty and staff. Memorial has been recognized as an Employer of Distinction by the Newfoundland and Labrador Employers' Council, which is reflective of its investment in comprehensive benefits, services such as childcare and recreation facilities, emphasis on work-life balance, and its vibrant work environment.

Governance and Administration

The management, administration and control of the property, revenue, business and affairs of the University are vested in a Board of Regents. The Board is appointed under the *Memorial University Act* and is responsible for the management, administration, and control of the property, revenue, business and affairs of the university. Matters of an academic character are in general charge of the Senate of the University.

For more information on Memorial University of Newfoundland, please visit:
Memorial's home page: <http://www.mun.ca/>

Territory Acknowledgements at Memorial:

We acknowledge that the lands on which Memorial University's Campus are situated are in the traditional territories of diverse Indigenous groups and we acknowledge with respect the diverse histories and cultures of the Beothuk, *Mi'kmaq*, *Innu*, and *Inuit of this province*.



**SPECIFICATION FOR
OSC-149-22
MEMORIAL UNIVERSITY OF NEWFOUNDLAND
OSC EMERGENCY EYE WASH AND SHOWER UPGRADE**

ISSUED FOR TENDER

DATE:

June 24, 2025

PREPARED FOR:

Memorial University
Elizabeth Avenue
St. John's, NL A1C 5S7

PREPARED BY:

Stantec Consulting Limited
141 Kelsey Drive
St. John's, NL A1B 0L2

SCL REF. NO: 133411894

Memorial University of Newfoundland
OSC Emergency Eye Wash and Shower Upgrade

Signature Page

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DISCIPLINE

DATE

STAMP

Mechanical
Specifications

2025-06-20



Electrical
Specifications

2025-06-20



PROCUREMENT AND CONTRACTING DOCUMENTS GROUP

DIVISION 0 – PROCUREMENT AND CONTRACTING REQUIREMENTS

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Appendix C2 – Unit Rates
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General Conditions and Agreement between Owner and Contractor for the Stipulated Price Contract

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Section 01 25 00 - Substitution Procedures
Section 01 26 00 - Contract Modification Procedures
Section 01 29 83 - Payment Procedures for Testing Laboratory Services
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Section 01 74 21 - Construction/Demolition Waste Management and Disposal
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Section 01 79 00.13 - Demonstration and Training for Building Commissioning
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DIVISION 2 - EXISTING CONDITIONS

Section 02 82 00.02 - Asbestos Abatement
Section 02 83 10 - Lead-base Paint Abatement

DIVISION 7 - THERMAL & MOISTURE PROTECTION

Section 07 84 00 - Firestopping

DIVISION 22 - PLUMBING

Section 22 05 00 - Common Work Results - Mechanical
Section 22 05 05 - Selective Demolition for Plumbing
Section 22 05 15 - Plumbing Specialties and Accessories
Section 22 07 19 - Plumbing Piping Insulation
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Section 23 05 15 - Common Installation Requirements for HVAC Pipework
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Section 26 05 00 - Common Work Results – Electrical
Section 26 05 20 - Wire and Box Connectors (0 - 1000V)
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APPENDICES

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END OF SECTION

Memorial University of Newfoundland
OSC Emergency Eye Wash and Shower Upgrade

Section 00 01 15 – List of Drawings

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- M104 OSC CDRF & TANK ENCLOSURE BUILDINGS MECHANICAL PLANS
- M105 OSC MAIN BUILDING MECHANICAL PLANS
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- E101 ENLARGED ELECTRICAL PLANS - OSC ANNEX
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- E104 ENLARGED ELECTRICAL PLANS - OSC MAIN BUILDING AND TANK ENCLOSURE
- E105 MECHANICAL AND ELECTRICAL COORDINATION

PART 1 – SUBMISSION INSTRUCTIONS

1.1 Bids to be Submitted on Time

Bids must be submitted as set out above on or before the Submission Deadline. Bids submitted after the Submission Deadline will be rejected. Onus and responsibility rest solely with the bidder to submit its bid to the email indicated in the Open Call for Bids on or before the Submission Deadline. The Owner does not accept any responsibility for any bids submitted by means other than the email listed above. Bidders making submissions near the deadline do so at their own risk due server availability. The time for the closing will be determined according to the inbox, time stamp on opencalls@mun.ca.

Bids received after the closing time based on this time stamp, will NOT be considered.

1.2 Bids to be Submitted in Prescribed Format

- Bidders should submit **one (1)** email submission in PDF format.
- **Please note: File size cannot exceed 15 MB. Otherwise server may reject bid submission due to size.**
- **Bids submitted by fax, mail, courier, drop off or by any other means of delivery other than by email stated above shall not be accepted.**

1.3 Amendment/Revision of Bids

Bidders shall amend their bids after they have been submitted if, and only if, the amendment is emailed prior to the Submission Deadline marked **BID SUBMISSION AMENDMENT** followed by open call number and name. Previous submissions shall be cancelled and the bid submission with the most recent date and time shall be considered the final bid.

Bidders shall revise **APPENDIX C- Pricing form** *only* by submitting an updated **Pricing Form** prior to submission deadline. The revised **Pricing Form** shall replace the **Pricing Form** received with the original bid submission.

PLEASE NOTE: APPENDIX C – Pricing Form is the only section of the bid that can be revised independently. All other amendments/revisions shall require completing a new bid submission.

Bidders may revise their bid by email: opencalls@mun.ca

The Owner does not accept any responsibility for amendments submitted by means other than the email listed above. Bidders making submission near the deadline do so at their own risk due to service availability. The time for the closing will be determined according to the inbox, time stamp on opencalls@mun.ca. Amendments to bids received after the closing time base on this times stamp, will NOT be considered.

Email inquiries and requests for clarification shall be accepted up to eight **(8) days (3:00pm NST)** prior to the closing time. Inquiries and requests for clarification received after this date shall not be addressed. The Strategic Procurement Office will be the only official source of

information regarding this Open Call for Bids and information from any other source shall be considered unofficial and may not be correct.

1.4 Amendment of Open Call for Bid Documents

To ensure consistency and quality in the information provided to bidders the Owner shall provide, by way of amendment to this Open Call for Bids, in the form of an addendum, any relevant information with respect to the Open Call inquiries received in writing without revealing the source of those inquiries. Bidders are cautioned that it is their responsibility to ensure that they receive all information relevant to this Open Call. The Owner shall not be responsible for bidders who fail to inform themselves regarding the scope and nature of the work. The Owner shall publish all amendments on Memorial University's current service providers: MERX: www.merx.com, BIDS: www.bids.ca and PODS: www.pods.net. In addition, all amendments will be published on https://www.mun.ca/finance/strategic_procurement/. Bidders should check on a regular basis for Open Call updates. Bidders are solely responsible for ensuring they are aware of and have complied with all amendments by tender closing time. In the event there is a discrepancy between MERX, BIDS, and PODS and the official website https://www.mun.ca/finance/strategic_procurement/ website, the https://www.mun.ca/finance/strategic_procurement/ is the official website. Bidders are welcome to register their email address through opencalls@mun.ca to receive addendum notifications from Open Calls as a matter of courtesy. This does not relieve any Bidder of their responsibility to ensure all addenda has been received.

1.5 Withdrawal of Bids

Bidders may withdraw their bids prior to the Submission Deadline. To withdraw a bid, a notice of withdrawal must be sent to the opencalls@mun.ca email address prior to the Submission Deadline. The Owner is under no obligation to return withdrawn bids.

1.6 Bids Irrevocable after Submission Deadline

Bids shall be irrevocable for a period of **45** days running from the moment that the Submission Deadline passes.

1.7 Delivery

Time is of the essence and delivery schedule(s) are legally binding. Memorial University reserves the right to assess penalties or cancel awards to Bidders who fail to meet the stated delivery or completion dates. Delivery of all materials and services must be DAP (delivered at place) or DDP (delivered duty paid (all locations) and local environs).

1.8 Signature

Memorial University, in consideration of section 11 of the Electronic Commerce Act, confirms its acceptance of electronic signatures, or other acceptable form of electronic consent, in satisfaction of the signature requirement for bid submissions. The electronic form of signature or consent must be directly related to the relevant bid submission at issue and must be reliable, in a manner as determined by Memorial University, for the purpose of identifying the person submitting the bid response. By submitting a bid under this process, the bidder confirms that the signatory has the appropriate and proper authority to bind the bidder to its submission, a confirmation upon which Memorial University relies in the

processing of the bid submission.

Bidders must complete Appendix B –Submission Form. Any bids received without Appendix B completed will be deemed non-complaint.

1.9 Closure

In the event that the University is closed earlier than normally expected prior to a scheduled open calls closing for that day, or for the full day, the closing date for those open calls will be extended to the next business day for the University at the same time as listed originally.

1.10 Corporations Act

The Corporations Act of Newfoundland and Labrador requires that an extra-provincial company be registered before it begins or carries on business in the Province. If your company is not registered, please apply for the appropriate forms and procedures to:

Commercial Registrations Division

Dept of Government Services, PO Box 8700 St John's, NL Canada A1B 4J6

Phone: 709-729-3317, Fax: 709-729-0232

Website: http://www.gs.gov.nl.ca/registries/companies/corp_art_inc.html

[End of Part 1]

PART 2 – EVALUATION AND AWARD

2.0 Stages of Evaluation

The Owner will conduct the evaluation of bids in the following stages:

2.1.0 Stage I – Mandatory Submission Requirements

Stage I will consist of a review to determine which bids comply with all of the mandatory submission requirements. Bids that do not comply with all of the mandatory submission requirements as of the Submission Deadline will, subject to the express and implied rights of the Owner, be disqualified and not evaluated further.

2.1.1 Stage II – Mandatory Technical Requirements

Stage II will consist of a review to determine which bids comply with all of the mandatory technical requirements. Bids that do not comply with all of the mandatory technical requirements as of the Submission Deadline will, subject to the express and implied rights of the Owner, be disqualified and not evaluated further. The mandatory technical requirements are listed in Appendix A - Specifications.

2.1.2 Stage III – Pricing

Stage III will consist of a scoring of the submitted pricing of each compliant bid in accordance with the evaluation method set out in the Pricing Form (Appendix C). The evaluation of price will be undertaken after the evaluation of mandatory requirements has been completed.

2.2 No Amendment to Forms

Other than inserting the information requested on the mandatory submission forms set out in the Open Call, a bidder may not make any changes to any of the forms. Any bid containing any such changes, whether on the face of the form or elsewhere in the bid, shall be disqualified.

2.3 Selection of Lowest Compliant Bidder as Preferred Supplier

Subject to the Owner's reserved rights, the compliant bidder with the lowest pricing will be the preferred supplier, and will be selected to enter into the Agreement in accordance with the following section. In the event of a tie, the preferred supplier will be determined by way of a coin toss, in accordance with the Public Procurement Policy. Provincial suppliers, suppliers with a place of business in Newfoundland and Labrador, will be given provincial supplier preference provision. This mandates an allowance of ten percent for provincial suppliers for all procurement below trade agreement thresholds.

Please note, the supplier preference does not apply when the estimated value of the commodity is above the trade agreement threshold shown in the following table.

Public Body	Thresholds			
	Goods	Services	Public Works	Lease of Space
Memorial University	\$133,800	\$133,800	\$334,400	\$100,000

2.4 Notice to Bidder and Execution of Agreement

Notice of selection by the Owner to the preferred supplier shall be in writing. The preferred supplier shall execute the Agreement, the form and content of which will be mutually agreed upon between the parties and satisfy any other applicable conditions of this open call within fifteen (15) days of notice of selection. This provision is solely for the benefit of the Owner and may be waived by the Owner.

2.5 Failure to Enter into Agreement

If a selected bidder fails to execute the Agreement or satisfy the pre-conditions of award listed in the Open Call Particulars within fifteen (15) days of notice of selection the Owner may, without incurring any liability, proceed with the selection of another bidder and pursue all remedies available to the Owner.

2.6 Payment Terms

The University's standard payment terms are net 30 days after delivery of goods, or net 15 days after successful completion of installation as applicable. In the case of services, payment terms are also net 30 days after successful completion of the service. These terms shall also apply in the case of sub-contracted items. Prepayments will not be considered unless the supplier provides an irrevocable standby letter of credit, or the supplier provides a credit reference from its banker (in conjunction with a 50% materials and labour bond and a 50% performance bond) satisfactory to the Director of Financial and Administrative Services.

[End of Part 2]

PART 3 – TERMS AND CONDITIONS OF THE OCB PROCESS

3.1 Open Call Incorporated into Bid

All of the provisions of this Open call are deemed to be accepted by each bidder and incorporated into each bidder's bid. A bidder who submits conditions, options, variations or contingent statements to the terms as set out in this Open call, either as part of its bid or after receiving notice of selection, unless otherwise indicated, shall be disqualified.

3.2 Bidders to Follow Instructions

Bidders should structure their bids in accordance with the instructions in this Open call. Where information is requested in this Open Call, any response made in a bid should reference the applicable section numbers of this Open Call.

3.3 Bids in English

All bids are to be in English only.

3.4 No Incorporation by Reference

The entire content of the bidder's bid should be submitted in a fixed form, and links to the content of websites or other external documents referred to in the bidder's bid but not attached will not be considered to form part of its bid.

3.5 References and Past Performance

In the evaluation process, the Owner may consider information provided by the bidder's references and may also consider the bidder's past performance or conduct on previous contracts with the Owner or other institutions.

3.6 Information in Open Call Only an Estimate

The Owner and its advisors make no representation, warranty or guarantee as to the accuracy of the information contained in this Open Call or issued by way of addenda. Any quantities shown or data contained in this Open Call or provided by way of addenda are estimates only, and are for the sole purpose of indicating to bidders the general scale and scope of the Deliverables. It is the bidder's responsibility to obtain all the information necessary to prepare a bid in response to this Open Call.

3.7 Bidders to Bear Their Own Costs

The bidder will bear all costs associated with or incurred in the preparation and presentation of its bid, including, if applicable, costs incurred for interviews or demonstrations.

3.8 Bid to be Retained by the Owner

The Owner will not return the bid or any accompanying documentation or samples submitted by a bidder.

3.9 Trade Agreements

Bidders should note that procurements falling within the scope of the Canadian Free Trade Agreement, and/or the Canada-European Union Comprehensive Economic Trade Agreement are subject to those trade agreements but that the rights and obligations of the parties will be governed by the specific terms of this Open Call.

3.10 No Guarantee of Volume of Work or Exclusivity of Contract

The Owner makes no guarantee of the value or volume of work to be assigned to the preferred supplier. The Agreement will not be an exclusive contract for the provision of the described Deliverables. The Owner may contract with others for goods and services the same as or similar to the Deliverables or may obtain such goods and services internally.

3.11 Communication After Issuance of Open Call

Bidders shall promptly examine all of the documents comprising this Open Call, and

- (a) shall report any errors, omissions or ambiguities; and
- (b) may direct questions or seek additional information in writing by email to opencalls@mun.ca on or before the Deadline for Questions. All questions or comments submitted by bidders by email to the Open Call Contact shall be deemed to be received once the email has entered into the Open Call Contact's email inbox. No such communications are to be directed to anyone other than the Open Call Contact, and the Owner shall not be responsible for any information provided by or obtained from any source other than the Strategic Procurement Office. The Owner is under no obligation to provide additional information. It is the responsibility of the bidder to seek clarification from the Open Call Contact on any matter it considers to be unclear. The Owner shall not be responsible for any misunderstanding on the part of the bidder concerning this Open Call or its process.

3.12 All New Information to Bidders by Way of Addenda

This Open Call may be amended only by addendum in accordance with this section. If the Owner, for any reason, determines that it is necessary to provide additional information relating to this Open Call, such information will be communicated to all bidders by addenda. Each addendum forms an integral part of this Open Call and may contain important information, including significant changes to this Open Call. Bidders are responsible for obtaining all addenda issued by the Owner. In the Submission Form (Appendix B), bidders MUST confirm their receipt of all addenda by setting out the number of each addendum in the space provided.

3.13 Addenda and Extension of Submission Deadline

Any addendum issued within four (4) calendar days of the Open Call for Bids closing (Including on closing day) will extend closing by a reasonable period to be determined by Memorial University.

When evaluating bids, the Owner may request further information from the bidder or third parties in order to verify, clarify or supplement the information provided in the bidder's bid. The response received by the Owner shall, if accepted by the Owner, form an integral part of the bidder's bid.

3.14 Notification to Other Bidders

In accordance with section 30 of the *Public Procurement Regulations*, once the Agreement is awarded by the Owner, the outcome of the Open Call will be publicly posted at https://www.mun.ca/finance/strategic_procurement/. There will be no issuing of regret letters.

3.15 Debriefing

In accordance with the Public Procurement Act and Regulations, unsuccessful bidders may request a debriefing within ten (10) business days after the award has been posted. The request must be sent in writing to the Open call contact. The intent of the debriefing information session is to provide the bidder an overview of their bid and why it was unsuccessful and to help the bidder in presenting a better bid in subsequent procurement opportunities. The debriefing process is not for the purpose of providing an opportunity to challenge the procurement process or its outcome. A debriefing shall not disclose information regarding another bidder's bid.

3.16 Supplier Complaint Process

If a bidder wishes to register a complaint with respect to the Open Call process, the complaint should be provided in writing and within the parameters established by section 25 of the Public Procurement Regulations, as amended. The notice must provide a detailed explanation of the bidder's concerns with the procurement process or its outcome, in addition to such other information as may be required by the *Regulations*. Bidders should note that these complaint procedures are separate and distinct from any dispute resolution processes that may be provided for under applicable trade agreements. If a bidder wishes to dispute a matter under an applicable trade agreement, the bidder must follow the process set out in the trade agreement.

3.17 Conflict of Interest and Prohibited Conduct

The Owner may disqualify a bidder for any conduct, situation or circumstances, determined by the Owner, in its sole and absolute discretion, that constitutes a conflict of interest.

The Owner reserves the right to disqualify any bidder that in the Owner's sole opinion has an actual or potential conflict of interest or an unfair advantage.

For the purposes of this Open Call, the term "Conflict of Interest" includes, but is not limited to, any situation or circumstance where in relation to the Open Call process, the bidder has an unfair advantage or engages in conduct, directly or indirectly, that may give it an unfair advantage, including but not limited to: (i) having, or having access to, confidential information of the Owner in the preparation of its bid that is not available to other bidders, (ii) communicating with any person with a view to influencing preferred treatment in the Open Call process (including but not limited to the lobbying of decision makers involved in the Open Call process), or (iii) engaging in conduct that compromises, or could be seen to compromise, the integrity of the open and competitive Open Call process or render that process non-competitive or unfair.

Bidders are required to disclose, to the Open Call Contact, any potential or perceived conflict of interest issues prior to Open Call closing date and time.

3.18 Disqualification for Prohibited Conduct

The Owner may disqualify a bidder, rescind a notification of selection or terminate a contract subsequently entered into if the Owner determines that the bidder has engaged in any conduct prohibited by this Open Call.

3.19 Bidder Not to Communicate with Media

Bidders must not at any time directly or indirectly communicate with the media in relation to this Open Call or any agreement entered into pursuant to this Open Call without first obtaining the written permission of the Open Call Contact.

3.20 No Lobbying

Bidders must not, in relation to this Open Call or the evaluation and selection process, engage directly or indirectly in any form of political or other lobbying whatsoever to influence the selection of the successful bidder(s).

3.21 Illegal or Unethical Conduct

Bidders must not engage in any illegal business practices, including activities such as bid-rigging, price-fixing, bribery, fraud, coercion or collusion. Bidders must not engage in any unethical conduct, including lobbying, as described above, or other inappropriate communications; offering gifts to any employees, officers, agents, elected or appointed officials or other representatives of the Owner; deceitfulness; submitting bids containing misrepresentations or other misleading or inaccurate information; or any other conduct that compromises or may be seen to compromise the competitive process provided for in this Open Call.

3.22 Past Performance or Past Conduct

The Owner may prohibit a supplier from participating in a procurement process based on past performance or based on inappropriate conduct in a prior procurement process, including but not limited to the following:

- (a) illegal or unethical conduct as described above;
- (b) the refusal of the supplier to honor submitted pricing or other commitments; or
- (c) any conduct, situation or circumstance determined by the Owner, in its sole and absolute discretion, to have constituted a Conflict of Interest.
- (d) performance on other contracts, including the efficiency and workmanship as well as the extent to which the Bidders performed the Work in accordance with the contractual clauses and conditions, is sufficiently poor to jeopardize the successful completion of the project being bid on, by way of previous contractor performance evaluations.

In addition, the Owner may suspend the bidding privileges of a supplier with regard to non-compliant or substandard performance in accordance with section 26 of the *Public Procurement Regulations*.

3.23 Confidential Information of the Owner

All information provided by or obtained from the Owner in any form in connection with this Open Call either before or after the issuance of this Open Call:

- (a) is the sole property of the Owner and must be treated as confidential;
- (b) is not to be used for any purpose other than replying to this Open Call and the performance of the Agreement;
- (c) must not be disclosed without prior written authorization from the Owner; and
- (d) must be returned by the bidder to the Owner immediately upon the request of the Owner.

3.24 Confidential Information of Bidder

This procurement process is subject to the *Access to Information and Protection of Privacy Act, 2015 (ATIPPA, 2015)*. A bidder must identify any information in its bid or any accompanying documentation supplied in confidence for which confidentiality is requested to be maintained by the Owner. The confidentiality of such information will be maintained by the Owner, except as otherwise required by law or by order of a court or tribunal. Bidders are advised that their bids will, as necessary, be disclosed, on a confidential basis, to advisers retained by the Owner to advise or assist with the Open Call process, including the evaluation of bids.

The Bidder agrees that any specific information in its submission that may qualify for an exemption from disclosure under subsection 39(1) of the *ATIPPA, 2015* has been identified in its submission. If no specific information has been identified it is assumed that, in the opinion of the proponent, there is no specific information that qualifies for an exemption under the subsection 39(1) of the *ATIPPA, 2015*. The Bidder acknowledges that contracting with the Owner is a public process and any information provided through this process and any records the Bidder supplies to the Owner, including the terms and conditions of any Agreement entered into, may be subject to requests under the *ATIPPA, 2015*. In the event of a request to Memorial for third party business information in its custody and control, information can be withheld only if it meets all parts of the 3-part harms test for non-disclosure as stated in section 39 of the *ATIPPA, 2015*.

Information, including the financial value of a contract resulting from this procurement process, will be publicly released as part of the award notification process, in accordance with section 30 of the *Public Procurement Regulations*.

If a bidder has any questions about the collection and use of personal information pursuant to this Open Call, questions are to be submitted to the Open Call Contact. Further information relating to subsection 39(1) of the *ATIPPA, 2015* is provided in guidance documents available through the Office of the Information and Privacy Commissioner at <https://oipc.nl.ca/guidance/documents>.

3.25 Reserved Rights of the Owner

The Owner reserves the right to:

- (a) make public the names of any or all bidders as well as bid price and value of contract;
- (b) make changes, including substantial changes, to this Open Call provided that those changes are issued by way of addendum in the manner set out in this Open Call; request written clarification or the submission of supplementary written information in relation to the clarification request from any bidder and incorporate a bidder's response to that request for clarification into the bidder's bid. This shall not be an opportunity for bid repair;
- (c) assess a bidder's bid on the basis of: (i) a financial analysis determining the actual cost of the bid when considering factors including quality, service, price and transition costs arising from the replacement of existing goods, services, practices, methodologies and infrastructure (howsoever originally established); and (ii) in addition to any other evaluation criteria or considerations set out in this Open Call consider any other relevant information that arises during this Open call process; and (iii) Unbalanced bids, as determined by the Owner, will be rejected (i.e. prices must fairly represent proper compensation for various items of work to be done).
- (d) waive minor irregularities and formalities and accept bids that substantially comply with the requirements of this Open Call ;
- (e) verify with any bidder or with a third party any information set out in a bid;
- (f) check references other than those provided by any bidder;
- (g) disqualify a bidder, rescind a notice of selection or terminate a contract subsequently entered into if the bidder has engaged in any conduct that breaches the process rules or otherwise compromises or may be seen to compromise the competitive process;
- (h) cancel this Open Call process at any stage;
- (i) cancel this Open Call process at any stage and issue a new Open Call for the same or similar deliverables;
- (j) accept any bid in whole or in part; or
- (k) reject any or all bids;
- (l) not necessarily select the lowest or any bidder;

And these reserved rights are in addition to any other express rights or any other rights that may be implied in the circumstances.

3.26 Limitation of Liability

By submitting a bid, each bidder agrees that:

- (a) neither the Owner nor any of its employees, officers, agents, elected or appointed officials,

advisors or representatives will be liable, under any circumstances, for any claim arising out of this Open Call process including but not limited to costs of preparation of the bid, loss of profits, loss of opportunity or for any other claim; and

- (b) the bidder waives any right to or claim for any compensation of any kind whatsoever, including claims for costs of preparation of the bid, loss of profit or loss of opportunity by reason of the Owner's decision not to accept the bid submitted by the bidder for any reason, the Owner's decision to enter into an agreement with any other bidder or to cancel this bidding process, and the bidder shall be deemed to have agreed to waive such right or claim.

3.31 Governing Law and Interpretation

These Terms and Conditions of the Open Call Process:

- (a) are intended to be interpreted broadly and independently (with no particular provision intended to limit the scope of any other provision);
- (b) are non-exhaustive and shall not be construed as intending to limit the pre-existing rights of the Owner; and
- (c) are to be governed by and construed in accordance with the laws of the Province of Newfoundland & Labrador and the federal laws of Canada applicable therein.

3.32 Facility Compliance Requirement

- (a) Equipment, power tools, instruments and appliances intended for use within Memorial University's facilities must comply with all regulatory requirements related to use and/or installation in University facilities. This includes but is not limited to certification/listing by recognized agencies, Pressure Vessel Act of Newfoundland and Labrador and similar.
- (b) Items provided related to this open call that receive power from the University's electrical system must be certified or listed for use within Canada by a recognized agency such as Canadian Standards Association (CSA) or Underwriter Laboratories Canada (ULC). A full list of agencies recognized by Memorial University is available upon request.
- (c) Equipment, tools, instruments and appliances that generate pressure may require registration as a pressure system with the Province of Newfoundland and Labrador. Compliance with the Boiler, Pressure Vessel and Compressed Gas Regulations under the Public Safety Act of Newfoundland and Labrador and the Boiler, Pressure Vessel, and Pressure Piping Code CSA B51:19 shall be demonstrated.
- (d) The vendor is responsible for all costs associated with ensuring the system is compliant with legislative requirements and for the application and registration processes. Field certifications may be considered but all costs and efforts for such scenarios are the responsibility of the vendor.

[End of Part 3]

PART 4 – ENVIRONMENTAL HEALTH AND SAFETY REQUIREMENTS

- 4.1** Maintaining a healthy and safe environment for all members of the campus community, as well as visitors, is a priority with the University. This involves a commitment from all sectors of the campus community and extends to outside agencies having occasion to come on campus to conduct business.

The following requirements will apply to all work undertaken by contractors and service personnel on any University property or for any work undertaken on behalf of the Owner.

4.1.0 Regulations, Codes and Standards

Contractors shall be familiar with and abide by provisions of various safety codes and standards applicable to the work performed and should refer to:

The Contractor shall be completely responsible for the safety of the Work as it applies to protection of the public and property and construction of the Work.

The codes that must be followed and enforced for safety are:

- (a) The National Building Code, Part 8, Safety Measures at Construction and Demolition Sites (Latest Edition);
- (b) Canadian Code for Construction Safety (Latest Edition) as issued by the Associate Committee of the National Building Code;
- (c) The Occupational Health and Safety Act of Newfoundland and Labrador (most current version) and Regulations.

In particular, strict adherence to the Provincial Occupational Health and Safety Act and Regulations and with the National Building Code of Canada, Part 8 is required.

4.2.0 General Health and Safety Regulations

- (a) Contractors/service agencies shall ensure that members of the campus community are not endangered by any work or process in which they may be engaged. Work areas shall be adequately barricaded, and if dust or fumes are generated, suitable enclosures shall be installed to contain such emissions.
- (b) No material shall be stored in such a way as to obstruct walkways or represent a danger to pedestrian or vehicular traffic.
- (c) Adequate protection shall be provided to prevent the possibility of goods falling from scaffolding or elevated areas. Areas where goods are being loaded or off loaded shall be barricaded or otherwise protected to prevent unauthorized entry. Appropriate warning signs must be posted.
- (d) The work areas must be kept reasonably clean and free from debris which could constitute a fire hazard. Care must be taken to ensure that the work process does not activate fire

alarm detection devices. (Generation of dust and fumes can activate smoke detectors causing a false alarm).

- (e) Due consideration shall be given to fire safety in buildings. Flammable goods must be kept away from sources of ignition. No work involving the use of open flame devices must be undertaken around flammable solvents or gases.
- (f) Some University buildings contain asbestos and other hazardous materials. Do not alter or disturb any goods believed to contain asbestos (unless this is a duly authorized part of the project). Consult with University officials before proceeding with any work.
- (g) Safety Data Sheets shall be procured for any hazardous product used on campus. Such sheets shall be made readily available for consultation as required under the Workplace Hazardous Materials Information System (WHMIS).
- (h) **Contractors are required to complete the online training module for Memorial's Zero Energy Isolation Program (ZEIP) before mobilizing on site. Training can be accessed via the link: <https://ooc.citl.mun.ca/enrol/index.php?id=21>.**
 - **First time users must create an account. Click 'Create new account'. Enter required information and click 'Create my new account'.**
 - **A confirmation email will be sent to the email you entered when creating your account. Open that email and click the link it contains.**
 - **Click 'Zero energy isolation Program for Contractors'.**
 - **To enroll in the training, enter the enrollment key: 7653. Click 'Enroll me'.**
 - **Complete the training according to the instructions provided in the course.**
 - **Successful completion certificates shall be available during auditing by Environmental Health & Safety.**

NOTE: The above requirements are not to be considered all-inclusive and are considered to be complementary to the safety requirements outlined in the agreement between the University and Supplier. Certain conditions and circumstances may require adherence to additional safety requirements.

As a general requirement, contract/service personnel are expected to conduct all work on campus in a professional and safe manner and to give priority to the safety and welfare of members of the campus community.

4.3.0 Contractor Safety Management

4.3.1 All Contractors and Subcontractors to be used by the Contractor in the execution of the Contract shall be required to submit confirmation of a current third party occupational health and safety program certification (Letter of Assurance). These may include, but not be limited to, Certificate of Recognition (COR), OHSAS 18001, and CSA Z.1000.

4.3.2 All Contractors and Subcontractors shall be required to review and follow all requirements of sections 4.4.5.2. below.

4.3.3 Prior to Contract award, the Contractor will be required to provide the Information requested in 4.4.5.2. below.

4.3.4 The University reserves the right to stop any work or portion of work where no documentation can be produced on site which identifies the hazards presented by a piece of work, safe work procedures for work or certification of employees performing work. The Contractor is liable for any costs incurred by affected parties associated with such a stoppage.

4.4.0 Contractor Safety Management Element

4.4.1 Purpose

This element establishes the requirements for the administration and monitoring of contractor health and safety programs and activities at Memorial University. These measures shall ensure that contractors understand their collective responsibility with respect to the Occupational Health & Safety Act and Regulations, Memorial University policy and this element.

4.4.2 Scope

This procedure shall apply to all work done for Memorial University of Newfoundland with respect to the provision of services as outlined below. Memorial University reserves the right to exempt a Contractor from this element, in whole or in part, based upon an evaluation of the risk of the work being conducted. This evaluation must comply with the hazard identification and risk management element.

4.4.3 Definitions

Act: Newfoundland & Labrador Occupational Health & Safety Act, latest edition.

Contract: A documented agreement between Memorial University and a contractor.

Contractor: The principal contractor, person, partnership, or corporation bound to execute the work under the contract and defined as such in the agreement is responsible for the supervision of the work so as to ensure the work is carried out in accordance with the contract.

Project Management Team: The group assigned by the University to act on behalf of the owner with respect to the execution of Contractor work.

Principal Contractor: The person primarily responsible for the carrying out of a contract.

Regulations: Newfoundland & Labrador Occupational Health & Safety Regulations, latest edition.

Subcontractor: A person, firm or corporation having a direct contract with the Contractor or subcontractor(s) to perform a part or parts of the work included in the contract, or to supply products worked to a special design according to the contract documents, but does not include one who merely supplies products not so worked.

Owner: The Owner, Engineer/Architect are the persons, firms or corporation identified as such in the Contract. The term Owner, Engineer/Architect means, respectively, each of the Owner, Engineer/Architect and their authorized representatives as designated by each such party in writing.

Work: The services and job procedure completion that is described in the contract.

4.4.4 Roles and Responsibilities

4.4.4.1 Project Management Team, including Environmental Health & Safety

Will monitor the Contractor's performance for health and safety compliance. Monitoring activities may include but are not limited to:

- planned and unplanned workplace inspections;
- attendance of meetings;
- communications of safety related issues and topics, as deemed necessary;
- review of contractor records, inspections, work practices and documentation; and
- complete audits to verify that contractors and subcontractors are meeting their legislative, procedural and contractual responsibilities.

4.4.4.2 Contractors

Will comply with applicable Federal and Provincial legislation and applicable MUN safety procedures. Contractor responsibilities include but not limited to:

- report all incidents immediately to the required University project team followed by a written incident report within 24 hours;
- be responsible for the safety of subcontractors including those not under their employ;
- stop work if the conditions are such that work cannot be performed safely;
- perform evaluation, monitoring of the workplace to identify potential hazards and associated risks and ensure corrective actions are implemented;
- ensure daily task specific hazard assessments are completed; and
- maintain the accountability of persons responsible for the reporting and correction of hazards.

4.4.5 Procedure

4.4.5.1 Considerations prior to signing of contract

Prior to signing of contract, the preferred General Contractor shall provide proof of compliance with 4.4.4.2. within seven (7) calendar days. After a pre-signing start up meeting, the General Contractor shall provide proof of compliance of themselves and their subcontractors with 4.4.4.2. as well as the information requested in Section 4.4.4.2.(a)(b).

4.4.5.2 Requirements

All Contractors, and their Subcontractors, shall be required to submit confirmation of a current third party occupational health and safety program certification (Letter of Assurance). These may include, but not be limited to, Certificate of Recognition (COR), OHSAS 18001, and CSA Z.1000.

Contractors shall also provide the following:

- (a) health and safety policy statement;
- (b) safety program table of contents; and
- (c) site hazard assessment;

The hazard assessment shall be updated by the General Contractor and re-submitted whenever the conditions, work practices or work forces change to the extent that new hazards can be identified.

In lieu of a Subcontractors 3rd party program, Contractors shall be required to integrate the Subcontractor(s) into the Contractors program and provide proof of same.

Memorial reserves the right to request and audit the full safety program of Contractors and Subcontractors and their associated documentation. This documentation may include, but not be limited to the following:

- (a) safety program and/or manual
- (b) applicable documented safe work practices;
- (c) inspection reports and schedules;
- (d) required employee safety training certifications and qualifications; and
- (e) updated list of OHS Committee and/or a worker health and safety representative, or workplace health and safety designate.

Request for submission shall be complied with within 7 calendar days of a written request from Memorial's Environmental Health and Safety unit.

Memorial reserves the right to:

- (a) Reject any Contractor that fails to meet the requirements or schedules outlined herein;
- (b) The University reserves the right to stop any work or portion of work where the risk presents an immediate danger.

4.4.5.3 Schedule of Submissions

General Contractors and their sub-contractors who have complied with 5.1.1 will be permitted to commence physical work on the site however no work shall be performed by the General Contractor, their sub-contractors until such a time as they comply with 5.1.1.

4.4.6 Post-Contract Evaluation

Environmental Health & Safety will determine the extent of the evaluation of the Contractor's safety performance at the completion of the contract. This evaluation will be conducted by way of a standard contractor safety evaluation form and will be supported by objective evidence documented during the term of the Contract. The records of the evaluation must be retained with the project owner.

4.5 Access To Site

4.5.1 All Contractors and Subcontractors to be used in the execution of the Contract shall give advance notification of when they will be on site. Any work to be performed outside of Regular Time must have advance approval of the Owner.

Any discontinuation of the Work which causes a Contractor or their Subcontractors to suspend operations onsite will require the following:

- Contractor/Subcontractors shall notify the Owner of the stop work date.
- Contractor/Subcontractors shall ensure the site is left in a safe and secure condition.
- Contractor/Subcontractors shall ensure that locks and tags on mechanical and/or electrical systems are removed and, where necessary, replaced by the University.
- Contractor/Subcontractors shall not return to site without expressed prior permission from the Owner.

[End of Part 4]

PART 5– GENERAL CONDITIONS

- 5.1** I/We hereby authorize the Owner to release names of Subcontractors, Suppliers and Manufacturers used in my/our Bid including those as listed in Appendix "D", where such information is requested from the Owner.
- 5.2** I/We understand that Bids that do not list major Subcontractors and Suppliers and Manufacturers where required in Appendix "D" may be rejected.
- 5.3** I/We reserve the right to substitute other Subcontractors and/or Suppliers and/or Manufacturers for any Subcontractor or Suppliers or Manufacturer withdrawing their Bid or becoming bankrupt after the date hereof. Any such substitutes shall be subject to the approval of the Owner and contingent upon evidence of withdrawal or bankruptcy satisfactory to the Owner.
- 5.4** I/We agree that upon approval by the Engineer/Architect, the Owner shall have the right to take possession of any part of the work upon its completion, except for minor deficiency items, and that such possession shall not necessarily constitute acceptance of that part of the work.
- 5.5** I/We understand and agree that the Owner may order changes to the work in the form of additions or deletions in accordance with the General Conditions, Supplementary General Conditions and the intent of the Contract Documents.
- 5.6** I/We understand and agree that the Unit Price Table in Appendix "C2" must be completed where indicated and the total amount included in my/our stipulated price for the total performance of the work under Part 4 of the Bid and Acceptance form. I/We understand that the Unit Prices include all costs and charges of every kind, including overhead and profit, to perform the items of work listed in Appendix "A". I/We also understand that these same Unit Prices will be used for additions or deletions to the actual measured quantities.
- 5.7** When Appendix "E" is included in the Open Call, I/we understand that bids which do not list project references, where required in Appendix "E", will be rejected.

5.8 Corporations Act

The Corporations Act of Newfoundland and Labrador requires that an extra-provincial company be registered before it begins or carries on business in the Province. If your company is not registered, please apply for the appropriate forms and procedures to:

Commercial Registrations Division
Dept. of Government Services, PO Box 8700
St John's, NL Canada A1B 4J6
Phone: 709-729-3317, Fax: 709-729-0232
Website: http://www.gs.gov.nl.ca/registries/companies/corp_art_inc.html

[End of Part 5]

Part 6 – Supplementary Terms and Conditions

6.1 The open call document consist of the Open Call and Acceptance Form, General Conditions of Contract, Supplementary General Conditions of Contract, Special Conditions, Campus Safety and Health Regulations, Contractors Performance Evaluation, Drawings, Specifications and any Addenda to the Contract Documents issued before the open call closing period.

6.2 Surety

6.2.1 Bid Surety

Bids shall be accompanied by a copy of a bid security by way of a Bid Bond from a surety company acceptable to the Owner and which is licensed to do business in the Province of Newfoundland and Labrador or a copy of a cheque in the amount of 10 percent of the bid price. Originals to be delivered to Memorial University post tender closing. Bid security will not be required for a total contract value of \$100,000 or less (**HST Excluded**), unless specifically called for in the contract documents. The bid security will be returned to the bidder upon receipt of the required Performance Bond and Labour and Materials Payment Bond as per 6.2.2 below.

The terms of the bid security will be invoked and the amount retained by the Owner if: the Tenderer fails to enter into a formal agreement, where one is specified, when notified of the award of the Contract within the tender validity period; or fails to provide the required Performance Bond and Labour and Materials Payment Bond within the time specified

6.2.2 Public Work's Surety

Within seven (7) days of the issuance of the letter of acceptance, the preferred Bidder shall obtain and deliver to the Owner a Performance Bond in the amount of 50 percent of the bid price (**HST Excluded**) which guarantees the successful and complete performance of the Work. The Performance Bond is required as a condition of bid award. In lieu of a Performance Bond an approved certified cheque in the amount of 10 percent of the bid price may, at their option, be accepted for retention by the Owner until the successful completion of the Contract. The certified cheque will be retained until satisfactory completion of the Work including the warranty period after which it will be returned to the Contractor. Performance Bond or other such security will not be required for a contract value of \$100,000 or less. No Work is to be undertaken while the above performance security remains outstanding.

Within seven (7) days of issuance of the letter of acceptance, the preferred Bidder shall obtain and deliver to the Owner a Labour and Materials Payment Bond in the amount of 50 percent of the bid price (**HST Excluded**). The Labour and Materials Payment Bond is required as a condition of the bid award. In lieu of a Labour and Materials Payment Bond, an approved certified cheque in the amount 10 percent of the bid price may, at their option, be accepted for retention by the Owner until successful completion of the Contract. The certified cheque will be retained until substantial completion of the Work as defined by the Mechanics Lien Act and upon receipt of an acceptable statutory declaration form stating that all labour and material obligations due and payable under the Work have been discharged, after which it will then be returned to the Contractor. Labour and Materials

Payment Bond or other such security will not be required for a contract value of \$100,000 or less. No Work is to be undertaken while the above labour and materials security remains outstanding.

No interest will be paid to the preferred Bidder for any certified cheques on deposit during the period of retention.

The cost of all bid, performance and labour and materials security shall be included in the bid price

6.3 Site Visit

A site visit may occur at the time and location identified on the Request for Open Calls for Bids Information Sheet.

Questions will not be answered at the site visit.

Before submitting a bid, Bidders may carefully examine the site of the Proposed Work and fully inform themselves of the existing condition and limitations. It is the responsibility of the Bidder to report any unsatisfactory conditions in writing which may adversely affect the proper completion of the work, to opencalls@mun.ca, at least **eight (8)** days before the open call closing date. Submission of a bid shall imply acceptance of previously completed Work and the conditions of the site, and the Contractor shall, therefore, be fully responsible for executing the Work in accordance with the Contract Documents.

6.4 Substitution of Materials

6.4.1 The open call shall be based upon using the materials or products as specified without substitution, unless there is an "or approved alternate" clause. Where two or more brand names are specified, the choice shall be left to the bidder. Where only one brand name is stated, there shall be no substitution.

6.4.2 Where the Specifications include the "or approved alternate" clause, substitutions may be proposed provided that the request for a substitution is received in writing at least eight (8) days (3:00pm NST) prior to the open call closing date and shall clearly define and describe the product for which the substitution is requested. Submissions shall compare in tabular form, to the characteristics and performance criteria of the specified material.

6.4.3 It is the Bidder's responsibility to ensure that the substituted article is equivalent to the specified article with regard to design, function, appearance, durability, operation and quality.

6.4.4 Request for substitutions made after the award of the contract will be subject to the requirements of Clause 2.37.0 MATERIALS AND SUBSTITUTIONS in the General Conditions of the Contract and will only be considered under special circumstances or where it is clear, at the Engineer's/Architect's discretion, that proposed substitution will provide a substantial benefit to the Owner.

6.4.5 Approval of the substitution shall be in the form of an addendum to the Specifications.

The decision on substitutions will be final.

6.5 Completion date

6.5.1 Bidders shall state the time required to complete the Contract from time of open call award. The bidder shall, within seven (7) days after the Contract is award submit a preliminary construction schedule indicating as closely as possible the starting and completion date for the major sections of the Work.

[End of Part 6]

APPENDIX A – SPECIFICATIONS AND DRAWINGS

**SPECIFICATIONS AND DRAWINGS
LOCATED AT THE END OF THIS DOCUMENT**

APPENDIX B – SUBMISSION FORM

1. Bidder Information

Please fill out the following form, naming one person to be the bidder's contact for the Open Call process and for any clarifications or communication that might be necessary.	
Full Legal Name of Bidder:	
Any Other Relevant Name under which Bidder Carries on Business:	
Street Address:	
City, Province/State:	
Postal Code:	
Phone Number:	
Fax Number:	
Company Website (if any):	
Bidder Contact Name and Title:	
Bidder Contact Phone:	
Bidder Contact Fax:	
Bidder Contact Email:	

2. Offer

The bidder has carefully examined the Open Call documents and has a clear and comprehensive knowledge of the Deliverables required under the Open Call. By submitting a bid, the bidder agrees and consents to the terms, conditions and provisions of the Open Call, including the Form of Agreement, and offers to provide the Deliverables in accordance therewith at the rates set out in the completed Pricing Form (Appendix C1 and/or C2 and/or C3).

3. Rates

The bidder has submitted its rates in accordance with the instructions in the Open Call and in the Pricing Form (Appendix C1 and/or C2 and/or C3). The bidder confirms that it has factored all of the provisions of Appendix A, including insurance and indemnity requirements, into its pricing assumptions and calculations.

4. Addenda

- 4.1** The bidder is deemed to have read and accepted all addenda issued by the Owner. The onus is on bidders to make any necessary amendments to their bids based on the addenda. The bidder is required to confirm that it has received all addenda by listing the addenda numbers in table below: **(Listing of individually the numbers of each Addendum received in the blank space)**

NOTE: FAILURE TO COMPLETE “TABLE: ADDENDA RECEIVED” LOCATED BELOW SHALL RESULT IN BID DISQUALIFICATION:

TABLE 1.10: ADDENDA RECEIVED

Bidders who fail to complete the above table will be deemed to have not received all posted addenda and shall be deemed **non-compliant**.

5. No Prohibited Conduct

The bidder declares that it has not engaged in any conduct prohibited by this Open Call.

6. Disclosure of Information

The bidder hereby agrees that any information provided in this bid, even if it is identified as being supplied in confidence, may be disclosed where required by law or by order of a court or tribunal. The bidder hereby consents to the disclosure, on a confidential basis, of this bid by the Owner to the advisers retained by the Owner to advise or assist with the Open Call process, including with respect to the evaluation of this bid.

7. Bid Irrevocable

The bidder agrees that its tender shall be irrevocable for a period of **45** days running from the moment that the Submission Deadline passes.

8. Execution of Agreement

The bidder agrees that in the event its bid is selected by the Owner, in whole or in part, it will finalize and execute the Agreement in the form set out in Appendix A (or in a form mutually acceptable to the parties) to this Open Call in accordance with the terms of this Open Call . Failure to submit this signature section will render the proposal NON-COMPLIANT and the proposal will be disqualified.

BIDDER SIGNATURE FORM:

BIDDERS MUST COMPLETE THE BIDDER SIGNATURE FORM. ANY BIDS RECEIVED WITHOUT THE BIDDER CONTACT FORM COMPLETED WILL BE DEEMED NON-COMPLIANT

(See Part 1 section 1.8 for Electronic Signature acceptance)

Signature of Witness

Signature of Bidder Representative

Name of Witness

Name of Bidder Representative

Title of Bidder Representative

Date

I have the authority to bind the bidder.

**IN SIGNING THIS PAGE AND
SUBMITTING YOUR PROPOSAL, THE
PROONENT ACKNOWLEDGES
HAVING READ, UNDERSTOOD AND
AGREED TO THE TERMS AND
CONDITIONS OF THIS DOCUMENT**

APPENDIX C1 – PRICING FORM

1. INSTRUCTIONS ON HOW TO COMPLETE THE PRICING FORM

- Rates must be provided in Canadian Dollars
- Rates quoted by the bidder must be all-inclusive and must include all labor and material costs, all travel and carriage costs, all insurance costs, all costs of delivery to the Owner, all costs of installation and set-up, including any pre-delivery inspection charges, and all other overhead, including any fees or other charges required by law
- Owner: Having carefully examined the site and all conditions affecting the proposed work as well as the Bid Documents including the Drawings and Specifications, all Addenda and the Instructions to bidders, I/We, the undersigned, hereby offer to furnish all necessary labour, materials, superintendence, plant, tools, equipment, etc., required to complete all work requisite and necessary for the proper execution of this Contract, expeditiously and in the satisfactory manner and accept in full payment therefore a stipulated sum of:
- Explanation of Price A and Price B Scope –
 - Please refer to the project drawings for details on the scope of work pertaining to Price A and Price B.
 - Price A pertains to the base scope of the project.
 - Price B pertains to all the scope associated with the single combination eyewash unit in the Tank Enclosure Building. This includes all scope requirements from the OSC Main Building level 3 to the combination eyewash unit in the Tank Enclosure Building.
 - “Price B: Optional Scope” pricing is required, though the award is based on the owner's discretion.

The scope of work for Price A and Price B is outlined in the contract documents - see specification section 01 11 00 Summary of Works. The Owner reserves the right to delete any or all parts of this tender and award individual and/or combined parts. Price B will only be awarded in combination with Price A.		
Contract Bid (HST Excluded)		
Price A: Base Scope		HST EXCLUDED
Price B: Optional Scope		HST EXCLUDED
Price C: Total: [(A+B)]		HST EXCLUDED

I/We agree to commence work within two (2) weeks after the acceptance of my/our Bid and complete the work in _____ weeks from the acceptance of the Bid and to coordinate the scheduling of our work with that of all Subcontractors working on the Project. The time of completion indicated herein is required and will be a significant factor in assessing bids.

2. THE DELIVERABLES:

TFM-030-25 OSC-149-22 OSC Lab Life Safety Upgrades as per specifications listed in Appendix A

3. MANDATORY SUBMISSION REQUIREMENTS

(a) Submission Form (Appendix B)

Each bid must include a Submission Form (Appendix B) completed and signed by an authorized representative of the bidder.

(b) Each bid must include Pricing Form (Appendix C1) as per instructions on form.

(c) Where Appendix C2 and C3 are required, they must be included in bid submission.

APPENDIX C2 – UNIT RATES

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APPENDIX C3 - FURNITURE BIDDING TABLE

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APPENDIX D - LIST OF SUBCONTRACTORS

Herewith is the list of Subcontractors, Suppliers and/or Manufacturers referred to in Section no. **5.1 of Part 5 of the Open Call and Acceptance Form**. The Subcontractors and Suppliers whose bids have been used in the preparation of this Bid must be listed in full including work to be done by own forces (B.O.F.). By Own Forces will be considered valid and satisfactory only if, prior to award, the supplier provides three (3) current (< 3 years) references of satisfactory completion of trade work of similar **scale, scope and complexity** as that described within the Bid documents. Trade certifications may be requested in addition to the references above. The determination of suitability is entirely at the discretion of the owner and shall be based on submitted documentation. The owner may use their knowledge and understanding of experience and performance of the Contractor on past work in lieu of this submission. The list will be subject to the approval of the Owner.

NOTE: FAILURE TO COMPLETE THIS PORTION OF THE BID SUBMISSION SHALL RESULT IN DISQUALIFICATION.

The trades below, if listed, have been identified by the owner, however it is the Bidder's responsibility to identify all applicable subtrades.

TRADE/DIVISION	SUBCONTRACTOR - SUPPLIER - MANUFACTURER
Hazardous Materials Abatement	
Demolition	
Plaster & Paint	
Specialties	
Plumbing	
Controls	
Electrical	

APPENDIX E – PROJECT REFERENCE (ROOFING PROJECTS ONLY)

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DEPARTMENT OF FACILITIES MANAGEMENT

GENERAL CONDITIONS

AND

AGREEMENT BETWEEN OWNER AND CONTRACTOR

FOR

THE STIPULATED PRICE CONTRACT

May 2023

**GENERAL CONDITIONS AND AGREEMENT
BETWEEN OWNER AND CONTRACTOR FOR THE STIPULATED PRICE CONTRACT**

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1.0 GENERAL CONDITIONS

1.1.0 DEFINITIONS

1.1.1 Contract Documents

The Contract Documents consist of the Instructions to bidders, Executed Agreement between the Owner and the Contractor, General Conditions of Contract, Supplementary General Conditions of Contract, Special Conditions, Campus Safety and Health Regulation, Contractor Performance Evaluations, Specifications, Drawings and such other documents forming part of the open call, including all amendments thereto incorporated before their execution and subsequent amendments thereto made pursuant to the provisions of the Contract or agreed upon between the parties. The successful bid and any Addenda to the Specifications issued during the bidding period shall also form part of the Contract Documents.

1.1.2 Owner, Engineer/Architect, Contractor

The Owner, Engineer/Architect and Contractor are the persons, firms or corporation identified as such in the Agreement. The term Owner, Engineer/Architect and Contractor means the Owner, Engineer/Architect and Contractor or their authorized representatives as designated by each party in writing.

1.1.3 Subcontractors

A Subcontractor is a person, firm or corporation having a direct contract with the Contractor to perform a part or parts of the Work included in the Contract, or to supply products worked to a special design according to the Contract Documents, but does not include one who merely supplies products not so worked.

1.1.4 The Project

The Project is the total construction contemplated of which the Work performed under the Contract Documents may be the whole or a part.

1.1.5 The Work

The Work means the total construction and related services required by the Contract Documents.

1.1.6 Place of Work

The Place of Work is the designated site or location of the project of which the Work may be the whole or a part.

1.1.7 Products/Materials/Equipment

The term Products/Materials/Equipment means all materials, machinery, equipment and fixtures forming the Work as required by the Contract Documents but does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work and normally referred to as construction machinery and equipment.

1.1.8 Other Contractor

The term Other Contractor means any persons, firm or corporation employed by or having a separate contract directly or indirectly with the Owner for Work other than that required by the Contract Documents.

1.1.9 Time

- a) The Contract Time is the time stated in the Open Call for Bid and Acceptance Form for substantial performance of the Work.
- b) The date of substantial performance of the Work is the date certified by the Engineer/Architect.
- c) The term day, as used in the Contract Documents, shall mean the calendar day.
- d) The term working day means any day observed by the construction industry in the area of the place of the Work.

1.1.10 Substantial Performance of the Work

A Contract shall be deemed to be substantially performed:

- a) When the Work or a substantial part thereof is ready for use or is being used for the purpose intended; and
- b) When the Work to be done under the Contract is capable of completion or correction at a cost of not more than:
 - (i) 3% (Three per centum) of the first two hundred and fifty thousand dollars (\$250,000) of the Contract Price;
 - (ii) 2% (Two per centum) of the next two hundred and fifty thousand dollars (\$250,000) of the Contract Price; and
 - (iii) 1% (One per centum) of the balance of the Contract Price.
- c) When the Work or a substantial part thereof is ready for use or is being used for the purpose intended and where the Work cannot be completed expeditiously for

reasons beyond the control of the Contractor, the value of the remaining Work to be completed shall be deducted from the Contract Price in determining substantial performance.

1.1.11 Total Performance of the Work

Total Performance of the Work shall mean when the entire Work except those items arising from the provision **2.26.0 WARRANTY** has been performed to the requirements of the Contract Documents and is so certified by the Engineer/Architect.

1.1.12 Changes in the Work

Changes in the Work means additions, deletions or other revisions to the Work within the general scope of Work as contemplated by the Contract Documents.

1.1.13 Extra Work

Extra Work means any additional work or service, the performance of which is beyond the scope of Work as contemplated by the Contract Documents.

2.2.0 DOCUMENTS

2.2.1 The Contract Documents shall be signed in triplicate by the Owner and the Contractor.

2.2.2 Words and abbreviations which have well-known technical or trade meanings are used in the Contract Documents in accordance with such recognized meanings.

2.2.3 In the event of conflicts between Contract Documents, the following shall apply:

- a) Documents of later date shall govern;
- b) Figured dimensions shown on the drawings shall govern even though they may differ from scaled dimensions on the same drawing;
- c) Drawings of larger scale shall govern over those of smaller scale of the same date;
- d) Specifications shall govern over drawings;
- e) Special Conditions shall govern over Specifications;
- f) The General Conditions of Contract shall govern over Specifications;
- g) Supplementary General Conditions shall govern over the General Conditions of the Contract;

h) The Executed Agreement between the Owner and the Contractor shall govern over all documents.

2.2.4 The Contractor will be provided, without charge, up to twelve (12) sets of Contract Documents or parts thereof as are reasonably necessary for the performance of the Work.

2.2.5 The Contractor shall keep a copy of all current Contract Documents and shop drawings on the site, in good order and available to the Engineer/Architect and or their representatives. This requirement shall not be deemed to include the executed Contract Documents.

2.2.6 Drawings, specifications, models and copies thereof furnished to the Contractor are to be used only with respect to the Work. Such documents and models are not to be otherwise used or revised in any manner without the written authorization of the Owner.

2.2.7 Models furnished by the Contractor at the Owner's expense are the property of the Owner.

2.3.0 ADDITIONAL INSTRUCTIONS AND SCHEDULE OF WORK

2.3.1 During the progress of the Work, the Engineer/Architect shall furnish to the Contractor such additional instructions as may be necessary to supplement the Contract Documents. All such instructions shall be consistent with the intent of the Contract Documents.

2.3.2 Additional instructions may include minor changes to the Work which affect neither the Contract Price nor the Contract Time.

2.3.3 Additional instructions may be in the form of drawings, samples, models or written instructions.

2.3.4 Additional instructions will be issued by the Engineer/Architect with reasonable promptness and in accordance with any schedule agreed upon for such instructions.

2.3.5 The Contractor shall prepare and update, as required, a construction schedule indicating the timing of major activities of the Work. The schedule shall be designed to conform with the Contract Time. The schedule shall be submitted to the Engineer/Architect within seven (7) days of the date of the Owner's letter of award. The contractor shall monitor the progress of the Work relative to the schedule and advise the Engineer/Architect of any revisions required as a result of delays, as provided for in **2.5.0 DELAYS**, and indicating what action will be taken to complete the Work within the Contract Time.

2.4.0 ENGINEER/ARCHITECT'S DECISIONS

- 2.4.1** The Engineer/Architect, in the first instance, shall decide on questions arising under the contract Documents and interpret the requirements therein. Such decisions shall be given in writing.
- 2.4.2** The Contractor shall notify the Engineer/Architect in writing within fourteen (14) days of receipt of a decision of the Engineer/Architect referred to in 2.4.1, should they hold that a decision by the Engineer/Architect is in error and/or at variance with the Contract Documents. Unless the Contractor fulfils this requirement, subsequent claims by them for extra compensation arising out of the decision will not be accepted.
- 2.4.3** If the question of error and/or variance is not resolved immediately, and the Engineer/Architect decides that the disputed work shall be carried out, the Contractor shall act according to the Engineer/Architect's written decision.

Any questions of change in Contract Price and/or extension of Contract Time due to such error and/or variance shall be decided as provided in **2.11.0 DISPUTES**.

2.5.0 DELAYS

- 2.5.1** If it can be clearly shown that the Contractor is delayed in the performance of the Work by any act or fault of the Owner, Engineer/Architect, then the Contract Time shall be extended for such reasonable time as the Engineer/Architect may decide in consultation with the Owner and the Contractor. The Contractor shall be entitled to be reimbursed for any costs incurred by them as a result of such a delay occasioned by the act or fault, provided that it can be clearly shown that the Contractor's forces cannot work efficiently elsewhere on the project and that the incurred cost is limited to that which could not reasonably have been avoided.
- 2.5.2** If the Contractor is delayed in the performance of the Work by a Stop Work Order issued by any court or other public authority and providing that such order was not issued as the result of any act or fault of the Contractor or of anyone employed by them directly or indirectly then the Contract Time shall be extended for such reasonable time as the Engineer/Architect may decide in consultation with the Contractor.
- 2.5.3** If the Contractor is delayed in the performance of the Work by civil disorders, labour disputes, strikes, lockouts, (including lockouts decreed or recommended for its members by a recognized Contractor's Association, of which the Contractor is a member) fire, unusual delay by common carriers or unavoidable casualties, or without limit to any of the foregoing, by any cause of any kind whatsoever beyond the Contractor's control, then the Contract Time shall be extended for such reasonable time as may be decided by the Engineer/Architect in consultation with the Owner and the Contractor, but in no case shall the extension of time be less than the time lost as the result of the event causing the delay, unless such shorter extension of time be agreed to by the Contractor.

2.5.4 No extension shall be made for delays unless written notice of claims is given to the Engineer/Architect within fourteen (14) days of its commencement, providing that in the case of the continuing cause of delay one notice shall be necessary.

2.5.5 If no schedule is provided under **2.3.0 ADDITIONAL INSTRUCTIONS AND SCHEDULE OF WORK**, no claim for delay will be considered because of failure to furnish instructions until fourteen (14) days after a demand for such instructions had been made and not then unless such claim is reasonable.

2.6.0 OWNER'S RIGHT TO PERFORM WORK, STOP WORK AND/OR TERMINATE CONTRACT

2.6.1 If the Contractor should be adjudged bankrupt or makes a general assignment for the benefit of creditors because of their insolvency or if a Receiver is appointed on account of their insolvency, the Owner may, without prejudice to any other right or remedy they may have, by giving the Contractor or Receiver or Trustee in Bankruptcy written notice, terminate the Contract. If a Performance Bond has been provided by the Contractor guaranteeing faithful performance of the Work, the Owner shall give written notice to the Surety invoking the terms of the bond.

2.6.2 The Owner may notify the Contractor in writing that they are in default of their contractual obligations, if the Contractor:

- a) Fails to proceed regularly and diligently with the Work; or
- b) Without reasonable cause wholly suspends the carrying out of the Work before the completion thereof; or
- c) Refuses or fails to supply sufficient, properly skilled workmen for proper workmanship, products or construction machinery and equipment for the scheduled performance of the Work within five (5) working days of receiving written notice from the Engineer/Architect except in those cases provided in **2.5.0 DELAYS**; or
- d) Fails to make payments due to their Subcontractors, their Suppliers for their workmen; or
- e) Persistently disregards laws or ordinances, or the Engineer/Architect's instructions; or
- f) Otherwise violates the provisions of their Contract to a substantial degree.

Such written notice by the Owner shall instruct the Contractor to correct the default within five (5) working days from the receipt of the written notice. If a Performance Bond has been provided by the Contractor, a copy of such written notice will be provided to the Surety.

- 2.6.3** If the correction of the default cannot be completed within the five (5) working days specified, the Contractor shall be considered to be in compliance with the Owner's instruction if they:
- a) Commence the correction of the default within the specified time; and
 - b) Provide the Owner with an acceptable schedule for such correction; and
 - c) Complete the correction in accordance with such schedule.
- 2.6.4** If the Contractor fails to correct the default within the time specified or subsequently agreed upon, the Owner may, without prejudice to any other right or remedy they may have:
- a) Correct such default and deduct the cost thereof as certified by the Engineer/Architect from any payment due under the Contract; or
 - b) Terminate the Contract by written notice to the Contractor. If a Performance Bond has been provided by the Contractor, the Owner will provide the Surety with a copy of such notice.
- 2.6.5** If the Owner terminates the Contract under the conditions set out above, they are entitled to:
- a) Take possession of the premises and products and utilize the temporary buildings, plants, tools, construction machinery and equipment, goods and materials, intended for, delivered to and placed on or adjacent to the Work and may complete the Work by whatever method they may deem expedient but without undue delay or expense;
 - b) Withhold any further payments to the Contractor until the Work is finished;
 - c) Upon total performance of the Work, charge the Contractor the amount by which the full cost of finishing the Work as certified by the Engineer/Architect including compensation to the Engineer/Architect for their additional services and a reasonable allowance to cover the cost of any corrections required by **2.26.0 WARRANTY** exceeds the unpaid balance of the Contract Price; or if such cost of finishing the Work is less than the unpaid balance of the Contract Price, pay the Contractor the difference;
 - d) On expiry of the warranty period, charge the Contractor the amount by which the cost of corrections under **2.26.0 WARRANTY** exceeds the allowance provided for such corrections, or if the cost of such corrections is less than the allowance, pay the Contractor the difference;

e) Invoke the terms of the Performance Bond if such Bond has been provided under the Contract.

2.6.6 The Contractor's obligation under the Contract as to the performance of the Work up to the time of termination will remain in force after such termination.

2.7.0 CONTRACTOR'S RIGHT TO STOP WORK AND/OR TERMINATE CONTRACT

2.7.1 If the Owner should be adjudged bankrupt or makes a general assignment for the benefit of creditors or if a Receiver is appointed on account of their insolvency, the Contractor may, without prejudice to any other right or remedy they may have, by giving the Owner written notice, terminate the Contract.

2.7.2 If the Work should be stopped or otherwise delayed for a period of thirty (30) days or more under an order of any court or other public authority and providing that such order was not issued as the result of any act or fault of the Contractor or of anyone directly or indirectly employed by him, the Contractor may, without prejudice to any other right or remedy they may have, by giving the Owner fifteen (15) days' written notice, terminate the Contract.

2.7.3 The Contractor may notify the Owner in writing that the Owner is in default of their contractual obligations if:

- a) The Engineer/Architect fails to issue a certificate in accordance with **2.16.0 CERTIFICATES AND PAYMENTS;**
- b) The Owner fails to pay the Contractor when due any amount certified by the Engineer/Architect and verified by the audit of the Owner;
- c) The Owner violates the provisions of the Contract to a substantial degree.

Such written notice shall advise the Owner that if such default is not corrected within fifteen (15) days from the receipt of the written notice, the Contractor may, without prejudice to any other right or remedy they may have, stop the Work and/or terminate the Contract.

2.7.4 If the Contractor terminates the Contract under the conditions set out above, they shall be entitled to be paid for all work performed including reasonable overhead and profit and for any loss sustained upon products, construction machinery and equipment and other damages as the Contractor may have sustained as a result of the termination of the Contract.

2.8.0 OTHER CONTRACTORS

- 2.8.1** The Owner reserves the right to let separate contracts in connection with the project of which the Work is part or do certain work by their own forces.
- 2.8.2** The Owner shall, in such cases, coordinate the Work and insurance coverage of other Contractors as it affects the Work of this Contract.
- 2.8.3** The Contractor shall coordinate their work with that of other Contractors and connect as specified or shown in the Contract Documents. Any change in the costs incurred by the Contractor in the planning and performance of such work which was not shown or included in the Contract Documents as of the date of signing the Contract, shall be evaluated as provided under **2.14.0 VALUATION AND CERTIFICATION OF CHANGES IN THE WORK** and authorized as provided in **2.13.0 CHANGES IN THE WORK AND EXTRA WORK**.
- 2.8.4** The Contractor shall report to the Engineer/Architect any apparent deficiencies in other Contractor's work which would affect this Contract immediately as they come to their attention and shall confirm such report in writing. Failure by the Contractor to so report shall invalidate any claims against the Owner by reason of the deficiencies of other Contractor's work except as to those of which they were not reasonably aware.

2.9.0 ASSIGNMENT

- 2.9.1** The Contractor shall not assign the Contract or any part thereof or any benefit or interest therein or thereunder without the written consent of the Owner.

2.10.0 SUBCONTRACTORS

- 2.10.1** The Contractor agrees to preserve and protect the rights of the Owner under the Contract with respect to any work to be performed under subcontract. The Contractor shall:
- a) Require their Subcontractors to perform their work in accordance with and subject to the terms and conditions of the Contract Documents; and
 - b) Be fully responsible to the Owner for acts and omissions of their Subcontractors and of persons directly or indirectly employed by them as for acts and omissions of persons directly employed by them.

The Contractor, therefore, agrees that they will incorporate all the terms and conditions of the Contract Documents into all Subcontractor Agreements they enter into with their Subcontractors.

- 2.10.2** The Contractor shall employ those Subcontractors proposed by them in writing and accepted by the Owner prior to the signing of the Contract for such portions of the Work as may be designated in the bidding requirements.
- 2.10.3** The Owner may, for reasonable cause, object to the use of a proposed Subcontractor and require the Contractor to employ one of the other Subcontractors.
- 2.10.4** In the event that the Owner requires a change from any proposed Subcontractor, the Contract price shall be adjusted by the difference in cost occasioned by such required change.
- 2.10.5** The Contractor shall not be required to employ as a Subcontractor any person or firm to whom they may reasonably object.
- 2.10.6** The Engineer/Architect may, upon reasonable request and at their discretion, provide to a Subcontractor information as to the percentage of the Subcontractor's work which has been certified for payment.
- 2.10.7** Nothing contained in the Contract Documents shall create any contractual relationship between any Subcontractor and the Owner.

2.11.0 DISPUTES

- 2.11.1** Differences between the parties to the Contract as to the interpretation, application or administration of this Contract or any failure to agree where agreement between the parties is called for, herein collectively called disputes, which are not resolved in the first instances by decision of the Engineer/Architect pursuant to the provisions of **2.4.0 ENGINEER/ARCHITECT'S DECISIONS** shall be settled in accordance with the requirement of the General Conditions.
- 2.11.2** The Claimant shall give written notice of such dispute to the other party no later than fourteen (14) days after the receipt of the Engineer/Architect's decisions given under **2.4.0 ENGINEER/ARCHITECT'S DECISIONS**. Such notice shall set forth particulars of the matters in dispute, the probable scope, extent and value of the dispute and relevant provisions of the Contract Documents. The other party shall reply to such notice no later than fourteen (14) days after they receive or are considered to have received it, setting out in such reply their grounds and other relevant provisions of the Contract Documents.
- 2.11.3** Pending settlement of the dispute, the Engineer/Architect will give such instructions as, in their opinion, are necessary for the proper performance of the Work or to prevent delays pending settlement of the dispute. The parties shall act immediately according to such instructions, it being understood that by so doing neither party will jeopardize any claim they may have. If it is subsequently determined that such instructions were in error or at variance with the Contract Documents, the Owner shall pay the Contractor cost incurred by the Contractor in carrying out such instructions which they were

required to do beyond what the Contract Documents correctly understood and interpreted would have required them to do, including costs resulting from interruption of the Work.

- 2.11.4** It is agreed that no act by either party shall be construed as a renunciation or waiver of any of their rights or recourse, provided they have given the notices in accordance with Paragraph 2.11.2 and have carried out the instructions as provided in Paragraph 2.11.3.
- 2.11.5** If the dispute or claim cannot be resolved to the satisfaction of both parties, either party may refer the matter to such judicial tribunal as the circumstances require.
- 2.11.6** In recognition of the obligation of the Contractor to perform the disputed work as provided in Paragraph 2.11.3, it is agreed that settlement of dispute proceedings may be commenced immediately following the dispute in accordance with the foregoing settlement of dispute procedures.

2.12.0 INDEMNIFICATION

- 2.12.1** Except as provided in Paragraph 2.10.2, the Contractor shall be liable for and shall indemnify and hold harmless the Owner and the Engineer/Architect, their agents and employees from and against all claims, demands, losses, costs, damages, actions, suits or proceedings whatsoever arising under any statute or Common law.
- a) In respect of personal injury to or the death of any person whomsoever arising out of or in the course of or caused by the carrying out of the Work; and
 - b) In respect of any injury or damage whatsoever to any property, real or personal or any chattel real, insofar as such injury or damage arises out of or in the course of or by reason of the carrying out of the Work.
- 2.12.2** The Contractor shall not be liable under Paragraph 2.12.1 if the injury, death, loss or damage is due to any act or neglect of the Owner or Engineer/Architect, their agents or employees.

2.13.0 CHANGES IN THE WORK AND EXTRA WORK

- 2.13.1** The Owner may, without invalidating the Contract, make changes by altering, adding to or deducting from the Work, with the Contract Price and the Contract Time being adjusted accordingly; and
- 2.13.2** No change in the Work shall be made without prior written order from the Owner, and no claim for an addition or deduction to the Contract Price or change in the Contract Time shall be valid unless so ordered and at the same time valued or agreed to be valued as provided in **2.14.0 VALUATION AND CERTIFICATION OF CHANGES IN THE WORK**. Signed faxed copies are acceptable at the discretion of the Owner.

2.14.0 VALUATION AND CERTIFICATION OF CHANGES IN THE WORK

2.14.1 The value of any change shall be determined in one or more of the following methods:

- a) By estimate and acceptance in a lump sum;
- b) By unit prices subsequently agreed upon;
- c) By cost and a fixed or percentage fee.

In the case of changes in the Work valued as outlined in Paragraph 2.14.1(a) (as will be the usual case), the Contractor will submit an itemized estimate of all materials and labour (including Subcontractor's work) to complete the change.

In the case of changes in the Work as valued in Paragraph 2.14.1 (c), the Contractor shall submit detailed invoices, vouchers and time sheets for all materials and labour to complete the change.

The submissions in both cases shall be in the manner acceptable to the Engineer/Architect and will show separately the following percentages for overhead and profit:

- (i) Subcontractors shall include, in the breakdown, their 15 percent mark-up (10 percent of the estimated cost for the overhead and 5 percent for profit).
- (ii) The Contractor shall include, in the breakdown, the percentages as outlined in (i) for the overhead and profit on their portion of the Work.
- (iii) The Contractor shall add 10 percent to the Subcontractor's pricing for their own profit and overhead combined.

2.14.2 Notwithstanding the provisions of Paragraph 2.14.1, in case of changes in the Work, the amount charged for equipment rentals shall be that provided in the rental Contract, and no additional amount shall be paid as markup for overhead or profit for the Contractor or Subcontractor.

2.14.3 When a change in the Work is proposed or required, the Contractor shall present to the Engineer/Architect for approval their claim for the change in the Contract Price and/or change in the Contract Time in a form acceptable to the Engineer/Architect and including the appropriate documentation. The Engineer/Architect shall satisfy themselves as to the correctness of such claim, and when approved by the Owner, a change order will be issued to the Contractor to proceed with the change. The value of Work performed in the change shall be included for payment with the regular certificates for payment.

- 2.14.4** In the case of changes in the Work to be paid for under methods (b) and (c) of Paragraph 2.14.1, the form of presentation of costs and methods of measurement shall be agreed to by the Engineer/Architect and Contractor before proceeding with the change. The Contractor shall keep accurate records, as agreed upon, of quantities or costs and present an account of the cost of the change in the Work, together with vouchers where applicable.
- 2.14.5** If the method of valuation, measurement and the change in Contract Price and/or change in Contract Time cannot be promptly agreed upon, and the change is required to be proceeded with, then the valuation, measurement and the change in Contract Price and/or Contract Time will be subject to final determination in the manner set out in **2.11.0 DISPUTES**. In this case, the Engineer/Architect shall, with the consent of the Owner, issue a written authorization for the change setting out the method of valuation and, if by lump sum, their valuation of the change in Contract Price and/or Contract Time.
- 2.14.6** In the case of a dispute in the valuation of a change authorized in the Work and pending final determination of such value, the Engineer/Architect shall certify the value of the Work performed in accordance with their own evaluation of the change and include the amount with the regular certificates for payment. The Contractor shall keep accurate records of quantities and cost of such work.
- 2.14.7** It is intended in all matters referred to above that both the Engineer/Architect and Contractor shall act promptly.
- 2.14.8** Should the Owner direct the Contractor not to correct work that has been damaged or that was not performed in accordance with the Contract Document, an equitable deduction from the Contract amount by the Architect/Engineer shall be made to compensate the Owner for the uncorrected or uncompleted work.
- 2.14.9** Credits will be based on the net cost of material and labour or the net difference in the unit price quantities.
- 2.15.0 APPLICATION FOR PAYMENT**
- 2.15.1** Applications for payment on account may be made monthly as the Work progresses.
- 2.15.2** Applications for payment shall be made monthly on a date to be agreed upon between the Owner and the Contractor, and the amount claimed shall be for the value proportionate to the amount of the Contract, of the Work performed and products delivered to the site at that date.
- 2.15.3** The Contractor shall submit to the Engineer/Architect, before the first application for payment, a schedule of values of the various parts of the Work aggregating the total amount of the Contract Price and divided so as to facilitate evaluation of applications for payment.

- 2.15.4** This schedule shall be made out in such form and supported by such evidence as to its correctness as the Engineer/Architect may reasonably direct and, when approved by the Engineer/Architect, shall be used as the basis for application for payment.
- 2.15.5** When making application for payment, the Contractor shall submit a statement based upon this schedule. Claims for products delivered to the site but not yet incorporated into the Work shall be supported by such evidence as the Engineer/Architect may reasonably require to establish the value and delivery of the products.
- 2.15.6** With each monthly claim for payment, except the first, the Contractor shall submit a Statutory Declaration attesting that they have made all payments to Subcontractors, Suppliers, and workmen on behalf of whom amounts were included in the previous claim for payment.
- 2.15.7** Applications for release of holdback monies following the substantial performance of the Work and the application for final payment shall be made at the time in the manner set forth in **2.16.0 CERTIFICATES AND PAYMENTS**.
- 2.15.8** For all projects, it should be clearly understood that the University's policy is as follows:
- a) Each Progress Claim must be accompanied by a breakdown indicating amounts included for each Subcontractor;
 - b) When the University makes a Progress Payment, it is made in prorated amounts on behalf of those Subcontractors for whom amounts have been included in the corresponding Progress Claim;
 - c) The Contractor submitting the Progress Claim **must** make payment of the amounts included for the various Subcontractors to the various Subcontractors within ten (10) working days of issuance of the Progress Payment by the University.
 - d) Monthly payment amounts are not final or conclusive as to their value or quality of work performed and are subject to reopening and readjustment
- 2.15.9** Contractors not following the above procedures will be considered to be in default of their Contract, and the University may proceed in accordance with **Article 2.6.0 OWNER'S RIGHT TO PERFORM WORK, STOP WORK AND/OR TERMINATE CONTRACT** Subsection **2.6.2 (d)** of the General Conditions.

2.16.0 CERTIFICATES AND PAYMENTS

2.16.1 The Engineer/Architect shall, within ten (10) days of receipt of an application for payment from the Contractor submitted in accordance with **2.15.0 APPLICATION FOR PAYMENT**, issue a certificate for payment in the amount applied for or such amount as they shall determine to be properly due. If the Engineer/Architect amends the application, they shall promptly notify the Contractor in writing, giving their reason(s) for the amendment.

2.16.2 The Owner shall, within thirty (30) days of receipt and approval by the Owner of a certificate for payment from the Engineer/Architect, make payment to the Contractor on account.

2.16.3 Notwithstanding any other provisions of the Contract:

- a) Where legislation permits and where, upon application by the Contractor, the Engineer/Architect has certified that a Subcontract has been totally performed to their satisfaction prior to the Substantial Performance of this Contract, the Owner may, at their discretion, pay the Contractor the holdback retained for such Subcontractor on the day following the expiration of the Statutory Limitations Period stipulated in the Mechanic's Lien Act applicable to the place of the Work and subject to the following conditions:
 - (i) A copy of the Contract between the Subcontractor and the General Contractor must be submitted.
 - (ii) The Subcontract is completed without deficiencies.
 - (iii) The warranty for the Subcontract will not start until Substantial Performance of the General Contract.
 - (iv) The General Contractor provides an approved Statutory Declaration that all monies have been paid to the said Subcontractor.
 - (v) The General Contractor provides an approved Waiver of Lien from this Subcontractor.
 - (vi) The Contractor and the Subcontractor provide an approved Waiver of Claim for all work associated with this Subcontractor.
 - (vii) A certificate is issued by the Engineer/Architect indicating that the Subcontract has been totally completed to their satisfaction.
 - (viii) The Owner will, at that time, release the total amount specified on the Subcontractor's Contract.

- 2.16.4** Notwithstanding the provisions of Paragraph 16.3 (a) and notwithstanding the wording of such certificate, the Contractor shall ensure that such work is protected pending the Total Performance of the Contract and be responsible for the correction of any defects in it regardless of whether or not they were apparent when such certificates were issued.
- 2.16.5** The Engineer/Architect shall within ten (10) days of receipt of an application from the Contractor for a Certificate of Substantial Performance make an inspection and assessment of the Work to verify the validity of the application. The Engineer/Architect shall within seven (7) days of their inspection notify the Contractor of their approval or the reasons for their disapproval of the application. When the Engineer/Architect finds the Work to be substantially performed, they shall issue such a certificate. The date of this certificate shall be the date of Substantial Performance of the Contract. Immediately following the issuance of the Certificate of Substantial Performance, the Engineer/Architect, in consultation with the Contractor, shall establish a reasonable date for the Total Performance of the Contract.
- 2.16.6** Following the issuance of the Certificate of Substantial Performance and upon receipt from the Contractor of all documentation called for in the Contract Documents, the Engineer/Architect shall issue a Certificate for Payment of holdback monies, providing that no lien or privilege claims against the Work exists, that the Contractor has submitted to the Owner a sworn statement that all accounts for labour, Subcontracts, products, construction machinery and equipment and any other indebtedness which may have been incurred by the Contractor in the Substantial Performance of the Work and for which the Owner might in any way be held responsible, have been paid in full and that the Contractor has submitted to the Owner a waiver of all claims associated with this project except holdback monies properly retained. The holdback monies will become due and payable on the day following the expiration of the Statutory Limitation Period stipulated in the Mechanic's Lien Act applicable to the place of buildings. The Owner may retain out of such holdback monies any sum required by law to satisfy any liens against the Work or other monetary claims against the Contractor which may be enforceable against the Owner.
- 2.16.7** The Engineer/Architect shall, within ten (10) days of receipt of an application from the Contractor for payment upon Total Performance of the Contract, make an inspection and assessment of the Work to verify the validity of the application. The Engineer/Architect shall, within seven (7) days of their inspection, notify the Contractor of their approval or the reasons for their disapproval of the application. When the Engineer/Architect finds the Work to be totally performed to their satisfaction, they shall issue a Certificate of Total Performance and certify for payment the remaining monies due to the Contractor under the Contract, less any holdback monies which are required to be retained. The date of this certificate shall be the date of Total Performance of the Contract. The Owner shall, within thirty (30) days of issuance of such certificate, make payment to the Contractor in accordance with the provisions of the Contract.
- 2.16.8** The release of any remaining holdback monies shall become due and payable on the day following the expiration of the Statutory Limitation period stipulated in the

Mechanics' Lien Act of the place of building provided that no claims against the Work exists and that the Contractor has submitted to the Owner a sworn statement that all accounts for labour, Subcontractors, products, construction machinery and equipment and any other indebtedness which may have been incurred by the Contractor in the Total Performance of the Work and for which the Owner might in any way be held responsible have been paid in full, except holdback monies properly retained.

2.16.9 No certificate for payment, any payment made thereunder or any partial or entire use of occupancy of the Work by the Owner shall constitute an acceptance of any work or products not in accordance with the Contract Documents.

2.16.10 As of the date of Total Performance of the Work as set out in the Certificate of Total Performance of the Work, the Owner expressly waives and releases the Contractor from all claims against the Contractor including, without limitation, those that might arise from the negligence or breach of Contract by the Contractor except one or more of the following:

- a) Those made in writing prior to the date of the Total Performance of the Work and still unsettled;
- b) Those arising from the provisions of **2.12.0 INDEMNIFICATION** or **2.26.0 WARRANTY**;
- c) Those made in writing within a period of six (6) years from the date of Substantial Performance of the Work, as set out in the Certificate of Substantial Performance of the Work or within such shorter period as may be prescribed by any Limitation Statute of the Province of Newfoundland and Labrador and arising from any liability of the Contractor for damages resulting from their performance of the Contract with respect to substantial defects or deficiencies in the Work for which the Contractor is proven responsible.

As used herein, "substantial defects or deficiencies" means those defects or deficiencies in the Work which affect the Work to such an extent or in such manner that a significant part or the whole of the Work is unfit for the purpose intended by the Contract Documents.

2.16.11 As of the date of Total Performance of the Work, as set out in the Certificate of Total Performance of Work, the Contractor expressly waives and releases the Owner from all claims against the Owner including, without limitation, those that might arise from the negligence or breach of Contract by the Owner except those made in writing prior to the Contractor's application for payment upon Total Performance of the Work and still unsettled.

2.16.12 In the event of conflict between the provisions of the General Conditions and **2.24.0 DAMAGES AND MUTUAL RESPONSIBILITY**, the provisions of this General Condition shall govern.

2.16.13 The holdback to be used by the Engineer/Architect when issuing certificates of payment will be ten (10) percent of the value of the Work completed at the date of Contractor's claim.

2.16.14 Notwithstanding any other provision of this Contract, the Owner may:

- a) In the event of a claim by the Owner against the Contractor for damages arising out of the performance or non-performance of the Contract, withhold payment of any amount equal to the alleged damages until the liability for damages is established, and no amount of interest will be paid on amounts held under this Clause;
- b) Set-off amounts owing by the Contractor to the Owner;
- c) Following the issuance of the Certificate of Substantial Performance, withhold payment of an amount equal to twice the cost as estimated by the Engineer/Architect of remedying deficiencies until the issuance of a Certificate of Total Performance, and no amount of interest will be paid on amounts held under this Clause.

2.17.0 TAXES AND DUTIES

2.17.1 Unless otherwise stated in the Supplementary General Conditions, the Contractor shall pay all applicable government sales taxes, goods and services taxes, customs duties and excise taxes with respect to the Contract.

2.17.2 Any increase or decrease in costs to the Contractor due to changes in such taxes and duties after the date of the Agreement and up to the agreed date of completion shall increase or decrease the Contract Price accordingly. If the Owner so desires, the Contractor is to cooperate with the Engineer/Architect and Owner and permit access to books and records in order to establish the amount of such taxes involved.

2.17.3 The Contractor shall maintain full records of their estimates and of actual costs to them of the Work, together with all proper open calls, quotations, contracts, correspondence, invoices, receipts, payments to Subcontractors and Suppliers and vouchers relating thereto and shall make them available to audit and inspection by the Owner, the Auditor General for Newfoundland and Labrador or by persons acting on their behalf and shall furnish them with any information which they may require from time to time in connection with such records.

2.18.0 LAWS, NOTICES, PERMITS AND FEES

2.18.1 The laws of the Province of Newfoundland and Labrador shall govern the Work.

2.18.2 The Contractor shall obtain all permits, licenses and certificates and pay all fees required for the performance of the Work which are in force at the date of open call closing with the following exceptions:

- a) The Contractor shall obtain building permits for the Work but are not required to pay for said permits.
- b) The Contractor shall not include the obtaining of permanent easements or rights of servitude.

2.18.3 The Contractor shall give all required notices and comply with all laws, ordinances, rules, regulations, codes and order of all authorities having jurisdiction relating to the Work, to the preservation of the public health and construction safety which are or become in force during the performance of the Work.

2.18.4 The Contractor shall not be responsible for verifying that the Contract Documents are in compliance with the applicable laws, ordinances, rules, regulations and codes relating to the Work. If the Contract Documents are a variance therewith or changes which necessitate modifications to the Contract Documents are required by the authorities having jurisdiction subsequent to the Open call closing date, the Contractor shall notify the Engineer/Architect in writing requesting direction immediately when any such variance or change is observed by them. The Engineer/Architect will make the changes required to the Contract Documents, and the Contract Price and/or Contract Time shall be adjusted in accordance with **2.13.0 CHANGES IN THE WORK AND EXTRA WORK** and evaluated in accordance with **2.14.0 VALUATION AND CERTIFICATION OF CHANGES IN THE WORK**.

2.18.5 If the Contractor fails to notify the Engineer/Architect in writing and obtain their direction as required in 2.18.4 and performs any work knowing it to be contrary to any laws, ordinances, rules, regulation, codes and orders of any authority having jurisdiction, they shall be responsible for and shall correct any violations thereof and shall bear all costs, expense and damages, attributable to their failure to comply with the provisions of such laws, ordinances, rules, regulations, codes and orders.

2.19.0 PATENT FEES

2.19.1 The Contractor shall pay all royalties and patent license fees required for the performance of the Contract and such royalties or fees shall be deemed to have been included in the Contract Price. They shall hold the Owner harmless from and against all claims, demands, losses, costs, damages, actions, suits or proceedings arising out of the Contractor's performance of the Contract which are attributable to an infringement or an alleged infringement of any patent or invention by the Contractor or anyone for whose acts they may be liable.

2.19.2 The Owner shall hold the Contractor harmless against all claims, demands, losses, costs, damages, actions, suits or proceedings arising out of the Contractor's performance of the Contract which are attributable to an infringement or an alleged

infringement of any patent or invention in executing anything for the purpose of the Contract, the model, plan or design of which was supplied to the Contractor by the Owner.

2.20.0 WORKERS' COMPENSATION

2.20.1 The Contractor shall be registered with and shall remain in good standing with the Workplace Health and Safety Compensation Commission during the term of their Contract.

2.20.2 At any time during the term of the Contract when requested by the Owner, the Contractor shall provide evidence of compliance by themselves and any or all of their Subcontractors.

2.21.0 LIABILITY INSURANCE

2.21.1 Comprehensive General Liability Insurance

- a) Without restricting the generality of **2.12.0 INDEMNIFICATION**, the Contractor shall provide and maintain, either by way of a separate policy or by an endorsement to their existing policy, Comprehensive General Liability Insurance acceptable to the Owner and subject to limits set out in detail below, inclusive per occurrence for bodily injury, death and damage to property including loss of use thereof.
- b) The insurance shall be in the joint names of the Contractor and the Owner. It shall also cover as named Insureds all Subcontractors and anyone employed directly or indirectly by the Contractor or their Subcontractors to perform a part or parts of the Work but excluding Suppliers whose only function is to supply and/or transport products to the project site.
- c) The insurance shall also include as Named Insureds the architectural and engineering consultants of the Owner and Engineer/Architect.
- d) The insurance shall preclude subrogation claims by the Insurer against anyone insured thereunder.
- e) The Comprehensive General Liability Insurance will not be limited to, but shall include coverage for:
 - (i) Premises and Operations Liability
 - (ii) Products or Completed Operations Liability
 - (iii) Blanket Contractual Liability

- (iv) Cross Liability
- (v) Elevator and Hoist Liability
- (vi) Contingent Employer's Liability
- (vii) Personal Injury Liability arising out of false arrest, detention or imprisonment or malicious prosecution, libel, slander or defamation of character, invasion of privacy or wrongful entry
- (viii) Shoring, blasting, excavating, underpinning, demolition, pile driving and caisson work, work below ground surface, tunnelling and grading, as applicable
- (ix) Liability with respect to non-owned, licensed vehicles.

2.21.2 The Contractor shall provide and maintain liability insurance in respect of owned licensed vehicles subject to limits set out in detail in Article **2.21.0 LIABILITY INSURANCE** subsection **2.21.6**.

2.21.3 All liability insurance shall be maintained continuously until twelve (12) months after the date the Engineer/Architect issues a Certificate of Substantial Performance.

2.21.4 The Contractor shall provide the Owner with evidence of all liability insurance prior to the commencement of the Work and shall promptly provide the Owner with a certified true copy of each insurance policy.

2.21.5 All liability insurance policies shall contain an endorsement to provide all Named Insureds with prior notice of changes and cancellations. Such endorsements shall be in the following form:

"It is understood and agreed that the coverage provided by this policy will not be changed or amended in any way nor cancelled until thirty (30) days after written notice of such change or cancellation shall have been given to all Named Insureds."

2.21.6 The Contractor shall protect themselves and indemnify and save the Owner harmless from any and all claims which may arise from the Contractor's performance or failure of performance of the Contract and for this purpose shall, without restricting the generality of the foregoing, maintain insurance acceptable to the Owner to the following limits:

- a) Where the contract value exceed \$100,000 (inclusive of HST)
 - Comprehensive General Liability = \$3,000,000.00;
 - Standard Automobile Policy Liability = \$3,000,000.00.

- b) Where the contract value is less than \$100,000 (inclusive of HST)
- Comprehensive General Liability = \$2,000,000.00;
 - Standard Automobile Policy Liability = \$2,000,000.00.

Prior to the commencement of any work hereunder, the Contractor shall file with the Owner a copy of each insurance policy and certificate required.

2.22.0 PROPERTY INSURANCE

2.22.1 The Contractor shall provide and maintain property insurance acceptable to the Owner insuring the full value of the Work in the amount of the replacement cost or the Contract value, whichever is greater, and the full value as stated of products for incorporation into the Work. The insurance shall be in the joint names of the Contractor, the Owner, the Subcontractors as Unnamed Insured or, if they specifically request, as Named Insured. The policies shall preclude subrogation claims by the Insurer against anyone insured thereunder.

2.22.2 Such coverage shall be provided by EITHER an ALL RISKS Builders' Risk Policy OR by a combination of a Coverage and Malicious Damage Endorsements and a Builder's Risk Difference in Conditions Policy providing equivalent coverage of Piers, Wharves and Docks, Government Structures Policy.

2.22.3 The policies shall insure against all risks of direct loss or damage. Such coverage shall apply to:

- a) All products, labour and supplies of any nature whatsoever, the property of the Insureds or of others for which the Insureds may have assumed responsibility, to be used in or pertaining to the site preparations, demolition of existing structures, erections and/or fabrication and/or reconstruction and/or repair of the insured project, while on the site or in transit, subject to the exclusion of the property specified.
- b) The installation, testing and any subsequent use of machinery and equipment including boilers, pressure vessels or vessels under vacuum.
- c) Damage to the Work caused by an accident to and/or the explosion of any boiler(s) or pressure vessel(s) forming part of the Work.

Such coverage shall exclude construction machinery, equipment, temporary structural and other temporary facilities, tools and supplies used in the construction of the Work and which are not expendable under the Contract.

2.22.4 The Contractor shall provide the Owner with evidence of all insurance prior to the commencement of the Work and shall promptly provide the Owner with a certified true copy of each insurance policy.

Policies provided shall contain an endorsement to provide all Named Insureds with prior notice of changes and cancellations. Such endorsements shall be in the following form:

"It is understood and agreed that the coverage provided by this policy will not be changed or amended in any way or cancelled until thirty (30) days after written notice of such change or cancellation shall have been given to all Named Insureds."

2.22.5 All such insurance shall be maintained continuously until ten (10) days after the date the Engineer/Architect issues a certificate of Total Performance. All such insurance shall provide for the Owner to take occupancy of the Work or any part thereof during the terms of this insurance. Any increase in the cost of this insurance arising out of such occupancy shall be at the Owner's expense.

2.22.6 The policies shall provide that, in the event of a loss, payment for damage to the Work shall be made to the Owner and the Contractor as their respective interests may appear. Damage shall not affect the rights and obligations of either party under the Contract except that the Contractor shall be entitled to such reasonable extension of time for Substantial and Total Performance of the Work as the Engineer/Architect may decide.

2.22.7 The Contractor and/or their Subcontractors, as may be applicable, shall be responsible for any deductible amounts under the policies and for providing such additional insurance as may be required to protect the Insureds against loss on items excluded from the policies.

2.22.8 When this Contract pertains to a new building or structure with a total bid amount greater than \$25,000.00, the Contractor shall maintain All Risk Builder's Risk Insurance acceptable to the Owner in the joint names of the Owner and Contractor in the amount of 100 percent of the total value of the Work done and material delivered to the site and payable to the Owner and Contractor as their respective interest may appear.

2.23.0 PROTECTION OF WORK AND PROPERTY

2.23.1 The Contractor shall protect the property adjacent to the project site from damage as the result of their operations under the Contract.

2.23.2 The Contractor shall protect the Work and the Owner's property from damage and shall be responsible for any damage which may arise as the result of their operations under the Contract except damage which occurs as the result of:

- a) Errors in the Contract documents; and/or
- b) Acts or omissions by the Owner, their agents, employees or other Contractors.

2.23.3 Should the Contractor, in the performance of this Contract, damage the Work and/or Owner's property and/or property adjacent to the place of the Work, the Contractor shall be responsible for making good such damage at their own expense or pay all costs incurred by others in making good such damage.

2.23.4 Should any damage occur to the Work and/or Owner's property for which the Contractor is not responsible as provided in of **2.12.0 INDEMNIFICATION**, they shall make good such damage to the Work and, if the Owner so directs, to the Owner's property, and the contract Price and Contract Time shall be adjusted in accordance with in **2.13.0 CHANGES IN THE WORK AND EXTRA WORK** and evaluated in accordance with in **2.14.0 VALUATION AND CERTIFICATION OF CHANGES IN THE WORK**.

2.23.5 The Contractor shall be completely responsible for the safety of the Work as it applies to protection of the public and property and construction of the Work.

The codes that must be followed and enforced for safety are:

- a) The National Building Code, Part 8, Safety Measures at Construction and Demolition Sites (Latest Edition);
- b) Canadian Code for Construction Safety (Latest Edition) as issued by the Associate Committee of the National Building Code;
- c) The Occupational Health and Safety Act (1979) and Regulations.

2.23.6 Any person not following stipulated safety regulations shall be dismissed.

2.24.0 DAMAGES AND MUTUAL RESPONSIBILITY

2.24.1 If either party to this Contract should suffer damage in any manner because of any wrongful act or neglect of the other party or anyone employed by them then they shall be reimbursed by the other party for such damages. The party reimbursing the other party shall be subrogated to the rights of the other party in respect of such wrongful act or neglect if it be that of a third party.

2.24.2 Claims under this Contract shall be made in writing to the party liable within two (2) weeks after the first observance of such damage and may be adjusted by agreement or in the manner set out in **2.11.0 DISPUTES**.

2.24.3 If the Contractor has caused damage to any other Contractor on the Work, the Contractor agrees upon due notice to settle with such other Contractor by agreement or arbitration, if they will so settle. If such other Contractor sues the Owner on account of any damage alleged to have been sustained, the Owner shall notify the Contractor and may require the Contractor to defend the action at the Contractor's expense. If

any final order or judgment against the Owner arises therefrom, the Contractor shall pay or satisfy it and pay all costs incurred by the Owner.

2.24.4 If the Contractor becomes liable to pay or satisfy any final order, judgment or award against the Owner then the Contractor, upon undertaking to indemnify the Owner against any and all liability for costs, shall have the right to appeal in the name of the Owner such final order or judgment to any and all courts of competent jurisdiction.

2.24.5 Should the Contractor fail to meet the date to substantially perform the Work, as indicated in the Agreement between the Owner and the Contractor, and is unable to provide justification acceptable to the Owner for the delay then the Contractor will be held liable for any liquidated damage amount indicated in **3.0 SUPPLEMENTARY GENERAL CONDITIONS** and may be held liable for payment to the Owner for other damages and losses suffered by the Owner as a result of the Contractor's delay including additional costs for Engineering/Architectural supervision.

2.25.0 BONDS

2.25.1 The Contractor shall promptly provide the Owner the surety bonds called for in the Open call Documents.

2.25.2 All such bonds shall be issued by a duly incorporated surety company approved by the Owner and authorized to transact a business or surety-ship in the Province of Newfoundland and Labrador.

2.25.3 If bonds are called for in the and Acceptance form, Instructions to Bidders or Supplementary General Conditions, the costs attributable to providing such bonds shall be included in the bid price.

2.25.4 Should the Owner require the provision of a bond or bonds by the Contractor other than those provided for under 2.25.3, the Contract Price shall be increased by all costs attributable to providing such bonds.

2.26.0 WARRANTY

2.26.1 The Contractor shall be responsible for the proper performance of the Work to the extent that the design and specifications permit such performance.

2.26.2 Subject to Paragraph 2.26.1, the Contractor agrees to correct promptly, at their own expense, defects or deficiencies in the Work which appear prior to and during the period of one (1) year from the date of Substantial Performance of the Work or such longer periods as may be specified for certain products or work.

2.26.3 The Contractor shall correct and/or pay for any damage to other work resulting from any corrections required under the conditions of Paragraph 2.26.2.

2.26.4 Neither the Engineer/Architect's final certificate nor payment thereunder shall relieve the Contractor from their responsibility hereunder.

2.26.5 The Owner and/or Engineer/Architect shall give the Contractor written notice of observed defects promptly.

2.27.0 CONTRACTOR'S RESPONSIBILITIES AND CONTROL OF THE WORK

2.27.1 The Contractor shall have complete control of the Work and shall effectively direct and supervise the Work so as to ensure conformance with the requirements of the Contract Documents. They shall be solely responsible for all construction means, methods, techniques, sequences and procedures and for coordinating all parts of the Work under the Contract.

2.27.2 The Contractor shall have the sole responsibility for the design, erection, operation, maintenance and removal of temporary structural and other temporary facilities and the design and execution of construction methods required in their use. The Contractor shall engage and pay for registered professional engineering personnel skilled in the appropriate disciplines to perform these functions where required by law or by the Contract Documents and, in all cases, where such temporary facilities and their method of construction are of such a nature that professional engineering skill is required to produce safe and satisfactory results.

2.27.3 Notwithstanding the provision of Paragraphs 2.27.1 and 2.27.2 above or any provisions to the contrary elsewhere in the Contract Documents where such Contract Documents include designs for temporary structural and other temporary facilities or specify a method of construction in whole or in part, such facilities and methods shall be deemed to comprise part of the overall design of the Work, and the Contractor shall not be held responsible for that part of the design or the specified method of construction. The Contractor shall, however, be responsible for the execution of such design or specified method of construction in the same manner that they are responsible for the execution of the Work.

2.27.4 The Contractor shall carefully examine the Contract Documents and shall promptly report to the Engineer/Architect any error, inconsistency or omission they may discover. The Contractor shall not be held liable for any damage resulting from any such errors, inconsistencies or omissions in the Contract Documents which they may discover, and they shall not proceed with the Work affected until they have received corrected or missing information from the Engineer/Architect.

2.28.0 PROJECT MANAGER AND SUPERINTENDENCE

2.28.1 The Contractor shall employ a competent Project Manager and necessary assistants who shall be in attendance at the Work site at all times while the Work is being performed.

- 2.28.2** The Project Manager shall be satisfactory to the Engineer/Architect and shall not be changed except for good reason and only then after consultation with an agreement by the Engineer/Architect.

The Project Manager shall have a minimum of ten (10) years' experience on construction projects of similar scale, complexity, type and value.

The project manager shall submit a resume and cover letter.

- 2.28.3** The Superintendent shall represent the Contractor at the place of work and instructions given to them by the Engineer/Architect shall be held to have been given to the Contractor. Important instructions shall be confirmed to the Contractor in writing, other instructions will be so confirmed if requested.

The superintendent shall have a minimum of ten (10) years' experience on construction projects of similar scale, complexity, type and value.

2.29.0 LABOUR AND PRODUCTS

- 2.29.1** Unless otherwise stipulated elsewhere in the Contract Documents, the Contractor shall provide and pay for all labour, products, tools, construction equipment and machinery, water, heat, light, power, transportation and other facilities and services necessary for the requirements of the Contract Documents.
- 2.29.2** All products provided shall be new unless otherwise specified in the Contract Documents. Any products which are not specified shall be of a quality best suited to the purpose required, and their use shall be subject to the approval of the Engineer/Architect.
- 2.29.3** In carrying out their duties under this Contract, the Contractor shall comply with all Provincial and Federal legislation respecting labour and the employment of labour, where applicable, including the Labour Standards Code and shall not operate in conflict with the Human Rights legislation. In the employment of labour, preference should be given to persons normally residing in Newfoundland and Labrador.
- 2.29.4** The Contractor and Subcontractors shall maintain and keep available for inspection by the Owner, a record of the names and addresses of all persons employed on the project.
- 2.29.5** The Contractor shall maintain good order and discipline among their employees engaged on the Work and shall employ on the Work only employees skilled in their various trades.
- 2.29.6** There shall be no discrimination in the selection of workers for employment on the project in respect to race, religion, views or political affiliation, and the office of the Canada Manpower will be used in the recruitment of workers wherever possible.

- 2.29.7** The Contractor shall pay fair wages and shall pay rates of wages and allowances to the various classes of labour not less favourable than those prevailing in the area where the Work is being performed.
- 2.29.8** The Contractor shall be aware that the majority of hourly-paid and maintenance workers employed within the University are unionized. It is of utmost importance that

any labour force used by the Contractor neither disrupts or be disrupted by any labour conditions existing on the University campus. Failure by the Contractor to familiarize themselves with labour conditions on Campus or disruptions to the Contractor's own labour force because of labour conditions on Campus will not relieve them of their obligations to furnish all labour and materials necessary to carry out the requirements of the Contract.

2.30.0 SUBSURFACE CONDITIONS

2.30.1 The Contractor shall promptly notify the Engineer/Architect in writing if, in their opinion, the subsurface conditions at the project site differ materially from that indicated or reasonably inferred from the Contract Documents.

2.30.2 After prompt investigation, should the Engineer/Architect determine that conditions do differ materially, they shall issue appropriate instructions for changes in the Work as provided for in **2.13.0 CHANGES IN THE WORK AND EXTRA WORK**.

2.31.0 USE OF THE WORK

2.31.1 The Contractor shall confine their apparatus, the storage of products and the operations of their employees to limits indicated by laws, ordinances, permits or by instructions of the Engineer/Architect and shall not unreasonably encumber the premises with their products.

2.31.2 The Contractor shall not load or permit to be loaded any part of the Work with a weight or force that will endanger its safety.

2.31.3 Unless otherwise provided, the Contractor shall, at their own expense and without expense to the Owner, make suitable provision to accommodate all traffic, either pedestrian or vehicular, over or around the project upon which work is being performed in a manner satisfactory to the Engineer/Architect.

2.31.4 The Contractor shall provide and maintain at their own expense such fences, barriers, signs, lights and watchmen as may be necessary to prevent avoidable accidents to University Users or to the public generally.

2.31.5 All work shall be executed with the least possible interference with or disturbance to personnel and the Public. The Contractor shall cooperate with the person in charge of the premises. The Contractor shall ascertain from the Owner's representative the hours during which the work shall be performed, conform to the directions of the representative and to the directions of the said representative in determining the order in which the work shall be done.

2.31.6 The Contractor shall carry out all work required to maintain the building services and to provide necessary access for personnel and vehicles whenever new work affects occupied portions of the building.

2.31.7 Before final completion of the work, the Owner shall be entitled to make use of any portion of the work which is completed and fit for use for the installation of equipment, storage and furniture, supplies, etc., and for occupancy, if such can be arranged without interfering with the progress of the work.

2.32.0 CUTTING AND REMEDIAL WORK

2.32.1 The Contractor shall do all cutting and remedial work that may be required to make the several parts of the Work come together properly and shall coordinate the Work to ensure that this requirement is kept to a minimum.

2.32.2 Should the Owner, the Engineer/Architect, other contractors or anyone employed by them, be responsible for ill-timed work necessitating additional cutting and/or remedial work to be performed, it shall be valued as provided in **2.14.0 VALUATION AND CERTIFICATION OF CHANGES IN THE WORK** and added to the Contract Price.

2.32.3 Cutting and remedial work shall be performed by specialists familiar with the materials affected and shall be performed in a manner to neither damage nor endanger any work.

2.33.0 INSPECTION OF WORK

2.33.1 The Owner, the Engineer/Architect and their authorized representatives shall have access to the Work for inspection wherever it is in preparation or progress. The Contractor shall cooperate to provide reasonable facilities for such access.

2.33.2 If parts of the Work are designated for special tests, inspections or approvals in the Contract Documents or by the Engineer/Architect's instructions or the laws or ordinances of the place of the Work, the Contractor shall give the Engineer/Architect timely notice requesting inspection. Inspection by the Engineer/Architect shall be made promptly. The Contractor shall arrange for inspections by other authorities and shall notify the Engineer/Architect with timely notice of the date and time.

2.33.3 If the Contractor covers or permits to be covered any of the Work that is designated for special tests, inspections or approvals, before such special tests, the Contractor shall, if so instructed by the Engineer/Architect, uncover the Work, have the inspection satisfactorily completed and make good the Work at their own expense.

2.33.4 The Engineer/Architect may order any part of the Work to be specifically examined, should they believe such work not to be in accordance with the requirements of the Contract Documents. If upon examination such work is found not to be in accordance with the requirements of the Contract Documents, the Contractor shall correct such work and pay the cost of examination and correction. If such work is found to be in accordance with the requirements of the Contract Documents, the Owner will pay the cost of examination and replacement.

2.33.5 The Contractors shall furnish promptly to the Engineer/Architect two (2) copies of all certificates and inspection reports relating to the Work.

2.34.0 ***REJECTED WORK***

2.34.1 Defective work, whether the result of poor workmanship, use of defective products or damage through carelessness or other act or omission of the Contractor and whether incorporated in the Work or not which has been rejected by the Engineer/Architect as failing to conform to the Contract Documents, shall be removed promptly from the premises by the Contractor and replaced and/or re-executed promptly in accordance with the Contract Documents at the Contractor's expense.

2.34.2 Other contractors' work destroyed or damaged by such removals or replacements shall be made good promptly at the Contractor's expense.

2.34.3 If, in the opinion of the Engineer/Architect, it is not expedient to correct defective work not done in accordance with the Contract Documents, the Owner may deduct from the Contract Price the difference in value between the Work as done and that called for by the Contract, the amount of which shall be determined in the first instance by the Engineer/Architect.

2.35.0 ***SHOP DRAWINGS AND SAMPLES***

2.35.1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by the Contractor to illustrate details of a portion of the Work.

2.35.2 The Contractor shall arrange for the preparation of clearly identified shop drawings as called for by the Contract Documents or as the Engineer/Architect may reasonably request.

2.35.3 Prior to submission to the Engineer/Architect, the Contractor shall review all shop drawings. By this review, the Contractor represents that they have determined and verified all field measurements, field construction criteria, materials, catalogue numbers and similar data, or will do so, and that they have checked and coordinated each shop drawing with the requirements of the Work and of the Contract Documents. The Contractor's review of each shop drawing shall be indicated by stamp, date and signature of a responsible person.

2.35.4 The Contractor shall submit shop drawings to the Engineer/Architect for their review with reasonable promptness and in orderly sequence so as to cause no delay in the Work or in the Work of other contractors. If either the Contractor or the Engineer/Architect so requests, they shall jointly prepare a schedule fixing the dates for submission and return of shop drawings. Shop drawings shall be submitted in the form

of reproducible transparencies or prints as the Engineer/Architect may direct. At the time of the submission, the Contractor shall notify the Engineer/Architect in writing of any deviations in the shop drawings from the requirements of the Contract Documents.

2.35.5 The Engineer/Architect will review and return shop drawings in accordance with any schedule agreed upon or otherwise with reasonable promptness so as to cause no delay. The Engineer/Architect's review will be for conformity to the design concept and for general arrangements only, and such review shall not relieve the Contractor of responsibility for errors or omissions in the shop drawings or of responsibility for meeting all requirements of the Contract Documents unless a deviation on the shop drawings has been approved in writing by the Engineers/Architects.

2.35.6 The Contractor shall make any changes in shop drawings which the Engineer/Architect may require consistent with the Contract Documents and resubmit, unless otherwise directed by the Engineer/Architect. When resubmitting, the Contractor shall notify the Engineer/Architect in writing of any deviations other than those requested by the Engineer/Architect.

2.35.7 The Contractor shall submit for the Engineer/Architect's approval such standard manufacturer's samples as the Engineer/Architect may reasonably require. Samples shall be labeled as to origin and intended use in the Work and shall conform to the requirements of the Contract Documents.

2.35.8 The Contractor shall provide samples of special products, assemblies or components when so specified. The cost of such samples not specified shall be authorized as an addition to the Contract Price as provided in **2.13.0 CHANGES IN THE WORK AND EXTRA WORK**.

2.36.0 TESTS AND MIX DESIGNS

2.36.1 The Contractor shall furnish to the Engineer/Architect test results and mix designs as may be requested. The testing company must first be approved by the Engineer/Architect.

2.36.2 The cost of tests and mix designs beyond those called for in the Contract Documents or beyond those required by law, ordinances, rules and regulations relating to the Work and the preservation of public health, shall be authorized as an addition to the Contract Price as provided in **2.13.0 CHANGES IN THE WORK AND EXTRA WORK**.

2.37.0 MATERIALS AND SUBSTITUTIONS

2.37.1 Materials described and named in the specifications with "or approved equal" clause after the Manufacturer's name are so described as to the establish quality only, and substitutions of a similar materials may be made before the award of the Contract provided the Engineer/Architect's approval is obtained. Substitutions after the award

may be considered under special circumstances as indicated in Subsection 1.7.4 in the **INSTRUCTIONS TO Bidders**

2.37.2 Requests for substitutions must be accompanied by sufficient information in the form of shop drawings, manufacturer's literature, samples and other data to permit proper investigation of the substitutes proposed, together with any increase or decrease in price.

2.37.3 Whenever a substitute is proposed for approval, the Contractor shall guarantee that such proposed substitute will not adversely affect the space requirements allocated on the drawings for the material specified, and they shall agree to bear any additional expense incurred due to their use of the proposed substitute.

2.37.4 The Engineer/Architect may accept or reject any or all of the proposed substitutions as they see fit, and their decision on a question of equality shall be final.

2.38.0 TIME OF ESSENCE AND SCHEDULE

2.38.1 Time is of the essence of the Contract.

2.39.0 CASH ALLOWANCE

2.39.1 The Contract Price includes cash allowances, if any, stated in the Contract Documents.

2.39.2 Cash allowances, unless otherwise specified, cover the entire cost to the Contractor of services, products, construction machinery and equipment, freight, unloading, handling, storage, installation and other authorized expenses incurred in performing the Work stipulated under the cash allowances. This also includes the Contractors overhead and profit in connection with such cash allowance.

2.39.3 The cash allowance shall not include HST.

2.39.4 Where costs under a cash allowance exceed the amount of the allowance, the Contractor shall be compensated for any excess incurred and substantiated plus an allowance for overhead and profit as set out in **2.14.0 VALUATION AND CERTIFICATION OF CHANGES IN THE WORK**.

2.39.5 The Contract Price shall be adjusted by written order to provide for any excess or deficit to each cash allowance.

2.39.6 Progress payments on account of Work authorized under cash allowance shall be included in the Engineer/Architect's monthly certificates for payment.

2.39.7 A schedule shall be prepared jointly by the Engineer/Architect and Contractor to show the items called for under Cash Allowances. They must be authorized by the Owner for ordering purposes so that the progress of the Work will not be delayed.

2.40.0 CLEANUP AND FINAL CLEANING OF THE WORK

2.40.1 The Contractor shall maintain the Work in a tidy condition and free from the accumulation of waste products and debris, other than that caused by the Owner, other contractors or their employees.

2.40.2 When the Work is substantially performed, the Contractor shall remove their surplus products, tools, construction machinery and equipment not required for the performance of the remaining Work. They shall also remove waste products and debris, other than that caused by the Owner, other contractors or their employees, and leave the Work clean and suitable for occupancy by the Owner, unless otherwise specified.

2.40.3 When the Work is totally performed, the Contractor shall remove their surplus products, tools, construction machinery and equipment. They shall also remove waste products and debris other than that caused by the Owner, other contractors or their employees.

3.0 SUPPLEMENTARY GENERAL CONDITIONS

SUPPLEMENTARY GENERAL CONDITIONS

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4.0 SPECIAL CONDITIONS

4.1.0 LAYOUT OF WORK

- 4.1.1** Other than the original lot lines and a bench mark, both shown on the drawings, establish and maintain all grades, lines, levels and well-built batter boards at all corners of the building. As work progresses, lay out on the forms or rough flooring the exact location of all partitions as a guide to all trades.
- 4.1.2** Verify all grades, lines, levels and dimensions as shown on the drawings and report any errors or inconsistencies in the above to the Engineer/Architect before commencing Work.

4.2.0 JOB SIGN

- 4.2.1** At the start of the job, erect two painted signs as detailed and where located by the Engineer/Architect. This will be the only sign or advertisement permitted on the site unless instructed otherwise by the Engineer/Architect.
- 4.2.2** The signs shall be 8'0" x 8'0" plywood, properly supported. It shall be painted and shall show the names of the building, Owner, Prime Consultant, Major Subconsultants, Contractor and Major Subcontractors. A drawing of the signs to be erected will be supplied by the Engineer/Architect.

4.3.0 TEMPORARY OFFICES AND SHEDS

- 4.3.1** Construct and maintain, until completion of the Contract temporary offices and storage sheds in approved locations on site for the use of staff.
- 4.3.2** Buildings shall be of weatherproof wood stud and plywood construction completely equipped with adequate lighting, heating and ventilation, and in addition, the Contractor's office shall be fully furnished with desks, plan tables, storage cabinets, file drawers, chairs, stools and plan racks.
- 4.3.3** Provide storage sheds for small tools, equipment, perishable materials, etc., as necessary. All buildings shall be equipped with windows for natural light and doors properly fitted and equipped with locks.
- 4.3.4** Maintain offices and storage sheds in good condition to the approval of the Engineer/Architect from start of Work until final completion of Work or, when directed by the Engineer/Architect, remove offices and sheds from the site and leave areas free of debris and waste materials and in a clean and tidy condition.
- 4.3.5** Offices and storage sheds required by Trade Contractors, such as mechanical and electrical, shall be provided by the trade requiring them.

4.3.6 Provide an office approximately 120 square feet for the absolute use of the Owner or their representative(s). It shall be properly fitted and furnished with light, heat, telephone, lock and key, shelving, table and chairs and plan rack. The building shall be removed from the site at the completion of the Work.

4.4.0 **TEMPORARY SERVICES**

4.4.1 Light and Power

Furnish all temporary light and power required to provide such intensity of light and sufficient power as necessary for the Work to be carried out under the best conditions. Obtain and pay for all permits and inspection tests required by Provincial and/or Municipal authorities. Pay all charges and maintain fixtures and equipment in good working order. **This shall include electric heat.**

4.4.2 Telephone

Install and pay for the operation of one job telephone and one telephone for the use of the Engineer/Architect for the duration of the Contract. Subcontractors requiring individual telephones shall have them installed at their expense. Long distance calls will be at the expense of the party making the calls.

4.4.3 Toilets

At the start of operations, provide and maintain in sanitary condition sufficient temporary toilets and washing facilities for the use of personnel on the job. Conform to requirements of the Department of Health and other authorities having jurisdiction. Supply adequate quantities of disinfectant and toilet paper. When building toilets and washing facilities are operable, they may be used under the same conditions as the temporary toilets with the latter being removed, leaving all surfaces and areas hygienically clean and in immaculate condition.

4.4.4 Heat

Provide and maintain in good condition a temporary heating system for use when the building is closed in until the project has been handed over to the Owner. Pay for fuel and maintenance of the system. Maintain temperatures at a minimum of 50° F, (higher if required for special trades). Heating equipment not adequately protected or operated in conditions other than those intended by the manufacturer shall be regarded as temporary. Remove all such equipment and replace with new permanent equipment.

When ready for operation, the permanent heating equipment may be used for temporary heating purposes, subject to the conditions of the Mechanical Division of the specifications. Protect all permanent heating equipment used for temporary heating purposes. Provide satisfactory site conditions for the proper operation of this equipment.

4.4.5 Water Supply

Provide in two convenient locations outside the building line a fresh water supply for the use of all trades.

Where connection cannot be made to an existing water supply, provide adequate size tanks and keep them filled for use of all trades.

4.5.0 PLANT AND MACHINERY

4.5.1 Provide all framework, scaffolding, ladders, cranes, derricks, planks, screens, gantries, tarpaulins, tools, equipment and machinery for the proper execution of the Work. Scaffolding shall be erected without damage of the structure or the finishes, be removed to suit the installation of work of other trades and be promptly removed at completion.

4.5.2 Where it is the normal practice for the trade to provide its own scaffolding, it shall be included in the Subcontract.

4.6.0 PROTECTION OF PUBLIC AND WORKMEN

4.6.1 Part 8 of the National Building Code of Canada, latest edition, shall apply to this project in its entirety. This covers fencing, barricades, Fire protection, excavation, use of streets or public property, control of vehicular traffic and mechanical methods of demolition.

4.6.2 The latest edition of Canadian Construction Safety Code shall also apply to all phases of this project.

4.6.3 The Workers' Compensation Board Regulations shall also apply to all phases of this project.

4.7.0 CONSTRUCTION SCHEDULE

4.7.1 The Contractor shall, within seven (7) days after the Contract is awarded, prepare for the use of the Engineer/Architect and Owner, a construction schedule. It shall indicate as closely as possible the starting and completion dates for the major sections of the Work, together with the Subcontractors' names.

4.7.2 With each monthly progress claim, submit one (1) copy of the original construction schedule marked in red to show the actual construction progress on the date of the submission of the claim.

Weekly schedule updates shall be provided.

Provide updated construction schedule demoting the original.

4.8.0 PROGRESS PHOTOGRAPHS

4.8.1 Submit with monthly progress claim digital progress photographs taken from points designated by the Engineer/Architect. In the lower right-hand corner of the prints show the date and name of the project.

4.9.0 OPERATIONS AND MAINTENANCE DATA

4.9.1 On completion of the project, submit to the Engineer/Architect two (2) copies of Operations and Maintenance Data and one (1) electronic copy as original editable format.

- a) Bind data in vinyl hard covered, 3-ring, loose-leaf binder for 215 x 280 mm size paper.
- b) Enclose title sheet, labelled "Operation and Maintenance Data", project number, project name, date and list of contents.
- c) Organize contents into applicable sections of work to parallel project specifications breakdown. Mark each section by labelled tabs protected with celluloid covers fastened to hard paper dividing sheets.
- d) Provide electronic document in CD or DVD as original editable file format or, at the direction of the Owner, pdf format.

4.9.2 Include the following information plus data specified in Division 15 and 16:

- a) Maintenance instruction for finished surface and materials.
- b) Copy of hardware schedules.
- c) Description, operation and maintenance instructions for equipment and systems, including complete list of equipment and parts list. Indicate nameplate information such as make, size capacity and serial number.
- d) Names, addresses, phone and fax numbers of Subcontractors and Suppliers.
- e) Guarantees, warranties and bonds showing:
 - (i) Name and address of project;
 - (ii) Guarantee commencement date (date of Final Certification of Completion).
 - (iii) Duration of guarantee.

(iv) Clear indication of what is being guaranteed and what remedial action will be taken under guarantee.

(v) Signature and Seal of Contractor.

f) Additional materials used in project listed under various sections showing name of manufacturer and source of supply.

4.9.3 Neatly type lists and notes. Use clear drawings, diagrams or manufacturer's literature.

4.9.4 The final certificate will not be issued until the data books have been received and approved by the Engineer/Architect.

4.10.0 COORDINATION OF WORK

4.10.1 The Contractor will coordinate the Work of their Subcontractors and provide necessary instructions and scheduling so as to permit continuous progress in the Work by all trades. They will coordinate work between the Subcontractors on the site to ensure that anchor bolts, plates, attachments, etc., are provided and set in place in a timely manner. They will lay out partitions and assist Subcontractors in establishing the actual location of the fixtures, pipes, outlets, duct conduit, etc., so as to limit the interference of one trade with another. Locations shown on the drawings are approximate. If interference problems are encountered which cannot be resolved on the site, advise the Engineer/Architect before proceeding with the Work. Conceal all mechanical and electrical work unless otherwise indicated.

4.11.0 TRAFFIC MAINTENANCE

4.11.1 Do not close or obstruct streets, sidewalks, driveways, etc., without permission from authorities having jurisdiction. Do not place or store materials in street, sidewalks, parking areas, etc., unless so authorized.

4.12.0 FIRE PROTECTION

4.12.1 Fire protection measures shall include:

- a) An adequate fire alarm signal, the use of fire resistant tarpaulins, the daily inspection of temporary heating system by competent staff and regular fire patrol;
- b) All temporary wiring shall be done by electricians qualified under the applicable local regulations;
- c) Supply and maintenance of fifteen (15) pounds dry chemicals and/or five (5) gallons soda-acid fire extinguishers in such locations that no working crew has to

travel more than fifty (50) feet to an extinguisher station. In any case, there shall be not less than one (1) fully charged extinguisher(s) at the job at any time.

4.13.0 JOB MEETINGS

4.13.1 Where the value of the contract exceeds \$100,000 (HST included) job meetings shall occur at definitely prescribed times (minimum once a month), which will be determined after commencement of work, the Contractor shall organize job meetings and send out notices stating time and place to the Owner's representative, the Engineer/Architect, Subconsultants, to all Subcontractors and to other persons whose presences are required at the meetings. They shall take note of all persons attending these meetings and shall, within one (1) week after each job meeting, submit to the Owner, the Engineer/Architect, the Subconsultants and others present, minutes of the meeting which must show any major decisions made and any instructions or information required.

4.13.2 Where the value of the contract is less than \$100,000 (HST included) job meetings shall occur at the discretion of the University Project Coordinator but shall not occur fewer than once per month.

4.14.0 AS-BUILT DRAWINGS

4.14.1 The Engineer/Architect will issue to the Contractor three (3) sets of prints of architectural, mechanical and electrical drawings for the sole purpose of providing "as-built" drawings. The Contractor shall pass these to the relevant Subcontractor who shall keep two (2) sets in their office and one (1) set on the job. As changes occur, the Subcontractor shall make them on the field set. Upon completion of the project, the Subcontractor shall accurately transfer all changes to the two (2) office sets in red ink and pass them to the Engineer/Architect, through the Contractor, for approval. If they are not approved, the Subcontractor shall prepare new sets for resubmission (purchasing additional white prints for this purpose).

4.14.2 As-built drawings shall be white prints and shall indicate all changes in Architectural, Mechanical and Electrical work, including any changes in location of piping, ducts, panels, etc.

4.14.3 Provide electronic as-builts in CD or DVD as original editable file format or, at the direction of the Owner, pdf format.

4.14.4 The Certificate of Total Performance will not be issued until such drawings have been received and approved.

4.15.0 COMPLETION TIME

4.15.1 The project shall be ready for the use and occupancy by the Owner within the time stated in the **Open Call and Acceptance Form.**

4.15.2 Prior to the acceptance by the Owner of the Substantial Performance, the Contractor and the Owner shall sign a list of deficiencies as prepared by the Engineer/Architect for prompt correction and/or completion.

4.16.0 CLOSE DOWN OF WORK

4.16.1 Should the Work be closed down for any cause, the Contractor shall assume all responsibility for its proper protection during such period. They must protect all foundation work and other work liable to be damaged.

4.17.0 BROKEN GLASS

4.17.1 The Contractor shall be held responsible for any damaged, broken or scratched glass and at completion shall replace all such glass at no additional cost to the Owner.

4.18.0 HOARDING

4.18.1 Before starting excavating, construct and thereafter maintain all necessary hoarding required by Municipal or Provincial regulations or by other authorities having jurisdiction.

4.19.0 COMMISSIONING

4.19.1 The Contractor is responsible for commissioning the Work to ensure that the various parts are operating in a manner as intended by the Contract Documents. Even through individual components and/or parts of the Work may have been tested and approved prior to the substantial completion, the Contractor must coordinate a final commissioning of the complete Work, including at the place of the Work all their major Subcontractors and Suppliers. The final commissioning will be carried out by the appropriate trades working together in a complementary manner such that the successful operation of the whole Work is completed properly to the satisfaction of the Engineer/Architect. The Substantial Performance Certificate will not be issued until the final commissioning of the Work has been successfully completed.

4.20.0 FINAL CLEAN-UP

4.20.1 At the end of the job, thoroughly clean the building of all rubbish and surplus materials.

4.20.2 Make good all damaged areas in the building caused as a result of the Work of this Contract.

4.20.3 Do final cleaning, waxing and polishing of resilient flooring.

5.0 CAMPUS SAFETY AND HEALTH REGULATIONS

Maintaining a healthy and safe environment for all members of the campus community, as well as visitors, is a priority with the University. This involves a commitment from all sectors of the campus community and extends to outside agencies having occasion to come on campus to conduct business.

The following regulations will apply to all work undertaken by contractors and service personnel on any University property.

5.1.0 REGULATIONS, CODES AND STANDARDS

Contractors shall be familiar with and abide by provisions of various safety codes and standards applicable to the work performed and should refer to Article **23. PROTECTION OF WORK AND PROPERTY** in the **General Conditions**.

In particular, strict adherence shall be required to the Provincial Occupational Health and Safety Act and Regulations and the National Building Code of Canada, Part 8.

5.2.0 GENERAL SAFETY REGULATIONS

- a) Contractors/service agencies shall ensure that members of the campus community are not endangered by any work or process in which they may be engaged. Work areas shall be adequately barricaded, and if dust or fumes are generated, suitable enclosures shall be installed to contain such emissions.
- b) No material shall be stored in such a way as to obstruct walkways or represent a danger to pedestrian traffic.
- c) Adequate protection shall be provided to prevent the possibility of materials falling from scaffolding or elevated areas. Areas where materials are being loaded or offloaded shall be barricaded or otherwise protected to prevent unauthorized entry. Where necessary, appropriate warning signs shall be posted.
- d) The work areas must be kept reasonably clean and free from debris which could constitute a fire hazard. Care must be taken to ensure that the work process does not activate fire alarm detection devices. (Generation of dust and fumes can activate smoke detectors causing a false alarm).
- e) Due consideration shall be given to fire safety in buildings. Flammable materials must be kept away from sources of ignition. No work involving the use of open flame devices must be undertaken around flammable solvents or gases.
- f) Do not alter or disturb any materials believed to contain asbestos materials (unless this is a duly authorized part of the project). Should suspect materials be encountered, consult with University officials before proceeding.

- g) Material Safety Data Sheets shall be procured for any hazardous product used on campus. Such sheets shall be made readily available for consultation as required under the Workplace Hazardous Materials Information System.

NOTE: The above regulations are not to be considered all inclusive and are considered to be complementary to the safety requirements outlined in the agreement between the Owner and the Contractor/Service Agency. Certain conditions and circumstances may require adherence to additional safety regulations.

As a general requirement, contract/service personnel are expected to conduct all work on campus in a professional and safe manner and to give priority to the welfare of members of the campus community.

6.0 CONTRACTOR PERFORMANCE EVALUATION

- 6.1.0 The purpose of this process is to maintain an acceptable level of performance with external contractors carrying out work for the Department of Facilities Management.
- 6.2.0 A record of the performance of external contractors will be maintained to identify the following:
- a) Those contractors who by virtue of satisfactory performance will continue to be eligible to submit bids for work at the University;
 - b) Those contractors whose performance is considered unsatisfactory and will be advised of the need to improve performance to remain eligible to submit bids for work at the University;
 - c) Those contractors whose record of unsatisfactory performance will render them ineligible to submit bids for work at the University.
- 6.3.0 Contractors' performance will be evaluated on a points rating system relative to quality of work performed, timeliness in completing work and management/administration of contracts/work and safety parameters.

PART 1 **GENERAL**

1.1 **SECTION INCLUDES**

- .1 Title and description of Work.
- .2 Contractor use of premises.
- .3 Owner occupancy.

1.2 **WORK COVERED BY CONTRACT DOCUMENTS**

- .1 Work of this Contract comprises of renovations for emergency eye wash and shower upgrades to the Ocean Sciences Center (OSC) located at Memorial University, St. John's, NL; and further identified as outlined in the Drawings and Specifications and also as follows:
 - .1 Installation of contractor supplied emergency plumbing fixtures and associated components as well as Owner supplied emergency plumbing fixtures and associated components.
 - .2 Transportation of Owner supplied emergency plumbing fixtures and components from Memorial University Prince Phillip Drive Campus to the OSC Campus.
 - .3 Supply and installation of a new duplex booster pumping system and water tempering station to serve new emergency plumbing fixtures.
 - .4 All electrical work associated with the installation of the emergency plumbing fixtures and associated components, booster pumping system and tempering station.
 - .5 Miscellaneous cutting and patching.
 - .6 Asbestos and lead paint abatement.
 - .7 Flushing and cleaning on both new and existing piping systems.
 - .8 Testing, balancing and commissioning of all equipment and systems.
- .2 Work of this contract is divided into two prices.
 - .1 Please refer to the project drawings for details on the scope of work pertaining to Price A and Price B.
 - .2 Price A pertains to the base scope of the project.
 - .3 Price B pertains to all the scope associated with the single combination eyewash unit in the Tank Enclosure Building. This includes all scope requirements from the OSC Main Building level 3 to the combination eyewash unit in the Tank Enclosure Building.

1.3 CONTRACTOR USE OF PREMISES

- .1 Contractor has restricted use of site.
- .2 Coordinate use of premises under direction of Owner.
- .3 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .4 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.
- .5 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Owner.

1.4 OWNER OCCUPANCY

- .1 Owner will occupy premises during entire construction period for execution of normal operations.
- .2 Cooperate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.

1.5 RELATED WORK

- .1 The following specification sections are referenced to indicate work responsibilities as specified and carried in other sections.
 - .1 Section 22 05 00 – Common Work Results - Mechanical.
 - .2 Section 26 05 00 – Common Work Results – Electrical.

1.6 ON-SITE DOCUMENTS

- .1 Maintain at job site documents as indicated in Section 01 31 00 – Project Management and Coordination.

1.7 CONTRACT DOCUMENTS

- .1 Legends and schedules in the Issued for Tender Drawings take precedence over the Technical Specifications with respect to products and materials identified.

PART 2 **PRODUCTS (NOT APPLICABLE)**

PART 3 **EXECUTION (NOT APPLICABLE)**

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

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

1.2 RELATED SECTIONS

- .1 Section 01 32 00 – Construct Progress Documentation.
- .2 Section 01 56 00 - Temporary Barriers and Enclosures.

1.3 EXISTING SERVICES

- .1 Notify Owner and utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give Owner a notice of three (3) working days for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.
- .3 Provide for pedestrian and vehicular traffic.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- .1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- .1 Section includes administrative and procedural requirements for substitutions.

1.3 RELATED SECTIONS

- .1 Section 01 61 00 – Common Product Requirements.

1.4 DEFINITIONS

- .1 Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by General Contractor.
- .2 Substitutions for Cause: Changes proposed by General Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
- .3 Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to General Contractor or Owner. No substitutions for convenience are permitted.

1.5 ACTION SUBMITTALS

- .1 Substitution Requests: Submit one (1) copy of each request, in PDF format, for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section Number and Title, and Drawing Numbers and Titles.
 - .1 Substitution Request Form: Use form provided at the end of this section.
 - .2 Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - .1 Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.

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- .2 Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
- .3 Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
- .4 Product Data, including drawings and descriptions of products and fabrication and installation procedures.
- .5 Samples, where applicable or requested.
- .6 Certificates and qualification data, where applicable or requested.
- .7 List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
- .8 Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
- .9 Detailed comparison of General Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
- .10 Cost information, including a proposal of change, if any, in the Contract Sum.
- .11 General Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
- .12 General Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

- .3 Owner Action: If necessary, Owner will request additional information or documentation for evaluation within five (5) working days of receipt of a request for substitution. Owner will notify General Contractor of acceptance or rejection of proposed substitution within ten (10) working days of receipt of request, or five (5) working days of receipt of additional information or documentation, whichever is later.
 - .1 Forms of Acceptance: Change Order, Construction Change Order, or Owner Supplemental Instructions for minor changes in the Work.
 - .2 Use product specified if Owner does not issue a decision on use of a proposed substitution within time allocated.

1.6 QUALITY ASSURANCE

- .1 Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.7 PROCEDURES

- .1 Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 PRODUCTS

2.1 SUBSTITUTIONS

- .1 Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than fifteen (15) days prior to the time required for preparation and review of related submittals.
 - .1 Conditions: Owner will consider General Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Owner will return requests without action, except to record noncompliance with these requirements:
 - .1 Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - .2 Requested substitution provides sustainable design characteristics that specified product provided.
 - .3 Substitution request is fully documented and properly submitted.

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- .4 Requested substitution will not adversely affect General Contractor's construction schedule.
 - .5 Requested substitution has received necessary approvals of authorities having jurisdiction.
 - .6 Requested substitution is compatible with other portions of the Work.
 - .7 Requested substitution has been coordinated with other portions of the Work.
 - .8 Requested substitution provides specified warranty.
 - .9 If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- .2 Substitutions for Convenience: Not permitted.

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

**Equal or Substitute
Product Request Form**

Request Received on (Date): _____

Owner's Review – This Substitution is:

- Approved.
(Submittals in accordance with Section 01 33 00 – Submittal Procedures)
- Approved as Noted.
(Submittals in accordance with Section 01 33 00 – Submittal Procedures)
- Rejected.
(Use Specified Materials)
- Rejected:
(Request Not Received Within Specified Time Period – Use Specified Materials)

Review Issued By: _____
(Print Name) *(Signature)*

(Date)

PART 1 **GENERAL**

1.1 **RELATED DOCUMENTS**

- .1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- .2 The General Contractor's attention is specifically directed, but not limited, to the following documents for additional requirements:
 - .1 General Conditions of Stipulated Price Contract.
 - .2 Supplementary General Conditions.

1.2 **SUMMARY**

- .1 Section includes administrative and procedural requirements for handling and processing Contract modifications. Contractor shall develop and implement a system acceptable to Owner for the preparation, review and processing of Proposed Change Orders, contingency and allowance expenditure authorizations, Change Orders, and requests for information.

1.3 **RELATED SECTIONS**

- .1 Section 01 25 00 - Substitution Procedures.

1.4 **DEFINITIONS**

- .1 Free Float – the maximum amount of time a scheduled activity can be delayed without delaying the early start date of any succeeding activities or violating a schedule restraint, (or the range an activity can move around without affecting the start of any activity after it.)
- .2 Total Float – the maximum amount of time a scheduled activity can be delayed or extended from its early start date without delaying the project finish date or violating a schedule restraint, (the range an activity can move around without affecting the end date of the project.)

1.5 **MINOR CHANGES IN THE WORK**

- .1 Owner will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time.

1.6 OWNER INITIATED PROPOSAL CHANGES

- .1 Owner may issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - .1 Work Proposed Change Orders issued by Owner are not instructions either to stop work in progress or to execute the proposed change.
 - .2 Within time specified in Proposed Change Order or ten (10) working days, when not otherwise specified, after receipt of Proposed Change Order, submit a quotation for cost adjustments to the Contract Sum and the Contract Time necessary to execute the change. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - .1 Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - .2 Include costs of labor and supervision directly attributable to the change.
 - .3 Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

1.7 GENERAL CONTRACTOR INITIATED PROPOSED CHANGES

- .1 If latent or changed conditions require modifications to the Contract, the General Contractor may initiate a claim by submitting a request for a change to Owner.
 - .1 Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 - .2 Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - .3 Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.
 - .4 Include costs of labor and supervision directly attributable to the change.

- .5 Include an updated General Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
- .6 Comply with requirements in Section 01 25 00 - Substitution Procedures if the proposed change requires substitution of one product or system for product or system specified.

1.8 CHANGE ORDER PROCEDURES

- .1 On approval of a Proposed Change Order for the Work, Owner will issue a Contract Change Order signed by the Owner and must be signed by the General Contractor and returned to the Owner.

1.9 CONSTRUCTION CHANGE DIRECTIVE

- .1 Owner may issue a Construction Change Directive.
- .2 A Construction Change Directive
 - .1 Instructs Contractor to proceed with a change in the Work, for potential inclusion in a Change Order.
 - .2 Contains a complete description of change in the Work.
 - .3 Designates method to be followed to determine change in the Contract Sum or the Contract Time.
- .3 Documentation:
 - .1 Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 - .2 After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

1.10 REQUESTS FOR INFORMATION (RFI)

- .1 In the event that the General Contractor or any Subcontractor involved in the Work, determines that some portion of the drawings, specifications, or other contract documents requires clarification or interpretation by the Owner, the General Contractor shall submit a Request for Information (RFI) in writing to the Owner.
- .2 RFI's may only be submitted by the General Contractor and shall only be submitted on the RFI Form as required by the Owner. Any RFI's submitted, not on the official RFI Form will be returned to the Contractor unreviewed.

- .3 In the RFI, the General Contractor shall clearly and concisely set forth the issue for which clarification or interpretation is sought and why a response is needed from the Owner.
- .4 In the RFI, the General Contractor shall set forth an interpretation or understanding of the requirement along with reasons why such an understanding was reached.
- .5 The Owner will review all RFI's to determine whether they are valid RFI's. If it is determined that the document is not a valid RFI, it will be returned to the General Contractor, unreviewed, with an explanation why it was deemed not valid.
- .6 A RFI Response shall be issued within ten (10) working days of receipt of the request from the General Contractor unless the Owner determines that a longer time is necessary to provide an adequate response. If a longer time is determined necessary by the Owner, the Owner will, within five (5) working days of receipt of the request, notify the General Contractor of the anticipated response time.
- .7 If the General Contractor submits a RFI on an activity with ten (10) working days or less of float on the current project schedule, the General Contractor shall not be entitled to any time extension due to the time it takes the Owner to respond to the request provided that the Owner's responds within the ten (10) working days set forth above.
- .8 A RFI Response from Owner will not change any requirement of the Contract Documents. In the event the General Contractor believes that the RFI Response will cause a change to the requirements of the Contract Documents, the General Contractor shall within five (5) working days give written notice to the Owner stating that the General Contractor believes the RFI Response will result in a Change Order and the Contractor intends to submit a "Proposed Change Order" request. Failure to give such written notice of five (5) working days shall waive the General Contractor's right to seek additional time or cost under the requirements of the Contract Documents.

PART 2 **PRODUCTS (NOT APPLICABLE)**

PART 3 **EXECUTION (NOT APPLICABLE)**

END OF SECTION

Request For Information (RFI)

RFI No.: _____ Page No.: _____ Date Requested: _____
Project Name: _____
Project Location: _____
Project No.: _____ Contract No.: _____
Contractor: _____

CONTRACTOR'S REQUEST FOR INFORMATION

RFI Subject: _____

References: Specification(s): _____ Section(s): _____ Paragraph(s): _____
Drawings(s): Drawing No(s): _____ Detail No(s): _____

Potential Cost Impact: _____

Potential Schedule Impact: _____

Request By: _____
(Print Name) *(Signature)*

Information Requested:

Empty space for detailing the information requested.

General Contractor's Recommendation:

Empty space for the contractor's recommendation.

Request For Information (RFI)

OWNER'S RESPONSE

Date Received: _____ Date Answered: _____

Request Reviewed By: _____
(Print Name) *(Signature)*

(Date)

Owner's Response to Contractor:

Attachments From Owner:

Note: The RFI system is intended to provide an efficient mechanism for responding to General Contractor's Requests for Information. It does not provide authority to proceed with additional work. If the General Contractor considers the RFI response a changed condition, provide written notice to the Owner in accordance with Contract provisions.

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Section 01 29 83 – Payment Procedures:
Testing Laboratory Services

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PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 Inspecting and testing by inspecting firms or testing laboratories designated by Owner.

1.2 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- .1 Particular requirements for inspection and testing to be carried out by testing laboratory designated by Owner are specified under various sections.

1.3 APPOINTMENT AND PAYMENT

- .1 Owner will appoint and pay for services of testing laboratory except as follows:
 - .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
 - .2 Inspection and testing performed exclusively for Contractor's convenience.
 - .3 Testing, adjustment and balancing of conveying systems, mechanical and electrical equipment and systems.
 - .4 Mill tests and certificates of compliance.
 - .5 Tests specified to be carried out by Contractor under the supervision of Owner.
- .2 Where tests or inspections by designated testing laboratory reveal Work not in accordance with contract requirements, pay costs for additional tests or inspections as required by Owner to verify acceptability of corrected work.

1.4 CONTRACTOR'S RESPONSIBILITIES

- .1 Provide labour, equipment and facilities to:
 - .1 Provide access to Work to be inspected and tested.
 - .2 Facilitate inspections and tests.
 - .3 Make good Work disturbed by inspection and test.
 - .4 Provide storage on site for laboratory's exclusive use to store equipment and cure test samples.

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Section 01 29 83 – Payment Procedures:
Testing Laboratory Services

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- .2 Notify Owner sufficiently in advance of operations to allow for assignment of laboratory personnel and scheduling of test.
- .3 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.
- .4 Pay costs for uncovering and making good Work that is covered before required inspection or testing is completed and approved by Owner.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 **GENERAL**

1.1 **SECTION INCLUDES**

- .1 Coordination work with other contractors and subcontractors under administration of Owner.
- .2 Scheduled project meetings.

1.2 **RELATED SECTIONS**

- .1 Section 01 11 00 - Summary of Work.
- .2 Section 01 91 13 – Commissioning .

1.3 **DESCRIPTION**

- .1 Coordination of progress schedules, submittals, use of site, temporary utilities, construction facilities, and construction Work, with progress of Work of other contractors and subcontractors under instructions of Owner.

1.4 **PROJECT MEETINGS**

- .1 Project meetings to be held at times and locations as determined by Owner.
- .2 Owner will arrange project meetings and record and distribute minutes.

1.5 **CONSTRUCTION ORGANIZATION AND START-UP**

- .1 Within ten (10) working days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Establish time and location of meetings and notify parties concerned minimum five (5) days before meeting.
- .3 Agenda to include following:
 - .1 Appointment of official representative of participants in Work.
 - .2 Schedule of Work, progress scheduling in accordance with Section 01 32 00 - Construction Progress Documentation.
 - .3 Schedule of submission of shop drawings, samples, colour chips in accordance with Section 01 33 00 - Submittal Procedures.

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Section 01 31 00 - Project Management
and Coordination

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- .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 51 00 - Temporary Utilities.
- .5 Delivery schedule of specified equipment in accordance with Section 01 32 00 - Construction Progress Documentation.
- .6 Site security in accordance with Section 01 52 00 - Construction Facilities.
- .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, and administrative requirements.
- .8 Record drawings in accordance with Section 01 78 00 - Closeout Submittals.
- .9 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.
- .10 Take-over procedures, acceptance, and warranties in accordance with Section 01 77 00 - Closeout Procedures and 01 78 00 - Closeout Submittals.
- .11 Monthly progress claims, administrative procedures, photographs, and holdbacks.
- .12 Appointment of inspection and testing agencies or firms in accordance with Section 01 45 00 - Quality Control.
- .13 Insurances and transcript of policies.
- .4 Comply with Owner's allocation of mobilization areas of site; for field offices and sheds, for access, traffic, and parking facilities.
- .5 During construction coordinate use of site and facilities through Owner's procedures for intra-project communications: Submittals, reports and records, schedules, coordination of drawings, recommendations, and resolution of ambiguities and conflicts.
- .6 Comply with instructions of Owner for use of temporary utilities and construction facilities.

1.6 ON-SITE DOCUMENTS

- .1 Maintain at job site, one copy each of the following:
 - .1 Contract drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Reviewed shop drawings.
 - .5 List of outstanding shop drawings.

- .6 Change orders.
- .7 Other modifications to Contract.
- .8 Field test reports.
- .9 Copy of approved Work schedule.
- .10 Health and Safety Plan and other Safety related documents.
- .11 Manufacturers' installation and application instructions.
- .12 Labour conditions and wage schedules.
- .13 Other documents as specified.

1.7 SCHEDULES

- .1 Submit preliminary construction progress schedule in accordance with Section 01 32 00 - Construction Progress Documents to Owner coordinated with Owner's project schedule. Schedule to show anticipated progress stages and final completion of work within time period required by contract documents.
- .2 After review, revise and resubmit schedule to comply with project schedule requirements.
- .3 During progress of Work revise and resubmit at project progress meetings or as directed by Owner.

1.8 SUBMITTALS

- .1 Make submittal to Owner's for review.
- .2 Submit preliminary shop drawings, product data and samples in accordance with Section 01 33 00 – Submittal Procedures 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 Owner.
- .3 Submit requests for payment for review to Owner.
- .4 Submit requests for interpretation of Contract Documents, and obtain instructions through Owner.
- .5 Process change orders through Owner.
- .6 Deliver closeout submittals for review by Owner.

1.9 COORDINATION

- .1 Coordinate construction operations included in various Sections of the Specifications to ensure efficient and orderly installation of each part of the Work.
- .2 Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection and operation.
- .3 Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
- .4 Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair of all components, mechanical, electrical, and otherwise,
 - .1 Provide adequate clearances for installation and maintenance of equipment.
 - .2 Install work to permit removal of parts requiring periodic replacement or maintenance.
 - .3 Arrange pipes, ducts, raceways and equipment to permit ready access to valves, cocks, traps, starters, motors, and control components.
 - .4 Doors and access panels shall be kept clear.
 - .5 Utilize space efficiently so that adequate accessibility is retained for future maintenance, repairs, modifications and additions.
 - .6 Check the locations selected for all sprinkler heads and check the Architectural reflected ceiling plans to prevent conflicts between the trades.
 - .7 Contractor is cautioned that, where specific dimensions are not indicated or where Drawings are schematic in nature, as with most Electrical and Mechanical Drawings, Contractor shall have sole responsibility to coordinate the work to meet this requirement.
- .5 Make adequate provisions to accommodate items scheduled for later installation.
- .6 Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work and completion within the specified Contract duration. Such administrative activities include, but are not limited to, the following:
 - .1 Preparation of Contractor's Construction Schedule.
 - .2 Installation and removal of temporary facilities and controls.

- .3 Delivery and processing of submittals.
- .4 Progress meetings.
- .5 Start-up, check-out, and final acceptance of systems.
- .6 Project closeout activities.
- .7 Protection of existing and new work.
- .7 Changes required in the Work of the Contract, caused by the Contractor's neglect to coordinate the work with others shall be made at the Contractor's own expense.

1.10 COORDINATION DRAWINGS

- .1 Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
- .2 Contractor to submit to the Owner, in AutoCAD format, coordination drawings, drawn accurately to a scale large enough to indicate and resolve conflicts.
- .3 Indicating the functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
- .4 Do not base coordination drawings on standard printed data.
- .5 Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
- .6 Show location and size of access doors required for access to concealed dampers, valves, and other controls.
- .7 Indicate required installation sequences.
- .8 Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements.
- .9 Minor dimension changes and difficult installations will not be considered changes to the Contract.
- .10 Owner will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination. If Owner determines that coordination drawings are not being prepared in sufficient

scope or detail, or are otherwise deficient, Owner will so inform Contractor, who shall make changes as directed and resubmit.

1.11 CLOSEOUT PROCEDURES

- .1 Notify Owner when Work is considered ready for Substantial Performance.
- .2 Accompany Owner on preliminary inspection to determine items listed for completion or correction.
- .3 Comply with Owner's instructions for correction of items of Work listed in executed certificate of Substantial Performance and for access to Owner-occupied areas.
- .4 Notify Owner of instructions of items of Work determined in Owner's final inspection.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 77 00 - Closeout Procedures.

1.2 SCHEDULES REQUIRED

- .1 Submit schedules as follows:
 - .1 Construction Progress Schedule.
 - .2 Submittal Schedule for Shop Drawings and Product Data.
 - .3 Submittal Schedule for Samples.
 - .4 Product Delivery Schedule.
 - .5 Cash Allowance Schedule for purchasing Products.
 - .6 Shutdown or closure activity.

1.3 FORMAT

- .1 Prepare schedule in form of a horizontal bar chart.
- .2 Provide a separate bar for each major item of work, trade or operation.
- .3 Split horizontally for projected and actual performance.
- .4 Provide horizontal time scale identifying first work day of each week.
- .5 Format for listings: chronological order of start of each item of work.
- .6 Identification of listings: By Systems description.

1.4 SUBMISSION

- .1 Submit initial format of schedules within 15 working days after award of Contract.
- .2 Submit schedules in electronic format, forward on disc as PDF files.
- .3 Submit one opaque reproduction, plus 2 copies to be retained by Owner.
- .4 Owner will review schedule and return review copy within ten (10) working days after receipt.
- .5 Resubmit finalized schedule within seven (7) working days after return of review copy.

- .6 Submit revised progress schedule with each application for payment.
- .7 Distribute copies of revised schedule to:
 - .1 Job site office.
 - .2 Subcontractors.
 - .3 Other concerned parties.
- .8 Instruct recipients to report to Contractor within ten (10) working days, any problems anticipated by timetable shown in schedule.

1.5 CRITICAL PATH SCHEDULING

- .1 Include complete sequence of construction activities.
- .2 Include dates for commencement and completion of each major element of construction as follows.
 - .1 Site clearing.
 - .2 Site utilities.
 - .3 Foundation Work.
 - .4 Structural framing.
 - .5 Special Subcontractor Work.
 - .6 Equipment Installations.
 - .7 Finishes.
- .3 Show projected percentage of completion of each item as of first day of month.
- .4 Indicate progress of each activity to date of submission schedule.
- .5 Show 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.
- .6 Provide a narrative 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 prime contractors.

1.6 SUBMITTALS SCHEDULE

- .1 Include schedule for submitting shop drawings, product data, and samples.

- .2 Indicate dates for submitting, review time, resubmission time, last date for meeting fabrication schedule.

PART 2 **PRODUCTS (NOT APPLICABLE)**

PART 3 **EXECUTION (NOT APPLICABLE)**

END OF SECTION

PART 1 GENERAL

1.1 SECTIONS INCLUDE

- .1 Shop drawings and product data.
- .2 Samples.
- .3 Certificates and transcripts.

1.2 RELATED SECTIONS

- .1 Section 01 32 00 – Construction Progress Documentation.
- .2 Section 01 45 00 – Quality Control.
- .3 Section 01 78 00 – Closeout Submittals.

1.3 ADMINISTRATIVE

- .1 This section specifies general requirements and procedures for contractor's submissions of shop drawings, product data, samples and mock-ups to Owner for review. Submit promptly and in orderly sequence 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 Do not proceed with work until relevant submissions are reviewed by Owner.
- .3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4 Where items or information is not produced in SI Metric units converted values are acceptable.
- .5 Review submittals prior to submission to Owner. 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. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and shall be considered rejected.
- .6 Notify Owner, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

- .7 Verify field measurements and affected adjacent Work are coordinated.
- .8 Contractor's responsibility for errors and omissions in submission is not relieved by Owner's review of submittals.
- .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Owner's review of submission, unless Owner gives written acceptance of specific deviations.
- .10 Make any changes in submissions which Owner may require consistent with Contract Documents and resubmit as directed by Owner. When resubmitting, notify Owner in writing of revisions other than those requested.
- .11 Notify Owner, in writing, when resubmitting, of any revisions other than those requested by Owner.
- .12 Keep one reviewed copy of each submission on site.

1.4 SUBMITTALS

- .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 Coordinate each submission with requirements of work and Contract Documents. Individual submissions will not be reviewed until all related information is available.
- .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 ten (10) working days for Owner's review of each submission.
- .5 Adjustments made on shop drawings by Owner are not intended to change contract price. If adjustments affect value of Work, state such in writing to Owner immediately after receipt of approval of shop drawings. If value of work is to change a change order must be issued prior to proceeding with work.
- .6 Structural Attachments:

- .1 Make changes in shop drawings as Owner may require, consistent with Contract Documents. When resubmitting, notify Owner in writing of 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 adjacent work.
- .9 After Owner's review, distribute copies.
- .10 Submit one (1) electronic copy in PDF format of shop drawings for each requirement requested in specification Sections and as Owner may reasonably request.

- .11 Submit electronic copy in PDF format of product data sheets or brochures for requirements requested in Specification Sections and as requested by Owner 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 Cross-reference product data information to applicable portions of Contract Documents.
- .15 If upon review by Owner, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of work may proceed.
- .16 Samples: examples of materials, equipment, quality, finishes, workmanship. Label samples with origin and intended use.
- .17 Notify Owner in writing, at time of submission of deviations in samples from requirements of contract documents.
- .18 Where colour, pattern or texture is criterion, submit full range of samples.
- .19 Adjustments made on samples by Owner are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Owner prior to proceeding with Work.
- .20 Make changes in samples, which Owner may require, consistent with Contract Documents.
- .21 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.
- .22 Submit drawings stamped and signed by Professional Engineer registered or licensed in the Province of Newfoundland and Labrador.

1.5 PROGRESS PHOTOGRAPHS

- .1 Progress photograph to be electronically formatted and labelled as to location and view.

1.6 SHOP DRAWINGS REVIEW

- .1 The review of shop drawings by Owner is for the sole purpose of ascertaining conformance with the general concept. This review shall not mean that Owner approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of responsibility for errors or omissions in the shop drawings or of responsibility for meeting all requirements of the construction and contract documents. Without restricting the generality of the foregoing, the Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains to fabrication processes or to techniques of construction and installation and for co-ordination of the work of all sub-trades.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA-Z259.1, Body Belts and Saddles for Work Positioning and Travel Restraint.
 - .2 CAN/CSA-Z259.10, Full Body Harnesses.
 - .3 CAN/CSA-Z259.11, Energy Absorbers and Lanyards.
 - .4 CAN/CSA-Z259.2.1, Fall Arresters, Vertical Lifelines and Rails.
 - .5 FCC No. 301, Standard for Construction Operations.
 - .6 CSA Z275.2, Occupational Safety Code for Diving Operations.
 - .7 CSA Z275.4, Competency Standard for Divers Operations.
 - .8 CSA Z797, Code of Practice for Access Scaffold.
- .2 FCC No. 302, Standard for Welding and Cutting.
- .3 Transportation of Dangerous Goods Act & Regulations.
- .4 Newfoundland and Labrador Occupational Health and Safety Act, Amended
- .5 Consolidated Newfoundland and Labrador Regulations 1149 WHMIS Regulations under the Occupational Health and Safety Act.
- .6 Consolidated Newfoundland and Labrador Occupational Health and Safety Regulations under the Occupational Health and Safety Act.
- .7 Canada Labour Code, Part 2.
- .8 National Building Code of Canada.
- .9 Department of Transportation and Infrastructure Occupational Health and Safety Manual.
- .10 Department of Transportation and Infrastructure Contractor Safety Management Program.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 35 43 - Environmental Procedures.

- .3 Section 01 41 00 - Regulatory Requirements.

1.3 GENERAL

- .1 All work to be performed in accordance with the requirements of the Newfoundland and Labrador Occupational Health and Safety Act and Regulations as amended, the Department of Transportation and Infrastructure's Contractor Safety Management Program and any specified Contract requirements.
- .2 The Contractor shall comply with and enforce compliance by employees, subcontractors, suppliers and visitors with all safety requirements of the Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with the Site Specific Health and Safety Plan (SSSP).
- .3 The Contractor is responsible for all work coordination at the project site, safety oversight, and must maintain full ownership and control of safety within the project area at all times.
 - .1 The Contractor shall ensure co-ordination of work schedules and tasks, and communication thereof for the purpose of ensuring health and safety on the worksite.
- .4 Owner may perform project due diligence, site visits, safety monitoring activities, make suggestions or recommendations for improvement, and/or request changes in how work is performed. Notwithstanding, the Contractor has full responsibility, authority, and accountability for safely performing all work on the project site and/or under the project. Owner solely relies on the Contractor to know how to safely perform all Work including making appropriate decisions on Owner recommendations or requests.
- .5 The Contractor shall ensure that in addition to those requirements set forth in the OHS Act and Regulations, all persons, including those employed by the Contractor or their subcontractors, working on projects for MUN shall wear the following mandatory Personal Protective Equipment at ALL times while working on the project.
 - .1 CSA approved safety boots meeting the CSA Z195 Standard.
 - .2 CSA approved hard hat meeting the CSA Z94.1 Standard.
 - .3 CSA approved safety glasses meeting CSA Z94 Standard.
 - .4 High visibility apparel as defined in the OHS Regulations.

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- .5 Where noise exceeds standards set out in the OHS Regulations hearing protection shall be worn, and hearing conservation program implemented.
- .6 Other personal protective equipment, as may be required by the work tasks, hazard assessments or the Contractor, depending on duties being performed.

1.4 SUBMITTALS

- .1 At least 10 (ten) working days prior to commencing any site work: submit to Owner copies of:
 - .1 A complete Site Specific Health and Safety Plan (SSSP).
 - .1 Current (less than one year) medical examination certificate (s) from a licensed medical doctor in the Province of Newfoundland and Labrador who is knowledgeable and competent in diving and hyperbaric medicine for all dives.
 - .2 Certificates of Analysis for quality/purity of breathing air to be used by diver(s).
 - .3 Documentation showing that diving life support equipment is in good working order and properly maintained.
 - .4 Copies of documentation shall be submitted to show:
 - .1 An up-to-date dive site listing of the contact Hyperbaric facility and phone numbers for each location.
 - .2 Written arrangements with standby physician(s) specializing in diving/hyperbaric medicine for contingent emergency response and post dive follow-up for 48 hours after dive is completed.
 - .3 Effective means of communication between the diving supervisor and physician are available.
 - .4 The name, location and telephone number of the hospital and emergency department nearest the dive site.
 - .2 If work entails confined space, submit the following:
 - .1 Copies of current confined space entry training certificates acceptable to Workplace NL, as well as copies of confined space entry programs, confined space assessment, safe work practices and rescue plans.
- .2 Review and acceptance of the SSSP and other submitted documents by the Owner shall only be viewed as acknowledgement that the contractor

has submitted the required documentation under this specification section.

- .3 Owner makes no representation and provides no warranty for the accuracy, completeness and legislative compliance of the Site Specific Health and Safety Plan and other submitted documents by this acceptance.
- .4 Responsibility for errors and omissions in the SSSP and other submitted documents is not relieved by acceptance by Owner.
- .5 Contractor to complete and submit to the Construction Manager, on a monthly basis, the Monthly Safety Performance Form, indicating monthly OHS performance indicators, OHS activities, training information and equipment maintenance.
 - .1 Monthly Safety Performance Form: use form provided at the end of this section.

1.5 OCCUPATIONAL HEALTH AND SAFETY (SITE SPECIFIC HEALTH AND SAFETY PLANS)

- .1 Conduct operations in accordance with latest edition of the Newfoundland Occupational Health and Safety (OHS) Act and Regulations, with specific reference to codes and standards referenced therein, the Department of Transportation and Infrastructure Occupational Health and Safety Manual (<https://www.gov.nl.ca/ti/files/publications-ohs-full.pdf>), and the Department of Transportation and Infrastructure Contractor Safety Management Plan (<https://www.gov.nl.ca/ti/files/Contractor-Safety-Management-program-November-20212.pdf>).
- .2 Prepare a detailed Site Specific Health and Safety Plan (SSSP) that shall identify, evaluate and control job specific hazards through a detailed hazard assessment of the tendered project outlining phases of the project and hazards/controls associated with specific work, equipment, locations and tasks associated with the work conducted during each phase of the project and the necessary control measures to be implemented for managing hazards.
- .3 The plan shall also ensure adequate policies, procedures and safe work practices are in place to manage hazards identified in the hazard assessment that cannot be addressed through engineering controls.
- .4 It is the responsibility of the Contractor to submit only one SSSP that incorporates all relevant portions of their subcontractors' safety documentation.

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- .5 For projects exceeding thirty (30) days, provide a copy of the SSSP upon request to Occupational Health and Safety Division, Digital Government and Service NL, Province of Newfoundland and Labrador and the Owner.
- .6 The written SSSP shall incorporate the following:
 - .1 Hazard assessment results.
 - .2 Engineering and administrative demonstrative controls (work-practices and procedures) to be implemented for managing identified and potential hazards, and comply with applicable federal and provincial legislation and more stringent requirements that have been specified in these specifications.
 - .3 An organizational structure, in the form of an organizational chart with contact information of the key positions, which shall establish the specific chain of command and specify the overall responsibilities of contractor's employees at the work site.
 - .1 The chart shall also include relevant information for all subcontractors.
 - .4 Identification of the designated qualified work coordinator(s) (i.e. Supervisor, Contractor Safety Representative) as per Section 21 of the OHS Regulations.
 - .5 A comprehensive work plan which shall:
 - .1 Outline the phases of the Project and the required tasks, equipment, positions, resources and objectives for each phase, including all subcontracted work.
 - .2 Conduct a detailed hazard assessment of each project phase, including all subcontracted work, taking into consideration the objectives, tasks, equipment, positions, resources, training, etc.
 - .3 Identify the controls required for all identified hazards and project phases that may include engineering controls, policies, procedures, equipment, safe work practices, training and communication with staff, etc.
 - .6 Establish personnel requirements for implementing the plan and controls, and establish site-specific training and notification requirements and schedules.
 - .7 A personal protection equipment (PPE) Program which shall detail PPE:
 - .1 Selection criteria based on site hazards as determined by the hazard assessment.
 - .2 Use, maintenance, inspection and storage requirements and procedures.

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- .3 Decontamination and disposal procedures.
- .4 Inspection procedures prior to, during and after use, and other appropriate medical considerations.
- .5 Limitations during temperature extremes, heat stress and other appropriate medical consideration.
- .8 An emergency response procedure, refer to clause [1.6 Supervision and Emergency Response Procedure](#) of this section for requirements.
- .9 A hazard communication program for informing workers, visitors and individuals outside of the work area as required. This will include but not be limited to a visitor safety and orientation policy and program that will include education on hazards, required PPE and accompaniment while on site.
 - .1 This program shall also take into consideration the safety of the general public that may come in contact with the work site and appropriate measures for notification and safety
- .10 A hearing conservation program in accordance with Part VI, Section 68 of the OHS Regulations.
- .11 A complete listing of employee names, their driver's license classification, expiry date, endorsements and the type of equipment that they are qualified to operate for the complete scope of work for this project. The Driver's License Number should not be provided as this is confidential information. Provision of the License Number may breach *PIPEDA* - the Personal Information Protection and Electronic Documents Act. (Federal Act) or *ATIPPA* - *Access to Information and Protection of Privacy Act* - Part IV. (Provincial Act of Newfoundland and Labrador). This shall also include documentation where required of certification in power line hazards.
- .12 An acceptable parking policy for all powered mobile equipment to be used on this project. The policy shall, at a minimum, be based on a hazard assessment that considers factors such as equipment type, potential for roll over, load capacity of the parking area, pedestrian and vehicular traffic, and potential for equipment tampering, equipment energy, and equipment contact with power lines.
- .13 A diving program which shall contain standard operating procedures to be followed in the diving operation.
- .14 A fall protection plan, if necessary. Refer to clause [1.22 Working at Heights](#).
- .15 A dust suppression management program, if necessary.

- .16 An assessment of all possible risks of violence for the project and corresponding control measures. Considerations should include location and circumstances of the site, previous history of incidents and or possible triggers.
- .17 General safety rules.
- .7 Periodically review and modify as required each component of the SSSP when a new hazard is identified during completion of work and when an error or omission is identified in any part of the SSSP.
- .8 Review the completeness of the hazard assessment immediately prior to commencing work, when a new hazard is identified during completion of work and when an error or omission is identified.
 - .1 Be solely responsible for investigating, evaluating and managing any report of actual or potential hazards.
 - .2 Clearly define accident incident investigation procedures.
 - .3 Clearly define policy and processes for early and safe return to work.
 - .4 Retain copies of all completed hazard assessments at the project site and make available to the Owner immediately upon request.
- .9 Implement all requirements of the SSSP.
 - .1 Ensure that every person entering the project site is informed of requirements under the SSSP.
 - .2 Take all necessary measures to immediately implement any engineering controls, administrative controls, personal protective equipment required or termination of work procedures to ensure compliance with the SSSP.
- .10 Conduct site orientations to advise workers of the hazards on their worksites. Site orientations to be performed by the party most familiar with the hazards of the worksite.
- .11 Hold regular toolbox talks, with additional talks if there are changes to the job.
- .12 Conduct weekly site inspections of the worksite.

1.6 SUPERVISION AND EMERGENCY RESCUE PROCEDURE

- .1 Develop an organizational structure which establishes a specific chain of command and overall responsibilities of all employees at the work site.

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- .2 Carry out work under the direct supervision of competent persons responsible for safety by ensuring the work complies with the appropriate section of OHS Act and Regulations
- .3 Assign a sufficient number of supervisory personnel to the work site.
 - .1 Any person assigned to supervisory duties shall not conduct significant work in relation to the contract that inhibits them from the ability to properly supervise the work site.
- .4 Ensure the site supervisor has complete understanding, working knowledge and familiarity with the SSSP, applicable codes and standards as well as the OHS Act and Regulations.
- .5 Ensure the site supervisor fully implements, enforces, and monitors the SSSP.
- .6 Prior to the start of work, ensure that the site supervisor(s) have the training, knowledge, and understanding in:
 - .1 Project tasks and construction activities.
 - .2 Hazard recognition evaluation and control.
 - .3 Development and implementation of safe work practices and procedures.
 - .4 Accident incident investigations and reporting.
 - .5 Workplace violence and harassment prevention.
 - .6 Equipment maintenance and inspections required for preventive safety.
 - .7 Care and maintenance of PPE to be used on site.
 - .8 Standard First Aid training certified by WorkplaceNL.
 - .9 WHMIS 2015.
- .7 The Site Supervisor shall:
 - .1 Be responsible for project safety by ensuring the work complies with all requirements of the SSSP and with the appropriate section(s) of OHS Act and Regulations, latest edition.
 - .2 Prior to mobilization on site, hold a pre-start Health and Safety meeting with the Contractors, subcontractors, and Owner to review of the SSSP including all its contents.
 - .3 Be responsible for the delivery and documentation of the site safety orientations and ensure that personnel who have not been oriented are not permitted to enter the site. This applies to all workers (Contractor, Subcontractor, and Department), and visitors.

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- .4 Advise of the health and safety hazards for the work site, provide written or verbal instructions of any precautions to be taken to protect everyone at the work site and ensure that the applicable personal protective equipment is used and worn on site at all times.
 - .5 Review hazard assessment for completeness immediately prior to commencing work, when a new hazard is identified during completion of work, or when an error or omission is identified.
 - .6 Address all safety concerns brought to their attention in a timely manner depending on the severity of the hazard.
 - .7 Be responsible for the maintenance of a daily log of inspections, meetings, infractions and mitigating measures. The log is to be filed daily and copies provided to the Owner as requested.
 - .8 Be responsible to log, investigate, track and follow-up on mitigations for all near misses, incidents and/or accidents.
 - .9 Promote employees' right to work in a respectful, harassment-free, and psychologically healthy and safe work environment. Assist the Owner to investigate incidents of workplace violence or harassment carried out against a MUN employee by contractor or sub-contractor employees.
 - .10 Ensure the correct traffic control signage plan is utilized on site and staff have been notified of the requirements. Ensure that road signage is inspected for accuracy and condition by a competent and trained person upon set-up, each morning prior to work, and at any point in which the signage requires change during the workday or life of the contract. A Traffic Control and Signage Log must be submitted with the Contractor's Monthly OHS Performance Report.
 - .11 If required for the project, coordinate with and support the efforts of the on-site safety representative.
- .8 Assign a dedicated on-site safety representative to assist the Site Supervisor during the completion of high-risk activities. This person shall have training, knowledge, and understanding regarding the activity(s) being completed. High-risk activities may include, but are not limited to:
- .1 Heavy lift operations which includes items greater than 1000 kg or which may need an engineered lift plan due to other identified risk factors.
 - .2 Lift operations that occur closer than 10 m of energized power lines or close proximity to moving traffic, public and residential areas, or other sensitive locations.
 - .3 When greater than three (3) employers are working in close proximity at the same time. Close proximity execution means any

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- time the operations of each employer are close enough to directly influence or add risk to another employer.
- .4 Working within or near highly populated residential areas when there is an appreciable ongoing risk to the public that needs continual safety oversight.
 - .5 When a complex traffic control plan is needed in high volume areas.
 - .6 Work involving confined space entry.
 - .7 Working with or near toxic and hazardous substances.
 - .8 Any other high-risk activity identified through hazard/risk assessment by the Contractor or by the Owner.
 - .9 In such instances, the Contractor may request and the Department may agree that such dedicated safety representation is not needed if the Contractor demonstrates there are adequate safety controls in place to mitigate the risk.
 - .9 Provide a suitable means of communications and check-in for workers required to work alone.
 - .10 Develop an emergency rescue plan for the job site and ensure that supervisors and workers are trained in the emergency rescue plan.
 - .11 The emergency response plan shall address, as a minimum:
 - .1 Pre-emergency planning (included the assessment of controls to reduce the likelihood of such an emergency if possible).
 - .2 Personnel roles, lines of authority and communication (include a communication list of all emergency services in the immediate and surrounding areas).
 - .3 Emergency recognition and prevention (identification of each potential type of emergency and evaluation of requirements for response).
 - .4 Required communication equipment including landlines, mobile phones, radios, satellite phones, and/or other equipment needed to ensure appropriate emergency communications in the area of the Project.
 - .5 Safe distances and places of refuge.
 - .6 Site security and control.
 - .7 Evacuation routes and procedures.
 - .8 Decontamination procedures which are not covered by the site specific safety and health plan.
 - .9 Emergency medical treatment and first aid.

- .10 Emergency alarm, notification and response procedures including procedures for reporting incidents to local, provincial and federal government departments.
 - .11 PPE and emergency equipment.
 - .12 Procedures for handling emergency incidents.
 - .13 Procedures and protocol for working alone and/or remote working.
 - .14 Site specific emergency response training requirements and schedules.
- .12 The emergency response procedures shall be rehearsed regularly as part of the overall training program and the results documented. The frequency at which all aspects of the emergency response plan will be rehearsed must be stated.
- .13 Provide adequate first aid facilities for the jobsite and ensure that a minimum number of workers are trained in first aid in accordance with the Occupational Health and Safety First Aid Regulations.

1.7 CONTRACTORS SAFETY REPRESENTATIVE

- .1 The contractor shall employ a Contractor's Safety Representative (CSR) who shall have as a minimum successfully completed the following training, and must have current credentials for those that have expiration dates:
- .1 Training in hazardous materials management and response/protocols.
 - .2 Training in the use, maintenance of fall protection systems certified by Workplace NL at a minimum.
 - .3 Training in the inspection of scaffolding in accordance with CSA Z797.
 - .4 Training in confined space entry protocols, techniques and rescue plans, certified by Workplace NL at a minimum.
 - .5 Supervisory training.
 - .6 Training in records and statistics.
 - .7 Training in hazard identification, inspections, analysis and control.
 - .8 Training in WHMIS 2015.
 - .9 Training in health and safety program content.
 - .10 Training in investigations and reporting.
 - .11 Training in occupational health/hygiene.
 - .12 Training in employee training and communication.
 - .13 Training in Emergency Preparedness and First Aid.

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- .14 A working knowledge of, and experience satisfactory to the Department, using the occupational safety and health legislation and regulations specific to Newfoundland and Labrador.
 - .15 Experience, satisfactory to the Department, with the safe work practices required for execution of the work and operation of equipment specific to the project.
 - .16 Experience, satisfactory to the Department, in developing and monitoring site safety and housekeeping policies.
 - .17 Experience, satisfactory to the Department, in developing and monitoring a preventative maintenance and inspection program for Construction Site Equipment.
- .2 The CSR shall:
- .1 Be responsible for developing, implementing, daily enforcement, monitoring and updating of the SSSP.
 - .2 Be responsible for the delivery of the site safety orientation and ensure that the personnel who have not been orientated are not permitted to enter the site. This applies to workers, inspectors and visitors.
 - .3 Report directly to and be under direction of the Site Superintendent or Contractor's Project Manager.
 - .4 Prior to mobilization on-site, hold an orientation meeting with the contractors, subcontractors and Owner to review project occupational health and safety. Include but not limit meeting to a review of:
 - .1 The SSSP.
 - .2 Construction Safety Measures.
 - .3 Supervision and Emergency Rescue Procedures.
 - .4 Hazard Assessments
 - .5 Maintain a daily log of inspections, meetings, infractions and mitigating measures. Log is to be filed daily and copies to be provided to the Site Superintendent and Owner.
 - .6 The CSR shall have:
 - .1 Formal training in OHS Management (degree, diploma, or certificate) combined with at least two (2) years of relevant experience, or
 - .2 A designation of National Construction Safety Officer (NCSO), Construction Safety Officer (CSO), Canadian Registered Safety Professional (CRSP), Canadian Registered Safety Technician (CRST), or Certified Health and Safety Consultant (CHSC), or other similar designation.

1.8 HEALTH AND SAFETY COMMITTEE

- .1 Establish an Occupational Health and Safety Committee where ten or more workers are employed on the job site for greater than 30 days as per the OHS Act and Regulations.
- .2 Committee members shall receive training from a WorkplaceNL recognized training provider.
- .3 Provide a copy of all committee minutes with the Contractor's Monthly OHS Performance Report.

1.9 CONTRACTOR ROLES AND RESPONSIBILITIES

- .1 Ensure that their organization is staffed appropriately to ensure completion of project tasks and all necessary safety related duties and responsibilities.
- .2 Ensure co-ordination of work schedules and tasks, and communication thereof for the purpose of ensuring health and safety on the worksite.
- .3 Be 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 extent that they may be affected by conduct of Work.
- .4 Develop a SSSP that thoroughly assesses the health and safety hazards of each project phase, including all subcontracted work.
- .5 Implement all requirements of the SSSP. The Contractor shall take all necessary measures to immediately implement any engineering controls, administrative controls, personal protective equipment required or termination of work procedures to ensure compliance with the SSSP and the OHS Act and Regulations. All measures should be immediately communicated to staff.
- .6 Comply with and enforce compliance by employees, subcontractors, suppliers and visitors with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with SSSP.
- .7 Where safety risks exist, the contractor must stop the work until such time as the risk can be mitigated to a safe level.
- .8 Take appropriate steps to ensure that the hazards are mitigated to a safe level, workers are notified of the hazards and how to protect themselves. As well, workers must be provided with any new safe work practices or information regarding mitigation of the risk.

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- .9 Periodically review and modify the SSSP as required including but not limited to when a new hazard is identified during completion of work or when an error or omission is identified in any part of the SSSP.
- .10 Support/permit periodic inspections of the Contractor's work by the Owner to maintain compliance with the SSSP. Inspections may include visual inspections of the site and documentation, as well as testing and sampling as required.
- .11 Be responsible for any and all costs associated with delays as a result of the Contractor's failure to comply with the requirements outlined in this Section or the OHS Act and Regulations.
- .12 Ensure that all workers receive necessary training as per the training matrix contained in the SSSP prior to the start of work. Maintain training records in a tabular format or spreadsheet for all employees on the project site and complete periodic reviews to ensure that necessary re-certifications are completed prior to expiration dates.
- .13 Ensure all equipment, vehicles, tools, or other devices necessary throughout the Project are suitable for the task and are inspected and maintained in accordance with the manufacturers' specifications and/or CSA standards adopted by the OHS Regulations.
- .14 Be responsible to ensure that site inspections have been completed at no less than one (1) week intervals. These site inspections shall include risk assessments where the nature of the ongoing work or tasks associated with the work increase in risk or significantly change due to phases in the project or project progression.
- .15 Ensure that toolbox meetings are held with staff no less than once per week and shall include review of safety related information that is pertinent to the safety of employees.
- .16 Ensure that all toolbox meetings, site inspections, risk assessments, OHS Committee meetings and any OHS Directives or reports are documented and submitted with the Contractor's Monthly OHS Performance Report.
- .17 Review for completeness the hazard assessment results immediately prior to commencing work, when a new hazard is identified during completion of work or when an error or omission is identified.
- .18 Be solely responsible for investigating, evaluating and managing any report of actual or potential hazards.

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- .19 Retain copies of all completed hazard assessments at the project site and provide a copy to the Owner. Copies of any hazard assessments not included in the original SSSP must be submitted immediately to the Owner and noted on the Contractor's Monthly OHS Performance Report.
- .20 Promote the employees' right to work in a respectful, harassment-free, and psychologically healthy and safe work environment. Assist the Owner to investigate incidents of workplace violence or harassment carried out against a MUN employee by contractor or sub-contractor employees.

1.10 UNFORSEEN HAZARDS

- .1 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction. Advise Owner verbally and in writing.

1.11 REPORTING AND INVESTIGATION

- .1 The Contractor shall adhere to a documented incident, hazard, safety reporting, and investigation process. The system shall:
 - .1 Ensure all hazards, near misses, incidents, accidents, injuries, equipment damage are recorded and properly investigated.
 - .2 Rank actual and potential severity of observations and report all high potential near misses, accidents, and incidents immediately to the Owner and to the OHS Division of Digital Government and Service NL.
 - .3 Advise the Owner and the OHS Division of Digital Government and Service NL verbally and in writing immediately of any incident that results in serious injury to a person or results in the death of a person; or had the reasonable potential to cause serious injury.
 - .4 Provide a copy of all notifications made to the OHS Division of Digital Government and Service NL to Transportation and Infrastructure.
 - .5 Where life safety risks or other high potential risks exists, the Contractor must stop work until such time as the risk can be mitigated to a safe level.
 - .6 Make appropriate steps to ensure that the hazards are mitigated to a safe level, workers are notified of the hazards and how to protect themselves. Additionally, workers must be provided with any new safe work practices or information regarding mitigation of the risk.

1.12 INSTRUCTION AND TRAINING

- .1 Workers shall not participate in or supervise any activity on the work site until they have been trained to a level required by this job function and responsibility.
- .2 Contractors shall develop an OHS training program that reflects OHS Legislative requirements and specific safety hazards based on Project work
- .3 Training shall as a minimum thoroughly cover the following:
 - .1 Federal and Provincial Health and Safety Legislation requirements including roles and responsibilities of workers and person(s) responsible for implementing, monitoring and enforcing health and safety requirements.
 - .2 Safety and health hazards associated with working on a contaminated site including recognition of symptoms and signs which might indicate over exposure to hazards.
 - .3 Limitations, use, maintenance and disinfection-decontamination of personal protective equipment associated with completing work.
 - .4 Limitations, use, maintenance and care of engineering controls and equipment.
 - .5 Limitations and use of emergency notifications and response equipment including emergency response protocol.
 - .6 Work practices and procedures to minimize the risk of an accident and hazardous occurrence from exposure to a hazard.
 - .7 Workers must receive training from a WorkplaceNL recognized training provider as outlined in the OHS legislation (i.e. fall protection, confined space entry, power line hazards, traffic control persons training).
 - .8 Training in the use, care and maintenance of PPE to be used on site.
 - .9 Training in the Contractor's emergency response plan for the Project. Workers engaged in fall arrest or confined space rescue operations will require specific training for the tasks involved.
 - .10 All workers at site must receive training in Workplace Violence and Harassment Prevention.
 - .11 Training in WHMIS 2015.
 - .12 Safety and health hazards associated with working in extreme weather conditions (i.e. heat/cold hazards).

- .4 Provide and maintain training of workers, as required, by Federal and Provincial legislation.
- .5 Provide copies of all training records to Owner for review, before a worker is to enter the work site. Site training records must be in tabular or spreadsheet format, stating employee name, occupation, required training, date that training was obtained and expiry date. This must be signed and dated by a member of the Contractor's management team.
- .6 Authorized visitors shall not access the work site until they have been:
 - .1 Notified of the names of persons responsible for implementing, monitoring and enforcing the SSSP.
 - .2 Briefed on safety and health hazards present on the site.
 - .3 Instructed in the proper use and limitations of personal protective equipment.
 - .4 Briefed as the emergency response protocol including notification and evacuation process.
 - .5 Informed of practices and procedures to minimize risks from hazards and applicable to activities performed by visitors.
 - .6 Accompanied while on site, and provided with the appropriate PPE.
- .7 All workers will be instructed and trained on the hazards associated with work they will perform and how to protect themselves. This will include a review of all safe work practices, the reporting and documentation of hazards, reporting accidents and injuries as well as, formal training in areas of high risk (i.e. fall protection, power line hazards, traffic control persons training).
- .8 The work site shall have the appropriate number of persons trained in emergency and Standard First Aid according to the First Aid Regulations.

1.13 CONSTRUCTION SAFETY MEASURES

- .1 Observe construction safety measures of National Building Code, latest edition, Federal and Provincial Government, OHS Act and Regulations, Workplace NL and Municipal Authority provided that in any case of conflict or discrepancy more stringent requirements shall apply.
- .2 Administer the project in a manner that will ensure, at all times, full compliance with Federal and Provincial Acts, regulations and applicable safety codes and the SSSP.

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- .3 Provide Owner with copies of all orders, directions and any other documentation, issued by the Occupational Health and Safety Division, Digital Government and Service NL, immediately after receipt.
- .4 Forward copies of all orders, directions or any other documentation immediately after receipt.

1.14 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 Province and authority having jurisdiction, and in consultation with Owner.

1.15 HEALTH AND SAFETY MONITORING

- .1 Periodic inspections of the contractor's work may be carried out by the Owner to maintain compliance with the Health and Safety Program. Inspections will include visual inspections as well as testing and sampling as required.
- .2 The contractor shall be responsible for any and all costs associated with delays as a result of contractor's failure to comply with the requirements outlined in this section.

1.16 NOTIFICATION

- .1 For projects exceeding thirty (30) days or more, the contractor shall, prior to the commencement of work, notify in writing the Occupational Health and Safety Division, Digital Government and Service NL with the following information and provide a copy to the Owner:
 - .1 Name and location of construction site.
 - .2 Company name and mailing address of contractor doing the work.
 - .3 The number of workers to be employed.
 - .4 A copy of the SSSP, if requested.

1.17 CORRECTION OF NON-COMPLIANCE

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Owner.
- .2 Provide Owner with written report of action taken to correct non-compliance of health and safety issues identified within ten (10) working days.

- .3 Owner may stop work if non-compliance of health and safety regulations is not corrected.

1.18 WHMIS 2015

- .1 Ensure that all controlled products are in accordance with the Workplace Hazardous Materials Information System (WHMIS 2015) Regulations and Chemical Substances of the OHS Act and Regulations regarding use, handling, labelling, storage, and disposal of hazardous materials.
- .2 Deliver copies of relevant Safety Data Sheets (SDS) to job site and the Owner. The SDS must be acceptable to Labour Canada and Health and Welfare Canada for all controlled products that will be used in the performance of this work. All SDS should be located in accessible locations for all workers and visitors throughout the site, bound and organized in binders.
- .3 Train workers required to use or work in close proximity to controlled products as per OHS Act and Regulations. This must be documented as part of the on-site orientation and a copy provided to the Owner.
- .4 Label controlled products at jobsite as per OHS and Regulations and WHMIS.
- .5 Provide appropriate emergency facilities as specified in the SDS where workers might be exposed to contact with chemicals, e.g. eye-wash facilities, emergency shower.
 - .1 Workers to be trained in use of such emergency equipment.
- .6 Contractor shall provide appropriate personal protective equipment as specified in the SDS where workers are required to use controlled products.
 - .1 Properly fit workers for personal protective equipment
 - .2 Train workers in care, use and maintenance of personal protective equipment.
- .7 No controlled products are to be brought on-site without prior approved SDS.
- .8 The SDS are to remain on site at all times and are accessible to everyone on site.

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1.19 OVERLOADING

- .1 The Contractor's Full Time CSR and/or Site Superintendent shall ensure no part of work or associated equipment is subjected to loading that will endanger its safety or will cause permanent deformation.
- .2 Ensure equipment operations follow manufacturer's operating manual.

1.20 FALSEWORK

- .1 Design and construct falsework in accordance with CSA S269.1.

1.21 SCAFFOLDING

- .1 Design, erect, inspect, operate, modify, and dismantle scaffolding in accordance with CSA Z797, Part XI: sections 147-249 of the OH&S Act and Regulations, and the scaffold manufacturer's written instructions.
- .2 Provide trained and certified Competent Scaffold Erectors for all scaffold erection, modification and dismantling. Training certification must be valid at time of erection, modification and dismantling of scaffold.
- .3 Conduct and document daily inspections of scaffolding by trained and certified Competent Scaffold Inspectors or Erectors. Training certification must be valid at the time of inspection.
 - .1 Records and copies of these inspections shall be kept on site and provided upon request to the Department of Transportation and Infrastructure officials, Owner, etc.
- .4 Scaffolding inspection reports may be required to be provided with the Contractor's Monthly OHS Performance Reports, at the discretion of the Owner.
- .5 Provide a scaffold tagging system as described in CSA Z797.
- .6 Ensure that all industry best practices for safe scaffold usage, including fall protection, proper loading, safe access, electrical hazards, exit door management and other concerns are strictly adhered to.

1.22 WORKING AT HEIGHTS

- .1 Develop a site specific fall protection plan, including a rescue plan, and provide it to the Owner as a part of the SSSP when fall protection systems are required during the course of the Project

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- .2 Ensure that fall restraint or fall arrest devices are used by all workers working at elevations greater than 3.05 meters above grade or floor level in accordance with CSA Z259, where alternate fall protection systems are not provided in accordance with Occupational Health and Safety Act and Regulations.
- .3 All workers performing work at height and who will be required to utilize a fall arrest system must be trained in a fall protection program certified by the Workplace NL. Training must be current and valid at the time of use.
- .4 Prior to working at height workers shall be instructed in a Contractor Safe Work Practice for working at height and associated Rescue Plan for working at heights, developed specific to the work to be performed, locations and risks.
- .5 Maintain a list of all persons trained in WorkplaceNL certified fall protection training on site. To be combined with other training records as required in a tabular or spreadsheet format listed throughout this Section.
- .6 Ensure regular inspections of all fall protection and fall arrest equipment are completed and that records are maintained and kept on site. Daily inspections of fall restraint and horizontal fall protection/arrest systems shall be conducted.
- .7 Ensure that manufacturer's specifications for engineered fall protection/arrest/restraint systems are kept on site at all times.
- .8 Develop Working from Height Safe Work Practices specific to the Work, location and risks, and ensure the workers receive specific instruction regarding the work tasks and associated rescue plans.
- .9 Ensure that rescue equipment for fall rescues is kept in close proximity to workers working at height.
- .10 Where necessary the Contractor shall ensure that adequate protection from falling debris is addressed in site specific safety plans, this may include debris nets, barriers, etc.

1.23 PERSONAL PROTECTIVE EQUIPMENT

- .1 Ensure workers on the jobsite use personal protective equipment appropriate to the hazards identified in the SSSP and those workers are trained in the proper care, use, and maintenance of such equipment.

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- .2 PPE selections shall be based on an evaluation of the performance characteristics of the PPE relative to the requirements and limitations of the site, task-specific conditions, duration and hazards and potential hazards identified on site. PPE must also be fitted for the worker.
- .3 Provide workers and visitors to the site with proper respiratory protection equipment.
 - .1 No work shall be performed in an area where an airborne contaminant exceeds recommendations of the ACGIH, do not meet the appropriate standards for the specific contaminants or are not in accordance with the OHS regulations.
 - .2 Respiratory protection shall be provided in accordance with the requirements of the Occupational Health and Safety Division, Digital Government and Service NL and these specifications.
 - .3 Establish, implement and maintain a respirator inspection and maintenance program in accordance with the CSA standard identified in the OHS Regulations.
 - .4 Copies of all respirator owners' maintenance manuals shall be kept at all times at the contractor's site office.
- .4 Provide and maintain a supply of dermal protection equipment to allow visitors and all workers proper dermal protection.
 - .1 Dermal protection shall be sufficient to act as a protective barrier between the skin and an airborne contaminant or hazardous material. Dermal protection shall also be provided for all physical hazards.
 - .2 Dermal protection equipment shall not be used after exceeding 75% of the break through time. The break through time shall be based on the contaminant which requires the least amount of time to break through the protective equipment
 - .3 Copies of all dermal protection user specifications, owners and maintenance manuals shall be kept at all times at the contractor's site office.
 - .4 Establish, implement and maintain air inspection program to ensure proper dermal protection in accordance with CSA, NIOSH, U.S. EPA and manufacturer's requirements.
- .5 Provide all workers and up to five (5) visitors to the site with proper hearing protection. Workers and visitors shall not be exposed to noise levels greater than 85 dB (A) over an eight hour shift without proper hearing protection, in accordance with the Hearing Conservation Program.

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- .6 Provide all workers and up to five (5) visitors to the site with CSA approved eye protection sufficient to act as a protective barrier between the eye and airborne contaminants, hazardous materials and physical hazard.
- .7 Provide workers and up to five (5) visitors to the site with CSA approved hard hats meeting the CSA Z94.1.
- .8 Provide high visibility apparel as defined in Occupational Health and Safety Regulations.
- .9 Provide CSA approved safety boots meeting CSA Z195.
- .10 Provide other personal protective equipment, as may be required by the owner, depending on duties being performed.

1.24 CONFINED SPACE WORK

- .1 Comply with the Newfoundland and Labrador Occupational Health and Safety Regulations.
- .2 Ensure a hazard assessment has been conducted related to the confined space and the work to be performed within the space.
- .3 Provide approved air monitoring equipment where workers are working in confined spaces and ensure any test equipment to be used is calibrated, in good working order and used by trained persons.
- .4 Ensure all required PPE is provided to the workers and workers are trained in its use, care and selection.
- .5 Develop a confined space entry (CSE) program specific to the nature of work performed and in accordance with OHS Act and Regulations and ensure supervisors and workers are trained in the confined space entry program. This shall include training on the CSE permit system, rescue plan, testing, communication equipment and all equipment and safe work procedures conducted in and around the confined space.
 - .1 Ensure that personal protective equipment and emergency rescue equipment appropriate to the nature of the work being performed is provided and used.
- .6 Provide and maintain training of workers through a provider certified by the Workplace NL.

- .7 Provide Owner with a copy of an “Entry Permit” for each entry into the confined space to ensure compliance Provincial Legislation.

1.25 HAZARDOUS MATERIALS

- .1 Should material resembling hazardous materials (e.g. asbestos/mould) not previously identified/documentated be encountered during the execution of work, stop work and notify Owner. Do not proceed until written instructions have been received from Owner.
- .2 Unless otherwise noted the services of a recognized Environmental Consultant to provide all air monitoring and testing services required by regulatory requirements for hazardous materials abatement and repair.

1.26 HEAVY EQUIPMENT

- .1 Ensure mobile equipment used on jobsite is of the type specified in OHS Act and Regulations fitted with a Roll Over Protective (ROP) Structure and Falling Object Protective (FOP) Structure.
- .2 Ensure that operators of mobile equipment have adequate instruction and are competent in the operation of mobile equipment.
- .3 Provide certificate of training in Power Line Hazards for operators of heavy equipment.
- .4 Obtain written clearance from the power utility where equipment is used in close proximity to (within 5.5 metres) overhead or underground power lines.
- .5 Equip cranes with:
 - .1 A mechanism which will effectively prevent the hook assembly from running into the top boom pulley.
 - .2 A legible load chart.
 - .3 A maintenance log book.

1.27 WORKPLACE VIOLENCE AND HARASSMENT

- .1 Develop a Workplace Violence and Harassment Prevention Plan for the project that complies with the latest edition of the OHS Regulations.

1.28 WORKING OVER OR NEAR WATER

- .1 Where the risk of entering water is identified and other means of fall protection or rescue are not adequate to prevent the worker from entering

the water, develop water rescue plans and ensure that workers on site are trained.

- .2 Keep and maintain a list of all persons trained in water rescue on site. This list shall be combined with other training records as required in a tabular or spreadsheet format listed throughout this Section.
- .3 Require that workers wear personal flotation devices where workers are at risk of entering the water.
- .4 Ensure that life-saving equipment is available near entry site for water rescue. This may include life boats, throw lines, life preservers, etc.

1.29 ACCESS, EGRESS AND WALKWAYS

- .1 Ensure that all accesses, egresses and walkways are continuously monitored for hazards which may include slips, trips, slippery conditions and other hazards.
- .2 Develop provisions for snow clearing of walkways, accesses and egresses.
- .3 Ensure that all access, egress hatches, holes or other potential hazards of this nature are clearly identified to workers and adequately covered.

1.30 RIGGING AND SLINGING

- .1 Ensure that workers required to perform work related to rigging and slinging are trained and deemed competent in such operations and practices.
- .2 Maintain and inspect all rigging and slinging equipment in accordance with manufacturers' specifications, CSA Standards and OHS Regulations.
- .3 Ensure that the working load limit of rigging and slinging equipment on site is marked and visible on the product.
- .4 At a minimum, ensure that rigging and slinging operations meet the requirements of the OHS Act and Regulations.
- .5 Ensure that rigging and slinging equipment identified in daily inspections or otherwise identified as damaged, worn or unacceptable to manufacturers' specifications, appropriate standards or OHS Regulations is immediately taken out of service and destroyed.

1.31 WORK STOPPAGE

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

1.32 OWNER'S STATEMENT

- .1 The Owner shall not be responsible for injury or damage occasioned by a failure of the Contractor to adhere to the provisions of this Section.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

Monthly Safety Performance Form

Contractor Information				
Contractor/Company Name				
Report Prepared By				
Report for Period		Beginning:	Ending:	
Project and Location				
Contact	Name		Contact Number	
Project Manager				
Contractor CSR				
Site Superintendent				
Monthly OHS Performance Indicators				
Lagging Indicators		Leading Indicators		
<i>Indicate the total within reporting period above</i>	Monthly Total	<i>Indicate the total within reporting period above</i>	Monthly Total	Records available
Lost Time Injuries		Tool Box Talks (safety specific)*		
Working Days Lost		OHS Committee/Rep Meetings*		
Return to Work Plans		Bi-Weekly Project Meeting		
First Aid Incidents		Site Safety Orientations		
Medical Aid Incidents		Weekly Site Inspections*		
Total Hours Worked (site)		Hazard Reports Submitted		
Accident /Incident reports*		Hazard Assessments Conducted*		
Accident Incident Investigations Conducted*		Traffic Control Signage Log Completed*		
		NLCSA Certificate of Recognition (COR)*		
OHS Division Activities				
OHS Division Inspections		OHS Division Directives Issued*		
Sub-Contractor Information				
Name sub-contractors working on site	Description of work conducted by sub-contractors		Days on site	COR Certified (Y/N)
Training Information				
Training conducted with staff	Brief description of training conducted with safety or work practice focus		Total staff trained	Records available (Y/N)
Equipment Maintenance				
Annual equipment inspections conducted (Y/N)	All equipment passed inspection (Y/N)	Records Available (Y/N)	Non-Routine maintenance required? Identify equipment	List maintenance conducted
Report completed on:		Signature:		

Please attach information pertaining to items highlighted with an asterisk (*)

Definitions

1. **Accident** – An undesired event resulting in death, ill health, damage or other loss.
2. **Accident/Incident Investigation** – An investigation by the employer into the root cause of an accident or incident to identify hazards and prevent workplace accidents/incidents from recurring.
3. **Accident/Incident Report** – all accidents and incidents must be reported, whether through an internal reporting structure or through the Workplace NL employers Form 7. All accidents of a serious nature must also be reported to the PHS Division within 24 hours (serious accidents as outlined in Section 54(3) of the OHS Act).
4. **First Aid Incident** – An occupational injury/illness that requires first aid treatment only and does not result in loss of time from work or restricted work.
5. **Incident** – An unplanned, undesired event that had the potential to cause injury or other damage.
6. **Lost-Time Injury** – An injury/illness resulting in Lost Days beyond the date of injury as a direct result of the occupational injury/illness incident on the project.
7. **Medical Aid incident** – A classification of occupational injury/illness for medical treatment beyond first aid injury where there has been no lost days, i.e., visit to a health care provider or hospital specific to the injury.
8. **Total Hours Worked** – Total number of hours of employment (i.e., the actual worked hours) of all employees for each contractor and sub-contractor companies for the reporting period specific to the project.
9. **Working Days Lost** – The number of calendar days that the employee is unable to work beyond the day of the injury specific to the project in which the injury occurred. Calculate total days for all employees working on the project.

Contractor Information			
Contractor/Company Name			
Report Prepared By			
Project and Location			
Contact	Name	Contact Number	
Project Manager			
Contractor CSR			
Site Superintendent			
Log No. _____			
Date/Time:		Number/Name of Signage Layout from TCM:	
Condition/Placement of Signage:			
Current/Expected Weather Conditions:		Signage/Equipment Adequate for work and Conditions (Y/N):	
Deficiencies Completed Prior to Start of Work (Signage Repairs, Replacements, Upgrading, etc.)			
Report Completed By:		Date/Time:	
TI Representative:		Date/Time:	
Log No. _____			
Date/Time:		Number/Name of Signage Layout from TCM:	
Condition/Placement of Signage:			
Current/Expected Weather Conditions:		Signage/Equipment Adequate for work and Conditions (Y/N):	
Deficiencies Completed Prior to Start of Work (Signage Repairs, Replacements, Upgrading, etc.)			
Report Completed By:		Date/Time:	
TI Representative:		Date/Time:	
Log No. _____			
Date/Time:		Number/Name of Signage Layout from TCM:	
Condition/Placement of Signage:			
Current/Expected Weather Conditions:		Signage/Equipment Adequate for work and Conditions (Y/N):	
Deficiencies Completed Prior to Start of Work (Signage Repairs, Replacements, Upgrading, etc.)			
Report Completed By:		Date/Time:	
TI Representative:		Date/Time:	
Log No. _____			
Date/Time:		Number/Name of Signage Layout from TCM:	
Condition/Placement of Signage:			
Current/Expected Weather Conditions:		Signage/Equipment Adequate for work and Conditions (Y/N):	
Deficiencies Completed Prior to Start of Work (Signage Repairs, Replacements, Upgrading, etc.)			
Report Completed By:		Date/Time:	
TI Representative:		Date/Time:	

PART 1 **GENERAL**

1.1 **FIRES**

- .1 Fires and burning of rubbish on site not permitted.

1.2 **DISPOSAL OF WASTES**

- .1 Do not bury rubbish and waste materials on site.
- .2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

1.3 **NOTIFICATION**

- .1 Owner will notify Contractor in writing of observed non-compliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of environmental protection. Contractor: after receipt of such notice, inform Owner of proposed corrective action and take such action as approved by Owner.
- .2 Owner may issue stop order of work until satisfactory corrective action has been taken.
- .3 No time extensions will be granted or equitable adjustments allowed to Contractor for such suspensions.

PART 2 **PRODUCTS (NOT APPLICABLE)**

PART 3 **EXECUTION (NOT APPLICABLE)**

END OF SECTION

PART 1 **GENERAL**

1.1 **SUMMARY**

- .1 Where building related projects involve work that could potentially disturb asbestos or lead based paints, disturbances must be carefully controlled by registered abatement contractors in accordance with the Occupational Health and Safety Regulations (OHS) and other applicable Sections in this Contract. The purpose of this procedure is to ensure that nuisance dust, not containing asbestos or lead, is controlled in an effective manner.

- .2 Section includes:
 - .1 Ensuring any maintenance, repair, construction or renovation activity that impacts building materials or creates dust is performed in such a way as to eliminate, minimize, contain and clean up any and all dust generated by the activity. This applies to work preparation, work activities and post-work activities.
 - .2 This applies to, but is not limited to, the following types of dust generating activities:
 - .1 Disturbing gypsum board, plaster or other surfacing materials.
 - .2 Disturbing concrete or wood containing materials.
 - .3 Handling or disturbing fibrous building insulation.
 - .4 Generating welding fumes: in addition to the requirements of this procedure, a hot work permit is also required to be completed by the contractor and submitted to the Owner for review if hot work is required in an occupied building.

1.2 **RELATED WORK**

- .1 Division 1 – General Requirements.
- .2 Section 06 10 53 – Miscellaneous Rough Carpentry.
- .3 Section 07 26 00 - Vapour Retarder.

1.3 **REFERENCES**

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.205, Sealer for Application to Asbestos-Fibre-Releasing Materials.
- .2 Canadian Standards Association (CSA)

- .1 CAN/CSA Z317.13-F07, Infection Control During Construction, Renovation and Maintenance of Health Care Facilities.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Polyethylene sheet in accordance with Section 07 26 00 - Vapour Retarders.
- .2 Wood studs for stand-alone barriers in accordance with Section 06 10 53 - Miscellaneous Rough Carpentry.

PART 3 EXECUTION

3.1 PRE-WORK ACTIVITIES

- .1 The contractor shall ensure the following prior to commencing work:
 - .1 Specific dust generating activities and associated controls shall be addressed in the Site Specific Health and Safety Plan.
 - .2 Workforce, including sub-contractors, must be made aware of the site dust control requirements.
 - .3 Check the various work zones within the building and adjacent areas to confirm the area are clean.
 - .4 Access to all active work areas shall be restricted to authorized contractors.
 - .5 For occupied buildings, dust generating activities shall be performed after normal hours of operations, unless prior permission if received from the Owner.

3.2 WORK ACTIVITIES

- .1 Dust producing projects shall be classified as small scale, medium scale or large scale projects, as detailed in paragraph 3.3.
- .2 For all dust generating activities, Contractor is required to have Site Safety Officer present to ensure dust control procedures are properly followed.
- .3 Any dust related complaints brought to the Contractors attention, must be immediately reported to Owner, and an incident investigation must be initiated to prevent reoccurrence.
- .4 Where practical, dust generation should be eliminated or minimized through the use of proper engineering controls (i.e. containment at source

such as drilling wall surface through a wet sponge, wet suppression, use of HEPA vacuum equipped tools, etc).

- .5 Dust generating power tools shall be equipped with HEPA filtered dust collectors where practical. Power tools capable of generating dust without dust collection shall only be used in conjunction with suitable work area containment and with Owner's approval.
- .6 Walk-off mats shall be employed for medium and large scale dust generating projects at all worker entrances/exits. Purpose of these mats is to trap dust from equipment and shoes of personnel leaving the dust contaminated work zone. Mats shall be vacuumed daily, or more frequently as necessary, using HEPA filtered vacuums. Mats shall be of sufficient size to place both feet on mat at once.

3.3 PROJECT CLASSIFICATION

- .1 Class A - Small Scale Project: (Dust producing activities disturbing less than one (1) linear meter or one (1) square meter of material. These are small scale, short duration jobs generating minimal dust.
 - .1 Some examples include:
 - .1 Installing wires or cables, sanding/repairing small section of wall, cutting out gypsum board to install receptacles.
 - .2 Carry out Work as follows:
 - .1 Remove all furniture, fixtures and belongings from the work area to a minimum of 1.5 m in all directions.
 - .2 Restrict access to immediate work area. Keep all doors closed where practical. Post "Dust Hazard Area – Do Not Enter" signs at all entrances to work area. In common areas use barrier tape to establish the regulated area.
 - .3 Place a drop cloth of polyethylene sheeting immediately underneath the work area extending a minimum of 1.5 m in each direction (unless flooring is easily cleanable).
 - .4 Cover all air return or exhaust vents if within 1.5 m of the work area with polyethylene sheeting and duct tape.
 - .5 Complete the task, minimizing dust production, as prescribed in paragraph 3.2 - Work Activities.
 - .6 When the work is completed, wet-wipe polyethylene sheeting and flooring and if necessary, other areas close by with a damp rag.
 - .7 Visually inspect the area for any remaining dust and wet wipe as necessary.

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- .8 If installed, remove polyethylene sheeting from air return and exhaust vents.
 - .9 Where practical, transport debris after hours using least congested and most direct routes. If any debris is spilled outside the work area, immediately wet-wipe debris.
 - .10 Clean all tools and equipment before removal from the work area.
- .2 .Class B - Medium Scale Project (Dust producing activities disturbing greater than one (1) square meter and less than 30 square meters of material) with anticipated moderate dust levels that are typically one shift or more in duration.
- .1 Examples include:
 - .1 Sanding several sheets of gypsum board.
 - .2 Electrical work above ceiling tiles where general debris is known above the ceiling.
 - .3 Removing numerous ceiling tiles in an area.
 - .4 New wall construction.
 - .2 Carry out the Work as follows:
 - .1 Determine the most effective way of isolating the work area from occupants (i.e. using plastic barriers or by sealing off doors).
 - .2 Complete all items specified under small scale projects.
 - .3 While performing the work, limit the dust generated by removing the materials in sections, lightly misting the material as necessary. Debris shall be bagged immediately for disposal. In addition to wet wiping, HEPA filtered vacuum systems shall be employed where practical to limit airborne dust.
 - .4 When the task is completed, HEPA vacuum and/or wet wipe the polyethylene sheeting.
 - .5 Prior to removing any temporary wall partitions from floor to ceiling or polyethylene barriers, a final inspection shall be performed by the Site Safety Officer or designate to ensure proper clean up has been completed. This inspection shall be documented by the Contractor and made available at the request of the Owner.
 - .6 Establishment of containment may result in the accumulation of dust within the enclosure. As such, the need for respiratory protection and decontamination would be greater than for small scale projects (i.e. N95 half face respirator with tyvek body covering).

- .3 Class C - Large Scale Projects (Dust Producing Activities disturbing greater than 30 meters of material with anticipated high dust levels and typically involves multiple work shifts.
 - .1 Examples include:
 - .1 Major demolition or construction.
 - .2 Extensive renovations to wall or ceiling surfaces.
 - .3 Generating significant amounts of concrete dust.
 - .2 Carry out the Work as follows:
 - .1 Complete all items as prescribed under the Medium Scale Projects section.
 - .2 If the work produces dust that cannot be limited by removal in sections or misting and the work area configuration allows, use HEPA filtered negative air units with the intake directly across from the dust generating activity. Exhaust the HEPA unit outside the building.
 - .3 If using a disposal cart or container to transport debris within the building, ensure the lid is tightly secured and the wheels are clean prior to exiting the work area.
 - .4 If local source capture is employed (i.e. HEPA filtered power tool) and no significant debris anticipated then treat as a medium scale project.
 - .5 Negative air units shall be left operating at the completion of cleanup, for the duration stipulated in Table 4, CAN/CSA Z317.13-F07.
 - .6 Windows, doors, exhaust vents and supply intakes shall be sealed off in dust generating areas. Upper seals must be employed where necessary to prevent the spread of dust into adjacent areas.
 - .7 The contractor must be able to show that the work zone is negatively pressurized in relation to adjacent occupied areas.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES AND CODES

- .1 Perform Work in accordance with National Building Code of Canada (NBC) including all amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.

- .2 Specific design and performance requirements listed in specifications or indicated on Drawings may exceed minimum requirements established by referenced Building Code; these requirements will govern over the minimum requirements listed in Building Code:
 - .1 Meet or exceed requirements of:
 - .1 Contract documents.
 - .2 Specified standards, codes and referenced documents.

1.2 HAZARDOUS MATERIAL DISCOVERY

- .1 Asbestos: stop work immediately should materials believed to contain asbestos be encountered in during the execution of the work and notify Owner. Do not proceed until written instructions have been received from Owner. Perform asbestos abatement and repair in accordance with Newfoundland and Labrador Asbestos Abatement Regulations, Latest Edition.

- .2 Mould: stop work immediately should material resembling mould be encountered during the execution of work and notify Owner. Do not proceed until written instructions have been received from Owner.

1.3 BUILDING SMOKING ENVIRONMENT

- .1 Comply with smoking restrictions.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 **GENERAL**

1.1 **RELATED DOCUMENTS**

- .1 Drawings and general provisions of this contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this section.

1.2 **INDUSTRY STANDARDS**

- .1 Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made part of the Contract Documents by reference.
- .2 All construction industry standards referenced in this specification to meet the edition of the standard referenced by the National Building Code of Canada (NBC). If the construction industry standard is not referenced in the National Building Code of Canada (NBC), the latest edition of the standard shall apply.
- .3 Each entity engaged in construction on this Project must be familiar with construction industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Construction Documents.
 - .1 Where copies of construction industry standards are needed to perform a required construction activity, obtain copies directly from publication source and make them available upon request.

1.3 **ABBREVIATIONS AND ACRONYMS FOR INDUSTRY ORGANIZATIONS**

- .1 Where abbreviations and acronyms are used, they shall mean the recognized name of the entities in the following list. Names are believed to be accurate and up-to-date as of the date of the Contract Documents.
- .2 Industry Organizations:
 - .1 Air Conditioning and Mechanical Contractors Association (AMCA).
 - .2 Air Conditioning and Refrigeration Institute (ARI).
 - .3 Americans with Disability Act (ADA).
 - .4 Air Movement and Control Association (AMCA).
 - .5 The Aluminum Association, Inc. (AA).

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- .6 American Architectural Manufacturers Association (AAMA).
- .7 American Association of State Highway and Transportation Officials (AASHTO).
- .8 American Association of Textile Chemists and Colourists (AATCC).
- .9 American Bearing Manufacturers Association (ABMA).
- .10 American Boiler Manufacturer's Association (ABMA).
- .11 American Concrete Institute (ACI).
- .12 American Industrial Hygiene Association (AIHA).
- .13 American Institute of Steel Construction (AISC).
- .14 American Iron & Steel Institute (AISI).
- .15 American National Standards Institute (ANSI).
- .16 American Petroleum Institute (API).
- .17 American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE).
- .18 American Society of Mechanical Engineers (ASME).
- .19 American Society of Sanitary Engineer's (ASSE).
- .20 American Society for Testing and Materials (ASTM).
- .21 American Water Works Association (AWWA).
- .22 American Welding Society (AWS).
- .23 American Wood-Preservers' Association (AWPA).
- .24 Architectural Woodwork Institute (AWI).
- .25 Architectural Woodwork Manufacturers Association of Canada (AWMAC).
- .26 Asphalt Institute (AI).
- .27 Associated Air Balance Council (AABC).
- .28 Association of the Wall and Ceilings Industries International (AWEI).
- .29 Atomic Energy Control Board Regulations.
- .30 Brick Industry Association (BIA).
- .31 Building Industry Consulting Services International (BICSI).
- .32 Canada Green Building Council (CaGCB).
- .33 Canada Labour Code.
- .34 Canadian Council of Ministers of the Environment (CCME).
- .35 Canadian Code for Preferred Packaging.
- .36 Canadian Construction Materials Centre (CCMC).
- .37 Canadian Environmental Protection Act (CEPA).
- .38 Canadian Gas Association (CGA).
- .39 Canadian General Standards Board (CGSB).

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- .40 Canadian Institute of Steel Construction (CISC).
- .41 Canadian Nursery Landscape Association (CNLA).
- .42 Canadian Paint Manufacturer's Association (CPMA).
- .43 Canadian Roofing Contractors' Association (CRCA).
- .44 Canadian Sheet Steel Building Institute (CSSBI).
- .45 Canadian Standards Association (CSA).
- .46 Canadian Steel Door and Frame Manufacturers' Association (CSDFMA).
- .47 Canadian Urethane Foam Contractors' Association Inc. (CUFCA).
- .48 Carpet and Rug Institute (CRI).
- .49 Ceramic Tile Institute (CTI).
- .50 Consumer Electronics Association (CEA).
- .51 Cooling Technology Institute (CTI).
- .52 Department of Justice Canada (Jus).
- .53 Electrical and Electronic Manufacturers' Association of Canada (EEMAC).
- .54 Electronic Industries Alliance (EIA).
- .55 Environment Canada (EC).
- .56 The Environmental Choice Program.
- .57 Environmental Protection Agency (EPA).
- .58 Environmental Protection Services (EPS).
- .59 ETL Listing Laboratories (ETL).
- .60 Factory Mutual (FM).
- .61 Federal Communications Commission (FCC).
- .62 Flat Glass Manufacturers Association (FGMA).
- .63 Green Seal Environmental Standards.
- .64 Health Canada - Workplace Hazardous Materials Information System (WHMIS).
- .65 Hydraulics Institute (HI).
- .66 Hydronic Institute of Boiler and Radiator Manufacturers (IBR).
- .67 Industry Canada - Terminal Attachment Program.
- .68 Institute of Electrical and Electronics Engineers (IEEE).
- .69 Institute for Research in Construction (IRC).
- .70 Insulated Cable Engineers Association (ICEA).
- .71 International ElectroTechnical Commission (IEC).
- .72 International Masonry Industry All-Weather Council (IMIAC).
- .73 International Standards Organization (ISO).
- .74 Laminators Safety Glass Association (LSGA).

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- .75 Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS).
- .76 Master Painters Institute (MPI).
- .77 National Energy Code of Canada for Buildings (NECB).
- .78 National Association of Architectural Metal Manufactures (NAAMM).
- .79 National Association of Corrosion Engineers (NACE).
- .80 National Building Code of Canada (NBC).
- .81 National Bureau of Standards/Products Standard (NBS/PS).
- .82 National Electrical Manufacturers Association (NEMA).
- .83 National Environmental Balancing Bureau (NEBB).
- .84 National Fire Code of Canada (NFC).
- .85 National Fire Protection Association (NFPA).
- .86 National Floor Covering Association (NFCA).
- .87 National Hardwood Lumber Association (NHLA).
- .88 National Lumber Grades Authority (NLGA).
- .89 National Plumbing Code of Canada (NPC).
- .90 National Research Council Canada (NRC).
- .91 National Roofing Contractors Association (NRCA).
- .92 National Sanitation Foundation (NSF).
- .93 Newfoundland Occupational Health and Safety Act.
- .94 Plumbing and Drainage Institute (PDI).
- .95 Province of Newfoundland and Labrador Building Accessibility Regulations.
- .96 Provincial Boiler, Pressure Vessel and Compressed Gas Regulations.
- .97 Scientific Equipment and Furniture Association (SEFA).
- .98 Sealant and Waterproofers' Institute.
- .99 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA).
- .100 Society of Automotive Engineers (SAE).
- .101 The Society for Protective Coatings (SSPC).
- .102 South Coast Air Quality Management District (SCAQMD).
- .103 Telecommunications Distribution Methods Manual (TDMM).
- .104 Telecommunications Industries Association (TIA).
- .105 Terrazzo Tile and Marble Association of Canada (TTMAC).
- .106 Thermal Insulation Association of Canada (TIAC).
- .107 Transport Canada (TC).

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- .108 Transport Canada - Marine Safety (TCMS).
- .109 Treasury Board of Canada (TB).
- .110 Treasury Board Information Technology Standard (TBITS).
- .111 Truss Plate Institute of Canada (TPIC).
- .112 Underwriters' Laboratories Inc. (UL).
- .113 Underwriter's Laboratories of Canada (ULC).
- .114 United States Federal Trade Commission (US Federal Trade Commission).
- .115 U.S. Coast Guard Equipment List (USCG).
- .116 U.S. Department of Transportation (DOT).
- .117 National Fireproofing Contractors Association (NFCA).

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 **GENERAL**

1.1 **SUMMARY**

- .1 This sections covers administrative and procedural Quality Control and Quality Assurance requirements for this Contract.
- .2 Quality control requirements include inspections, tests and related actions including reports performed by independent agencies, governing authorities, and the Contractor.
- .3 The Contractor is responsible for controlling the quality of work, including work of its subcontractors and suppliers, and for ensuring the quality specified in the Contract Documents is achieved.
- .4 Provisions for quality assurance apply to workmanship and craftsmanship applied to work executed in the performance of the Contract.
 - .1 Perform work with suitable qualified personnel to produce work of specified quality.
 - .2 Refer to applicable Codes and Standards.
 - .3 Refer to printed manufacturer's instructions.
 - .4 Refer to workmanship requirements of trade associations.
 - .5 Test materials in accordance with applicable standards.
 - .6 Provide field samples and mock-ups to establish acceptable level of quality and a basis for judging work.
 - .7 Follow inspection requirements.
- .5 Related work described elsewhere:
 - .1 Provisions of trade associations.
 - .2 Manufacturer's printed instructions.
 - .3 Recommendations, methods and criteria for applications and installation of systems and assemblies.
 - .4 Various technical sections of these Contract specifications and drawings.
 - .5 Provisions of work installed under this Contract furnished by others.
- .6 Testing and inspection services are required to verify compliance with the Contract Documents. These services do not relieve the Contractor of their responsibility for compliance with the Contract's requirements.
- .7 Various requirements for Quality Control of the Work are specified throughout the Contract Documents. These requirements shall be deemed

the minimum requirements for the Work's quality and acceptability. The Contractor shall perform as many inspections and tests as necessary to verify that the Work conforms to the Contract's requirements.

- .8 Perform testing and inspections in accordance with, and as required by, all applicable codes, regulations, laws and requirements of authorities having jurisdiction.
- .9 Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products.
 - .1 Specific quality control requirements for individual construction activities are specified in the Sections that specify those activities. Those requirements, including inspections and tests, cover production standards as well as customized fabrication and installation procedures.
 - .2 Inspections, tests and related actions specified are not intended to limit the Contractor's quality control procedures that facilitate compliance with the Contract Document requirements.
 - .3 Requirements for the Contractor to provide Quality Control services are not limited by the provisions of this Section.

1.2 CONTRACTOR RESPONSIBILITIES

- .1 The Contractor shall perform the general responsibilities specified herein for both Quality Control and Quality Assurance requirements.
- .2 Coordinate sequence of activities to accommodate required Quality Assurance and Quality Control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
- .3 Coordinate construction operations included under different Sections of the Specifications that are dependent upon each other for proper installation, connection and operation.
- .4 Coordinate, arrange, stage and sequence all testing and inspections, including obtaining samples.
- .5 Schedule times for tests, inspections, obtaining samples, and similar activities. Provide timely notice of the Work's readiness for all required tests and inspections.
- .6 Prepare a schedule of tests, inspections and similar quality control services required by the Contract Documents.

- .1 Submit schedule within three (3) weeks from date of award of Contract.
- .2 Distribute schedule to Owner and each party involved in the performance of portions of the Work where tests and inspections are required.
- .7 Furnish labour, resources and facilities to:
 - .1 Provide safe access to work to be inspected and tested.
 - .2 Facilitate inspections and tests.
 - .3 Obtain and handle samples and materials required for inspections and tests.
 - .4 Make good work that is disturbed by inspecting and testing.
 - .5 Provide sufficient space to facilitate the storage, security, protection and curing of samples, as well as the storage of testing and inspection equipment.

1.3 PROJECT INSPECTOR

- .1 Owner will engage a qualified Inspector whose primary duty is to inspect the Work for compliance with the Contract Documents.
 - .1 The Inspector will report to the Owner.
- .2 Provide free access to all parts of the Work at all times, so as to allow continuous observation by the Inspector.
 - .1 Presence of the Inspector does not relieve the Contractor in any way from requirement to comply with the Contract Documents.
- .3 Provide Inspector minimum two (2) days notice of time when work that requires inspecting will be performed.
- .4 Provide reasonable facilities for Inspector's use in performing inspection duties, as specified in Section 01 52 00 – Construction Facilities.
- .5 Inspector shall have authority to stop the Work in the event Contract Documents are not being complied with, but is not authorized to change requirements contained in the Contract Documents.

1.4 QUALIFICATIONS

- .1 Project Superintendent
 - .1 The Contractor shall engage a qualified person who is thoroughly trained and experienced in the duties of a Project Superintendent to oversee the total overall Work of this Contract.
 - .2 Project Superintendent shall:

- .1 Have a minimum ten (10) years construction experience, with a minimum of five (5) years being in commercial construction.
 - .2 Demonstrate successful completion of a minimum of five (5) projects of similar scope and budget through a resume and letters of recommendation.
 - .3 Exercise general supervision over the Work, have the decision-making authority of the Contractor, and be familiar with the specified requirements and methods to be used in the scheduling, supervision, performance and execution of the Work.
- .3 Project Superintendent's qualifications are subject to review and approval by the Owner, and shall not be reassigned until final acceptance of the Work, unless permitted in writing by the Owner.
- .2 Subcontractors
 - .1 Trade subcontractors involved in work of this Project shall be administered, supervised and directed by at least one qualified journeyman foreman who is thoroughly trained and skilled in the arts generic to their trade and such qualifications may be subject to review by the Owner.
- .3 Workers
 - .1 Workers engaged in the performance of work of this Project shall be skilled and knowledgeable in methods and craftsmanship needed to produce required quality levels for workmanship in completed work.
 - .2 Workers shall be thoroughly trained and experienced in the installation of the specified and selected products, and who are completely familiar with the requirements of their respective work and this Work.
- .4 Fabricators, Suppliers, Installers and Personnel
 - .1 A firm or individual experienced in producing, installing, erecting or assembling products similar to those indicated for this Project, and with a record of successful in-service performance.
 - .2 Fabricators, erectors, suppliers, installers, and applicators shall have not less than five (5) years continuous experience in the execution of their respective duties, and their qualifications may be subject to review and approval by the Owner.
- .5 Manufacturer

- .1 A firm experienced in manufacturing products or systems similar to those indicated for this Project, and with a record of successful in-service performance.

1.5 QUALITY CONTROL

- .1 The Owner may provide inspections, tests and similar quality control services, specified in individual Specification Sections and are required by governing authorities, except where they are specifically indicated to be the Contractor's responsibility.
 - .1 The Owner may employ and pay an independent agency to perform specified quality control services.
- .2 The Contractor shall cooperate with agencies performing required inspections, tests and similar services, and provide reasonable auxiliary services as requested. Auxiliary services required but are not limited to:
 - .1 Providing access to the Work and furnishing incidental labour and facilities necessary to facilitate inspections and tests.
 - .2 Taking adequate quantities of representative samples of materials that require testing or assisting the agency in taking samples.
 - .3 Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.
 - .4 Security and protection of samples and test equipment at the Project site.
- .3 Notify the agency sufficiently in advance of operations to permit assignment of personnel.
- .4 The Contractor is responsible for retesting costs where results of required inspections, tests or similar services prove unsatisfactory and do not meet the requirements of the Contract Documents, regardless of whether the original test was the Contractor's responsibility.
 - .1 Cost of retesting construction revised or replaced by the Contractor is the Contractor's responsibility.
- .5 The independent testing agency shall cooperate with the Construction Manager and Contractor in performance of its duties, and shall provide qualified personnel to perform required inspections and tests.
 - .1 The agency shall notify the Owner and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 - .2 The agency shall determine the location from which test samples will be taken or where tests are conducted.

- .3 The agency shall conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
- .4 The agency shall submit a certified written report of each test, inspection, and similar quality assurance service to the Owner, with a copy to the Contractor.
- .5 The agency is not authorized to release, revoke, alter or enlarge requirements of the Contract Documents, or approve or accept any portion of the Work.
- .6 The agency shall not perform any duties of the Contractor.
- .6 Where tests and inspections are indicated as Contractor's responsibility, provide quality control services specified and those required by authorities having jurisdiction.
 - .1 Perform quality control services required of Contractor by authorities have jurisdiction, whether specified or not.
- .7 Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform the quality control services.
 - .1 Contractor shall not employ same entity engaged by the Owner, unless agreed to in writing by the Owner.
- .8 Where quality control services are indicated as Contractor's responsibility, submit a certified written report of each quality control service.
- .9 Testing and inspecting requested by the Contractor and not required by the Contract Documents are the Contractor's responsibility.
- .10 Submit additional copies of each written report directly to authorities having jurisdiction, when directed so.
- .11 Where quality control services are the Contractor's responsibility, provide quality control services, including retesting and re-inspecting, for construction that replaces or is necessitated by Work that failed to comply with the Contract Documents.

1.6 REPAIR AND PROTECTION

- .1 Upon completion of inspection, testing, sample-taking and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes.
- .2 Protect construction exposed by or for quality control service activities, and protect repaired construction.

- .3 Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing or similar services.
- .4 Remove and replace work which does not comply with workmanship standards as specified and as recognized in the construction industry for applications indicated. Remove and replace other work damaged or deteriorated by faulty workmanship or its replacement.

1.7 COVERED WORK

- .1 If any work designated for testing and inspecting is covered or permitted to be covered, the Contractor shall uncover the work at their own cost to allow for completion of testing and inspecting.

1.8 NON-CONFORMING, REPERFORMANCE AND REMEDIAL WORK

- .1 Where the Contractor's Quality Control and Quality Assurance programs reveal Work which does not conform to the Contract's requirements, regardless of the reason for non-conformance and whether incorporated into the Work or not, the Contractor shall promptly perform the following:
 - .1 Submit details of the proposed remedial work to the Owner for review prior to performing remedial work on the affected item.
 - .2 Remove and replace or re-execute the work in accordance with the Contract Documents and at the Contractor's own expense.
- .2 The Contractor shall repair and replace products and materials, correct defects, re-execute work and reperform testing and inspections as necessary to ensure that the Work conforms to the Contract's requirements. Work damaged or destroyed by such corrections shall be promptly made good by the Contractor at their own expense.
- .3 If Quality Assurance and/or Quality Control testing on a portion of the Work not tested by the Contractor identifies a non-conformance to the Contract's requirements, the Contractor shall have the option to either arrange for an independent reperformance of the test at their own expense or correct the non-conforming work and perform a retest.
- .4 The Owner reserves the right to request that the Contractor perform additional inspection and testing to determine the full extent of defects revealed by the Quality Control and Quality Assurance programs.
- .5 The Contractor shall perform retesting and remedial work until the Work meets Contract requirements.

1.9 CONFLICTING REQUIREMENTS

- .1 Throughout the Contract specifications, reference to various industry standards may be made. Conform to the latest version of such standards available at the time of tendering, in whole or in part, as specified.
- .2 If there are questions as to whether any product of system is in conformance with applicable standards, the Owner reserves the right to have such products or systems tested to prove or disprove conformance with Contract Documents, or by the Contractor in the event of non-conformance.
- .3 Copies of applicable referenced standards are not included in the Contract Documents. Where copies of standards are needed by the Contractor for superintendence and quality control of the work, the Contractor shall obtain a copy or copies directly from the publication source and maintain at the jobsite, available to the Contractor's personnel, subcontractors, and Owner.
- .4 If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to the Owner for a decision before proceeding.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 SECTIONS INCLUDE

- .1 Inspection and testing, administrative and enforcement requirements.
- .2 Tests and mix designs.
- .3 Mock-ups.
- .4 Mill tests.
- .5 Equipment and system adjust and balance.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 01 78 00 – Closeout Submittals.

1.3 INSPECTION

- .1 Allow Owner 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 48 hours notice requesting inspection if Work is designated for special tests, inspections or approvals by Owner's instructions.
- .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.
- .4 Owner may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Owner shall pay cost of examination and replacement.

1.4 INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection/Testing Agencies will be engaged by Owner for purpose of inspecting and/or testing portions of Work.

- .2 Provide equipment required for executing inspection and testing by appointed agencies.
- .3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Owner at no cost to Owner. Pay costs for retesting and reinspection.

1.5 ACCESS TO WORK

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

1.6 PROCEDURES

- .1 Notify appropriate agency and Owner in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or 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.

1.7 REJECTED WORK

- .1 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 Owner 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 in opinion of Owner it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner may deduct from Contract Price difference in value between Work performed

and that called for by Contract Documents, amount of which shall be determined by Owner.

1.8 REPORTS

- .1 Submit 3 copies of inspection and test reports to Owner, plus electronic copies in PDF format.
- .2 Provide copy to Subcontractor of work being inspected or tested, manufacturer or fabricator of material being inspected or tested.
- .3 Include copy of all inspection and test reports in Commissioning Manuals.

1.9 MOCK-UPS

- .1 Before installing portions of the Work requiring mock ups, build mock ups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed work:
 - .1 Build mock ups in location and of size and profile indicated, or if not indicated, as directed by Owner.
 - .2 Provide Owner minimum five (5) working days advance notice of dates and times when mock ups will be constructed and able to be inspected.
 - .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 Allow five (5) working days for Owner's initial review and re-review of each mock up.
 - .5 Do not complete production of materials for final Project site until Owner's review of mock up has been obtained.
 - .6 Where mock up is rejected, replace, rebuild and/or modify mock up as directed by the Owner.
 - .7 Demonstrate the proposed range of aesthetic effects and workmanship.
 - .8 Employ supervisory personal to oversee mock up construction. Employ same workers that will be employed during the construction of the Project.
 - .9 Unless otherwise indicated, accepted mock ups establish the standard by which the Work shall be judged.
 - .10 Maintain mock ups during construction in an undisturbed condition as a standard of judging the completed Work.

- .11 Mock ups may remain part of the finished product, unless otherwise indicated.

1.10 EQUIPMENT AND SYSTEMS

- .1 Submit adjustment and balancing reports for mechanical, electrical and building equipment systems.
- .2 Mechanical – coordinate with mechanical division.
- .3 Electrical – Coordinate with electrical division.

1.11 FIRE SEPARATIONS

- .1 Provide fire separation labelling.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 52 00 - Construction Facilities.
- .2 Section 01 56 00 - Temporary Barriers and Enclosures.

1.2 INSTALLATION AND REMOVAL

- .1 Provide temporary utilities controls in order to execute work expeditiously.
- .2 Remove from site all such work after use.

1.3 DEWATERING

- .1 Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.

1.4 WATER SUPPLY

- .1 Arrange for connection with appropriate utility company and pay all costs for installation, maintenance and removal.
- .2 Contractor is responsible to provide potable water as required for completion of work.

1.5 TEMPORARY HEATING AND VENTILATION

- .1 Pay for costs of temporary heat and ventilation used during construction, including costs of installation, fuel operation, maintenance and removal of equipment. Use of direct, fired heaters discharging waste products into work areas will not be permitted unless prior approval is given by Owner.
- .2 Owner will provide and pay for temporary power during constructing for temporary lighting and operating of power tools, to the extent available on site. Contractor to connect to existing power supply in accordance with governing regulations and the Canadian Electrical Code, latest edition.
 - .1 Temporary power for equipment requiring in excess of above is responsibility of Contractor.
- .3 Construction heaters used inside building must be vented to outside or be non-flameless type. Solid fuel salamanders are not permitted.
- .4 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 safe working environment.
- .5 Maintain temperatures of minimum 10°C and relative humidity less than 60% in areas where construction is in progress.
 - .1 Maintain minimum temperature of 10°C or higher where specified as soon as finished work is commenced. Maintain until acceptance of structure by Owner.
 - .2 Maintain ambient temperature and humidity levels as required for comfort of office personnel.
- .6 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 atmosphere of occupied areas.
 - .3 Dispose of exhaust materials in 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 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.
- .8 Be responsible for damage to Work due to failure in providing adequate heat, humidity and protection during construction.
- .9 Use of new or existing systems for temporary heating, ventilating or air conditioning will not be permitted.

1.6 TEMPORARY POWER AND LIGHT

- .1 Provide and pay for temporary power during constructing for temporary lighting, heating, site construction trailers and operating of power tools in accordance with governing regulations and the Canadian Electrical Code, latest edition.
- .2 Arrange for connection with Utility company. Pay all costs for installation, maintenance and removal of cables, distribution and branch panel boards, poles, lighting, heating and general power receptacles as required.
- .3 Temporary power for electric cranes and other equipment requiring in excess of above is responsibility of Contractor.
- .4 Provide and maintain temporary lighting throughout project. Ensure level of illumination on all floors and stairs is not less than 162 lx. Temporary lighting to consist of wiring, pig tail sockets and 75 watt shatterproof incandescent lamps to provide a minimum light level of 162 lux.
- .5 Electrical power and lighting systems installed under this contract may be used for construction requirements only with prior approval of Owner provided that guarantees are not affected. Make good damage to electrical system caused by use under this contract. Replace lamps which have been used for more than 3 months.
- .6 General contractor responsible for payment of all electrical energy charges associated with temporary power up to date of substantial completion.

1.7 FIRE PROTECTION

- .1 Provide and maintain temporary fire protection equipment during performance of Work required by insurance companies having jurisdiction and governing codes, regulations and bylaws.
- .2 Burning rubbish and construction waste materials is not permitted on site.

1.8 SANITARY FACILITIES

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.9 TEMPORARY COMMUNICATION FACILITIES

- .1 Provide and pay for temporary telephone, fax, data hook up, lines and equipment necessary for own use and use of Owner.

1.10 SITE SIGN AND NOTICES

- .1 Contractor is responsible for the construction of job sign frame and the installation of the plywood job sign. Timber frame shall be constructed as specified and detailed on “Job Sign Support Frame Detail”. Plywood job sign shall be as per layout on “Job Sign Detail”. These drawings documents are published at <http://www.gov.nl.ca/ti/works/signs> under the Project Signs Link and is to be picked up by contractor at the Sign Shop, Department of Transportation and Infrastructure, White Hills, St. John’s, Newfoundland and Labrador. Plywood job sign and timber frame shall remain the property of the Owner and shall be disposed of at the discretion of the Owner.
- .2 Locate job sign as directed by Owner so as to ensure good visibility by passing traffic.
- .3 Construct timber job sign frame using two (2) 140 x 140mm timber posts set vertically in concrete to a ground depth of 1000mm or below the frost line, whichever is greater. Install three (3) 38 x 89mm horizontal timber braces, all as shown on “Job Sign Support Frame Detail” published at <http://www.gov.nl.ca/ti/works/signs> under the Project Signs Link. Attach plywood sign to timber frame using galvanized nails. Paint timber frame with two (2) coats of white paint if using untreated timber. Backfill compact and level ground around job sign frame to the satisfaction of the Owner.

1.11 REMOVAL OF TEMPORARY FACILITIES

- .1 Remove temporary facilities from site when directed by Owner.
- .2 When project is closed down at end of construction season keep temporary facilities operational until close down or removal is approved by Owner.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 Construction aids.
- .2 Office and sheds.
- .3 Parking.
- .4 Project identification.

1.2 RELATED SECTIONS

- .1 Section 01 35 29.06 – Health and Safety Requirements
- .2 Section 01 51 00 - Temporary Utilities.
- .3 Section 01 56 00 - Temporary Barriers and Enclosures.

1.3 INSTALLATION AND REMOVAL

- .1 Provide construction facilities in order to execute work expeditiously.
- .2 Remove from site all such work after use.

1.4 SCAFFOLDING

- .1 Provide and maintain scaffolding in rigid, secure and safe manner.
- .2 Erect scaffolding independent of walls. Remove promptly when no longer required. Refer to Section 01 35 29.06 – Health and Safety Requirements.

1.5 HOISTING

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

1.6 SITE STORAGE/LOADING

- .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.

1.7 CONSTRUCTION PARKING

- .1 Parking will be permitted on site provided it does not disrupt performance of work.
- .2 Provide and maintain adequate access to project site.
- .3 Build and maintain temporary roads where indicated or directed by Owner and provide snow removal during period of Work.
- .4 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractor's use of roads.

1.8 CONTRACTOR'S SITE OFFICES

- .1 Provide office heated to 22 °C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table, fax machine, telephone, file cabinet and chair. Provide an accessible washroom within the contractor's site office.
- .2 Accessible washroom, meeting space and entrance to contractor's site office to meet the accessibility requirements of the NL Accessibility Act and Regulations, and CSA B651, Accessible Design for the Built Environment.
- .3 Provide a clearly marked and fully stocked first-aid case in a readily available location.
- .4 Subcontractors may provide their own offices as necessary. Direct location of these offices.

1.9 EQUIPMENT, TOOL AND MATERIALS STORAGE

- .1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities.

1.10 SANITARY FACILITIES

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.

- .2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.11 CLEAN-UP

- .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Store materials resulting from demolition activities that are salvageable.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 Barriers.
- .2 Environmental Controls.
- .3 Fire Routes.

1.2 RELATED SECTIONS

- .1 Section 01 51 00 – Temporary Utilities.
- .2 Section 01 52 00 – Construction Facilities.

1.3 INSTALLATION AND REMOVAL

- .1 Provide temporary controls in order to execute Work expeditiously.
- .2 Remove from site all such work after use.

1.4 HOARDING

- .1 As requested by Owner, erect temporary site enclosures using 38 x 89 mm construction grade lumber framing at 600 mm centres, installed on 89 x 89 mm wood posts at 2400 mm centres or 50 mm dia. steel posts at 2400 mm centres. Posts to be place in post holes filled with concrete to minimum 900 mm depth. Finish temporary site enclosures with 1200 x 2400 x 13 mm exterior grade fir plywood to CSA O121 or chain link fence fabric.
- .2 Apply plywood panels or chain link fence fabric vertically flush and butt jointed.
- .3 Provide one lockable truck entrance gate and at least one pedestrian door as directed and conforming to applicable traffic restrictions on adjacent streets. Equip gates with locks and keys.
- .4 Erect and maintain pedestrian walkways including roof and side covers, complete with signs and electrical lighting as required by law.
- .5 Paint public side of site enclosure in selected colours with one coat primer to CGSB 1.189M and one coat exterior paint to CGSB 1.59. Maintain public side of enclosure in clean condition.

- .6 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

1.5 GUARD RAILS AND BARRICADES

- .1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors and roofs.
- .2 Provide as required by governing authorities.

1.6 WEATHER ENCLOSURES

- .1 Provide weather tight closures to unfinished door and window openings, tops of shafts and any other openings in building envelope.
- .2 Close off floor areas where walls are not finished; seal off other openings; enclose building interior work for temporary heat.
- .3 Erect enclosures to allow access for installation of materials and working inside enclosure.
- .4 Design enclosures to withstand wind pressure and snow loading.

1.7 DUST TIGHT SCREENS

- .1 Provide dust tight screens or insulated 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.

1.8 FIRE ROUTES

- .1 Maintain access to property including overhead clearances for use by emergency response vehicles.

1.9 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.

1.10 PROTECTION OF BUILDING FINISHES

- .1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.

- .2 Provide necessary screens, covers, and hoardings.
- .3 Confirm with Owner locations and installation schedule 3 days prior to installation.
- .4 Be responsible for damage incurred due to lack of or improper protection.

1.11 PROTECTION OF BUILDING OCCUPANTS

- .1 The buildings will be occupied during work of this contract. Contractor shall provide barriers, screens, hoarding etc as required to protect the job site / areas of construction from building occupants and other unauthorized access.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 Product quality, availability, storage, handling, protection, and transportation.
- .2 Manufacturer's instructions.
- .3 Quality of Work, coordination and fastenings.

1.2 RELATED SECTIONS

- .1 Section 01 45 00 – Quality Control.
- .2 Section 01 73 00 – Execution.

1.3 REFERENCES

- .1 Within text of each specifications section, reference may be made to reference standards. Conform to these reference standards, in whole or in part as specifically requested in specifications.
- .2 Conform to latest date of issue of referenced standards in effect on date of submission of Tenders, except where specific date or issue is specifically noted.

1.4 QUALITY

- .1 Products, materials, equipment and articles (referred to as products throughout specifications) incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 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.
- .3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Owner based upon requirements of Contract Documents.
- .4 Within seven (7) working days of written request by Owner, submit following information for material and equipment proposed for supply:

- .1 Name and address of manufacturer.
 - .2 trade name, model and catalogue number,
 - .3 performance, descriptive and test data,
 - .4 manufacturer's installation or application instructions,
 - .5 evidence of arrangements to procure.
- .5 Use products of one manufacturer for material and equipment of same type or classification unless otherwise specified.
- .6 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.5 AVAILABILITY

- .1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify Owner of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of work.
- .2 In event of failure to notify Owner at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Owner reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.6 STORAGE, HANDLING AND PROTECTION

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.

- .6 Store sheet materials, lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged products at own expense and to satisfaction of Owner.
- .9 Touch-up damaged factory finished surfaces to Owner's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.7 TRANSPORTATION

- .1 Pay costs of transportation of products required in performance of Work.

1.8 MANUFACTURER'S INSTRUCTIONS

- .1 Unless otherwise indicated in specifications, install 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.
- .2 Notify Owner in writing, of conflicts between specifications and manufacturer's instructions, so that Owner may establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Owner to require removal and re-installation 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 Owner if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. Owner reserves right to require dismissal from site, workers deemed incompetent or careless.
- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Owner, whose decision is final.

1.10 CO-ORDINATION

- .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.

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 Owner if there is interference. Install as directed by Owner.

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 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.
- .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 Owner of conflicting installation. Install as directed.
- .4 Submit field drawings to indicate relative position of various services and equipment when required by Owner.

1.14 FASTENINGS GENERAL

- .1 Provide metal fastenings and accessories in same texture, colour and finish as base metal in which they occur. Prevent electrolytic action between dissimilar metals. Use non-corrosive fasteners, anchors and spacers for securing exterior work, unless stainless steel or other material is specifically requested in affected specification section.

- .2 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood plugs are not acceptable.
- .3 Conceal fasteners where indicated. Space evenly and lay out neatly.
- .4 Fastenings which cause Spalding or cracking are not acceptable.
- .5 Obtain Owner's approval before using explosive actuated fastening devices. If approval is obtained comply with CSA Z166.

1.15 FASTENINGS - EQUIPMENT

- .1 Any fastenings installed outdoors shall be 316 stainless steel.
- .2 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .3 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 316 stainless steel for exterior areas.
- .4 Bolts may not project more than one diameter beyond nuts.
- .5 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.16 PROTECTION OF WORK IN PROGRESS

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

1.17 EXISTING UTILITIES

- .1 When breaking into or connecting to existing services or utilities, execute work at times directed by local governing authorities, with minimum of disturbance to work.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.
- .3 Submit schedule to and obtain approval from Owner for any shut-down or closure of active services or facility. Adhere to approved schedule and provide notice to affected parties.

- .4 Where unknown services are encountered, immediately advise Owner and confirm findings in writing.
- .5 Remove abandoned services lines within 2.0 m of structures. Cap or otherwise seal lines at cut-off points as directed by Owner.

1.18 SELECTION OF MATERIAL AND EQUIPMENT

- .1 Material and equipment will be specified in the tender documents, and selected by Contractor, by one or more of the following methods:
 - .1 Specification by reference to a relevant Standard, such as CSA, ASTM, ULC, etc., select any material or equipment that meets or exceeds the specified.
 - .2 Specification by reference to an accepted product evaluation publication, such as the CGSB “Qualified Products List”, or CCMC Registry of Product Evaluations”, - select any manufacturer’s product so listed.
 - .3 Specification by Prescriptive or Performance specification – select any material or equipment meeting or exceeding specification.
 - .4 Specification by identification of one or more Manufacturer’s specific product(s) as an “Acceptable Product”, along with a listing of other manufacturers who may offer equivalent products – select any product so named, or select from equivalent product(s) of other listed manufacturers.
- .2 “Acceptable Product” is deemed to be a complete and working commodity as described by a manufacturer’s name, catalogue number, trade name, or any combination thereof, and will constitute the minimum standard of acceptance.
- .3 Owner will determine acceptability of Contractor’s selection of material and equipment at time of Shop Drawing review.
- .4 When material or equipment is specified by a Standard, Prescriptive or Performance specification, upon request of the Owner, obtain from manufacturer an independent laboratory reporting, showing that material or equipment meets or exceeds the specified requirements.

1.19 SUBSTITUTION OF MATERIAL AND EQUIPMENT

- .1 Substitution prior to Tender closing will be considered by Owner only if the conditions of Section 01 25 00 – Substitution Procedures are met.
- .2 **After Contract award** substitutions of material or equipment, other than as selected by Contractor from those specified, will be considered by

Owner only if the conditions of Section 01 25 00 – Substitution Procedures are met.

- .3 Requests for substitutions after Contract award must be accompanied by sufficient information in the form of shop drawings, manufacturer's literature, samples or other data to permit proper investigation of the substitutes used. Requests must also include statements of respective costs of material or equipment originally specified and the proposed substitution.
- .4 Should a proposed substitution be accepted after Contract award either in part or in whole, assume full responsibility and costs when substitution affects other work on Project. Contractor to pay for design or drawing changes required as a result of the substitution.
- .5 Amounts of all credits arising from approval of substitutions after Contract award will be determined by Owner and the Contract amount will be reduced accordingly.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 Requirements and limitations for cutting and patching the Work.

1.2 RELATED SECTIONS

- .1 Section 01 11 00 - Summary of Work.
- .2 Section 01 33 00 - Submittal Procedures.

1.3 SUBMITTALS

- .1 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 elements.
 - .3 Efficiency, maintenance, or safety of any operational element.
 - .4 Visual qualities of sight-exposed elements.
 - .5 Work of Owner or separate contractor.
- .2 Include in request:
 - .1 Identification of Project.
 - .2 Location and description of affected Work.
 - .3 Statement on 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.

1.4 PREPARATION

- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering, inspect conditions affecting performance of Work.
- .3 Beginning of cutting or patching means acceptance of existing conditions.
- .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.

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- .5 Provide protection from elements for areas which may be exposed by uncovering work; maintain excavations free of water.
- .6 Obtain Owner's approval before cutting, boring or sleeving load-bearing members.

1.5 EXECUTION

- .1 Execute cutting, fitting, and patching including excavation and fill, to complete Work.
- .2 Fit several parts together, to integrate with other Work.
- .3 Uncover Work to install ill-timed Work.
- .4 Remove and replace defective and non-conforming Work.
- .5 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
- .6 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .7 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .8 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .9 Restore work with new products in accordance with requirements of Contract Documents.
- .10 Fit Work to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .11 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with firestopping material in accordance with Section 07 84 00 - Firestopping, full thickness of the construction element.
- .12 Refinish surfaces to match adjacent finishes: For continuous surfaces refinish to nearest intersection; for an assembly, refinish entire unit.
- .13 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.
- .14 Make cuts with clean, true, smooth edges.

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- .15 Where new work connects with existing, and where existing work is altered, cut, patch and make good to match existing work.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 **GENERAL**

1.1 **GENERAL**

- .1 Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
- .2 Store volatile waste in covered metal containers and remove from premises at end of each working day.
- .3 Provide adequate ventilation during use of volatile or noxious substances. Use for building ventilation systems is not permitted for this purpose.

1.2 **RELATED SECTION**

- .1 Section 01 77 00 - Closeout Procedures.

1.3 **PROJECT CLEANLINESS**

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by Owner or other Contractors.
- .2 Remove waste materials and debris from site at the end of each working day. Do not burn waste materials on site.
- .3 Clear snow and ice from access to building.
- .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Provide on-site containers for collection of waste materials and debris.
- .6 Clean interior areas prior to start of finish work, maintain areas free of dust and other contaminants during finishing operations.
- .7 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .8 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .9 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

- .10 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.
- .11 Provide and use marked separate bins for recycling. Refer to Section 01 74 21 – Construction/Waste Management and Disposal.
- .12 Dispose of waste materials and debris at designated dumping areas off site.

1.4 FINAL CLEANING

- .1 Refer to General Conditions.
- .2 When Work is Substantially Performed, remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .3 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .4 When the Work is Totally Performed, remove surplus products, tools, construction machinery and equipment. Remove waste products and debris other than that caused by the Owner or other Contractors.
- .5 Remove waste materials from the site at regularly scheduled times or dispose of as directed by the Owner. Do not burn waste materials on site.
- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 Leave the work broom clean before the inspection process commences.
- .8 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.
- .9 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, floors and ceilings.
- .10 Clean lighting reflectors, lenses, and other lighting surfaces.
- .11 Vacuum clean and dust building interiors, behind grilles, louvres and screens.

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- .12 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .13 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .14 Remove dirt and other disfiguration from exterior surfaces.
- .15 Sweep and wash clean paved areas.
- .16 Clean equipment and fixtures to a sanitary condition; clean or replace filters of mechanical equipment.
- .17 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 Text, schedules and procedures for systematic Waste Management Program for construction, deconstruction, demolition, and renovation projects, including:
 - .1 Diversion of Materials.
 - .2 Waste Audit (WA) - Schedule A.
 - .3 Waste Reduction Workplan (WRW) - Schedule B.
 - .4 Demolition Waste Audit (DWA) - Schedule C.
 - .5 Cost/Revenue Analysis Workplan (CRAW) - Schedule D.
 - .6 Materials Source Separation Program (MSSP).
 - .7 Canadian Governmental Responsibility for the Environment Resources - Schedule E.

1.2 DEFINITIONS

- .1 Demolition Waste Audit (DWA): Relates to actual waste generated from project.
- .2 Materials Source Separation Program (MSSP): Consists of series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.
- .3 Recyclable: Ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse by others.
- .4 Recycle: Process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
- .5 Recycling: Process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- .6 Reuse: Repeated use of product in same form but not necessarily for same purpose. Reuse includes:
 - .1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.

- .2 Returning reusable items including pallets or unused products to vendors.
- .7 Salvage: Removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.
- .8 Separate Condition: Refers to waste sorted into individual types.
- .9 Source Separation: Acts of keeping different types of waste materials separate beginning from first time they became waste.

1.3 MATERIALS SOURCE SEPARATION PROGRAM (MSSP)

- .1 Prepare MSSP and have ready for use prior to project start-up.
- .2 Implement MSSP for waste generated on project in compliance with approved methods and as reviewed by authorities having jurisdiction.
- .3 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.
- .4 Provide containers to deposit reusable and recyclable materials.
- .5 Locate containers in locations, to facilitate deposit of materials without hindering daily operations.
- .6 Locate separated materials in areas which minimize material damage.
- .7 Collect, handle, store on-site, and transport off-site, salvaged materials in separate condition.
 - .1 Transport to recycling facility.

1.4 STORAGE, HANDLING AND PROTECTION

- .1 Unless specified otherwise, materials for removal become Contractor's property.
- .2 Protect, stockpile, store and catalogue salvaged items.
- .3 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to approved local facility.
- .4 Protect structural components not removed for demolition from movement or damage.

- .5 Support affected structures. If safety of building is endangered, cease operations and immediately notify Department having jurisdiction.
- .6 Protect surface drainage, mechanical and electrical from damage and blockage.
- .7 Separate and store materials produced during dismantling of structures in designated areas.
- .8 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.
 - .1 On-site source separation is recommended.

1.5 DISPOSAL OF WASTES

- .1 Disposal of waste is the responsibility of the Contractor. Disposal shall be in accordance with all applicable regulations and requirements of the Authority Having Jurisdiction.
- .2 Do not bury rubbish or waste materials.
- .3 Do not dispose of any waste into waterways, storm, or sanitary sewers.
- .4 Remove materials from deconstruction as deconstruction/disassembly Work progresses.
- .5 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in pre-demolition material audit.

1.6 USE OF SITE AND FACILITIES

- .1 Execute work with least possible interference or disturbance to normal use of premises.
- .2 Provide security measures approved by Owner.

1.7 SCHEDULING

- .1 Coordinate Work with other activities at site to ensure timely and orderly progress of Work.

PART 2 **PRODUCTS (NOT APPLICABLE)**

PART 3 **EXECUTION**

3.1 **APPLICATION**

- .1 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

3.2 **CLEANING**

- .1 Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.
- .2 Clean-up work area as work progresses.
- .3 Source separate materials to be reused/recycled into specified sort areas.

3.3 **DIVERSION OF MATERIALS**

- .1 From following list, separate materials from general waste stream and stockpile in separate piles or containers, as reviewed by Owner and consistent with applicable fire regulations.
 - .1 Mark containers or stockpile areas.
 - .2 Provide instruction on disposal practices.
- .2 On-site sale or distribution of salvaged materials to third parties is not permitted.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 74 00 - Cleaning.
- .2 Section 01 78 00 - Closeout Submittals.
- .3 Section 01 91 13 - Commissioning.

1.2 FINAL INSPECTION AND DECLARATION PROCEDURES

- .1 Contractor's Inspection: The Contractor and all Subcontractors shall conduct an inspection of Work, identify deficiencies and defects; repair as required. Notify the Owner in writing of satisfactory completion of the Contractor's Inspection and that corrections have been made. Request an Owner's Consultant's Inspection.
- .2 Owner's Inspection: Owner and the Contractor will perform an inspection of the Work to identify obvious defects or deficiencies. The contractor shall correct Work accordingly.
- .3 Completion: submit written certificate that the following have been performed:
 - .1 Work has been completed and inspected for compliance with Contract Documents.
 - .2 Defects have been corrected and deficiencies have been completed.
 - .3 Equipment and systems have been tested, adjusted and balanced and are fully operational.
 - .4 Certificates required by Fire Commissioner, Utility companies have been submitted.
 - .5 Operation of systems have been demonstrated to Owner's personnel.
 - .6 Commissioning of building systems: completed in accordance with section 01 91 13 – Commissioning and copies of final Commissioning Report submitted to Owner.
 - .7 Work is complete and ready for Final Inspection.
- .4 Final Inspection: When items noted above are completed, request final inspection of Work by the Owner's Representative and the Contractor. If Work is deemed incomplete by the Owner, complete outstanding items and request a reinspection.

- .5 Declaration of Substantial Performance: When the Owner considers deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for Certificate of Substantial Performance. Refer to General Conditions for specifics to application.
- .6 Commencement of Lien and Warranty Periods: The date of Owner acceptance of the submitted declaration of Substantial Performance shall be the date for commencement for the warranty period and commencement of the lien period.
- .7 Declaration of Total Performance: When the Owner considers final deficiencies and defects have been corrected and it appears requirements of the Contract have been totally performed, make application for certificate of Total Performance. Refer to General Conditions for specifics to application. If Work is deemed incomplete by the Consultant, complete the outstanding items and request a reinspection.

1.3 REINSPECTION

- .1 Should status of work require reinspection by Owner due to failure of work to comply with Contractor's claims for inspection, Owner will deduct amount of compensation for reinspection services from payment to Contractor.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 As-built, samples, and specifications.
- .2 Equipment and systems.
- .3 Product data, materials and finishes, and related information.
- .4 Operation and maintenance data.
- .5 Spare parts, special tools and maintenance materials.
- .6 Warranties and bonds.
- .7 Final site survey.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 45 00 - Quality Control.
- .3 Section 01 71 00 - Examination and Preparation.
- .4 Section 01 77 00 - Closeout Procedures.
- .5 Section 01 91 13 - Commissioning.

1.3 SUBMISSION

- .1 Prepare instructions and data using personnel experienced in maintenance and operation of described products.
- .2 Submit one copy of completed volumes in final form 15 days prior to final inspection.
- .3 Copy will be returned after final inspection, with Owner's comments.
- .4 Revise content of documents as required prior to final submittal.
- .5 Two weeks prior to Substantial Performance of the Work, submit to the Owner, two final copies of operating and maintenance manuals.

- .6 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.
- .7 If requested, furnish evidence as to type, source and quality of products provided.
- .8 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.
- .9 Pay costs of transportation.

1.4 FORMAT

- .1 Organize data in the form of an instructional manual.
- .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.
- .3 When multiple binders are used, correlate data into related consistent groupings. Identify contents of each binder on spine.
- .4 Cover: Identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .5 Arrange content under Section numbers and sequence of Table of Contents.
- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7 Text: Manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- .9 Provide CAD files in DWG format on CD. Also provide electronic files in PDF format.

1.5 CONTENTS - EACH VOLUME

- .1 Table of Contents: provide title of project; names, addresses, and telephone numbers of Consultant and Contractor with name of responsible parties; schedule of products and systems, indexed to content of volume.
- .2 For each product or system:

- .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to clearly identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.
- .6 Training: Refer to Section 01 91 13 – Commissioning.

1.6 AS-BUILTS AND SAMPLES

- .1 In addition to requirements in General Conditions, maintain at the site for Owner one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to the Contract.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Field test records.
 - .7 Inspection certificates.
 - .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Owner.

1.7 RECORDING ACTUAL SITE CONDITIONS

- .1 Record information on set of blue line opaque drawings, provided by Owner.
- .2 Provide felt tip marking pens, maintaining red color pens for recording information.
- .3 Record information concurrently with construction progress. Do not conceal Work until required information is 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: submit manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.
- .7 At completion of project, provide all recorded information on print drawings. Transfer recorded information to AutoCAD files in DWG format. Submit DWG files, also with electronic files in PDF format as part of the Closeout Submittals.

1.8 FINAL SURVEY

- .1 Submit final site survey certificate certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.

1.9 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 nomenclature and commercial number of replaceable parts.
- .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 Contractor's 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 list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- .14 Include test and balancing reports
- .15 Additional requirements: As specified in individual specification sections.

1.10 MATERIALS AND FINISHES

- .1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured products.
- .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 Additional Requirements: as specified in individual specifications sections.

1.11 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 Deliver to site location as directed; place and store.
- .4 Receive and catalogue all items. Submit inventory listing to Owner. Include approved listings in Maintenance Manual.
- .5 Obtain receipt for delivered products and submit prior to final payment.

1.12 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 Deliver to site location as directed; place and store.
- .4 Receive and catalogue all items. Submit inventory listing to Owner. Include approved listings in Maintenance Manual.
- .5 Obtain receipt for delivered products and submit prior to final payment.

1.13 SPECIAL TOOLS

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

1.14 STORAGE, HANDLING AND PROTECTION

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

1.15 WARRANTIES AND BONDS

- .1 Develop warranty management plan to contain information relevant to Warranties.
- .2 Submit warranty management plan to Owner's approval.
- .3 Warranty management plan to include required actions and documents to assure that Owner receives warranties to which it is entitled.
- .4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.
- .5 Assemble approved information in binder and submit upon acceptance of work. Organize binder as follows:
 - .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 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work.
- .4 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial Performance is determined.
- .5 Verify that documents are in proper form, contain full information, and are notarized.
- .6 Co-execute submittals when required.
- .7 Retain warranties and bonds until time specified for submittal.
- .6 Include information contained in warranty management plan as follows:
 - .1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.
 - .2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to include roofs, HVAC balancing, pumps, motors, transformers, and commissioned systems such as fire protection, alarm systems, sprinkler systems, lightning protection systems.
 - .3 Provide list for each warranted equipment, item, feature of construction or system indicating:
 - .1 Name of item.
 - .2 Model and serial numbers.
 - .3 Location where installed.
 - .4 Name and phone numbers of manufacturers or suppliers.
 - .5 Names, addresses and telephone numbers of sources of spare parts.
 - .6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.
 - .7 Cross-reference to warranty certificates as applicable.
 - .8 Starting point and duration of warranty period.
 - .9 Summary of maintenance procedures required to continue warranty in force.
 - .10 Cross-Reference to specific pertinent Operation and Maintenance manuals.

- .11 Organization, names and phone numbers of persons to call for warranty service.
- .12 Typical response time and repair time expected for various warranted equipment.
- .4 Procedure and status of tagging of equipment covered by extended warranties.
- .5 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.
- .7 Respond in a timely manner to oral or written notification of required construction warranty repair work.
- .8 Written verification will follow oral instructions. Failure to respond will be cause for the Owner to proceed with action against Contractor.

1.16 PRE-WARRANTY CONFERENCE

- .1 Meet with Owner to develop understanding of requirements of this section. Schedule meeting prior to contract completion, and at time designated by Owner.
- .2 Owner will establish communication procedures for:
 - .1 Notification of construction warranty defects.
 - .2 Determine priorities for type of defect.
 - .3 Determine reasonable time for response.

1.17 WARRANTY TAGS

- .1 Tag, at time of installation, each warranted item. Provide durable, oil and water resistant tag approved by Owner.
- .2 Leave date of acceptance until project is accepted for occupancy.
- .3 Indicate following information on tag:
 - .1 Type of product/material.
 - .2 Model number.
 - .3 Serial number.
 - .4 Contract number.
 - .5 Warranty period.
 - .6 Inspector's signature.
 - .7 Construction Contractor.

PART 2 **PRODUCTS (NOT APPLICABLE)**

PART 3 **EXECUTION (NOT APPLICABLE)**

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES:

- .1 This Section specifies roles and responsibilities of Commissioning Training.

1.2 RELATED SECTIONS:

- .1 Section 01 78 00 – Closeout Submittals.
- .2 Section 01 91 13 – Commissioning.

1.3 TRAINEES

- .1 Trainees: personnel selected for operating and maintaining this facility including, but not limited to, Facility Manager, building operators, maintenance staff, security staff, and technical specialists as required.
- .2 Trainees may be available for training during any stage of construction.

1.4 INSTRUCTORS

- .1 The Cx Manual will contain:
 - .1 Descriptions of systems.
 - .2 Instruction on design philosophy, design criteria, and design intent.
- .2 Contractor and certified factory-trained manufacturers' personnel: to provide instruction on the following:
 - .1 Start-Up, operation, shut-down and maintenance of equipment, components and systems.
 - .2 Control features and reasons for, results of, implications on associated systems of adjustment of set points of control and safety devices.
 - .3 Instructions on servicing, maintenance and adjustment of systems, equipment and components.
 - .4 Training to be completed after Installation and Performance Verification are completed.

1.5 TRAINING OBJECTIVES

- .1 Training to be detailed and of sufficient duration to ensure:
 - .1 Safe, reliable, cost-effective, energy-efficient operation of systems in normal and emergency modes under all conditions.

- .2 Effective on-going inspection, measurements of system performance.
- .3 Proper preventive maintenance, diagnosis, trouble-shooting and maintenance.
- .4 Ability to update documentation.
- .5 Ability to operate equipment and systems under emergency conditions until appropriate qualified assistance arrives.
- .6 At a minimum, the training duration shall be one full 8 hour work day.

1.6 TRAINING MATERIALS

- .1 Instructors to be responsible for content and quality. Provide copies for all those in attendance.
- .2 Training materials to include:
 - .1 "As-Built" Contract Documents.
 - .2 Operating Manual.
 - .3 Maintenance Manual.
 - .4 Testing, adjusting and balancing and performance verification reports where applicable.
- .3 Owner will review training manuals.
- .4 Training materials to be in a format that permits future training procedures to the same degree of detail with or without the instructor.

1.7 SCHEDULING

- .1 Contractor to include in schedule time for training. Provide a detailed commissioning schedule indicating all Cx tasks and training.
- .2 Deliver training during regular working hours, training sessions to be determined in Commissioning meetings.
- .3 Training to be completed prior to Substantial Completion.

1.8 RESPONSIBILITIES

- .1 Be responsible for:
 - .1 Implementation of training activities,
 - .2 Coordination among instructors,
 - .3 Quality of training, training materials,
- .2 Owner will evaluate training and materials.

- .3 Upon completion of training, provide written report, signed by Instructors, witnessed by Owner. Include list of those in attendance. The Cx manual will provide templates for these submittals.

1.9 TRAINING CONTENT

- .1 Training to include demonstrations by Instructors using the installed equipment and systems.
- .2 Content includes:
 - .1 Review of facility and occupancy profile.
 - .2 Functional requirements.
 - .3 System philosophy, limitations of systems and emergency procedures.
 - .4 Review of system layout, equipment, components and controls.
 - .5 Equipment and system start-up, operation, monitoring, servicing, maintenance and shut-down procedures.
 - .6 System operating sequences, including step-by-step directions for starting up, shut-down, operation of valves, dampers, switches, adjustment of control settings and emergency procedures.
 - .7 Maintenance and servicing.
 - .8 Trouble-shooting diagnosis.
 - .9 Inter-Action among systems during integrated operation.
 - .10 Review of O&M documentation.
- .3 Provide specialized training as specified in relevant Technical Sections of the construction specifications.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 General requirements for commissioning facility systems.
- .2 Certification and/or verification of the newly installed, added, deleted or modified systems, to the Owner for approval.
 - .1 All equipment and systems installed as per this contract shall be commissioned.

1.2 RELATED SECTIONS

- .1 Section 01 45 00 - Quality Control.

1.3 QUALITY ASSURANCE

- .1 Co-operate with testing organization services under provisions specified in Section 01 45 00 - Quality Control.
- .2 Testing organization: current member in good standing of AABC certified to perform specified services. All testing organizations shall be qualified and acceptable to the authority having jurisdiction (AHJ).
- .3 Comply with applicable procedures and standards of the certification sponsoring association.
- .4 Perform services under direction of supervisor qualified under certification requirements of sponsoring association.

1.4 REFERENCES

- .1 Associated Air Balance Council (AABC): National Standards For Field Measurements and Instrumentation, Total Systems Balance, Air Distribution-Hydronics Systems.
- .2 NFPA and National Fire Code
- .3 Canadian Electrical Code
- .4 National Plumbing Code

1.5 SUBMITTALS.

- .1 Prior to start of Work, submit name of organization or Contractor personnel proposed to perform commissioning services. Designate who

has managerial responsibilities for coordination of entire commissioning process.

- .2 Submit documentation to confirm organization or personnel compliance with quality assurance provision.
- .3 Submit 3 preliminary specimen copies of each of report forms proposed for use.
- .4 Fifteen days prior to Substantial Performance, submit 3 copies of final reports on applicable forms.
- .5 Submit reports of testing, adjusting, and balancing and commissioning postponed due to seasonal, climatic, occupancy, or other reasons beyond Contractor's control, promptly after execution of those services.

1.6 PROCEDURES - GENERAL

- .1 Comply with procedural standards of certifying association under whose standard services will be performed.
- .2 Notify Owner 7 days prior to beginning of operations.
- .3 Accurately record data for each step.
- .4 Report to Owner any deficiencies or defects noted during performance of services.

1.7 FINAL REPORTS

- .1 Prepare final commissioning report and submit to Owner for review and approval. Commissioning forms for all individual pieces of equipment shall be provided to the Contractor by the Owner or Owner's Representative.
- .2 Ensure each form bears signature of recorder, and that of supervisor of reporting organization.
- .3 Identify each instrument used, and latest date of calibration of each.

1.8 CONTRACTOR RESPONSIBILITIES

- .1 Prepare each system for commissioning.
- .2 Provide personnel and operate systems at designated times, and under conditions required for proper commissioning.
- .3 Notify Owner 7 days prior to time project will be ready for commissioning.

- .4 The Owner's Representative shall provide commissioning forms for the equipment and systems installed as part of this project and they shall be completed by the Contractor. Commissioning shall take place at a time suitable with the Owner's Representative. Commissioning forms shall be completed in the presence of the Owner's Representative.

1.9 PREPARATION

- .1 Provide instruments required for testing and commissioning operations.
- .2 All equipment / instruments used for testing and commissioning shall be calibrated with valid calibration certificates available for review by Owner.
- .3 Make instruments available to the Owner to facilitate spot checks during testing.
- .4 Retain possession of instruments and remove at completion of services.
- .5 Verify systems installation is complete and in continuous operation.

PART 2 PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 EXECUTION

- .1 Test and commission all work of this contract. All work shall be tested and commissioned in the presence of the Owner or Owner's Representative.

END OF SECTION

PART 1 GENERAL

1.1 RELATED WORK

- .1 Division 1 - General Requirements.
- .2 Comply with Asbestos Abatement Regulations, Latest Edition.

1.2 SECTION INCLUDES

- .1 Removal (other than defined minor amounts) of friable materials containing asbestos.
- .2 Use of power tools that are fitted with dust collectors equipped with a HEPA filter to cut, shape, grind, drill, scrape, or abrade manufactured products containing asbestos.
- .3 Cleaning, maintaining, or removal of air-handling equipment in buildings where sprayed fireproofing materials containing asbestos have been applied.

1.3 REFERENCES

- .1 Codes and standards referenced in this section refer to the latest edition thereof.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.205, Sealer for Application to Asbestos-Fibre-Releasing Materials.
- .3 Government of Newfoundland and Labrador:
 - .1 Asbestos Abatement Regulations, 1998.
 - .2 Guidance Document for Low and Moderate Risk Asbestos Abatement Projects. (included as Appendix B to this Specification)

1.4 DEFINITIONS

- .1 HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with a filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.
- .2 Amended Water: Water with a non-ionic surfactant wetting agent added to reduce water tension to allow wetting of fibres.

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- .3 Asbestos-Containing Materials (ACMs): Materials identified under Existing Conditions (Article 1.7), including fallen materials and settled dust.
- .4 Asbestos Work Area: Area where actual removal, sealing and enclosure of spray or trowel-applied asbestos-containing materials takes place.
- .5 Authorized Visitors: Building Owner, Asbestos Abatement Consultant or designated representative, and persons representing regulatory agencies.
- .6 Friable Material: Material that when dry can be crumbled, pulverized or powdered by hand pressure and includes such material that is crumbled, pulverized or powdered.
- .7 Occupied Area: Any area of the building or work site that is outside the Asbestos Work Area.
- .8 Polyethylene sheeting sealed with tape: Polyethylene sheeting of type and thickness specified sealed with tape along all edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide a continuous polyethylene membrane to protect underlying surfaces from water damage or damage by sealants, and to prevent escape of asbestos fibres through the sheeting into a clean area.
- .9 Glove Bag: Prefabricated glove bag as follows:
 - .1 Minimum thickness 0.25 mm (10 mil) polyvinyl-chloride bag.
 - .2 Integral 0.25 mm (10 mil) thick polyvinyl-chloride gloves and elastic ports.
 - .3 Equipped with reversible double-pull double throw zipper on top.
 - .4 Straps for sealing ends around pipe.
 - .5 Must incorporate internal closure strip if it is to be moved or used in more than one specific location.
- .10 DOP Test: A testing method used to determine the integrity of the Negative Pressure unit using dioctyl phthalate (DOP) HEPA-filter leak test.
- .11 Sprayer: Garden reservoir type sprayer or airless spray equipment capable of producing a mist or fine spray. Must be appropriate capacity for scope of work.
- .12 Negative pressure: A system that extracts air directly from work area, filters such extracted air through a High Efficiency Particulate Air filtering system, and discharges this air directly outside work area to exterior of building. This system shall maintain a minimum pressure differential of 5 Pa relative to adjacent areas outside of work areas, be equipped with an

alarm to warn of system breakdown and be equipped with an instrument to continuously monitor and automatically record pressure differences.

- .13 Airlock: A system for permitting ingress or egress without permitting air movement between a contaminated area and an uncontaminated area, typically consisting of two curtained doorways at least 2 m apart.
- .14 Curtained doorway: An arrangement of closures to allow ingress and egress from one room to another while permitting minimal air movement between rooms, typically constructed as follows: Place two overlapping sheets of polyethylene over an existing or temporarily framed doorway, secure each along the top of the doorway, secure the vertical edge of one sheet along one vertical side of the doorway, and secure the vertical edge of the other sheet along the opposite vertical side of the doorway. Reinforce free edges of polyethylene with duct tape and weight the bottom edge to ensure proper closing. Each polyethylene sheet shall overlap openings not less than 1.5 m on each side.
- .15 Competent person: in relation to specific work, means a worker who:
 - .1 Is qualified because of knowledge, training and experience to perform the work.
 - .2 Is familiar with the provincial and federal laws and with the provisions of the regulations that apply to the work.
 - .3 Has knowledge of all potential or actual danger to health or safety in the work.
- .16 Non-Friable Material: material that when dry cannot be crumbled, pulverized or powdered by hand pressure.

1.5 SUBMITTALS

- .1 Before commencing work:
 - .1 Obtain from the appropriate agency and submit to Owner all necessary permits for transportation and disposal of asbestos waste. Ensure that dump operator is fully aware of hazardous nature of material being dumped, and proper methods of disposal. Submit proof satisfactory to Owner that suitable arrangements have been made to receive and properly dispose of asbestos waste.
 - .2 Submit proof satisfactory to Owner that all employees have had instruction on the hazards of asbestos exposure, respirator use, dress, use of showers, entry and exit from work areas, and all aspects of work procedures and protective measures. Supervisory personnel shall have attended an asbestos abatement course, of not less than two days duration, approved by the Owner. Submit

proof of attendance in the form of a certificate. Minimum of one Supervisor for every five workers.

- .3 Submit layout of proposed enclosures and decontamination facilities to Owner for review.
- .4 Submit documentation including test results for sealer proposed for use.
- .5 Submit Provincial and/or local requirements for Notice of Project Form.
- .6 Submit proof of Contractor's Asbestos Liability Insurance.
- .7 Submit proof satisfactory to the Owner that all employees have respirator fitting and testing. Workers must be fit-tested with the respirator that is personally issued.
- .8 Submit Workplace Health, Safety and Compensation Commission status and transcription of insurance.

1.6 REGULATORY REQUIREMENTS

- .1 Comply with Federal, Provincial, and local requirements pertaining to asbestos, provided that in case of conflict among those requirements or with these specifications the more stringent requirement applies. Comply with regulations in effect at the time the work is performed.
- .2 Follow Newfoundland Regulation of the Occupation Health and Safety Act, Asbestos Abatement Regulations, Latest Edition. All work as defined under this section must be completed by a "Qualified Asbestos Abatement Contractor" (registered with the Government of Newfoundland and Labrador)
- .3 Follow regulations for the transport of asbestos waste, specifically the Transportation of Dangerous Goods Act, latest edition.
- .4 Follow regulations for the disposal of asbestos waste, specifically Waste Management Regulations and Waste Material Disposal Areas Regulations.

1.7 EXISTING CONDITIONS

- .1 Available reports and information pertaining to asbestos, directly associated with this specific project, are bound into this specification.
- .2 Prior to commencing of work, verify with Owner, and review whether an asbestos audit and/or Asbestos Management Plan are in place for the building.

- .3 Information contained in audits and plans are for general information only and are not necessarily representative of all asbestos containing materials covered within the scope of this project.
- .4 Notify Owner of materials believed to contain asbestos encountered during the execution of work that is not contained in the audits and plans. Do not disturb such materials until instructed by Owner.

1.8 INSTRUCTION AND TRAINING

- .1 Before commencing work, provide to the Owner satisfactory proof that every worker has had instruction and training in the hazards of asbestos exposure, in personal hygiene including dress and showers, in entry and exit from the Asbestos Work Area, in all aspects of work procedures including glove bag procedures, and in the use, cleaning, and disposal of respirators and protective clothing.
- .2 Instruction and training related to respirators includes, at a minimum:
 - .1 Proper fitting of the equipment.
 - .2 Inspection and maintenance of the equipment.
 - .3 Disinfecting of the equipment.
 - .4 Limitations of the equipment.
- .3 Instruction and training must be provided by a competent, qualified person.
- .4 Supervisory personnel to complete required training.

1.9 WORKER PROTECTION

- .1 Protective equipment and clothing to be worn by workers while in the Asbestos Work Area includes:
 - .1 Respirator equipped with HEPA filter cartridges, personally issued to the worker and marked as to efficiency and purpose, and acceptable to the Provincial Authority having jurisdiction as suitable for the type of asbestos and the level of asbestos exposure in the Asbestos Work Area. If disposable type filters are used, provide sufficient filters so that workers can install new filters following disposal of used filters and before re-entering contaminated areas.
 - .2 Disposable-type protective clothing that does not readily retain or permit penetration of asbestos fibres, consisting of full-body covering including head covering with snug-fitting cuffs at wrists, ankles, and neck.
- .2 Each worker shall:

- .1 Remove street clothes in clean change room and put on respirator with new filters or reusable filters that have been tested as satisfactory, clean coveralls and head covers before entering Equipment and Access Rooms or Asbestos Work Area. All street clothes, uncontaminated footwear, towels, and similar uncontaminated articles shall be stored in clean change room.
- .2 Remove gross contamination from clothing before leaving work area then proceed to Equipment and Access Room. Place contaminated attire in receptacles for disposal with other asbestos - contaminated materials Clean outside of respirator with soap and water. Remove respirator; remove filters and wet them and dispose of filters in the container provided for the purpose; and wash and rinse the inside of the respirator. When not in use in the work area, store work footwear in Equipment and Access Room. Upon completion of asbestos abatement, dispose of footwear as contaminated waste or clean thoroughly inside and out using soap and water before removing from work area or from Equipment and Access Room.
- .3 Workers shall not eat, drink, smoke or chew gum or tobacco at the work site except in established clean room.
- .4 Workers shall be fully protected with respirators and protective clothing during preparation of system of enclosures prior to commencing actual asbestos abatement.
- .5 Provide and post in Clean Change Room and in Equipment and Access Room the procedures described in 1.9 of this section, in both official languages.
- .6 Ensure that no person required to enter an Asbestos Work Area has facial hair that affects the seal between the respirator and the face.

1.10 VISITOR PROTECTION

- .1 Provide protective clothing and approved respirators to Authorized Visitors to work areas.
- .2 Instruct Authorized Visitors in the use of protective clothing and respirators.
- .3 Instruct Authorized Visitors in proper procedures to be followed in entering into and exiting from work areas.

1.11 NOTIFICATION

- .1 Not later than ten (10) working days before commencing work on this project notify the Occupational Health and Safety Division in writing as per Regulation 194/91, Section 34 Sub-Section (7). Provide telephone notification immediately prior to the start of work.
- .2 Notify Sanitary Landfill site.
- .3 Inform all sub-trades of the presence of friable asbestos-containing materials identified in the Existing Conditions.
- .4 Submit to the Owner a copy of all notifications prior to the start of work.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 All materials and equipment brought to work site must be in good condition and free of asbestos, asbestos debris, and fibrous materials. Disposable items must be of new materials only.
- .2 Polyethylene: Minimum 0.15 mm thick unless otherwise specified; in sheet size to minimize joints.
- .3 Tape: Fibreglass reinforced duct tape suitable for sealing polyethylene under both dry conditions and wet conditions using amended water.
- .4 Wetting agent: 50% polyoxyethylene ester and 50% polyoxyethylene ether, or other material approved by Owner, mixed with water in a concentration to provide adequate penetration and wetting of asbestos-containing material.
- .5 Asbestos waste containers: Metal or fibre - type acceptable to dump operator with tightly fitting covers and 0.15 mm minimum thickness sealable polyethylene liners. Labelling requirements: Affix a pre-printed cautionary asbestos warning, in both official languages, that is clearly visible when ready for removal to disposal site.
- .6 Encapsulants : Type 2 surface film forming type Class A water based conforming to CAN/CGSB-1.205, ULC listed.
- .7 Glove bag: Acceptable materials include safe-T-strip products in configuration suitable for work, or alternative material approved by addendum during the tendering period in accordance with the Instructions to Tenderers. Glove bags intended for use in more than one location must

be equipped with a reversible, double-pull, double-throw zipper on the top and at approximately the mid-section of the bag.

- .8 Slow drying sealer: non-staining, clear, water - dispersible type that remains tacky on surface for at least 8 hours and designed for the purpose of trapping residual asbestos fibres. Sealer shall have flame spread and smoke developed rating less than 50

PART 3 EXECUTION

3.1 PREPARATION

- .1 Remove and store items to be salvaged or reused as directed by Owner.
 - .1 Protect and wrap items and transport and store in area specified by Owner.
- .2 Work Area:
 - .1 Shut off and isolate HVAC system to prevent dust dispersal into other building areas. Conduct smoke tests to ensure duct work is airtight.
 - .2 Pre-clean fixed casework and equipment within work area, using HEPA vacuum and cover and seal with polyethylene sheeting and tape.
 - .3 Clean work area using HEPA vacuum. If not practicable, use wet cleaning method. Do not raise dust.
 - .4 Seal off openings with polyethylene sheeting and seal with tape.
 - .5 Protect floor surfaces covered from wall to wall with polyethylene sheets.
 - .6 Maintain emergency fire exits or establish alternatives satisfactory to Authority Having Jurisdiction.
 - .7 Where water application is required for wetting lead containing materials, provide temporary water supply appropriately sized for application of water as required.
 - .8 Provide electrical power and shut off for operation of powered tools and equipment. Provide 24 V safety lighting and ground fault interrupter circuits on power source for electrical tools, in accordance with applicable CSA Standard. Ensure safe installation of electrical cables and equipment.
- .3 Do not start work until:
 - .1 Arrangements have been made for disposal of waste.
 - .2 Tools, equipment, and materials waste containers are on site.

- .3 Arrangements have been coordinated with building security.
- .4 Notifications have been completed, and preparatory steps have been taken.

- .4 Worker Decontamination Enclosure System:
 - .1 Worker Decontamination Enclosure System shall comprise an Equipment and Access Room,
 - .1 Clean Room: Build a Clean Room between the work area and areas outside of enclosures,

- .5 Container and Equipment Decontamination Enclosure System:
 - .1 Container and Equipment Decontamination Enclosure System consists of a Staging Area within the work area, a Holding Room, and an Unloading Room. The purpose of this system is to provide a means to decontaminate waste containers, scaffolding, waste and material containers, vacuum and spray equipment, and other tools and equipment for which the Worker Decontamination Enclosure System is not suitable.
 - .1 Staging Area: Designate a Staging Area in the work area for gross removal of dust and debris from waste containers and equipment, labelling and sealing of waste containers, and temporary storage pending removal

- .6 Construction of Decontamination Enclosures:
 - .1 Build suitable framing for enclosures or use existing rooms where convenient, and line with polyethylene sheeting sealed with tape.
 - .2 Build curtained doorways between enclosures so that when people move through or when waste containers and equipment are moved through a doorway, one of the two closures comprising the doorway always remains closed.

- .7 Separation of Work Areas from Occupied Areas:
 - .1 Separate parts of the building required to remain in use from parts of the building used for asbestos abatement by means of an airtight barrier system constructed as follows:
 - .1 Build suitable floor to ceiling lumber or metal stud framing, cover with polyethylene sheeting sealed with tape, and apply 9 mm minimum thick plywood. Seal all joints between plywood sheets and between plywood and adjacent materials with surface film forming type sealer, to create an airtight barrier.

- .2 Cover plywood barrier with polyethylene sealed with tape, as specified for work areas.
- .8 Maintenance of Enclosures:
 - .1 Maintain enclosures in tidy condition.
 - .2 Ensure that barriers and polyethylene linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately upon discovery.
 - .3 Visually inspect enclosures at the beginning of each working period.
 - .4 Use smoke methods to test effectiveness of barriers when directed by Owner.
- .9 Asbestos Abatement work shall not commence until:
 - .1 Arrangements have been made for disposal of waste.
 - .2 For wet stripping techniques, arrangements have been made for containing, filtering, and disposal of wastewater.
 - .3 Work area and decontamination enclosures and parts of the building required to remain in use are effectively segregated.
 - .4 Tools, equipment, and materials waste containers are on hand.
 - .5 Arrangements have been made for building security.
 - .6 Warning signs specified in PART 3 are displayed where access to contaminated areas is possible.
 - .7 All notifications have been completed, and other preparatory steps have been taken.

3.2 SUPERVISION

- .1 A minimum of one Supervisor for every five workers is required. Refer to Asbestos Abatement Regulations for definition and training of supervisor.
- .2 An approved Supervisor must remain within the Asbestos Work Area at all times during the disturbance, removal, or other handling of asbestos-containing materials.

3.3 ASBESTOS REMOVAL

- .1 Before removing asbestos:
 - .1 Prepare site.
 - .2 Spray asbestos material with water containing the specified wetting agent, using airless spray equipment capable of providing a "mist" application to prevent release of fibres. Saturate the asbestos material sufficiently to wet it to the substrate without causing excess

dripping. Spray the asbestos material repeatedly during work process to maintain saturation and to minimize asbestos fibre dispersion.

- .2 Remove the saturated asbestos material in small sections. Do not allow saturated asbestos to dry out. As it is being removed pack the material in sealable plastic bags 0.15 mm minimum thick and place in labelled containers for transport.
- .3 Seal filled containers. Clean external surfaces thoroughly by wet sponging. Remove from immediate working area to Staging Area. Clean external surfaces thoroughly again by wet sponging before moving containers to decontamination Washroom. Wash containers thoroughly in decontamination Washroom, and store in Holding Room pending removal to Unloading Room and outside. Ensure that containers are removed from the Holding Room by workers who have entered from uncontaminated areas dressed in clean coveralls.
- .4 After completion of stripping work, all surfaces from which asbestos has been removed shall be wire brushed and wet-sponged to remove all visible material. During this work keep the surfaces wet.
- .5 Where Owner decides complete removal of asbestos-containing material is impossible due to obstructions such as structural members or major service elements, and provides a written direction, encapsulate the material as follows:
 - .1 Apply surface film forming type sealer to provide 0.635 mm minimum dry film thickness over sprayed asbestos surfaces. Apply using airless spray equipment to avoid blowing off fibres.
- .6 After wire brushing and wet sponging to remove visible asbestos, and after encapsulating asbestos-containing material impossible to remove, wet clean the entire work area including the Equipment and Access Room, and equipment used in the process. After a 24 hour period to allow for dust settling, wet clean these areas and objects again. During this settling period no entry, activity, or ventilation will be permitted.

3.4 PIPE INSULATION REMOVAL USING GLOVE BAG

- .1 Place tools necessary to remove insulation in tool pouch. Wrap the bag around pipe and close zippers. Seal bag to pipe with cloth straps.
- .2 Place hands in gloves and use necessary tools to remove insulation. Arrange insulation in bag to obtain full capacity of bag.

- .3 Insert nozzle of a garden reservoir type sprayer into bag through valve and wash down pipe and interior of bag thoroughly. Wet surface of insulation in lower section of bag.
- .4 When glove bags are intended for use at more than one location: After wash-down and application of sealer, seal off waste in lower section of bag using zipper at mid-section of bag. Remove air from top section of bag through the elasticized valve using a HEPA vacuum. Remove bag from pipe, reinstall in new location, and reseal to pipe prior to opening the lower section of the bag. Repeat stripping operation.
- .5 If bag is to be moved along pipe, first remove air from top section through the elasticized valve using a HEPA vacuum. Next loosen straps, move bag, re-seal to pipe using double-pull zipper to pass hangers. Repeat stripping operation.
- .6 To remove bag after completion of stripping, wash top section and tools thoroughly. Remove air from top section through the elasticized valve using a HEPA vacuum. Pull polyethylene waste container over glove bag before removing from pipe. Release one strap and remove freshly washed tools. Place tools in water. Remove second strap and zipper. Fold over into waste container and seal.
- .7 After removal of bag ensure that pipe is free of all residue. Remove all residue using HEPA vacuum or wet cloths. Ensure that surfaces are free of sludge which after drying could release asbestos dust into atmosphere. Seal exposed surfaces of pipe and ends of insulation with slow-drying sealer to seal in any residual fibres.
- .8 Upon completion of work shift, cover exposed ends of remaining pipe insulation with polyethylene taped in place.

3.5 FINAL CLEANUP

- .1 Remove polyethylene sheet by rolling it away from walls to centre of work area. Vacuum all visible asbestos-containing particles observed during cleanup, immediately, using HEPA vacuum equipment.
- .2 Place polyethylene seals, tape, cleaning material, clothing, and other contaminated waste in plastic bags and sealed labelled waste containers for transport.
- .3 Work areas, Equipment and Access Room, Wash Area Room, and other enclosures that may be contaminated shall be included in the clean-up.

- .4 Sealed waste containers and all equipment used in the work shall be included in the cleanup and shall be removed from work areas, via the Container and Equipment Decontamination Enclosure System, at an appropriate time in the cleaning sequence.
- .5 A final check shall be carried out to ensure that no dust or debris remains on surfaces as a result of dismantling operations and air-monitoring shall be carried out again to ensure that asbestos levels in the building do not exceed 0.10 fibres/cc. Repeat cleaning using HEPA vacuum equipment, or wet cleaning methods where feasible, in conjunction with sampling until levels meet these criteria.
- .6 As work progresses, and to prevent exceeding available storage capacity on site, remove sealed and labelled containers containing asbestos waste and dispose of to authorized disposal area in accordance with requirements of disposal authority. Ensure that each shipment of containers transported to dump is accompanied by Contractor's representative who shall ensure that dumping is done in accordance with governing regulations.

3.6 AIR MONITORING

- .1 From commencement of work until completion of cleaning operations, air samples will be taken on a daily basis both inside and outside of work area enclosure in accordance with Asbestos Abatement Regulations (personal, perimeter and clearance) and conforming to applicable NIOSH sampling protocol. (ie: NIOSH 7400)
- .2 Results of air monitoring inside the work area will be used to establish the type of respirators to be used. Workers may be required to wear sample pumps for up to full-shift periods. If fibre levels are above the safety factor of the respirators in use, the abatement will be stopped, means of dust suppression will be applied, and a higher safety factor in respiratory protection will be used by all persons inside the enclosure. If air monitoring shows that areas outside work area enclosures are contaminated, these areas shall be enclosed, maintained and cleaned, in the same manner as that applicable to work areas.
- .3 During the course of the work, fibre content of the air will be measured by a PCM test. If PCM measurements exceed 0.10 f/cc work will be stopped until procedures are corrected.
- .4 Conduct final air monitoring as follows: After the Asbestos Work Area has passed a visual inspection, an acceptable coat of lock-down agent has been applied to all surfaces of the enclosure, and an appropriate setting period has passed, perform air monitoring within the Asbestos Work Area.

Final air monitoring results must show fibre levels of less than 0.10 f/cc. If air monitoring results show fibre levels in excess of 0.10 f/cc, re-clean the work area and apply another acceptable coat of lock-down agent to all surfaces. Repeat as necessary until fibre levels are less than 0.10 f/cc.

3.7 INSPECTION

- .1 Inspection of the Asbestos Work Area will be performed to confirm compliance with the requirements of the specifications and governing authorities. Deviation from the Asbestos Abatement Regulations is not accepted without prior approval of the governing authority. Any deviation from these requirements that have not been approved in writing by the Owner and the governing authority may result in a stoppage of work, at no cost to the Owner.
- .2 The Owner is empowered to inspect adherence to specific procedures and materials, and to inspect for final cleanliness and completion. Additional labour or materials expended by the Contractor to provide performance to the level specified shall be at no additional cost.
- .3 The Owner is empowered to order a shutdown of work when a leakage of asbestos from the Asbestos Work Area has occurred or is likely to occur. Additional labour or materials expended by the Contractor to provide performance to the level specified shall be at no additional cost.

END OF SECTION

PART 1 **GENERAL**

1.1 **SUMMARY**

- .1 Comply with requirements of this Section when performing following Work:
 - .1 Removal of lead-containing coatings with a chemical gel or paste and fibrous laminated cloth wrap on areas as indicated on drawings.
 - .2 Removal of lead-containing coatings or materials using a power tool with an effective dust collection system equipped with a HEPA filter on areas as indicated on drawings.
 - .3 Removal of lead-containing coatings or materials with non-powered hand tool, other than manual scraping and sanding on areas as indicated on drawings.

1.2 **REFERENCED STARDARDS**

- .1 Department of Justice Canada
 - .1 Canadian Environmental Protection Act, 1999 (CEPA).
- .2 Health Canada
 - .1 Workplace Hazardous Materials Information System (WHMIS): Safety Data Sheets (SDS).
- .3 Human Resources and Social Development Canada (HRSDC)
 - .1 Canada Labour Code Part II, - SOR 86-304 - Occupational Health and Safety Regulations.
- .4 Province of Newfoundland and Labrador
 - .1 Occupational Health and Safety Act, R.S.N. - Updated 2013.
- .5 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act, 1992 (TDGA).
- .6 Underwriters' Laboratories of Canada (ULC)

1.3 **DEFINITIONS**

- .1 HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with a filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.
- .2 Authorized Visitors: Owner or designated representative.

- .3 Polyethylene: polyethylene sheeting or rip-proof polyethylene sheeting with tape along edges, around penetrating objects over cuts and tears, and elsewhere as required to provide protection and isolation. For protection of underlying surfaces from damage and to prevent lead dust entering in clean area.
- .4 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must be appropriate capacity for scope of work.
- .5 Action level: employee exposure, without regard to use of respirators, to airborne concentration of lead of 50 micrograms per cubic metre of air (50 ug/m³) calculated as 8-hour time-weighted average (TWA). Minimum precautions for lead abatement are based on airborne lead concentrations less than 0.05 milligrams per cubic metre of air for removal of lead-based paint by methods noted in paragraph 1.1.
- .6 Competent person: individuals capable of identifying existing lead hazards in workplace taking corrective measures to eliminate them.
- .7 Lead dust: wipe sampling on vertical surfaces and/or horizontal surfaces, dust and debris is considered to be lead contaminated if it contains more than 131 micrograms of lead in dust per square metre.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide proof satisfactory to Owner that suitable arrangements have been made to dispose of lead-based paint waste in accordance with requirements of authority having jurisdiction.
- .3 Provide proof of Contractor's General and Environmental Liability Insurance.
- .4 Quality Control:
 - .1 Provide Owner the necessary permits for transportation and disposal of lead-based paint waste and proof that lead based paint waste has been received and properly disposed of.
 - .2 Provide proof satisfactory to Owner that employees have had instruction on hazards of lead exposure, respirator use, dress, and aspects of work procedures and protective measures.

1.5 QUALITY ASSURANCE

- .1 Regulatory Requirements: comply with Federal, Provincial, Territorial and local requirements pertaining to lead paint, provided that in case of conflict among those requirements or with these specifications more stringent requirement applies. Comply with regulations in effect at time work is performed.
- .2 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.
 - .2 Half mask respirator: half-mask particulate respirator with N - series filter, and 95% efficiency could be provided.
 - .3 Eating, drinking, chewing, and smoking are not permitted in work area.
 - .4 Ensure workers wash hands and face when leaving work area. Facilities for washing are located as indicated on drawings.
 - .5 Visitor Protection:
 - .1 Provide approved respirators to Authorized Visitors to work areas.
 - .2 Instruct Authorized Visitors on procedures to be followed in entering and exiting work area.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .2 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal regulations.
- .3 Disposal of lead waste generated by removal activities must comply with Federal, Provincial, Territorial and Municipal regulations. Dispose of lead waste in sealed double thickness 0.15 mm bags or leak proof drums. Label containers with appropriate warning labels.
- .4 Provide manifests describing and listing waste created. Transport containers by approved means to licensed landfill for burial.

1.7 EXISTING CONDITIONS

- .1 Available reports and information pertaining to lead based paint, directly associated with this specific project, are bound into this specification.

- .2 Notify Owner of lead based paint discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material until instructed by Owner.

1.8 SCHEDULING

- .1 Not later than two (2) days before beginning Work on this Project notify following in writing:
 - .1 Provincial Department of Immigration, Population Growth and Skills.
 - .2 Disposal Authority.
- .2 Hours of Work: perform work involving lead-based paint abatement outside of normal working hours. Include in the Contract amount any additional cost due to this requirement.
- .3 Inform sub trades of presence of lead-containing materials identified in Existing Conditions.
- .4 Provide Owner copy of notifications prior to start of Work.

1.9 PERSONNEL TRAINING

- .1 Provide Owner satisfactory proof that every worker has had instruction and training in hazards of lead exposure, in personal hygiene, in aspects of work procedures, and in use, cleaning, and disposal of respirators.
- .2 Instruction and training related to respirators includes, at minimum:
 - .1 Proper fitting of equipment.
 - .2 Inspection and maintenance of equipment.
 - .3 Disinfecting of equipment.
 - .4 Limitations of equipment.
- .3 Instruction and training must be provided by competent, qualified person.
- .4 Supervisory personnel to complete required training.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Polyethylene 0.15 mm thick unless otherwise specified; in sheet size to minimize joints.

- .2 Tape: fibreglass - reinforced duct tape suitable for sealing polyethylene under dry conditions and wet conditions using amended water.
- .3 Slow-drying sealer: non-staining, clear, water - dispersible type that remains tacky on surface for at least eight (8) hours and designed for purpose of trapping residual lead paint residue.
- .4 Lead waste containers: type acceptable to dump operator with tightly fitting covers and 0.15 mm thickness sealable polyethylene liners.
 - .1 Label containers with pre-printed bilingual cautionary "Warning Lead" clearly visible when ready for removal to disposal site.

PART 3 EXECUTION

3.1 SUPERVISION

- .1 One Supervisor for every ten workers is required.
- .2 Supervisor must remain within work area during disturbance, removal, or handling of lead-based paints.

3.2 PREPARATION

- .1 Remove and store items to be salvaged or reused as directed by Owner.
 - .1 Protect and wrap items and transport and store in area specified by Owner.
- .2 Work Area:
 - .1 Shut off and isolate HVAC system to prevent dust dispersal into other building areas. Conduct smoke tests to ensure duct work is airtight.
 - .2 Pre-clean fixed casework and equipment within work area, using HEPA vacuum and cover and seal with polyethylene sheeting and tape.
 - .3 Clean work area using HEPA vacuum. If not practicable, use wet cleaning method. Do not raise dust.
 - .4 Seal off openings with polyethylene sheeting and seal with tape.
 - .5 Protect floor surfaces covered from wall to wall with polyethylene sheets.
 - .6 Maintain emergency fire exits or establish alternatives satisfactory to Authority Having Jurisdiction.

- .7 Where water application is required for wetting lead containing materials, provide temporary water supply appropriately sized for application of water as required.
- .8 Provide electrical power and shut off for operation of powered tools and equipment. Provide 24 V safety lighting and ground fault interrupter circuits on power source for electrical tools, in accordance with applicable CSA Standard. Ensure safe installation of electrical cables and equipment.
- .3 Do not start work until:
 - .1 Arrangements have been made for disposal of waste.
 - .2 Tools, equipment, and materials waste containers are on site.
 - .3 Arrangements have been coordinated with building security.
 - .4 Notifications have been completed, and preparatory steps have been taken.

3.3 LEAD ABATEMENT

- .1 Removal of lead-containing coatings with a chemical gel or paste and fibrous laminated cloth wrap; or removal equipped with HEPA filters; or removal with using power tools non-powered hand tool, other than manual scraping and sanding.
- .2 Remove lead-based paint in small sections and pack as it is being removed in sealable 0.15 mm plastic bags and place in labelled containers for transport.
- .3 Seal filled containers. Clean external surfaces thoroughly by wet sponging. Remove from immediate working area to staging area. Clean external surfaces thoroughly again by wet sponging. Wash containers thoroughly pending removal to outside. Ensure containers are removed by workers who have entered from uncontaminated areas dressed in clean coveralls.
- .4 After completion of stripping work, wire brush and wet sponge surface from which lead based paint has been removed to remove visible material. During this work keep surfaces wet.
- .5 After wire brushing and wet sponging to remove visible lead-based paint, and after encapsulating lead containing material impossible to remove, wet clean entire work area, and equipment used in process. After inspection by Owner apply continuous coat of slow drying sealer to surfaces of work area. Do not disturb work area for eight (8) hours. No entry, activity, ventilation, or disturbance during this period.

3.4 INSPECTION

- .1 Perform inspection to confirm compliance with specification and governing authority requirements. Deviations from these requirements not approved in writing by Owner will result in work stoppage, at no cost to Owner.
- .2 Owner will inspect work for:
 - .1 Adherence to specific procedures and materials.
 - .2 Final cleanliness and completion.
 - .3 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.

3.5 LEAD SURFACE SAMPLING - WORK AREAS

- .1 Final lead surface sampling to be conducted as follows:
 - .1 After work area has passed a visual inspection for cleanliness approved and accepted by Owner. Apply coat of lock-down agent to surfaces within enclosure, and appropriate setting period of eight (8) hours has passed, Owner will perform lead wipe sampling.
 - .1 Final lead wipe sampling results from horizontal and vertical surfaces must show lead levels of less than 131 micrograms of lead in dust per square metre. Samples collected and analyzed in accordance with EPA 747-R-95-007.
 - .2 If wipe sampling results show levels of lead in excess of 131 micrograms per square metre, re-clean work area at contractor's expense and apply another acceptable coat of lock-down agent to surfaces.
 - .3 Repeat as necessary until fibre levels are less than 131 micrograms per square metre.

3.6 FINAL CLEANUP

- .1 Following cleaning and when lead wipe surfaces sampling are below acceptable concentrations, proceed with final cleanup.
- .2 Remove polyethylene sheet by rolling it away from walls to centre of work area. Vacuum visible lead containing particles observed during cleanup, immediately, using HEPA vacuum.
- .3 Place polyethylene sheets, tape, cleaning material, clothing, and contaminated waste in plastic bags and sealed labelled waste containers for transport.
- .4 Conduct final check to ensure no dust or debris remains on surfaces as result of dismantling operations.

3.7 RE-ESTABLISHMENT OF OBJECTS AND SYSTEMS

- .1 Repair or replace objects damaged in course of work to their original state or better, as directed by Owner.

END OF SECTION

PART 1 GENERAL

1.1 RELATED WORK

- .1 Coordinate work of this section with other sections as required to properly execute the work and as necessary maintain satisfactory progress of the work of other sections.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 01 45 00 – Quality Control.

1.3 REFERENCES

- .1 Underwriter’s Laboratories of Canada (ULC)
 - .1 CAN-S115, Fire Tests of Firestop Systems.

1.4 DEFINITIONS

- .1 Fire Stop Material: device intended to close off opening or penetration during fire or materials that fill openings in wall or floor assembly where penetration is by cables, cable trays, conduits, ducts and pipes and poke-through termination devices, including electrical outlet boxes along with their means of support through wall or floor openings.
- .2 Single Component Fire Stop System: fire stop material that has Listed Systems Design and is used individually without use of high temperature insulation or other materials to create fire stop system.
- .3 Multiple Component Fire Stop System: exact group of fire stop materials that are identified within Listed Systems Design to create on site fire stop system.
- .4 Tightly Fitted; (ref: NBC Part 3.1.9.1.1 and 9.10.9.6.1): penetrating items that are cast in place in buildings of noncombustible construction or have "0" annular space in buildings of combustible construction.
 - .1 Words "tightly fitted" should ensure that integrity of fire separation is such that it prevents passage of smoke and hot gases to unexposed side of fire separation.

1.5 SUBMITTALS

- .1 Prior to start of work submit the following:

- .1 Duplicate 300 x 300 mm samples showing actual firestop material proposed for project.
- .2 Shop drawings to show proposed material, reinforcement, anchorage, fastenings and method of installation. Construction details should accurately reflect actual job conditions.
- .3 Manufacturer's engineering judgement identification number and drawing details when no ULC or cUL system is available. Engineering judgement must include both project name and contractor's name who will install firestop system as described in drawing.
- .4 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. Include manufacturer's specifications, training letter, and technical data for each material including the composition and limitations, documentation of ULC or CUL firestop systems to be used.
- .5 Safety data sheets provided with product delivered to job site.

1.6 MANUFACTURER'S REPRESENTATIVE

- .1 A manufacturer's representative is to be on site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures and at commissioning stage to certify acceptance completed installation. Training will be done as per manufacturer's written recommendations published in their literature and drawing details.

1.7 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Installer: person specializing in fire stopping installations with minimum five (5) years documented experience approved by the fire stopping manufacturer.
 - .2 Manufacturer: company with minimum five (5) years experience in producing of material used for work required for this project, with sufficient production capacity to produce and deliver required units without causing delay in work.
- .2 All fire stopping materials for this project to be supplied by a single manufacturer.

PART 2 **PRODUCTS**

2.1 **MATERIALS**

- .1 Use only firestop products that have been ULC or cUL tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements and fire-rating involved for each separate instance.

- .2 Fire stopping and smoke seal systems: in accordance with CAN-S115.
 - .1 Asbestos-free materials and systems capable of maintaining an effective barrier against flame, smoke and gases in compliance with requirements of CAN-S115 and not to exceed opening sizes for which they are intended.
 - .2 Firestop system rating: to match the construction assembly being penetrated.

- .3 Service penetration assemblies: certified and tested by ULC or cUL in accordance with CAN-S115.

- .4 Service penetration firestop components: certified and tested by ULC or cUL in accordance with CAN-S115.

- .5 Fire-resistance rating of installed fire stopping assembly in accordance with NBC.

- .6 Non-curing, re-penetrable intumescent sealants, caulking or putty material for use with flexible cables or cable bundles.

- .7 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal.

- .8 Firestopping shall be compatible with all assembly and penetrating components. Note that PVC and CPVC piping, among other materials, will be used on this project.

- .9 Intumescent sealants or caulking materials for use with combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe. No silicone based firestop are allowed to be applied on plastic pipes.

- .10 Primers: to manufacturer's recommendation for specific material, substrate, and end use.

- .11 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.
- .12 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.
- .13 Sealants for vertical joints: non-sagging.

PART 3 **EXECUTION**

3.1 **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 clean, dry and frost free.
- .2 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.
- .3 Maintain insulation around pipes and ducts penetrating fire separation without interruption to vapour barrier.
- .4 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

3.2 **INSTALLATION**

- .1 Install fire stopping and smoke seal material and components in accordance with ULC certification or UL Products Certified for Canada (CUL) and manufacturer's instructions. The rating of the fire stopping shall match the rating of the assembly being penetrated. Coordinate with Owner on site.
- .2 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.
- .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.

3.3 INSPECTION

- .1 Notify Owner when ready for inspection and prior to concealing or enclosing firestopping materials and service penetration assemblies.

3.4 SCHEDULE

- .1 Firestop and smoke seal at:
 - .1 Penetrations through fire-resistance rated masonry, concrete, and gypsum board partitions and walls.
 - .2 Penetrations through fire-resistance rated floor slabs, ceilings and roofs.
 - .3 Openings and sleeves installed for future use through fire separations.
 - .4 Around mechanical and electrical assemblies penetrating fire separations.

3.5 FIRE SEPARATIONS

- .1 Coordinate fire separation labelling/stenciling.

3.6 CLEAN UP

- .1 Remove excess materials and debris and clean adjacent surfaces immediately after application.
- .2 Remove temporary dams after initial set of fire stopping and smoke seal materials.

END OF SECTION

PART 1 **GENERAL**

1.1 **SCOPE OF WORK**

- .1 Decommission, remove and dispose of existing systems as indicated on drawings and specified herein.
- .2 Supply, install, test and commission new mechanical systems as indicated on drawings and specified herein.

1.2 **SUBMITTALS**

- .1 Submittals: in accordance with Division 01.
- .2 Shop drawings; submit drawings stamped and signed for approval by Owner's Representative.
- .3 Shop drawings to show:
 - .1 Mounting arrangements.
 - .2 Operating and maintenance clearances.
- .4 Shop drawings and product data 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 current model production.
 - .5 Certification of compliance to applicable codes.
- .5 In addition to transmittal letter referred to in Division 01: use "Shop Drawing Submittal Title Sheet". Identify section and paragraph number.
- .6 Fabrication Drawings:
 - .1 Fabrication (interference) drawings shall consist of equipment layout including assembly and installation details.
 - .2 Drawings shall include any information required to demonstrate that the system has been coordinated and will properly function as a unit and shall show equipment relationship to other parts of the work, including clearances required for operation and maintenance.
- .7 Closeout Submittals:
 - .1 Provide operation and maintenance data for incorporation into manual specified in Division 01.

- .2 Operation and maintenance manual approved by, and final copies deposited with Owner's Representative before final inspection.
- .3 Operation data to include:
 - .1 Control schematics for systems including environmental controls.
 - .2 Description of systems and their controls.
 - .3 Operation instruction for systems and component.
 - .4 Description of actions to be taken in event of equipment failure.
 - .5 Valves schedule and flow diagram.
 - .6 Colour coding chart.
- .4 Maintenance data to 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 datasheets with point of operation as left after commissioning is complete.
 - .2 Equipment performance verification test results.
 - .3 Special performance data as specified.
 - .4 Testing, adjusting and balancing reports as specified in Division 22, 23 and in accordance with manufacturer's instructions.
- .6 Approvals:
 - .1 Submit 2 copies of draft Operation and Maintenance Manual for approval. Submission of individual data will not be accepted unless directed by Owner's Representative.
 - .2 Make changes as required and re-submit as directed.
- .7 Additional data:
 - .1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.
- .8 Site records:
 - .1 Owner's Representative will provide PDF of mechanical drawings. Provide sets of white prints as required for each phase of work. Mark changes as work progresses and as changes occur. Include changes to existing mechanical systems and control systems.
 - .2 Transfer information weekly to PDF, revising to show work as actually installed.

- .3 Use different colour for each service.
- .4 Make available for reference purposes and inspection.
- .9 As-built drawings:
 - .1 Prior to start of Testing, Adjusting and Balancing, finalize production of as-built drawings.
 - .2 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: - "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (Date).
 - .3 Submit to Owner's Representative for approval and make corrections as directed.
 - .4 Perform testing, adjusting and balancing for HVAC using as-built drawings.
 - .5 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.
- .10 Submit copies of as-built drawings for inclusion in final TAB report.

1.3 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Division 01.
- .2 All work shall be completed by certified journey persons.
- .3 Health and Safety Requirements: do construction occupational health and safety in accordance with Division 01.

1.4 MAINTENANCE

- .1 Furnish spare parts in accordance with Division 01 as follows (as applicable), and as indicated in other specification sections:
 - .1 One set of packing 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 filter cartridge or set of filter media for each filter or filter bank in addition to final operating set.
- .2 Provide one set of special tools required to service equipment as recommended by manufacturers and in accordance with Division 01.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Waste Management and Disposal:

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Place materials defined as hazardous or toxic in designated containers.
- .3 Handle and dispose of hazardous materials in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal, Canadian Environmental Protection Act (CEPA), Transportation of Dangerous Goods Act (TDGA), Provincial and Municipal regulations.
- .4 Divert unused metal materials from landfill to metal recycling facility as approved by Owner's Representative.
- .5 Unused paint, coating materials must be disposed of at official hazardous material collection site as approved by Owner's Representative.
- .6 Unused sealant materials must not be disposed of into sewer system, into streams, lakes, onto ground in other location where it will pose health or environmental hazard.

1.6 CONFORMANCE

- .1 The General Conditions, Supplements and Amendments shall govern this Division. This section covers items common to all sections of Division 22 and 23 and is intended to supplement the requirements of Division 01.

1.7 WORK INCLUDED

- .1 Provide complete, fully tested and operational mechanical systems to meet the requirements described herein, in complete accordance with applicable codes and ordinances.
- .2 The word "Provide" shall mean "Supply and Install" the products and services specified. "As Indicated" means that the item(s) specified are shown on the drawings.
- .3 Provide materials, equipment and plant, of specified design, performance and quality; and, current models with published certified ratings for which replacement parts are readily available.
- .4 Provide project management and on-site supervision to undertake administration, meet schedules, ensure timely performance, ensure coordination, establish orderly completion and the delivery of a fully commissioned installation.
- .5 Follow manufacturer's recommended installation details and procedures for equipment, supplemented by requirements of Contract Documents.

- .6 The most stringent requirements of this and other mechanical sections shall govern. Should inconsistencies exist such as the drawings disagreeing within themselves or with the specifications, the better quality and/or greater quantity of work or materials shall be estimated upon, performed and furnished unless otherwise ordered by the Owner's Representative in writing during the bidding period.
- .7 All work shall be in accordance with the Drawings and Specifications and their intent, complete with all necessary components, including those not normally shown or specified, but required for a complete installation.
- .8 Connect to equipment specified in other Sections and to equipment supplied and installed by other Contractors or by the Owner's Representative. Uncrate equipment, move in place and install complete; start-up and test. Include all field assembly of loosely/separately packaged accessories.

1.8 RESPONSIBILITIES

- .1 Visit the site during tendering. Coordination of site visit will be conducted by Owner's Representative. Examine all local and existing conditions on which the work is dependent. No consideration will be granted for any misunderstanding, of work to be done, resulting from failure to visit the site.
- .2 Ensure that equipment does not transmit noise and/or vibration to other parts of the building, as a result of poor installation practice.
- .3 Where the Contract Documents do not contain sufficient information for the proper selection of equipment for bidding, notify the Owner's Representative during the tendering period. Failure to do this shall not relieve the Contractor of responsibility to provide the intended equipment.
- .4 Examine carefully the entire drawing package (including civil, mechanical, electrical, structural and architectural drawings etc.) and confirm that the work can be satisfactorily carried out without changes to the systems as shown on these plans.
- .5 Be responsible for prompt installation of this work in advance of concrete pouring or similar work. Provide and set sleeves where required.
- .6 During freezing weather, protect all materials in such a manner that no harm can be done to installations already in place and/or to materials and equipment on the job.
- .7 On completion of the work, all tools and surplus and waste materials shall be removed and the work left in a clean and perfect condition.

1.9 COORDINATION

- .1 Thoroughly review the drawings of all trades to verify space and headroom limitations for work to be installed. Coordinate work with all trades and make changes to facilitate a satisfactory installation. Make no deviations to the design intent involving extra cost to the Owner, without the Owner's written approval.
- .2 The drawings indicate the general location and route to be followed by the piping. Where details are not shown on the drawings or only shown diagrammatically, the pipes shall be installed in such a way as to conserve head room and interfere as little as possible with the free use of space through which they pass. Service lines shall run parallel to building lines. All pipes in the ceiling shall be kept as tight as possible to beams or other limiting members at high level. All pipes shall be coordinated in elevation to ensure that they are concealed in the ceiling or structural space provided unless detailed otherwise on drawings.
- .3 Work out jointly all interference problems on the site with other trades and coordinate all work before fabricating or installing any material or equipment. Where necessary, produce interference drawings showing exact locations of mechanical equipment within mechanical rooms, service areas, shafts and the ceiling space (See Fabrication Drawings, this section). Ensure that all materials and equipment fit into the allotted spaces and that all equipment can be properly serviced and replaced. Advise the Owner's Representative of space problems before fabricating or installing any material or equipment. Demonstrate to the Owner's Representative on completion of the work that all equipment installed can be properly, safely serviced and replaced. Remove and replace improperly installed equipment to satisfaction of the Owner's Representative at no extra cost. Extras for improper coordination and removal of equipment to permit remedial work shall not be allowed.
- .4 When open web structural joists are used, obtain structural shop drawings to ensure adequate space is available for installation of pipes.

1.10 INSPECTION OF WORK

- .1 The Owner's Representative shall inspect all work prior to it being concealed. All piping below ground must be approved prior to covering.
- .2 All work shall be approved by all authorities having jurisdiction.
- .3 All openings shall be sealed appropriately in particular in fire rated walls and floors. Sealing shall be inspected prior to covering.

1.11 CODES, REGULATIONS AND STANDARDS

- .1 Division 22 and 23 work shall conform to the following codes, regulations and standards, and all other codes in effect at the time of award of Contract, and any others having jurisdiction. The latest revision of each code and standard shall apply unless otherwise specified in the contract documents:
 - .1 Local Building Bylaws.
 - .2 Canadian Standards Association
 - .3 ASHRAE Handbooks of Recommended Practice
 - .4 ASHRAE Standard 62.1
 - .5 ASHRAE Standard 55
 - .6 ASHRAE Standard 90.1
 - .7 CSA Standard B51, Boiler, Pressure Vessel and Pressure Piping Code.
 - .8 CSA Standard B52, Mechanical Refrigeration Code.
 - .9 CSA B139 Installation Code for Oil Burning Equipment
 - .10 NFPA 10 Portable Fire Extinguishers
 - .11 NFPA 13 Installation of Sprinkler Systems
 - .12 National Research Council of Canada
 - .13 National Building Code of Canada (latest edition)
 - .14 National Plumbing Code of Canada (latest edition)
 - .15 National Fire Code of Canada (latest edition)
 - .16 Province of Newfoundland and Labrador Acts and Regulations
 - .17 Underwriter's Laboratories of Canada
 - .18 SMACNA HVAC Duct Construction Standards, latest edition.
 - .19 Where these specifications indicate requirements more onerous than the aforementioned codes, the specifically indicated requirements shall be incorporated into the work.
- .2 Obtain and pay for all permits, fees, licenses and inspections required by authorities having jurisdiction.
- .3 Arrange for inspection of all work by the authorities having jurisdiction over the work.
- .4 Before starting any work, submit the required number of copies of drawings and specification to the authorities for their approval and comments. Comply with any changes requested as part of the Contract, but notify the Owner's Representative immediately of such changes for proper processing of these requirements. Prepare and furnish any additional drawings, details or information as may be required.

1.12 WARRANTY

- .1 Use of installed equipment during construction shall not shorten or alter the warranty period as specified in the General Conditions.

- .2 Furnish a written warranty stating that all work executed under this Division will be free from defects of material and workmanship for the period specified in the General Conditions. Warranty shall include any part of equipment, units or structures furnished hereunder that show defects in the works under normal operating conditions and/or for the purpose of which they were intended.

1.13 WORKMANSHIP

- .1 Workmanship shall be in accordance with well-established practice and standards accepted and recognized by the Owner's Representative and the Trade.

- .2 The Owner's Representative shall have the right to reject any item of work that does not conform to the Contract Documents and accepted standards of performance, quietness of operation, finish and appearance.

- .3 Employ only tradespersons holding valid Provincial Trade Qualification Certificates. Tradespersons shall perform only work that their certificate permits. Certificates shall be available for inspection by the Owner's Representative.

1.14 DRAWINGS AND MEASUREMENTS

- .1 Drawings are generally diagrammatic and are intended to indicate the scope and general arrangement of work and are not detailed installation drawings. Do not scale the drawings.

- .2 This specification and related plans establish scope, material and installation quality but do not necessarily show every offset, fitting or installation difficulty that may be encountered during the execution of the work. Contractor shall provide all additional materials, components and labour as required for complete working systems meeting the intent of the drawings and specifications.

- .3 Fixture locations shown are approximate. Verify exact locations on site with Owner's Representative before placement.

- .4 Take field measurements, where equipment and material dimensions are dependent upon building dimensions.

- .5 Before commencement of any mechanical work examine the work of each mechanical section and make an immediate report to the Owner's

Representative of any defect or interference affecting the work or the guarantee of this section.

- .6 All work must be in full accordance with the complete intent of the drawings and specification in every way, and ready for satisfactory and efficient operation when finally accepted and delivered to the Owner.

1.15 EXISTING CONDITIONS

- .1 Visit and examine the site and note all characteristics and irregularities affecting the work of this section.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 All materials used on this project shall be new and CSA approved unless noted otherwise.

PART 3 EXECUTION

3.1 PAINTING, REPAIRS AND RESTORATION

- .1 Prime and touch up marred finished paintwork to match original.
- .2 Restore to new condition, finishes which have been damaged.

3.2 CLEANING

- .1 Clean interior and exterior of all systems including strainers, piping and piping system components.
- .2 Protect open ends of piping and associated components during construction to prevent ingress of dust and dirt. If dust or dirt is detected prior to startup, clean to satisfaction of Owner's Representative.
- .3 Progress cleaning: clean in accordance with Section 01 74 00 – Cleaning. Leave work area clean at the end of each day.
- .4 Final cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 – Cleaning.
- .5 Waste management: see Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

3.3 FIELD QUALITY CONTROL

- .1 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports.
 - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

3.4 DEMONSTRATION

- .1 Owner's Representative will use equipment and systems for test purposes prior to acceptance. Contractor to supply labour, material, and instruments required for testing.
- .2 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, troubleshooting and servicing of all systems and equipment during regular work hours, prior to acceptance.
- .3 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.
- .4 Instruction duration time requirements as specified in appropriate sections.
- .5 Demonstrations may be recorded for future reference.

3.5 TRAINING

- .1 The Contractor shall provide 8 hours of training to demonstrate the operation and maintenance of all equipment and systems installed as part of this project.

3.6 PROTECTION

- .1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

3.7 CONCEALMENT

- .1 Conceal all piping and conduit in partitions, walls, crawlspaces and ceiling spaces, unless otherwise noted.
- .2 Do not install piping and conduit in outside walls or roof slabs unless specifically directed, in which case, install them with the building insulation between them and the outside face of the building.

3.8 ACCESSIBILITY

- .1 Install all work to be readily accessible for adjustment, operation and maintenance. Furnish access doors where required in building surfaces for installation by building trades.

3.9 PROTECTION OF WORK

- .1 Protect equipment and materials, stored or in place, from the weather, moisture, dust and physical damage.
- .2 Equipment having operating parts, bearings or machined surfaces, showing signs of rusting, pitting or physical damage will be rejected.
- .3 Refinish damaged or marred factory finish.

3.10 CUTTING, PATCHING, CORING

- .1 Lay out all cutting, patching, coring required to accommodate the mechanical services. Coordinate with other Divisions.
- .2 Refer to structural drawings for permissible locations of openings and permissible opening sizes in concrete floors and walls.
- .3 Be responsible for correct location and sizing of all openings required under Division 22 and Division 23 including pipe sleeves. Allow oversized openings for pipe penetrations where insulation is specified.

3.11 COMMISSIONING

- .1 The Owner's Representative shall provide commissioning forms for the equipment and systems installed as part of this project and they shall be completed by the Contractor. Commissioning shall take place at a time suitable with the Owner's Representative. Commissioning forms shall be completed in the presence of the Owner's Representative. See also Section 01 91 13 – Commissioning.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- .1 This Section includes requirements for selective demolition and removal of plumbing and related mechanical components and incidentals required to complete work described in this Section ready for new construction.

1.2 REFERENCES

- .1 CSA Group (CSA)
 - .1 CSA S350 M1980, Code of Practice for Safety in Demolition of Structures

1.3 DEFINITIONS

- .1 Demolish: Detach items from existing construction and legally dispose of items off site, unless indicated as removed and salvaged, or removed and reinstalled.
- .2 Remove: Planned deconstruction and disassembly of electrical items from existing construction including removal of conduit, junction boxes, cabling and wiring from electrical component to panel taking care not to damage adjacent assemblies designated to remain; legally dispose of items off site, unless indicated as removed and salvaged, or removed and reinstalled.
- .3 Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.
- .4 Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- .5 Existing to Remain: Existing items of construction that are not removed and that are not otherwise indicated as being removed and salvaged, or removed and reinstalled.
- .6 Hazardous Substances: Dangerous substances, dangerous goods, hazardous commodities and hazardous products may include asbestos, mercury and lead, PCB s, poisons, corrosive agents, flammable substances, radioactive substances, or other material that can endanger human health or wellbeing or environment if handled improperly as defined by Federal Hazardous Products Act (RSC 1985) including latest amendments.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Action Submittals: Provide in accordance with Section 01 33 00 – Submittal Procedures before starting work of this Section:
- .2 Landfill Records: Indicate receipt and acceptance of selective demolition waste and hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.5 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate work of this Section to avoid interference with work by other Sections.
- .2 Scheduling:
 - .1 Account for Owner’s continued occupancy requirements during selective demolition and schedule staged occupancy and worksite activities with Owner.

1.6 QUALITY ASSURANCE

- .1 Regulatory Requirements: Perform work of this Section in accordance with:
 - .1 Provincial/Territorial Workers’ Compensation Boards/Commissions.
 - .2 Provincial/Territorial Occupational Health and Safety Standards and Programs.

1.7 SITE CONDITIONS

- .1 Condition of materials identified as being salvaged or demolished are based on their observed condition at time of site examination before tendering.
- .2 Discovery of Hazardous Substances:
 - .1 It is not expected that Hazardous Substances will be encountered in the Work. Immediately notify Owner if materials suspected of containing hazardous substances are encountered.

1.8 SALVAGE AND DEBRIS MATERIALS

- .1 Demolished items become Contractor’s property and will be removed from Project site; except for items indicated as being reused, salvaged, or otherwise indicated to remain the Owner’s property.
- .2 Carefully remove materials and items designated for salvage and store in a manner to prevent damage or devaluation of.

PART 2 **PRODUCTS**

2.1 **MATERIALS**

- .1 General - Patching and Repair Materials: Patching and repair materials incidental to removal or demolition of components associated with work of this project shall match existing adjacent materials in type and quality. Use only new materials.

- .2 Plumbing Repair Materials: Use only new materials required for completion or repair matching materials damaged during performance of work of this Section; new materials are required to meet assembly or system characteristics as existing systems indicated to remain and carry CSA approval labels required by the Authority Having Jurisdiction.

- .3 Fire stopping Repair Materials: Use listed fire stopping materials compatible with existing fire stopping systems where removal or demolition work affects rated assemblies, restore to match existing fire rated performance.

PART 3 **EXECUTION**

3.1 **EXAMINATION**

- .1 Verification of Existing Conditions:
 - .1 Visit site, thoroughly examine and become familiar with conditions that may affect the work of this Section before tendering the Bid.
 - .2 Owner will not consider claims for extras for work or materials necessary for proper execution and completion of the contract that could have been determined by a site visit.

- .2 Identify on-site removal of walls and ceilings required to facilitate work.

- .3 Identify on-site testing of piping to facilitate work.

- .4 Identify risks from hazardous materials prior to commencing work.

- .5 Ensure hazardous materials are removed or abated prior to commencing demolition.

- .6 For components intended to for relocation and reuse; remove, protect, store, clean, reinstall and connect to plumbing system. Recommission.

3.2 PREPARATION

- .1 Protection of Existing Systems to Remain: Protect systems and components indicated to remain in place during selective demolition operations and as follows:
 - .1 Prevent movement and install bracing to prevent settlement or damage of adjacent services and parts of existing buildings scheduled to remain.
 - .2 Notify Owner and cease operations where safety of buildings being demolished, adjacent structures or services appears to be endangered and await additional instructions before resuming demolition work specified in this Section.
 - .3 Prevent debris from blocking drainage inlets.
 - .4 Protect mechanical systems that will remain in operation.
- .2 Protection of Building Occupants: Sequence demolition work so that interference with the use of the building by the Owner and users is minimized and as follows:
 - .1 Prevent debris from endangering safe access to and egress from occupied buildings.
 - .2 Notify Owner and cease operations where safety of occupants appears to be endangered and await additional instructions before resuming demolition work specified in this Section.

3.3 EXECUTION

- .1 Coordinate requirements of this Section with all other trades as well as the Owner, and as follows:
 - .1 Disconnect and cap mechanical services in accordance with requirements of local Authority Having Jurisdiction.
 - .2 Do not disrupt active or energized utilities without approval of the Owner.
 - .3 Erect and maintain dust proof and weather tight partitions to prevent the spread of dust and fumes to occupied building areas; remove partitions when complete.
 - .4 Demolish parts of existing building to accommodate new construction and remedial work as indicated.
 - .5 At end of each work day, leave worksite in safe condition.
 - .6 Perform demolition work in a neat and workmanlike manner:
 - .1 Remove tools or equipment after completion of work, and leave site clean and ready for subsequent renovation work.
 - .2 Repair and restore damages caused as a result of work of this Section to match existing materials and finishes.

- .7 Conduct demolition of plumbing systems in accordance with local Authorities Having Jurisdiction (AHJ's) including Service NL, Labour Division Inspection Authority and city plumbing inspection authority.

3.4 CLOSEOUT ACTIVITIES

- .1 Arrange for legal disposal and remove demolished materials to accredited provincial landfill site or alternative disposal site (recycle centre) except where explicitly noted otherwise for materials being salvaged for re use in new construction.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- .1 Section Includes:
 - .1 Materials and installation for plumbing specialties and accessories.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 01 35 29.06 – Health and Safety Requirements.
- .3 Section 01 45 00 – Quality Control.
- .4 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .5 Section 01 78 00 – Closeout Submittals.
- .6 Section 01 91 13 – Commissioning.

1.3 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A126, Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.
 - .2 ASTM B62, Specification for Composition Bronze or Ounce Metal Castings.
- .2 American Water Works Association (AWWA)
 - .1 AWWA C700, Cold Water Meters-Displacement Type, Bronze Main Case.
 - .2 AWWA C701, Cold Water Meters-Turbine Type for Customer Service.
 - .3 AWWA C702, Cold Water Meters-Compound Type.
- .3 American National Standards Institute (ANSI)
 - .1 ANSI/ISA 12.12.01 - Non-Incendive Electrical Equipment for use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous Locations
 - .2 ANSI Z358.1 Emergency eyewash and shower equipment.
- .4 Canadian Standards Association (CSA)
 - .1 CSA-B64 Series, Backflow Preventers and Vacuum Breakers.

- .2 CSA-B356, Water Pressure Reducing Valves for Domestic Water Supply Systems.
- .3 CAN/CSA C22.2 No. 0 - General Requirements - Canadian Electrical Code, Part II, CSA C22.2 No. 30 - Explosion-Proof Enclosures for Use in Class I Hazardous, CSA Std C22.2 No. 213 - Non-Incendive Electrical Equipment for Use in Class I, Division 2 Hazardous Location
- .5 Health Canada/Workplace Hazardous Materials Information Systems (WHMIS).
 - .1 Safety Data Sheets (SDS).
- .6 Plumbing and Drainage Institute (PDI)
 - .1 PDI-G101, Testing and Rating Procedure for Grease Interceptors with Appendix of Installation and Maintenance.
 - .2 PDI-WH201, Water Hammer Arresters Standard.
- .7 Underwriters Laboratories (UL)
 - .1 UL 508 - Industrial Control Equipment and UL 1203 - Explosion-Proof and Dust-Ignition Proof Electrical Equipment for use in Hazardous Locations.

1.4 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet for fixtures and equipment.
 - .2 Indicate dimensions, construction details and materials for specified items.
 - .3 Submit WHMIS SDS in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's for adhesive and solvents during application and curing.
- .3 Shop Drawings:
 - .1 Submit shop drawings to indicate materials, finishes, method of anchorage, number of anchors, dimensions, construction and assembly details and accessories.
- .4 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .5 Manufacturer's Certificates: Submit certificates documenting factory testing of emergency plumbing fixtures and tempering station.

- .6 Instructions: submit manufacturer's installation instructions.
- .7 Closeout submittals: submit maintenance and engineering data for incorporation into manual specified in Section 01 78 00 – Closeout Submittals. Include:
 - .1 Description of plumbing specialties and accessories, giving manufacturer's name, type, model, year and capacity.
 - .2 Details of operation, servicing and maintenance.
 - .3 Recommended spare parts list.

1.5 QUALITY ASSURANCE

- .1 Pre-Installation Meetings:
 - .1 Convene pre-installation meeting one week prior to beginning work of this Section and on-site installations.
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Co-ordination with other building subtrades.
 - .4 Review manufacturer's installation instructions and warranty requirements.
 - .2 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 – Health and Safety Requirements.
- .2 Electrical Components: Listed and labeled per NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.
- .3 ANSI Standard: Emergency plumbing fixtures and tempering station shall comply with ANSI Z358.1.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
 - .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
 - .3 Collect and separate for disposal, paper, plastic, polystyrene, corrugated cardboard packaging materials in appropriate on-site bins for recycling in accordance with Waste Management Plan.
 - .4 Divert unused metal materials from landfill to metal recycling facility as approved by Owner.

- .5 Fold up metal and plastic banding flatten and place in designated area for recycling.

1.7 WARRANTY

- .1 Provide a written guarantee, signed and issued in the name of the owner, against defective materials and workmanship for a period of one (1) year from the date of Substantial Completion.

PART 2 PRODUCTS

2.1 FLOOR DRAINS

- .1 FD-1: Acid resisting epoxy coated cast iron body, round adjustable head, 125 mm, sediment basket, nickel bronze strainer, integral seepage pan and clamping collar, trap primer connection. Acceptable products: Zurn ZN415-B or approved equal.

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 Access covers:
 - .1 Wall access: face or wall type, or stainless steel square cover with flush head securing screws, bevelled edge frame complete with anchoring lugs.
 - .2 Floor access: round cast iron body and frame with adjustable secured nickel bronze top.
 - .1 Plugs: bronze with neoprene gasket.
 - .2 Cover for unfinished concrete floors: cast iron round, gasket, vandal-proof screws.
 - .3 Cover for terrazzo finish: polished nickel bronze brass with recessed cover for filling with terrazzo, vandal-proof locking screws.
 - .4 Cover for tile and linoleum floors: polished nickel bronze with recessed cover for linoleum or tile infill, complete with vandal-proof locking screws.

2.3 WATER HAMMER ARRESTORS

- .1 Certified to NSF/ANSI 372, copper body with a low lead brass hexagonal

male pipe threaded inlet, an acetal, polycarbonate or low lead brass piston, EPDM o-rings and lead-free solder.

- .2 Pre-charged and permanently sealed at the factory.
- .3 To PDI-WH201, ASSE Listed 1010, ANSI A112.26.1.
- .4 Sizes as indicated on schedule.
- .5 Acceptable products: Zurn Model 1260XL or approved equal.

2.4 VACUUM BREAKERS

- .1 To CSA-B64 Series.
- .2 Atmospheric vacuum breaker, where indicated:
 - .1 Plain brass body with silicone disc.
 - .2 Suitable for temperatures up to 82°C.
 - .3 Maximum operating pressure: 860 kPa.
 - .4 Size: as indicated.
- .3 Hose connection vacuum breaker:
 - .1 NPS ¾ female hose thread inlet, NPS ¾ male hose thread outlet, brass finish.

2.5 PRESSURE RELIEF VALVES

- .1 Lead free copper alloy body.
- .2 Stainless steel spring.
- .3 Silicone disc.
- .4 NPS ¾ size.
- .5 1,034 kPa relief setting.
- .6 Listed and certified by the National Board of Boiler and Pressure Vessel Inspectors to ASME section IV & by CSA to ANSI Z21.22/CSA 4.4, and NSF 372 certified for potable water use.

2.6 CIRCUIT SETTERS

- .1 Brass construction circuit setters, providing the following functions: balancing, presetting, measuring, shut off and draining.
- .2 Suitable for potable water systems.

- .3 IAPMO Certified in accordance with ANSI/NSF 61 for cold 23°C and hot 82°C potable water service and ANSI/NSF 372.
- .4 2,758 kPa maximum working pressure.
- .5 Threaded end connections.
- .6 Complete with drain kit.

2.7 PRESSURE REGULATORS

- .1 Complete with integral strainer shall be installed in the locations indicated on the drawings.
- .2 Valve outlet pressure shall be adjustable from 172 kPa to 517 kPa.
- .3 Valve shall be constructed using lead free materials. The valve shall be lead free cast copper silicon alloy suitable for water supply pressures up to 20.7 bar.
- .4 Valve shall permit the bypass flow of water back through the valve into the main when pressures, due to thermal expansion on the outlet side of the valve, exceed the pressure in the main supply.
- .5 Valve shall be listed to ASSE 1003 and IAPMO and certified to CSA B356.
- .6 NSF 61 certified for potable water use.
- .7 NPT Union X NPT threaded end connections.
- .8 Acceptable manufacturers: Watts Series LF25AUB-Z3 or approved equal.

2.8 HOSE BIBBS AND SEDIMENT FAUCETS

- .1 Bronze construction complete with integral back flow preventer, hose thread spout, replaceable composition disc, and chrome plated in finished areas.

2.9 TRAP SEAL PRIMERS

- .1 Pressure drop actuated:
 - .1 Lead free construction.
 - .2 Brass body construction with inlet opening of ½ male NPT and outlet opening of female ½ NPT.
 - .3 Primer shall operate on a 20.7 kPa (3 psi) pressure drop.
 - .4 Provide complete with four-hole view built-in air gap to prevent any backflow from trap being fed into the water supply.

- .5 Provide removable inlet filter screen.
- .6 Capacity to serve up to four (4) floor drains.
- .7 Provide complete with separate air gap fitting, with a 25 mm air gap. Air gap fitting shall be in accordance with ANSI/ASME A112.1.2.
- .8 Provide complete with trap seal primer distribution unit as follows:
 - .1 Brass body construction.
 - .2 ½ NPT inlet connection.
 - .3 Four (4) 3/8 FPT brass nipple outlet connections.
 - .4 Four (4) 6 mm diameter vent holes in lid to provide air gap and backflow protection.

2.10 STRAINERS

- .1 860 kPa, Y type with 20 mesh, monel, bronze or stainless steel removable screen.
- .2 NPS 2 and under, bronze body, screwed ends, with brass cap, tapped blowoff and plug.
- .3 NPS 2½ and over, cast iron body, flanged ends, with bolted cap, tapped blow off connection with bronze ball valve.

2.11 COMBINATION EMERGENCY DRENCH SHOWER/EYEWASH UNIT ES-1, ES-2, ES-11, ES-12 (BARRIER FREE)

- .1 Bowl: 279 mm diameter corrosion resistant stainless steel bowl.
- .2 Shower head: corrosion resistant ABS plastic shower head with flow control.
- .3 Pipe and fittings: galvanized steel.
- .4 Operation:
 - .1 Shower: pull rod with triangular handle.
 - .2 Eyewash: large, highly visible push handle.
- .5 High visibility stripes.
- .6 Water supply: NPS 1-1/4.
- .7 Waste: NPS 1-¼.
- .8 Shower and eyewash valves: chrome-plated brass stay-open ball valve.

- .9 Eye/face wash spray head assembly: inverted directional laminar flow with integral flow control to ensure safe, steady flow under varying water supply conditions. Complete with plastic pop off dust cover.
- .10 Identification sign: 355 mm x 90 mm sign for wall mounting. Sign to read "**EMERGENCY DRENCH SHOWER/EYEWASH UNIT**".
- .11 Location: as indicated.
- .12 Unit shall be certified to meet ANSI Z358.1.

2.12 EMERGENCY SHOWER UNITS ES-3, ES-4 (BARRIER FREE)

- .1 Shower head: corrosion resistant ABS plastic shower head with flow control.
- .2 Operation:
 - .1 Shower: pull rod with triangular handle.
- .3 Water supply: NPS 1.
- .4 Shower valve: chrome-plated brass stay-open ball valve.
- .5 Identification sign: 355 mm x 90 mm sign for wall mounting. Sign to read "**EMERGENCY DRENCH SHOWER UNIT**".
- .6 Location: as indicated.
- .7 Unit shall be certified to meet ANSI Z358.1.
- .8 Contractor shall provide galvanized steel supports to secure / suspend units from ceiling.

2.13 EMERGENCY EYEWASH FIXTURE EW-1

- .1 Operation:
 - .1 Eyewash: large, highly visible stainless steel push handle.
- .2 Water supply: NPS 1/2.
- .3 Eyewash valve: chrome-plated brass stay-open ball valve.
- .4 Wall bracket.
- .5 Eye/face wash spray head assembly: inverted directional laminar flow with integral flow control to ensure safe, steady flow under varying water supply conditions. Complete with plastic pop off dust cover.

- .6 Identification sign: 355 mm x 90 mm sign for wall mounting. Sign to read "EMERGENCY EYEWASH UNIT".
- .7 Location: as indicated.
- .8 Unit shall be certified to meet ANSI Z358.1.
- .9 Complete with wall bracket for securing unit to wall.

2.14 EMERGENCY EYEWASH FIXTURE EW-4

- .1 Floor mounted pedestal type.
- .2 Operation:
 - .1 Eyewash: large, highly visible stainless steel push handle.
- .3 Water supply: NPS 1/2.
- .4 Waste: NPS 1-1/4.
- .5 Bowl: 279 mm diameter corrosion resistant stainless steel bowl.
- .6 Eyewash valve: chrome-plated brass stay-open ball valve.
- .7 Chrome plated brass 50 X 50 mesh water strainer.
- .8 Galvanized steel Schedule 40, NPS 1-1/4 pipe and fittings and powder coated cast iron floor flange.
- .9 Eye/face wash spray head assembly: inverted directional laminar flow with integral flow control to ensure safe, steady flow under varying water supply conditions. Complete with plastic pop off dust cover.
- .10 Identification sign: 355 mm x 90 mm sign for wall mounting. Sign to read "EMERGENCY EYEWASH UNIT".
- .11 Location: as indicated.
- .12 Unit shall be certified to meet ANSI Z358.1.

2.15 EMERGENCY EYEWASH FIXTURE EW-5, EW-6 (BARRIER FREE)

- .1 Wall mount, pull down type. Surface mount.
- .2 18-gauge, type 304 stainless steel.
- .3 Operation:
 - .1 Eyewash: flushing of fluid occurs with pull down of handle.

- .4 Water supply: NPS 1/2.
- .5 Waste: NPS 2.
- .6 Eye / face wash valve: chrome-plated brass stay-open ball valve.
- .7 Chrome plated brass 50 X 50 mesh water strainer.
- .8 Brass pipe and fittings.
- .9 Stainless steel drain pan.
- .10 Removeable access panel.
- .11 Eye/face wash spray head assembly: inverted directional laminar flow with integral flow control to ensure safe, steady flow under varying water supply conditions. Complete with plastic pop off dust cover.
- .12 Identification sign: 355 mm x 90 mm sign for wall mounting. Sign to read "EMERGENCY EYEWASH UNIT".
- .13 Location: as indicated.
- .14 Unit shall be certified to meet ANSI Z358.1.

2.16 EMERGENCY EYEWASH FIXTURE EW-7 (BARRIER FREE)

- .1 Wall mount type.
- .2 Operation:
 - .1 Eyewash: large, highly visible stainless steel push handle.
- .3 Water supply: NPS 1/2.
- .4 Waste: NPS 1-1/4.
- .5 Bowl: 279 mm diameter corrosion resistant stainless steel bowl.
- .6 Eyewash valve: chrome-plated brass stay-open ball valve.
- .7 Chrome plated brass 50 X 50 mesh water strainer.
- .8 Chrome plated brass trap and tailpiece.
- .9 Eye/face wash spray head assembly: inverted directional laminar flow with integral flow control to ensure safe, steady flow under varying water supply conditions. Complete with plastic pop off dust cover.

- .10 Identification sign: 355 mm x 90 mm sign for wall mounting. Sign to read "EMERGENCY EYEWASH UNIT".
- .11 Stainless steel wall bracket.
- .12 Location: as indicated.
- .13 Unit shall be certified to meet ANSI Z358.1.

2.17 EMERGENCY TEMPERED WATER STATION

- .1 Description: Indoor emergency water tempering skid to supply tepid water for multiple emergency plumbing fixtures (showers, eyewashes, combination units) for an indoor application.
- .2 Pipe and Fittings: Water inlets, NPS 1-1/2 diameter, stainless steel.
- .3 Supply Voltage: 600V, 3ph.
- .4 Skid Platform: Aluminum 1.5 x 1.5 m frame with a composite equipment platform, with black chemical and UV resistant polyester based powder coating.
- .5 Tank Systems: 1,512 liter (400 gal) insulated ASME tank complete with 10 kW electric resistance immersion heaters to maintain the following.
 - .1 Tank temperature of 62.8⁰C, suitable for two 15 minute showers, with a minimum inlet temperature of 1.7⁰C.
 - .2 Tank shall be complete with temperature and pressure relief valve, vacuum breaker, air eliminator, tank drain valve.
- .6 Thermostatic Mixing Valves: Two, low lead, paraffin based tempering valves with 4.9 l/s (78 gpm), full flow cold water bypass, anti scald protection and internal check stops. Outlet temperature shall be set at 29.4⁰C. Mixing valves shall meet ANSI Z358.1 requirements.
- .7 Pressure drop through tempering station / skid shall be no more than 27.6 kPa (4 psi) at a flow rate of 1.89 l/s (30 gpm)
- .8 System shall be complete with stainless steel valves and piping, temperature control package, electrical disconnect switch, pressure gauges, temperature gauges, alarm package complete with isolated dry contacts, ASME rated expansion tank, recirculation pump rated for 0.63 l/s @ 7.3 m total head (10 gpm @ 24' TDH) and 0 l/s @ 9.45 m total head (0 gpm @ 31' TDH), and system control panel. System shall be complete with all wiring and controls and shall only require a single point power connection for complete operation of the system and components described above.

- .9 System shall be disassembled on site to fit within a 1,778 mm wide X 2,057 mm high (70" X 81") doorway. The manufacturer shall provide support and assistance to the Contractor with the disassembly and reassembly process. The Contractor shall document this process and submit to the manufacturer for review and approval.
- .10 System shall be suitable for potable water service.
- .11 Acceptable products: Haws Corp, emergency tempering skid, Model 8780 or approved equal.

2.18 PIPE WALL AND FLOOR PENETRATION SEAL

- .1 Application:
 - .1 Pipes penetrating exterior concrete walls below grade and concrete floors on grade.
- .2 Seal material to be EPDM.
- .3 Pressure plates to be glass-reinforced plastic.
- .4 Bolts and nuts to be stainless steel 18-8.
- .5 Suitable temperature range to be -40°C to 121°C.
- .6 Wall sleeves to be Schedule 40 black iron pipe. Sleeves in exterior walls to be galvanized.
- .7 Floor sleeves to be Schedule 40 black iron pipe.
- .8 Wall and floor sleeves to be sufficiently long to mount flush with interior and exterior walls and flush with finished floor of slab-on-grade floors, 50 mm above floor, for floors above grade.

2.19 POTABLE WATER THERMAL EXPANSION TANK

- .1 Installed at outlet of booster pumps.
- .2 ASME Section VIII construction and label.
- .3 CSA approved to NSF 61 EPDM bladder.
- .4 1 NPT stainless steel system connection.
- .5 Standard tire air charging valve connection.
- .6 1724 kPa maximum working pressure.

- .7 Vertical tank, floor mounted.
- .8 Dimensions: 406 mm diameter, 885 mm high.
- .9 Tank volume: 98 liter.
- .10 Acceptance volume: 66 liter.
- .11 Painted primer exterior finish.
- .12 Air pre-charge to be adjusted in field by the Mechanical Contractor to the requirements specified by the pump controller manufacturer.

2.20 EMERGENCY FIXTURE FLOW SWITCH ALARM / HORN / STROBE SYSTEM

- .1 Suitable for flow rates as low as 0.15 L/s.
- .2 Power supply: 120/1/60.
- .3 Emergency alarm and light system shall be operated by a double pole, double throw flow switch, which contains multiple sets of contacts for remote activation, and activates an amber flashing light and buzzer/ horn at 90 db, audible at 3 meters (horn to be able to be silenced during testing).
- .4 System can be mounted to pipe or wall.
- .5 Flow switch pre-mounted in 1-1/4 NPT fitting. Provide fittings as required to transition to line size.
- .6 Electrical connection: Pre-wired 1800 mm long multiple conductor, waterproof cable for easy connection to the alarm assembly.
- .7 On/Off (Acknowledgement) Switch: Enables horn to be turned off while the strobe light continues to flash and the water flows.
- .8 CSA certified, Type 4.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: Comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheet.

3.2 INSTALLATION

- .1 Install in accordance with National Plumbing Code of Canada, and local authority having jurisdiction.
- .2 Install in accordance with manufacturer's instructions and as specified.
- .3 Provide connections to fixtures and associated fittings in accordance with manufacturer's instructions.

3.3 CLEANOUTS

- .1 In addition to those required by code, and as indicated, install at base of soil and waste stacks, and rainwater leaders.
- .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 NPS4.

3.4 WATER HAMMER ARRESTORS

- .1 Install on branch supplies to fixtures or group of fixtures, and where indicated on drawings.

3.5 HOSE BIBBS AND SEDIMENT FAUCETS

- .1 Install at bottom of risers, at low points to drain systems, and as indicated.

3.6 TRAP SEAL PRIMERS

- .1 Install for floor drains and elsewhere, as indicated.
- .2 Install on cold water supply to nearest frequently used plumbing fixture, in concealed space, to approval of Owner.
- .3 Install Type K soft copper piping to floor drain. Insulate piping to the requirements of domestic CWS.

3.7 STRAINERS

- .1 Install with sufficient room to remove basket.

3.8 TEMPERING STATION

- .1 Install unit level, plumb, and anchored firmly in place in accordance with manufacturer's rough-in drawings.

- .2 Contractor shall remove and reinstall doors as required to fit tempering station in through the entry way to the basement of the OSC Annex.

3.9 START-UP AND COMMISSIONING

- .1 General:
 - .1 The Owner's Representative shall provide commissioning forms for the equipment and systems installed as part of this project and they shall be completed by the Contractor. Commissioning shall take place at a time suitable with the Owner's Representative. Commissioning forms shall be completed in the presence of the Owner's Representative.
 - .2 In accordance with Section 01 91 13 - Commissioning: supplemented as specified herein.
- .2 Timing: Start-up only after:
 - .1 Pressure tests have been completed.
 - .2 Disinfection procedures have been completed.
 - .3 Water treatment systems operational.
- .3 Provide continuous supervision during start-up.

3.10 TESTING AND ADJUSTING

- .1 General:
 - .1 In accordance with Section 01 91 13 - Commissioning: supplemented as specified herein.
- .2 Timing:
 - .1 After start-up deficiencies rectified.
 - .2 After certificate of completion has been issued by authority having jurisdiction.
- .3 Application tolerances:
 - .1 Pressure at fixtures: +/- 70 kPa.
 - .2 Flow rate at fixtures: +/- 20%.
- .4 Adjustments:
 - .1 Verify that flow rate and pressure meet design criteria.
 - .2 Make adjustments while flow rate or withdrawal is (1) maximum and (2) 25% of maximum and while pressure is (1) maximum and (2) minimum.
- .5 Floor drains:

- .1 Verify operation of trap seal primer.
- .2 Prime, using trap primer. Adjust flow rate to suit site conditions.
- .3 Check operations of flushing features.
- .4 Check security, accessibility, removeability of strainer.
- .5 Clean out baskets.
- .6 Vacuum breakers, backflow preventers, backwater valves:
 - .1 Test tightness, accessibility for O&M of cover and of valve.
 - .2 Simulate reverse flow and back-pressure conditions to test operation of vacuum breakers, backflow preventers.
 - .3 Verify visibility of discharge from open ports.
- .7 Access doors:
 - .1 Verify size and location relative to items to be accessed.
- .8 Cleanouts:
 - .1 Verify covers are gas-tight, secure, yet readily removable.
- .9 Water hammer arrestors:
 - .1 Verify proper installation of correct type of water hammer arrester.
- .10 Pressure regulators, PRV assemblies:
 - .1 Adjust settings to suit locations, flow rates, pressure conditions.
- .11 Strainers:
 - .1 Clean out repeatedly until clear.
 - .2 Verify accessibility of cleanout plug and basket.
 - .3 Verify that cleanout plug does not leak.
- .12 Hose bibbs, sediment faucets:
 - .1 Verify operation and at all low points.
- .13 Tempered water stations:
 - .1 Verify operation of tempered water assemblies at both high and low flow conditions.
 - .2 Set field-adjustable temperature set points of temperature-actuated water mixing valves.
 - .3 Adjust set point within allowable temperature range.
 - .4 Verify proper discharge temperature setpoint for all tempered water assemblies.
 - .5 Test and adjust installation.
- .14 Emergency fixture flow alarms:

- .1 Verify proper operation of both new and reused flow alarm systems.
- .15 Commissioning Reports:
 - .1 In accordance with Section 01 91 13 - Commissioning:
supplemented as specified herein.
- .16 Training:
 - .1 In accordance with Section 01 91 13 - Commissioning:
supplemented as specified herein.
 - .2 Demonstrate full compliance with Design Criteria.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- .1 Section Includes:
 - .1 Thermal insulation for piping and piping accessories in commercial type applications, including pre-insulated and heat traced piping system.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .3 Section 22 11 18.01 - Domestic Water Piping.
- .4 Section 23 05 53.01 – Mechanical Identification.

1.3 REFERENCES

- .1 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
 - .1 ASHRAE Standard 90.1, Energy Efficient Design of New Buildings Except Low-Rise Residential Buildings (Including all Addenda).
- .2 American Society for Testing and Materials (ASTM)
 - .1 ASTM B209M, Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate Metric.
 - .2 ASTM C335, Standard Test Method for Steady State Heat Transfer Properties of Horizontal Pipe Insulation.
 - .3 ASTM C411, Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.
 - .4 ASTM C449/C449M, Standard Specification for Mineral Fibre-Hydraulic-Setting Thermal Insulating and Finishing Cement.
 - .5 ASTM C533 Standard specification for Calcium Silicate Insulation Block and Pipe.
 - .6 ASTM C547 Standard Specification for Mineral Fibre Pipe Insulation.
 - .7 ASTM C795, Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.

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- .8 ASTM C921, Standard Practice for Determining the Properties of Jacketing Materials for Thermal Insulation.
- .9 ASTM D1784, Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.
- .3 Canadian General Standards Board (CGSB)
 - .1 CGSB 51-GP-52Ma, Vapour Barrier, Jacket and Facing Material for Pipe, Duct and Equipment Thermal Insulation.
 - .2 CAN/CGSB-51.53, Poly (Vinyl Chloride) Jacketing Sheet, for Insulated Pipes, Vessels and Round Ducts
- .4 Department of Justice Canada (Jus)
 - .1 Impact Assessment Act (IAA).
 - .2 Canadian Environmental Protection Act, (CEPA), c. 33.
 - .3 Transportation of Dangerous Goods Act (TDGA), c. 34.
- .5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Safety Data Sheets.
- .6 Manufacturer's Trade Associations
 - .1 Thermal Insulation Association of Canada (TIAC): National Insulation Standards.
- .7 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102, Surface Burning Characteristics of Building Materials and Assemblies.
- .8 National Energy Code for Buildings (NECB).

1.4 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.
- .2 TIAC ss:
 - .1 CRF: Commercial Rectangular Finish
 - .2 CPF: Commercial Piping Finish.

1.5 SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 33 00 - Submittal Procedures. Include product characteristics, performance criteria, and limitations.
 - .1 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Safety Data Sheets (SDS) in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Shop Drawings:
 - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .4 Samples:
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit for approval: complete assembly of each type of insulation system, insulation, coating, and adhesive proposed. Mount sample on 12 mm plywood board. Affix label beneath sample indicating service.
- .5 Quality assurance submittals: submit following in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .2 Instructions: submit manufacturer's installation instructions to Owner.

1.6 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Installer: Certified in performing work of this Section and have at least 5 years successful experience in this size and type of project, qualified to standards of TIAC.
- .2 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Packing, shipping, handling and unloading:

- .1 Deliver, store and handle in accordance with manufacturer's written instructions and Section 01 61 00 - Common Product Requirements.
- .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .3 Deliver materials to site in original factory packaging, labeled with manufacturer's name, address.
- .2 Storage and Protection:
 - .1 Protect from weather, construction traffic.
 - .2 Protect against damage.
 - .3 Store at temperatures and conditions required by manufacturer.
- .3 Waste Management and Disposal:
 - .1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .2 Place excess or unused insulation and insulation accessory materials in designated containers.
 - .3 Divert unused metal materials from landfill to metal recycling facility approved by Owner.
 - .4 Dispose of unused adhesive material at official hazardous material collections site approved by Owner.

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 specified includes glass fibre, rock wool, slag wool.
- .2 Thermal conductivity ("k" factor) not to exceed specified values at 24° C mean temperature when tested in accordance with ASTM C335.
- .3 TIAC Code A-2: Rigid moulded calcium silicate in sections and blocks, and with special shapes to suit project requirements.
 - .1 Insulation: to ASTM C533.

- .2 Maximum "k" factor: to 0.075 W/m ° C @ 500° C.
- .3 Design to permit periodic removal and re-installation.
- .4 TIAC Code A-3: Rigid moulded mineral fibre with factory applied vapour retarder jacket.
 - .1 Mineral fibre: to CAN/ULC-S702 and ASTM C547.
 - .2 Jacket: to CGSB 51-GP-52Ma.
 - .3 Maximum "k" factor: to CAN/ULC-S702.
- .5 TIAC Code A-6: Flexible unicellular tubular elastomer.
 - .1 Insulation: with vapour retarder jacket to ASTM C534.
 - .2 Jacket: to CGSB 51-GP-52Ma.
 - .3 Maximum "k" factor: 0.039 W/m – °C.
 - .4 To be certified by manufacturer to be free of potential stress corrosion cracking corrodants.
 - .5 Flame spread index less than 25, and smoke developed index less than 50.
- .6 TIAC Code C-2: Mineral fibre blanket faced with factory applied vapour retarder jacket (as scheduled in PART 3 of this section).
 - .1 Mineral fibre: to CAN/ULC-S702.
 - .2 Jacket: to CGSB 51-GP-52Ma.
 - .3 Maximum "k" factor: to CAN/ULC-S702.

2.3 INSULATION SECUREMENT

- .1 Tape: Self-adhesive, aluminum, plain reinforced, 50 mm wide minimum.
- .2 Contact adhesive: Quick setting.
- .3 Canvas adhesive: Washable.
- .4 Tie wire: 1.5 mm diameter stainless steel.
- .5 Bands: Stainless steel, 19 mm wide, 0.5 mm thick.

2.4 CEMENT

- .1 Thermal insulating and finishing cement:
 - .1 Hydraulic setting or air drying on mineral wool, to ASTM C449/C449M.

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 OUTDOOR VAPOUR RETARDER FINISH

- .1 Vinyl emulsion type acrylic, compatible with insulation.
- .2 Reinforcing fabric: Fibrous glass, untreated 305 g/m².

2.8 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: to match adjacent finish paint. Confirm colour with Owner.
 - .3 Minimum service temperatures: -20° C.
 - .4 Maximum service temperature: 65° C.
 - .5 Moisture vapour transmission: 0.02 perm.
 - .6 Thickness: 0.55 mm.
 - .7 Fastenings:
 - .1 Use solvent weld adhesive compatible with insulation to seal laps and joints.
 - .2 Tacks.
 - .3 Pressure sensitive vinyl tape of matching colour.
 - .8 Special requirements:
 - .1 Indoor: Flame spread rating 25, smoke developed rating 50.
 - .2 Outdoor: UV rated material at least 0.5 mm thick.
- .2 Canvas:
 - .1 220gm/m² cotton, plain weave, treated with dilute fire retardant lagging adhesive to ASTM C921.
 - .2 Lagging adhesive: Compatible with insulation.
- .3 Aluminum:
 - .1 To ASTM B209.
 - .2 Thickness: 0.50 mm sheet.
 - .3 Finish: Embossed or corrugated.
 - .4 Joining: Longitudinal and circumferential slip joints with 50 mm laps.
 - .5 Fittings: 0.5 mm thick die-shaped fitting covers with factory-attached protective liner.

- .6 Metal jacket banding and mechanical seals: stainless steel, 19 mm wide, 0.5 mm thick at 300 mm spacing.
- .4 Stainless steel:
 - .1 Type: 304 or type 316.
 - .2 Thickness: 0.25 mm.
 - .3 Finish: Smooth.
 - .4 Joining: Longitudinal and circumferential slip joints with 50 mm laps.
 - .5 Fittings: 0.5 mm thick die-shaped fitting covers with factory-attached protective liner.
 - .6 Metal jacket banding and mechanical seals: stainless steel, 19 mm wide, 0.5 mm thick at 300 mm spacing.

2.9 WEATHERPROOF CAULKING FOR JACKETS INSTALLED OUTDOORS

- .1 As recommended by manufacturer to suit the application.

2.10 PREINSULATED AND HEAT TRACED EXTERIOR PIPING

- .1 Piping and fittings shall be Schedule 40 stainless steel as described in specification Section 22 11 18.01 - Domestic Water Piping. Pipe sizes as indicated on the drawings.
- .2 The pipe shall be factory insulated complete with integral conduits for electric heat trace cable and for temperature sensors (minimum two conduits required).
- .3 The insulation of associated joints, fittings and accessories shall be as per manufacturer's recommendations.
- .4 Pipe and casing jacket shall be cleaned of surface dust or dirt to ensure adhesion of the foam to the pipe and inner jacket surface.
- .5 Heat tracing conduits shall consist of an extruded molding and shall be applied to the pipe prior to application of the insulation. The conduits shall be securely fastened to the pipe to prevent the ingress of foam therein during the insulation process. All conduits shall be checked after insulating to ensure they are not blocked. The ends shall be sealed prior to shipping to prevent any foreign material from entering the conduit while in transit or during installation.
- .6 Insulation
 - .1 Material: Rigid polyurethane foam, factory applied.

- .2 Thickness: Nominal 50.8 mm.
 - .3 Density: (ASTM D1622) 35 to 45 kg/m³.
 - .4 Closed cell content: (ASTM D6226) ≥ 90%.
 - .5 Water absorption: (ASTM D2842) ≤ 4.0% by volume.
 - .6 Thermal conductivity: (ASTM C518) 0.020 to 0.022 W/m°C.
 - .7 Temperature range: Cryogenic to 93.3 °C (200 °F).
 - .8 System compressive strength: (modified ASTM D1621 with casing jacket) approximately 690 to 1379 kPa, varies with pipe diameter.
 - .9 Temperature limitations: Minimum ambient installation temperature -34 °C.
- .7 PE Casing Outer Jacket: The outer protective jacket shall consist of black PE, UV inhibited, factory applied with the following specifications:
- .1 Casing shall be extruded from polyethylene resin with cell class requirements 334360C as defined in ASTM D3350-12;
 - .2 Polyethylene compound shall be of color and UV stabilizer Code C (black) as specified in ASTM D3350, with a target range of 2 to 2.5% well dispersed carbon black (max. 2.8%);
 - .3 Jacket thickness shall be 3.81 mm to 7.62 mm depending on pipe diameter and PE casing availability from supplier.
- .8 Insulated Pipe Joints
- .1 Insulated pipe joints shall be completed with slip joint kits consisting of preformed polyisocyanurate foam or polyurethane foam half shells supplied with PE cover sheet, stainless steel bands, gear clamps and self tapping screws.
 - .2 All PE overlaps at the joints and fittings shall be 50.8 mm minimum and shall be field positioned in such a way as to shed water. The insulation shall be pre-grooved on the inside or slightly oversized to accommodate heat trace cables.
 - .3 Waterproofing: A heat shrink sleeve shall be supplied by insulation system manufacturer and field applied to the insulation half shells as primary seal under the PE cover sheet.
- .9 Insulation Kits for Fittings
- .1 Insulation kits for fittings shall consist of rigid polyisocyanurate or polyurethane foam half shells complete with a heavy polymer protective coating on the outside surfaces. All insulation kits shall be supplied complete with silicone caulking, stainless steel bands and gear clamps. If the insulation shells are form hugging to the fitting, 150 mm wide PE cover sheets with stainless steel bands and gear clamps shall be supplied for each end of the kit.
 - .2 Rigid polyisocyanurate or polyurethane foam:

- .1 Density: (ASTM D1622) 32 kg/m³.
- .2 Compressive strength: (ASTM D1621) 124 to 186 kPa.
- .3 Closed cell content: (ASTM D2856) 90%, minimum.
- .4 Water absorption: (ASTM C272) 2.0% by volume.
- .5 K factor: (ASTM C518) 0.027 W/m°C.
- .6 Thickness: 50.8 mm.
- .3 Polymer coating:
 - .1 Two component high density polyurethane coating, black in color.
 - .2 Density: 1170 kg/m³.
 - .3 Durometer D scale 60.
 - .4 Tensile strength: 11.10 MPa.
 - .5 Tear strength: 26.5 N/mm.
 - .6 Thickness: 2.16 mm outside surfaces, 0.51 mm inside surfaces.
- .4 Insulation and jacketing system shall be completely waterproof.
- .10 Heat Trace Cable:
 - .1 Fluoropolymer insulated parallel heating cable, constant watt, parallel resistance type.
 - .2 120 Volt, 13 watt per meter cable.
 - .3 Complete with power and end termination kits, splice kits, aluminum tape, power feed kits and all other components as required for a complete working system. Provide additional wiring as required to reach from thermostat mounting location to the heat trace cable, confirm exact distance on site.
- .11 Electronic Thermostat:
 - .1 CSA approved.
 - .2 NEMA 4 enclosure.
 - .3 Indicator light: Multi-function three color LED.
 - .4 Valid temperature range: -5 to +100°C.
 - .5 Alarm/Electronic thermostat reset: Push button.
 - .6 Input voltage range: 120-240 Vac, 50/60 Hz.
 - .7 Alarm output: 1 A max, 240 Vac max., 50/60 Hz, SPDT (form C) relay output configured for "fail-safe" operation.
 - .8 Power output: 2 pole relay output rated 30 A - 240 Vac.
 - .9 Monitoring and alarming: The electronics monitor low temperature (when enabled), ground fault current, connected load current, open / shorted temperature sensors, high temperature (when enabled) & functional MCU.

- .10 Operating ambient temperature: -40 to +50 °C.
 - .11 Current monitoring: Up to 30A.
 - .12 Display: OLED display module (2 lines x 16 characters) that will indicate alarms, temperatures, load current, GFI, serial number & software version. ON/OFF switch installed inside enclosure.
 - .13 Programming: USB port to download standard or custom program codes in the electronic card.
 - .14 Low temperature alarm: Feature can be enabled to provide low temperature alarm on RTD1, RTD2 and/or RTD3.
 - .15 Low temperature setpoint range: -10 to 90°C.
 - .16 Remote override: The user may force the unit on/off via a remote dry contact. Factory adjustable to operate in timed (1-48 hours) or non-timed mode.
 - .17 Temperature control: Three 3-wire 100 Ω @ 0 °C platinum RTD lead compensated to 20 Ω per lead.
 - .18 Control temperature setpoint range: -5 to +100 °C. Control temperature shall be 18°C.
 - .19 Deadband: 1 to 5 °C.
 - .20 Auto-cycle: The electronic thermostat performs an auto-cycle test (if enabled) by turning on the load to measure the ground fault leakage current when the electronic thermostat is energized and then at 24 hours intervals. If the measured ground fault current is above the set level, the ground fault current alarm is activated.
 - .21 Ground fault detection: Factory adjustable to trip or alarm only. Setting @ 30 or 100 ma.
 - .22 High cable temperature: Not required.
 - .23 Provide all additional wiring as required to reach from thermostat mounting location to the heat traced piping. Confirm exact distance on site.
-
- .12 Pre-insulated pipe, heat trace cables, temperature sensors, electronic thermostats shall be supplied as a complete system by one manufacturer. The manufacturer shall provide all additional components as required for a complete working system, meeting the intent of the drawings and specifications (even if not specifically identified above).
 - .13 The electronic thermostat, heat trace cables and all associated electrics shall be installed by the Division 26 Contractor but supplied by the Division 22/23 Mechanical Contractor.
 - .14 Acceptable Products: Urecon pre-insulated pipe and fittings (with PE casing for above ground applications), Urecon NGUTC-2030 electronic thermostats, Urecon Thermocable, or approved equal.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 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.

3.3 INSTALLATION

- .1 Install in accordance with TIAC National Standards.
- .2 Apply materials in accordance with manufacturer's instructions and this specification.
- .3 Use two layers with staggered joints when required nominal wall thickness exceeds 75 mm.
- .4 Maintain uninterrupted continuity and integrity of vapour retarder jacket and finishes.
 - .1 Install hangers, supports 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.

3.4 REMOVABLE, PRE-FABRICATED, INSULATION AND ENCLOSURES

- .1 N/A.

3.5 INSTALLATION OF ELASTOMERIC INSULATION

- .1 Insulation to remain dry. Overlaps to manufacturers instructions. Ensure tight joints.
- .2 Provide vapour retarder as recommended by manufacturer.

3.6 PIPING INSULATION SCHEDULES

- .1 Includes valves, valve bonnets, strainers, flanges and fittings unless otherwise specified.
- .2 TIAC Code: A-2.
 - .1 Insulation securements: 18 ga SS wire or 12 mm x 0.51 mm SS bands at 300 mm oc.
 - .2 Seals: lap seal adhesive, lagging adhesive.
 - .3 Installation: TIAC Code: 1501-H.
- .3 TIAC Code: A-3.
 - .1 Securements: Tape at 300 mm oc.
 - .2 Seals: VR lap seal adhesive, VR lagging adhesive.
 - .3 Installation: TIAC Code: 1501-C.
- .4 TIAC Code: A-6.
 - .1 Insulation securements: as per manufacturer's recommendation.
 - .2 Seals: lap seal adhesive, lagging adhesive.
 - .3 Installation: TIAC Code: 1501-CA.
- .5 TIAC Code: C-2 with vapour retarder jacket.
 - .1 Insulation securements: 18 ga SS wire or 12 mm x 0.5 mm SS bands at 300 mm oc.
 - .2 Seals: lap seal adhesive, lagging adhesive.
 - .3 Installation: TIAC Code: 1501-C.
- .6 Thickness of insulation to be as listed in following table.
 - .1 Run-outs to individual units and equipment not exceeding 4000 mm long.
 - .2 Do not insulate exposed runouts to plumbing fixtures, chrome plated piping, valves, fittings.

Application	Temp °C	TIAC code	Pipe sizes (NPS) and insulation thickness (mm)					
			Run out	to 1	1 1/4 to 2	2 1/2 to 4	5 to 6	8 & over
Tempered Water & Recirc (Inside Buildings)		A-3	25	25	25	38	38	38

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Application	Temp °C	TIAC code	Pipe sizes (NPS) and insulation thickness (mm)					
			<i>Run out</i>	<i>to 1</i>	<i>1 1/4 to 2</i>	<i>2 1/2 to 4</i>	<i>5 to 6</i>	<i>8 & over</i>
Tempered Water & Recirc (Outside)			See item 2.10 above for details.					
Domestic CWS		A-3	25	25	25	25	25	25

.7 Finishes:

- .1 Exposed indoors: PVC jacket.
- .2 Exposed in mechanical rooms: PVC jacket.
- .3 Concealed, indoors: canvas on valves, fittings. No further finish.
- .4 Use vapour retarder jacket on TIAC code A-3 insulation compatible with insulation.
- .5 Outdoors: Per section 2.10 above.
- .6 Finish attachments: SS screws or bands, at 150 mm oc. Seals: wing or closed.
- .7 Installation: To appropriate TIAC code CPF/1 through CPF/5.

3.7 CLEANING

- .1 Proceed in accordance with Section 01 74 00 – Cleaning.
- .2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- .1 Section includes:
 - .1 Materials and installation for plumbing pumps.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 01 35 29.06 – Health and Safety Requirements.
- .3 Section 01 45 00 – Quality Control.
- .4 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .5 Section 01 78 00 – Closeout Submittals.
- .6 Section 01 91 13 – Commissioning.

1.3 REFERENCES

- .1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Safety Data Sheets (SDS)

1.4 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheet for fixtures and equipment.
 - .2 Submit WHMIS SDS in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's for adhesive and solvents during application and curing.
- .3 Shop Drawings:
 - .1 Submit shop drawings to indicate:
 - .1 Equipment, including connections, fittings, control assemblies and ancillaries. Identify whether factory or field assembled.
 - .2 Wiring and schematic diagrams.

- .3 Dimensions and recommended installation.
- .4 Pump performance and efficiency curves.
- .4 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .5 Instructions: submit manufacturer's installation instructions.
- .6 Manufacturers' Field Reports: manufacturers' field reports specified.
- .7 Closeout submittals: submit maintenance and engineering data for incorporation into manual specified in Section 01 78 00 – Closeout submittals, include:
 - .1 Manufacturers name, type, model year, capacity and serial number.
 - .2 Details of operation, servicing and maintenance.
 - .3 Recommended spare parts list with names and addresses.

1.5 QUALITY ASSURANCE

- .1 Pre-Installation Meeting:
 - .1 Convene pre-installation meeting one week prior to beginning work of this Section and on-site installation.
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Co-ordination with other building subtrades.
 - .4 Review manufacturer's installation instructions and warranty requirements.
- .2 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 – Health and Safety Requirements.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Construction /Demolition Waste Management and Disposal.
 - .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
 - .3 Collect and separate for disposal, paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

- .4 Divert unused metal materials from landfill to metal recycling facility as approved by Owner.
- .5 Unused sealant materials must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.
- .6 Fold up metal and plastic banding, flatten and place in designated area for recycling.

PART 2 PRODUCTS

2.1 DOMESTIC WATER BOOSTER SYSTEM (P-1, P-2)

- .1 Packaged duplex system, factory assembled, tested and adjusted, ready for site piping and electrical connections. System / components must be able to be disassembled to allow transport through an 838 mm wide by 1,778 mm door (clear dimensions). Coordinate on site for available floor space and optimum orientation, prior to submitting shop drawings.
- .2 Capacity, per pump:
 - .1 Flow rate: 2.17 L/s.
 - .2 Min flow rate: 0.189 L/s.
 - .3 Pump design head: 745 kPa.
 - .4 Pump minimum head: appx 448 kPa.
 - .5 Pump RPM: 3500.
 - .6 Efficiency: 70.12%
 - .7 Brake horsepower: 3.1 HP.
 - .8 Motor horsepower: 5 HP.
 - .9 NPSH required: 23.3 kPa.
 - .10 575 V, 3 phase, 60 Hz.
 - .11 Duplex system – one duty pump and one standby pump (see also control requirements noted below).
 - .12 Acceptable products: Xylem Goulds eSv 5SV10, or approved equal.
- .3 Construction: multi stage centrifugal, stainless steel casing, stainless steel impeller, capable of working pressures of 2,482 kPa. Inline piping connections, stainless steel diffuser bowl per stage, mechanical shaft seal. Pumps shall be NSF 61 certified for potable water applications. Include hydropneumatic pressure tank to prevent starts at low flows (see Section 22 05 15 – Plumbing Specialties and Accessories).

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- .4 Valves: to Section 22 11 18.01 - Domestic Water Piping. Stainless steel. Suction and discharge ball valves, silent check valve on each pump and as indicated on drawings.
- .5 Pumping package piping and fittings shall be stainless steel, see Section 22 11 18.01 - Domestic Water Piping.
- .6 Motors: TEFC, premium efficiency and inverter duty rated for variable frequency drive.
- .7 Supports: install complete package on factory fabricated stainless steel structural steelwork.
- .8 Anchor bolts and templates:
 - .1 Supply an install.
- .9 Control panels: CSA 4 enclosures complete with:
 - .1 Externally operated fused disconnect switch.
 - .2 Variable frequency drive (VFD) with bypass contactor for lead pump: VFDs mounted in control cabinet and rotates among pumps. VFDs complete with pressure transducers and associated wiring to control speed of pumps.
 - .3 Overload protection for each phase.
 - .4 Adjustable pressure transmitter per VFD.
 - .5 Low pressure safety cut-out.
 - .6 Control circuit transformer with fused secondary.
 - .7 Adjustable time delay relay.
 - .8 Hand-off-automatic selector switch for pumps.
 - .9 Pressure and suction gauges, to Section 23 05 19.13 – Thermometers and Pressure Gauges – Piping Systems, two times operating pressure.
 - .10 Pilot lights; power on, low suction pressure, pump 1 run, pump 2 run, system fault.
 - .11 Lead/lag selector switch.
 - .12 Alarm: visual and audible with silencing switch for abnormal conditions.
 - .13 Phase failure protection.
 - .14 Lightning protection.
 - .15 Ammeter, voltmeter, audible system fault alarm.
 - .16 Fault alarm contacts to building EMCS (for future).
 - .17 Pump elapsed time meters.
 - .18 Emergency/normal switches (bypass VFD).

- .19 VFDs shall be Xylem Aquavar IPC or approved equal.
- .10 Operation:
 - .1 It is intended for one pump to operate and one pump on standby, and the pumps controlled to maintain a constant discharge pressure. Note that the design intent is for the most remote and highest elevation emergency fixture to be provided with 206.8 kPa (30 psi) inlet pressure (minimum) for proper operation. Although the design intent is for duty / standby pump operation, the booster system must be able to operate and control both pumps simultaneously should it be required.
 - .2 Automatic control of pumps with the following choices:
 - .1 Cascade control.
 - .2 Synchronous control.
 - .3 Multi Control.
 - .4 Selectable pump alternation by clock hours or run hours.
 - .3 Automatic changeover between pumps in operation (ensures the same number of operating hours for all pumps).
 - .4 Stop function when operating at low flow (increases the efficiency when operating at low flow).
 - .5 Manual operation (enables testing of individual pumps).
 - .6 Various setpoint influences:
 - .1 Friction-loss compensation (decreasing pressure with decreasing flow)
 - .2 Setpoint adjustment via external signals (temperature, time, level and flow).
 - .3 Constant pressure control (with field adjustable pressure setpoint).
 - .7 Pump and system monitoring functions:
 - .1 Pump no flow
 - .2 No water, loss of prime
 - .3 Short cycle
 - .4 Vibration
 - .5 High and low system pressure shutdown
 - .6 Inlet pressure measurement
 - .7 Motor protection
 - .8 BUS communication

PART 3 **EXECUTION**

3.1 **MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheet.

3.2 **INSTALLATION**

- .1 Make piping and electrical connections to pump and motor assembly and controls as indicated.
- .2 Ensure pump and motor assembly do not support piping.

3.3 **FIELD QUALITY CONTROL**

- .1 Check power supply.
- .2 Check starter protective devices.
- .3 Start-up, check for proper and safe operation.
- .4 Check settings and operation of hand-off-auto selector switch, operating, safety and limit controls, audible and visual alarms, over-temperature and other protective devices.
- .5 Adjust flow from water-cooled bearings.
- .6 Adjust impeller shaft stuffing boxes, packing glands.

3.4 **START-UP**

- .1 General:
 - .1 In accordance with Section 01 91 13 – Commissioning, supplemented as specified herein.
 - .2 Procedures:
 - .1 Check power supply.
 - .2 Check starter O/L heater sizes.
 - .3 Start pumps, check impeller rotation.
 - .4 Check for safe and proper operation.
 - .5 Check settings, operation of operating, limit, safety controls, over-temperature, audible/visual alarms, other protective devices.
 - .6 Test operation of HOA switch.
 - .7 Test operation of alternator.

- .8 Adjust leakage through water-cooled bearings.
- .9 Adjust shaft stuffing boxes.
- .10 Adjust leakage flow rate from pump shaft stuffing boxes to manufacturer's recommendations.
- .11 Check base for free-floating, no obstructions under base.
- .12 Run-in pumps for 12 continuous hours.
- .13 Check installation, operation of mechanical seals, packing gland type seals. Adjust as necessary.
- .14 Adjust alignment of piping and conduit to ensure full flexibility at all times.
- .15 Eliminate causes of cavitations, flashing, air entrainment.
- .16 Measure pressure drop across strainer when clean and with flow rates as finally set.
- .17 Replace seals if pump used to degrease system or if pump used for temporary heat.
- .18 Verify lubricating oil levels.

3.5 PERFORMANCE VERIFICATION (PV) PRESSURE BOOSTER PUMPS

- .1 General:
 - .1 In accordance with Section 01 91 13 - Commissioning: supplemented as specified herein.
- .2 Obtain manufacturer's approval, before performing PV, to ensure warranties remain intact.
- .3 Application tolerances:
 - .1 Flow: +/- 10%.
 - .2 Pressure: Plus 20%, minus 5%.
- .4 PV procedures:
 - .1 Operate an emergency combination shower / eyewash fixture.
 - .2 Measure differential pressure (DP) across pump.
 - .3 Measure amperage and voltage and compare with manufacturer's data sheets and motor nameplate data.
 - .4 If suction is different size than discharge connection, add velocity head correction factor to DP.
 - .5 Mark this DP on manufacturer's pump curve.
 - .6 If flow rate is higher than specified, adjust valve until specified DP is reached.
 - .7 Repeat measurements of amps and volts. Compare with manufacturer's data sheets.

- .8 Calculate BHP and compare with nameplate data.

3.6 PERFORMANCE VERIFICATION (PV) - PRESSURE BOOSTER SYSTEM

- .1 Pumps: As specified above.
- .2 PV of complete unit:
 - .1 Test performance of pumps in lead and in lag position.
 - .2 Test operation of alternator.
 - .3 Simulate failure of pumps in possible combinations such as:
 - .1 Failure of each "lead" pump.
 - .2 Failure of first "lag" pump, then 2nd "lag" pump, etc.
 - .4 Test operation by simulating 0%, 10%, 25%, 50%, 75%, 100% and 110% of design load and for one hour. Record pressure at:
 - .1 Which lead and lag pump cut in and cut out.
 - .2 Water meter outlet.
 - .3 "Worst" plumbing fixture.
 - .5 Verify operation and control of over-temperature protection devices.

3.7 REPORTS

- .1 The Owner's Representative shall provide commissioning forms for the equipment and systems installed as part of this project and they shall be completed by the Contractor. Commissioning shall take place at a time suitable with the Owner's Representative. Commissioning forms shall be completed in the presence of the Owner's Representative.
- .2 In accordance with Section 01 91 13 - Commissioning: supplemented as specified herein.
- .3 Include
 - .1 PV results on approved PV Report Forms.
 - .2 Product Information report forms.
 - .3 Pump performance curves (family of curves) with final point of actual performance marked thereon.

3.8 TRAINING

- .1 In accordance with Section 01 79 00.13 - Demonstration and Training for Building Commissioning, supplemented as specified herein.

3.9 MANUFACTURER'S REPRESENTATIVE

- .1 Booster system supplier and manufacturer's representative shall be present and take part in start up, commissioning and training.

END OF SECTION

Part 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 35 29.06 - Health and Safety Requirements.
- .3 Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
- .4 Section 01 78 00 - Closeout Submittals.
- .5 Section 01 91 13 - Commissioning
- .6 Section 22 05 00 – Common Work Results for Mechanical.
- .7 Section 22 07 19 – Plumbing Piping Insulation.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI)
 - .1 ANSI B16.1, Cast Iron Pipe Flanges and Flange Fittings, Class 25, 125, 250 and 800.
- .2 Canadian Standard Association (CSA)
 - .1 CSA B137.5, Crosslinked Polyethylene (PEX) Tubing Systems for Pressure Applications.
 - .2 CSA B137.6, CPVC Pipe, Tubing and Fittings for Both Hot and Cold Water Distribution Systems.
- .3 National Sanitation Foundation (NSF)
 - .1 NSF61 Potable Water Listing.
- .4 Underwriters Listing of Canada (ULC)
 - .1 CAN/ULC S101, Fire Endurance Tests of Buildings Construction and Materials.
 - .2 CAN/ULC S102.2, Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings and Miscellaneous Materials and Assemblies.
 - .3 CAN/ULC S115, Standard Method of Fire Tests of Firestop Systems.

- .5 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - .2 ASTM B88M, Standard Specification for Seamless Copper Water Tube (Metric).
 - .3 ASTM D1784 Standard Specification for Rigid Poly (Vinyl Chloride) PVC Compounds and Chlorinated Poly (Vinyl Chloride) CPVC compounds.
 - .4 ASTM D2467, Standard Specification for Poly (Vinyl Chloride) PVC Plastic Pipe Fittings, Schedule 80.
 - .5 ASTM F437 Standard Specification for Threaded Chlorinated Poly (Vinyl Chloride) CPVC Plastic Pipe Fittings Schedule 80.
 - .6 ASTM F439 Standard Specification for Chlorinated Poly (Vinyl Chloride) CPVC Plastic Pipe Fittings Schedule 80.
 - .7 ASTM F441/441M Standard Specification for Chlorinated Poly (Vinyl Chloride) CPVC Plastic Pipe Schedules 40 and 80.
 - .8 ASTM F876 Standard Specification for Crosslinked Polyethylene (PEX) Tubing.
 - .9 ASTM F877 Standard Specification for Crosslinked Polyethylene (PEX) Hot and Cold Water Distribution System.
- .6 Department of Justice Canada (Jus).
 - .1 Canadian Environmental Protection Act (CEPA).
- .7 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Safety Data Sheets (SDS).
- .8 Manufacturer's Standardization Society of the Valve and Fittings Industry (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-110 Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends
- .9 National Research Council (NRC)/Institute for Research in Construction.
 - .1 NRCC, National Plumbing Code of Canada (NPC).
- .10 Transport Canada (TC).

- .1 Transportation of Dangerous Goods Act (TDGA).

1.3 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit product data for following: all components specified within this Section.
- .3 Submit WHMIS SDS - Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures.
- .4 Provide maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.4 HEALTH AND SAFETY

- .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Separate for reuse and recycling and place in designated containers Steel, Metal, Plastic waste in accordance with Waste Management Plan.
- .4 Place materials defined as hazardous or toxic in designated containers.
- .5 Handle and dispose of hazardous materials in accordance with CEPA, TDGA , Regional and Municipal regulations.
- .6 Fold up metal banding, flatten and place in designated area for recycling.

PART 2 PRODUCTS

2.1 PIPING

- .1 Cold, tempered and recirculation systems;

- .1 NPS ½ to 4 CPVC to SDR11 with IPS outside dimensions: CSA B 137.6, ASTM D1784 cell class of 24448 and NSF 61 certified.
 - .2 Entire system (pipe, fittings, threaded adapters) shall be rated for 2,757 kPa (400 psi) at 22.8°C (73 F) and 2 510 kPa (364 psi) at 32.2°C (90 F). Any components (flanges, threaded fittings, unions, cpvc ball valves etc.) with lower pressure ratings are not permitted.
 - .3 Solvent cement and primer shall be certified for use with potable water. Pipe, valves, fittings, primer and solvent cement shall be provided by the same manufacturer as a complete piping system.
 - .4 CPVC piping and fittings shall have flame spread and smoke developed ratings no greater than 25 and 50, respectively.
 - .5 Use NSF 61 approved, lead free bronze threaded unions with a pressure rating of 2,757 kPa (400 psi) at 22.8°C (73 F) where unions are required or identified on the drawings.
 - .6 Piping system manufacturer shall instruct the contractor on proper installation procedures and techniques, prior to piping installation commencing. Owner's representative shall be present for this instruction process.
- .2 Bronze ball valves, for use in CPVC piping system:
 - .1 2 piece construction, full port, lead free brass.
 - .2 Bottom-loaded blowout-proof stem, virgin PTFE seats, thrust washer, adjustable stem packing gland, stem packing nut, chrome-plated lead free brass ball, copper silicon alloy adapter, and steel handle.
 - .3 Complete with stem extension kits and locking handle kits.
 - .4 CSA, UL and FM approved. NSF 61 certified.
 - .5 4,137 kPa (600 psi) cold working pressure.
 - .3 Stainless steel pipe, valves and fittings (outside piping, booster pump packaged system piping):
 - .1 Type 304, schedule 40 stainless steel.
 - .2 Stainless steel pipe conforming to ASME B36.19M, "Stainless Steel Pipe," and ASTM A312/A312M, Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes.
 - .3 Stainless steel pipe flanges shall conform to ASME B16.5, Pipe Flanges and Flanged Fittings: NPS ½ through NPS 24 Metric/Inch Standard, and ASTM A182/A182M, Standard Specification for Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service, or

ANSI/AWWA C228, Stainless-Steel Pipe Flanges for Water Service
– Sizes 2 in. through 72 in. (50 mm through 1,800 mm)

- .4 Stainless steel pipe flanges shall be made of a material that matches the grade of the pipe material used.
- .5 Stainless steel threaded fittings shall be schedule 40s or greater conforming to ASTM A182/A182M, “Standard Specification for Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service,” or ASTM A351/A351M, “Standard Specification for Castings, Austenitic, for Pressure-Containing Parts.
- .6 Stainless steel threaded fittings shall be made of a material that matches the grade of the pipe material used.
- .7 Ball valves:
 - .1 Body materials: CF8M stainless steel.
 - .2 Stem materials: 316 stainless steel.
 - .3 Seat materials: RPTFE.
 - .4 Threaded NPT end connections.
 - .5 Full port.
 - .6 6,894 kPa cold working pressure.
 - .7 NSF 61 and 372 certified for use with potable water.

2.2 JOINTS

- .1 Rubber gaskets, elastomeric, full face, hardness of 50 to 70 durometer. Gaskets shall be certified for use in contact with potable water.
- .2 Bolts, nuts, hex head and washers: to ASTM A307, heavy series.
- .3 Solder: 95/5 tin copper alloy lead free for copper pipe.
- .4 Teflon tape: for threaded joints.
- .5 Solvent weld with primer to ASTM F493, certified for use with potable water, suitable for the pressure rating of the piping system. For CPVC to PVC transition joints, use solvent cement and primer specifically suited for this application, as recommended by the manufacturer.

2.3 SILENT CHECK VALVES

- .1 NPS2 and under, screwed:

- .1 Silent operating type that begins to close as the forward flow diminishes and fully closes at zero velocity preventing flow reversal and resultant water hammer.
- .2 Certified to NSF/ANSI 61, Drinking Water System Components – Health Effects, and certified to be Lead-Free in accordance with NSF/ANSI 372.
- .3 Two-piece body with female threaded NPT ends.
- .4 Valve body and disc shall be ASTM B584 copper alloy C87600 lead-free bronze. The seat shall be TFE. The spring shall be Type 316 stainless steel.
- .5 Resilient seal shall be provided on the seat to provide zero leakage at both high and low pressures without overloading or damaging the seal. The seal design shall provide both a metal-to-metal and a metal-to resilient seal.
- .6 1,724 kPa (250 psi) working pressure at 22.8°C (73 F).

PART 3 EXECUTION

3.1 INSTALLATION

- .1 Install in accordance with National Plumbing Code and local authority having jurisdiction.
- .2 Install pipe work in accordance with Section 23 05 15 – Common Installation Requirements for HVAC Pipework and manufacturers' recommendations by certified journeyman supplemented as specified herein.
- .3 Assemble piping using fittings manufactured to ANSI standards.
- .4 Install cold water piping below and away from tempered water piping and hot piping so as to maintain temperature of cold water as low as possible.
- .5 Connect to fixtures and equipment in accordance with manufacturer's written instructions unless otherwise indicated.
- .6 Do not install in vertical shafts.

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 Test pressure: greater of 1 ½ times maximum system operating pressure or 860 kPa (125 psi). Test medium shall be water, not air.
- .2 Measure water pressure at each new emergency plumbing fixture installed as part of this project and submit results to the Owner for review.

3.4 FLUSHING AND CLEANING

- .1 Flush and clean all new work as indicated below.
- .2 Flush entire system for 8 h. Ensure outlets flushed for 2 h. Let stand for 24 h, then draw one sample off longest run. Submit to testing laboratory for bacteriological testing to verify that system is clean to Provincial potable water guidelines. Let system flush for additional 2 h, then draw off another sample for testing. The flushing and cleaning contractor shall prepare and submit a procedure outlining the flushing and cleaning process (including chemical treatments) to the Owner for review and approval.
- .3 Prior to installation of new piping, the existing 50 mm PVC line that is routed from the OSC Annex basement up to the upper floor of the OSC Aquaculture facility (also known as JBARB), the existing 50 mm PVC line that is routed from the OSC Annex basement to CDRF, and the existing 50 mm PVC line routed from CDRF to the upper level of the OSC Aquaculture (JBARB) shall be chemically cleaned and flushed. These lines are being repurposed for use in this current design and shall be flushed and cleaned in their entirety prior to any new piping being connected and installed. The Contractor shall prepare and submit a procedure outlining the flushing and cleaning process (including chemical treatments) to the Owner for review and approval. The existing piping systems shall be forward and backward flushed in their entirety. Flush entire piping runs for a minimum of 24 h (or longer if recommended by the flushing and cleaning contractor). Let stand for 24 h, then draw one sample from each of the existing piping runs. Submit to testing laboratory for bacteriological testing to verify that each piping run is clean to Provincial potable water guidelines. Let piping flush for additional 2 h, then draw off another sample for testing for confirmation clean to Provincial potable water guidelines. The Contractor shall be responsible for providing all equipment (including but not limited to temporary pumps, temporary electrical connections, clean/ potable water, materials etc) and labour as required to complete the flushing and cleaning process.

3.5 PRE-START-UP INSPECTIONS

- .1 Systems to be complete, prior to flushing, testing and start-up.
- .2 Verify that system can be completely drained.
- .3 Ensure that pressure booster systems are operating properly.
- .4 Ensure that air chambers, expansion compensators are installed properly.
- .5 Verify expansion tank is charged to value specified by booster pump controller manufacturer.

3.6 DISINFECTION

- .1 Flush out, disinfect and rinse system to requirements of authority having jurisdiction and approval of Owner.
- .2 Upon completion, provide laboratory test reports on water quality to Owner.
- .3 See also item 3.4 above.

3.7 START-UP

- .1 Timing: Start up after:
 - .1 Pressure tests have been completed.
 - .2 Disinfection procedures have been completed.
 - .3 Water treatment systems operational.
- .2 Provide continuous supervision during start-up.
- .3 Start-up procedures:
 - .1 Establish circulation and ensure that air is eliminated.
 - .2 Check pressurization to ensure proper operation and to prevent water hammer, flashing and/or cavitation.
 - .3 Bring tempered water storage tank up to design temperature slowly.
 - .4 Monitor tempered water piping systems for freedom of movement, pipe expansion as designed.
 - .5 Check control, limit, safety devices for normal and safe operation.
- .4 Rectify start-up deficiencies.

3.8 PERFORMANCE VERIFICATION

- .1 Timing:
 - .1 After pressure and leakage tests and disinfection completed, and certificate of completion has been issued by authority having jurisdiction.
- .2 Procedures:
 - .1 Have NEBB or AABC TAB contractor complete the following activities:
 - .1 Verify that the flow rate and pressures at each of the emergency fixtures meet the Design Criteria.
 - .2 Adjust and set tempered water recirculation circuit setters.
 - .3 Verify flow rates and pressures from new booster pump system.
 - .4 Verify and adjust tempering station leaving water setpoint.
 - .5 TAB contractor shall submit report showing findings for Owner's review and approval.
 - .2 Adjust pressure regulating valves while withdrawal is maximum and inlet pressure is minimum.
 - .3 Sterilize tempered water and tempered water recirculation systems for Legionella control.
 - .4 Verify performance of temperature controls.
 - .5 Verify compliance with safety and health requirements.
 - .6 Check for proper operation of every water hammer arrestor installed on this Project. Run each outlet for 10 seconds, then shut off water immediately. If water hammer occurs, replace water hammer arrestor or re-charge air chambers. Repeat for all emergency plumbing fixtures installed per this project.
 - .7 Confirm water quality consistent with supply standards, verifying that no residuals remain as a result of flushing and/or cleaning.
- .3 Reports:
 - .1 In accordance with Section 01 91 13 – Commissioning.
 - .2 Include certificate of water flow and pressure tests conducted on emergency plumbing fixtures, demonstrating adequacy of flow and pressure.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- .1 Section includes:
 - .1 The installation of drainage waste and vent piping – plastic.

1.2 RELATED SECTIONS

- .1 Section 01 35 29.06 - Health and Safety Requirements.
- .2 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .3 Section 22 05 00 – Common Work Results – Mechanical.

1.3 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM D2235, Specification for Solvent Cement for Acrylonitrille-Butadiene-Styrene (ABS) Plastic Pipe and Fittings.
 - .2 ASTM D2564, Specification for Solvent Cements for Poly(Vinyl-Chloride) (PVC) Plastic Piping Systems.
- .2 Canadian Standards Association (CSA)
 - .1 CSA-B1800 Series, ABS Drain, Waste and Vent Pipe and Pipe Fittings.
 - .2 CSA-B181.2, PVC Drain, Waste and Vent Pipe and Pipe Fittings.
 - .3 CSA-B182.1, Plastic Drain and Sewer Pipe and Pipe Fittings.
- .3 Underwriters Laboratory of Canada (ULC)
 - .1 CAN/ULC-S102.2 Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies.

1.4 DELIVERY STORAGE AND DISPOSAL

- .1 Waste Management and Disposal:
 - .1 Separate and recycle waste materials in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

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- .2 Collect and separate for disposal, paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

1.5 SUBMITTALS:

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature and datasheets for piping and adhesives, and include product characteristics, performance criteria, physical size, finish and limitations.

PART 2 PRODUCTS

2.1 PIPING AND FITTINGS

- .1 For aboveground DWV piping for non-combustible construction:
 - .1 Flame spread rating less than 25 and smoke developed classification less than 50.
 - .2 CSA B181.2

2.2 JOINTS

- .1 Solvent weld for PVC: to ASTM D2564.
 - .1 NPS 1 ½ to 6: one step or two step cement, as recommended by the manufacturer.
 - .2 NPS 8 and above: two step cement.
- .2 Solvent weld for ABS: to ASTM D2235.

PART 3 EXECUTION

3.1 INSTALLATION

- .1 In accordance with Section 23 05 15 – Common Installation Requirements for HVAC Pipework and by a certified journeyman.
- .2 Install in accordance with the National Plumbing Code and local authority having jurisdiction.

3.2 TESTING

- .1 Pressure test systems in accordance with National Plumbing Code.
- .2 Hydraulically test to verify grades and freedom from obstructions.

3.3 PERFORMANCE VERIFICATION

- .1 Cleanouts:
 - .1 Ensure accessible and that access doors are correctly located.
 - .2 Open, cover with linseed oil and re-seal.
 - .3 Verify cleanout rods can probe as far as the next cleanout, at least.
- .2 Test to ensure traps are fully and permanently primed.
- .3 Ensure fixtures are properly anchored, connected to system and effectively vented.
- .4 Affix applicable label (storm, sanitary, vent, pump discharge etc.) c/w directional arrows in accordance with Section 23 05 53.01 – Mechanical Identification.
- .5 Provide copies of test reports and include in Commissioning Report / Manual.

END OF SECTION

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PART 1 **GENERAL**

1.1 **RELATED SECTIONS**

- .1 Section 01 74 00 – Cleaning.
- .2 Section 01 74 21 – Construction / Demolition Waste Management and Disposal

1.2 **WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal, paper, plastic, polystyrene, corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .4 Divert unused metal materials from landfill to metal recycling facility approved by Owner.

1.3 **QUALITY ASSURANCE**

- .1 Installers to be certified to journeyperson.

PART 2 **PRODUCTS (NOT USED)**

PART 3 **EXECUTION**

3.1 **CONNECTIONS TO EQUIPMENT**

- .1 In accordance with manufacturer's instructions unless otherwise indicated.
- .2 Use valves and either unions or flanges for isolation and ease of maintenance and assembly.
 - .1 Unions are not required in installations using grooved mechanical couplings (The couplings shall serve as unions).
- .3 Use double swing joints when equipment mounted on vibration isolation and when piping subject to movement.

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3.2 CLEARANCES

- .1 Provide clearance around systems, equipment and components for observation of operation, inspection, servicing, maintenance and as recommended by manufacturer.
- .2 Provide space for disassembly, removal of equipment and components as recommended by manufacturer or as indicated (whichever is greater) without interrupting operation of other system, equipment, components.

3.3 DRAINS

- .1 Install piping with grade in direction of flow except as indicated.
- .2 Install drain valve at low points in piping systems, at equipment and at section isolating valves.
- .3 Pipe each drain valve discharge separately to above floor drain. Discharge to be visible.
- .4 Drain valves: NPS 3/4 gate or globe valves unless indicated otherwise, with hose end male thread, cap and chain.

3.4 AIR VENTS

- .1 Install automatic air vents at high points in piping systems.
- .2 Install isolating valve at each automatic air valve.
- .3 Install drain piping to approved location and terminate where discharge is visible.

3.5 DIELECTRIC WATERWAY FITTINGS AND COUPLINGS

- .1 General: Compatible with system, to suit pressure rating of system.
- .2 Locations: Where dissimilar metals are joined.
- .3 NPS 2 and under: Isolating waterway fittings, unions or bronze valves.
 - .1 Waterway fittings shall be complete with thermoplastic liner.
- .4 Over NPS 2: Isolating waterway fittings and flanges.
 - .1 Waterway fittings shall be complete with thermoplastic liner.

3.6 PIPEWORK INSTALLATION

- .1 Installation by certified journeyman.

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- .2 Screwed fittings jointed with Teflon tape or pipe dope as recommended by manufacturer.
- .3 Protect openings against entry of foreign material.
- .4 Install to isolate equipment and allow removal without interrupting operation of other equipment or systems.
- .5 Assemble piping using fittings manufactured to ANSI standards.
- .6 Saddle type branch fittings may be used on mains if branch line is no larger than half the size of main.
 - .1 Hole saw (or drill) and ream main to maintain full inside diameter of branch line prior to welding saddle.
- .7 Install exposed piping, equipment, rectangular cleanouts and similar items parallel or perpendicular to building lines.
- .8 Install concealed pipework to minimize furring space, maximize headroom, conserve space.
- .9 Slope piping, except where indicated, in direction of flow for positive drainage and venting.
- .10 Install, except where indicated, to permit separate thermal insulation of each pipe.
- .11 Group piping wherever possible and as indicated.
- .12 Ream pipes, remove scale and other foreign material before assembly.
- .13 Use eccentric reducers at pipe size changes to ensure positive drainage and venting.
- .14 Provide for thermal expansion as indicated.
- .15 Valves:
 - .1 Install in accessible locations.
 - .2 Remove interior parts before soldering.
 - .3 Install with stems above horizontal position unless otherwise indicated.
 - .4 Valves accessible for maintenance without removing adjacent piping.
 - .5 Use ball valves at branch take-offs for isolating purposes except where otherwise specified.

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- .16 Check Valves:
 - .1 Install silent check valves on discharge of pumps and in vertical pipes with downward flow and elsewhere as indicated.

3.7 SLEEVES

- .1 General: Install where pipes pass through masonry, concrete structures, fire rated assemblies, and elsewhere as indicated.
- .2 Material: Schedule 40 black steel pipe.
- .3 Construction: Foundation walls and where sleeves extend above finished floors to have annular fins continuously welded on at mid-point.
- .4 Sizes: 6 mm minimum clearance between sleeve and uninsulated pipe or between sleeve and insulation.
- .5 Installation:
 - .1 Concrete, masonry walls, concrete floors on grade: Terminate flush with finished surface.
 - .2 Other floors: Terminate 25 mm above finished floor.
 - .3 Before installation, paint exposed exterior surfaces with heavy application of zinc-rich paint.
- .6 Sealing:
 - .1 Foundation walls and below grade floors: Fire retardant, waterproof non-hardening mastic.
 - .2 Elsewhere: Provide space for firestopping. Maintain fire rating integrity.
 - .3 Sleeves installed for future use: Fill with lime plaster or other easily removable filler.
 - .4 Ensure no contact between copper pipe or tube and sleeve.

3.8 ESCUTCHEONS

- .1 Install on pipes passing through walls, partitions, floors, and ceilings in finished areas.
- .2 Construction: One piece type with set screws. Chrome or nickel plated brass or type 302 stainless steel.
- .3 Sizes: Outside diameter to cover opening or sleeve. Inside diameter to fit around pipe or outside of insulation if so provided.

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3.9 PREPARATION FOR FIRESTOPPING

- .1 Material and installation within annular space between pipes, insulation and adjacent fire separation to manufacturer's written instructions.
- .2 Uninsulated unheated pipes not subject to movement: No special preparation.
- .3 Uninsulated heated pipes subject to movement: Wrap with non-combustible smooth material to permit pipe movement without damaging firestopping material or installation, or install per manufacturer's recommendation as specified within the associated approval.
- .4 Insulated pipes: Ensure integrity of insulation and vapour barriers.

3.10 FLUSHING OUT OF PIPING SYSTEMS

- .1 As specified in Division 22 specifications.
- .2 Before start-up, clean interior of piping systems in accordance with requirements of Section 01 74 00 - Cleaning supplemented as specified in relevant sections of other Divisions.
- .3 Preparatory to acceptance, clean and refurbish equipment and leave in operating condition, including replacement of filters in piping systems.

3.11 PRESSURE TESTING OF EQUIPMENT AND PIPEWORK

- .1 Advise Owner, 48 hours minimum prior to performance of pressure tests.
- .2 Pipework: Test as specified in relevant sections of other sections or Divisions.
- .3 Maintain specified test pressure without loss for four (4) hours minimum unless specified for longer period of time in relevant sections of other Divisions.
- .4 Prior to tests, isolate equipment and other parts which are not designed to withstand test pressure or media.
- .5 Conduct tests in presence of Owner. Work to be carried out in off hours after 5 p.m., weekends or holidays.
- .6 Pay costs for repairs or replacement, retesting, and making good. Owner to determine whether repair or replacement is appropriate.
- .7 Insulate or conceal work only after approval and certification of tests by Owner.

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3.12 EXISTING SYSTEMS

- .1 Connect into existing piping systems at times approved by Owner. Work to be carried out off hours after 5 p.m., weekends or holidays.
- .2 Request written approval ten (10) working days minimum, prior to commencement of work.
- .3 Be responsible for damage to existing plant by this work.
- .4 Ensure daily clean-up of existing areas.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 Materials and installation for thermometers and pressure gauges in piping systems.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures
- .2 Section 01 74 21 – Construction/Demolition Waste Management and Disposal
- .3 Section 23 05 53.01 – Mechanical Identification

1.3 REFERENCES

- .1 American Society of Mechanical Engineers (ASME)
 - .1 ASME B40.100, Pressure Gauges and Gauge Attachments.
 - .2 ASME B40.200, Thermometers, Direct Reading and Remote Reading.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-14.4, Thermometers, Liquid-in-Glass, Self Indicating, Commercial/Industrial Type.
 - .2 CAN/CGSB-14.5, Thermometers, Bimetallic, Self-Indicating, Commercial/Industrial Type.

1.4 SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit shop drawings and product data.
- .3 Submit manufacturer's product data for following items:
 - .1 Pressure Gauges
 - .2 Ball Valves

1.5 HEALTH AND SAFETY

- .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 – Health and Safety Requirements.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .2 Collect, separate and place in designated containers for reuse and recycling, paper, plastic, polystyrene, corrugated cardboard packaging, steel, metal, in accordance with Waste Management Plan.
- .3 Fold up metal banding, flatten and place in designated area for recycling.
- .4 Place materials defined as hazardous or toxic waste in designated containers.
- .5 Ensure emptied containers are sealed, labelled and stored safely for disposal away from children.

PART 2 PRODUCTS

2.1 GENERAL

- .1 Design point to be at mid point of scale or range.
- .2 Ranges: dual imperial and metric.

2.2 PRESSURE GAUGES

- .1 Dial type: 112 mm to ASME B40.100, Grade 2A, stainless steel or phosphor bronze bourdon tube having 0.5% accuracy full scale, 1% accuracy for liquid filled.
- .2 Provide:
 - .1 Snubber for pulsating operation.
 - .2 Gasketed pressure relief back with solid front.
 - .3 Isolation valves as specified in Section 22 11 18.01 – Domestic Water Piping.
 - .4 Liquid filled.
- .3 Any components in contact with potable water shall be certified to NSF 61, lead free and suitable for potable water use.

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 **PRESSURE GAUGES**

- .1 Install in following locations:
 - .1 Suction and discharge of pumps.
 - .2 Upstream and downstream of PRV's.
 - .3 Upstream and downstream of control valves.
 - .4 Outlet of boilers.
 - .5 In other locations as indicated.
- .2 Install isolation (ball) valves as specified in Section 22 11 18.01 – Domestic Water Piping Plastic
- .3 Use extensions where pressure gauges are installed through insulation.

3.3 **NAMEPLATES**

- .1 Install engraved lamicoïd nameplates as specified in Section 23 05 53.01 - Mechanical Identification, identifying medium.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- .1 Section includes:
 - .1 Concrete housekeeping pads, hangers and supports for mechanical piping and equipment.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 21 – Construction/Demolition Waste Management and Disposal

1.3 REFERENCES

- .1 American National Standards Institute/ American Society of Mechanical Engineers (ANSI/ASME)
 - .1 ANSI/ASME B31.1, Power Piping, (SI Edition).
- .2 American Society for Testing and Materials (ASTM)
 - .1 ASTM A125, Specification for Steel Springs, Helical, Heat-Treated.
 - .2 ASTM A307, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - .3 ASTM A563, Specification for Carbon and Alloy Steel Nuts.
- .3 Factory Mutual (FM)
- .4 Health Canada / Workplace Hazardous Materials Information System (WHMIS).
 - .1 Safety Data Sheets (SDS).
- .5 Manufacturer's Standardization Society of the Valves and Fittings Industry (MSS)
 - .1 MSS SP-58, Pipe Hangers and Supports - Materials, Design and Manufacture.
 - .2 ANSI/MSS SP-69, Pipe Hangers and Supports - Selection and Application.
 - .3 MSS SP-89, Pipe Hangers and Supports - Fabrication and Installation Practices.
- .6 Underwriter's Laboratories of Canada (ULC)

1.4 SYSTEM DESCRIPTION

- .1 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 MSS SP58 or ASME B31.1.
 - .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 SP58.
- .2 Performance Requirements
 - .1 Design supports, platforms, hangers, to withstand seismic events for location as per the National Building Code

1.5 SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop drawings: submit drawings stamped and signed for approval by Owner.
- .3 Submit shop drawings and product data for following items:
 - .1 Bases, hangers and supports.
 - .2 Connections to equipment and structure.
 - .3 Structural assemblies.
- .4 Quality assurance submittals: submit following in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .2 Instructions: submit manufacturer's installation instructions.
 - .1 Owner will make available one (1) copy of systems supplier's installation instructions.
- .5 Closeout Submittals:

- .1 Provide maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals

1.6 QUALITY ASSURANCE

- .1 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

- .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.
 - .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Waste Management and Disposal:
 - .1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

PART 2 PRODUCTS

2.1 GENERAL

- .1 Fabricate hangers, supports and sway braces in accordance with ANSI B31.1 and MSS SP-58 and SP-89.
- .2 Use components for intended design purpose only. Do not use for rigging or erection purposes.

2.2 OUTDOOR APPLICATIONS

- .1 All exterior components shall be 316 stainless steel.

2.3 PIPE HANGERS

- .1 Finishes:
 - .1 Pipe hangers and supports: galvanized painted with zinc-rich paint after manufacture.
 - .2 Use electro-plating galvanizing process or hot dipped galvanizing process.
 - .3 Ensure steel hangers in contact with copper piping are copper plated or epoxy coated.

- .2 Upper attachment structural: Suspension from lower flange of I-Beam.
 - .1 Cold piping NPS 2 maximum: malleable iron C-clamp with hardened steel cup point setscrew, locknut and carbon steel retaining clip.
 - .1 Rod: 9 mm UL listed, 13 mm FM approved.
 - .2 Cold piping NPS 2 1/2 or greater, 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 where required to MSS-SP58 and MSS-SP69.
- .3 Upper attachment structural: Suspension from upper flange of I-Beam.
 - .1 Cold piping NPS 2 maximum: Ductile iron top-of-beam C-clamp with hardened steel cup point setscrew, locknut and carbon steel retaining clip, UL listed FM approved where required to MSS SP69.
 - .2 Cold piping NPS 2 1/2 or greater, all hot piping: Malleable iron top-of-beam jaw-clamp with hooked rod, spring washer, plain washer and nut UL listed, FM approved where required.
- .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 minimum greater than rod diameter.
 - .2 Concrete inserts: wedge shaped body with knockout protector plate UL listed FM approved where required to MSS SP-69.
- .5 Shop and field-fabricated assemblies.
 - .1 Trapeze hanger assemblies: MSS SP-89.
 - .2 Steel brackets: MSS SP-89.
 - .3 Sway braces for seismic restraint systems: to MSS SP-89.
- .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.
 - .3 Do not use 22 mm or 28 mm rod.
- .7 Pipe attachments: material to MSS SP-58.
 - .1 Attachments for steel piping: carbon steel galvanized.
 - .2 Attachments for copper piping: copper plated black steel.
 - .3 Use insulation saddles for hot pipework.
 - .4 Oversize pipe hangers and supports for insulated pipes.

- .8 Adjustable clevis: material to MSS SP-69, UL listed FM approved, where required clevis bolt with nipple spacer and vertical adjustment nuts above and below clevis.
 - .1 Ensure "U" has hole in bottom for rivetting to insulation shields.
- .9 Yoke style pipe roll: carbon steel yoke, rod and nuts with cast iron roll, to MSS SP-69.
- .10 U-bolts: carbon steel to MSS SP-69 with 2 nuts at each end to ASTM A563.
 - .1 Finishes for steel pipework: galvanized.
 - .2 Finishes for copper, glass, brass or aluminum pipework: black with formed portion plastic coated or epoxy coated.
- .11 Pipe rollers: cast iron roll and roll stand with carbon steel rod to MSS SP-69.

2.4 RISER CLAMPS

- .1 Steel, cast iron, plastic pipe: galvanized black carbon steel to MSS SP-58, type 42, UL listed FM approved where required.
- .2 Copper pipe: carbon steel copper plated to MSS SP-58, type 42.
- .3 Bolts: to ASTM A307.
- .4 Nuts: to ASTM A563.

2.5 INSULATION PROTECTION SHIELDS

- .1 Insulated cold piping:
 - .1 64 kg/m³ density insulation plus insulation protection shield to: MSS SP-69, galvanized sheet carbon steel. Length designed for maximum 3.0 m span.
- .2 Insulated tempered piping:
 - .1 Curved plate 300 mm long, with edges turned up, welded-in centre plate for pipe sizes NPS 12 and over, carbon steel to comply with MSS SP-69.

2.6 EQUIPMENT SUPPORTS

- .1 Fabricate equipment supports not provided by equipment manufacturer from structural grade steel. Submit calculations with shop drawings.

2.7 EQUIPMENT ANCHOR BOLTS AND TEMPLATES

- .1 Provide templates to ensure accurate location of anchor bolts.

2.8 HOUSE-KEEPING PADS

For base-mounted equipment: 30 MPa concrete, at least 100 mm high, 50 mm larger all around than equipment, and with chamfered edges.

2.9 OTHER EQUIPMENT SUPPORTS

- .1 From structural grade steel (hot dipped galvanized for indoor applications, 316 stainless steel for outdoor applications).
- .2 Submit structural calculations with shop drawings.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 INSTALLATION

- .1 Install in accordance with:
 - .1 Manufacturer's instructions and recommendations.
- .2 Vibration Control Devices:
 - .1 Install on piping systems at pumps and 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, one at each corner.
- .5 PVC and CPVC piping will be used in this project. Hang and support piping in accordance with piping manufacturer's recommendations.

- .6 Provide supplementary structural steelwork where structural bearings do not exist or where concrete inserts are not in correct locations.

3.3 HANGER SPACING

- .1 Plumbing piping: most stringent requirements of the National Plumbing Code. PVC and CPVC piping shall have hangers spaced at no further than 1 m apart, unless closer hanger spacing is recommended by piping manufacturer. The most stringent requirement shall apply.
- .2 Copper piping: up to NPS 1/2: every 1.5 m.
- .3 Hydronic, steam, condensate, rigid, and flexible joint roll groove pipe: in accordance with table below, but not less than one hanger at joints.

Maximum Pipe Size: NPS	Maximum Spacing: Steel	Maximum Spacing: Copper
up to 1-1/4	2.1 m	1.8 m
1-1/2	2.7 m	2.4 m
2	3.0 m	2.7 m
2-1/2	3.6 m	3.0 m
3	3.6 m	3.0 m
3-1/2	3.9 m	3.3 m
4	4.2 m	3.6 m
5	4.8 m	
6	5.1 m	
8	5.7 m	
10	6.6 m	
12	6.9 m	

- .4 Within 300 mm of each elbow.
- .5 Pipework greater than NPS 12: to MSS SP69.

3.4 HANGER INSTALLATION

- .1 Plumbing piping: in accordance with the National Plumbing Code.
- .2 Install hanger so that rod is vertical under operating conditions.
- .3 Adjust hangers to equalize load.
- .4 Support from structural members. Where structural bearing does not exist or inserts are not in suitable locations, provide supplementary structural steel members, comprised of angel iron or c-channel.

3.5 HORIZONTAL MOVEMENT

- .1 Angularity of rod hanger resulting from horizontal movement of pipework from cold to hot position not to exceed 4 degrees from vertical.
- .2 Where horizontal pipe movement is less than 13 mm, offset pipe hanger and support so that rod hanger is vertical in the hot position.

3.6 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 SUMMARY

- .1 Section Includes:
 - .1 Materials and requirements for the identification of piping systems, valves and controllers, including the installation and location of identification systems.
 - .2 Sustainable requirements for construction and verification.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 21 – Construction/Demolition Waste Management and Disposal

1.3 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-24.3, Identification of Piping Systems.

1.4 SUBMITTALS

- .1 Product Data:
 - .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Product data to include paint colour chips, other products specified in this section.
 - .3 Samples:
 - .1 Submit samples in accordance with Section 01 33 00 – Submittal Procedures.
 - .2 Samples to include nameplates, labels, tags, lists of proposed legends.

1.5 QUALITY ASSURANCE

- .1 Quality assurance submittals: submit following in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 – Health and Safety Requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store and handle in accordance with Section 01 61 00 – Common Product Requirements.
 - .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Waste Management and Disposal:
 - .1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .2 Dispose of unused paint coating material at official hazardous material collections site approved by Owner.
 - .3 Do not dispose of unused paint coating material into sewer system, into streams, lakes, onto ground or in locations where it will pose health or environmental hazard.

PART 2 PRODUCTS

2.1 MANUFACTURER'S EQUIPMENT NAMEPLATES

- .1 Metal or plastic laminate 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 thick laminated plastic or white anodized aluminum, matte finish, with square corners, letters accurately aligned and machine engraved into core.

.3 Sizes:

.1 Conform to following table:

Size # mm	Sizes (mm)	No. of Lines	Height of Letters (mm)
1	10 x 50	1	3
2	13 x 75	1	5
3	13 x 75	2	3
4	20 x 100	1	8
5	20 x 100	2	5
6	20 x 200	1	8
7	25 x 125	1	12
8	25 x 125	2	8
9	35 x 200	1	20

.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.

2.3 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 Owner.

2.4 PIPING SYSTEMS GOVERNED BY CODES

.1 Identification:

.1 Natural gas: to CSA/CGA B149.1, authority having jurisdiction.

.2 Propane gas: to CSA/CGA B149.1 authority having jurisdiction.

.3 Sprinklers: to NFPA 13.

.4 Standpipe and hose systems: to NFPA 14.

.5 Medical Gas: to CAN/CSA Z7396.1.

2.5 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 Pictograms:
 - .1 Where required, to Workplace Hazardous Materials Information System (WHMIS) regulations.
- .3 Legend:
 - .1 Block capitals to sizes and colours listed in CAN/CGSB 24.3.
- .4 Arrows showing direction of flow:
 - .1 Outside diameter of pipe or insulation less than 75 mm: 100 mm long x 50 mm high.
 - .2 Outside diameter of pipe or insulation 75 mm and greater: 150 mm long x 50 mm high.
 - .3 Use double-headed arrows where flow is reversible.
- .5 Extent of background colour marking:
 - .1 To full circumference of pipe or insulation.
 - .2 Length to accommodate pictogram, full length of legend and arrows.
- .6 Materials for background colour marking, legend, arrows:
 - .1 Pipes and tubing 20 mm and smaller: Waterproof and heat-resistant pressure sensitive plastic marker tags.
 - .2 All other pipes: Pressure sensitive plastic-coated cloth or vinyl with protective overcoating, waterproof contact adhesive undercoating, suitable for ambient of 100%RH and continuous operating temperature of 150°C and intermittent temperature of 200°C.
- .7 Colours and Legends:
 - .1 Where not listed, obtain direction from Owner.
 - .2 Colours for legends, arrows, to following table:

Background colour	Legend, arrows
Yellow	BLACK
Green	WHITE
Red	WHITE

- .3 Background colour marking and legends for piping systems:

Contents	Background colour marking	Legend
Tempered water	Green	TEMP WATER
Tempered water recirculation	Green	TEMP WATER RECIRC

Contents	Background colour marking	Legend
Potable Cold Water	Green	POTABLE COLD WATER
Sanitary	Green	SAN

2.6 REPURPOSED PIPING

- .1 Provide new identification on existing piping that is being repurposed per this project.

2.7 VALVES, CONTROLLERS

- .1 Brass tags 12 mm diameter with 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.

2.8 CONTROLS COMPONENTS IDENTIFICATION

- .1 Identify all systems, equipment, components, controls, sensors with system nameplates
- .2 Inscriptions to include function and (where appropriate) fail-safe position, component ID name.

2.9 LANGUAGE

- .1 Identification to be in English.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 TIMING

- .1 Provide identification only after all painting has been completed.

3.3 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.

3.4 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.

3.5 LOCATION OF IDENTIFICATION ON PIPING SYSTEMS

- .1 On long straight runs in open areas in boiler rooms, equipment rooms, galleries, tunnels: At not more than 17 m 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 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, confined spaces, at entry and exit points, and at access openings.
- .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.

3.6 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 Owner. Provide one copy (reduced in size if required) in each operating and maintenance manual.
- .3 Number valves in each system consecutively.

3.7 CLEANING

- .1 Proceed in accordance with Section 01 74 00 – Cleaning.
- .2 Upon completion and verification of performance of installation, remove surplus materials, rubbish, tools and equipment.

END OF SECTION

PART 1 **GENERAL**

1.1 **GENERAL**

- .1 This Section covers items common to Sections of Division 26. This section supplements requirements of Division 1 and Division 23.

1.2 **REFERENCES**

- .1 Codes and standards referenced in this section refer to the latest edition thereof.
- .2 Canadian Standards Association (CSA)
 - .1 CSA C22.1, Canadian Electrical Code, Part 1, Safety Standard for Electrical Installations.
 - .2 CAN3-C235, Preferred Voltage Levels for AC Systems, 0 to 50,000V.
 - .3 CSA Z462, Workplace electrical safety.

1.3 **CARE, OPERATION AND START-UP**

- .1 Instruct Owner's Representative and operating personnel in the operation, care and maintenance of systems, system equipment and components.
- .2 Operating instructions to include following:
 - .1 Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.
 - .2 Start up, proper adjustment, operating, lubrication, and shutdown procedures.
 - .3 Safety precautions.
 - .4 Procedures to be followed in event of equipment failure.
 - .5 Other items of instruction as recommended by manufacturer of each system or item of equipment.
- .3 Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance, and calibrate components and instruct operating personnel.
- .4 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.

1.4 **DESIGN REQUIREMENTS**

- .1 Operating voltages: to CAN3-C235
- .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.

1.5 SUBMITTALS

- .1 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure coordinated installation.
- .2 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
- .3 Indicate of drawings clearances for operation, maintenance, and replacement of operating equipment devices.
- .4 Quality Control: in accordance with Section 01 45 00 - Quality Control.
 - .1 Provide CSA certified equipment and material. Where CSA certified equipment and material is not available, submit such equipment and material to authority having jurisdiction for approval before delivery to site.
 - .2 Submit test results of installed electrical systems and instrumentation.
 - .3 Submit, upon completion of Work, load balance report as described in PART 3 - LOAD BALANCE.
 - .4 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Owner's Representative.
- .5 Manufacturer's Field Reports: submit to Owner's Representative within 7 days of review, verifying compliance of Work and electrical system and instrumentation testing, as described in PART 3 - FIELD QUALITY CONTROL.
- .6 All submittals shall be in standard electronic PDF format.
- .7 Shop drawings:
 - .1 Indicate details of construction, dimensions, capacities, weights and electrical performance characteristics of equipment or materials.
 - .2 Where applicable, indicate wiring, single line and schematic diagrams.
 - .3 Include wiring drawings or diagrams showing interconnection with work of other sections.
 - .4 Each shop drawing will be stamped and signed by the Contractor before submitting, stating that he has checked the drawings against the requirements as called for in the Contract Documents and also in the case where the equipment is attached to or connects to other equipment, that is has been properly coordinated with this equipment, whether supplied under Division 26 or under other Divisions.
 - .5 Each shop drawing for non-catalogue items shall be prepared specifically for this project. If brochures are submitted for catalogue items, the brochures shall be marked deficiently indicating the item or items to be supplied.
 - .6 Work shall not be proceeded with on any of the equipment until final review of shop drawings received by the Contractor.
 - .7 Note: Shop drawing review is for general compliance with Contract Documents. No responsibility is assumed by the Owners Representative

for correctness of dimensions or details. Corrections or comments, or lack thereof, made on the shop drawings during the Owners Representative's review does not relieve the Contractor from compliance with the requirements of the drawings and specifications.

- .8 If changes are required, notify Owners Representative of these changes before they are made.

.8 **Operation and Maintenance Data:**

- .1 Provide operation and maintenance data for incorporation into operation and maintenance manuals.
- .2 Include in operations and maintenance data:
 - .1 Details of design elements, construction features, component function and maintenance requirements to permit effective start-up operation, maintenance, repair, modification, extension and expansion of any portion or feature of installation.
 - .2 Technical data, product data, supplemented by bulletins, exploded views, technical description of items and part lists. Advertising or sales literature not acceptable.
 - .3 Wiring and schematic diagrams and performance curves.
 - .4 Names and addresses of local suppliers for items included in maintenance manuals.
 - .5 Copy of reviewed shop drawings.
- .3 As-Built Drawings – Submit in accordance with Division 01.

1.6 PERMITS, FEES AND INSPECTION

- .1 Submit to Electrical Inspection Division and Supply Authority necessary number of drawings and specifications for examination and approval prior to commencement of work.
- .2 Pay associated fees.
- .3 Owner's Representative will provide drawings and specifications required by Electrical Inspection Division and Supply Authority at no cost.
- .4 Notify Owner's Representative of changes required by Electrical Inspection Division prior to making changes.
- .5 Furnish Certificates of Acceptance from Electrical Inspection Division or authorities having jurisdiction on completion of work to Owner's Representative.

1.7 CO-ORDINATION

- .1 Co-ordinate work with work of other divisions to avoid conflict.
- .2 Locate distribution systems, equipment, and materials to provide minimum interference and maximum usable space.

- .3 Locate all existing underground services and make all parties aware of their existence and location.
- .4 Where interference occurs, Owner's Representative must approve relocation of equipment and materials regardless of installation order.
- .5 Notwithstanding the review of shop drawings, this division may be required to relocate electrical equipment which interferes with the equipment of other trades, due to lack of co-ordination by this Division. The cost of this relocation shall be the responsibility of this Division. The Owner's Representative shall decide the extent of relocation required.

1.8 CUTTING AND PATCHING

- .1 Inform all other divisions in time, concerning required openings. Where this requirement is not met, bear the cost of all cutting. Openings of 200 mm or smaller shall be the responsibility of Division 26. Openings larger than 200 mm shall be the responsibility of Division 1. Obtain written approval of Structural engineer before drilling any beams or floors.

1.9 PROTECTION

- .1 Protect exposed live equipment during construction for personnel safety.
- .2 Shield and mark all live parts "LIVE 600 VOLTS", or with appropriate voltage in English.
- .3 Arrange for installation of temporary doors for rooms containing electrical distribution equipment. Keep these doors locked except when under direct supervision of electrician.

1.10 AS-BUILT DRAWINGS

- .1 Obtain and pay for three sets of white prints. As the job progresses, mark these prints to accurately indicate installed work. Always have the white prints available for inspection at the site and present for scrutiny at each job meeting.
- .2 Show on the as-built drawings the installed inverts of all services entering and leaving the building and the property. Dimension underground services at key points of every run in relation to the structure and building.
- .3 Indicate exact location of all services for future work. Show and dimension all work embedded in the structure.
- .4 Submit as-built drawings within 30 days prior to start of commissioning.

1.11 INSPECTION OF WORK

- .1 The Owner will make periodic visits to the site during construction to ascertain reasonable conformity to plans and specifications but will not execute quality control. The Contractor shall be responsible for the execution of his work in

conformity with the construction documents and with the requirements of the inspection authority.

1.12 SCHEDULING OF WORK

- .1 Work shall be scheduled in phases as per other divisions of the specifications.
- .2 Become familiar with the phasing requirements for the work and comply with these conditions.
- .3 No additional monies will be paid for contractor's requirement to comply with work phasing conditions.

1.13 FIRE RATING OF PENETRATIONS

- .1 This contractor is responsible to maintain fire and smoke ratings around electrical conduits, cables, raceway and, cable trays passing through rated floor, ceiling and wall assemblies.
- .2 Refer to drawings for identification of rated assemblies.
- .3 Acceptable products for fire barrier products shall be 3M #CP25 fire barrier caulk, #303 putty, #FS 195 wrap and #CS195 sheet.
- .4 Acceptable manufacturers: Hilti, Nelson, Fire Stop Systems, 3M or approved equal. Material of same manufacturer to be used throughout project by this contractor.

1.14 EQUIPMENT SUPPORTS AND HOUSEKEEPING PADS

- .1 Equipment supports supplied by equipment manufacturer are specified elsewhere in Division 26.
- .2 Fabricate equipment supports not supplied by equipment manufacturer from structural grade steel meeting requirements of Division 5. Submit structural calculations with shop drawings. Ensure that supports meet the requirements of the National Building Code Section 4.1.9.
- .3 Mount base mounted equipment on chamfered edge housekeeping pads, minimum of 100 mm high and 50 mm larger than equipment dimensions all around.

1.15 ANCHOR BOLTS AND TEMPLATES

- .1 Supply anchor bolts and templates for installation by other divisions.

1.16 ACCESS DOORS

- .1 Supply access doors for concealed electrical equipment to allow operation, inspection, adjusting and servicing.

- .2 Use flush mounted 600 x 600 mm for body entry and 300 x 300 mm for hand entry unless otherwise noted. Doors to open 180, have rounded safety corners, concealed hinges, screwdriver latches and anchor straps.
- .3 Material:
 - .1 Use stainless steel with brushed satin or polished finish in special areas such as tiled or marble surfaces and as directed by Consultant.
 - .2 In remaining areas, use prime coated steel.
 - .3 Use ULC rated access doors in fire rated walls and ceilings.
- .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 manufacturers: Buensod; Le Hage; Zurn.

PART 2 PRODUCTS

2.1 CONTROLS

- .1 Supplier and installer responsibility is indicated on the electrical drawings.

2.2 FINISHES

- .1 All electrical panel boards, switchgear, high voltage cables (outer jacket), busduct, junction box covers, conduit and transformers for this project must be color coded in accordance with the following:

.1	Normal Power 15 kv	TPG Buttercup	Pantone 12-0752
.2	Essential Power 5 kv	Orangeade	Pantone 17-1461
.3	Normal Power 600 v	Iced Aqua	Pantone 13-5410
.4	Essential Power 600 v	TPG Barrier Reef	Pantone 17-4530
.5	Normal Power 208 v	TPG Beachnut	Pantone 14-0425
.6	Essential Power 208 v	TPG Avocado	Pantone 18-0430
- .2 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two (2) coats of finish enamel.
 - .1 Transfer switches to be painted Essential 600 V or Essential 208V as required.
 - .2 Transformers to be painted to match primary voltage color.
 - .3 Paint outdoor electrical equipment "equipment green" finish to EEMAC Y1-1.

2.3 MATERIALS AND EQUIPMENT

- .1 Provide materials and equipment in accordance with Section 01 61 00 - Common Product Requirements.

- .2 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 Inspection Division.
- .3 Factory assemble control panels and component assemblies.

2.4 WARNING SIGNS

- .1 As specified and to meet requirements of Electrical Inspection Department and Owner’s Representative.
- .2 Porcelain enamel decal signs, minimum size 175 x 250 mm.
- .3 Install adhesive backed polyester arc flash warning labels on all major electrical components including switchgear, panelboards, disconnects, splitters and switches.

2.5 WIRING TERMINATIONS

- .1 Lugs, terminals, screws used for termination of wiring to be suitable for either copper or aluminum conductors.

2.6 EQUIPMENT IDENTIFICATION

- .1 Identify electrical equipment with nameplates and labels as follows:
 - .1 Nameplates: Lamicoïd 3 mm thick plastic engraving sheet, black white face, black white core, mechanically attached with self tapping screws.
 - .2 Sizes as follows:

NAMEPLATE SIZES

Size 1	10 x 50 mm	1 line	3 mm high letters
Size 2	12 x 70 mm	1 line	5 mm high letters
Size 3	12 x 70 mm	2 lines	3 mm high letters
Size 4	20 x 90 mm	1 line	8 mm high letters
Size 5	20 x 90 mm	2 lines	5 mm high letters
Size 6	25 x 100 mm	1 line	12 mm high letters
Size 7	25 x 100 mm	2 lines	6 mm high letters

- .2 Labels:
 - .1 Embossed plastic labels with 6 mm high letters unless specified otherwise.
- .3 Wording on nameplates and labels to be approved by Owner’s Representative prior to manufacture.
- .4 Allow for average of twenty-five (25) letters per nameplate and label.
- .5 Identification to be English.

- .6 Nameplates for terminal cabinets and junction boxes to indicate system name and voltage characteristics.
- .7 Disconnects, starters and contactors: indicate equipment being controlled and voltage.
- .8 Terminal cabinets and pull boxes: indicate system name and voltage.
- .9 Transformers: indicate capacity, primary and secondary voltages, and transformer number.
- .10 All equipment nameplates to include client issued equipment identification numbers. Numbers to be as indicated on the drawings or otherwise as provided by the Owner's Representative during construction. Contractor to confirm all equipment ID tags prior to nameplate manufacturing.

2.7 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, Canadian Electrical Code.
- .4 Use colour coded wires in communication cables, matched throughout system.

2.8 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 intervals.
- .3 Refer to 2.2 – Finishes for line voltage systems color coding.

2.9 MATERIAL SPECIFIED

- .1 Where additional manufacturers are named under Articles entitled "Approved Manufacturers", the selection of a named manufacturer, in reference to a particular article, shall be the Contractor's responsibility.
- .2 Materials or products specified without the clauses "or approved equal" or "approved manufacturers" shall be supplied as specified and no proposed substitution will be considered.
- .3 Where approvals are granted for the use of other equipment all changes or additions required for the installation or operation of the approved equipment will be made by the Contractor at their own expense and no claims will be approved for any such changes, notwithstanding approval of shop drawings. Equipment

that is accepted and installed and then does not perform as represented by original submitted data shall be replaced by the Contractor with equipment as specified at no charge to the Owner.

- .4 Trade names are given as a standard of quality and configuration.

2.10 EXAMINATION OF OTHER WORK

- .1 This Division requires the examination of the material and work for all other Divisions under which the work of this Section depends for proper completion. Any defect in work, levels or materials shall be reported to the Engineer. The work of this Division shall not commence until such defects have been corrected. This also applied to existing work installed under other Contracts.

2.11 CUTTING PATCHING SLEEVES AND PLATES

- .1 All drilling for hangers, rod, inserts and work of similar nature shall be done by Division 26.
- .2 Have sleeves installed in foundation walls to accommodate the work of this Division. Seal the space between the sleeve and conduit by packing with oakum and sealing with mastic to form a waterproof seal.

2.12 HANGERS

- .1 All equipment provided under the Electrical Division shall be complete with all necessary supports and hangers required for a safe and workmanlike installation and to avoid strain on conduit, etc. Auxiliary supports where required shall be provided under this Division.
- .2 Hammer driven hanger supports, e.g. staples, nails, etc. will not be used.
- .3 Expansion bolts, inserted after concrete has been poured are acceptable.
- .4 Paint all hangers, e.g., U-bolts, trapeze hangers, etc. BEFORE INSTALLATION.
- .5 Wire is not an acceptable conduit support.

2.13 TESTING, ACCEPTANCE AND GUARANTEE

- .1 The work of this Contract shall be tested and installed and any defects in operation shall be remedied immediately. Tests required by local authorities shall be the responsibility of the Contractor. When the work is completed, it shall be tested in its entirety and shall be in good working order before the Owner's Certificate of Acceptance shall be issued.
- .2 A written guarantee shall be supplied to the Owner by the Contractor covering the prompt making good of all defects in material and workmanship for the period of one (1) year from the date of acceptance and the making good of any such defects shall be completely the responsibility of the Contractor.

2.14 ARC FLASH WARNING LABELS

- .1 The contractor shall provide 3.5 in. x 5 in. thermal transfer type labels of high adhesion polyester for equipment added or modified under the contract scope.
- .2 All labels will be based on recommended overcurrent device settings and will be provided for the results of the short circuit analysis by the owner after any system changes, upgrades or modifications have been incorporated.
- .3 The label shall have an orange header with the working: "WARNING: ARC FLASH HAZARD" and shall include the following information, at a minimum:
 - .1 Location designation
 - .2 Nominal voltage
 - .3 Flash protection boundary
 - .4 Hazard risk category
 - .5 Incident energy
 - .6 Working distance
 - .7 Engineering report number, revision number and issue date.
- .4 Labels shall be machine printed, with no field markings.
- .5 Arc flash labels shall be provided in the following manner and all labels shall be based on recommended overcurrent device settings.
 - .1 For each 600, 480 and applicable 208-volt panelboard, one arc flash label shall be provided.
 - .2 For each motor control center, one arc flash label shall be provided.
 - .3 For each low voltage switchboard, one arc flash label shall be provided.
 - .4 For each switchgear cubicle, one flash label shall be provided.
 - .5 For medium voltage switches and breakers, one arc flash label shall be provided.

PART 3 EXECUTION

3.1 NAMEPLATES AND LABELS

- .1 Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.

3.2 CONDUIT AND CABLE INSTALLATION

- .1 Install conduit and sleeves prior to pouring of concrete. Sleeves through concrete: schedule 40 steel pipe, sized for free passage of conduit, and protruding 50 mm.
- .2 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.

- .3 Install cables, conduits, and fittings to be embedded or plastered over, neatly and close to building structure so furring can be kept to minimum.

3.3 MOUNTING HEIGHTS

- .1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.
- .2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.

3.4 CO-ORDINATION OF PROTECTIVE DEVICES

- .1 Ensure circuit protective devices such as overcurrent trips, relays and fuses are installed to required values and settings.

3.5 FIELD QUALITY CONTROL

- .1 All electrical work to be carried out by qualified, licensed electricians or apprentices as per the conditions of the Provincial Act respecting manpower vocational training and qualification. Employees registered in a provincial apprentice's program shall be permitted, under the direct supervision of a qualified licensed electrician, to perform specific tasks – the activities permitted shall be determined based on the level of training attained and the demonstration of ability to perform specific duties.
- .2 The work of this division to be carried out by a contractor who holds a valid Code 1 Electrical Contractor License as issued by the province.
- .3 Perform tests in Accordance with this section as noted and Section 01 91 13 – Commissioning.
- .4 Load Balance:
 - .1 Measure phase current to panelboard 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, operating under normal load. State hour and date on which each load was measured, and voltage at time of test.
- .5 Conduct and pay for following tests:
 - .1 Circuits originating from branch distribution panels.
 - .2 Motors, heaters, and associated control equipment including sequenced operations of systems where applicable.

- .6 Furnish manufacturer's certificate or letter confirming that entire installation as it pertains to each system has been installed to manufacturer's instructions.
- .7 Insulation resistance testing.
 - .1 Megger and record circuits, feeders, and equipment up to 350 V with a 500 V instrument.
 - .2 Megger and record 350-600 V circuits, feeders, and equipment with a 1000 V instrument.
 - .3 Check resistance to ground before energizing and record value.
- .8 Provide instruments, meters, equipment, and personnel required to conduct tests during and conclusion of project.
- .9 Submit test results for Owner's Representative's review and include in Commissioning Manuals specified in Section 01 91 13 – Commissioning.

3.6 CLEANING

- .1 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.
- .2 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

END OF SECTION

PART 1 **GENERAL**

1.1 **SECTION INCLUDES**

- .1 Materials and installation for wire and box connectors.

1.2 **REFERENCES**

- .1 Codes and standards referenced in this section refer to the latest edition thereof.
- .2 Canadian Standards Association (CSA)
 - .1 CAN/CSA-C22.2 No.18, Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware.
 - .2 CSA C22.2 No.65, Wire Connectors.
- .3 Electrical and Electronic Manufacturers' Association of Canada (EEMAC):
 - .1 EEMAC 1Y-2, Bushing Stud Connectors and Aluminum Adapters (1200 Ampere Maximum Rating).
- .4 National Electrical Manufacturers Association (NEMA)

PART 2 **PRODUCTS**

2.1 **MATERIALS**

- .1 Pressure type wire connectors to: CSA C22.2 No.65, with current carrying parts of copper sized to fit copper conductors as required.
- .2 Fixture type splicing connectors to: CSA C22.2 No.65, with current carrying parts of copper sized to fit copper conductors 10 AWG or less.
- .3 Bushing stud connectors: to EEMAC 1Y-2 to consist of:
 - .1 Connector body and stud clamp for stranded copper conductors.
 - .2 Clamp for copper bar.
 - .3 Stud clamp bolts.
 - .4 Bolts for copper bar.
 - .5 Sized for conductors and bars as indicated.
- .4 Clamps or connectors for armoured cable, flexible conduit as required to: CAN/CSA-C22.2 No.18.

PART 3 **EXECUTION**

3.1 **INSTALLATION**

- .1 Remove insulation carefully from ends of conductors and:

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- .1 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.
- .2 Install fixture type connectors and tighten. Replace insulating cap.
- .3 Install bushing stud connectors in accordance with EEMAC 1Y-2.

END OF SECTION

PART 1 **GENERAL**

1.1 **RELATED SECTIONS**

- .1 Refer to drawings for wiring type required under different applications.

1.2 **REFERENCES**

- .1 Codes and standards referenced in this section refer to the latest edition thereof.
- .2 Canadian Standards Association (CSA)
 - .1 CSA C22.2 No .0.3, Test Methods for Electrical Wires and Cables.
 - .2 CAN/CSA-C22.2 No. 131, Type TECK 90 Cable.

PART 2 **PRODUCTS**

2.1 **BUILDING WIRES**

- .1 Conductors: stranded for 10 AWG and larger. Minimum size: 12 AWG.
- .2 Copper and ACM alloy conductors: size as indicated, with 600 V insulation of cross-linked thermosetting polyethylene material rated RW90 XLPE and RWU90 XLPE as indicated. Provide RWU90 XLPE rated cable for underground wiring. RWU90 XLPE not required under interior floor slabs.
- .3 Copper conductors: size as indicated, with thermoplastic insulation type TWH rated at 600 V, typically used for insulated ground wires.
- .4 Type ACM conductors permitted for feeders above 60 amps.

2.2 **TECK CABLE**

- .1 Cable: to CAN/CSA-C22.2 No. 131.
- .2 Conductors:
 - .1 Grounding conductor: copper.
 - .2 Circuit conductors: copper or ACM alloy, size as indicated.
- .3 Insulation:
 - .1 Type: ethylene propylene rubber.
 - .2 Chemically cross-linked thermosetting polyethylene rated type RW90, 600 V.
- .4 Inner jacket: polyvinyl chloride material.
- .5 Armour: interlocking.

- .6 Overall covering: thermoplastic polyvinyl chloride material.
- .7 Fastenings:
 - .1 One hole steel straps to secure surface cables 50 mm and smaller. Two hole steel straps for cables larger than 50 mm.
 - .2 Channel type supports for two or more cables at 1500 mm centers.
 - .3 Threaded rods: 6 mm dia. to support suspended channels.
- .8 Connectors:
 - .1 Watertight and/or type approved for TECK cable.

2.3 ARMoured CABLES

- .1 Conductors: insulated, copper, size as indicated.
- .2 Type: AC90.
- .3 Armour: interlocking type fabricated from aluminum strip.
- .4 Connectors: standard as required, complete with double split rings.

2.4 CONTROL CABLES

- .1 Type LVT: 2 soft annealed copper conductors, sized as indicated, with thermoplastic insulation, outer covering of thermoplastic jacket. Low energy 300 V control cable: stranded annealed copper conductors sized as indicated, with PVC insulation type TW -40C polyethylene insulation with shielding of tape coated with paramagnetic material wire braid over each conductor and overall covering of PVC jacket.
- .2 Twisted Shielded Cable (Non-Plenum Rated): Single twisted pair 18/2 polyethylene insulation copper conductors, aluminum foil shield, tinned copper drain wire. Outer PVC jacket. Non plenum rated. Standard of Acceptance: Belden 8760.
- .3 Twisted Shielded Cable (Plenum Rated): Single twisted pair 18/2 Teflon insulated conductors, aluminum foil shield, tinned copper drain wire. Outer Teflon jacket. Classified for use in air plenums. Standard of Acceptance: Belden 88760.

PART 3 EXECUTION

3.1 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Requirements - Electrical.
- .2 Perform tests using method appropriate to site conditions and to approval of Owner's Representative and local authority having jurisdiction over installation.

- .3 Perform tests before energizing electrical system.

3.2 GENERAL CABLE INSTALLATION

- .1 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors - (0-1000 V).
- .2 Cable Color Coding: to Section 26 05 00 Common Work Requirements - Electrical.
- .3 Wiring in walls: typically drop or loop vertically from above to better facilitate future renovations. Generally wiring from below and horizontal wiring in walls to be avoided unless indicated.
- .4 Provide numbered wire collars for control wiring. Numbers to correspond to control shop drawing legend. Obtain wiring diagram for control wiring.

3.3 INSTALLATION OF BUILDING WIRES

- .1 Install wiring as follows:
 - .1 In conduit systems in accordance with Section 26 05 34- Conduits, Fastenings and Fittings.

3.4 INSTALLATION OF TECK CABLE 0 -1000 V

- .1 Install cables.
 - .1 Group cables wherever possible on channels.
 - .2 Use permitted only as specifically indicated on electrical drawings.
- .2 Terminate cables in accordance with Section 26 05 20- Wire and Box Connectors - 0 - 1000 V.

3.5 INSTALLATION OF ARMOURED CABLES (AC-90)

- .1 Group cables wherever possible.
- .2 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors - 0 - 1000 V.
- .3 Use permitted only for vertical power supply drops to lighting fixtures.

3.6 INSTALLATION OF CONTROL CABLES

- .1 Install control cables in conduit as indicated.
- .2 Ground control cable shield.

END OF SECTION

PART 1 **GENERAL**

1.1 **RELATED SECTIONS**

- .1 Grounding conductors for all distribution grounding to be insulated copper.

1.2 **REFERENCES**

- .1 Codes and standards referenced in this section refer to the latest edition thereof.
- .2 American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE)
 - .1 ANSI/IEEE 837, Qualifying Permanent Connections Used in Substation Grounding.

PART 2 **PRODUCTS**

2.1 **EQUIPMENT**

- .1 Grounding conductors: bare stranded copper, soft annealed, size as indicated.
- .2 Insulated grounding conductors: green, type TW.
- .3 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including but not necessarily limited to:
 - .1 Grounding and bonding bushings.
 - .2 Protective type clamps.
 - .3 Bolted type conductor connectors, as required by local authority having jurisdiction.
 - .4 Bonding jumpers, straps.
 - .5 Pressure wire connectors.
 - .6 Compression type connectors.

PART 3 **EXECUTION**

3.1 **INSTALLATION GENERAL**

- .1 Install complete permanent, continuous grounding and bonding system including, electrodes, conductors, connectors, accessories. Where EMT is used, run insulated copper ground wire in conduit.
- .2 Install connectors in accordance with manufacturer's instructions.
- .3 Protect exposed grounding conductors from mechanical injury.
- .4 Use mechanical connectors for bonding connections to equipment provided with lugs.

- .5 Soldered joints not permitted.
- .6 Where not installed within the conduit, install bonding wire for flexible conduit, connected at both ends to grounding bushing, solderless lug, clamp or cup washer and screw. Neatly cleat bonding wire to exterior of flexible conduit.
- .7 Make bonding connections in radial configuration only, with connections terminating at single grounding point. Avoid loop connections.
- .8 All conduits containing bonding or grounding conductors which terminate above the electrical room ground bus to be equipped with bonding jumpers.

3.2 EQUIPMENT BONDING

- .1 Install bonding connections to typical equipment included in, but not necessarily limited to following list: transformers, frames of motors, starters, control panels.

3.3 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 – Common Work Requirements - Electrical and Section 01 19 13 – Commissioning.
- .2 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of Owner’s Representative and local authority having jurisdiction over installation.
- .3 Perform tests before energizing electrical system.
- .4 Disconnect ground fault indicator during tests.

END OF SECTION

PART 1 **GENERAL (NOT APPLICABLE)**

PART 2 **PRODUCTS**

2.1 **SUPPORT CHANNELS**

- .1 U shape, size 41 x 41 mm, 2.5 mm thick, surface mounted suspended or set in poured concrete walls and ceilings as required.
- .2 Refer to Section 33 65 73 - Concrete Encased Duct Banks and Manholes for required support channels located in manholes.

PART 3 **EXECUTION**

3.1 **INSTALLATION**

- .1 Secure equipment to hollow or solid masonry, tile and plaster surfaces with lead anchors or nylon shields.
- .2 Secure equipment to poured concrete with expandable inserts.
- .3 Secure equipment to hollow masonry walls or suspended ceilings with toggle bolts.
- .4 Secure surface mounted equipment with twist clip fasteners to inverted T bar ceilings. Ensure that T bars are adequately supported to carry weight of equipment specified before installation.
- .5 Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.
- .6 Fasten exposed conduit or cables to building construction or support system using straps.
 - .1 One-hole steel straps to secure surface conduits and cables 50 mm and smaller.
 - .2 Two-hole steel straps for conduits and cables larger than 50 mm.
 - .3 Beam clamps to secure conduit to exposed steel work.
 - .4 Strap AC-90 cable at box location plus every 900 mm.
- .7 Suspended support systems.
 - .1 Support individual cable or conduit runs with 6 mm dia threaded rods and spring clips.
 - .2 Support 2 or more cables or conduits on channels supported by 6 mm dia threaded rod hangers where direct fastening to building construction is impractical.

- .8 For surface mounting of two or more conduits use channels at 1.5 m on centre spacing.
- .9 Provide metal brackets, frames, hangers, clamps, and related types of support structures, where indicated, or as required to support conduit and cable runs.
- .10 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.
- .11 Do not use wire lashing, wood blocking, plastic strap, or perforated strap to support or secure raceways or cables.
- .12 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trade and approval of Owner's Representative.
- .13 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.

END OF SECTION

PART 1 **GENERAL**

1.1 **SUBMITTALS**

- .1 Provide manufacturer's printed product literature, specifications and datasheet and include characteristics, performance, physical size, finish and limitations.

PART 2 **PRODUCTS**

2.1 **SPLITTERS**

- .1 Not used.

2.2 **JUNCTION AND PULL BOXES**

- .1 Welded steel construction with screw-on flat covers for surface mounting.
- .2 Covers with 25 mm minimum extension all around, for flush-mounted pull and junction boxes.
- .3 Sized in accordance with the CEC without use of extension sections.

2.3 **CABINETS**

- .1 Not used.

PART 3 **EXECUTION**

3.1 **JUNCTION AND PULL BOXES INSTALLATION**

- .1 Install pull boxes in inconspicuous but accessible locations.
- .2 Only main junction and pull boxes are indicated. Install pull boxes so as not to exceed 30m of conduit run between pull boxes.

3.2 **IDENTIFICATION**

- .1 Provide equipment identification in accordance with Section 26 05 00 – Common Work Requirements - Electrical.
- .2 Install size 2 identification labels indicating system name voltage and phase.

END OF SECTION

PART 1 **GENERAL**

1.1 **REFERENCES**

- .1 Canadian Standards Association (CSA)
 - .1 CSA C22.1, Canadian Electrical Code, Part 1.

PART 2 **PRODUCTS**

2.1 **OUTLET AND CONDUIT BOXES GENERAL**

- .1 Size boxes in accordance with CSA C22.1.
- .2 102 mm 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 347V outlet boxes for 347V switching devices.
- .6 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 x 50 x 38 mm or as indicated. 102 mm square outlet boxes when more than one conduit enters one side with extension and plaster rings as required.
- .2 Electro-galvanized steel utility boxes for outlets connected to surface-mounted EMT conduit, minimum size 102 x 54 x 48 mm.
- .3 102 mm square or octagonal outlet boxes for lighting fixture outlets.
- .4 102 mm square outlet boxes with extension and plaster rings for flush mounting devices in finished plaster 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 **CONDUIT BOXES**

- .1 Cast FS or FD aluminum boxes with factory-threaded hubs and mounting feet for surface wiring of switches and receptacle.

2.5 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 and pull boxes for larger conduits.
- .4 Double locknuts and insulated bushings on sheet metal boxes.
- .5 Double split rings for AC-90 terminations.

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 of opening.
- .4 Provide correct size of openings in boxes for conduit and armoured cable connections. Reducing washers are not allowed.
- .5 Vacuum clean interior of outlet boxes before installation of wiring devices.
- .6 Identify systems for outlet boxes as required.

END OF SECTION

PART 1 **GENERAL**

1.1 **REFERENCES**

- .1 Codes and standards referenced in this section refer to the latest edition thereof.
- .2 Canadian Standards Association (CSA)
 - .1 CAN/CSA C22.2 No. 18, Outlet Boxes, Conduit Boxes, and Fittings and Associated Hardware, a National Standard of Canada.
 - .2 CSA C22.2 No. 45, Rigid Metal Conduit.
 - .3 CSA C22.2 No. 56, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
 - .4 CSA C22.2 No. 83, Electrical Metallic Tubing.
 - .5 CSA C22.2 No. 211.2, Rigid PVC (Unplasticized) Conduit.
 - .6 CAN/CSA C22.2 No. 227.3, Nonmetallic Mechanical Protection Tubing (NMPT), a National Standard of Canada.

1.2 **SUBMITTALS**

- .1 Product data: submit manufacturer's printed product literature, specifications and datasheets.

PART 2 **PRODUCTS**

2.1 **CONDUITS**

- .1 Rigid metal conduit: to CSA C22.2 No. 45.1, hot dipped galvanized steel threaded.
- .2 Epoxy coated conduit: to CSA C22.2 No. 45, with zinc coating and corrosion resistant epoxy finish inside and outside.
- .3 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with couplings.
- .4 Rigid PVC conduit: to CSA C22.2 No. 211.2.
- .5 Flexible metal conduit: to CSA C22.2 No. 56, aluminum liquid-tight flexible metal.

2.2 **CONDUIT FASTENINGS**

- .1 One hole steel straps to secure surface conduits 50 mm and smaller. Two-hole steel straps for conduits larger than 50 mm.
- .2 Beam clamps to secure conduits to exposed steel work.
- .3 Channel type supports for two or more conduits at 1.5 m oc.
- .4 Threaded rods, 6 mm dia., to support suspended channels.

2.3 CONDUIT FITTINGS

- .1 Fittings: manufactured for use with conduit specified. Coating: same as conduit.
- .2 Factory "ells" where 90°, 45 ° or 22.5 ° bends are required for 25 mm and larger conduits.
- .3 Ensure conduit bends other than factory "ells" are made with an approved bender. Making offsets and other bends by cutting and rejoining 90 degree bends are not permitted.
- .4 Connectors and couplings for EMT. Steel set-screw type, size as required.
- .5 CSA Certified watertight connectors for all conduit entries into top of electrical equipment, panelboards, transformers and switchgear. Thomas & Betts Bullet Hub or equal.

2.4 EXPANSION FITTINGS FOR RIGID CONDUIT

- .1 Weatherproof expansion fittings with internal bonding assembly suitable for 100 mm linear expansion.
- .2 Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19 mm deflection in all directions.
- .3 Weatherproof expansion fittings for linear expansion at entry to panel.

2.5 FISH CORD

- .1 Polypropylene.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

- .1 Install all conduit, conduit fittings and accessories in accordance with the latest edition of the Canadian Electrical Code in a manner that does not alter, change, or violate any part of the installed system components or the CSA/UL certification of these components.
- .2 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.

- .3 Conceal conduits except in mechanical and electrical service rooms and in unfinished areas. Surface mount conduits except in finished areas or as indicated.
- .4 Do not install conduit within 100mm of the underside of roof decking in accordance with GCS Electrical Bulletin dated January 13, 2010.
- .5 Use rigid hot dipped galvanized steel threaded conduit for exposed work below 2.4 m above finished floor.
- .6 Use epoxy coated conduit underground in corrosive areas and where exposed to exterior elements.
- .7 Use electrical metallic tubing (EMT) except in cast concrete and where subject to mechanical injury, as well as concealed work in masonry construction.
- .8 Use rigid PVC conduit underground and buried in or under concrete slab on grade.
- .9 Use flexible metal conduit for connections to vibrating equipment in dry areas.
- .10 Use liquid tight flexible metal conduit for connection to vibrating equipment in damp, wet or corrosive locations.
- .11 Use AC90 for individual vertical power supply drops to light fixtures only.
- .12 Minimum conduit size for lighting and power circuits: 21mm. 16mm conduit is acceptable for switch leg drops only where one two-wire circuit and ground is required.
- .13 Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its original diameter.
- .14 Mechanically bend steel conduit over 19 mm dia.
- .15 Install fish cord in empty conduits.
- .16 Remove and replace blocked conduit sections. Do not use liquids to clean out conduits.
- .17 Dry conduits out before installing wire.
- .18 Install watertight bullet hubs on all conduits entering top of equipment.

3.3 SURFACE CONDUITS

- .1 Run parallel or perpendicular to building lines.
- .2 Run conduits in flanged portion of structural steel.
- .3 Group conduits wherever possible on suspended channels.

- .4 Do not pass conduits through structural members except as indicated.
- .5 Do not locate conduits less than 75 mm parallel to hot water lines with minimum of 25 mm at crossovers.
- .6 Do not install conduit within 100mm of the underside of roof decking in accordance with GCS Electrical Bulletin dated January 13, 2010. See drawings for acceptable methods of running conduit below roofing decks.

3.4 CONCEALED CONDUITS

- .1 Run parallel or perpendicular to building lines.
- .2 Do not install horizontal runs in masonry walls.
- .3 Do not install conduits in terrazzo or concrete toppings.

3.5 CLEANING

- .1 Proceed in accordance with Section 01 74 00 – Cleaning.
- .2 On Completion and verification of performance of installation, remove surplus materials, excess materials rubbish, tools, and equipment.

END OF SECTION

PART 1 **GENERAL – NOT USED**

PART 2 **PRODUCTS**

2.1 **BREAKERS GENERAL**

- .1 Bolt-on moulded case circuit breaker: quick- make, quick-break type, for manual and automatic operation with temperature compensation for 40°C ambient.
- .2 Common-trip breakers: with single handle for multi-pole applications.
- .3 Magnetic instantaneous trip elements in circuit breakers to operate only when value of current reaches setting. Trip settings on breakers with adjustable trips to range from 3-8 times current rating.
- .4 Circuit breakers with interchangeable trips as indicated.
- .5 Circuit breakers to have minimum of 10,000 A symmetrical rms interrupting capacity rating.

2.2 **THERMAL MAGNETIC BREAKERS DESIGN A**

- .1 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.

2.3 **OPTIONAL FEATURES**

- .1 Include, as noted:
 - .1 On-off locking device.

2.4 **ENCLOSURE**

- .1 Mounted in NEMA 1 type enclosure, sprinkler proof as indicated.

PART 3 **EXECUTION**

3.1 **INSTALLATION**

- .1 Install circuit breakers as indicated.

END OF SECTION

PART 1 **GENERAL**

1.1 **SECTION INCLUDES**

- .1 Equipment and installation for ground fault circuit interrupters (GFCI).

1.2 **REFERENCES**

- .1 Codes and standards referenced in this section refer to the latest edition thereof.
- .2 Canadian Standards Association (CSA)
 - .1 CAN/CSA-C22.2 No.144, Ground Fault Circuit Interrupters.
- .3 National Electrical Manufacturers Association (NEMA)
 - .1 NEMA PG 2.2, Application Guide for Ground Fault Protection Devices for Equipment.

1.3 **SUBMITTALS**

- .1 Submit product data and shop drawings.
- .2 Submit test report for field testing of ground fault equipment to Owner's Representative and a certificate that system as installed meets criteria specified herein.

PART 2 **PRODUCTS**

2.1 **MATERIALS**

- .1 Equipment and components for ground fault circuit interrupters (GFCI): to CAN/CSA-C22.2 No.144.
- .2 Components comprising ground fault protective system to be of same manufacturer.

2.2 **BREAKER TYPE GROUND FAULT INTERRUPTER**

- .1 Single or two pole ground fault circuit interrupter for 15 or 20 A, 120Vac, 1 phase circuit c/w test and reset facilities.

2.3 **GROUND FAULT PROTECTOR UNIT**

- .1 Self-contained with 15A or 20A as indicated, 120Vac circuit interrupter and duplex receptacle complete with:
 - .1 Solid state ground sensing device.
 - .2 Facility for testing and reset.

- .3 CSA Enclosure 1, flush mounted with stainless steel face plate.
- .4 Ivory face.

PART 3 **EXECUTION**

3.1 **INSTALLATION**

- .1 Do not ground neutral on load side of ground fault relay.
- .2 Pass phase conductors including neutral through zero sequence transformers.
- .3 Connect supply and load wiring to equipment in accordance with manufacturer's recommendations.

3.2 **FIELD QUALITY CONTROL**

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Requirements - Electrical and Section 01 91 13 – Commissioning.
- .2 Arrange and pay for field testing of ground fault equipment before commissioning service.
- .3 Demonstrate simulated ground fault tests.

END OF SECTION

PART 1 **GENERAL – NOT USED**

PART 2 **PRODUCTS**

2.1 **DISCONNECT SWITCHES**

- .1 Fusible and non-fusible disconnect switch in CSA Enclosure. Unless otherwise indicated on drawings provide Type 1 for interior, type 4X for exterior, size as indicated.
- .2 Provision for padlocking in on-off switch position by three locks.
- .3 Mechanically interlocked door to prevent opening when handle in ON position.
- .4 Fuses: size as indicated.
- .5 Fuseholders: suitable without adaptors, for type and size of fuse indicated.
- .6 Quick-make, quick-break action.
- .7 ON-OFF switch position indication on switch enclosure cover.

2.2 **EQUIPMENT IDENTIFICATION**

- .1 Provide equipment identification in accordance with Section 26 05 00 – Common Work Requirements - Electrical.
- .2 Indicate name of load controlled on size 4 nameplate.

PART 3 **EXECUTION**

3.1 **INSTALLATION**

- .1 Install disconnect switches complete with fuses as indicated.

END OF SECTION

APPENDIX A
OSC ASBESTOS AND LEAD PAINT TESTING REPORTS

**ASBESTOS AND LEAD PAINT BUILDING MATERIALS SURVEY FOR:
OCEAN SCIENCES CENTER, MAIN BUILDING AND ANNEX
MEMORIAL UNIVERSITY OF NEWFOUNDLAND**



Prepared for:
Memorial University of Newfoundland
St. John's, NL

Pinchin LeBlanc Environmental Ltd
Project No. 02-02-00900

March 22, 2013

EXECUTIVE SUMMARY

Pinchin LeBlanc Environmental Limited (Pinchin) was retained by Memorial University of Newfoundland to perform asbestos and lead paint surveys in selected buildings on the Memorial University of Newfoundland's St. John's, NL campus. A total of twenty-seven (27) buildings were surveyed for asbestos containing materials (ACM) and lead based paints (LBP). This report will provide the findings for the following location;

BUILDING DESCRIPTION: OCEAN SCIENCES CENTER MAIN BUILDING AND ANNEX

BUILDING ADDRESS: MEMORIAL UNIVERSITY OF NL, ST. JOHN'S CAMPUS, NL

A summary of the findings for the Site Building is provided. For specific recommendations regarding any hazardous materials listed the reader will refer to Sections 3 and 4 of this report:

1. Friable asbestos containing materials identified inside the Site Building include: spray fireproofing DEBRIS, parging cement on pipe elbows/fittings, tank insulation, and boiler exhaust insulation.
2. Non-friable asbestos containing materials with the potential to become friable during renovation or construction activities have been identified inside the Site Building, specifically drywall joint compound.
3. Non-friable asbestos containing materials identified inside the Site Building specifically vinyl floor tiles, transite, and textile materials.
4. Analytical results indicate that four (4) of the samples collected of painted surfaces would be considered a risk to worker exposure during construction or renovation activities (with lead concentrations exceeding 0.06%). The off-white paint in room AX-1001 the yellow paint in room AX-1001, the black paint in room AX-3C01, and the blue paint in room AX-3C01.

This Executive Summary is subject to the same standard limitations as contained in the report and must be read in conjunction with the entire report.

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1.0 INTRODUCTION

Pinchin LeBlanc Environmental Ltd. (Pinchin) was retained by Memorial University of Newfoundland to perform asbestos and lead paint surveys in selected buildings on the Memorial University of Newfoundland's St. John's, NL campus. A total of twenty-seven (27) buildings were surveyed for asbestos containing materials (ACM) and lead based paints (LBP). This report will provide the findings for the following location;

BUILDING DESCRIPTION: OCEAN SCIENCES CENTER, MAIN BUILDING AND ANNEX

BUILDING ADDRESS: MEMORIAL UNIVERSITY OF NL, ST. JOHN'S CAMPUS, NL

The report presents a detailed investigation of condition, quantity, location, access, and type of ACM and LBP present in the building. The Overview Report, provided under separate cover, provides detailed information regarding the survey methodology, sampling procedure, evaluation criteria, suspect materials and regulatory information.

Provincial regulations and guidelines distinguish between friable¹ and non-friable² materials. The asbestos building materials survey performed by Pinchin included a search for both friable and common non-friable ACM.

For reporting purposes, the survey will be divided into sections. The report is presented in this manner to accommodate ease in reading and to allow access to report information for specific areas or materials within the building. The report also addresses specific systems and products likely present in the building. The sections of the report are as follows:

- 2.0 Survey Information
- 3.0 ACM Survey Findings
- 4.0 LBP Survey Findings

1 The term friable is applied to a material that can be readily reduced to dust or powder by hand or moderate pressure. Friable ACM has a much greater potential to release airborne asbestos fibres when disturbed. The most common friable ACM used in the past are sprayed or trowelled materials (for fireproofing or thermal insulation), texture plaster (decorative or acoustic), and mechanical insulations.

2 Common non-friable ACM include vinyl floor tiles, ceiling tiles, gasket materials, asbestos cement pipe or board (transite), and asbestos textiles. Although a product may be considered non-friable when new, if the product releases fine dust due to deterioration or during removal, the free dust is considered friable. For example, most lay-in or glued on acoustic ceiling tiles release significant dust during removal of large quantities of these tiles.

5.0 Recommendations

2.0 SURVEY INFORMATION

The survey was conducted on between November 29th and November 30th, 2012. The survey, collection of representative bulk samples, and recording of information was performed by Mr. Trent Hardy of Pinchin. All accessible areas of the building were inspected for the presence of asbestos containing materials (ACM) and lead based paints (LBP).

A total of twenty-seven (27) representative bulk samples were collected for analysis for asbestos content and eight (8) bulk samples were collected for analysis of lead content.

3.0 ACM SURVEY FINDINGS

The ACM found during this survey are detailed in the location & data excel document provided to the client. The excel document serves as the clients active asbestos management plan. Quantities of materials identified, locations and friable or non-friable are also present in this excel file. Laboratory certificates for asbestos samples collected are presented in Appendix I and lead samples are presented in Appendix II. Sample location drawings are provided in Appendix III. A photographic record of the samples collected during the survey of the building is presented in Appendix IV. The following is summary of the findings for this building.

3.1 Sprayed or Trowelled Fireproofing and Thermal Insulation

Debris present on the ceiling and surfaces in room OS-2002 was sampled and contains 60% amosite asbestos (reference samples 02-02-900-S026). This DEBRIS is suspected to be associated with spray applied fireproofing previously located on the ceiling of this room. For locations and conditions of this material at the time of the building survey refer to location & data excel document.

3.2 Mechanical Insulation

Five (5) samples were collected of the parging cement used on the elbows and fittings in the site building and contains 25% Chrysotile asbestos in two (2) of the five (5) samples (reference sample 02-02-900-S075 and 02-02-900-S076). For locations and conditions of this material at the time of the building survey refer to location & data excel document.

3.2.1 *Straight Run Pipe Insulations*

Suspect asbestos containing straight pipe insulation was not observed in the Site Building. The majority of piping straight sections observed is insulated with non-asbestos fiberglass wrapped in canvas jacketing.

3.2.2 Pipe Elbows and Fittings

Friable insulating cement, commonly referred to as parging cement, is present on various elbows and fittings in the Site Building. A summary of the results for these samples is described below. For locations and conditions of this material at the time of the survey refer to location & data excel document.

- Parging cement present on 6" water lines in room AX-1001 was sampled, and contains 30% chrysotile asbestos (reference sample 02-02-900-S005).
- Parging cement present on 4" water lines in room AX-1001 was sampled, and contains 30% chrysotile asbestos (reference sample 02-02-900-S004).
- Parging cement present on 6" water lines near the eyewash station was sampled in room AX-1001. Analysis of this sample did not identify the presence of asbestos (reference sample 02-02-900-S003).

3.2.3 Tanks and Boilers

Suspect asbestos-containing materials present on tanks and boilers in the Site Building were collected. A summary of the results for these samples is provided below. For locations and conditions of this material at the time of the building survey refer to location & data excel document.

- Friable mechanical insulation present on the steam header in room AX1001 was sampled, and contains 15% amosite and 10% chrysotile asbestos (reference sample 02-02-900-S001).
- Friable mechanical insulation present on the boiler exhaust in room AX-1001 was sampled and contains 40% chrysotile asbestos (reference sample 02-02-900-S002).
- Friable mechanical insulation present on the tank in room AX-1000 was sampled, and contains 30% chrysotile asbestos (reference sample 02-02-900-S007).
- Non-friable textile cloth expansion joints present on ducting in room OS-2002 was sampled, and contains 50% chrysotile asbestos (reference sample 02-02-900-S027).
- Non-friable textile gaskets present on the heads of boilers #1 and #2 in room AX-1001 was sampled. Analysis of this sample did not identify the presence of asbestos (reference sample 02-02-900-S006).

3.3 Acoustic Ceiling Tiles

Two (2) types of acoustic ceiling tiles were observed in the Site Building. A summary of the results for these samples is provided below. For locations and conditions of this material at the time of the survey refer to location & data excel document.

- 2'x 4' acoustic ceiling tile distinguished with a longitudinal fissure and pinhole pattern were sampled in room AX-2S02. Analysis of this sample did not identify the presence of asbestos (reference sample 02-02-900-S014).
- 2'x 4' acoustic ceiling tile distinguished with a longitudinal fissure and pinhole pattern were sampled in room AX-3C01. Analysis of this sample did not identify the presence of asbestos (reference sample 02-02-900-S017).

3.4 Drywall, Plaster, and Texture Finishes

Drywall was used as a wall and ceiling finish throughout the building. Until the early to mid-1980s, drywall joint compound may have contained chrysotile asbestos. Drywall joint compound is considered a non-friable material. Most buildings of this type undergo constant renovation, including the removal and replacement of drywall partitions. Therefore extensive sampling of drywall compound is necessary to come to a reasonable conclusion regarding the extent of asbestos. Furthermore, any attempt to distinguish and delineate all asbestos-containing drywall compounds from new non-asbestos drywall compound is often unachievable. Therefore, drywall joint compound was sampled at walls, which were believed to be original to try to define the presence of asbestos content in the original drywall compound.

Six (6) samples, in total, of drywall joint compound were collected in the Site Building. Results from two (2) of the six (6) samples collected contain 3% chrysotile asbestos (reference samples, 02-02-900-S020, and 02-02-900-S022). For locations and conditions of this material at the time of the survey refer to location & data excel document.

Plaster was not observed in use as a wall and/or ceiling finish in the Site Building. It should be noted that plaster can at times be difficult to distinguish from other wall and ceiling finishes such as drywall and concrete. Should plaster be encountered during any demolition or renovation activities, it should be sampled for analysis for asbestos content.

3.5 Vinyl Flooring Materials

3.5.1 Vinyl Floor Tiles

Samples were collected of eight (8) types of vinyl floor tiles observed in the Site Building. A summary of the results for these samples is provided below. For locations and conditions of this material at the time of the survey refer to location & data excel document.

3.5.1.1 *Asbestos Containing Vinyl Floor Tiles*

- Beige with thick brown streak, 12"x 12" vinyl floor tiles were sampled in room OS-3C01 and contain 5% chrysotile asbestos (reference sample 02-02-900-S016).
- Beige with thick brown streak, 9"x 9" vinyl floor tiles were sampled in room OS-3016 and contain 6% chrysotile asbestos (reference sample 02-02-900-S023).
- Brown with thick brown streak, 12"x 12" vinyl floor tiles were sampled in room OS-2000/200A and contain 5% chrysotile asbestos (reference sample 02-02-900-S016).

3.5.1.2 *Non-Asbestos Containing Vinyl Floor Tiles*

- White with brown streak, 12"x 12" vinyl floor tiles were sampled in room AX-2002. Analysis of the sample and associated tar mastic adhesive did not identify the presence of asbestos (reference sample 02-02-900-S009).
- White with brown streak, 12"x 12" vinyl floor tiles were sampled in room AX-2003. Analysis of the sample did not identify the presence of asbestos (reference sample 02-02-900-S011).
- Beige with brown streak, 12"x 12" vinyl floor tiles were sampled in room AX-3C01. Analysis of the sample and associated tar mastic adhesive did not identify the presence of asbestos (reference sample 02-02-900-S015).
- Grey 12"x 12" vinyl floor tiles were sampled in room AX-3001B. Analysis of the sample and associated tar mastic adhesive did not identify the presence of asbestos (reference sample 02-02-900-S019).
- White with abundant blue fleck, 12"x 12" vinyl floor tiles were sampled in room AX-4013. Analysis of the sample and associated tar mastic adhesive did not identify the presence of asbestos (reference sample 02-02-900-S021).

3.6 **Asbestos Cement Products**

Transite present in room AX-2001B was sampled and contains 20% chrysotile asbestos (reference sample 02-02-900-S013). For locations and conditions of this material at the time of the building survey refer to location & data excel document.

3.7 **Vermiculite Insulation**

No vermiculite containing products were observed. Visual observations were made above the ceiling and through any hatches.

3.8 Other Asbestos Containing Building Materials

Tar roofing material present above the ceiling in room AX-2S02 was sampled. Analysis of this sample did not identify the presence of asbestos (reference sample 02-02-900-S010).

4.0 LBP SURVEY FINDINGS

Analytical results indicate that four (4) of the samples collected of painted surfaces would be considered a risk to worker exposure during construction or renovation activities (with lead concentrations exceeding 0.06%). The off-white paint in room AX-1001 (reference sample 02-02-900-L002), the yellow paint in room AX-1001 (reference sample 02-02-900-L003), the black paint in room AX-3C01 (reference sample 02-02-900-L004), and the blue paint in room AX-3C01 (reference sample 02-02-900-L005) and the same paint colours located elsewhere should be managed as lead containing.

Results indicate that were detected, all other paint samples containing less than 0.06% lead.

All paints observed inside the Site Building were observed in GOOD condition.

5.0 RECOMMENDATIONS

Asbestos containing materials have been identified in the Site Building. Listed below are a series of general recommendations for the Site Building. Recommendations provided in the Overview Report may also be reviewed and applied to this building.

Friable ACMs

Friable asbestos containing materials identified inside the Site Building include: spray fireproofing DEBRIS, parging cement on pipe elbows/fittings, tank insulation, and boiler exhaust insulation.

1. Any DEBRIS associated with friable asbestos containing materials should be abated as soon as reasonably possible to prevent worker exposure. Entry into these spaces should follow Type II (moderate risk) entry procedures until the hazard can be removed. Abatement of the DEBRIS and residual material would be completed using Type III (high risk) asbestos abatement procedures.
2. Type III (high risk) asbestos abatement procedures should be carried out for the scheduled removal of greater than 1ft² of friable asbestos containing materials. Alternatively, Type II (moderate risk) glove bag abatement procedures may be applied where practical;

3. Type II (moderate risk) asbestos abatement procedures should be carried out for the scheduled repair or enclosure of friable ACMs or for the removal of less than 1ft² of material;

Potentially Friable Materials

Non-friable asbestos containing materials with the potential to become friable during renovation or construction activities have been identified inside the Site Building, specifically drywall joint compound.

1. Under the NL guidance documents for moderate and low risk asbestos abatement procedures, quantities of plaster within an enclosure exceeding 100 ft² should be removed using Type III (high risk) asbestos abatement procedures. Quantities less than 100 ft² but exceeding 10ft² should be removed using Type II (moderate risk) asbestos abatement procedures, while quantities less than 10 ft² should be removed using Type I (low risk) asbestos abatement procedures.

Non-Friable Materials

Non-friable asbestos containing materials identified inside the Site Building include: vinyl floor tiles, transite, and textile materials.

1. Type I (low risk) asbestos abatement procedures should be carried out for the scheduled disturbance of any non-friable materials provided the materials can be removed intact, and without the use of powered hand tools.
2. Should the use of powered hand tools or excessive breakage of the materials become necessary, Type II (moderate risk) asbestos abatement procedures should be adopted.

Lead Based Paints

Do not grind, sand, torch or cut lead materials without using proper procedures, as material poses a health hazard if disturbed by these methods.

Any painted surfaces visually matching the identified paint colors should be managed as lead containing and necessary precautions (i.e.: worker protection) should be employed prior to the disturbance to these materials.

Should there be any questions pertaining to the contents of this report, please do not hesitate to contact the undersigned at our office.

Pinchin LeBlanc Environmental Limited

Prepared by;

APPENDIX I

ASBESTOS ANALYTICAL REPORT



Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020



Customer: Pinchin LeBlanc Environmental
27 Austin St
2nd Flr
St Johns NL A1B 4C3

Attn: Paul Staeben
Dawn Benteau

Lab Order ID: 1219843

Analysis ID: 1219843_PLM

Date Received: 12/10/2012

Date Reported: 12/14/2012

Date Amended: 3/22/2013

Project: 02-02-00900 MUN Asbestos and Lead
Survey - OSC Main Bulding and Annex

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
02-02-900-S001	Mechanical Insulation on Steam Header	15% Amosite 10% Chrysotile		75% Other	White Fibrous Homogeneous
1219843PLM_1					Teased
02-02-900-S002	Mechanical Insulation on Boiler Exhaust	40% Chrysotile		60% Other	Gray Fibrous Homogeneous
1219843PLM_2					Teased
02-02-900-S003	Parging Cement on 6" Water Lines	None Detected	30% Mineral Wool	70% Other	White Fibrous Homogeneous
1219843PLM_3					Teased
02-02-900-S004	Parging Cement on 4" Water Lines	30% Chrysotile		70% Other	Gray Fibrous Homogeneous
1219843PLM_4					Teased
02-02-900-S005	Parging Cement on 6" Water Lines	30% Chrysotile		70% Other	Gray Fibrous Homogeneous
1219843PLM_5					Teased
02-02-900-S006	Textile Gasket on Boilers 1 and 2	None Detected	90% Cellulose	10% Other	Tan Fibrous Heterogeneous
1219843PLM_6					Teased, Dissolved
02-02-900-S007	Tank Insulation	30% Chrysotile		70% Other	Gray, White Fibrous Heterogeneous
1219843PLM_7					Teased
02-02-900-S008	Drywall Joint Compound	None Detected		100% Other	White Non Fibrous Homogeneous
1219843PLM_8					Crushed

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Estimated MDL is 0.1%.

Sharon Donald (31)

Analyst

Approved Signatory



Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020



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Project: 02-02-00900 MUN Asbestos and Lead
Survey - OSC Main Bulding and Annex

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
02-02-900-S009 - A	12"x12" Vinyl Floor Tiles - White With Brown Streaks	None Detected		100% Other	Brown, White Non Fibrous Heterogeneous
1219843PLM_9	tile				Dissolved
02-02-900-S009 - B	12"x12" Vinyl Floor Tiles - White With Brown Streaks	None Detected	2% Cellulose	98% Other	Black Non Fibrous Homogeneous
1219843PLM_28	mastic				Dissolved
02-02-900-S010	Tar Roof Material	None Detected		100% Other	White Non Fibrous Homogeneous
1219843PLM_10					Crushed
02-02-900-S011	12"x 12" Vinyl Floor Tiles - White With Abundant Brown Flecks	None Detected		100% Other	Beige Non Fibrous Heterogeneous
1219843PLM_11					Dissolved
02-02-900-S012	Drywall Joint Compound	None Detected		100% Other	White Non Fibrous Homogeneous
1219843PLM_12					Crushed
02-02-900-S013	Transite	20% Chrysotile		80% Other	Gray Fibrous Heterogeneous
1219843PLM_13					Teased
02-02-900-S014	2'x4' Acoustic Ceiling Tiles - Longitudinal Fissure and Pinhole Pattern	None Detected	60% Mineral Wool 30% Cellulose	10% Other	Gray Fibrous Heterogeneous
1219843PLM_14					Teased
02-02-900-S015 - A	12"x 12" Vinyl Floor Tiles - Beige with Brown Streaks	None Detected		100% Other	Brown, Beige Non Fibrous Heterogeneous
1219843PLM_15	tile				Dissolved

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Sharon Donald (31)

Analyst

Approved Signatory



Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020



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Survey - OSC Main Bulding and Annex

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
02-02-900-S015 - B	12"x 12" Vinyl Floor Tiles - Beige with Brown Streaks	None Detected	2% Cellulose	98% Other	Black Non Fibrous Homogeneous
1219843PLM_29	mastic				Dissolved
02-02-900-S016	12"x12" Vinyl Floor Tiles - Beige with Thick Brown Streaks	5% Chrysotile		95% Other	Beige Non Fibrous Heterogeneous
1219843PLM_16	tile only				Dissolved
02-02-900-S017	2'x4' Acoustic Ceiling Tiles - Pinhole and Fleck Pattern	None Detected	50% Cellulose 30% Mineral Wool	10% Perlite 10% Other	White Fibrous Heterogeneous
1219843PLM_17			Teased		
02-02-900-S018	Drywall Joint Compound	None Detected		100% Other	White Non Fibrous Homogeneous
1219843PLM_18					Crushed
02-02-900-S019 - A	12"x12" Vinyl Floor Tiles - Grey	None Detected		100% Other	Gray Non Fibrous Heterogeneous
1219843PLM_19	tile				Dissolved
02-02-900-S019 - B	12"x12" Vinyl Floor Tiles - Grey	None Detected	2% Cellulose	98% Other	Black Non Fibrous Homogeneous
1219843PLM_30	mastic-small sample				Dissolved
02-02-900-S020	Drywall Joint Compound	3% Chrysotile		97% Other	Cream Non Fibrous Homogeneous
1219843PLM_20					Crushed
02-02-900-S021 - A	12"x 12" Vinyl Floor Tiles - White with Abundant Blue Flecks	None Detected		100% Other	White Non Fibrous Heterogeneous
1219843PLM_21	tile				Dissolved

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Sharon Donald (31)

Analyst

Approved Signatory



Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020



Customer: Pinchin LeBlanc Environmental
27 Austin St
2nd Flr
St Johns NL A1B 4C3

Attn: Paul Staeben
Dawn Benteau

Lab Order ID: 1219843

Analysis ID: 1219843_PLM

Date Received: 12/10/2012

Date Reported: 12/14/2012

Date Amended: 3/22/2013

Project: 02-02-00900 MUN Asbestos and Lead
Survey - OSC Main Bulding and Annex

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
02-02-900-S021 - B	12"x 12" Vinyl Floor Tiles - White with Abundant Blue Flecks	None Detected		100% Other	Yellow Non Fibrous Homogeneous
1219843PLM_31	mastic-small sample				Dissolved
02-02-900-S022	Drywall Joint Compound	3% Chrysotile		97% Other	Cream Non Fibrous Homogeneous
1219843PLM_22					Crushed
02-02-900-S023	9"x9" Vinyl Floor Tiles - Beige with Thick Brown Streaks	6% Chrysotile		94% Other	Beige Non Fibrous Heterogeneous
1219843PLM_23	tile only				Dissolved
02-02-900-S024	Drywall Joint Compound	None Detected		100% Other	White Non Fibrous Homogeneous
1219843PLM_24					Crushed
02-02-900-S025	12"x12" Vinyl Floor Tiles - Brown with Thick Brown Streaks	5% Chrysotile		95% Other	Beige Non Fibrous Heterogeneous
1219843PLM_25	tile only				Dissolved
02-02-900-S026	Sprayed Fireproofing	60% Amosite		40% Other	Gray Fibrous Homogeneous
1219843PLM_26					Teased
02-02-900-S027	Textile Cloth on Ductwork	50% Chrysotile	20% Cellulose	30% Other	White, Green Fibrous Heterogeneous
1219843PLM_27					Teased

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommended that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Estimated MDL is 0.1%.

Sharon Donald (31)

Analyst

Approved Signatory

APPENDIX II

LEAD PAINT ANALYTICAL REPORT



Analysis for Lead Concentration in Paint Chips

by Flame Atomic Absorption Spectroscopy
EPA SW-846 3rd Ed. Method No. 3050B/Method No. 7420



Customer: Pinchin LeBlanc Environmental
27 Austin St
2nd Flr
St Johns NL A1B 4C3

Attn: Paul Staeben
Dawn Benteau

Lab Order ID: 1219842

Analysis ID: 1219842_PBP

Date Received: 12/10/2012

Date Reported: 12/18/2012

Project: 02-02-00900 MUN Asbestos and Lead
Survey OSC Main Building and Annex

Sample ID	Description	Mass	Analytical Sensitivity	Concentration
Lab Sample ID	Lab Notes	(g)	(% by weight)	(% by weight)
02-02-900-L001	Grey- main boiler room	0.0453	0.003%	< 0.009%
1219842PBP_1				
02-02-900-L002	Off white- main boiler room	0.0626	0.002%	0.12%
1219842PBP_2				
02-02-900-L003	Yellow- main boiler room	0.0696	0.002%	0.12%
1219842PBP_3				
02-02-900-L004	Black-3rd floor hallway	0.0477	0.003%	0.42%
1219842PBP_4				
02-02-900-L005	Blue-3rd floor hallway	0.0440	0.003%	0.12%
1219842PBP_5				
02-02-900-L006	Sky blue-OS-4000	0.0327	0.004%	< 0.012%
1219842PBP_6				
02-02-900-L007	Tan-OS-2003	0.0778	0.002%	< 0.005%
1219842PBP_7				
02-02-900-L008	Green-room OS-2002	0.0508	0.003%	0.009%
1219842PBP_8				

The quality control samples run with the samples in this report have passed all AIHA required specifications unless otherwise noted. This report relates only to the samples tested and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by AIHA or any other agency of the U.S. government.

Robert Duke (8)

Analyst

Scientific Analytical Institute, Inc. 4604 Dundas Dr. Greensboro, NC 27407 (336) 292-3888

Laboratory Director

APPENDIX III
SITE DRAWINGS



LEGEND:

XXX PINCHIN LOCATION NUMBER



CLIENT:

MEMORIAL UNIVERSITY OF
NEWFOUNDLAND

PROJECT:

ASBESTOS AND LEAD PAINT BUILDING
MATERIALS SURVEY

SITE ADDRESS:

OCEAN SCIENCES CENTER
RESEARCH BUILDING,
NEWFOUNDLAND AND LABRADOR

DRAWING NAME:

SAMPLE LOCATIONS
LEVEL 1

REFERENCE:

PLEL SITE SURVEY

DATE:

MARCH 2013

PROJECT #:

02 - 02 - 00900

SCALE:

N.T.S.

FIGURE #:

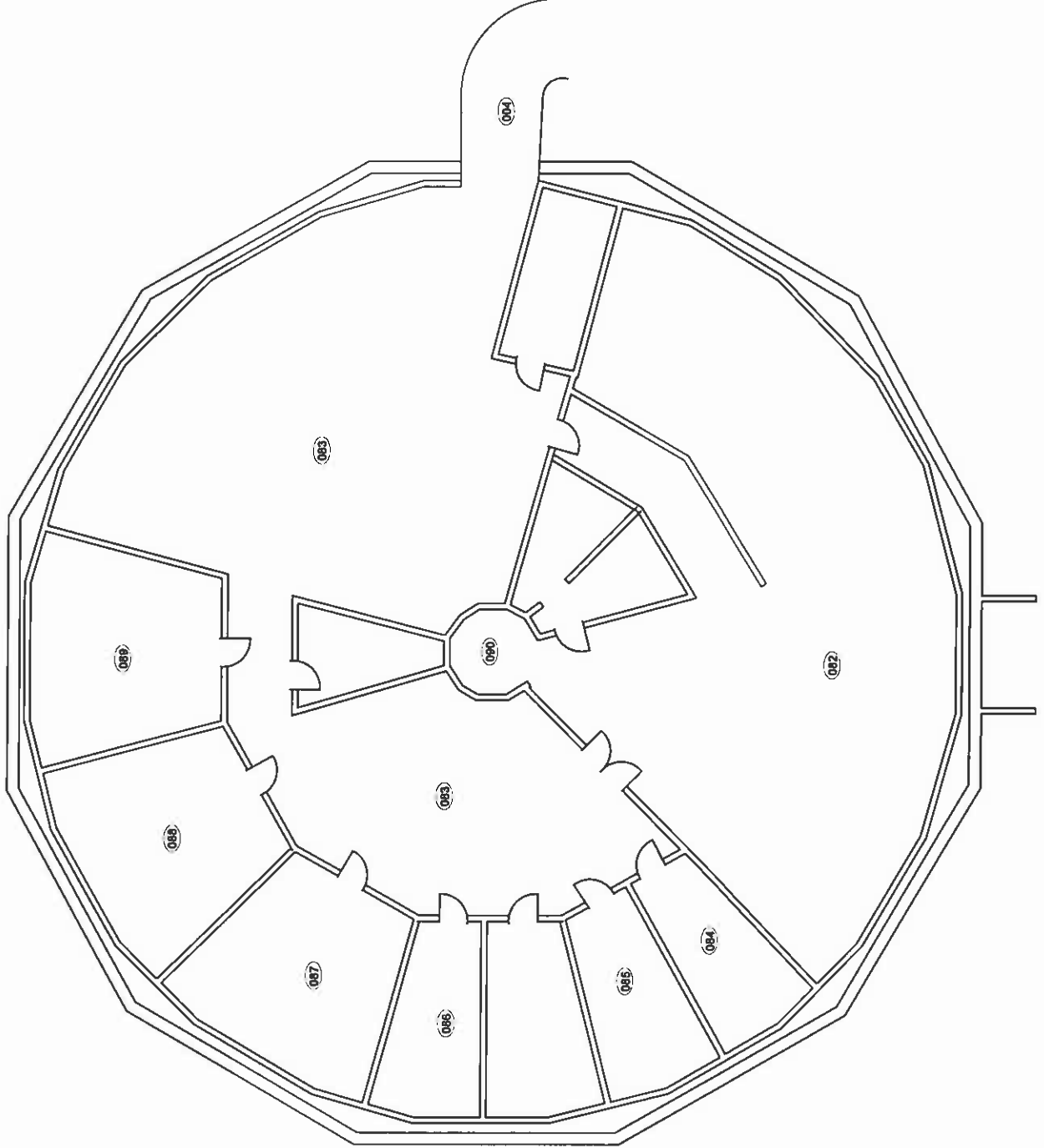
DRAWN BY:

A. ANISCIKLI

1

CHECKED BY:

P. STAEBEN





LEGEND:

- XXX PINCHIN LOCATION NUMBER
- ◎ ASBESTOS SAMPLE ID NUMBER
- ▲ LEAD SAMPLE ID NUMBER



CLIENT:

MEMORIAL UNIVERSITY OF
NEWFOUNDLAND

PROJECT:

ASBESTOS AND LEAD PAINT BUILDING
MATERIALS SURVEY

SITE ADDRESS:

OCEAN SCIENCES CENTER
RESEARCH BUILDING,
NEWFOUNDLAND AND LABRADOR

DRAWING NAME:

SAMPLE LOCATIONS
LEVEL 2

REFERENCE:

PLEL SITE SURVEY

DATE:

MARCH 2013

PROJECT #:

02 - 02 - 00900

SCALE:

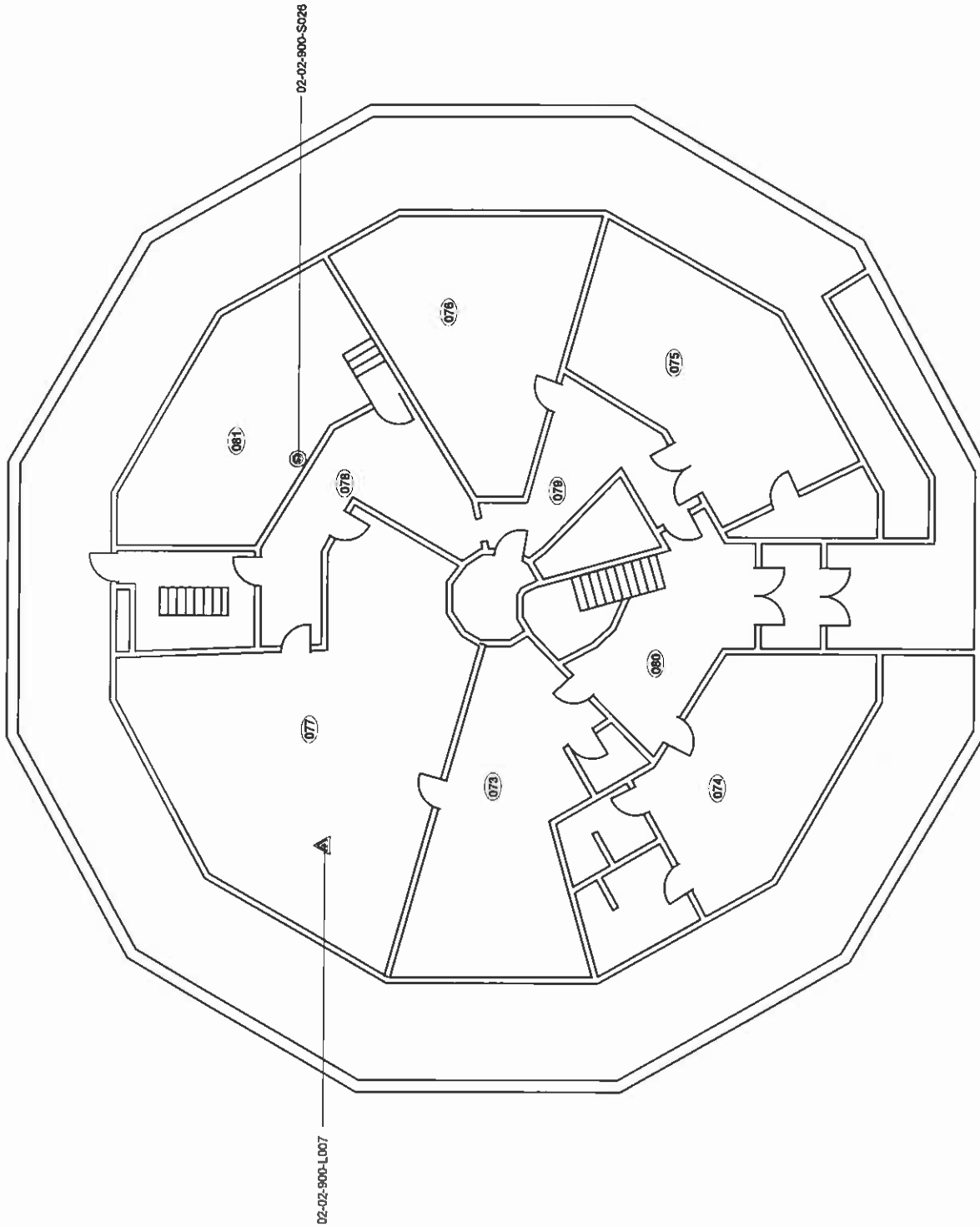
N.T.S.

FIGURE #:

A. ANISCIKLI

2

P. STAEBEN





LEGEND:

- XXX PINCHIN LOCATION NUMBER
- © ASBESTOS SAMPLE ID NUMBER



CLIENT:

MEMORIAL UNIVERSITY OF
NEWFOUNDLAND

PROJECT:

ASBESTOS AND LEAD PAINT BUILDING
MATERIALS SURVEY

SITE ADDRESS:

OCEAN SCIENCES CENTER
RESEARCH BUILDING,
NEWFOUNDLAND AND LABRADOR

DRAWING NAME:

SAMPLE LOCATIONS
LEVEL 3

REFERENCE:

PLEL-SITE SURVEY

DATE:

MARCH 2013

PROJECT #:

02 - 02 - 00900

SCALE:

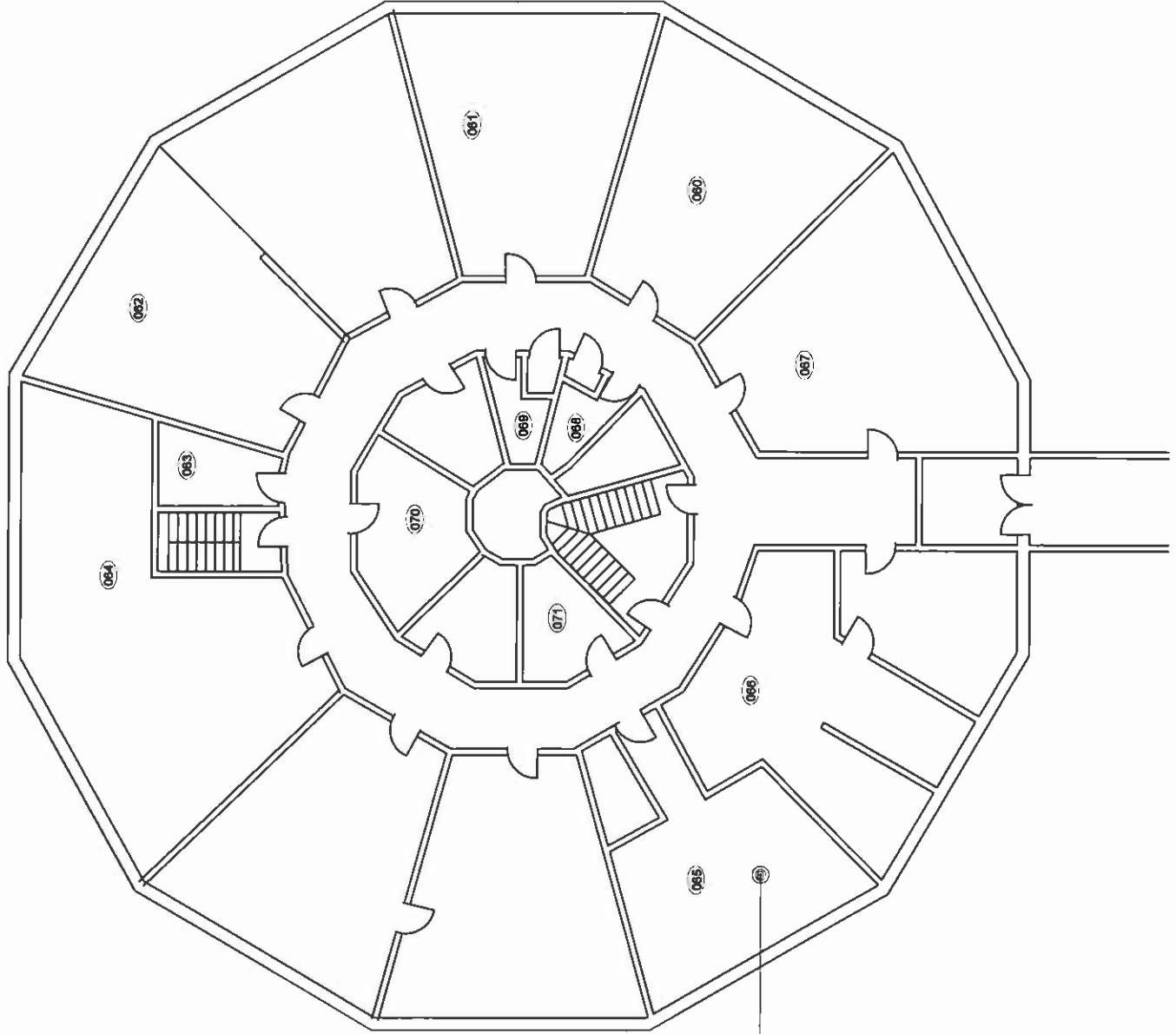
N.T.S.

FIGURE #:

DRAWN BY:
A. ANISCIKLI

3

CHECKED BY:
P. STAELEN



02-02-900-S023
02-02-900-S024



LEGEND:



PINCHIN LOCATION NUMBER



CLIENT:

MEMORIAL UNIVERSITY OF
NEWFOUNDLAND

PROJECT:

ASBESTOS AND LEAD PAINT BUILDING
MATERIALS SURVEY

SITE ADDRESS:

OCEAN SCIENCES CENTER
RESEARCH BUILDING,
NEWFOUNDLAND AND LABRADOR

DRAWING NAME:

SAMPLE LOCATIONS
LEVEL 4

REFERENCE:

PIEL SITE SURVEY

DATE:

MARCH 2013

PROJECT #:

02 - 02 - 00900

SCALE:

N.T.S.

FIGURE #:

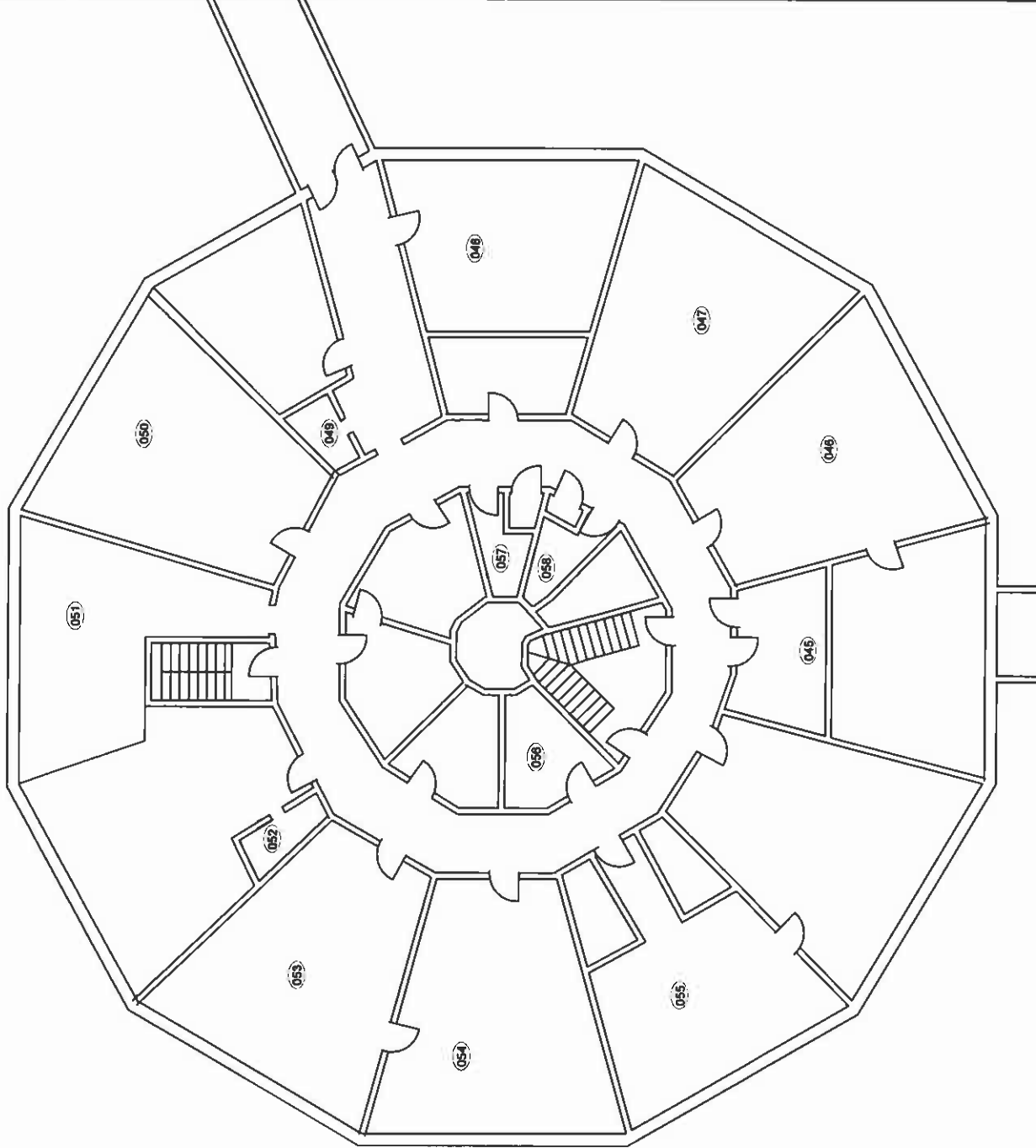
DRAWN BY:

A. ANISCIKLI

CHECKED BY:

P. STAEBEN

4





LEGEND:

- XXX PINCHIN LOCATION NUMBER
- ◎ ASBESTOS SAMPLE ID NUMBER
- ▲ LEAD SAMPLE ID NUMBER
- N/A NOT ACCESSIBLE



CLIENT:

MEMORIAL UNIVERSITY OF
NEWFOUNDLAND

PROJECT:

ASBESTOS AND LEAD PAINT BUILDING
MATERIALS SURVEY

SITE ADDRESS:

OCEAN SCIENCES CENTER
ANNEX BUILDING
NEWFOUNDLAND AND LABRADOR

DRAWING NAME:

SAMPLE LOCATIONS
LEVEL 1

REFERENCE:

PIEL SITE SURVEY

DATE:

MARCH 2013

PROJECT #:

02 - 02 - 00900

SCALE:

N.T.S.

FIGURE #:

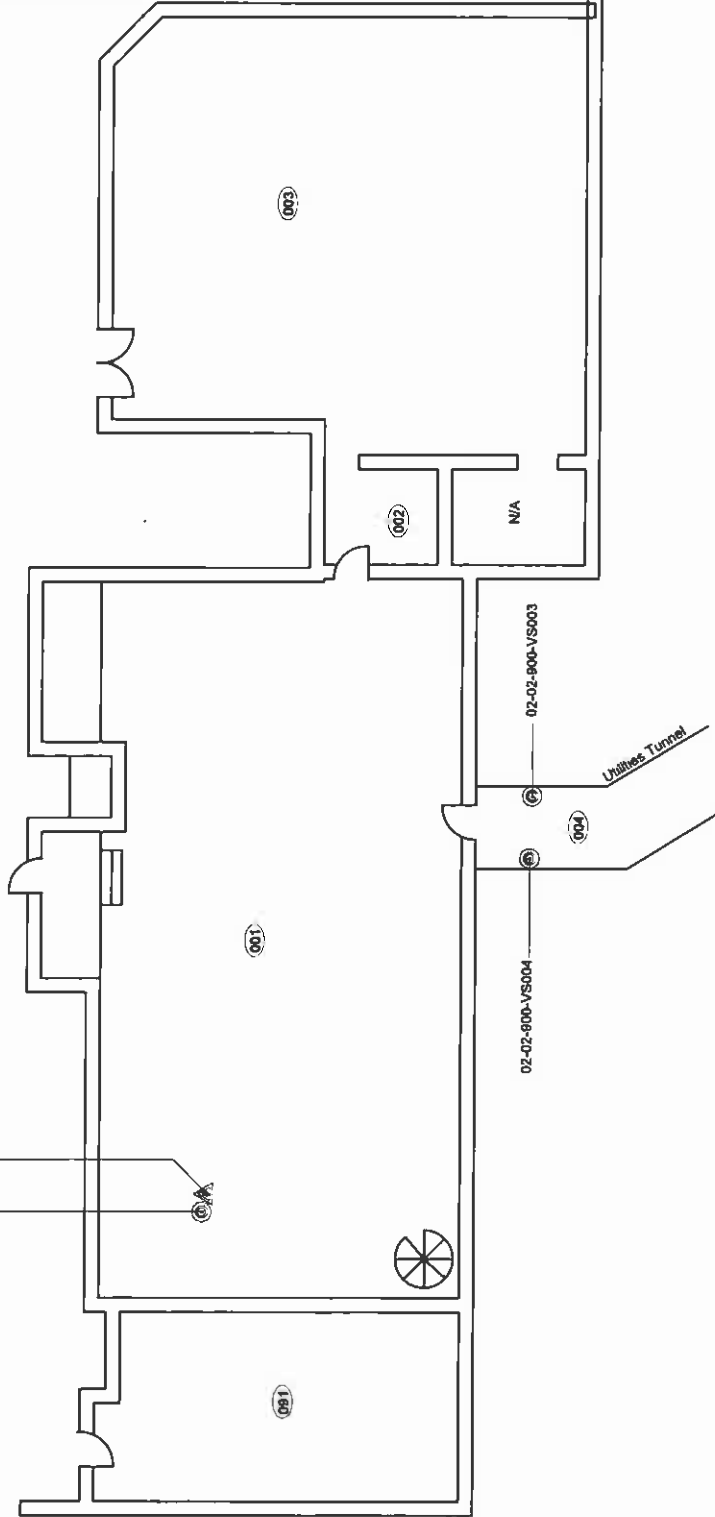
DRAWN BY:
A. ANISCIKLI

1

CHECKED BY:
P. STAEBEN

- 02-02-900-S001
- 02-02-900-S002
- 02-02-900-S003
- 02-02-900-S004
- 02-02-900-S005
- 02-02-900-S006

- 02-02-900-L001
- 02-02-900-L002
- 02-02-900-L003





LEGEND:



PINCHIN LOCATION NUMBER



ASBESTOS SAMPLE ID NUMBER



CLIENT:

MEMORIAL UNIVERSITY OF
NEWFOUNDLAND

PROJECT:

ASBESTOS AND LEAD PAINT BUILDING
MATERIALS SURVEY

SITE ADDRESS:

OCEAN SCIENCES CENTER
ANNEX BUILDING,
NEWFOUNDLAND AND LABRADOR

DRAWING NAME:

SAMPLE LOCATIONS
LEVEL 2

REFERENCE:

PIEL SITE SURVEY

DATE:

MARCH 2013

PROJECT #:

02 - 02 - 00900

SCALE:

N.T.S.

FIGURE #:

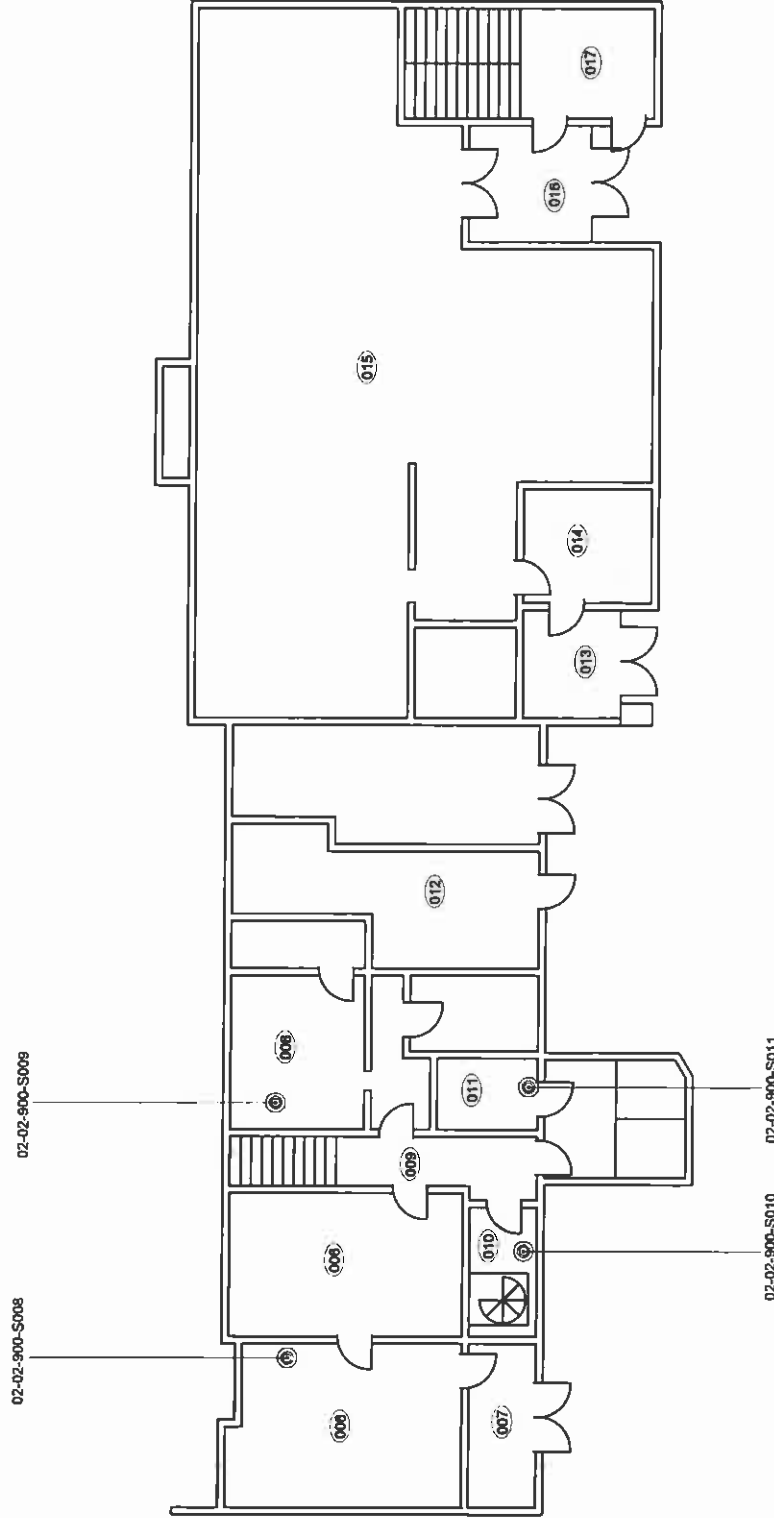
DRAWN BY:

A. ANISCIKLI

CHECKED BY:

P. STAEBEN

2





LEGEND:

- XXX PINCHIN LOCATION NUMBER
- © ASBESTOS SAMPLE ID NUMBER
- ▲ LEAD SAMPLE ID NUMBER



CLIENT:

MEMORIAL UNIVERSITY OF
NEWFOUNDLAND

PROJECT:

ASBESTOS AND LEAD PAINT BUILDING
MATERIALS SURVEY

SITE ADDRESS:

OCEAN SCIENCES CENTER
ANNEX BUILDING,
NEWFOUNDLAND AND LABRADOR

DRAWING NAME:

SAMPLE LOCATIONS
LEVEL 3

REFERENCE:

PLEL SITE SURVEY

DATE:

MARCH 2013

PROJECT #:

02 - 02 - 00900

SCALE:

N.T.S.

FIGURE #:

3

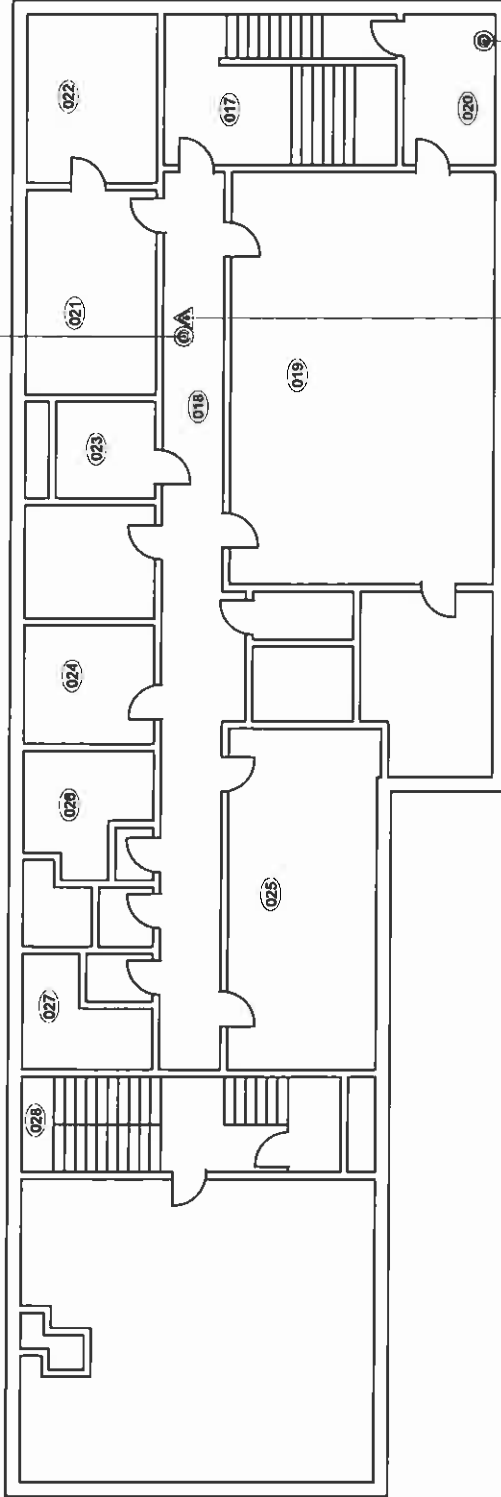
DRAWN BY:

A. ANISCIKLI

CHECKED BY:

P. STAEBEN

02-02-900-S015
02-02-900-S018
02-02-900-S017
02-02-900-S018



02-02-900-S019

02-02-900-L003
02-02-900-L004



LEGEND:



PINCHIN LOCATION NUMBER



ASBESTOS SAMPLE ID NUMBER



CLIENT:

MEMORIAL UNIVERSITY OF
NEWFOUNDLAND

PROJECT:

ASBESTOS AND LEAD PAINT BUILDING
MATERIALS SURVEY

SITE ADDRESS:

OCEAN SCIENCES CENTER
ANNEX BUILDING,
NEWFOUNDLAND AND LABRADOR

DRAWING NAME:

SAMPLE LOCATIONS
LEVEL 4

REFERENCE:

PLEL SITE SURVEY

DATE:

MARCH 2013

PROJECT #:

02 - 02 - 00900

SCALE:

N.T.S.

FIGURE #:

4

DRAWN BY:

A. ANISCIKLI

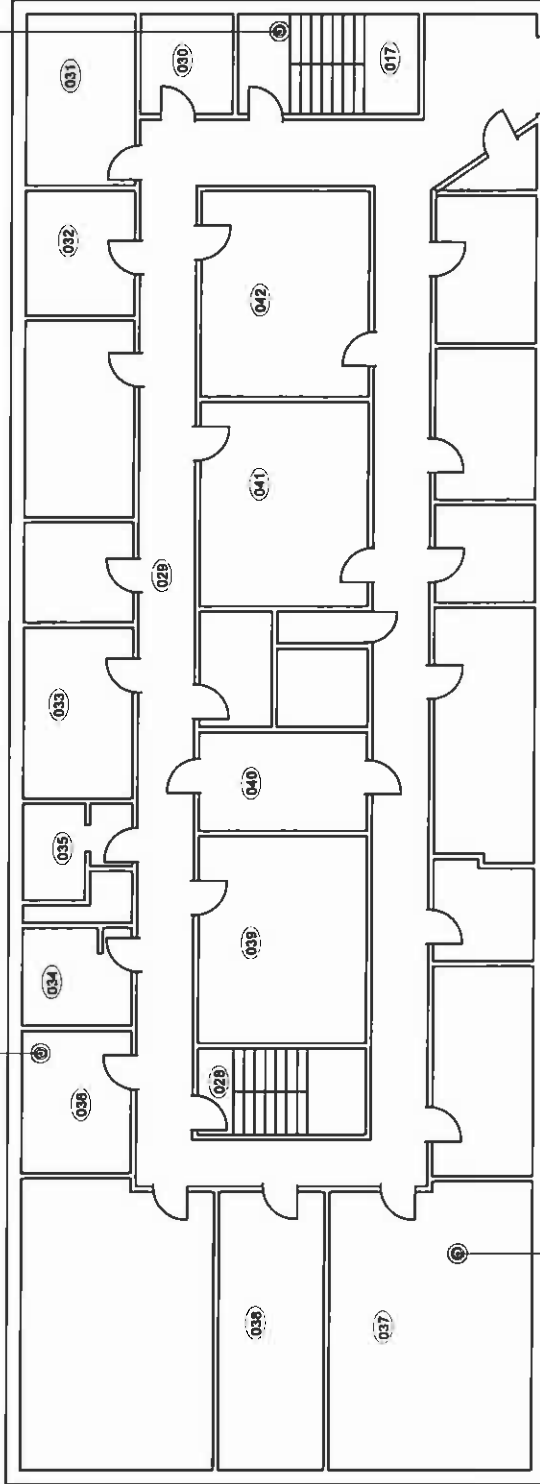
CHECKED BY:

P. STAELEN

02-02-900-S014

02-02-900-S019

02-02-900-S022





LEGEND:

XXX: PINCHIN LOCATION NUMBER



CLIENT:

MEMORIAL UNIVERSITY OF
NEWFOUNDLAND

PROJECT:

ASBESTOS AND LEAD PAINT BUILDING
MATERIALS SURVEY

SITE ADDRESS:

OCEAN SCIENCES CENTER
RESEARCH BUILDING,
NEWFOUNDLAND AND LABRADOR

DRAWING NAME:

SAMPLE LOCATIONS
LEVEL 5

REFERENCE:

PLEL SITE SURVEY

DATE:

MARCH 2013

PROJECT #:

02 - 02 - 00900

SCALE:

N.T.S.

FIGURE #:

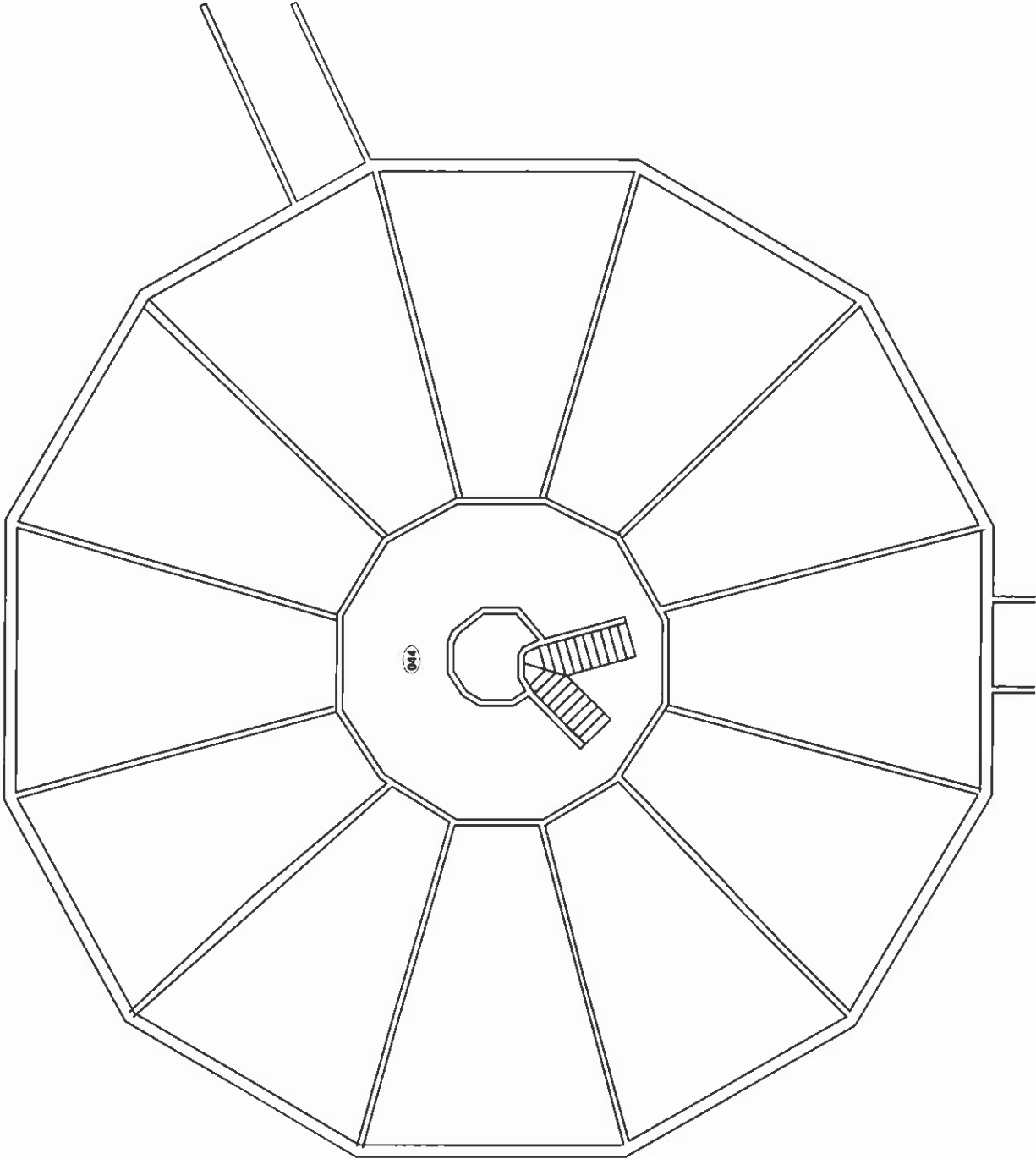
5

DRAWN BY:

A. ANISCIKLI

CHECKED BY:

P. STAEBEN



APPENDIX IV

SAMPLE LOG



ASBESTOS BULK SAMPLING FORM

Sample #:	S001	Date Sampled:	November 29, 2012	
Building :	OSC Main BLDG and Annex	Sampler:	Trent Hardy	
Location:	001, room AX1001	Analysis:	SAI - PLM	
MUN Project #:	02-02-900	Work Order #:		
Bulk Sampling Parameters				
Pipe/Tank	Flooring	Ceiling	Roofing	Location
<input checked="" type="checkbox"/> Insulation <input type="checkbox"/> Elbow <input type="checkbox"/> Fitting <input type="checkbox"/> Transite Pipe <input type="checkbox"/> Gasket <input type="checkbox"/> Tank Insulation <input type="checkbox"/> Pipe Wrap HVAC <input type="checkbox"/> Insulation <input type="checkbox"/> Tape <input type="checkbox"/> Paper Wrap	<input type="checkbox"/> 12'x12' Tile <input type="checkbox"/> 9'x9'Tile <input type="checkbox"/> Vinyl Sheet <input type="checkbox"/> Mastic Wall <input type="checkbox"/> Transite Panel <input type="checkbox"/> Textured Wall <input type="checkbox"/> Plaster <input type="checkbox"/> DWJC	<input type="checkbox"/> Textured <input type="checkbox"/> Stucco <input type="checkbox"/> Popcorn <input type="checkbox"/> DWJC <input type="checkbox"/> Plaster <input type="checkbox"/> Acoustic Tile (Dropped) <input type="checkbox"/> Acoustic Tile (Glued-on) <input type="checkbox"/> Mastic Structural <input type="checkbox"/> Steel F. P. ing <input type="checkbox"/> Deck F. P. ing	<input type="checkbox"/> Shingle <input type="checkbox"/> Rolled <input type="checkbox"/> Felt <input type="checkbox"/> Tar Miscellaneous: _____ No. of Phases: _____ Colour: _____	<input type="checkbox"/> Floor <input type="checkbox"/> Wall Orientation <input type="checkbox"/> Ceiling <input type="checkbox"/> Above Ceiling <input checked="" type="checkbox"/> Other (steam header)





ASBESTOS BULK SAMPLING FORM

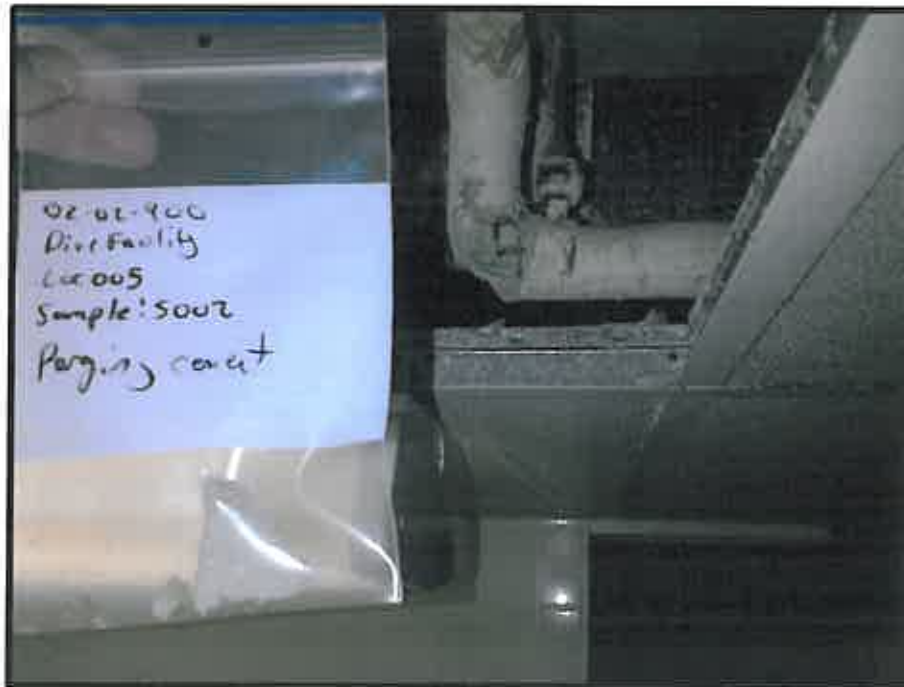
Sample #:	S002	Date Sampled:	November 29, 2012	
Building :	OSC Main BLDG and Annex	Sampler:	Trent Hardy	
Location:	001, room AX1001	Analysis:	SAI - PLM	
MUN Project #:	02-02-900	Work Order #:		
Bulk Sampling Parameters				
Pipe/Tank	Flooring	Ceiling	Roofing	Location
<input checked="" type="checkbox"/> Insulation <input type="checkbox"/> Elbow <input type="checkbox"/> Fitting <input type="checkbox"/> Transite Pipe <input type="checkbox"/> Gasket <input type="checkbox"/> Tank Insulation <input type="checkbox"/> Pipe Wrap HVAC <input type="checkbox"/> Insulation <input type="checkbox"/> Tape <input type="checkbox"/> Paper Wrap	<input type="checkbox"/> 12'x12' Tile <input type="checkbox"/> 9'x9'Tile <input type="checkbox"/> Vinyl Sheet <input type="checkbox"/> Mastic Wall <input type="checkbox"/> Transite Panel <input type="checkbox"/> Textured Wall <input type="checkbox"/> Plaster <input type="checkbox"/> DWJC	<input type="checkbox"/> Textured <input type="checkbox"/> Stucco <input type="checkbox"/> Popcorn <input type="checkbox"/> DWJC <input type="checkbox"/> Plaster <input type="checkbox"/> Acoustic Tile (Dropped) <input type="checkbox"/> Acoustic Tile (Glued-on) <input type="checkbox"/> Mastic Structural <input type="checkbox"/> Steel F. P. ing <input type="checkbox"/> Deck F. P. ing	<input type="checkbox"/> Shingle <input type="checkbox"/> Rolled <input type="checkbox"/> Felt <input type="checkbox"/> Tar Miscellaneous: _____ No. of Phases: _____ Colour: _____	<input type="checkbox"/> Floor <input type="checkbox"/> Wall Orientation <input type="checkbox"/> Ceiling <input type="checkbox"/> Above Ceiling <input checked="" type="checkbox"/> Other (boiler exhaust)





ASBESTOS BULK SAMPLING FORM

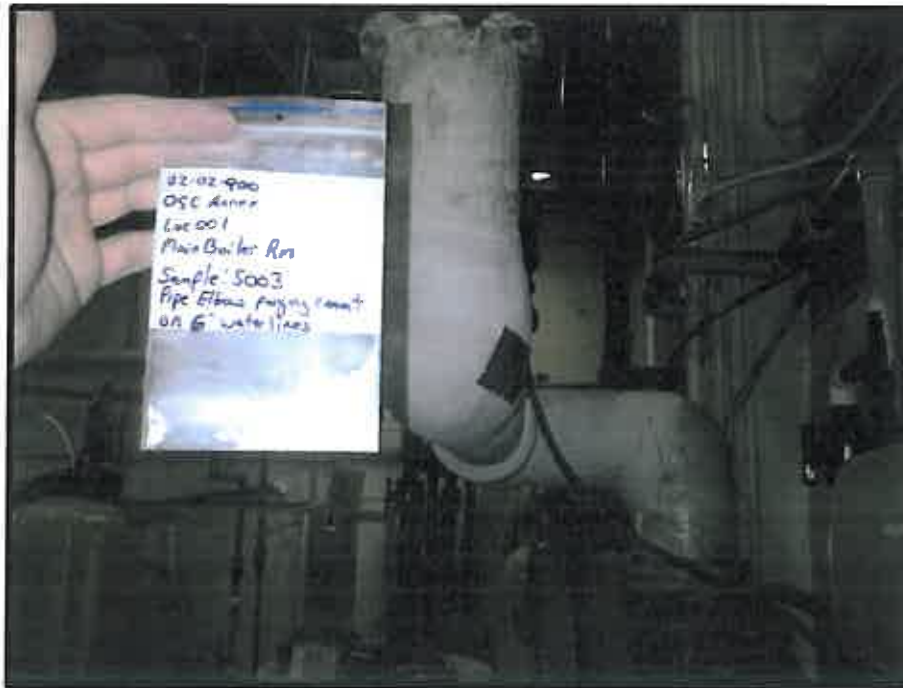
Sample #:	S002	Date Sampled:	November 30, 2012	
Building :	OSC Main BLDG and Annex	Sampler:	Trent Hardy	
Location:	005, room DV1001	Analysis:	SAI - PLM	
MUN Project #:	02-02-900	Work Order #:		
Bulk Sampling Parameters				
Pipe/Tank	Flooring	Ceiling	Roofing	Location
<input type="checkbox"/> Insulation <input checked="" type="checkbox"/> Elbow <input type="checkbox"/> Fitting <input type="checkbox"/> Transite Pipe <input type="checkbox"/> Gasket <input type="checkbox"/> Tank Insulation <input type="checkbox"/> Pipe Wrap HVAC <input type="checkbox"/> Insulation <input type="checkbox"/> Tape <input type="checkbox"/> Paper Wrap	<input type="checkbox"/> 12'x12' Tile <input type="checkbox"/> 9'x9'Tile <input type="checkbox"/> Vinyl Sheet <input type="checkbox"/> Mastic Wall <input type="checkbox"/> Transite Panel <input type="checkbox"/> Textured Wall <input type="checkbox"/> Plaster <input type="checkbox"/> DWJC	<input type="checkbox"/> Textured <input type="checkbox"/> Stucco <input type="checkbox"/> Popcorn <input type="checkbox"/> DWJC <input type="checkbox"/> Plaster <input type="checkbox"/> Acoustic Tile (Dropped) <input type="checkbox"/> Acoustic Tile (Glued-on) <input type="checkbox"/> Mastic Structural <input type="checkbox"/> Steel F. P. ing <input type="checkbox"/> Deck F. P. ing	<input type="checkbox"/> Shingle <input type="checkbox"/> Rolled <input type="checkbox"/> Felt <input type="checkbox"/> Tar Miscellaneous: _____ No. of Phases: _____ Colour: _____	<input type="checkbox"/> Floor <input type="checkbox"/> Wall Orientation <input type="checkbox"/> Ceiling <input checked="" type="checkbox"/> Above Ceiling <input type="checkbox"/> Other





ASBESTOS BULK SAMPLING FORM

Sample #:	S003	Date Sampled:	November 29, 2012	
Building :	OSC Main BLDG and Annex	Sampler:	Trent Hardy	
Location:	001, room AX1001	Analysis:	SAI - PLM	
MUN Project #:	02-02-900	Work Order #:		
Bulk Sampling Parameters				
Pipe/Tank	Flooring	Ceiling	Roofing	Location
<input type="checkbox"/> Insulation <input checked="" type="checkbox"/> Elbow <input type="checkbox"/> Fitting <input type="checkbox"/> Transite Pipe <input type="checkbox"/> Gasket <input type="checkbox"/> Tank Insulation <input type="checkbox"/> Pipe Wrap HVAC <input type="checkbox"/> Insulation <input type="checkbox"/> Tape <input type="checkbox"/> Paper Wrap	<input type="checkbox"/> 12'x12' Tile <input type="checkbox"/> 9'x9'Tile <input type="checkbox"/> Vinyl Sheet <input type="checkbox"/> Mastic Wall <input type="checkbox"/> Transite Panel <input type="checkbox"/> Textured Wall <input type="checkbox"/> Plaster <input type="checkbox"/> DWJC	<input type="checkbox"/> Textured <input type="checkbox"/> Stucco <input type="checkbox"/> Popcorn <input type="checkbox"/> DWJC <input type="checkbox"/> Plaster <input type="checkbox"/> Acoustic Tile (Dropped) <input type="checkbox"/> Acoustic Tile (Glued-on) <input type="checkbox"/> Mastic Structural <input type="checkbox"/> Steel F. P. ing <input type="checkbox"/> Deck F. P. ing	<input type="checkbox"/> Shingle <input type="checkbox"/> Rolled <input type="checkbox"/> Felt <input type="checkbox"/> Tar Miscellaneous: _____ No. of Phases: _____ Colour: _____	<input type="checkbox"/> Floor <input type="checkbox"/> Wall Orientation <input type="checkbox"/> Ceiling <input type="checkbox"/> Above Ceiling <input checked="" type="checkbox"/> Other (6" waterlines)





ASBESTOS BULK SAMPLING FORM

Sample #:	S004	Date Sampled:	November 29, 2012	
Building :	OSC Main BLDG and Annex	Sampler:	Trent Hardy	
Location:	001, room AX1001	Analysis:	SAI - PLM	
MUN Project #:	02-02-900	Work Order #:		
Bulk Sampling Parameters				
Pipe/Tank	Flooring	Ceiling	Roofing	Location
<input type="checkbox"/> Insulation <input checked="" type="checkbox"/> Elbow <input type="checkbox"/> Fitting <input type="checkbox"/> Transite Pipe <input type="checkbox"/> Gasket <input type="checkbox"/> Tank Insulation <input type="checkbox"/> Pipe Wrap HVAC <input type="checkbox"/> Insulation <input type="checkbox"/> Tape <input type="checkbox"/> Paper Wrap	<input type="checkbox"/> 12'x12' Tile <input type="checkbox"/> 9'x9'Tile <input type="checkbox"/> Vinyl Sheet <input type="checkbox"/> Mastic Wall <input type="checkbox"/> Transite Panel <input type="checkbox"/> Textured Wall <input type="checkbox"/> Plaster <input type="checkbox"/> DWJC	<input type="checkbox"/> Textured <input type="checkbox"/> Stucco <input type="checkbox"/> Popcorn <input type="checkbox"/> DWJC <input type="checkbox"/> Plaster <input type="checkbox"/> Acoustic Tile (Dropped) <input type="checkbox"/> Acoustic Tile (Glued-on) <input type="checkbox"/> Mastic Structural <input type="checkbox"/> Steel F. P. ing <input type="checkbox"/> Deck F. P. ing	<input type="checkbox"/> Shingle <input type="checkbox"/> Rolled <input type="checkbox"/> Felt <input type="checkbox"/> Tar Miscellaneous: _____ No. of Phases: _____ Colour: _____	<input type="checkbox"/> Floor <input type="checkbox"/> Wall Orientation <input type="checkbox"/> Ceiling <input type="checkbox"/> Above Ceiling <input checked="" type="checkbox"/> Other (4" waterlines)





ASBESTOS BULK SAMPLING FORM

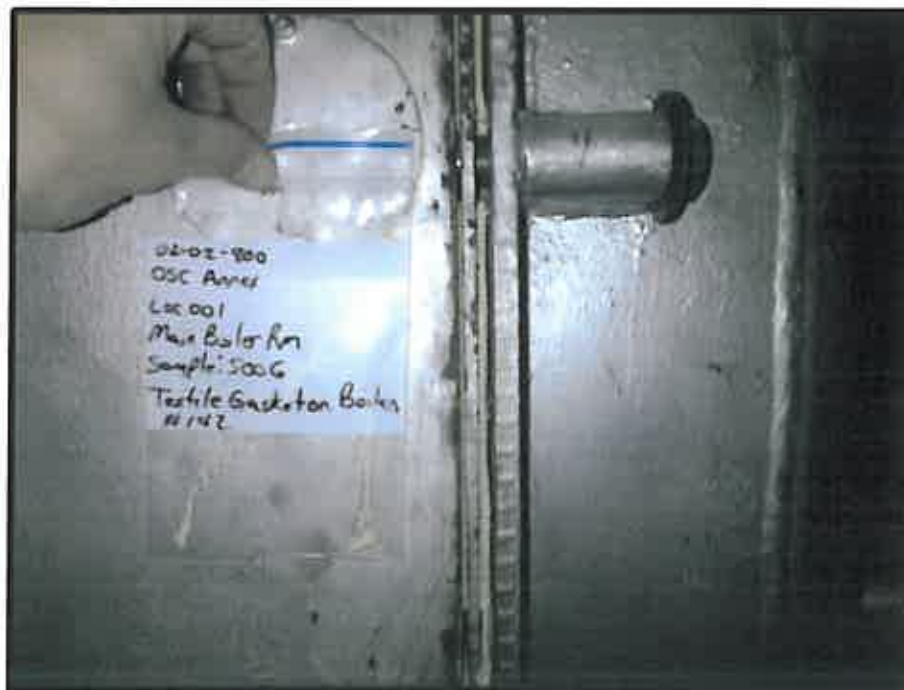
Sample #:	S005	Date Sampled:	November 29, 2012	
Building :	OSC Main BLDG and Annex	Sampler:	Trent Hardy	
Location:	001, room AX1001	Analysis:	SAI - PLM	
MUN Project #:	02-02-900	Work Order #:		
Bulk Sampling Parameters				
Pipe/Tank	Flooring	Ceiling	Roofing	Location
<input type="checkbox"/> Insulation <input checked="" type="checkbox"/> Elbow <input type="checkbox"/> Fitting <input type="checkbox"/> Transite Pipe <input type="checkbox"/> Gasket <input type="checkbox"/> Tank Insulation <input type="checkbox"/> Pipe Wrap HVAC <input type="checkbox"/> Insulation <input type="checkbox"/> Tape <input type="checkbox"/> Paper Wrap	<input type="checkbox"/> 12'x12' Tile <input type="checkbox"/> 9'x9'Tile <input type="checkbox"/> Vinyl Sheet <input type="checkbox"/> Mastic Wall <input type="checkbox"/> Transite Panel <input type="checkbox"/> Textured Wall <input type="checkbox"/> Plaster <input type="checkbox"/> DWJC	<input type="checkbox"/> Textured <input type="checkbox"/> Stucco <input type="checkbox"/> Popcorn <input type="checkbox"/> DWJC <input type="checkbox"/> Plaster <input type="checkbox"/> Acoustic Tile (Dropped) <input type="checkbox"/> Acoustic Tile (Glued-on) <input type="checkbox"/> Mastic Structural <input type="checkbox"/> Steel F. P. ing <input type="checkbox"/> Deck F. P. ing	<input type="checkbox"/> Shingle <input type="checkbox"/> Rolled <input type="checkbox"/> Felt <input type="checkbox"/> Tar Miscellaneous: _____ No. of Phases: _____ Colour: _____	<input type="checkbox"/> Floor <input type="checkbox"/> Wall Orientation <input type="checkbox"/> Ceiling <input type="checkbox"/> Above Ceiling <input checked="" type="checkbox"/> Other (6" pipes)





ASBESTOS BULK SAMPLING FORM

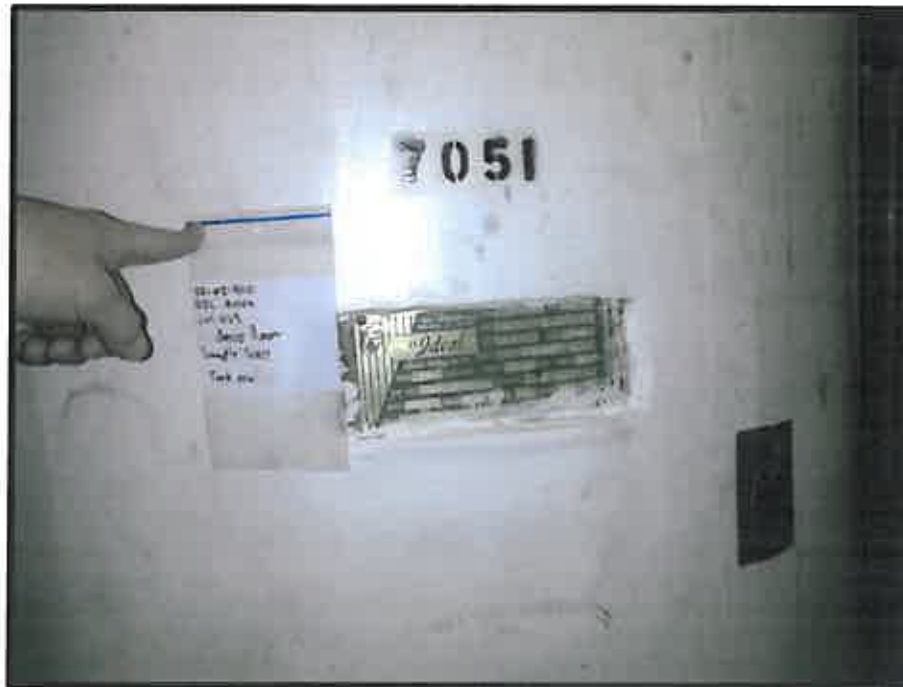
Sample #:	S006	Date Sampled:	November 29, 2012	
Building :	OSC Main BLDG and Annex	Sampler:	Trent Hardy	
Location:	001, room AX1001	Analysis:	SAI - PLM	
MUN Project #:	02-02-900	Work Order #:		
Bulk Sampling Parameters				
Pipe/Tank	Flooring	Ceiling	Roofing	Location
<input type="checkbox"/> Insulation <input type="checkbox"/> Elbow <input type="checkbox"/> Fitting <input type="checkbox"/> Transite Pipe <input type="checkbox"/> Gasket <input type="checkbox"/> Tank Insulation <input type="checkbox"/> Pipe Wrap <div style="padding-left: 20px;">HVAC</div> <input type="checkbox"/> Insulation <input type="checkbox"/> Tape <input type="checkbox"/> Paper Wrap	<input type="checkbox"/> 12'x12' Tile <input type="checkbox"/> 9'x9'Tile <input type="checkbox"/> Vinyl Sheet <input type="checkbox"/> Mastic <div style="text-align: center;">Wall</div> <input type="checkbox"/> Transite Panel <input type="checkbox"/> Textured Wall <input type="checkbox"/> Plaster <input type="checkbox"/> DWJC	<input type="checkbox"/> Textured <input type="checkbox"/> Stucco <input type="checkbox"/> Popcorn <input type="checkbox"/> DWJC <input type="checkbox"/> Plaster <input type="checkbox"/> Acoustic Tile (Dropped) <input type="checkbox"/> Acoustic Tile (Glued-on) <input type="checkbox"/> Mastic <div style="text-align: center;">Structural</div> <input type="checkbox"/> Steel F. P. ing <input type="checkbox"/> Deck F. P. ing	<input type="checkbox"/> Shingle <input type="checkbox"/> Rolled <input type="checkbox"/> Felt <input type="checkbox"/> Tar Miscellaneous: <u>Textile gasket</u> No. of Phases: _____ Colour: _____	<input type="checkbox"/> Floor <input type="checkbox"/> Wall Orientation <input type="checkbox"/> Ceiling <input type="checkbox"/> Above Ceiling <input checked="" type="checkbox"/> Other (boilers 1 & 2)





ASBESTOS BULK SAMPLING FORM

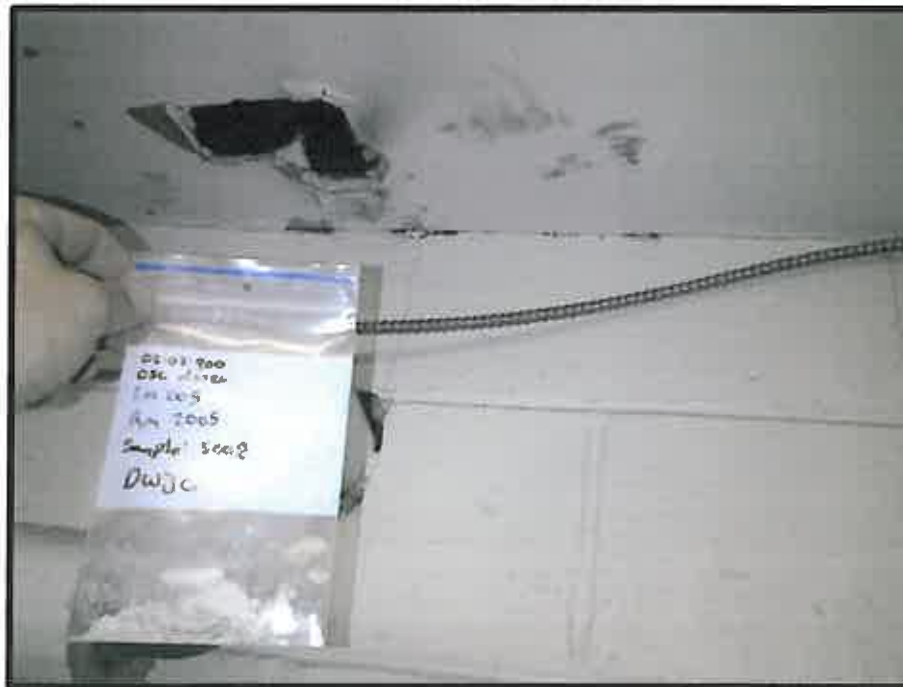
Sample #:	S007	Date Sampled:	November 29, 2012	
Building :	OSC Main BLDG and Annex	Sampler:	Trent Hardy	
Location:	003, room AX1000	Analysis:	SAI - PLM	
MUN Project #:	02-02-900	Work Order #:		
Bulk Sampling Parameters				
Pipe/Tank	Flooring	Ceiling	Roofing	Location
<input checked="" type="checkbox"/> Insulation <input type="checkbox"/> Elbow <input type="checkbox"/> Fitting <input type="checkbox"/> Transite Pipe <input type="checkbox"/> Gasket <input type="checkbox"/> Tank Insulation <input type="checkbox"/> Pipe Wrap HVAC <input type="checkbox"/> Insulation <input type="checkbox"/> Tape <input type="checkbox"/> Paper Wrap	<input type="checkbox"/> 12'x12' Tile <input type="checkbox"/> 9'x9'Tile <input type="checkbox"/> Vinyl Sheet <input type="checkbox"/> Mastic Wall <input type="checkbox"/> Transite Panel <input type="checkbox"/> Textured Wall <input type="checkbox"/> Plaster <input type="checkbox"/> DWJC	<input type="checkbox"/> Textured <input type="checkbox"/> Stucco <input type="checkbox"/> Popcorn <input type="checkbox"/> DWJC <input type="checkbox"/> Plaster <input type="checkbox"/> Acoustic Tile (Dropped) <input type="checkbox"/> Acoustic Tile (Glued-on) <input type="checkbox"/> Mastic Structural <input type="checkbox"/> Steel F. P. ing <input type="checkbox"/> Deck F. P. ing	<input type="checkbox"/> Shingle <input type="checkbox"/> Rolled <input type="checkbox"/> Felt <input type="checkbox"/> Tar Miscellaneous: _____ No. of Phases: _____ Colour: _____	<input type="checkbox"/> Floor <input type="checkbox"/> Wall Orientation <input type="checkbox"/> Ceiling <input type="checkbox"/> Above Ceiling <input checked="" type="checkbox"/> Other (tank)





ASBESTOS BULK SAMPLING FORM

Sample #:	S008	Date Sampled:	November 29, 2012	
Building :	OSC Main BLDG and Annex	Sampler:	Trent Hardy	
Location:	005, room AX2005A	Analysis:	SAI - PLM	
MUN Project #:	02-02-900	Work Order #:		
Bulk Sampling Parameters				
Pipe/Tank	Flooring	Ceiling	Roofing	Location
<input type="checkbox"/> Insulation <input type="checkbox"/> Elbow <input type="checkbox"/> Fitting <input type="checkbox"/> Transite Pipe <input type="checkbox"/> Gasket <input type="checkbox"/> Tank Insulation <input type="checkbox"/> Pipe Wrap HVAC <input type="checkbox"/> Insulation <input type="checkbox"/> Tape <input type="checkbox"/> Paper Wrap	<input type="checkbox"/> 12'x12' Tile <input type="checkbox"/> 9'x9'Tile <input type="checkbox"/> Vinyl Sheet <input type="checkbox"/> Mastic Wall <input type="checkbox"/> Transite Panel <input type="checkbox"/> Textured Wall <input type="checkbox"/> Plaster <input type="checkbox"/> DWJC	<input type="checkbox"/> Textured <input type="checkbox"/> Stucco <input type="checkbox"/> Popcorn <input checked="" type="checkbox"/> DWJC <input type="checkbox"/> Plaster <input type="checkbox"/> Acoustic Tile (Dropped) <input type="checkbox"/> Acoustic Tile (Glued-on) <input type="checkbox"/> Mastic Structural <input type="checkbox"/> Steel F. P. ing <input type="checkbox"/> Deck F. P. ing	<input type="checkbox"/> Shingle <input type="checkbox"/> Rolled <input type="checkbox"/> Felt <input type="checkbox"/> Tar Miscellaneous: _____ No. of Phases: _____ Colour: _____	<input type="checkbox"/> Floor <input type="checkbox"/> Wall Orientation <input checked="" type="checkbox"/> X Ceiling <input type="checkbox"/> Above Ceiling <input type="checkbox"/> Other





ASBESTOS BULK SAMPLING FORM

Sample #:	S009	Date Sampled:	November 29, 2012
Building :	OSC Main BLDG and Annex	Sampler:	Trent Hardy
Location:	009, hallway 2C01	Analysis:	SAI - PLM
MUN Project #:	02-02-900	Work Order #:	
Bulk Sampling Parameters			
Pipe/Tank	Flooring	Ceiling	Roofing Location
<input type="checkbox"/> Insulation	X12'x12' Tile	<input type="checkbox"/> Textured	<input type="checkbox"/> Shingle X Floor
<input type="checkbox"/> Elbow	<input type="checkbox"/> 9'x9'Tile	<input type="checkbox"/> Stucco	<input type="checkbox"/> Rolled <input type="checkbox"/> Wall Orientation
<input type="checkbox"/> Fitting	<input type="checkbox"/> Vinyl Sheet	<input type="checkbox"/> Popcorn	<input type="checkbox"/> Felt <input type="checkbox"/> Ceiling
<input type="checkbox"/> Transite Pipe	<input type="checkbox"/> Mastic	<input type="checkbox"/> DWJC	<input type="checkbox"/> Tar <input type="checkbox"/> Above Ceiling
<input type="checkbox"/> Gasket	Wall	<input type="checkbox"/> Plaster	<input type="checkbox"/> Other
<input type="checkbox"/> Tank Insulation	<input type="checkbox"/> Transite Panel	<input type="checkbox"/> Acoustic Tile (Dropped)	
<input type="checkbox"/> Pipe Wrap	<input type="checkbox"/> Textured Wall	<input type="checkbox"/> Acoustic Tile (Glued-on)	
HVAC	<input type="checkbox"/> Plaster	<input type="checkbox"/> Mastic	Miscellaneous: _____
<input type="checkbox"/> Insulation	<input type="checkbox"/> DWJC	Structural	No. of Phases: _____
<input type="checkbox"/> Tape		<input type="checkbox"/> Steel F. P. ing	Colour: White with brown streaks
<input type="checkbox"/> Paper Wrap		<input type="checkbox"/> Deck F. P. ing	





ASBESTOS BULK SAMPLING FORM

Sample #:	S010	Date Sampled:	November 29, 2012	
Building :	OSC Main BLDG and Annex	Sampler:	Trent Hardy	
Location:	010, hallway AX2S02	Analysis:	SAI - PLM	
MUN Project #:	02-02-900	Work Order #:		
Bulk Sampling Parameters				
Pipe/Tank	Flooring	Ceiling	Roofing	Location
<input type="checkbox"/> Insulation <input type="checkbox"/> Elbow <input type="checkbox"/> Fitting <input type="checkbox"/> Transite Pipe <input type="checkbox"/> Gasket <input type="checkbox"/> Tank Insulation <input type="checkbox"/> Pipe Wrap HVAC <input type="checkbox"/> Insulation <input type="checkbox"/> Tape <input type="checkbox"/> Paper Wrap	<input type="checkbox"/> 12'x12' Tile <input type="checkbox"/> 9'x9'Tile <input type="checkbox"/> Vinyl Sheet <input type="checkbox"/> Mastic Wall <input type="checkbox"/> Transite Panel <input type="checkbox"/> Textured Wall <input type="checkbox"/> Plaster <input type="checkbox"/> DWJC	<input type="checkbox"/> Textured <input type="checkbox"/> Stucco <input type="checkbox"/> Popcorn <input type="checkbox"/> DWJC <input type="checkbox"/> Plaster <input type="checkbox"/> Acoustic Tile (Dropped) <input type="checkbox"/> Acoustic Tile (Glued-on) <input type="checkbox"/> Mastic Structural <input type="checkbox"/> Steel F. P. ing <input type="checkbox"/> Deck F. P. ing	<input type="checkbox"/> Shingle <input type="checkbox"/> Rolled <input type="checkbox"/> Felt <input checked="" type="checkbox"/> X Tar Miscellaneous: _____ No. of Phases: _____ Colour: _____	<input type="checkbox"/> Floor <input type="checkbox"/> Wall Orientation <input type="checkbox"/> Ceiling <input checked="" type="checkbox"/> X Above Ceiling <input type="checkbox"/> Other





ASBESTOS BULK SAMPLING FORM

Sample #:	S011	Date Sampled:	November 29, 2012	
Building :	OSC Main BLDG and Annex	Sampler:	Trent Hardy	
Location:	011, room AX2003	Analysis:	SAI - PLM	
MUN Project #:	02-02-900	Work Order #:		
Bulk Sampling Parameters				
Pipe/Tank	Flooring	Ceiling	Roofing	Location
<input type="checkbox"/> Insulation	X12'x12' Tile	<input type="checkbox"/> Textured	<input type="checkbox"/> Shingle	X Floor
<input type="checkbox"/> Elbow	<input type="checkbox"/> 9'x9'Tile	<input type="checkbox"/> Stucco	<input type="checkbox"/> Rolled	<input type="checkbox"/> Wall Orientation
<input type="checkbox"/> Fitting	<input type="checkbox"/> Vinyl Sheet	<input type="checkbox"/> Popcorn	<input type="checkbox"/> Felt	<input type="checkbox"/> Ceiling
<input type="checkbox"/> Transite Pipe	<input type="checkbox"/> Mastic	<input type="checkbox"/> DWJC	<input type="checkbox"/> Tar	<input type="checkbox"/> Above Ceiling
<input type="checkbox"/> Gasket	Wall	<input type="checkbox"/> Plaster		<input type="checkbox"/> Other
<input type="checkbox"/> Tank Insulation	<input type="checkbox"/> Transite Panel	<input type="checkbox"/> Acoustic Tile (Dropped)		
<input type="checkbox"/> Pipe Wrap	<input type="checkbox"/> Textured Wall	<input type="checkbox"/> Acoustic Tile (Glued-on)		
HVAC	<input type="checkbox"/> Plaster	<input type="checkbox"/> Mastic		Miscellaneous: _____
<input type="checkbox"/> Insulation	<input type="checkbox"/> DWJC	Structural		No. of Phases: _____
<input type="checkbox"/> Tape		<input type="checkbox"/> Steel F. P. ing		Colour: <u>White with abundant brown flecks</u>
<input type="checkbox"/> Paper Wrap		<input type="checkbox"/> Deck F. P. ing		





ASBESTOS BULK SAMPLING FORM

Sample #:	S012	Date Sampled:	November 29, 2012	
Building :	OSC Main BLDG and Annex	Sampler:	Trent Hardy	
Location:	012, room AX2001B	Analysis:	SAI - PLM	
MUN Project #:	02-02-900	Work Order #:		
Bulk Sampling Parameters				
Pipe/Tank	Flooring	Ceiling	Roofing	Location
<input type="checkbox"/> Insulation <input type="checkbox"/> Elbow <input type="checkbox"/> Fitting <input type="checkbox"/> Transite Pipe <input type="checkbox"/> Gasket <input type="checkbox"/> Tank Insulation <input type="checkbox"/> Pipe Wrap HVAC <input type="checkbox"/> Insulation <input type="checkbox"/> Tape <input type="checkbox"/> Paper Wrap	<input type="checkbox"/> 12'x12' Tile <input type="checkbox"/> 9'x9'Tile <input type="checkbox"/> Vinyl Sheet <input type="checkbox"/> Mastic Wall <input type="checkbox"/> Transite Panel <input type="checkbox"/> Textured Wall <input type="checkbox"/> Plaster X DWJC	<input type="checkbox"/> Textured <input type="checkbox"/> Stucco <input type="checkbox"/> Popcorn <input type="checkbox"/> DWJC <input type="checkbox"/> Plaster <input type="checkbox"/> Acoustic Tile (Dropped) <input type="checkbox"/> Acoustic Tile (Glued-on) <input type="checkbox"/> Mastic Structural <input type="checkbox"/> Steel F. P. ing <input type="checkbox"/> Deck F. P. ing	<input type="checkbox"/> Shingle <input type="checkbox"/> Rolled <input type="checkbox"/> Felt <input type="checkbox"/> Tar Miscellaneous: _____ No. of Phases: _____ Colour: _____	<input type="checkbox"/> Floor <input type="checkbox"/> X Wall Orientation <input type="checkbox"/> Ceiling <input type="checkbox"/> Above Ceiling <input type="checkbox"/> Other





ASBESTOS BULK SAMPLING FORM

Sample #:	S013	Date Sampled:	November 29, 2012	
Building :	OSC Main BLDG and Annex	Sampler:	Trent Hardy	
Location:	012, room AX2001B	Analysis:	SAI - PLM	
MUN Project #:	02-02-900	Work Order #:		
Bulk Sampling Parameters				
Pipe/Tank	Flooring	Ceiling	Roofing	Location
<input type="checkbox"/> Insulation <input type="checkbox"/> Elbow <input type="checkbox"/> Fitting <input type="checkbox"/> Transite Pipe <input type="checkbox"/> Gasket <input type="checkbox"/> Tank Insulation <input type="checkbox"/> Pipe Wrap HVAC <input type="checkbox"/> Insulation <input type="checkbox"/> Tape <input type="checkbox"/> Paper Wrap	<input type="checkbox"/> 12'x12' Tile <input type="checkbox"/> 9'x9'Tile <input type="checkbox"/> Vinyl Sheet <input type="checkbox"/> Mastic Wall <input checked="" type="checkbox"/> Transite Panel <input type="checkbox"/> Textured Wall <input type="checkbox"/> Plaster <input type="checkbox"/> DWJC	<input type="checkbox"/> Textured <input type="checkbox"/> Stucco <input type="checkbox"/> Popcorn <input type="checkbox"/> DWJC <input type="checkbox"/> Plaster <input type="checkbox"/> Acoustic Tile (Dropped) <input type="checkbox"/> Acoustic Tile (Glued-on) <input type="checkbox"/> Mastic Structural <input type="checkbox"/> Steel F. P. ing <input type="checkbox"/> Deck F. P. ing	<input type="checkbox"/> Shingle <input type="checkbox"/> Rolled <input type="checkbox"/> Felt <input type="checkbox"/> Tar Miscellaneous: _____ No. of Phases: _____ Colour: _____	<input type="checkbox"/> Floor <input checked="" type="checkbox"/> Wall Orientation <input type="checkbox"/> Ceiling <input type="checkbox"/> Above Ceiling <input type="checkbox"/> Other





ASBESTOS BULK SAMPLING FORM

Sample #:	S015	Date Sampled:	November 29, 2012
Building :	OSC Main BLDG and Annex	Sampler:	Trent Hardy
Location:	017, stairwell 2S01	Analysis:	SAI - PLM
MUN Project #:	02-02-900	Work Order #:	
Bulk Sampling Parameters			
Pipe/Tank	Flooring	Ceiling	Roofing Location
<input type="checkbox"/> Insulation	X12'x12' Tile	<input type="checkbox"/> Textured	<input type="checkbox"/> Shingle X Floor
<input type="checkbox"/> Elbow	<input type="checkbox"/> 9'x9'Tile	<input type="checkbox"/> Stucco	<input type="checkbox"/> Rolled <input type="checkbox"/> Wall Orientation
<input type="checkbox"/> Fitting	<input type="checkbox"/> Vinyl Sheet	<input type="checkbox"/> Popcorn	<input type="checkbox"/> Felt <input type="checkbox"/> Ceiling
<input type="checkbox"/> Transite Pipe	<input type="checkbox"/> Mastic	<input type="checkbox"/> DWJC	<input type="checkbox"/> Tar <input type="checkbox"/> Above Ceiling
<input type="checkbox"/> Gasket	Wall	<input type="checkbox"/> Plaster	<input type="checkbox"/> Other
<input type="checkbox"/> Tank Insulation	<input type="checkbox"/> Transite Panel	<input type="checkbox"/> Acoustic Tile (Dropped)	
<input type="checkbox"/> Pipe Wrap	<input type="checkbox"/> Textured Wall	<input type="checkbox"/> Acoustic Tile (Glued-on)	
HVAC	<input type="checkbox"/> Plaster	<input type="checkbox"/> Mastic	Miscellaneous: _____
<input type="checkbox"/> Insulation	<input type="checkbox"/> DWJC	Structural	No. of Phases: _____
<input type="checkbox"/> Tape		<input type="checkbox"/> Steel F. P. ing	Colour: <u>Beige with brown streaks</u>
<input type="checkbox"/> Paper Wrap		<input type="checkbox"/> Deck F. P. ing	





ASBESTOS BULK SAMPLING FORM

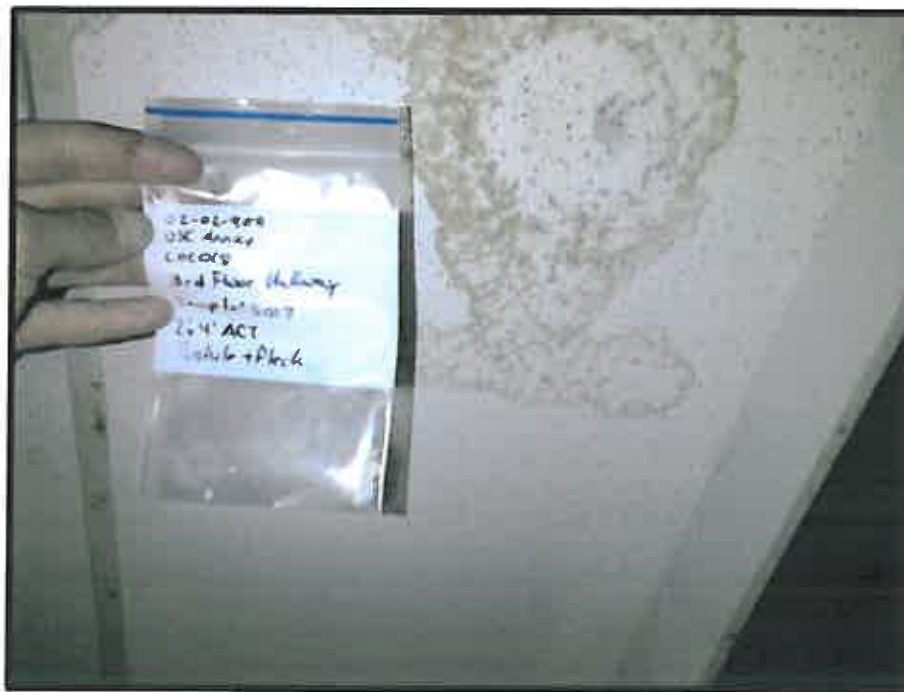
Sample #:	S016	Date Sampled:	November 29, 2012
Building :	OSC Main BLDG and Annex	Sampler:	Trent Hardy
Location:	017, stairwell 2S01	Analysis:	SAI - PLM
MUN Project #:	02-02-900	Work Order #:	
Bulk Sampling Parameters			
Pipe/Tank	Flooring	Ceiling	Roofing
<input type="checkbox"/> Insulation <input type="checkbox"/> Elbow <input type="checkbox"/> Fitting <input type="checkbox"/> Transite Pipe <input type="checkbox"/> Gasket <input type="checkbox"/> Tank Insulation <input type="checkbox"/> Pipe Wrap HVAC <input type="checkbox"/> Insulation <input type="checkbox"/> Tape <input type="checkbox"/> Paper Wrap	X12'x12' Tile <input type="checkbox"/> 9'x9'Tile <input type="checkbox"/> Vinyl Sheet <input type="checkbox"/> Mastic Wall <input type="checkbox"/> Transite Panel <input type="checkbox"/> Textured Wall <input type="checkbox"/> Plaster <input type="checkbox"/> DWJC	<input type="checkbox"/> Textured <input type="checkbox"/> Stucco <input type="checkbox"/> Popcorn <input type="checkbox"/> DWJC <input type="checkbox"/> Plaster <input type="checkbox"/> Acoustic Tile (Dropped) <input type="checkbox"/> Acoustic Tile (Glued-on) <input type="checkbox"/> Mastic Structural <input type="checkbox"/> Steel F. P. ing <input type="checkbox"/> Deck F. P. ing	<input type="checkbox"/> Shingle <input type="checkbox"/> Rolled <input type="checkbox"/> Felt <input type="checkbox"/> Tar Miscellaneous: _____ No. of Phases: _____ Colour: <u>Beige with thick brown streaks</u>





ASBESTOS BULK SAMPLING FORM

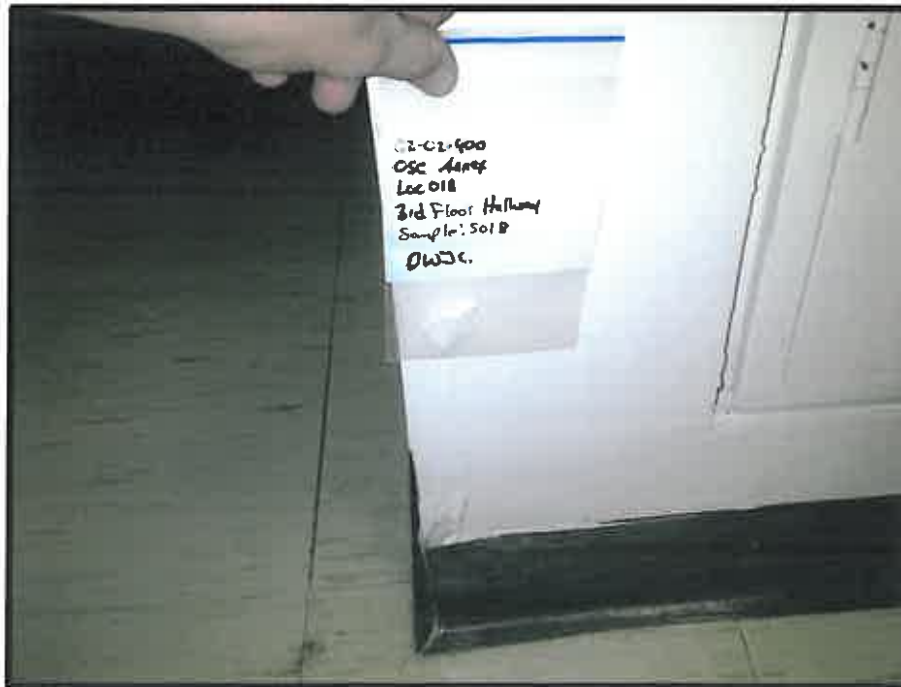
Sample #:	S017	Date Sampled:	November 29, 2012
Building :	OSC Main BLDG and Annex	Sampler:	Trent Hardy
Location:	017, stairwell 2S01	Analysis:	SAI - PLM
MUN Project #:	02-02-900	Work Order #:	
Bulk Sampling Parameters			
Pipe/Tank	Flooring	Ceiling	Roofing Location
<input type="checkbox"/> Insulation <input type="checkbox"/> Elbow <input type="checkbox"/> Fitting <input type="checkbox"/> Transite Pipe <input type="checkbox"/> Gasket <input type="checkbox"/> Tank Insulation <input type="checkbox"/> Pipe Wrap HVAC <input type="checkbox"/> Insulation <input type="checkbox"/> Tape <input type="checkbox"/> Paper Wrap	<input type="checkbox"/> 12'x12' Tile <input type="checkbox"/> 9'x9'Tile <input type="checkbox"/> Vinyl Sheet <input type="checkbox"/> Mastic Wall <input type="checkbox"/> Transite Panel <input type="checkbox"/> Textured Wall <input type="checkbox"/> Plaster <input type="checkbox"/> DWJC	<input type="checkbox"/> Textured <input type="checkbox"/> Stucco <input type="checkbox"/> Popcorn <input type="checkbox"/> DWJC <input type="checkbox"/> Plaster <input checked="" type="checkbox"/> Acoustic Tile (Dropped) <input type="checkbox"/> Acoustic Tile (Glued-on) <input type="checkbox"/> Mastic Structural <input type="checkbox"/> Steel F. P. ing <input type="checkbox"/> Deck F. P. ing	<input type="checkbox"/> Shingle <input type="checkbox"/> Rolled <input type="checkbox"/> Felt <input type="checkbox"/> Tar <input type="checkbox"/> Floor <input type="checkbox"/> Wall Orientation <input checked="" type="checkbox"/> Ceiling <input type="checkbox"/> Above Ceiling <input type="checkbox"/> Other Miscellaneous: <u>2' x 4' pinhole and fleck</u> No. of Phases: _____ Colour: _____





ASBESTOS BULK SAMPLING FORM

Sample #:	S018	Date Sampled:	November 29, 2012	
Building :	OSC Main BLDG and Annex	Sampler:	Trent Hardy	
Location:	017, stairwell 2S01	Analysis:	SAI - PLM	
MUN Project #:	02-02-900	Work Order #:		
Bulk Sampling Parameters				
Pipe/Tank	Flooring	Ceiling	Roofing	Location
<input type="checkbox"/> Insulation <input type="checkbox"/> Elbow <input type="checkbox"/> Fitting <input type="checkbox"/> Transite Pipe <input type="checkbox"/> Gasket <input type="checkbox"/> Tank Insulation <input type="checkbox"/> Pipe Wrap HVAC <input type="checkbox"/> Insulation <input type="checkbox"/> Tape <input type="checkbox"/> Paper Wrap	<input type="checkbox"/> 12'x12' Tile <input type="checkbox"/> 9'x9'Tile <input type="checkbox"/> Vinyl Sheet <input type="checkbox"/> Mastic Wall <input type="checkbox"/> Transite Panel <input type="checkbox"/> Textured Wall <input type="checkbox"/> Plaster X DWJC	<input type="checkbox"/> Textured <input type="checkbox"/> Stucco <input type="checkbox"/> Popcorn <input type="checkbox"/> DWJC <input type="checkbox"/> Plaster <input type="checkbox"/> Acoustic Tile (Dropped) <input type="checkbox"/> Acoustic Tile (Glued-on) <input type="checkbox"/> Mastic Structural <input type="checkbox"/> Steel F. P. ing <input type="checkbox"/> Deck F. P. ing	<input type="checkbox"/> Shingle <input type="checkbox"/> Rolled <input type="checkbox"/> Felt <input type="checkbox"/> Tar Miscellaneous: _____ No. of Phases: _____ Colour: _____	<input type="checkbox"/> Floor <input type="checkbox"/> X Wall Orientation <input type="checkbox"/> Ceiling <input type="checkbox"/> Above Ceiling <input type="checkbox"/> Other





ASBESTOS BULK SAMPLING FORM

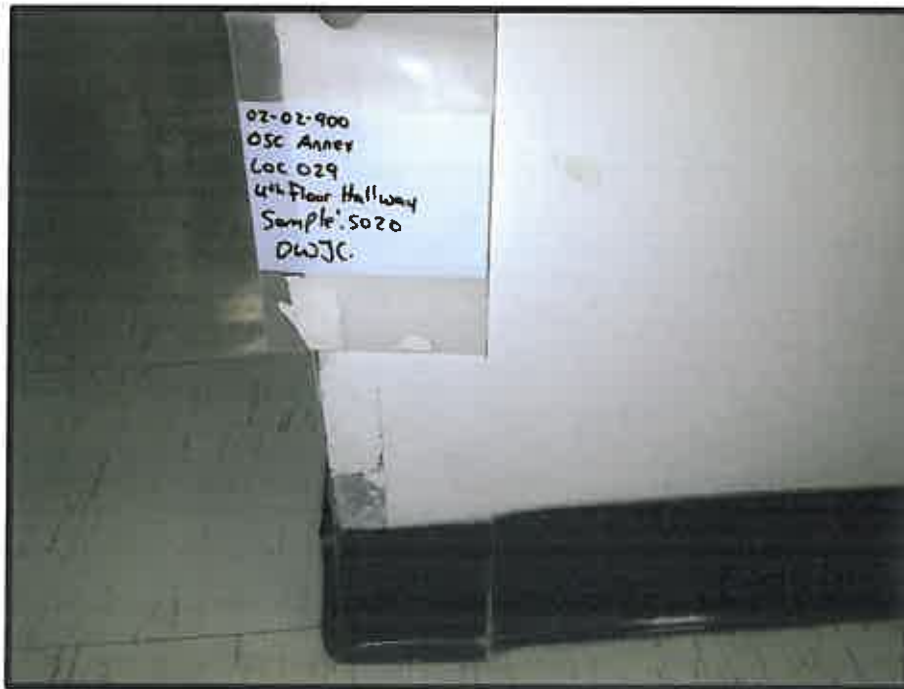
Sample #:	S019	Date Sampled:	November 29, 2012
Building :	OSC Main BLDG and Annex	Sampler:	Trent Hardy
Location:	020, room 3001B	Analysis:	SAI - PLM
MUN Project #:	02-02-900	Work Order #:	
Bulk Sampling Parameters			
Pipe/Tank	Flooring	Ceiling	Roofing
<input type="checkbox"/> Insulation <input type="checkbox"/> Elbow <input type="checkbox"/> Fitting <input type="checkbox"/> Transite Pipe <input type="checkbox"/> Gasket <input type="checkbox"/> Tank Insulation <input type="checkbox"/> Pipe Wrap HVAC <input type="checkbox"/> Insulation <input type="checkbox"/> Tape <input type="checkbox"/> Paper Wrap	X12'x12' Tile <input type="checkbox"/> 9'x9'Tile <input type="checkbox"/> Vinyl Sheet <input type="checkbox"/> Mastic Wall <input type="checkbox"/> Transite Panel <input type="checkbox"/> Textured Wall <input type="checkbox"/> Plaster <input type="checkbox"/> DWJC	<input type="checkbox"/> Textured <input type="checkbox"/> Stucco <input type="checkbox"/> Popcorn <input type="checkbox"/> DWJC <input type="checkbox"/> Plaster <input type="checkbox"/> Acoustic Tile (Dropped) <input type="checkbox"/> Acoustic Tile (Glued-on) <input type="checkbox"/> Mastic Structural <input type="checkbox"/> Steel F. P. ing <input type="checkbox"/> Deck F. P. ing	<input type="checkbox"/> Shingle <input type="checkbox"/> Rolled <input type="checkbox"/> Felt <input type="checkbox"/> Tar Miscellaneous: _____ No. of Phases: _____ Colour: <u>Grey</u>
		Location	
		<input type="checkbox"/> X Floor <input type="checkbox"/> Wall Orientation <input type="checkbox"/> Ceiling <input type="checkbox"/> Above Ceiling <input type="checkbox"/> Other	





ASBESTOS BULK SAMPLING FORM

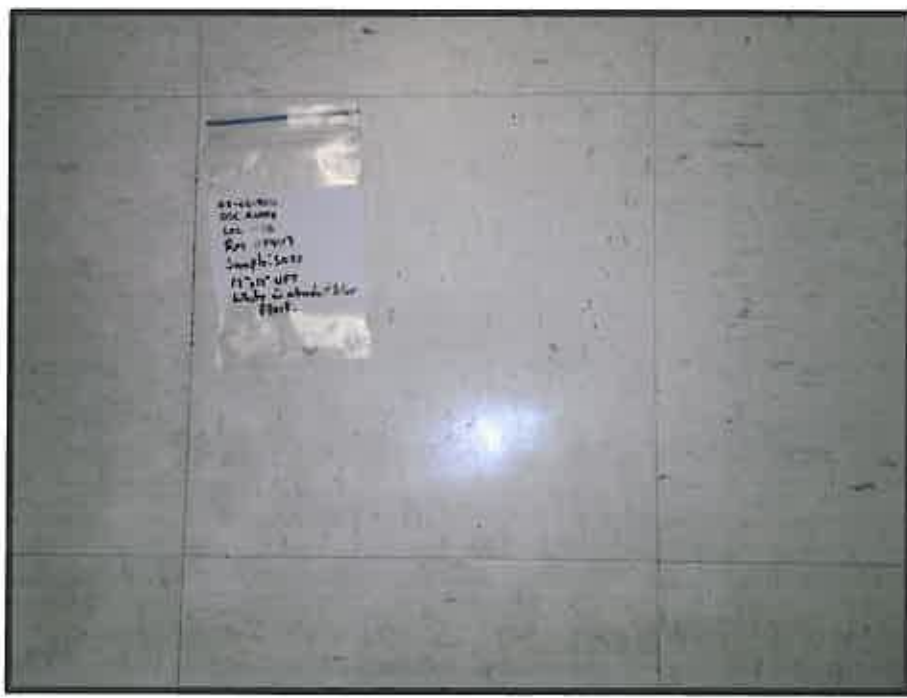
Sample #:	S020	Date Sampled:	November 29, 2012	
Building :	OSC Main BLDG and Annex	Sampler:	Trent Hardy	
Location:	031, room AX4001	Analysis:	SAI - PLM	
MUN Project #:	02-02-900	Work Order #:		
Bulk Sampling Parameters				
Pipe/Tank	Flooring	Ceiling	Roofing	Location
<input type="checkbox"/> Insulation <input type="checkbox"/> Elbow <input type="checkbox"/> Fitting <input type="checkbox"/> Transite Pipe <input type="checkbox"/> Gasket <input type="checkbox"/> Tank Insulation <input type="checkbox"/> Pipe Wrap HVAC <input type="checkbox"/> Insulation <input type="checkbox"/> Tape <input type="checkbox"/> Paper Wrap	<input type="checkbox"/> 12'x12' Tile <input type="checkbox"/> 9'x9'Tile <input type="checkbox"/> Vinyl Sheet <input type="checkbox"/> Mastic Wall <input type="checkbox"/> Transite Panel <input type="checkbox"/> Textured Wall <input type="checkbox"/> Plaster X DWJC	<input type="checkbox"/> Textured <input type="checkbox"/> Stucco <input type="checkbox"/> Popcorn <input type="checkbox"/> DWJC <input type="checkbox"/> Plaster <input type="checkbox"/> Acoustic Tile (Dropped) <input type="checkbox"/> Acoustic Tile (Glued-on) <input type="checkbox"/> Mastic Structural <input type="checkbox"/> Steel F. P. ing <input type="checkbox"/> Deck F. P. ing	<input type="checkbox"/> Shingle <input type="checkbox"/> Rolled <input type="checkbox"/> Felt <input type="checkbox"/> Tar Miscellaneous: _____ No. of Phases: _____ Colour: _____	<input type="checkbox"/> Floor <input checked="" type="checkbox"/> Wall Orientation <input type="checkbox"/> Ceiling <input type="checkbox"/> Above Ceiling <input type="checkbox"/> Other





ASBESTOS BULK SAMPLING FORM

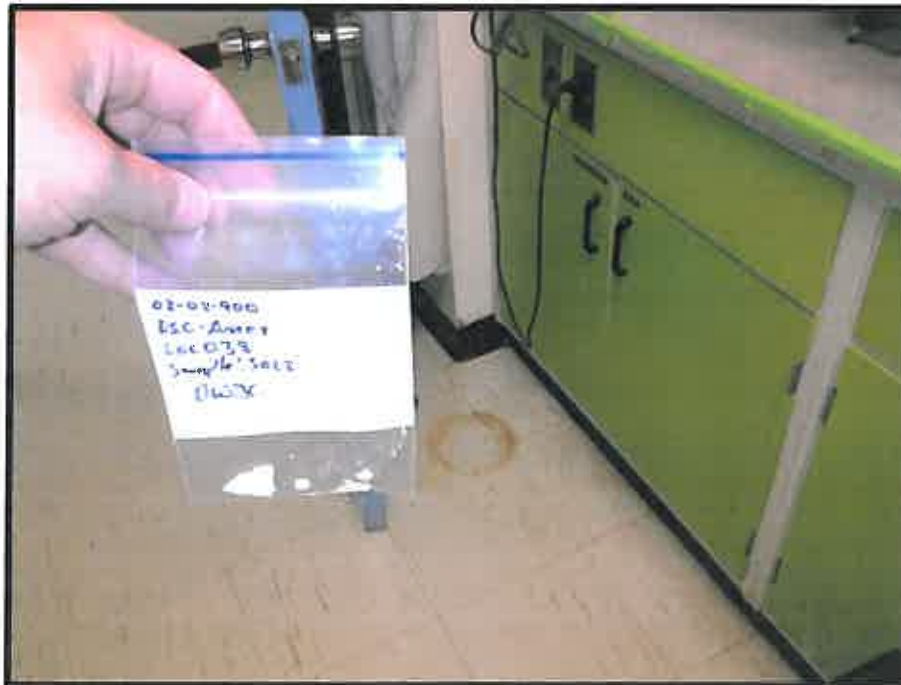
Sample #:	S021	Date Sampled:	November 29, 2012	
Building :	OSC Main BLDG and Annex	Sampler:	Trent Hardy	
Location:	036, room 4013	Analysis:	SAI - PLM	
MUN Project #:	02-02-900	Work Order #:		
Bulk Sampling Parameters				
Pipe/Tank	Flooring	Ceiling	Roofing	Location
<input type="checkbox"/> Insulation	X12'x12' Tile	<input type="checkbox"/> Textured	<input type="checkbox"/> Shingle	X Floor
<input type="checkbox"/> Elbow	<input type="checkbox"/> 9'x9'Tile	<input type="checkbox"/> Stucco	<input type="checkbox"/> Rolled	<input type="checkbox"/> Wall Orientation
<input type="checkbox"/> Fitting	<input type="checkbox"/> Vinyl Sheet	<input type="checkbox"/> Popcorn	<input type="checkbox"/> Felt	<input type="checkbox"/> Ceiling
<input type="checkbox"/> Transite Pipe	<input type="checkbox"/> Mastic	<input type="checkbox"/> DWJC	<input type="checkbox"/> Tar	<input type="checkbox"/> Above Ceiling
<input type="checkbox"/> Gasket	Wall	<input type="checkbox"/> Plaster		<input type="checkbox"/> Other
<input type="checkbox"/> Tank Insulation	<input type="checkbox"/> Transite Panel	<input type="checkbox"/> Acoustic Tile (Dropped)		
<input type="checkbox"/> Pipe Wrap	<input type="checkbox"/> Textured Wall	<input type="checkbox"/> Acoustic Tile (Glued-on)		
HVAC	<input type="checkbox"/> Plaster	<input type="checkbox"/> Mastic		Miscellaneous: _____
<input type="checkbox"/> Insulation	<input type="checkbox"/> DWJC	Structural		No. of Phases: _____
<input type="checkbox"/> Tape		<input type="checkbox"/> Steel F. P. ing		Colour: <u>White with abundant blue flecks</u>
<input type="checkbox"/> Paper Wrap		<input type="checkbox"/> Deck F. P. ing		





ASBESTOS BULK SAMPLING FORM

Sample #:	S022	Date Sampled:	November 29, 2012	
Building :	OSC Main BLDG and Annex	Sampler:	Trent Hardy	
Location:	037, room 4016	Analysis:	SAI - PLM	
MUN Project #:	02-02-900	Work Order #:		
Bulk Sampling Parameters				
Pipe/Tank	Flooring	Ceiling	Roofing	Location
<input type="checkbox"/> Insulation <input type="checkbox"/> Elbow <input type="checkbox"/> Fitting <input type="checkbox"/> Transite Pipe <input type="checkbox"/> Gasket <input type="checkbox"/> Tank Insulation <input type="checkbox"/> Pipe Wrap HVAC <input type="checkbox"/> Insulation <input type="checkbox"/> Tape <input type="checkbox"/> Paper Wrap	<input type="checkbox"/> 12'x12' Tile <input type="checkbox"/> 9'x9'Tile <input type="checkbox"/> Vinyl Sheet <input type="checkbox"/> Mastic Wall <input type="checkbox"/> Transite Panel <input type="checkbox"/> Textured Wall <input type="checkbox"/> Plaster <input type="checkbox"/> DWJC	<input type="checkbox"/> Textured <input type="checkbox"/> Stucco <input type="checkbox"/> Popcorn <input type="checkbox"/> DWJC <input type="checkbox"/> Plaster <input type="checkbox"/> Acoustic Tile (Dropped) <input type="checkbox"/> Acoustic Tile (Glued-on) <input type="checkbox"/> Mastic Structural <input type="checkbox"/> Steel F. P. ing <input type="checkbox"/> Deck F. P. ing	<input type="checkbox"/> Shingle <input type="checkbox"/> Rolled <input type="checkbox"/> Felt <input type="checkbox"/> Tar Miscellaneous: _____ No. of Phases: _____ Colour: _____	<input type="checkbox"/> Floor <input checked="" type="checkbox"/> X Wall Orientation <input type="checkbox"/> Ceiling <input type="checkbox"/> Above Ceiling <input type="checkbox"/> Other





ASBESTOS BULK SAMPLING FORM

Sample #:	S023	Date Sampled:	November 29, 2012
Building :	OSC Main BLDG and Annex	Sampler:	Trent Hardy
Location:	065, room OS3016	Analysis:	SAI - PLM
MUN Project #:	02-02-900	Work Order #:	
Bulk Sampling Parameters			
Pipe/Tank	Flooring	Ceiling	Roofing Location
<input type="checkbox"/> Insulation <input type="checkbox"/> Elbow <input type="checkbox"/> Fitting <input type="checkbox"/> Transite Pipe <input type="checkbox"/> Gasket <input type="checkbox"/> Tank Insulation <input type="checkbox"/> Pipe Wrap <div style="text-align: center;">HVAC</div> <input type="checkbox"/> Insulation <input type="checkbox"/> Tape <input type="checkbox"/> Paper Wrap	<input type="checkbox"/> 12'x12' Tile <input type="checkbox"/> X 9'x9'Tile <input type="checkbox"/> Vinyl Sheet <input type="checkbox"/> Mastic <div style="text-align: center;">Wall</div> <input type="checkbox"/> Transite Panel <input type="checkbox"/> Textured Wall <input type="checkbox"/> Plaster <input type="checkbox"/> DWJC	<input type="checkbox"/> Textured <input type="checkbox"/> Stucco <input type="checkbox"/> Popcorn <input type="checkbox"/> DWJC <input type="checkbox"/> Plaster <input type="checkbox"/> Acoustic Tile (Dropped) <input type="checkbox"/> Acoustic Tile (Glued-on) <input type="checkbox"/> Mastic <div style="text-align: center;">Structural</div> <input type="checkbox"/> Steel F. P. ing <input type="checkbox"/> Deck F. P. ing	<input type="checkbox"/> Shingle <input type="checkbox"/> Rolled <input type="checkbox"/> Felt <input type="checkbox"/> Tar <input type="checkbox"/> X Floor <input type="checkbox"/> Wall Orientation <input type="checkbox"/> Ceiling <input type="checkbox"/> Above Ceiling <input type="checkbox"/> Other Miscellaneous: _____ No. of Phases: _____ Colour: <u>Beige with thick brown streaks</u>



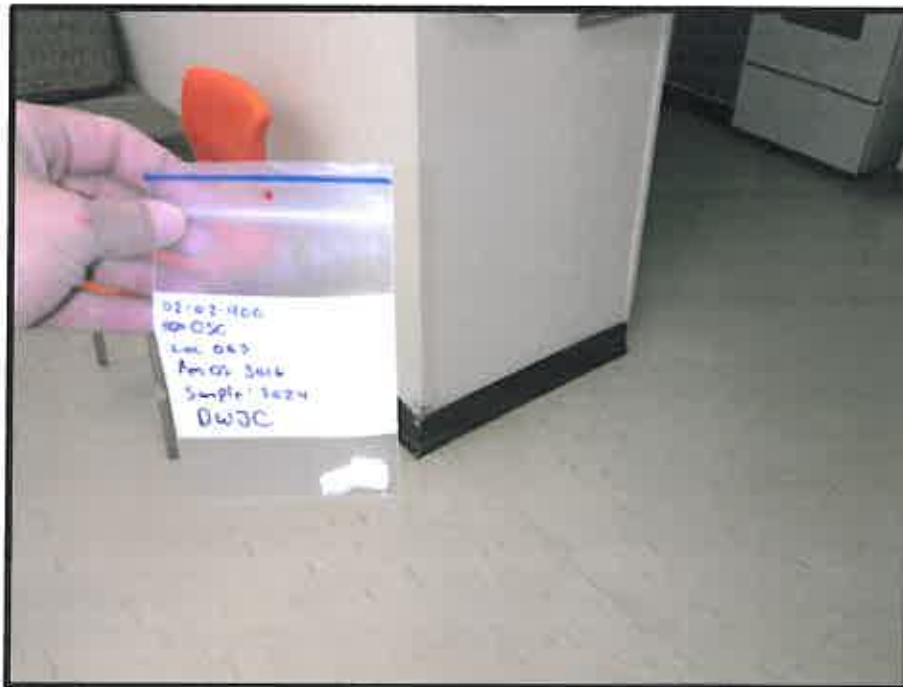


ASBESTOS BULK SAMPLING FORM

Sample #:	S024	Date Sampled:	November 29, 2012
Building :	OSC Main BLDG and Annex	Sampler:	Trent Hardy
Location:	065, room OS3016	Analysis:	SAI - PLM
MUN Project #:	02-02-900	Work Order #:	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
<input type="checkbox"/> Insulation	<input type="checkbox"/> 12'x12' Tile	<input type="checkbox"/> Textured	<input type="checkbox"/> Shingle	<input type="checkbox"/> Floor
<input type="checkbox"/> Elbow	<input type="checkbox"/> 9'x9'Tile	<input type="checkbox"/> Stucco	<input type="checkbox"/> Rolled	<input type="checkbox"/> X Wall Orientation
<input type="checkbox"/> Fitting	<input type="checkbox"/> Vinyl Sheet	<input type="checkbox"/> Popcorn	<input type="checkbox"/> Felt	<input type="checkbox"/> Ceiling
<input type="checkbox"/> Transite Pipe	<input type="checkbox"/> Mastic	<input type="checkbox"/> DWJC	<input type="checkbox"/> Tar	<input type="checkbox"/> Above Ceiling
<input type="checkbox"/> Gasket	Wall	<input type="checkbox"/> Plaster		<input type="checkbox"/> Other
<input type="checkbox"/> Tank Insulation	<input type="checkbox"/> Transite Panel	<input type="checkbox"/> Acoustic Tile (Dropped)		
<input type="checkbox"/> Pipe Wrap	<input type="checkbox"/> Textured Wall	<input type="checkbox"/> Acoustic Tile (Glued-on)		
HVAC	<input type="checkbox"/> Plaster	<input type="checkbox"/> Mastic		
<input type="checkbox"/> Insulation	X DWJC	Structural	Miscellaneous: _____	
<input type="checkbox"/> Tape		<input type="checkbox"/> Steel F. P. ing	No. of Phases: _____	
<input type="checkbox"/> Paper Wrap		<input type="checkbox"/> Deck F. P. ing	Colour: _____	





ASBESTOS BULK SAMPLING FORM

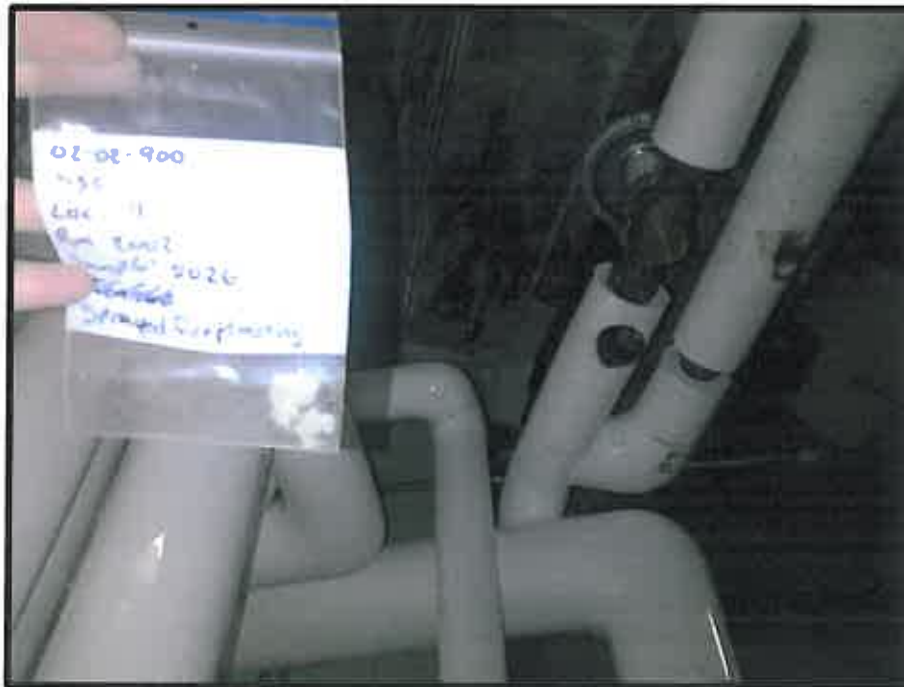
Sample #:	S025	Date Sampled:	November 29, 2012	
Building :	OSC Main BLDG and Annex	Sampler:	Trent Hardy	
Location:	075, room OS2000	Analysis:	SAI - PLM	
MUN Project #:	02-02-900	Work Order #:		
Bulk Sampling Parameters				
Pipe/Tank	Flooring	Ceiling	Roofing	Location
<input type="checkbox"/> Insulation <input type="checkbox"/> Elbow <input type="checkbox"/> Fitting <input type="checkbox"/> Transite Pipe <input type="checkbox"/> Gasket <input type="checkbox"/> Tank Insulation <input type="checkbox"/> Pipe Wrap HVAC <input type="checkbox"/> Insulation <input type="checkbox"/> Tape <input type="checkbox"/> Paper Wrap	X12'x12' Tile <input type="checkbox"/> 9'x9'Tile <input type="checkbox"/> Vinyl Sheet <input type="checkbox"/> Mastic Wall <input type="checkbox"/> Transite Panel <input type="checkbox"/> Textured Wall <input type="checkbox"/> Plaster <input type="checkbox"/> DWJC	<input type="checkbox"/> Textured <input type="checkbox"/> Stucco <input type="checkbox"/> Popcorn <input type="checkbox"/> DWJC <input type="checkbox"/> Plaster <input type="checkbox"/> Acoustic Tile (Dropped) <input type="checkbox"/> Acoustic Tile (Glued-on) <input type="checkbox"/> Mastic Structural <input type="checkbox"/> Steel F. P. ing <input type="checkbox"/> Deck F. P. ing	<input type="checkbox"/> Shingle <input type="checkbox"/> Rolled <input type="checkbox"/> Felt <input type="checkbox"/> Tar Miscellaneous: _____ No. of Phases: _____ Colour: <u>Brown with thick dark brown streaks</u>	X Floor <input type="checkbox"/> Wall Orientation <input type="checkbox"/> Ceiling <input type="checkbox"/> Above Ceiling <input type="checkbox"/> Other





ASBESTOS BULK SAMPLING FORM

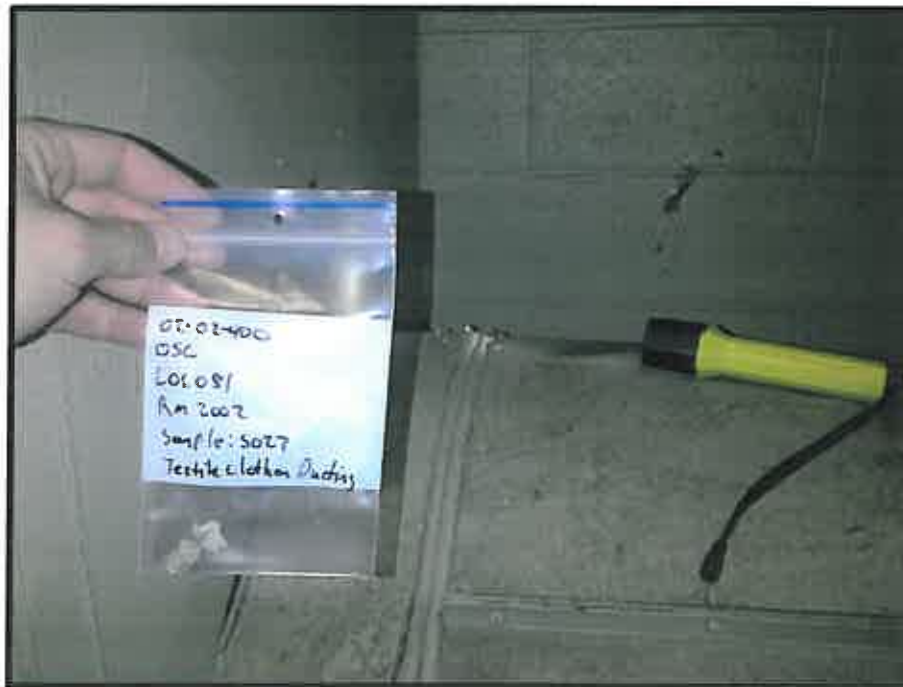
Sample #:	S026	Date Sampled:	November 29, 2012	
Building :	OSC Main BLDG and Annex	Sampler:	Trent Hardy	
Location:	081, room OS2002	Analysis:	SAI - PLM	
MUN Project #:	02-02-900	Work Order #:		
Bulk Sampling Parameters				
Pipe/Tank	Flooring	Ceiling	Roofing	Location
<input type="checkbox"/> Insulation <input type="checkbox"/> Elbow <input type="checkbox"/> Fitting <input type="checkbox"/> Transite Pipe <input type="checkbox"/> Gasket <input type="checkbox"/> Tank Insulation <input type="checkbox"/> Pipe Wrap HVAC <input type="checkbox"/> Insulation <input type="checkbox"/> Tape <input type="checkbox"/> Paper Wrap	<input type="checkbox"/> 12'x12' Tile <input type="checkbox"/> 9'x9'Tile <input type="checkbox"/> Vinyl Sheet <input type="checkbox"/> Mastic Wall <input type="checkbox"/> Transite Panel <input type="checkbox"/> Textured Wall <input type="checkbox"/> Plaster <input type="checkbox"/> DWJC	<input type="checkbox"/> Textured <input type="checkbox"/> Stucco <input type="checkbox"/> Popcorn <input type="checkbox"/> DWJC <input type="checkbox"/> Plaster <input type="checkbox"/> Acoustic Tile (Dropped) <input type="checkbox"/> Acoustic Tile (Glued-on) <input type="checkbox"/> Mastic Structural <input type="checkbox"/> Steel F. P. ing <input checked="" type="checkbox"/> Deck F. P. ing	<input type="checkbox"/> Shingle <input type="checkbox"/> Rolled <input type="checkbox"/> Felt <input type="checkbox"/> Tar Miscellaneous: _____ No. of Phases: _____ Colour: _____	<input type="checkbox"/> Floor <input type="checkbox"/> Wall Orientation <input type="checkbox"/> Ceiling <input type="checkbox"/> Above Ceiling <input type="checkbox"/> Other





ASBESTOS BULK SAMPLING FORM

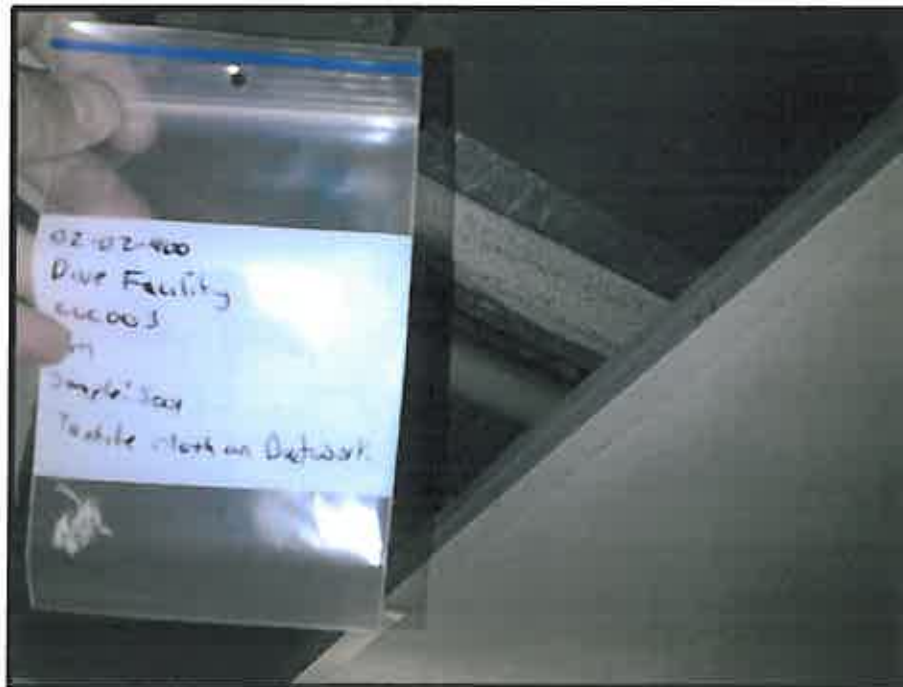
Sample #:	S027	Date Sampled:	November 29, 2012	
Building :	OSC Main BLDG and Annex	Sampler:	Trent Hardy	
Location:	081, room OS2002	Analysis:	SAI - PLM	
MUN Project #:	02-02-900	Work Order #:		
Bulk Sampling Parameters				
Pipe/Tank	Flooring	Ceiling	Roofing	Location
<input type="checkbox"/> Insulation <input type="checkbox"/> Elbow <input type="checkbox"/> Fitting <input type="checkbox"/> Transite Pipe <input type="checkbox"/> Gasket <input type="checkbox"/> Tank Insulation <input type="checkbox"/> Pipe Wrap HVAC <input type="checkbox"/> Insulation <input type="checkbox"/> Tape <input type="checkbox"/> Paper Wrap	<input type="checkbox"/> 12'x12' Tile <input type="checkbox"/> 9'x9'Tile <input type="checkbox"/> Vinyl Sheet <input type="checkbox"/> Mastic Wall <input type="checkbox"/> Transite Panel <input type="checkbox"/> Textured Wall <input type="checkbox"/> Plaster <input type="checkbox"/> DWJC	<input type="checkbox"/> Textured <input type="checkbox"/> Stucco <input type="checkbox"/> Popcorn <input type="checkbox"/> DWJC <input type="checkbox"/> Plaster <input type="checkbox"/> Acoustic Tile (Dropped) <input type="checkbox"/> Acoustic Tile (Glued-on) <input type="checkbox"/> Mastic Structural <input type="checkbox"/> Steel F. P. ing <input type="checkbox"/> Deck F. P. ing	<input type="checkbox"/> Shingle <input type="checkbox"/> Rolled <input type="checkbox"/> Felt <input type="checkbox"/> Tar Miscellaneous: <u>Textile cloth</u> No. of Phases: _____ Colour: <u>Green</u>	<input type="checkbox"/> Floor <input type="checkbox"/> Wall Orientation <input type="checkbox"/> Ceiling <input type="checkbox"/> Above Ceiling <input checked="" type="checkbox"/> Other (ducts)





ASBESTOS BULK SAMPLING FORM

Sample #:	S001	Date Sampled:	November 30, 2012	
Building :	OSC Main BLDG and Annex	Sampler:	Trent Hardy	
Location:	001, room DV1000B	Analysis:	SAI - PLM	
MUN Project #:	02-02-900	Work Order #:		
Bulk Sampling Parameters				
Pipe/Tank	Flooring	Ceiling	Roofing	Location
<input type="checkbox"/> Insulation <input type="checkbox"/> Elbow <input type="checkbox"/> Fitting <input type="checkbox"/> Transite Pipe <input type="checkbox"/> Gasket <input type="checkbox"/> Tank Insulation <input type="checkbox"/> Pipe Wrap HVAC <input type="checkbox"/> Insulation <input type="checkbox"/> Tape <input type="checkbox"/> Paper Wrap	<input type="checkbox"/> 12'x12' Tile <input type="checkbox"/> 9'x9'Tile <input type="checkbox"/> Vinyl Sheet <input type="checkbox"/> Mastic Wall <input type="checkbox"/> Transite Panel <input type="checkbox"/> Textured Wall <input type="checkbox"/> Plaster <input type="checkbox"/> DWJC	<input type="checkbox"/> Textured <input type="checkbox"/> Stucco <input type="checkbox"/> Popcorn <input type="checkbox"/> DWJC <input type="checkbox"/> Plaster <input type="checkbox"/> Acoustic Tile (Dropped) <input type="checkbox"/> Acoustic Tile (Glued-on) <input type="checkbox"/> Mastic Structural <input type="checkbox"/> Steel F. P. ing <input type="checkbox"/> Deck F. P. ing	<input type="checkbox"/> Shingle <input type="checkbox"/> Rolled <input type="checkbox"/> Felt <input type="checkbox"/> Tar Miscellaneous: <u>Textile cloth</u> No. of Phases: _____ Colour: _____	<input type="checkbox"/> Floor <input type="checkbox"/> Wall Orientation <input type="checkbox"/> Ceiling <input checked="" type="checkbox"/> X Above Ceiling <input type="checkbox"/> Other





ASBESTOS BULK SAMPLING FORM

Sample #:	S003	Date Sampled:	November 30, 2012
Building :	OSC Main BLDG and Annex	Sampler:	Trent Hardy
Location:	006, room DV2003	Analysis:	SAI - PLM
MUN Project #:	02-02-900	Work Order #:	

Bulk Sampling Parameters

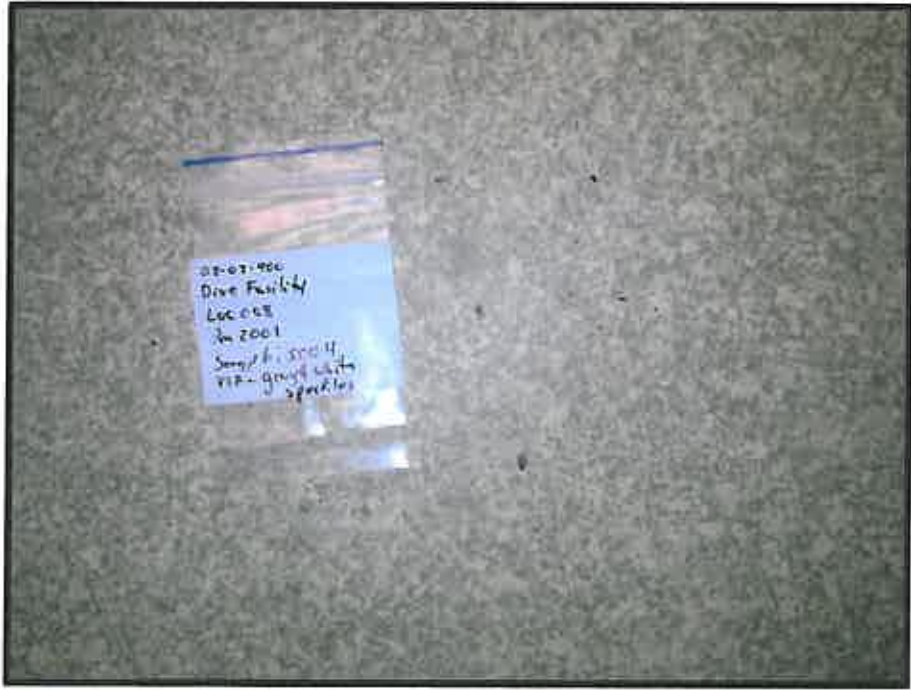
Pipe/Tank	Flooring	Ceiling	Roofing	Location
<input type="checkbox"/> Insulation	<input type="checkbox"/> 12'x12' Tile	<input type="checkbox"/> Textured	<input type="checkbox"/> Shingle	<input type="checkbox"/> Floor
<input type="checkbox"/> Elbow	<input type="checkbox"/> 9'x9'Tile	<input type="checkbox"/> Stucco	<input type="checkbox"/> Rolled	<input type="checkbox"/> X Wall Orientation
<input type="checkbox"/> Fitting	<input type="checkbox"/> Vinyl Sheet	<input type="checkbox"/> Popcorn	<input type="checkbox"/> Felt	<input type="checkbox"/> Ceiling
<input type="checkbox"/> Transite Pipe	<input type="checkbox"/> Mastic	<input type="checkbox"/> DWJC	<input type="checkbox"/> Tar	<input type="checkbox"/> Above Ceiling
<input type="checkbox"/> Gasket	Wall	<input type="checkbox"/> Plaster		<input type="checkbox"/> Other
<input type="checkbox"/> Tank Insulation	<input type="checkbox"/> Transite Panel	<input type="checkbox"/> Acoustic Tile (Dropped)		
<input type="checkbox"/> Pipe Wrap	<input type="checkbox"/> Textured Wall	<input type="checkbox"/> Acoustic Tile (Glued-on)		
HVAC	<input type="checkbox"/> Plaster	<input type="checkbox"/> Mastic		
<input type="checkbox"/> Insulation	X DWJC	Structural	Miscellaneous: _____	
<input type="checkbox"/> Tape		<input type="checkbox"/> Steel F. P. ing	No. of Phases: _____	
<input type="checkbox"/> Paper Wrap		<input type="checkbox"/> Deck F. P. ing	Colour: _____	





ASBESTOS BULK SAMPLING FORM

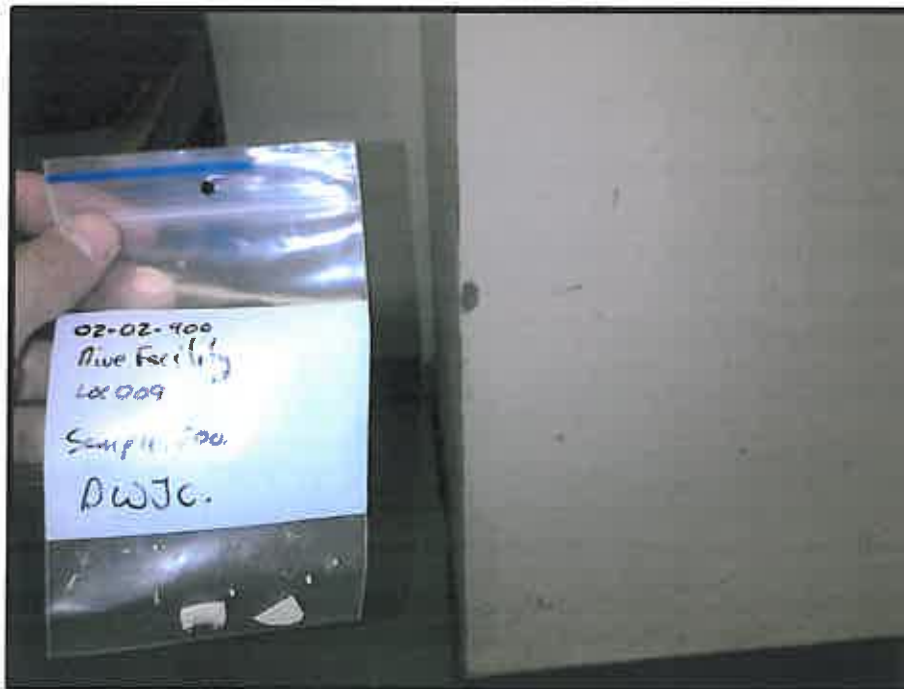
Sample #:	S004	Date Sampled:	November 30, 2012	
Building :	OSC Main BLDG and Annex	Sampler:	Trent Hardy	
Location:	008, room DV2001	Analysis:	SAI - PLM	
MUN Project #:	02-02-900	Work Order #:		
Bulk Sampling Parameters				
Pipe/Tank	Flooring	Ceiling	Roofing	Location
<input type="checkbox"/> Insulation <input type="checkbox"/> Elbow <input type="checkbox"/> Fitting <input type="checkbox"/> Transite Pipe <input type="checkbox"/> Gasket <input type="checkbox"/> Tank Insulation <input type="checkbox"/> Pipe Wrap HVAC <input type="checkbox"/> Insulation <input type="checkbox"/> Tape <input type="checkbox"/> Paper Wrap	<input type="checkbox"/> 12'x12' Tile <input type="checkbox"/> 9'x9'Tile <input checked="" type="checkbox"/> Vinyl Sheet <input type="checkbox"/> Mastic Wall <input type="checkbox"/> Transite Panel <input type="checkbox"/> Textured Wall <input type="checkbox"/> Plaster <input type="checkbox"/> DWJC	<input type="checkbox"/> Textured <input type="checkbox"/> Stucco <input type="checkbox"/> Popcorn <input type="checkbox"/> DWJC <input type="checkbox"/> Plaster <input type="checkbox"/> Acoustic Tile (Dropped) <input type="checkbox"/> Acoustic Tile (Glued-on) <input type="checkbox"/> Mastic Structural <input type="checkbox"/> Steel F. P. ing <input type="checkbox"/> Deck F. P. ing	<input type="checkbox"/> Shingle <input type="checkbox"/> Rolled <input type="checkbox"/> Felt <input type="checkbox"/> Tar Miscellaneous: _____ No. of Phases: _____ Colour: <u>Grey and white specks</u>	<input checked="" type="checkbox"/> Floor <input type="checkbox"/> Wall Orientation <input type="checkbox"/> Ceiling <input type="checkbox"/> Above Ceiling <input type="checkbox"/> Other





ASBESTOS BULK SAMPLING FORM

Sample #:	S005	Date Sampled:	November 30, 2012	
Building :	OSC Main BLDG and Annex	Sampler:	Trent Hardy	
Location:	009, room DV2000	Analysis:	SAI - PLM	
MUN Project #:	02-02-900	Work Order #:		
Bulk Sampling Parameters				
Pipe/Tank	Flooring	Ceiling	Roofing	Location
<input type="checkbox"/> Insulation <input type="checkbox"/> Elbow <input type="checkbox"/> Fitting <input type="checkbox"/> Transite Pipe <input type="checkbox"/> Gasket <input type="checkbox"/> Tank Insulation <input type="checkbox"/> Pipe Wrap HVAC <input type="checkbox"/> Insulation <input type="checkbox"/> Tape <input type="checkbox"/> Paper Wrap	<input type="checkbox"/> 12'x12' Tile <input type="checkbox"/> 9'x9'Tile <input type="checkbox"/> Vinyl Sheet <input type="checkbox"/> Mastic Wall <input type="checkbox"/> Transite Panel <input type="checkbox"/> Textured Wall <input type="checkbox"/> Plaster <input checked="" type="checkbox"/> DWJC	<input type="checkbox"/> Textured <input type="checkbox"/> Stucco <input type="checkbox"/> Popcorn <input type="checkbox"/> DWJC <input type="checkbox"/> Plaster <input type="checkbox"/> Acoustic Tile (Dropped) <input type="checkbox"/> Acoustic Tile (Glued-on) <input type="checkbox"/> Mastic Structural <input type="checkbox"/> Steel F. P. ing <input type="checkbox"/> Deck F. P. ing	<input type="checkbox"/> Shingle <input type="checkbox"/> Rolled <input type="checkbox"/> Felt <input type="checkbox"/> Tar Miscellaneous: _____ No. of Phases: _____ Colour: _____	<input type="checkbox"/> Floor <input checked="" type="checkbox"/> Wall Orientation <input type="checkbox"/> Ceiling <input type="checkbox"/> Above Ceiling <input type="checkbox"/> Other





Pinchin Ltd. Asbestos Laboratory *Certificate of Analysis*

Project Name: Memorial University, Ocean Science Center
Project No.: 0305762.286
Prepared For: S. Gosling / A. Park

Lab Reference No.: b331526
Analyst(s): R. Janssen

Date Received: February 3, 2025 **Samples Submitted:** 2
Date Analyzed: February 6, 2025 **Phases Analyzed:** 3

The Pinchin Ltd. Dartmouth asbestos laboratory is accredited by the National Institute of Standards and Technology, National Voluntary Laboratory Accreditation Program (NVLAP Lab Code 201032-0) for the 'EPA – 40 CFR Appendix E to Subpart E of Part 763, Interim Method of the Determination of Asbestos in Bulk Insulation Samples,' and the 'EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials'; and meets all requirements of ISO/IEC 17025:2017. The Pinchin asbestos laboratory uses the aforementioned methods of analysis.

Bulk samples are checked visually and scanned under a stereomicroscope. Slides are prepared and observed under a Polarized Light Microscope (PLM) at magnifications of 40X, 100X or 400X as appropriate. Asbestos fibres are identified by a combination of morphology, colour, refractive index, extinction, sign of elongation, birefringence and dispersion staining colours. A visual estimate is made of the percentage of asbestos present. A reported concentration of less than (<) the regulatory threshold indicates the presence of confirmed asbestos in trace quantities, limited to only a few fibres or fibre bundles in an entire sample. This method complies with provincial regulatory requirements where applicable. Multiple phases within a sample are analyzed and reported separately.

All bulk samples submitted to this laboratory for asbestos analysis are retained for a minimum of three months. Samples may be retrieved, upon request, for re-examination at any time during that period.

This report relates only to the items tested.

This report relates only to the items tested and is valid only when signed with a protected, authorized, electronic signature. This report may not be reproduced, except in full, without the written approval of Pinchin Ltd. The client may not use this report to claim product endorsement by NVLAP or any agency of the U.S. Government. Internal verification studies, quality assurance / control data and laboratory documentation on measurement uncertainty are available upon request.



Pinchin Ltd. Asbestos Laboratory
Certificate of Analysis

Project Name: Memorial University, Ocean Science Center
Project No.: 0305762.286
Prepared For: S. Gosling / A. Park

Lab Reference No.: b331526
Date Analyzed: February 6, 2025

BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
S0001 White ceiling paint / RT1000	2 Phases: a) Homogeneous, white, soft, cementitious material.	None Detected	Non-Fibrous Material > 75%
	b) Homogeneous, white, coating material.	None Detected	Non-Fibrous Material > 75%
S0002 Mortar from concrete block wall / AX-2000	Homogeneous, grey, granular, cementitious material.	None Detected	Non-Fibrous Material > 75%

Reviewed by:

Reporting Analyst:



Analyzed By: RS

Reviewed By: _____

Report Sent By: _____

Special Instructions:

**Pinchin Ltd. - Asbestos Laboratory
Internal Asbestos Bulk Sample Chain of Custody**

Client Name:	Memorial University	Project Address:	Ocean Science Center
Portfolio/Building No:		Pinchin File:	305762.286
Submitted by:	Stephen Gosling	Email:	sgosling@pinchin.com
CC Results to:	Aaron Park	CC Email:	apark@pinchin.com
Invoice to:		Invoice Email:	
Date Submitted:	January 31 2025	Required by:	February 7 2025
# of Samples:	2	Priority:	5 Day Turnaround
Year of Building Construction (Mandatory Field):			
Do NOT Stop on Positive (Sample Numbers):			
Pinchin Group Company (Mandatory Field): Pinchin			

To be Completed by Lab Personnel Only:

Lab Reference #:	<u>b331526</u>	Time:	24 hour clock		
Received by:	<u>R. Sanssen</u>	Date:	<u>Feb 3/25</u>	Month	Day 2021
Name(s) of Analyst(s):	<u>R. Sanssen</u>				

Sample Prefix	Sample No.	Sample Suffix	Sample Description/Location (Mandatory)
S	0001		White ceiling paint / RT1000 a) NO b) NO
S	0002		Mortar from concrete block wall / AX-2000 NO

3



Analysis for Lead Concentration in Paint Chips

by Flame Atomic Absorption Spectroscopy
EPA SW-846 3050B/6010C/7000B



Customer: Pinchin Ltd
27 Austin St. 2nd Flr
St Johns, NL A1B 4C3

Attn: Aaron Park
Stephen Gosling
Rebecca Tizzard

Lab Order ID: 10074184
Analysis: PBP
Date Received: 02/03/2025
Date Reported: 02/10/2025

Project: 305762.286

Sample ID <i>Lab Sample ID</i>	Description <i>Lab Notes</i>	Mass (g)	Reporting Limit (ppm)	Concentration (ppm)	Concentration (% by weight)
L0001 <i>10074184_0001</i>	White paint on drywall / RT 2002 / 2005	0.0906	44	<44	<0.0044%
L0002 <i>10074184_0002</i>	White ceiling paint on concrete / RT1000	0.0969	41	<41	<0.0041%
L0003 <i>10074184_0003</i>	White wall paint on concrete / OS -3008	0.0782	51	1800	0.18%
L0004 <i>10074184_0004</i>	White wall paint on concrete / OS -4010	0.1278	31	880	0.088%
L0005 <i>10074184_0005</i>	White paint on wood / AC-1010	0.0793	50.	<50.	<0.0050%
L0006 <i>10074184_0006</i>	Tan paint on wood / AC-2003	0.0513	78	<78	<0.0078%
L0007 <i>10074184_0007</i>	Cream paint on wood / AC-2003A	0.0815	49	<49	<0.0049%
L0008 <i>10074184_0008</i>	White paint on concrete walls / AX-2000	0.0853	47	<47	<0.0047%

Disclaimer: Unless otherwise noted blank sample correction was not performed on analytical results. Scientific Analytical Institute participates in the AIHA ELPAT program. ELPAT Laboratory ID: 173190. This report relates only to the samples tested and may not be reproduced, except in full, without the written approval of SAI. Analytical uncertainty available upon request. The quality control samples run with the samples in this report have passed all EPA required specifications unless otherwise noted. RL: (Report Limit for an undiluted 50ml sample is 4µg Total Pb). All sample dried before preparation and analysis.

Athena Summa (9)

Analyst

Approved Signatory



Analysis for Lead Concentration in Paint Chips

by Flame Atomic Absorption Spectroscopy
EPA SW-846 3050B/6010C/7000B



Customer: Pinchin Ltd
27 Austin St. 2nd Flr
St Johns, NL A1B 4C3

Attn: Aaron Park
Stephen Gosling
Rebecca Tizzard

Lab Order ID: 10074184

Analysis: PBP

Date Received: 02/03/2025

Date Reported: 02/10/2025

Project: 305762.286

Sample ID	Description	Mass (g)	Reporting Limit (ppm)	Concentration (ppm)	Concentration (% by weight)
Lab Sample ID	Lab Notes				
L0009	Grey paint on concrete wall / AX-1000	0.0610	66	890	0.089%
10074184_0009					

Disclaimer: Unless otherwise noted blank sample correction was not performed on analytical results. Scientific Analytical Institute participates in the AIHA ELPAT program. ELPAT Laboratory ID: 173190. This report relates only to the samples tested and may not be reproduced, except in full, without the written approval of SAI. Analytical uncertainty available upon request. The quality control samples run with the samples in this report have passed all EPA required specifications unless otherwise noted. RL: (Report Limit for an undiluted 50ml sample is 4µg Total Pb). All sample dried before preparation and analysis.

Athena Summa (9)

Analyst

Approved Signatory

10074184

Client: Pinchin Ltd.
Contact: Stephen Gosling
Address: 27 Austin Street, St. John's, NL
Phone: 709-765-4059
Fax: 709-754-1359
Email: sgosling@pinchin.com
apark@pinchin.com
rtizzard@pinchin.com
Project: 305762.286
Client Notes:
P.O. #:
Date Submitted: 1/31/2025 12:00
Analysis: Paint Chips Flame AA
TurnAroundTime: Regular Analysis

***Instructions:**
 Use Column "B" for your contact info

 To See an Example Click the
 bottom Example Tab.

Enter samples between "<<" and ">>"
Begin Samples with a "<<" "above the first sample
and end with a ">>" below the last sample.
Only Enter your data on the first sheet "Sheet1"

Note: Data 1 and Data 2 are optional
fields that do not show up on the official
report, however they will be included
in the electronic data returned to you
to facilitate your reintegration of the report data.

Scientific
Analytical
Institute

302-L Pomona Dr.
Greensboro, NC 27407
Phone: 336.292.3888
Fax: 336.292.3313
Email: lab@sailab.com



<<
 L0001 White paint on drywall / RT 2002 / 2005
 L0002 White ceiling paint on concrete / RT1000
 L0003 White wall paint on concrete / OS-3008
 L0004 White wall paint on concrete / OS-4010
 L0005 White paint on wood / AC-1010
 L0006 Tan paint on wood / AC-2003
 L0007 Cream paint on wood / AC-2003A
 L0008 White paint on concrete walls / AX-2000
 L0009 Grey paint on concrete wall / AX-1000
 >>

Accepted
Rejected

[Handwritten Signature] 2/3
 1039

APPENDIX B
GUIDENCE DOCUMENT FOR LOW AND MODERATE RISK
ABESTOS ABATEMENT PROJECTS

Newfoundland and Labrador Guidance Document for Low Risk Asbestos Abatement Projects.

Type I

- Installing or removing non friable asbestos containing materials without breaking.
- Using non powered hand tools to disturb, cut or abrade non friable asbestos containing materials when wet.
- Removal of 1.5m² (16ft²) or less of asbestos containing ceiling tiles if they are not broken or cut.
- Removal of 0.93 m² (10ft²) or less of drywall with asbestos containing joint compound.

Procedures

- Dry removal is not permitted.
- Warning Signs and barricades must be erected.
- 6 mil Polyethylene drop sheets must be utilized.
- If materials cannot be adequately wetted Type II abatement procedures must be used.
- Encapsulate exposed surfaces upon completion.

Decontamination

- HEPA vacuum any dust and debris off clothing and drop sheets.
- Wet Wiping of personal protective equipment and tools.

Air Monitoring

- Initial sampling to confirm airborne levels during low risk activities.
- Periodic sampling completed over each 12 month period to validate the exposure prediction.

Personal Protective Equipment (PPE)

- Respirators are to be selected based upon a risk assessment as required under Section 85 of the *Newfoundland and Labrador Occupational Health and Safety Regulations 70/09*. Respiratory protection shall meet or exceed the protection factor provided by a ½ Face Respirator equipped with P100 filters.
- Full body coveralls, as well as appropriate footwear and gloves.
- PPE appropriate to other hazards at the work site.

Visual Inspection

- Required upon completion, written documentation to be maintained and shall include details regarding controls, PPE utilized and conditions at the time of completion.

Newfoundland and Labrador Guidance Document for Moderate Risk Asbestos Abatement Projects.

Type II

- Hand tools to cut, drill or abrade dry non friable materials.
- Using power tools equipped with HEPA filtration. If power tools are not equipped with a HEPA filter work must proceed to Type III abatement procedures.
- Removing ceiling tiles which may contain friable ACM on the surface.
- Removing less than 0.09 m² (1ft²) friable materials.
- Removal using a glove bag.
- Dry buffing and stripping ACM floor tiles.
- Renovation or demolition of drywall joint compound, stucco, mortar or plaster.
- Repairing or enclosing friable ACM.
- Removal of greater than 0.93 m² (10ft²) and less than 9.29m² (100 ft²) ACM ceiling tiles.
- Containments less than 9.29m² (100 ft²) for all abatement other than ACM floor tiles.

Procedures

- Containment must be achieved through sealing openings and doors or through the use of a mini enclosure. Please note: Containments may not be required for glove bag operations or the use of power tools equipped with HEPA filtration. This shall be determined during the site specific risk assessment by a competent individual.
- Warning Signs and barricades must be erected.
- HEPA Exhaust, negative pressure of -0.02 inches of water must be maintained.
- Materials must be adequately wetted.
- 6 mil Polyethylene drop sheets must be utilized.
- Encapsulate exposed surfaces upon completion.
- If airborne asbestos concentrations are not maintained as low as reasonably achievable, work shall advance to Type III Abatement.

Personal Protective Equipment (PPE)

- Respirators are to be selected based upon a risk assessment as required under Section 85 of the *Newfoundland and Labrador Occupational Health and Safety Regulations 70/09*. Respiratory protection shall meet or exceed the protection factor provided by a ½ Face Respirator equipped with P100 filters.
- Full body coveralls, as well as appropriate footwear and gloves.
- PPE appropriate to other hazards at the work site.

Decontamination

- A separate decontamination room must be constructed at entrance to the work area.

Air Monitoring

- Clearance Monitoring is required prior to removing controls.
- The need for Personal and perimeter samples shall be evaluated based upon the specific task, as well as the size and duration of the project.

Visual Inspection

- Required upon completion, written documentation to be maintained and shall include details regarding controls, PPE utilized and conditions at the time of completion.

These guidelines are to be used for all low and moderate risk asbestos abatement activities in this province. High risk activities or those outside the scope of these guidelines must follow the *Asbestos Abatement Regulations, 1998*.

These guidelines are intended for guidance purposes only. All projects will require the completion of a risk assessment by a competent individual and the work procedures must be modified accordingly.

The Occupational Health and Safety Division may require additional controls than those included in this guidance document.

Government of Newfoundland and Labrador
Department of Government Services
Occupational Health and Safety Division

July, 2010

OSC EMERGENCY EYE WASH AND SHOWER UPGRADE



Issued for Tender: JUNE 24, 2025

Client Project #: OSC-149-22

Consultant Project # 133411894

KEYPLAN



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DRAWING LIST

Note: Review all drawings for any interdisciplinary work.

DWG #	Title
M101	OSC ANNEX LEVEL 1 MECHANICAL PLAN AND LEGEND
M102	OSC ANNEX LEVEL 2 AND 4 MECHANICAL PLANS
M103	OSC AQUACULTURE FACILITY MECHANICAL PLAN
M104	OSC CDRF & TANK ENCLOSURE BUILDINGS MECHANICAL PLANS
M105	OSC MAIN BUILDING MECHANICAL PLANS
M201	OSC MECHANICAL DETAILS AND SCHEMATICS
M202	OSC MECHANICAL DETAILS AND SCHEDULE
E001	ELECTRICAL LEGEND, LIST OF DRAWINGS, AND DETAILS
E101	ENLARGED ELECTRICAL PLANS - OSC ANNEX
E102	ENLARGED ELECTRICAL PLANS - OSC ANNEX AND AQUACULTURE
E103	ENLARGED ELECTRICAL PLANS - OSC AQUACULTURE AND CDRF
E104	ENLARGED ELECTRICAL PLANS - OSC MAIN BUILDING AND TANK ENCLOSURE
E105	MECHANICAL AND ELECTRICAL COORDINATION

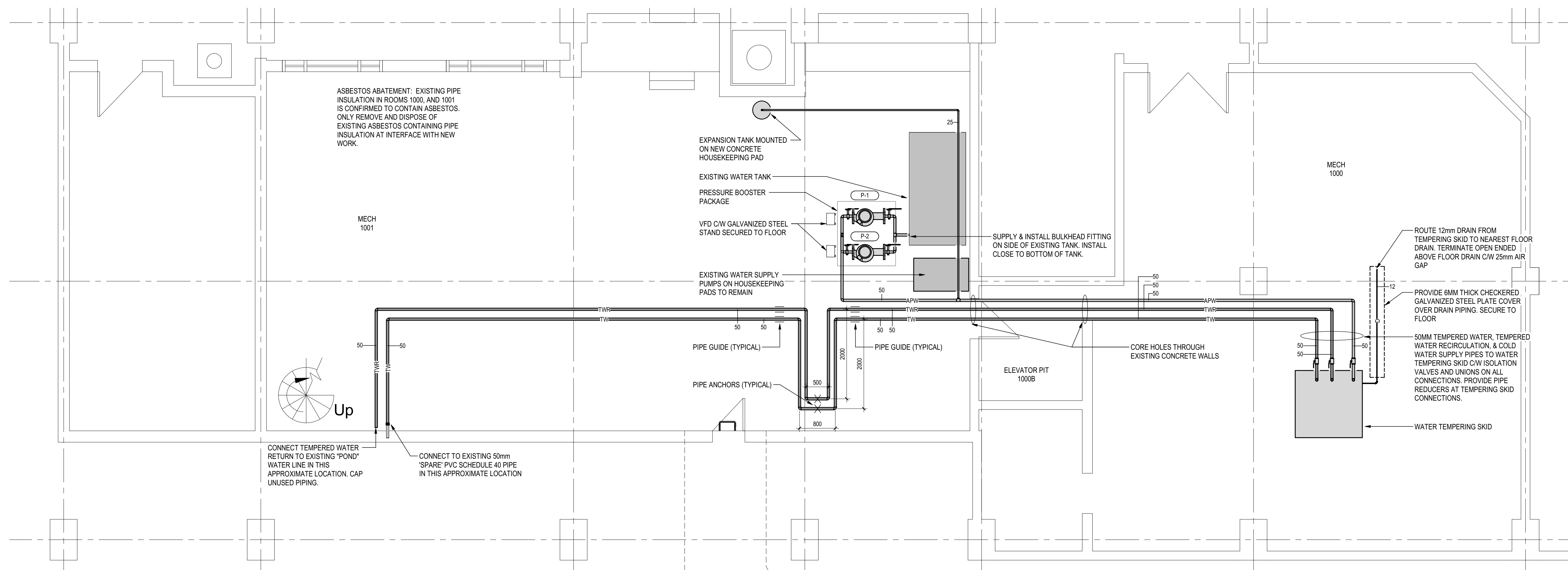
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MECHANICAL LEGEND

	EXISTING PIPING TO REMAIN		BALL VALVE
	AMBIENT POND PIPE		PIPE GUIDE
	SANITARY PIPE		PIPE ANCHOR
	TEMPERED WATER PIPE		AMBIENT POND WATER (SCHEMATIC)
	TEMPERED WATER RETURN PIPE		POND WATER (SCHEMATIC)
	FLOW SWITCH		TEMPERED WATER (SCHEMATIC)
	WATER HAMMER ARRESTOR		TEMPERED WATER RECIRC. (SCHEMATIC)
	EMERGENCY FIXTURE AUDIBLE/VISUAL ALARM & ACKNOWLEDGEMENT SWITCH		COLD WATER (SCHEMATIC)
	CLEAN OUT		EXISTING TEMPERED WATER (SCHEMATIC)
	FLOOR DRAIN		EXISTING TEMPERED WATER RECIRC. (SCHEMATIC)
			TRAP SEAL PRIMER PIPING

1 MECHANICAL LEGEND
M101 NTS



2 OSC ANNEX LEVEL 1 MECHANICAL PLAN (OPTION A)
M101 1:50

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OSC EMERGENCY EYE WASH AND SHOWER UPGRADE

Title
OSC ANNEX LEVEL 1 MECHANICAL PLAN AND LEGEND

Project No. 133411894	Scale AS INDICATED
Revision 2	Drawing No. M101

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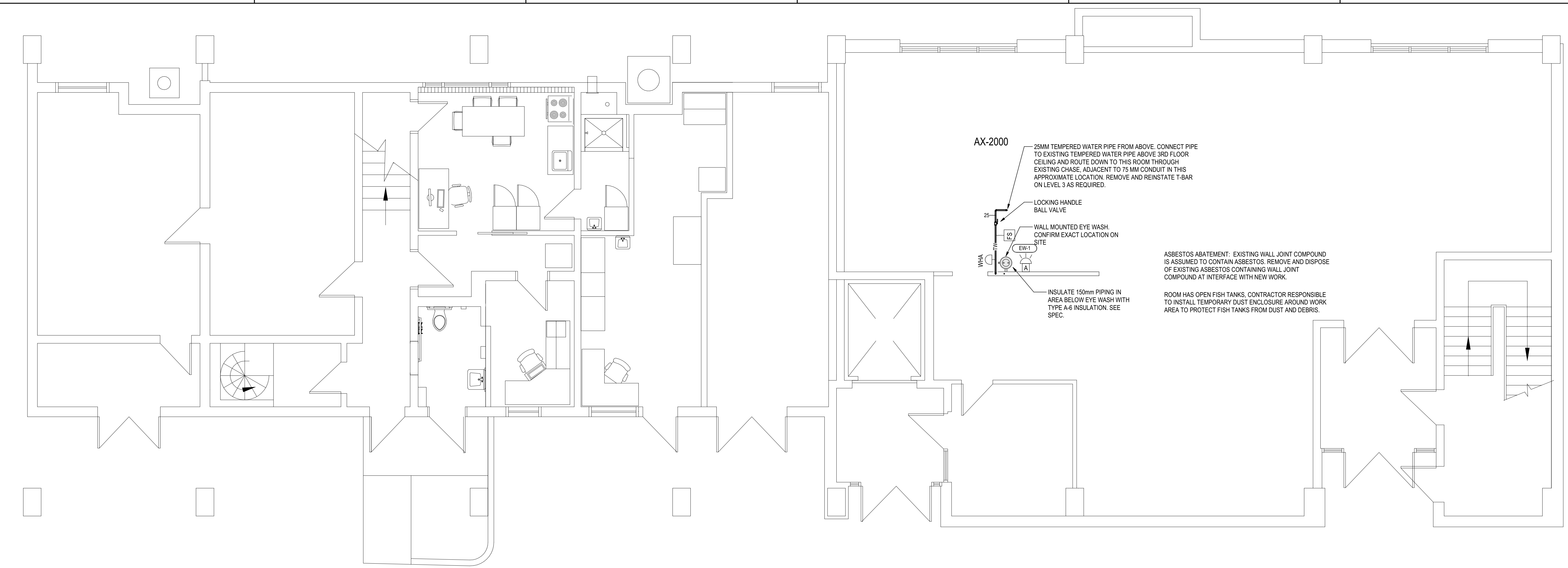


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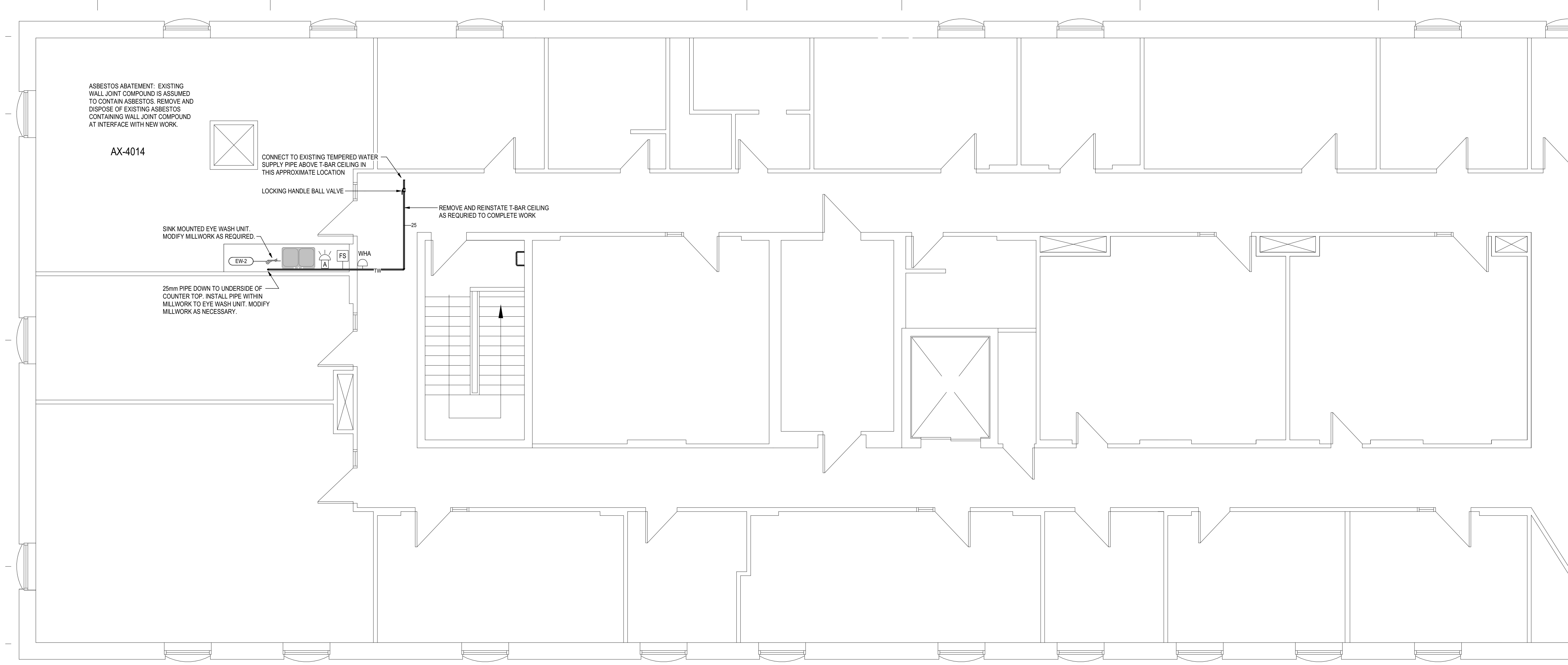
OSC EMERGENCY EYE WASH AND SHOWER UPGRADE

Title
OSC ANNEX LEVEL 2 AND 4 MECHANICAL PLANS

Project No. 133411894 Scale AS INDICATED
Revision Drawing No. **M102**



1 OSC ANNEX LEVEL 2 MECHANICAL PLAN (OPTION A)
M102 1:50

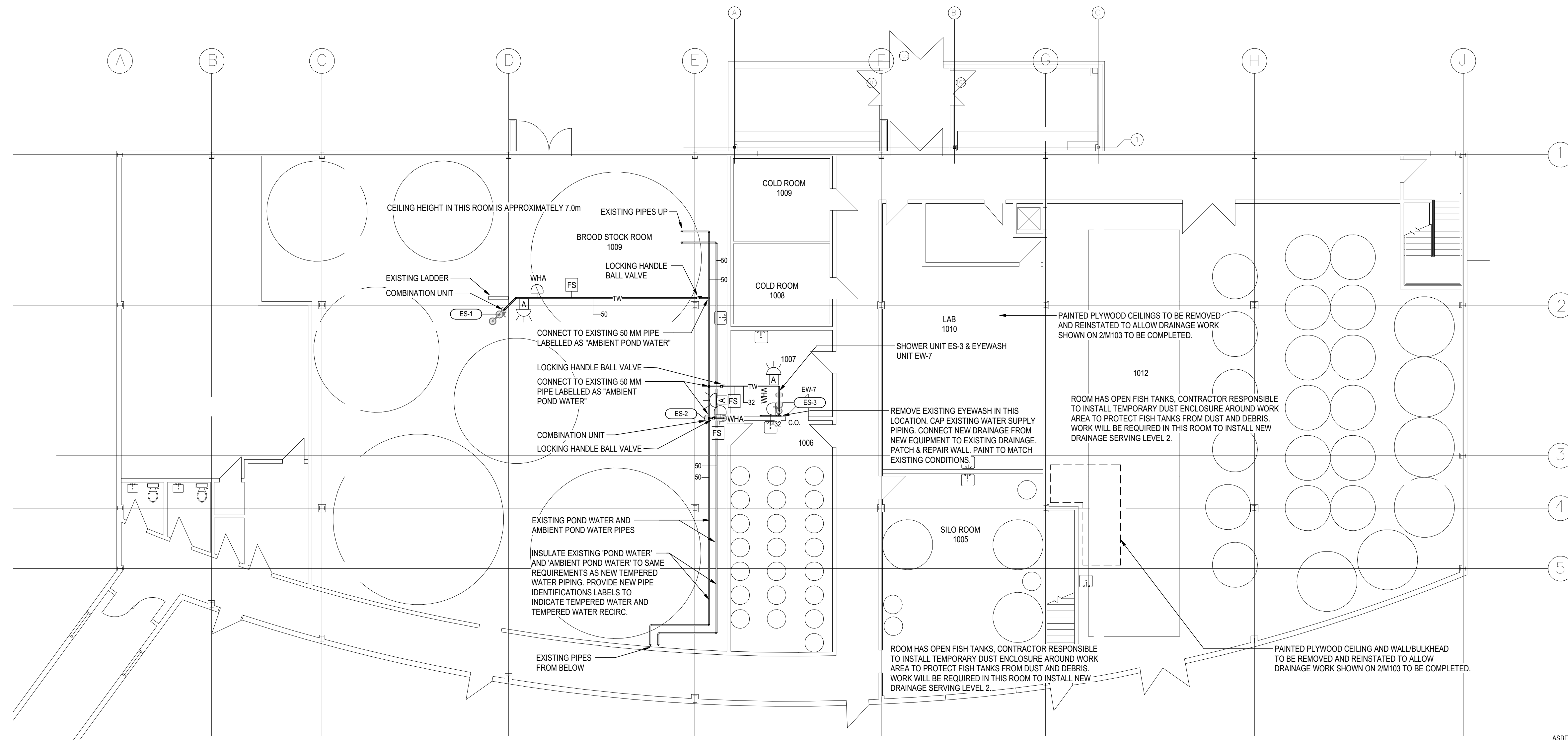


2 OSC ANNEX LEVEL 4 MECHANICAL PLAN (OPTION A)
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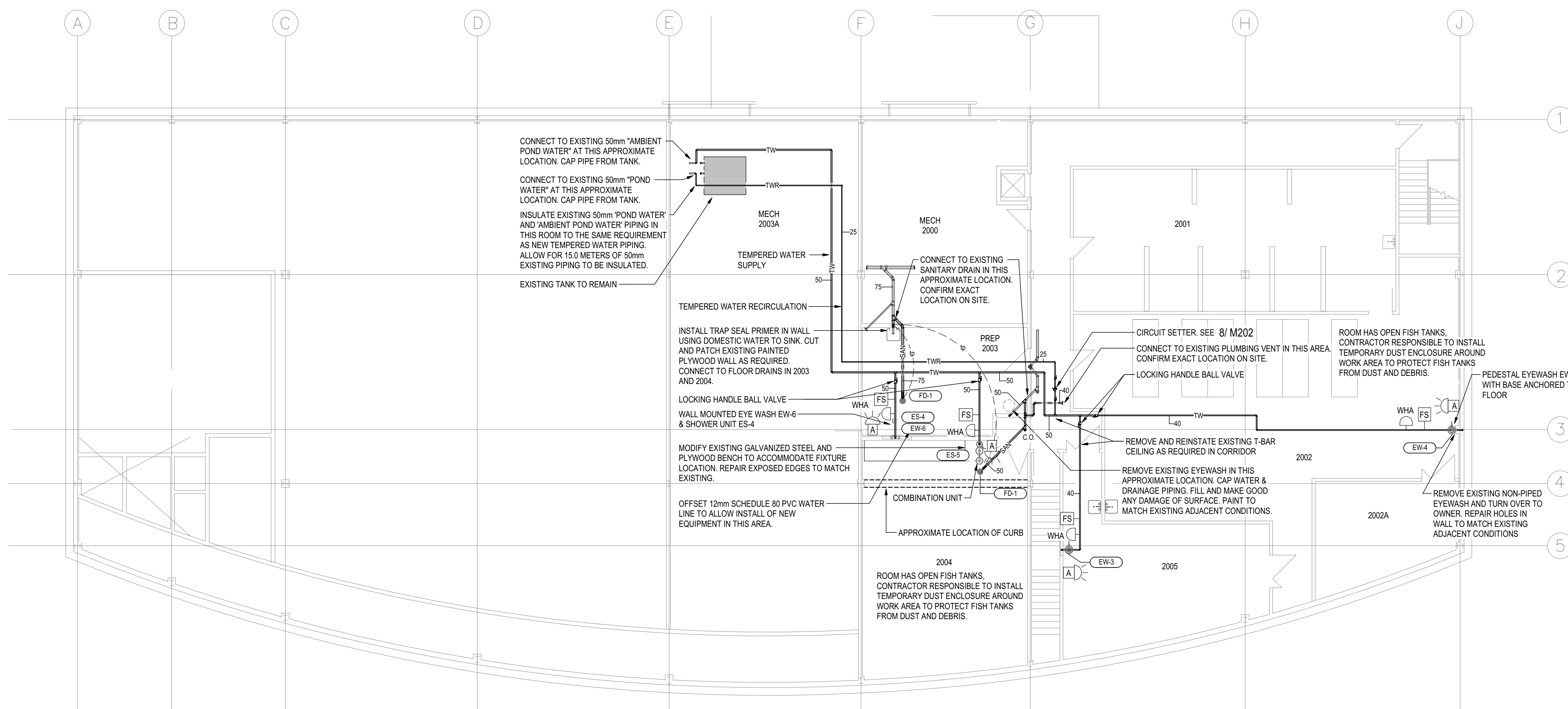
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ASBESTOS ABATEMENT: EXISTING WALL JOINT COMPOUND IS ASSUMED TO CONTAIN ASBESTOS. REMOVE AND DISPOSE OF EXISTING ASBESTOS CONTAINING WALL JOINT COMPOUND AT INTERFACE WITH NEW WORK.

1 OSC AQUACULTURE FACILITY LEVEL 1 MECHANICAL PLAN (OPTION A)

M103 1:100



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2 OSC AQUACULTURE FACILITY LEVEL 2 MECHANICAL PLAN (OPTION A)

M103 1:100

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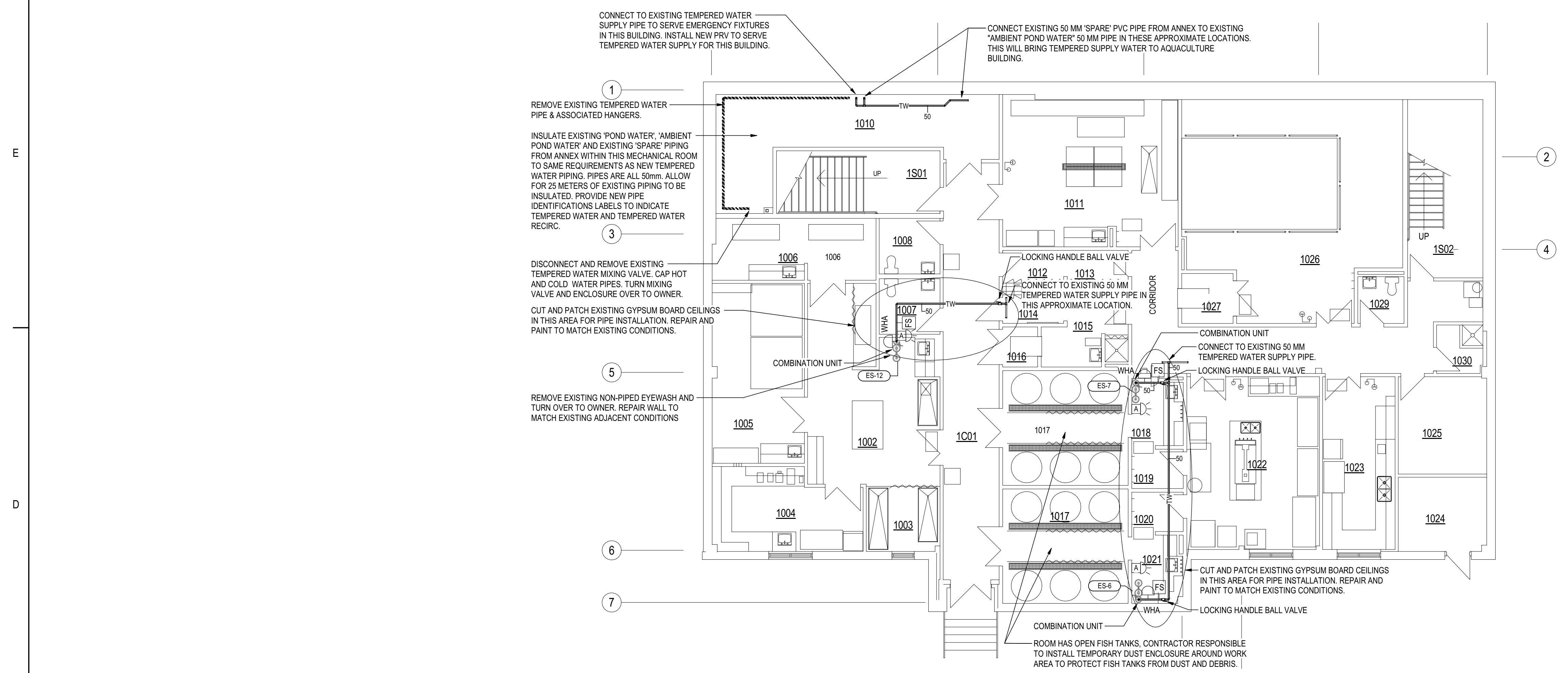
OSC EMERGENCY EYE WASH AND SHOWER UPGRADE

Title
OSC AQUACULTURE FACILITY MECHANICAL PLAN

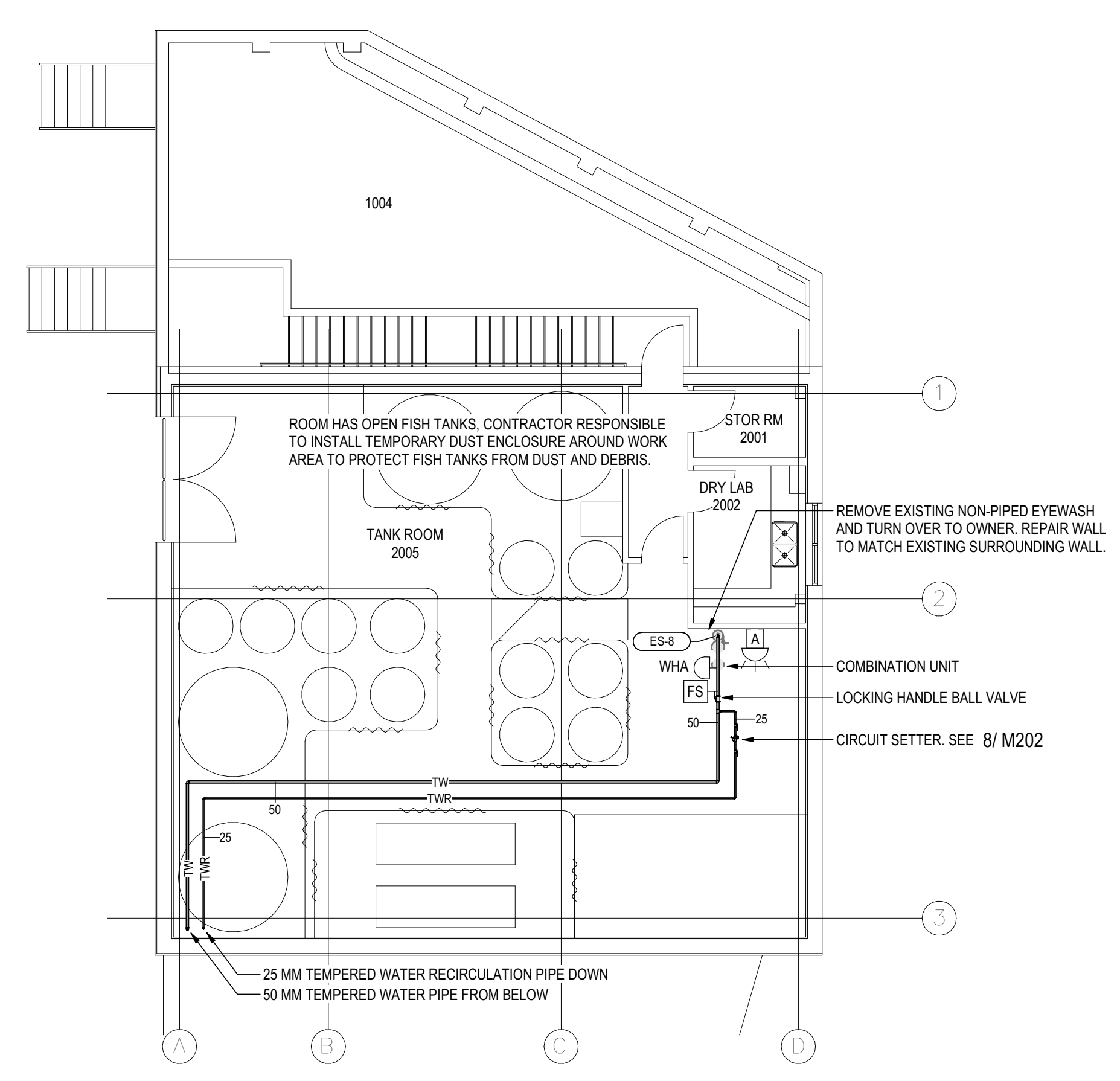
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Revision	Drawing No.
2	M103

GENERAL NOTES:

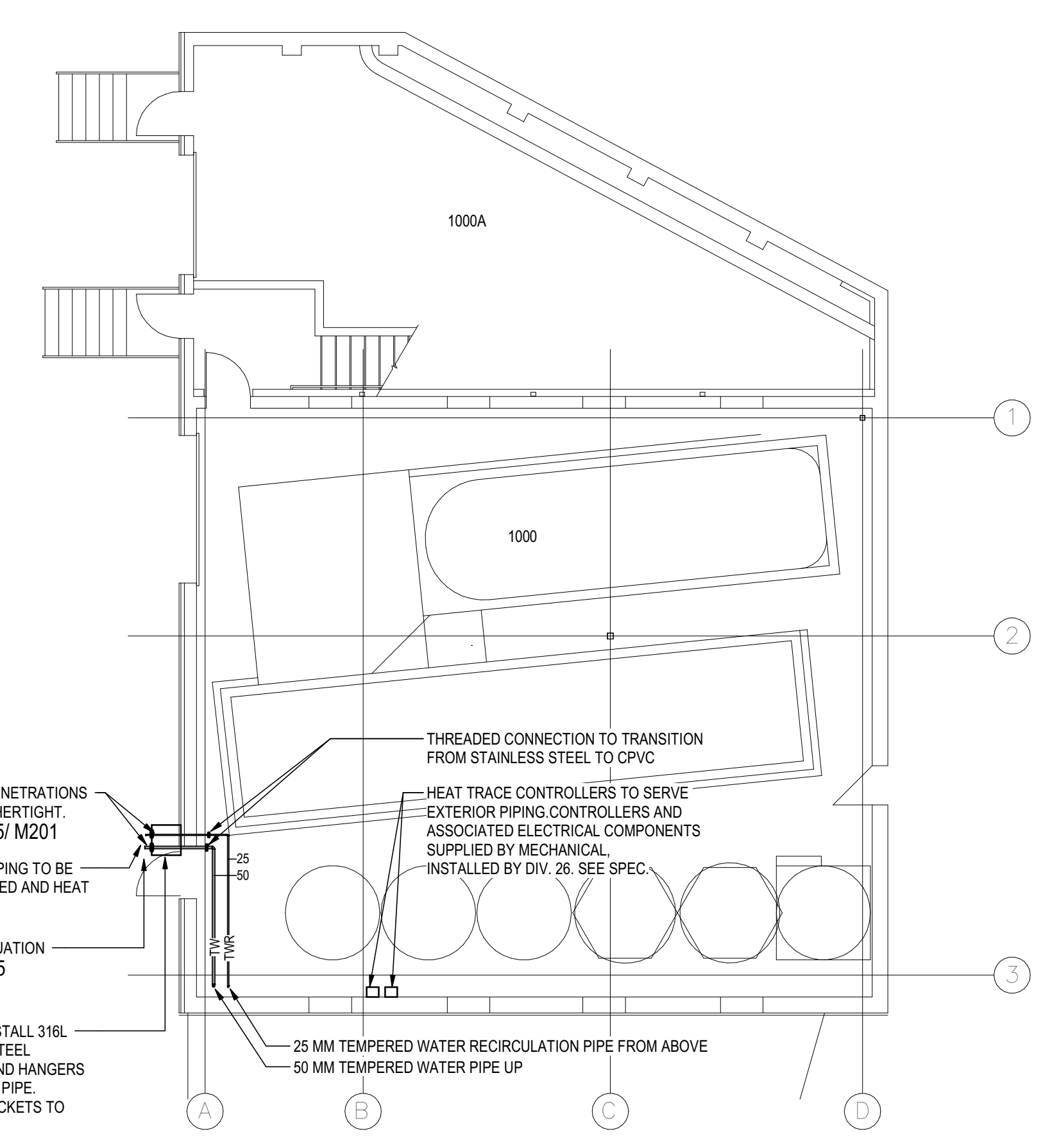
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1 OSC CDRF LEVEL 1 MECHANICAL PLAN (OPTION A)
 M104 1:100



3 OSC TANK ENCLOSURE LEVEL 2 MECHANICAL PLAN (OPTION B)
 M104 1:100



2 OSC TANK ENCLOSURE LEVEL 1 MECHANICAL PLAN (OPTION B)
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OSC EMERGENCY EYE WASH AND SHOWER UPGRADE

Title
OSC CDRF & TANK ENCLOSURE BUILDINGS MECHANICAL PLANS

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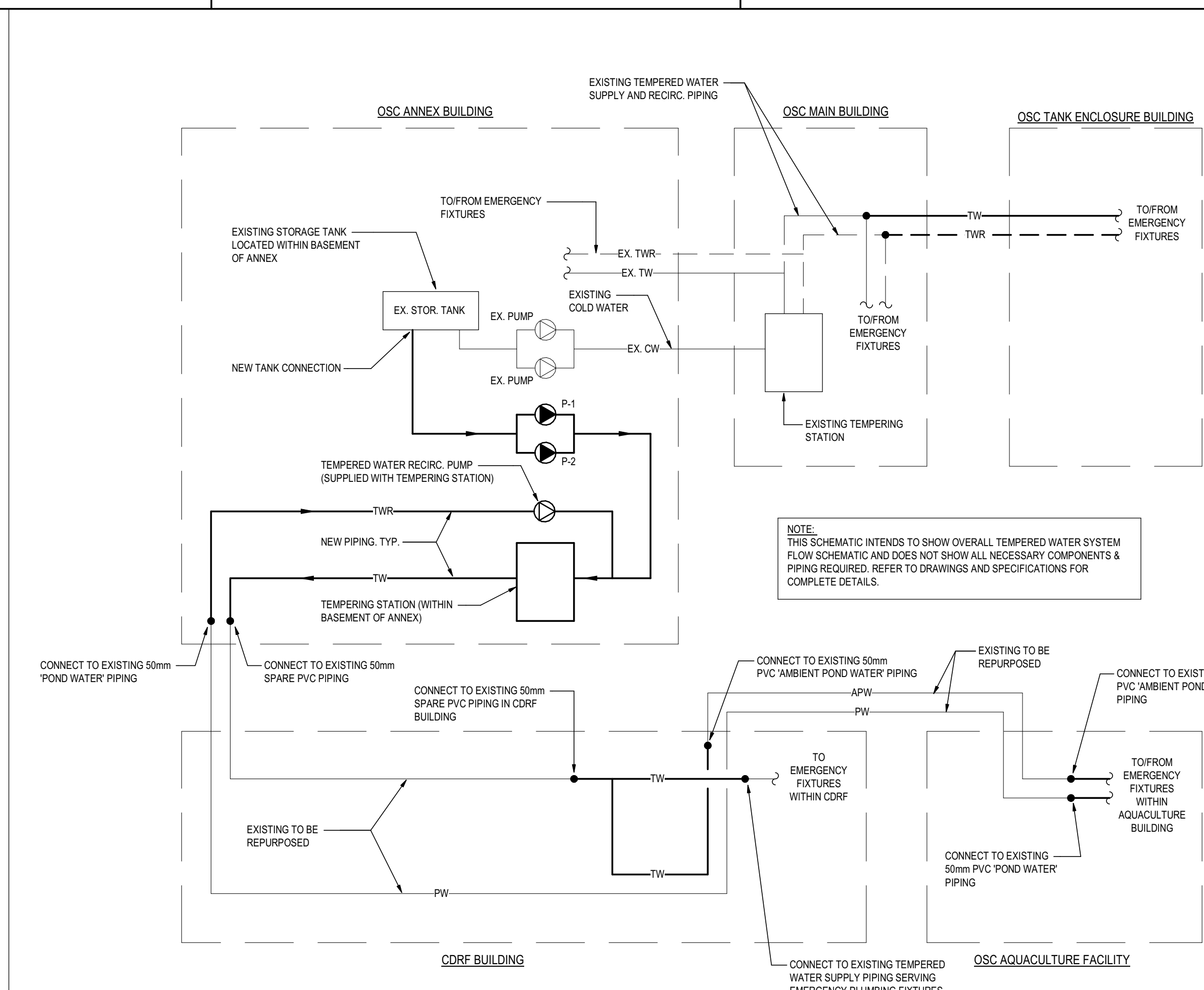
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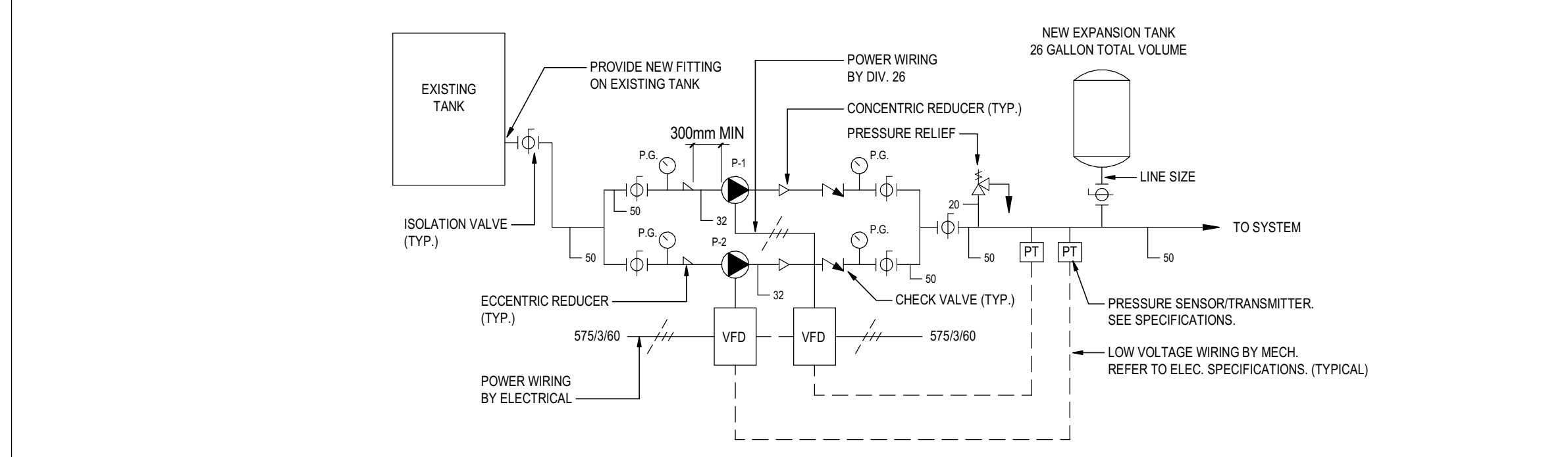
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OSC MECHANICAL DETAILS AND SCHEMATICS

Project No. 133411894 Scale As indicated

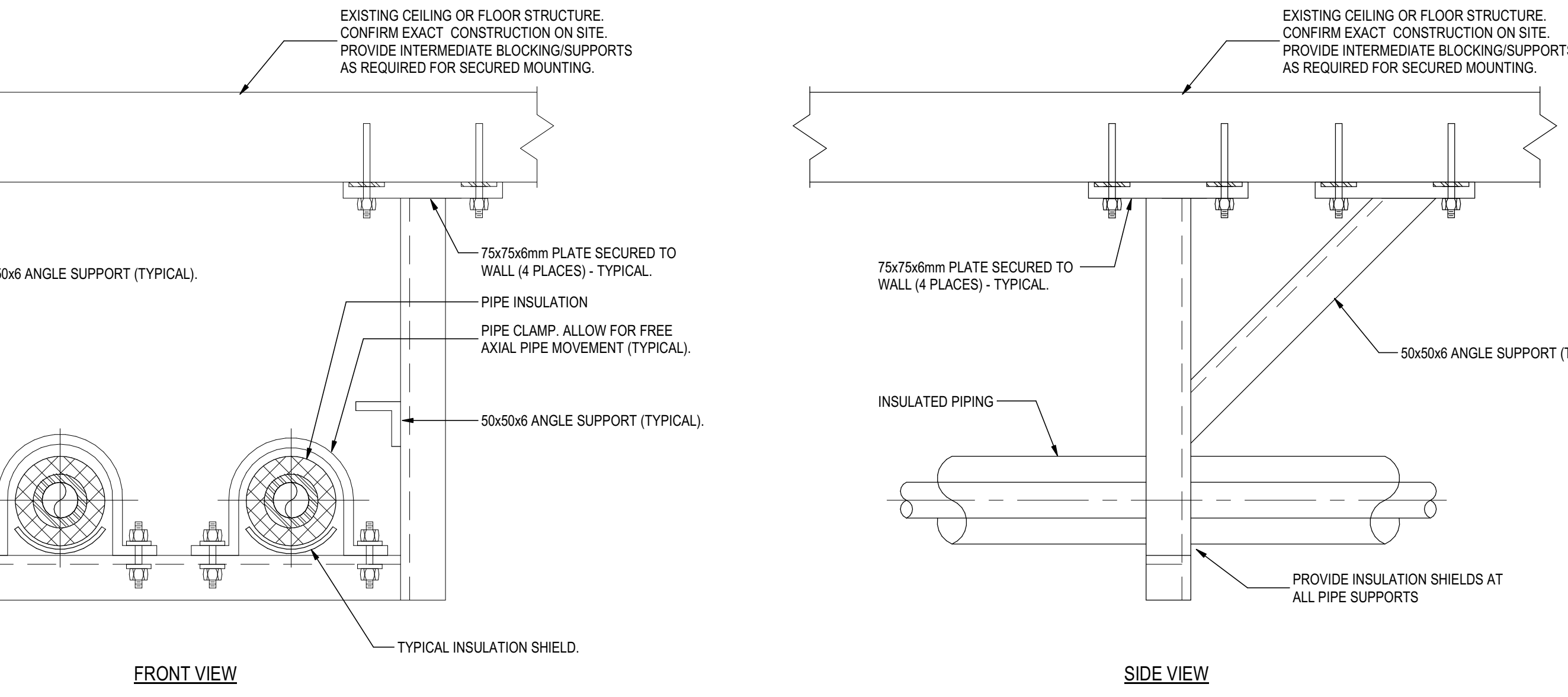
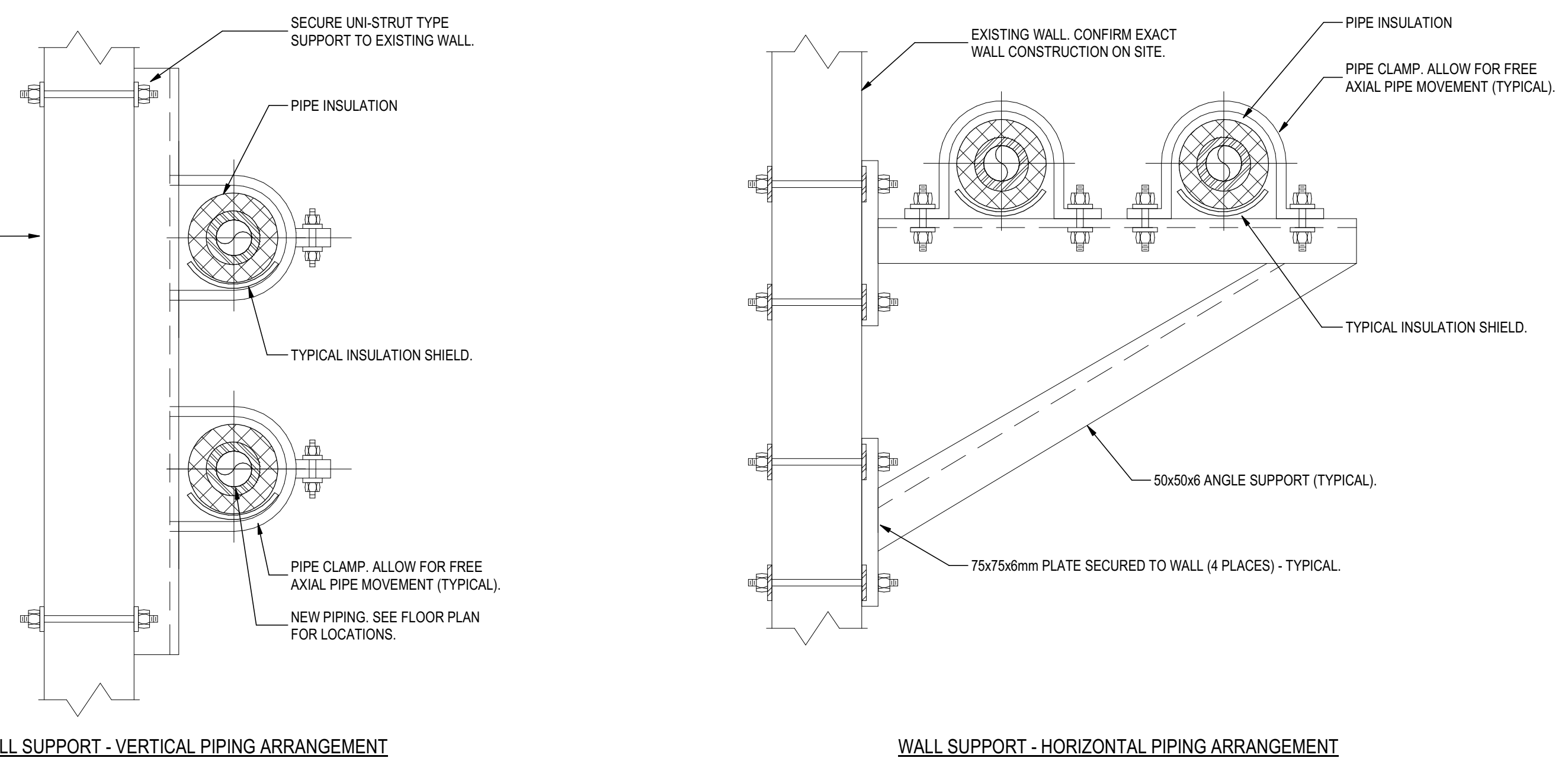
Revision Drawing No. M201



1 SITE TEMPERED WATER SCHEMATIC
M201 N.T.S.

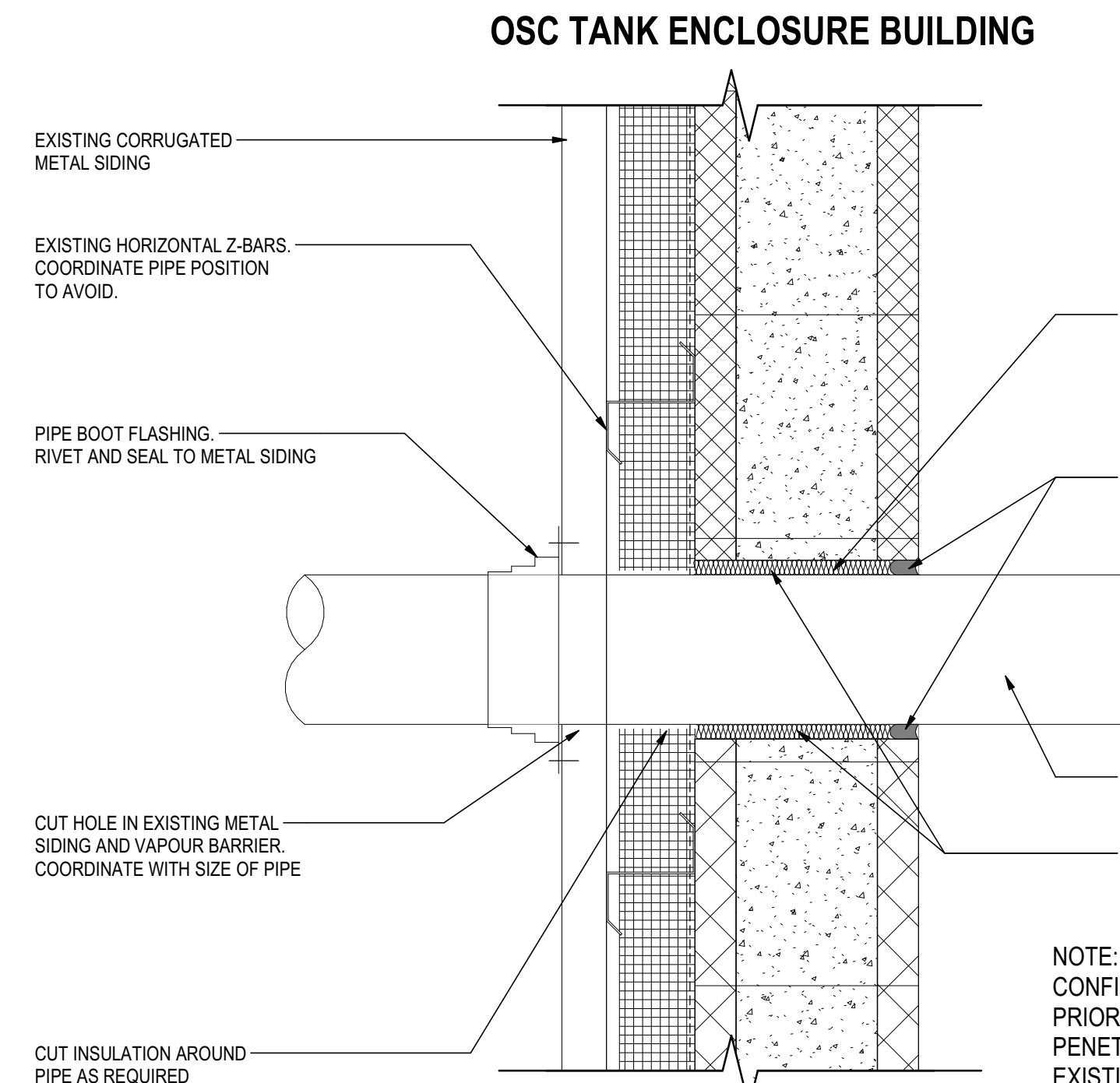
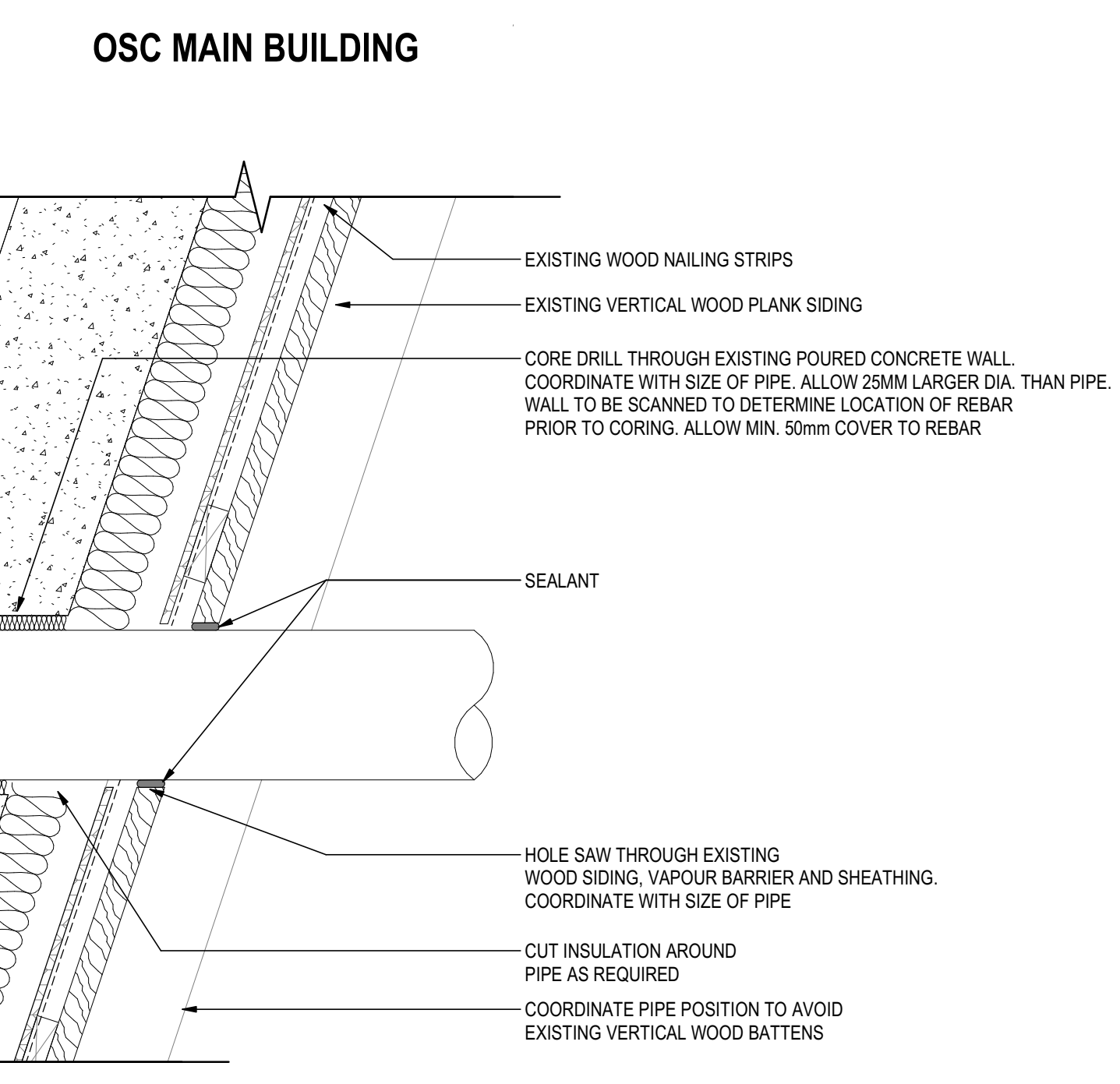


2 PRESSURE BOOSTER STATION SCHEMATIC
M201 N.T.S.



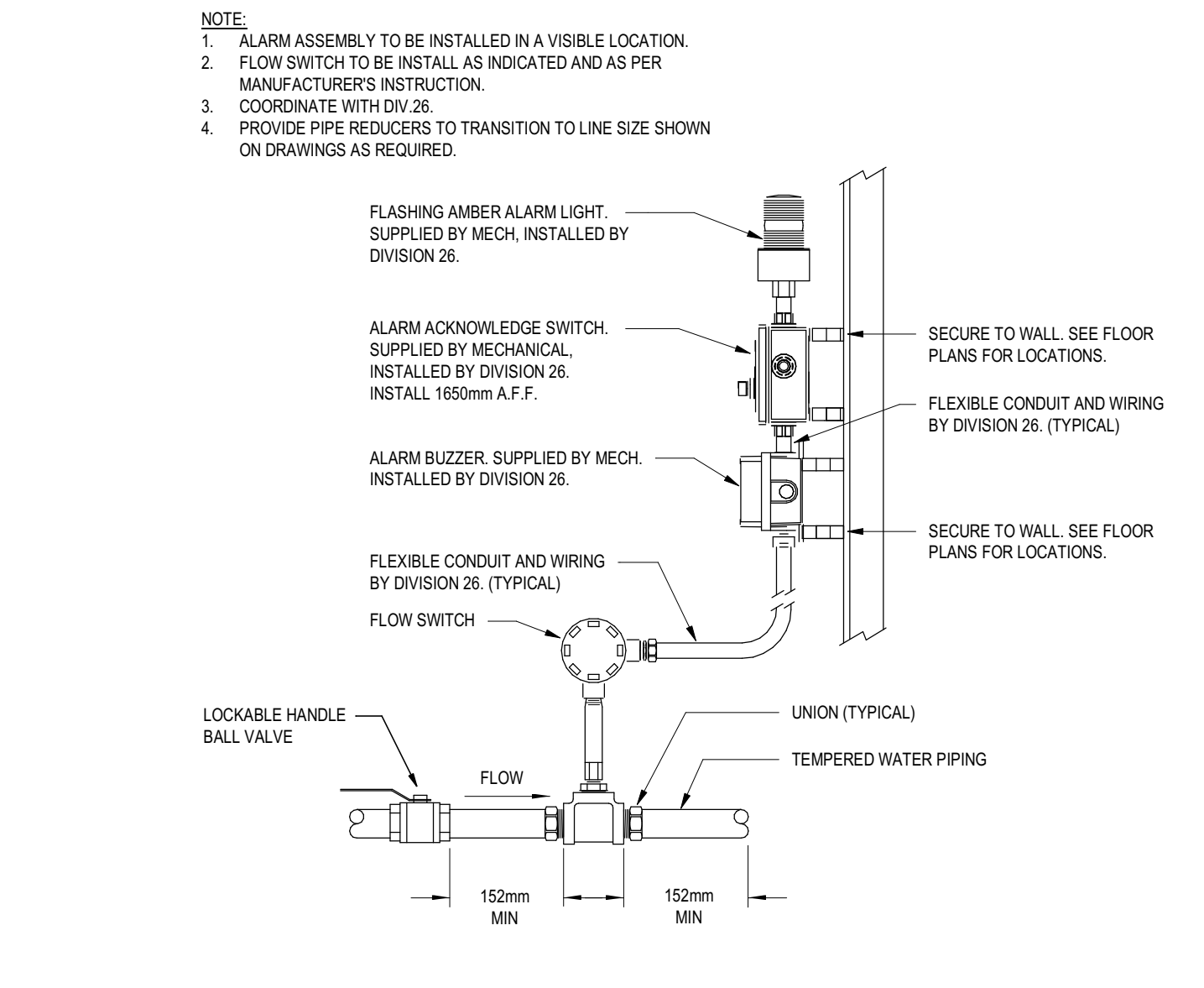
- NOTES:
- FOLLOW PIPE MANUFACTURER'S RECOMMENDATIONS FOR SUPPORTING AND ANCHORING PLASTIC PIPING.
 - USE SUPPORT METHOD SHOWN ABOVE AT LEAST EVERY THIRD POINT OF SUPPORT & ONE AT EACH CHANGE OF DIRECTION.
 - ALL STEEL SHALL BE HOT DIPPED GALVANIZED.
 - PIPING TO BE SECURED WITH SMOOTH STRAPS AND/OR HANGERS THAT ALLOW FOR MOVEMENT FOR EXPANSION AND CONTRACTION.

4 PIPING SUPPORT DETAILS
M201 N.T.S.



- NOTE:
- CONFIRM EXACT LOCATIONS OF PENETRATIONS ON SITE. PRIOR TO CORE DRILLING CONDUCT REBAR SCAN. NEW PENETRATIONS SHALL ENSURE 75mm MINIMUM COVER OVER EXISTING REBAR. DO NOT DISTURB EXISTING REBAR.

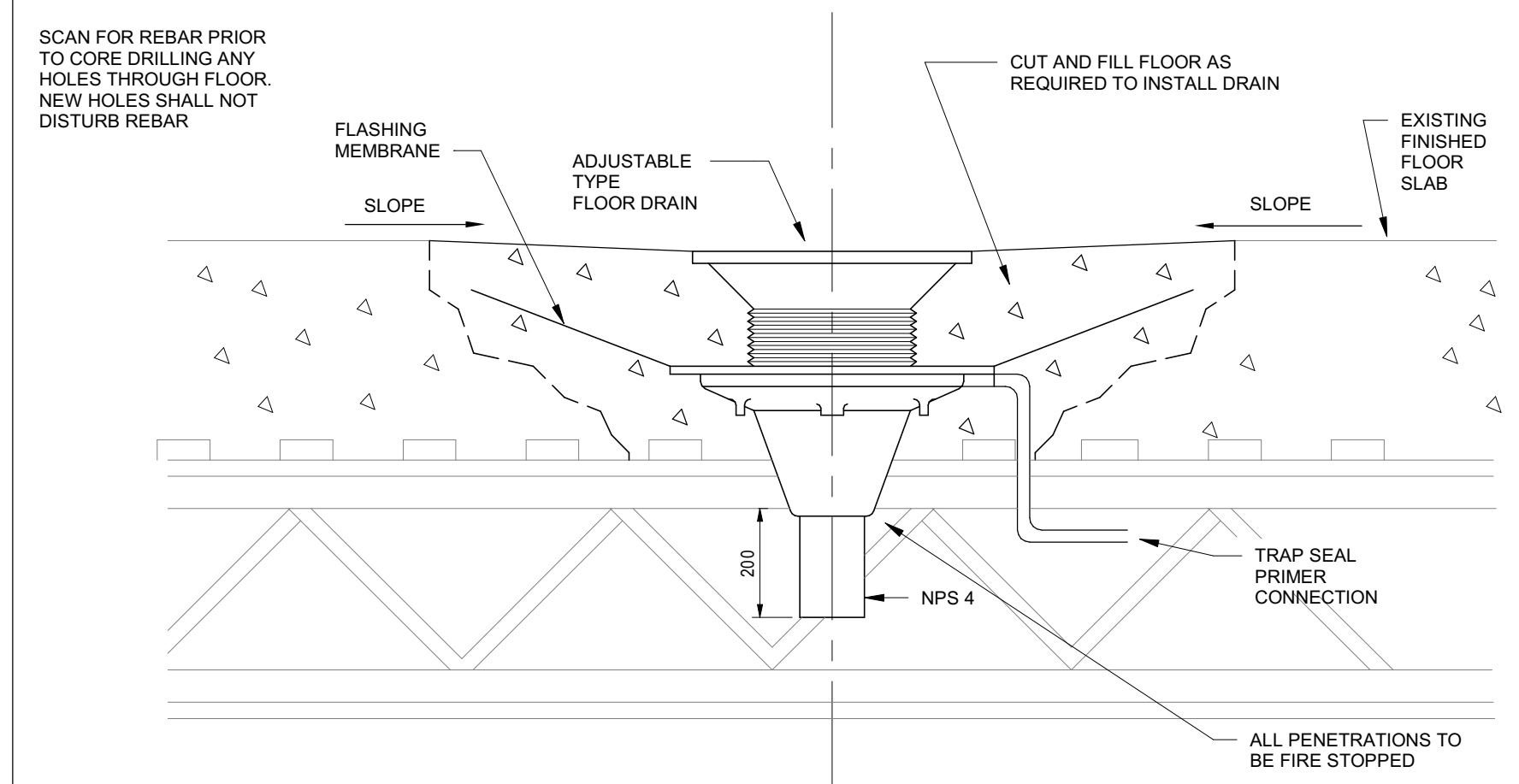
5 TYPICAL PENETRATION AT BUILDING
M201 N.T.S.



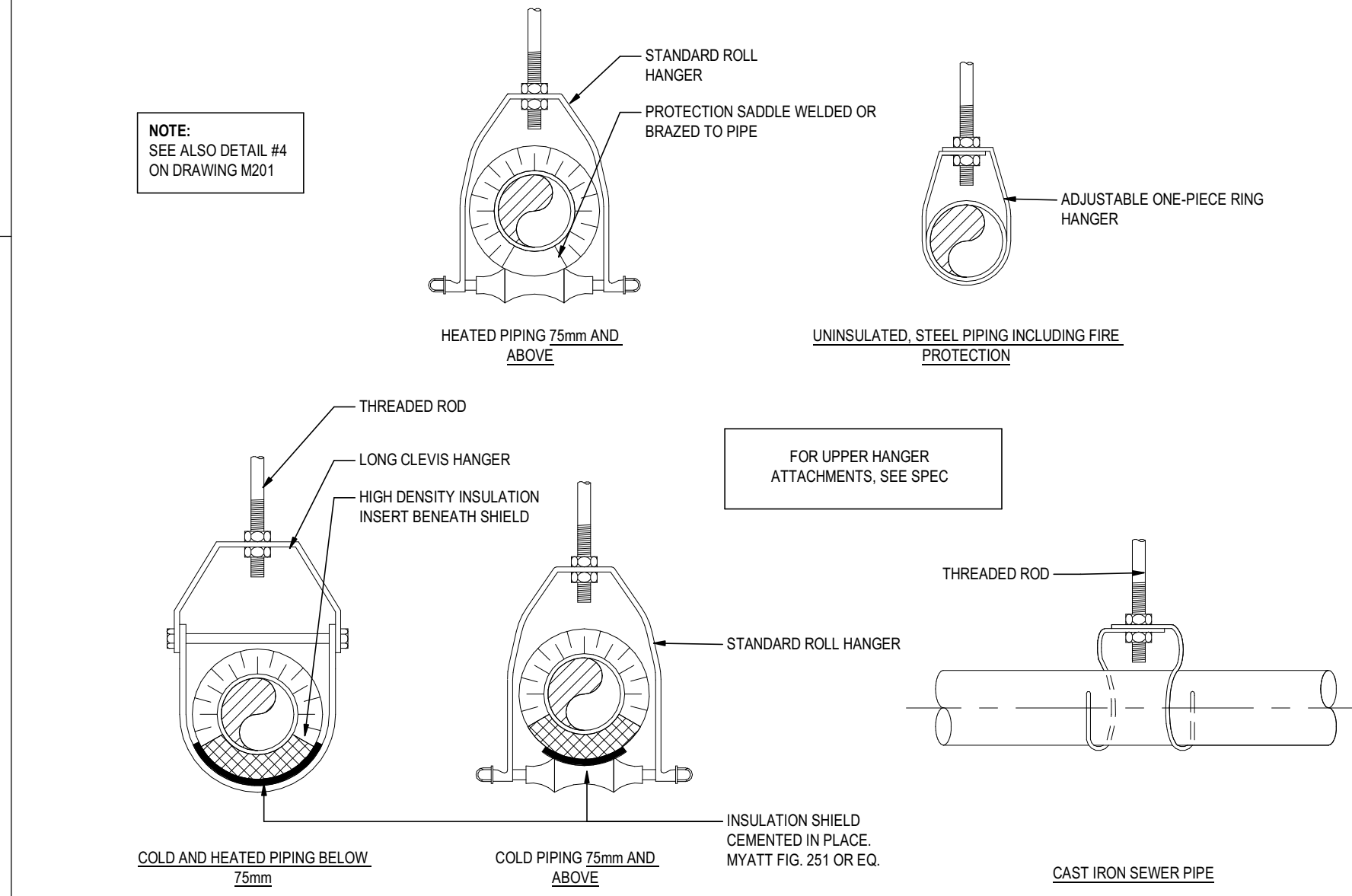
3 EMERGENCY FIXTURE AUDIBLE/VISUAL ALARM GENERAL ARRANGEMENT
M201 N.T.S.

GENERAL NOTES:

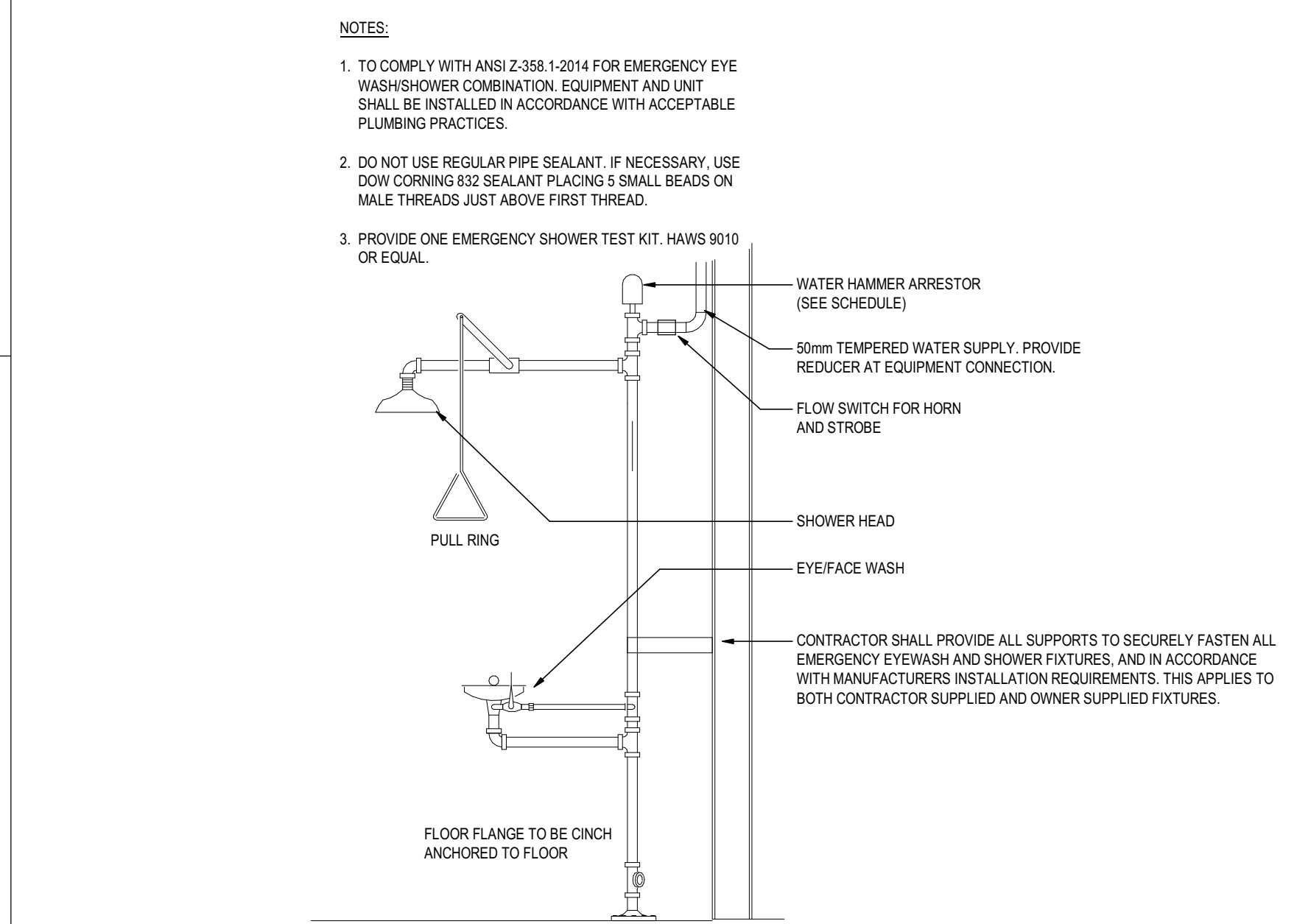
- DRAWINGS ARE SCHEMATIC AND DO NOT SHOW EVERY OFFSET, FITTING, COMPONENT, ETC. CONTRACTOR SHALL SUPPLY ALL REQUIRED MATERIALS AND LABOUR AS REQUIRED FOR COMPLETE WORKING SYSTEMS.
- FIRESTOP ALL PIPING PENETRATIONS THROUGH WALLS AND FLOORS.
- INSTALL ALL EQUIPMENT IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS, INCLUDING EQUIPMENT TO BE REUSED. COORDINATE MAKE & MODEL OF EXISTING EQUIPMENT TO BE REUSED WITH OWNER.
- COORDINATE EXACT FINAL LOCATION OF EQUIPMENT WITH OWNER PRIOR TO INSTALLATION.
- PROVIDE PENETRATIONS FOR PIPING THROUGH WALLS & FLOORS TO ROUTE NEW PIPING.
- WHERE CONNECTING TO EXISTING PIPING, CAP PIPING THAT WILL NO LONGER BE IN USE.
- DO NOT SCALE FROM DRAWINGS.
- ROUTE ALL PIPING AS CLOSE TO CEILING AS POSSIBLE
- PROVIDE ACCESS DOORS AT ALL CONCEALED VALVES, FLOW SWITCHES AND OTHER MECHANICAL EQUIPMENT. PROVIDE FIRE RATED ACCESS DOORS WHERE REQUIRED.
- CONTRACTORS TO VERIFY ALL DIMENSIONS, PIPE SIZES AND CONDITIONS ON SITE AND REPORT ANY DISCREPANCIES TO ENGINEER BEFORE PROCEEDING WITH ANY WORK.
- CONTRACTORS TO PROTECT ALL EXISTING FINISHES, MILLWORK, EQUIPMENT AND FURNITURE FROM DAMAGE.
- ALL EMERGENCY EYE WASHES, DRENCH SHOWERS AND COMBINATION UNITS ARE TO BE INSTALLED AS PER ANSI Z358.1 AND MANUFACTURERS RECOMMENDATIONS.
- CUT, REPAIR, FINISH FLOORS AND WALLS AS REQUIRED BY DEMOLITION AND NEW CONSTRUCTION.
- REMOVE AND REINSTATE CEILINGS AS REQUIRED TO ACCOMMODATE NEW WORK. IF ANY CEILING TILES ARE DAMAGED DURING REMOVAL, CONTRACTOR IS RESPONSIBLE TO PLACE.
- TOUCH UP, PAINT AND REPAIR ALL FINISHES DAMAGED DURING DEMOLITION OR NEW CONSTRUCTIONS. ALL FINISHES TO MATCH EXISTING ADJACENT FINISHES.
- CONFIRM EXACT LOCATIONS OF WALL/FLOOR PENETRATIONS ON SITE. PRIOR TO CORE DRILLING CONDUCT REBAR SCAN. NEW PENETRATIONS SHALL ENSURE 75mm MINIMUM COVER OVER EXISTING REBAR. DO NOT DISTURB EXISTING REBAR.



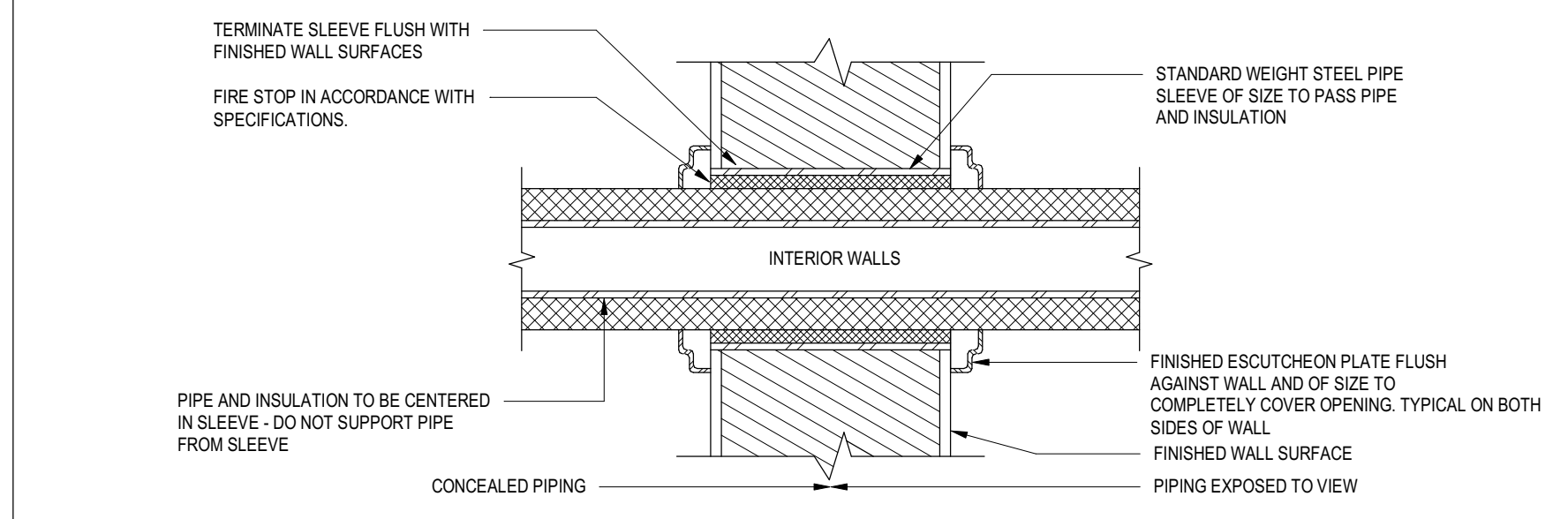
1 FLOOR DRAIN
NTS



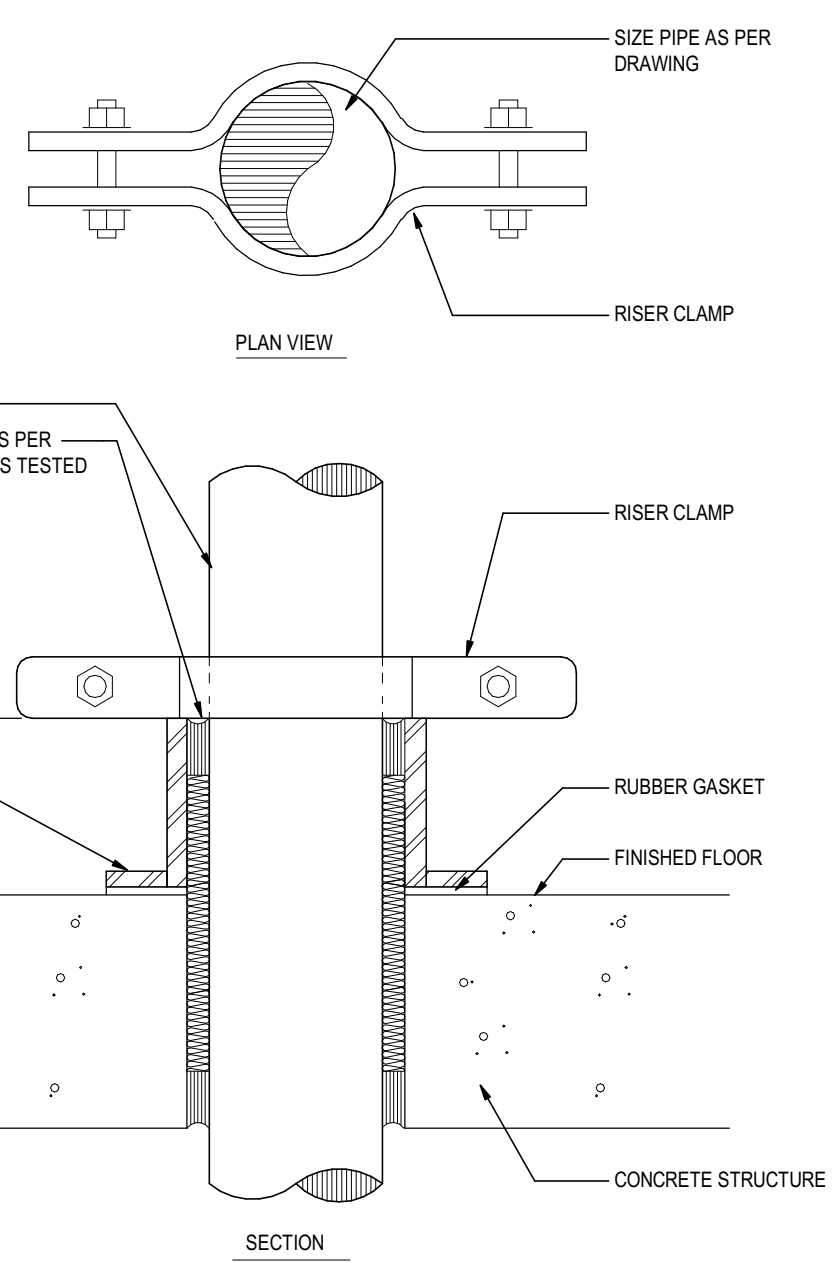
2 SUPPORT HANGER PIPE ATTACHMENTS
NTS



3 EMERGENCY SHOWER AND EYE WASH COMBINATION UNIT
NTS



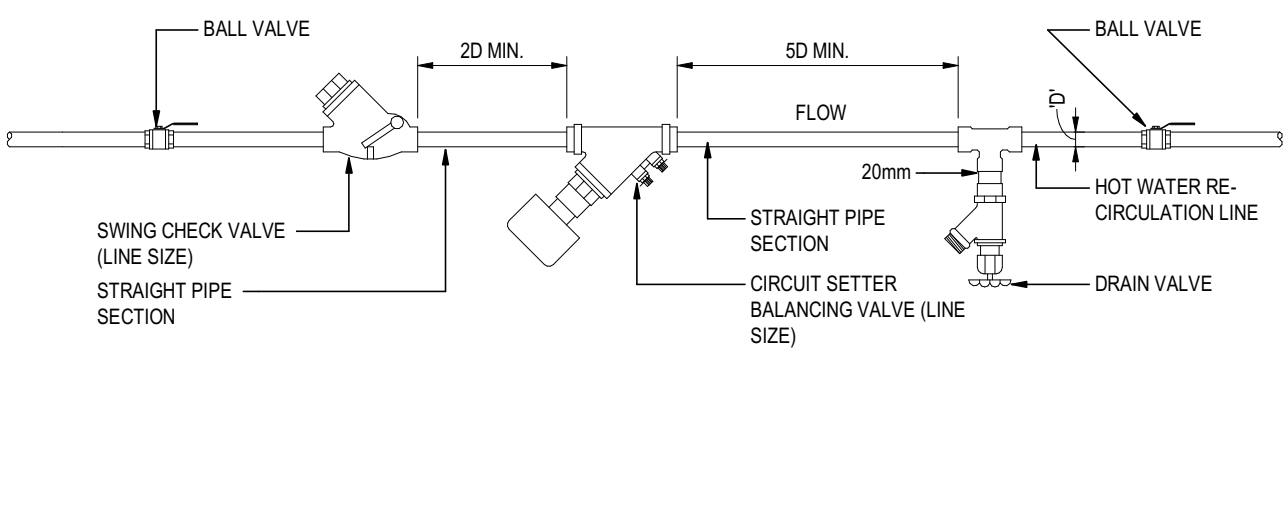
4 INTERIOR PIPE PENETRATION DETAIL
N.T.S.



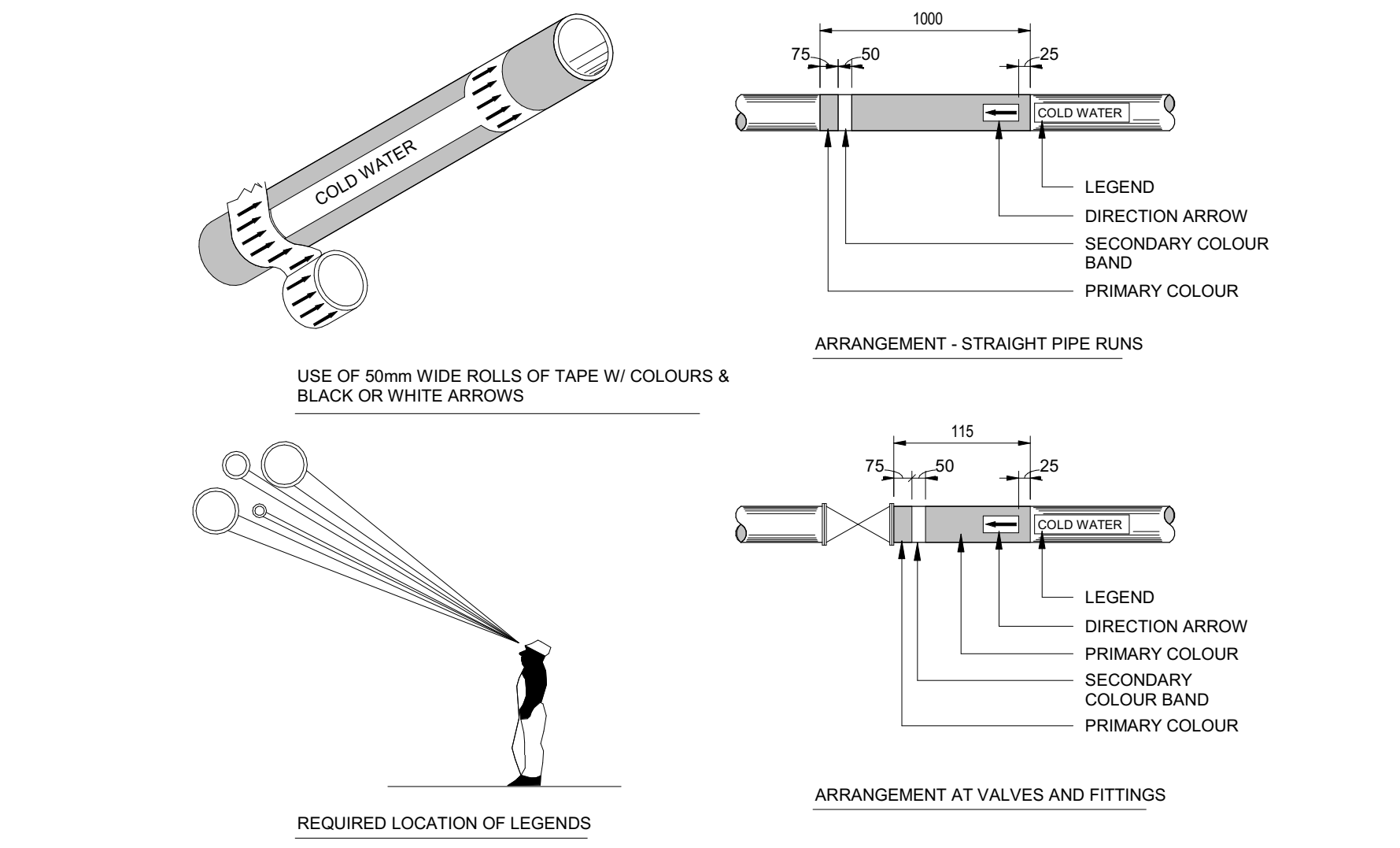
7 FLOOR PIPE PENETRATION AND RISER CLAMP
NTS

- EMERGENCY FIXTURE PLACEMENT REQUIREMENTS:**
- EYEWASH OR EYE/FACE WASH SHALL BE POSITIONED SUCH THAT FLUSHING FLUID PATTERN IS NOT LESS THAN 638mm AND NO GREATER THAN 1346mm FROM SURFACE ON WHICH USER STANDS, AND 153mm MINIMUM FROM WALL OR NEAREST OBSTRUCTION.
 - SHOWER SHALL BE POSITIONED SUCH THAT SHOWER HEAD IS NOT LESS THAN 2083mm AND NO GREATER THAN 2438mm FROM SURFACE ON WHICH USER STANDS.
 - SHOWER SPRAY PATTERN SHALL HAVE A MINIMUM DIAMETER OF 508mm AT 1524mm ABOVE SURFACE ON WHICH USER STANDS. CENTER OF SPRAY PATTERN SHALL BE LOCATED AT LEAST 406mm FROM ANY OBSTRUCTION.
 - INSTALL EQUIPMENT IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.

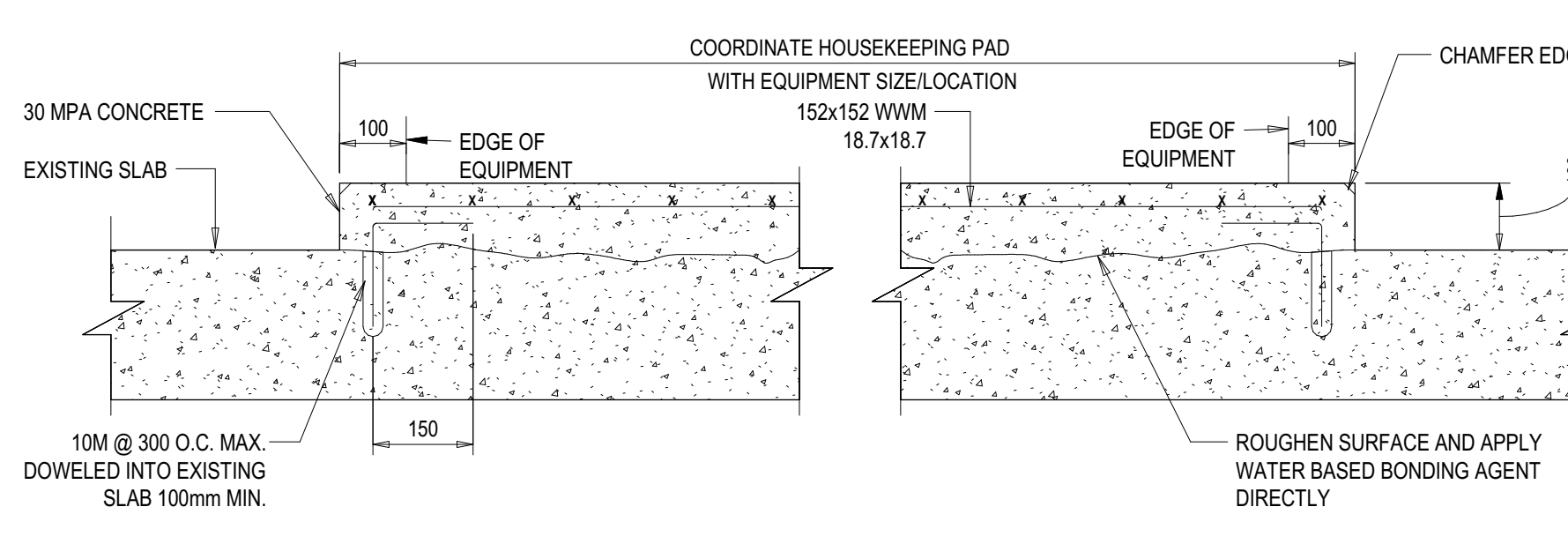
9 ANSI Z358.1-2014 MISC. FIXTURE PLACEMENT REQUIREMENTS
NTS



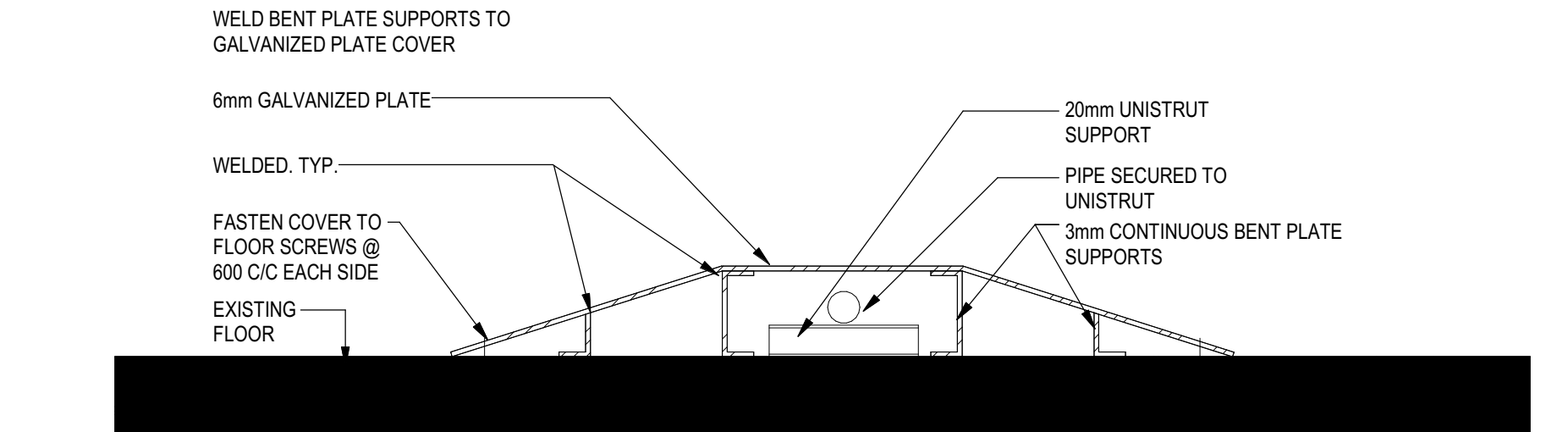
8 WATER RE-CIRCULATION DETAIL
NTS



5 IDENTIFICATION OF PIPING SYSTEM
NTS



6 HOUSEKEEPING PAD DETAIL
NOT TO SCALE



10 PIPE COVER DETAIL
NOT TO SCALE

EMERGENCY FIXTURE SCHEDULE							
TAG	DESCRIPTION	LOCATION	EXISTING LOCATION*	EXISTING COMPONENTS TO BE RELOCATED AND INSTALLED BY CONTRACTOR	ACCESSORIES TO BE CONTRACTOR SUPPLIED AND INSTALLED	ACCEPTABLE PRODUCTS	WATER HAMMER ARRESTOR SIZE TO BE CONTRACTOR SUPPLIED AND INSTALLED**
EW-1	WALL MOUNTED EYE WASH UNIT	AX-2000	CONTRACTOR SUPPLIED	-	C/W HORN, STROBE, ACKNOWLEDGEMENT SWITCH, FLOW SWITCH, WALL BRACKET, SIGNAGE.	HAWS 7324 OR APPROVED EQUAL	C
EW-2	COUNTER MOUNTED EYE WASH UNIT	AX-4014	ROOM C-5004A	EYE WASH C/W HORN, STROBE, ACKNOWLEDGEMENT SWITCH, FLOW SWITCH AND SIGNAGE.	-	-	C
EW-3	EYE WASH UNIT	AC-2002	ROOM C-2023	EYE WASH C/W HORN, STROBE, ACKNOWLEDGEMENT SWITCH, FLOW SWITCH AND SIGNAGE.	-	-	E
EW-4	EYE WASH UNIT	AC-2005	CONTRACTOR SUPPLIED	-	C/W HORN, STROBE, ACKNOWLEDGEMENT SWITCH, FLOW SWITCH, SIGNAGE.	HAWS 7361/7461 OR APPROVED EQUAL	E
EW-5	SURFACE MOUNT PULL DOWN EYE WASH UNIT	OS-4008	CONTRACTOR SUPPLIED	-	C/W HORN, STROBE, ACKNOWLEDGEMENT SWITCH, FLOW SWITCH, SIGNAGE.	HAWS 7656WCSM OR APPROVED EQUAL	C
EW-6	SURFACE MOUNT PULL DOWN EYE WASH UNIT	AC-2003	CONTRACTOR SUPPLIED	-	C/W SIGNAGE. THE HORN, STROBE, FLOW SWITCH, AND ACKNOWLEDGEMENT SWITCH WITH ES-4 SHALL SERVE THIS EQUIPMENT ALSO.	HAWS 7656WCSM OR APPROVED EQUAL	B
EW-7	WALL MOUNTED EYE WASH UNIT	AC-1007	CONTRACTOR SUPPLIED	-	C/W SIGNAGE. THE HORN, STROBE, FLOW SWITCH, AND ACKNOWLEDGEMENT SWITCH WITH ES-3 SHALL SERVE THIS EQUIPMENT ALSO.	HAWS 7360BTWC OR APPROVED EQUAL	B
ES-1	COMBINATION SHOWER/EYE WASH UNIT	AC-1004	CONTRACTOR SUPPLIED	-	C/W HORN, STROBE, ACKNOWLEDGEMENT SWITCH, FLOW SWITCH, SIGNAGE.	HAWS 8309WC OR APPROVED EQUAL	E & F (2 IN TOTAL)
ES-2	COMBINATION SHOWER/EYE WASH UNIT	AC-1004	CONTRACTOR SUPPLIED	-	C/W HORN, STROBE, ACKNOWLEDGEMENT SWITCH, FLOW SWITCH, SIGNAGE.	HAWS 8309WC OR APPROVED EQUAL	F
ES-3	SHOWER UNIT	AC-1007	CONTRACTOR SUPPLIED	-	C/W HORN, STROBE, ACKNOWLEDGEMENT SWITCH, FLOW SWITCH, SIGNAGE. SECURE SHOWER FROM CEILING WITH SITE FABRICATED METAL SUPPORTS.	HAWS 8122HWC OR APPROVED EQUAL	E
ES-4	SHOWER UNIT	AC-2003	CONTRACTOR SUPPLIED	-	C/W HORN, STROBE, ACKNOWLEDGEMENT SWITCH, FLOW SWITCH, SIGNAGE. SECURE SHOWER FROM CEILING WITH SITE FABRICATED METAL SUPPORTS.	HAWS 8122HWC OR APPROVED EQUAL	E
ES-5	COMBINATION SHOWER/EYE WASH UNIT	AC-2004	ROOM C-5011	SHOWER & EYE WASH C/W HORN, STROBE, ACKNOWLEDGEMENT SWITCH, FLOW SWITCH AND SIGNAGE.	-	-	E
ES-6	COMBINATION SHOWER/EYE WASH UNIT	CD-1021	ROOM C-4030	SHOWER & EYE WASH C/W HORN, STROBE, ACKNOWLEDGEMENT SWITCH, FLOW SWITCH AND SIGNAGE.	-	-	F
ES-7	COMBINATION SHOWER/EYE WASH UNIT	CD-1018	ROOM C-5001	SHOWER & EYE WASH C/W HORN, STROBE, ACKNOWLEDGEMENT SWITCH, FLOW SWITCH AND SIGNAGE.	-	-	F
ES-8	COMBINATION SHOWER/EYE WASH UNIT	RT-2005	ROOM C-5007A	SHOWER & EYE WASH C/W HORN, STROBE, ACKNOWLEDGEMENT SWITCH, FLOW SWITCH AND SIGNAGE.	-	-	E & F & F (3 IN TOTAL)
ES-9	COMBINATION SHOWER/EYE WASH UNIT	OS-3008	ROOM C-5009A	SHOWER & EYE WASH C/W HORN, STROBE, ACKNOWLEDGEMENT SWITCH, FLOW SWITCH AND SIGNAGE.	-	-	F
ES-10	COMBINATION SHOWER/EYE WASH UNIT	OS-4009	ROOM C-5002	SHOWER & EYE WASH C/W HORN, STROBE, ACKNOWLEDGEMENT SWITCH, FLOW SWITCH AND SIGNAGE.	-	-	F
ES-11	COMBINATION SHOWER/EYE WASH UNIT	OSC-3011	CONTRACTOR SUPPLIED	-	C/W HORN, STROBE, ACKNOWLEDGEMENT SWITCH, FLOW SWITCH, SIGNAGE.	HAWS 8309WC OR APPROVED EQUAL	F
ES-12	COMBINATION SHOWER/EYE WASH UNIT	CD-1002	CONTRACTOR SUPPLIED	-	C/W HORN, STROBE, ACKNOWLEDGEMENT SWITCH, FLOW SWITCH, SIGNAGE.	HAWS 8309WC OR APPROVED EQUAL	F

* THE CONTRACTOR SHALL BE RESPONSIBLE FOR TRANSPORTING EXISTING EQUIPMENT FROM MEMORIAL UNIVERSITY PRINCE PHILIP DRIVE CAMPUS TO THE INSTALLATION LOCATION.
** EXISTING FIXTURES TO BE RELOCATED MAY BE EQUIPPED WITH WATER HAMMER ARRESTORS (WHA). CONTRACTOR SHALL REMOVE THEM AND INSTALL NEW WHA, SIZED AS INDICATED.

NO.	ISSUED FOR	BY	DATE
2	ISSUED FOR TENDER	MR	MS 2025.04.24
1	ISSUED FOR TENDER	NP	MS 2025.05.02
0	ISSUED FOR TENDER	CH	BD 2024.06.21

Issued/Revision
By App'd YYYY.MM.DD

File Name: N/A Author Designer Checker 03/30/23
Dwn. Dggn. Chk'd. YYYY.MM.DD

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ENGINEERING PERMIT J0291
STANTEC CONSULTING LTD.
04862
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Client/Project Logo

Client/Project
MEMORIAL UNIVERSITY

OSC EMERGENCY EYE WASH AND SHOWER UPGRADE

Title
OSC MECHANICAL DETAILS AND SCHEDULE

Project No. 133411894 Scale AS INDICATED
Revision Drawing No. M202
2

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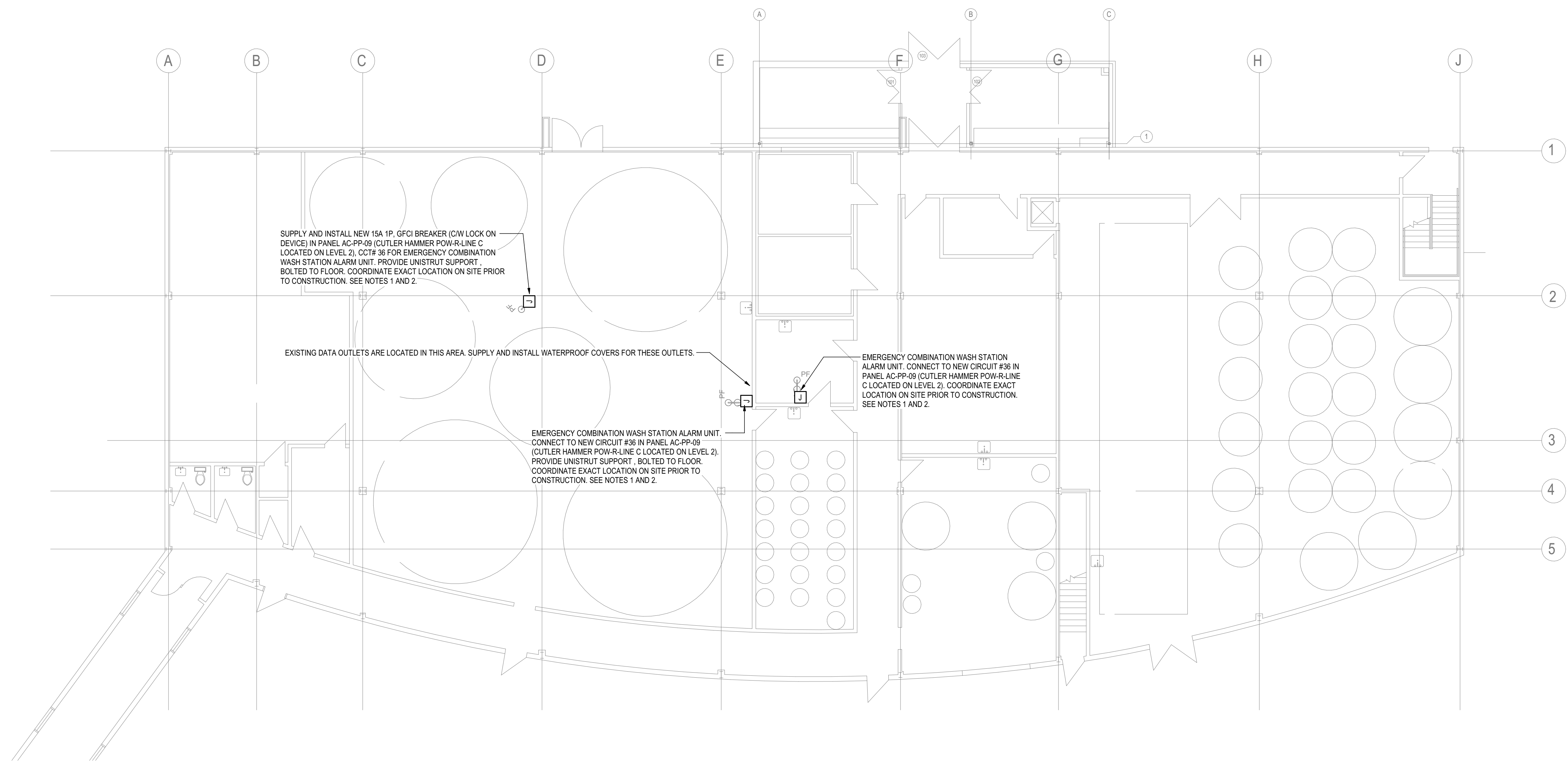
Consultant

GENERAL NOTES:

1. MOUNT NEW STROBE/BUZZER/SWITCH AS SHOWN ON MECHANICAL DRAWINGS. STROBE, BUZZER AND SWITCH TO BE SUPPLIED AND INSTALLED BY MECHANICAL. WIRED BY ELECTRICAL. CIRCUIT # AS INDICATED.
2. PROVIDE AND INSTALL TECK90 CABLE AND WEATHERTIGHT CONNECTORS FOR POWER TERMINATION AT ALARM UNIT.



1 ENLARGED PLAN - OSC ANNEX LEVEL 4 (OPTION A)
E102 1 : 100



2 ENLARGED PLAN - OSC AQUACULTURE FACILITY LEVEL 1 (OPTION A)
E102 1 : 100

Rev	Issued/Revision	By	App'd	YYYY.MM.DD
2	ISSUED FOR TENDER	MR	BR	2024.06.24
1	ISSUED FOR TENDER	MR	BR	2025.05.02
0	ISSUED FOR TENDER	MR	BR	2024.06.21

File Name: N/A Author: Designer: Checker: 12/07/23
Dwn: Dgn: Ckcl: YYYY.MM.DD

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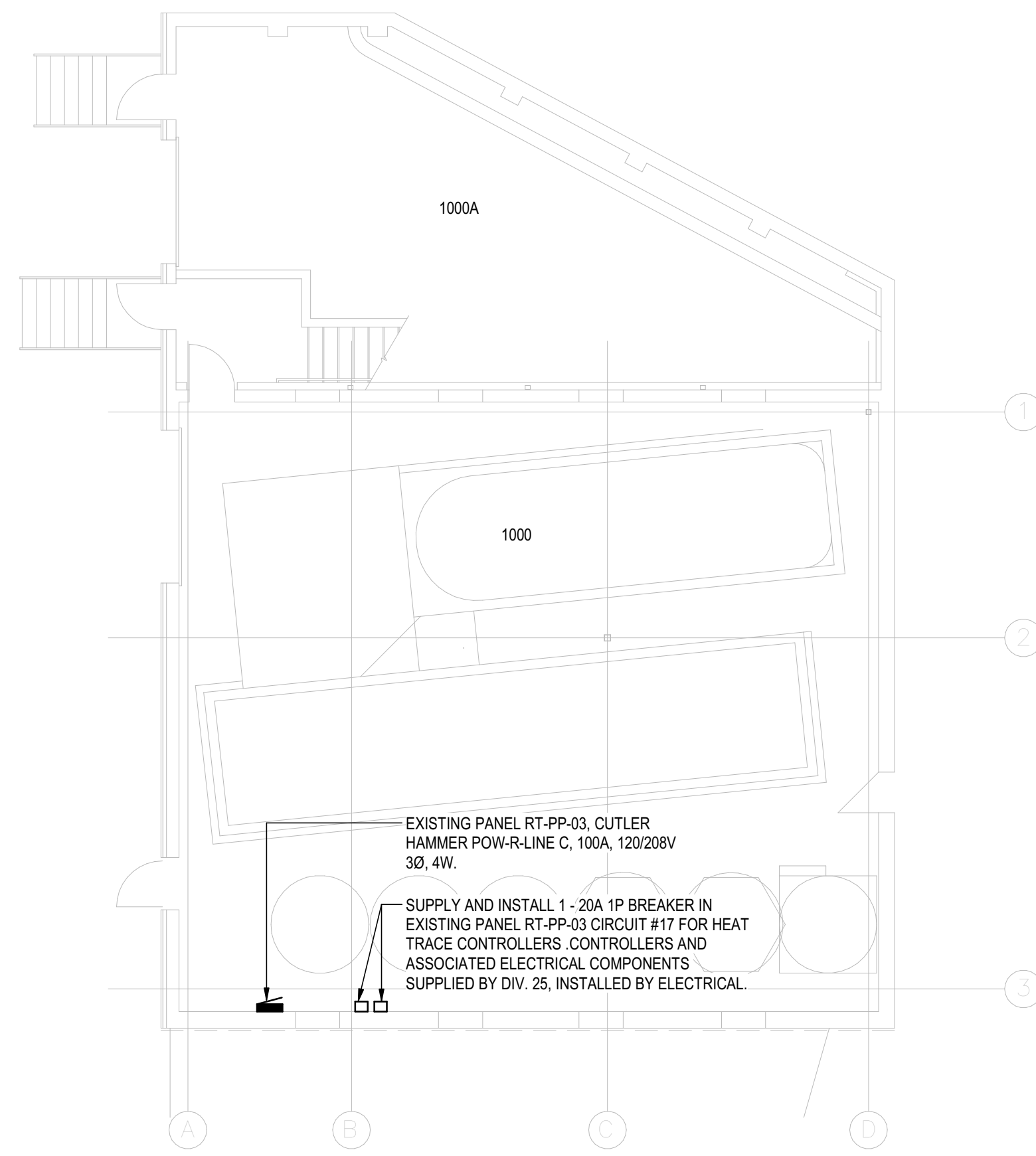
Client/Project
MEMORIAL UNIVERSITY

OSC EMERGENCY EYE WASH AND SHOWER UPGRADE

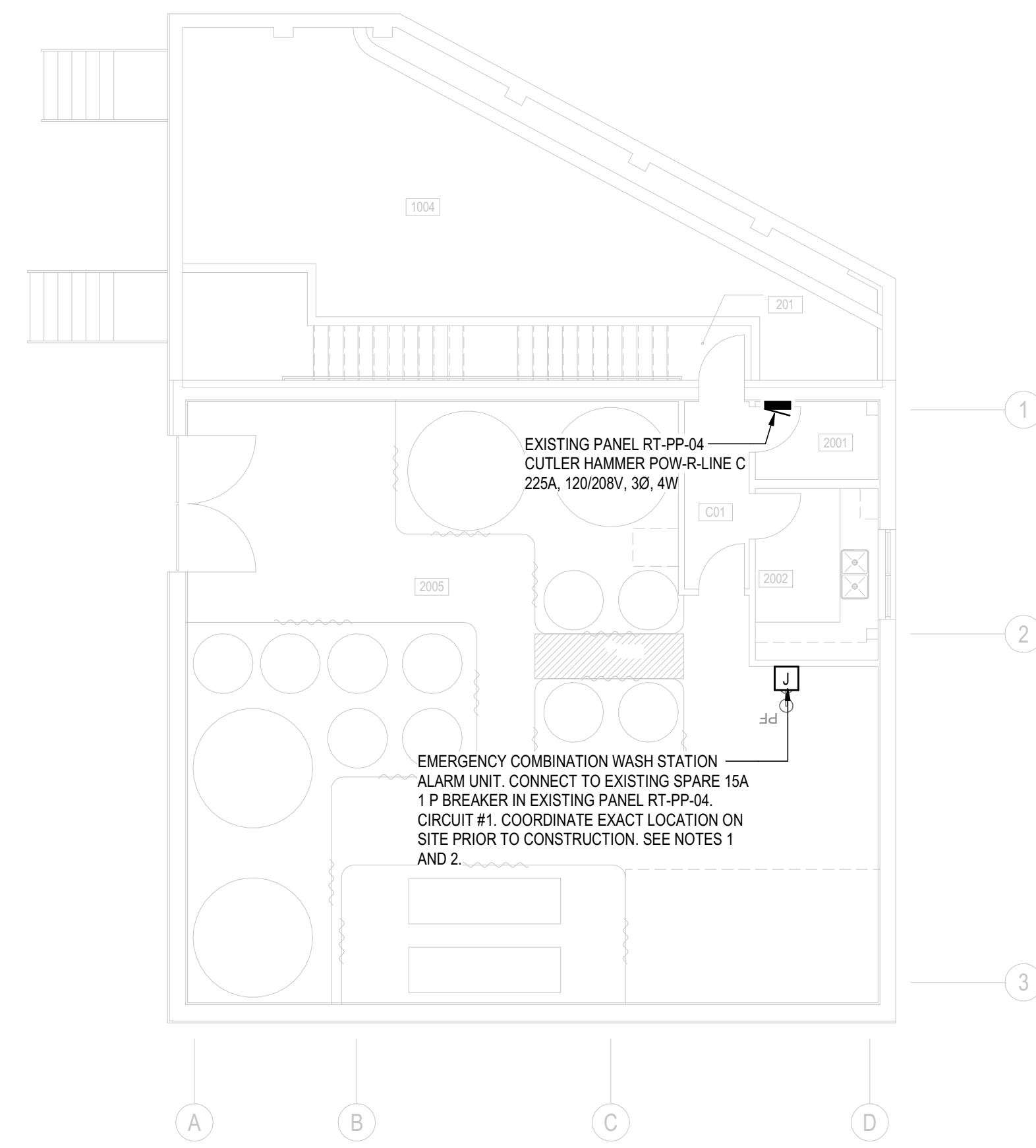
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ENLARGED ELECTRICAL PLANS - OSC ANNEX AND AQUACULTURE

GENERAL NOTES:

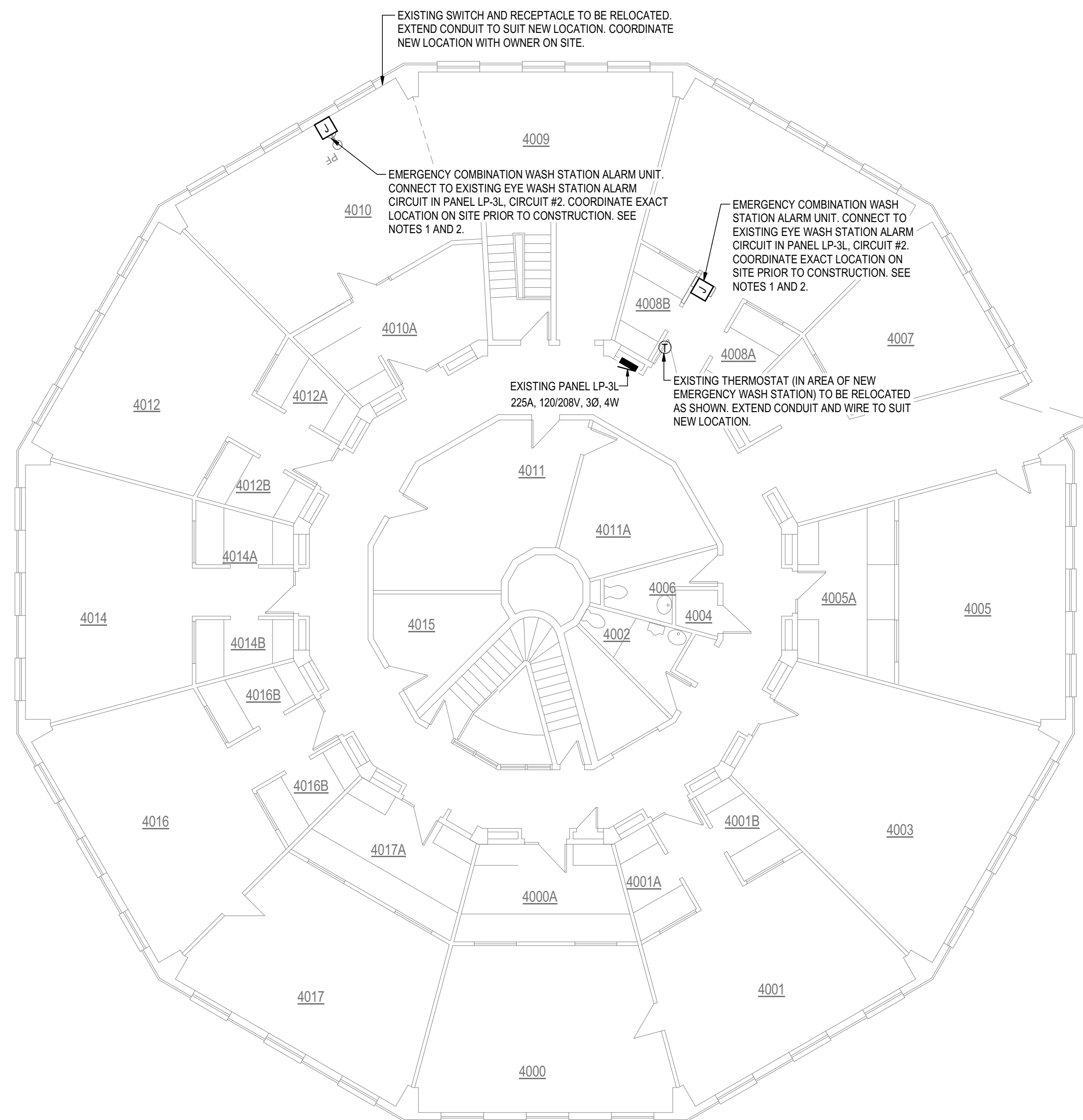
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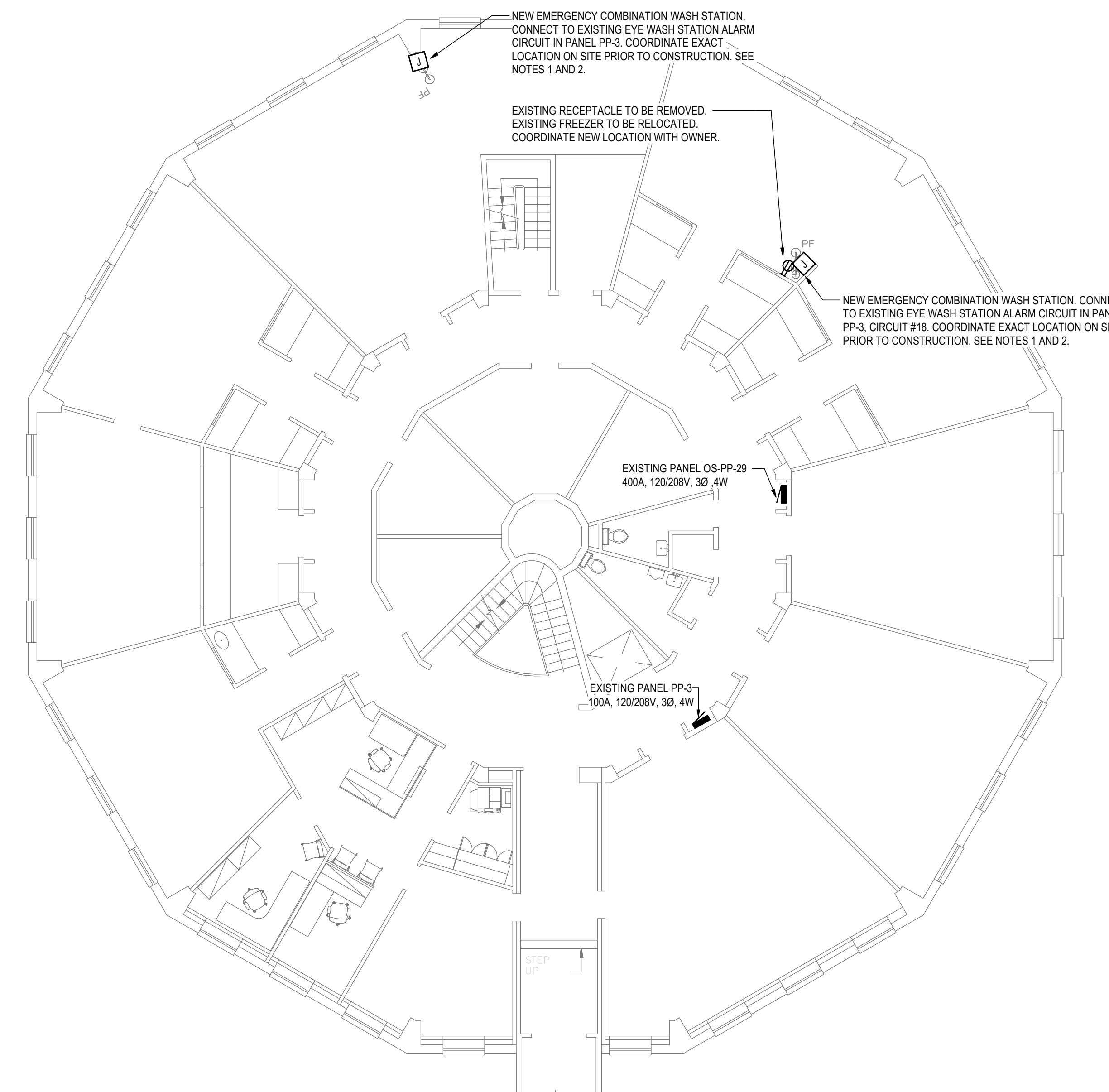
3 ENLARGED FLOOR PLAN - OSC TANK ENCLOSURE LEVEL 1 (OPTION B)
E104 1: 100



1 ENLARGED FLOOR PLAN - OSC TANK ENCLOSURE LEVEL 2 (OPTION B)
E104 1: 100



4 ENLARGED PLAN - OSC MAIN BUILDING LEVEL 4 (OPTION A)
E104 1: 100



2 ENLARGED PLAN - OSC MAIN BUILDING LEVEL 3 (OPTION A)
E104 1: 100

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2 ISSUED FOR TENDER	MR	BR	2024.06.24
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0 ISSUED FOR TENDER	MR	BR	2024.06.21

File Name	N/A	Author	Designer	Checker	12/07/23
Dwn.	Dgn.	Chk'd.	YYYY.MM.DD		

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PEGA PROFESSIONAL ENGINEER
REGISTERED PROFESSIONAL ENGINEER
2025-05-20
NEWFOUNDLAND & LABRADOR



Client/Project
MEMORIAL UNIVERSITY

OSC EMERGENCY EYE WASH AND SHOWER UPGRADE

Title
ENLARGED ELECTRICAL PLANS - OSC MAIN BUILDING AND TANK ENCLOSURE

FILE LOCATION: H:\Projects\133411894\0402023\133411894

