

# NATIONAL RESEARCH COUNCIL 1200 MONTREAL ROAD OTTAWA, ONTARIO K1A 0R6 BUILDING M-06 DEAERATOR REPLACEMENT



### GENERAL NOTES

- CONTRACTOR TO VERIFY ALL DIMENSIONS AND CLEARANCES ON SITE PRIOR TO CONSTRUCTION AND REPORT ANY DISCREPANCIES AND/OR OMISSIONS TO DEPARTMENTAL REPRESENTATIVE.
- CONTRACTOR MUST VISIT THE SITE AND FULLY FAMILIARIZE THEMSELVES WITH THE SCOPE OF THE WORK PRIOR TO PROJECT COMMENCEMENT.
- ALL TRADES TO COORDINATE WORK ON SITE, WITH APPROVAL OF DEPARTMENTAL REPRESENTATIVE TO AVOID ANY CONFLICTS AND/OR INTERFERENCE.
- ANY AND ALL REQUIRED SHUTDOWNS SHALL BE COORDINATED WITH DEPARTMENTAL REPRESENTATIVE.
- INSTALLATION OF ALL SYSTEMS SHALL BE IN ACCORDANCE WITH APPLICABLE CODES AND STANDARDS.
- CONTRACTOR TO BE RESPONSIBLE FOR REINSTATEMENT AND REPAIR OF ANY DAMAGE CAUSED BY WORK.
- CONTRACTOR SHALL PREVENT THE SPREAD OF DUST AND DEBRIS BEYOND AREA OF WORK AND CLEAN ALL SURFACES AT COMPLETION.

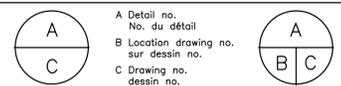
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DRAWING NUMBER	DRAWING NAME
5889-G01	COVER SHEET
5889-S01	DEAERATOR REPLACEMENT - GENERAL NOTES
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5889-M10	DEAERATOR REPLACEMENT - GENERAL ARRANGEMENT



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- o Verify all dimensions and site conditions and be responsible for same
- o Vérifier toutes les dimensions et l'état des lieux et en assumer la responsabilité



project \_\_\_\_\_ projet \_\_\_\_\_

**BUILDING M-06  
DEAERATOR REPLACEMENT**

MONTREAL ROAD CAMPUS

**DEAERATOR REPLACEMENT  
COVER SHEET**

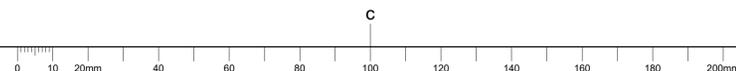
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M.COHEN				

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approved	approuvé	W.O.no.	D.T.no.
		A1-010981-04-01	

dwg.no.	dessin no.
<b>5889-G01</b>	



**GENERAL NOTES**

- STRUCTURAL DESIGN IN ACCORDANCE WITH THE NATIONAL BUILDING CODE OF CANADA 2015 AND THE USER'S GUIDE – NBC 2015 STRUCTURAL COMMENTARIES (PART 4 OF DIVISION B).
- PERFORM ALL WORK TO THE REQUIREMENTS OF THE NATIONAL BUILDING CODE OF CANADA 2015. OBSERVE ALL LOCAL AND PROVINCIAL REGULATORY REQUIREMENTS AND EXECUTE ALL WORK TO THE REQUIREMENTS OF THE APPLICABLE CSA STANDARDS. ALL WORKMANSHIP TO BE REPRESENTATIVE OF THE HIGHEST INDUSTRY STANDARD.
- COMPLY WITH LOCAL, PROVINCIAL, AND FEDERAL ENVIRONMENTAL REGULATIONS WHEN PERFORMING ALL WORK. COMPLY WITH ALL REQUIREMENTS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT.
- READ THESE DRAWINGS IN CONJUNCTION WITH THE MECHANICAL AND ELECTRICAL DRAWINGS. COORDINATE THE REQUIREMENTS OF THESE TRADES WITH THE STRUCTURAL WORK AND PROVIDE FOR OPENINGS, SLEEVES, DUCTS, ETC. IN THE CASE OF DISCREPANCIES, NOTIFY THE NRC DEPARTMENTAL REPRESENTATIVE IMMEDIATELY FOR CLARIFICATION. CUTTING OR DRILLING THROUGH REBAR AND MASS WOOD ELEMENTS IS NOT PERMITTED WITHOUT WRITTEN APPROVAL OF THE NRC DEPARTMENTAL REPRESENTATIVE. ALL CONCRETE ELEMENTS TO BE DRILLED OR CORED MUST BE SCANNED TO LOCATE EMBEDDED REBAR AND CONDUITS.
- CONFIRM ALL DIMENSIONS, ELEVATIONS, GRADES AND EXISTING CONDITIONS PRIOR TO COMMENCING THE WORK AND REPORT ANY DISCREPANCIES TO THE NRC DEPARTMENTAL REPRESENTATIVE. DIMENSIONS ARE BASED ON AS-BUILT DRAWINGS AND FIELD MEASUREMENTS AND ARE TO BE CONFIRMED BY THE CONTRACTOR FOR THEIR ACCURACY.
- PROPRIETARY SYSTEMS ARE TO BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
- INSTALL TEMPORARY HOARDING AND SHORING, AS REQUIRED TO PROTECT WORKERS AND OCCUPANTS OF THE SITE. MAINTAIN EXITS AT ALL TIMES. RESTORE DAMAGED CONSTRUCTION TO THE SATISFACTION OF THE NRC DEPARTMENTAL REPRESENTATIVE.
- DO NOT SCALE THE DRAWINGS. DRAWING UNITS ARE IMPERIAL UNLESS NOTED OTHERWISE.
- THE NOTES ON THIS SHEET ARE ONLY INTENDED TO SUPPLEMENT THE SPECIFICATIONS. REFER TO THE APPLICABLE SPECIFICATIONS FOR ALL REQUIREMENTS AND ADDITIONAL INFORMATION. REFER TO 5889-M01 FOR ADDITIONAL GENERAL NOTES.

**DEMOLITION NOTES**

- THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING AND PAYING FOR ANY AND ALL LOCATES (INCLUDING PRIVATE) REQUIRED TO COMPLETE THE WORK, INCLUDING, BUT NOT LIMITED TO, HYDRO, TELEPHONE, GAS, PROCESS, FIBRE, ETC.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO RELOCATE ANY EXISTING MECHANICAL AND ELECTRICAL SERVICES THAT ARE TO REMAIN AND ARE AFFECTED BY THE DEMOLITION. THE CONTRACTOR IS TO TAKE CARE NOT TO DAMAGE THE EXISTING SERVICES AND PROVIDE SUPPORT, AS REQUIRED, TO FACILITATE THE DEMOLITION.
- CONTRACTOR TO CARRY OUT DEMOLITION WORK IN ACCORDANCE WITH THE CSA CODE OF PRACTICE FOR SAFETY IN DEMOLITION OF STRUCTURES (CSA S350 – M1980 (R2003)).
- THE CONTRACTOR IS RESPONSIBLE FOR THE OVERALL SEQUENCE OF WORK AND TO ENSURE THE BUILDING AND ALL ITS COMPONENTS ARE STABLE AND SAFE AT ALL TIMES. PROVIDE SHOP DRAWINGS SHOWING CLEAR DECONSTRUCTION METHOD AND SEQUENCING. DRAWINGS ARE TO BE SEALED BY A PROFESSIONAL ENGINEER LICENSED BY THE PROVINCE OF ONTARIO.
- CONTRACTOR IS TO PROVIDE TEMPORARY SHORING SUPPORTS AS REQUIRED TO FACILITATE THEIR CONSTRUCTION METHODS AND ENSURE STABILITY OF THE OVERALL SYSTEM UNTIL PERMANENT FRAMING ARE IN PLACE AND SECURE. ALL TEMPORARY WORKS SHOULD BE DESIGNED AND REVIEWED BY A PROFESSIONAL ENGINEER LICENSED BY THE PROVINCE OF ONTARIO.
- THE CONTRACTOR IS REQUIRED TO TAKE ALL PRECAUTIONS TO MINIMIZE VIBRATION, NOISE, DUST AND DEBRIS IN ALL AREAS ADJACENT TO AREAS OF DEMOLITION.

**STRUCTURAL STEEL**

- STRUCTURAL STEEL DESIGN IN ACCORDANCE WITH CAN/CSA S16-14 "DESIGN OF STEEL STRUCTURES" AND THE "CANADIAN INSTITUTE OF STEEL HANDBOOK OF STEEL CONSTRUCTION, ELEVEN EDITION".
- ALL STRUCTURAL STEEL AND MISCELLANEOUS METALS TO CONFORM TO:
  - WIDE FLANGE (W) TO: CAN/CSA-G40.20/G40.21 GRADE 350W
  - PLATES, AND ANGLES (L) TO: CAN/CSA-G40.20/G40.21 GRADE 300W
  - HOLLOW STRUCTURAL SECTIONS (HSS) TO: CAN/CSA-G40.20/G40.21 GRADE 350W, CLASS C
- HOT DIP GALVANIZING TO CAN/CSA G164-18, 600g/m<sup>2</sup> MINIMUM. ALL EXTERIOR STEEL TO BE HOT DIP GALVANIZED U.N.O. ALL EXTERIOR STEEL IS TO BE FABRICATED AND DETAILED AS TO MINIMIZE FIELD WELDING.
- ALL BOLTED CONNECTIONS TO USE BOLTS IN ACCORDANCE WITH ASTM F3125 / F3125M, NUTS IN ACCORDANCE ASTM A563M AND WASHERS IN ACCORDANCE WITH ASTM F436M.
- ALL HIGH STRENGTH BOLTED CONNECTIONS SHALL BE INSTALLED TO A SNUG-TIGHTENED CONDITION PRIOR TO INSPECTION. THE CONTRACTOR IS NOT TO PRE-TENSION BOLTS UNTIL SNUG TIGHT CONDITION HAS BEEN VERIFIED. THE STRUCTURAL STEEL INSPECTOR SHALL BE PRESENT DURING PRE-TENSIONING TO ASCERTAIN THAT THE PROPER PROCEDURES ARE EMPLOYED.
- NO FIELD CUTTING OF STRUCTURAL STEEL IS PERMITTED WITHOUT PRIOR WRITTEN APPROVAL FROM THE ENGINEER OF RECORD
- ALL WELDS EXPOSED TO VIEW SHALL BE GROUND SMOOTH AND TOUCHED UP WITH ZINC RICH PAINT IF REQUIRED..
- ALL INTERIOR EXPOSED STRUCTURAL STEEL SHALL BE COATED WITH ZINC RICH PRIMER AND PAINTED.
- MISCELLANEOUS MATERIALS AND ACCESSORIES ASSOCIATED WITH GOOD PRACTICE THAT ARE NOT SHOWN SHALL BE PROVIDED.
- DRIFT PINS SHALL NOT BE USED TO ENLARGE MISALIGNED OR UNFAIR BOLT HOLES. HOLES THAT REQUIRE ENLARGING SHALL BE REAMED.
- THE CONTRACTOR IS RESPONSIBLE FOR ALL TEMPORARY SHORING, BRACING AND SUPPORTS TO ADEQUATELY MAINTAIN THE PARTIALLY ERECTED STEEL IN PLACE DURING THE WORK. SUBMIT ERECTION DRAWINGS AND CALCULATIONS SEALED BY A QUALIFIED PROFESSIONAL ENGINEER LICENSED IN THE PROVINCE OF ONTARIO INDICATING SEQUENCE OF ERECTION, ALL BRACING AND LOADS.
- WELDING IN ACCORDANCE WITH CSA W59. ELECTRODES TO BE E49XX. ALL WELDS TO BE CONTINUOUS UNLESS NOTED OTHERWISE. THE MINIMUM FILLET WELD UNLESS NOTED OTHERWISE IS 6mm.
- PRIOR TO BEGINNING ANY STRUCTURAL WELDING, SUBMIT PHOTOCOPIES OF ALL CWB WELDING CERTIFICATES OF WELDERS. QUALIFICATIONS FOR CERTIFICATES PROVIDED SHALL MATCH PROPOSED WELDS TO BE USED IN CONNECTIONS.

**DESIGN LOADS**

- STRUCTURAL DESIGN IN ACCORDANCE WITH THE NATIONAL BUILDING CODE OF CANADA 2015 AND THE USER'S GUIDE – NBC 2015 STRUCTURAL COMMENTARIES (PART 4 OF DIVISION B).

**DEAD LOADS:**

DEAERATOR WEIGHT

EMPTY:	18.6 kN
OPERATING:	44 kN
FLOODED:	75.6 kN

STEEL FRAME:	0.5 kPa
MECH & ELECT:	0.5 kPa

**LIVE LOADS:**

EQUIPMENT AREA:	3.6 kPa
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**SEISMIC LOADS NON-STRUCTURAL:**

$$V_{ESFP} = 0.3 * S_{0.2} * I_e * W * S_p \text{ SEISMIC BASE SHEAR EQUATION}$$

$$V_{ESFP} = 7.03 \text{ kN}$$

**WHERE:**

$I_e$	= 1.5	POST-DISASTER IMPORTANCE CATEGORY
$W$	= 44.5kN	OPERATION WEIGHT
$S_{0.2}$	= 0.439g	OTTAWA, NBCC2015 TABLE C-3
$A_r$	= 1.0	CATEGORY 11-TABLE 4.1.8.18 NBCC2015
$R_p$	= 1.125	CATEGORY 11-TABLE 4.1.8.18 NBCC2015
$C_p$	= 1.0	CATEGORY 11-TABLE 4.1.8.18 NBCC2015
$S_p$	= 0.8	



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No.	Date	Revision	By: Parr
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project \_\_\_\_\_ projet \_\_\_\_\_

**BUILDING M-06  
DEAERATOR REPLACEMENT**  
  
MONTREAL ROAD CAMPUS

drawing \_\_\_\_\_ dessin \_\_\_\_\_  
**DEAERATOR REPLACEMENT  
GENERAL NOTES**

designed <b>A.GONÇALVES</b>	conçu	date <b>08/01/2021</b>	date
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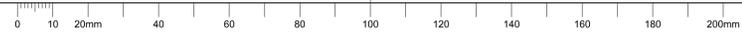
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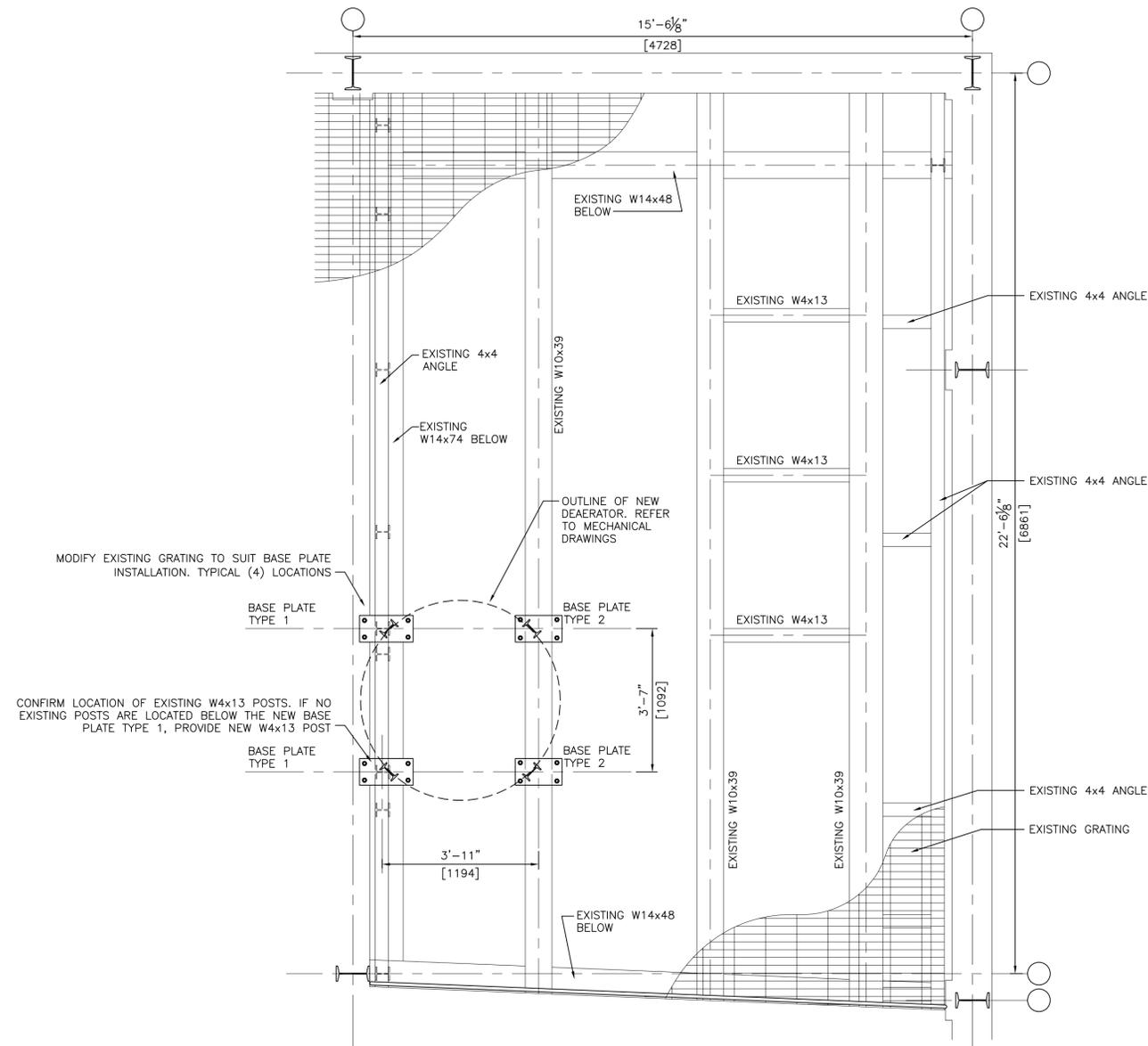
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approved	approuvé	W.O.no. <b>A1-010981-04-01</b>	D.T.no.
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**5889-S01**

**C**





1  
S02

**DEAERATOR PLATFORM PLAN**  
 SCALE: 1/2" = 1'-0"



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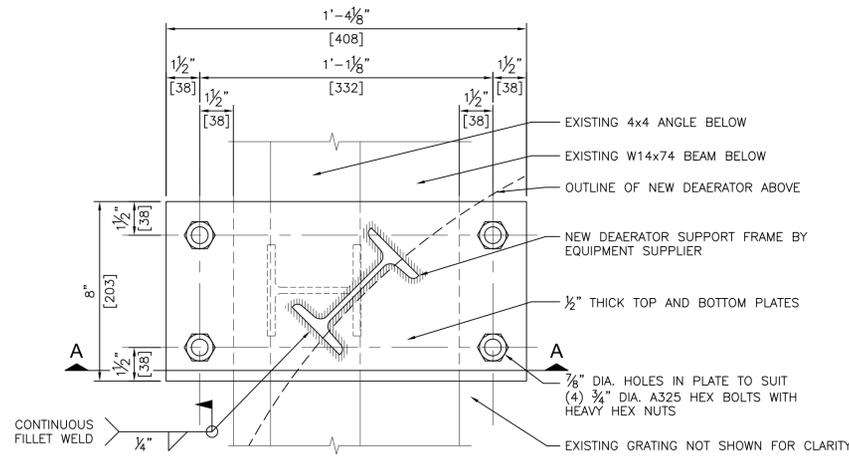
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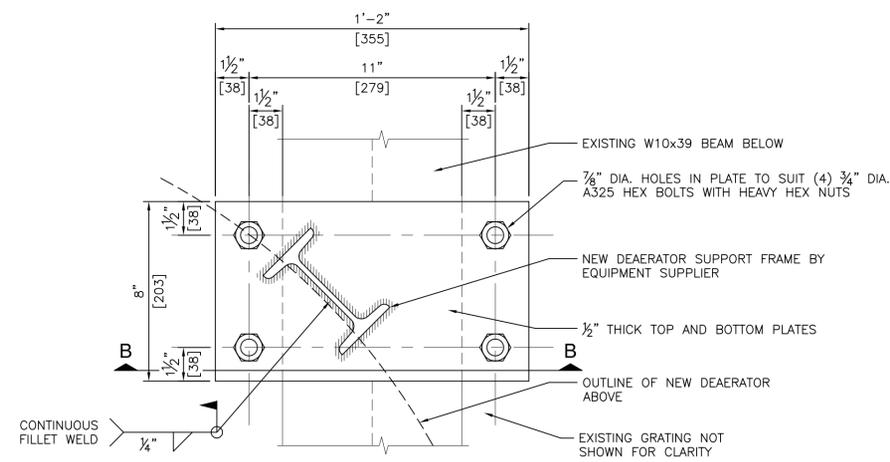
project: **BUILDING M-06  
 DEAERATOR REPLACEMENT**  
 MONTREAL ROAD CAMPUS

drawing: **DEAERATOR REPLACEMENT  
 DEAERATOR PLATFORM PLAN**

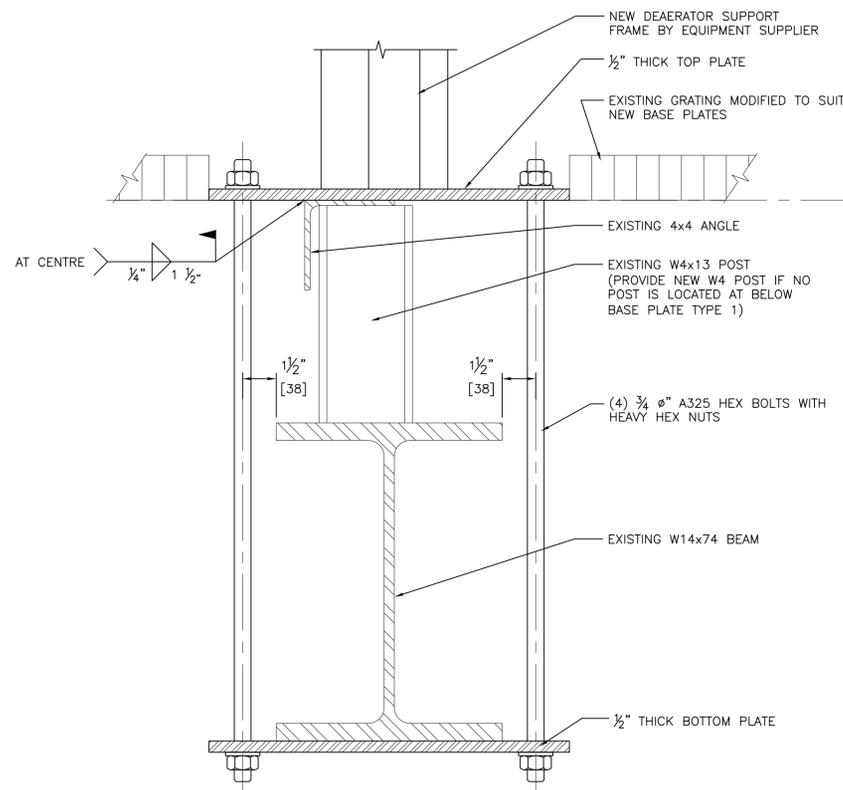
designed <b>A. GONÇALVES</b>	conçu	date <b>08/01/2021</b>	date
drawn <b>J. CALE</b>	dessiné	scale <b>AS NOTED</b>	échelle
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dwg. no. <b>5889-S02</b>	dessin no.		



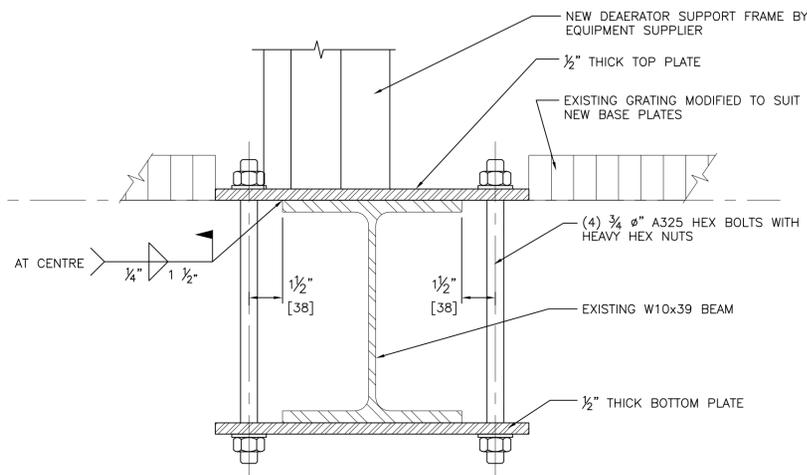
PLAN VIEW



PLAN VIEW

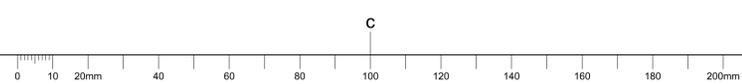


SECTION A-A  
 TYPICAL BASE PLATE - TYPE 1



SECTION B-B  
 TYPICAL BASE PLATE - TYPE 2

1 BASE PLATE DETAILS  
 SCALE: 3" = 1'-0"



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project: **BUILDING M-06 DEAERATOR REPLACEMENT**

location: **MONTREAL ROAD CAMPUS**

drawing: **DEAERATOR REPLACEMENT SECTION DETAILS**

designed <b>A.GONÇALVES</b>	conçu	date <b>08/01/2021</b>	date
drawn <b>J.CALE</b>	dessiné	scale <b>AS NOTED</b>	échelle
checked <b>S.BERNARD</b>	vérifié	sheet <b>1 of/de 1</b>	feuille
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General Conditions

- The work of this contract is comprised of the replacement and installation of (1) deaerator and related accessories and controls, located at 1200 Montreal Road, building M-06. The contractor shall supply and install, but not limited to, all equipment, labor, electrical, controls and instrumentation, piping, supports, insulation, construction bulks and consumables, and testing and balancing per the specifications and information outlined in the contract drawings.
- The work of this project must include provision for coordinating with all trades on site for all work covered under separate contract.
- All work to be executed in accordance with the requirements of NRC Section 00 10 00 General Instructions and 00 15 45 General and Fire Safety. In the event of any discrepancies between this set of instructions and the NRC specifications, NRC specifications shall govern.
- Contractor to bear all costs for all material, equipment, labor, sub-trades, permits, inspections, testing and balancing outlined in this contract unless otherwise noted.
- The contractor's use of the premises is restricted and the contractor shall use the premises under the direction of the NRC Departmental Representative. All work shall be scheduled with the NRC Departmental Representative in order to minimize conflict and disruption to the Owner's use of the premises. Adjacent areas to the work space shall be operational during the demolition and construction period for normal day to day operation. The contractor shall make every reasonable effort to execute the work with minimal interferences or disturbances.
- Normal working hours on the NRC property are from 7:00 a.m. until 5:00 p.m., Monday to Friday inclusive, except statutory holidays. At all other times, special written passes are required for access to the building site. Before scheduling any work outside normal working hours, obtain permission from the Departmental Representative to perform the specific tasks. An escort may be required whenever working outside normal hours. Contractor to bear the associated costs.
- All contractor and subcontractor employees must be security cleared in accordance with NRC requirements and must wear and keep visible identification badges issued by NRC. Contractor to coordinate with NRC Departmental Representative.
- All service interruptions, if required, must be arranged in advance with the NRC Departmental Representative with 2 weeks advanced notice. All interruptions are to be of a minimum duration. All service interruptions affecting building occupants to be performed after hours. All interruption to All coordinated power outages must be scheduled with NRC.
- Contractor to submit a construction schedule with their fee proposal and update the schedule after contracting. Submittal to include a GANTT chart outlining the entire construction project schedule having at minimum all major milestones (as per good judgment). NRC to approve the construction schedule prior to construction. In the event the contractor is not meeting the approved schedule, the contractor shall contact NRC immediately to determine reasonable solutions to keep the project on schedule. New deaerator shall be operational by September 30th, 2021, at the latest.
- Shop drawings and product data (including wiring diagrams) shall be submitted to the NRC Departmental Representative with reasonable promptness for review and for approval prior to ordering. Work affected by the submittal shall not proceed until the review is complete. Shop drawings to be submitted 10 days prior to tender close and to include installation instructions including electrical wiring diagrams if equipment submitted is for the purpose of seeking an approved equipment equivalent. All shop drawings and product data to be submitted in imperial units for review. The contractor's responsibility for errors, omissions and deviations in a submission is not relieved by the NRC Departmental Representative review of the submittals.
- Contractor is responsible for a safe work environment at all times. Contractor must maintain work area(s) in a tidy condition, free from accumulation of waste products and debris, including that caused by the work of this contract. All construction waste and debris shall be cleaned and removed from the facility daily by the contractor and at their own expense.
- Products, materials, equipment and articles (referred to as products throughout the specification) incorporated in the work shall be new, not damaged or defective, and of the best quality (compatible with the specifications) for the purpose intended. If requested the contractor shall furnish evidence to the type, source, and quality of the products provided. Defective products whenever identified shall be rejected regardless of previous inspections. Inspections do not relieve the contractor's responsibility, but is a precaution against oversight or error. All defective products shall be removed and replaced at the contractors expense. All delays and expense caused by the rejection shall be the responsibility of the contractor. Should any dispute regarding the quality or fitness for service arise, the decision shall rest solely with the NRC Departmental Representative based on the requirements of the contract documents.
- The contractor shall coordinate contract drawings with site conditions prior to the commencement of fabrication and installation. All interferences shall be reported to the NRC Departmental Representative. The contractor shall work with the NRC Departmental Representative in determining reasonable solutions at no additional costs to the project.

- Project close-out shall be complete upon submittal of the following to the NRC Departmental Representative:
  - Hard copies, 2 bilingual or 2 English and 2 French (printed and placed in binders with an index) and (1) soft (electronic) copy of operating and maintenance manuals for all installed equipment including all shop drawings.
  - The contractor shall be responsible for all documentation for as-built conditions and shall submit red lined drawings documenting the final site installation.
  - All deliverables mentioned within the contract drawings.
  - All Hazardous Materials Assessment(s) or other reports.
  - All inspections as per the local authorities having jurisdiction.
  - All mechanical and electrical project close-out submittals as per the mechanical and electrical specifications.
- The contractor shall be responsible and bear all costs for supplying and receiving all equipment for this project, off loading, storing and moving into final location.
- All cabling, fire protection systems and other building services to be protected during installation. Any interference or damage to be reported immediately to the NRC Departmental Representative.
- The contractor shall ensure that the placement of new equipment does not interfere with the operation and maintenance of any existing or other new equipment.
- All equipment is to be installed per manufacturer's instructions.
- Contractor shall not stop or disconnect any equipment within the space without the NRC Departmental Representative's approval in advance.
- The contractor is advised that fire alarm sensors are placed in several locations in the building. The NRC Departmental Representative is to be advised when working near a sensor to determine if the sensor must be disconnected or disabled during the work.
- Removal and relocation of existing equipment is necessary per contract drawings and specific contract drawings provide arrangements and details to describe the general design intent of the work and do not show the exact details for all installation conditions. A site review is mandatory and the contractor shall make themselves aware of all obstructions, interferences and other site conditions not captured on contract drawings and documents. The contractor shall be advised that some details used in the drawings may change depending on specific site conditions. NRC reserves the right to make reasonable adjustments, due to site conditions not captured in the contract documents or specifications, to the location of equipment, piping, supports and architectural details at no cost to NRC.
- It is the responsibility of the contractor, prior to proceeding with any scope of work within the contract documents, to contact the engineer and NRC if the contractor requires any clarification in regards to any information shown within the contract drawings.

COVID-19 Site Protocol

- To help prevent the spread of COVID-19, NRC requires contractors who are managing construction sites within our buildings or on our grounds to include a COVID-19 Construction Site Protocol as part of their Site Specific Health and Safety Plan. The NRC will provide a list of the expected actions and requirements that should be included in this protocol. For further information and guidance on prevention of the spreading of the COVID-19 virus on construction sites, please refer to the Canadian Construction Association website (<https://www.cca-acc.com/>).
- All NRC contractors, Consultants and service providers have a responsibility to report to the NRC departmental representative any confirmed COVID-19 in the workplace.
- NRC Contractors, Consultants and service providers must provide their COVID-19 Plan as part of their site specific safety plan.

GENERAL NOTES

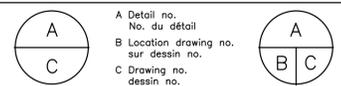
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**BUILDING M-06  
DEAERATOR REPLACEMENT**  
MONTREAL ROAD CAMPUS

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**SPECIFICATIONS  
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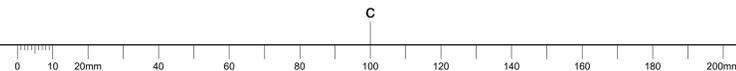
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drawn **M. COHEN** dessiné \_\_\_\_\_ scale **N.T.S.** échelle \_\_\_\_\_

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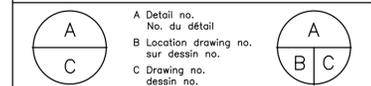
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**BUILDING M-06**  
**DEAERATOR REPLACEMENT**  
 MONTREAL ROAD CAMPUS

drawing \_\_\_\_\_ dessin \_\_\_\_\_  
**SPECIFICATIONS**  
**GENERAL SPECIFICATIONS**

designed \_\_\_\_\_ conçu \_\_\_\_\_ date \_\_\_\_\_ date  
 11/25/2020

drawn \_\_\_\_\_ dessiné \_\_\_\_\_ scale \_\_\_\_\_ échelle \_\_\_\_\_  
 M. COHEN N.T.S.

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approved \_\_\_\_\_ approuvé \_\_\_\_\_ W.O.no. \_\_\_\_\_ D.T.no. \_\_\_\_\_  
 A1-010981-04-01

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**5889-M02**

Basic Mechanical Requirements

- The contractor shall comply with Municipal, Provincial, or National Codes as applicable, Rules and Regulations and/or Authorities having jurisdiction. Comply with the National Building Code in areas where the Municipal or Provincial Building Codes are not mandatory. The contractor shall comply with the Occupational Health and Safety Act and Regulations for Construction Projects.
- The contractor shall obtain, at their cost, all permits and inspections, pressure piping registration with provincial authorities and any other requirements per the authorities having jurisdiction. Test all piping systems as required by CSA B51 and ASME B31.1 codes.
- The work is suitably outlined on the contract drawings with regards to sizes, general locations and arrangements. The location of equipment, associated piping, and other material describes the general requirements of the work. The routing of piping may be altered, upon approval, for ease of installation, cost reduction or relief from a site interference. The contractor shall include as part of the work specific manufacturer's installation details and requirements outlined in the installation instructions for the actual equipment being provided.
- All materials shall meet or exceed the building code requirements for flame spread and smoke developed rating.
- In order to achieve the desired routing some wiring and other components may need to be altered or relocated. Once identified the contractor shall notify the NRC Departmental Representative of the alteration for approval. The contractor shall be responsible for all costs associated with the rewiring/relocation as required. Alteration shall be made by qualified personnel only and approved by the NRC Departmental Representative prior to the commencement of work.
- Trade qualifications: Plumbers, Welders, Pipe Fitters and all other applicable trades. All trade workers to have provincial certification licensed by the Provincial Authorities and/or other authorities having jurisdiction. The ratio of Journeymen to apprentice shall not exceed the ratio as defined by the provincial authority. The contractor shall maintain an up to date record listing Journeymen and apprentices working on the site.
- Contractor to install equipment in a compact, neat and workman like manner with accessibility to all maintenance points.
- Equipment to be installed per manufacturer's recommendations. Adequate space is necessary for maintenance and disassembly. If components are installed that do not permit maintenance the contractor shall rework the installation as directed by the NRC departmental representative. All costs for the rework shall be to the contractor's account. All components to be installed and commissioned in accordance with industry standards and manufacturer's printed instructions.

Mechanical Scope

The contractor shall supply, install, and conduct the following work below:

- All required demolition and relocation of equipment as outlined in the contract drawings and specifications. Existing deaerator must remain fully operational until new deaerator is on site, and has been inspected and approved by NRC departmental representative.
- The contractor shall supply and install, but not limited to, all equipment, labor, electrical, piping, supports, instruments (unless provided by controls contractor), construction bulks and consumables and testing and balancing per the specifications and information outlined below:
  - Vertical deaerator and all associated piping and wiring. Specifications are provided on 5889-M03/M04, and full submittal to be provided separately by NRC along with contract drawings.
  - New accessories:
    - Relief valve and drip pan elbow
    - Vent valve w/ drilled gate
    - Thermowells (where required)
    - Gauge glass
    - Bridle piping c/w valves
    - Vacuum breaker
 Accessories to be specified and provided by deaerator manufacturer to suit deaerator requirements.
  - Remove and replace water inlet valve (valve supplied by R&R Automation)
- Contractor to provide as-built drawings, sealed by an Ontario professional engineer, of any new or modified piping, along with any required thermal and seismic analysis. Drawings to clearly show pipe supports and any nozzle reaction loads.
- Provide all required inspections per the authorities having jurisdiction.
- New deaerator and all new piping to be TSSA registered and hold Ontario CRN.
- All new electrical power supplies/feeds for new and relocated equipment per the contract drawings.
- All required cranes and/or other equipment to demolish existing equipment and install all new equipment within the contract drawings. Existing deaerator to be removed, and new deaerator installed, through the existing roof hatch indicated on drawings. Coordination with deaerator vendor is required to ensure new equipment will pass freely through roof hatch opening.
- Contractor to allow for costs to have manufacturer's representatives for all new equipment to come to site, for not less than two days, and supervise their equipment commissioning and provide operator/ maintenance training.
- All items mentioned within the contract drawings. This list above does not exclude any items mentioned within any of the contract drawings.

Controls Scope

The contractor shall carry a cash allowance for R&R Automation to conduct the following work:

- Removal and reinstallation of all electronic instruments, sensors, control devices, control system wiring, etc. as required to conduct the work listed under this section, and the Mechanical Scope section.
- Supply and installation of new instruments/ control devices:
  - Water inlet valve c/w positioner
  - Temperature transmitter
  - Pressure transmitter
  - Level switch (piping and valves by Mechanical Contractor)
  - Level switch/ transmitter (guided-wave)

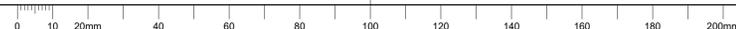
Asbestos and Other Hazardous Substances within the Building:

- The intent of this section is to inform the contractor and all other applicable parties in regards to the possibility of asbestos and other possible Hazardous Substances present within the building. This section is not to be relied upon. Contractor to take the required steps as outlined below and as per NRC's instructions and specifications as to identifying Hazardous Materials and having the required assessments done and work procedures put in place to provide a safe work environment for everyone.
- Contractor to coordinate a meeting with the NRC Departmental Representative and NRC Building Coordinator to form a work plan in regards to the possibility of asbestos and other Hazardous Substances present within the building. The following (not limited to) is to be discussed: possible locations of asbestos containing materials and any other Hazardous Materials, plans to remove if required, contracting practices, existing NRC Asbestos protocol(s)/procedure(s), and any existing/past Hazardous Materials Reports including Asbestos Reports.
- Contractor to refer to NRC Specification Section of hazardous material surveys. NRC to bear all costs for Asbestos and all other Hazardous Material Assessments. Contractor shall bear all costs associated with the removal and containment of any Hazardous material(s), temporary barriers, temporary fan systems, filtration systems, storage, inspections, reports, shipping and handling of Hazardous Materials, disposal of Hazardous Materials, and other requirements deemed necessary for all work within this contract.
- Contractor to coordinate a meeting with the NRC Departmental Representative to formulate the requirements of providing a safe work environment for all building occupants and employees.
- All personnel are to be trained and fully informed of the Asbestos and other Hazardous Materials Work Plan and Procedure(s) formulated in order to best protect workers and building occupants.

Seismic Engineering and Supports

- NRC building M-06 has a "Post-Disaster" importance category. The contractor shall provide seismic engineering for the systems being installed in accordance with the Provincial and National Building Codes. All piping components and equipment shall have seismic restraints and braces per the building code and SMACNA guidelines. Upon completion the contractor shall provide a letter to the NRC Departmental Representative signed and sealed by the Seismic Engineer of record stating that all systems meet the project seismic requirements.
- The contractor is to contact the seismic engineer during tendering in order to determine the required seismic scope of work (from the seismic engineer) in order for the contractor to account for this work during the tendering process. All work required by the seismic engineer is to be supplied and installed by the contractor per the seismic engineers instructions.
- Contractor to contact the NRC Departmental Representative with any issues obtaining the required seismic engineering services by others.

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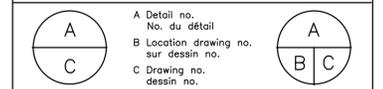


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MONTREAL ROAD CAMPUS

**SPECIFICATIONS  
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designed conçu date 11/25/2020 date

drawn M. COHEN dessiné scale N.T.S. échelle

checked vérifié sheet 1 of/de 1 feuille

approved approuvé W.O.no. A1-010981-04-01 D.T.no.

dwg.no. 5889-M03 dessin no.

**5889-M03**

Deaerator (HPDEA01)

1. Description

The deaerator shall be a direct contact, tray type with integral vent condensing equipment and separate water storage section. The heater shall be designed for two-stage operation. Incoming undeaerated water enters the deaerator through spring-loaded, stainless steel spray valves. These variable orifice valves produce a fine spray in a uniform pattern from 5% to 200% of design capacity. The fine droplets of water maximize the surface area in contact with steam, raising the temperature to within a few degrees of saturation temperature and instantly releasing the majority of the corrosive, non-condensable gases. The preheated and partially deaerated water flows through the tray stack where the hottest, purest steam vigorously scrubs the water to heat it to saturation and strip the last traces of dissolved gases. Counterflow movement of water and steam ensures that the water leaving the bottom layer of trays is "stripped" by pure steam entering the deaerator.

2. Performance

2.1. Performance Guarantee

The deaerator shall be designed for safe and reliable operation under the conditions shown on the Deaerator Data Sheet (summarized in table below) over the full load range from 10% to 100% of the specified design capacity. The deaerator shall be guaranteed to deliver the following:

- Water effluent within 2°F of the saturation temperature corresponding to the steam pressure within the deaerator.
- Reduction of O<sub>2</sub> in effluent to 0.005 cc/liter (7ppb) or less when tested at the outlet of the deaerator in accordance with ASME PTC 12.3
- Reduction of the free CO<sub>2</sub> in effluent to 0 ppm when tested by the APHA method.

Performance Data		
Flow:	lb/hr (kg/hr)	°F (°C)
Feedwater inlet	9,798 (4,444)	60 (15.6)
Condensate Inlet	88,179 (39,997)	170 (76.7)
Main steam	7,023 (3,186)	
Total Outlet	105,000 (47,630)	230 (110)
Vent	73 (33)	
Storage	661 (2,502)	Gal (L)

2.2. Performance Tests

Testing shall be in accordance with the HEI standard using a suitable colorimetric test. Testing shall be performed as close to the deaerator storage section as possible and below the water level. Dissolved oxygen in deaerated and/or partially deaerated water shall be determined by either the titration method as defined in ASME PTC 12.3, or the Rhodazine DO method by CHEMetrics, Inc., using 0 to 20 ppb range oxygen self-filling ampules. Carbon dioxide test shall be run per the APHA method.

3. Scope

The equipment and services to be furnished include, but are not limited to, the following:

Deaerating feedwater heater with integral storage, Inlet distribution header with spray valves, deaerating tray assemblies, integral supports for the deaerator, connections for NRC supplied and installed instrumentation and piping, special tools and/or devices required for maintenance.

4. Codes and Standards

4.1. Code Requirements

The deaerator shall be designed, manufactured, tested and stamped in accordance with ASME, Section VIII, Division 1 and latest addenda. The deaerator and water storage sections shall also be registered with the TSSA and follow all requirements of O.Reg. 220/01. The deaerator and storage section shall be hydro-tested as required by ASME. The vessel MAWP shall be equal to, or greater than, the design pressure.

5. Technical Requirements

5.1. Design

The vessels shall be designed for the pressure and temperature as specified on the Deaerator Data Sheet. Internal design pressure shall be a minimum of 50 psig. Design temperature shall be a minimum of 350 °F.

The materials used for pressure parts and for external supports shall be in accordance with the ASME Code, as necessitated by the design pressure and temperature. The vessel heads and shell shall be fabricated with a 1/8" corrosion allowance. Nozzles, nozzle necks, and manway covers shall include a minimum of 1/16" corrosion allowance. A corrosion allowance is not required for stainless steel components.

5.2. Fabrication

All pressure welds are to be full penetration, with a finished surface that is smooth and sufficiently free of abrupt changes in profile. For vessel longitudinal and circumferential seams, the SAW welding process is preferred due to its inherent smoothness. For nozzles and other welds, a process may be selected in which the manufacturer is experienced. Grinding is to be performed as required to attain a smooth surface.

Where possible, vessel shell and head seams are to be located such that they are accessible for future internal inspection.

5.3. Internal Materials

All materials in contact with noncondensable gases, undeaerated water or steam which has previously been in contact with undeaerated or partially deaerated water shall be stainless steel, stainless steel lined or stainless steel clad. Liners and shields shall be not less than 1/8 inch (3.2 mm) thick. To avoid possible liner collapse during transient load conditions, liners and shields shall be securely attached by means which avoid welding stainless steel to the carbon steel shell. Any stainless steel components that are heat treated with the vessel shall be made of "L" grade stainless steel.

5.3.1. Spray System

A spray system shall be provided to distribute condensate evenly into the spray chamber. The spray system shall consist of a stainless steel header containing spring-loaded spray valves. Spray valves shall be type 316 stainless steel and shall produce a hollow cone, thin-filmed spray pattern over the range of 5% to 200% of design capacity. Valves shall be provided with nonbinding guides as required to ensure proper spray distribution. Valve springs shall be heat treated if heat treatment is required to retain their elastic properties at the temperatures to be encountered. Spray valves shall be readily accessible for inspection, maintenance, and removal without disturbing any internal piping.

5.3.2. Tray System

Trays shall be riveted or stamped of type 430 stainless steel, not less than 16 gauge. Welding shall not be utilized for tray construction. Trays shall be interchangeable and of a convenient size and weight for easy handling. Trays shall be housed in a stainless steel enclosure, closed on five sides to eliminate oxygen coming in contact with the carbon steel head/shell. Tray hold downs shall be designed to secure the trays so that they will not become dislodged while in service, during sudden load rejection, or during shipping and erection.

5.3.3. Vent Condenser

The vent condenser shall be stainless steel and of the internal, direct contact, spray type.

5.4. Storage

The storage shall be integral to the deaerator and sized for 3 minutes retention at overflow based upon the design capacity shown on the deaerator Data Sheet.

5.5. Connections

5.5.1. General

Nozzle sizes shall be as required to meet the velocity criteria and recommendations of HEI. Unless noted on the deaerator Data Sheet, connections 2" and smaller shall be socket weld and connections larger than 2" shall be butt weld.

Nozzles shall be joined to the vessel shells using complete penetration welds through the shell and any reinforcing pads. Longitudinal joints in nozzle necks shall be fully radiographed.

5.5.2. Makeup and Vent

The makeup and vent connections shall be "L" grade stainless steel or carbon steel with stainless steel liners.

5.5.3. Manways

The deaerating section shell shall be provided with a hinged and bolted manway for tray access. Manways shall be of adequate size for tray removal and be a minimum of 18" diameter. The storage section shell shall be provided with a Clark Kennedy Co. elliptical manway assembly. Each manway shall be provided with 3/4 inch (19 mm) diameter grab rungs attached to the inside surface of the shell. Manway shall be furnished complete with bolting and two (2) spare, spiral wound (or manufacturer-specified) gaskets.

5.5.4. Returns

The following returns shall be introduced by means of baffles or other suitable distribution system:

- High-Pressure Heater Drains Inlet: These returns shall be introduced into the deaerating section below the trays or into the storage section above the water level.
- Building Heating, and Process Condensate Returns: These returns shall be introduced over the trays.
- Boiler Feed Pump Recirculation: These returns shall be introduced into the water storage section above the water level.

5.5.5. Pump Suction

Pump suction connections shall extend into the storage vessel a minimum of 3" to prevent sludge and debris from entering the pumps. The connections shall be complete with a vortex breaker.

5.5.6. Nozzle Tolerances

Fabrication tolerances for location of nozzles shall not exceed the following limitations. The tolerance values indicated shall not be cumulative:

- Nozzles shall be located within 1/4 inch of the locations indicated on the drawings.
- Nozzle tilt and misalignment shall be limited to ±1/2 degree.
- Angular misalignment of flange faces and nozzle butt-weld ends shall be limited so that the distance from any point on the weld end or flange circumference to the true plane does not exceed 1/8 inch (3.2 mm).
- Flanged connections shall have a 1 degree maximum rotational misalignment between mating bolt holes.

5.5.7. Nozzle Loads

Connections shall be suitably reinforced to withstand forces and moments imposed by connecting piping. Allowable forces and moments shall be provided at major equipment attachment locations which interface with materials, such as piping, supplied by others. Allowable forces and moments shall be provided for normal operating conditions.

5.5.8. Impingement Protection

All steam, drain return and condensate return inlets shall be provided with stainless steel baffles or shell liners to prevent impingement of steam, water, or noncondensable gases on any part of the carbon steel shells or tray enclosure. Baffles and liners shall be constructed of stainless steel plate not less than 1/4 inch (6.4 mm) thick.

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5.6 Supports

The deaerator shall be supported on 4 pedestal type supports, matching the existing support plates and bolt pattern. Baseplates shall have the bolt holes cut at site at the time of installation to ensure proper fitup. Baseplates shall be shipped loose as required to fit through existing roof hatch. Supports shall be welded to the shell.

5.7 Lugs

Platforms and ladders, and their supports if required, will be furnished under separate specifications. Lug dimensions and locations will be determined after contract award. Both deaerating section and storage section shells shall be provided with lifting lugs. Lifting lugs shall be designed as guides for lifting the assembled vessels.

5.8 Inspection and Testing

5.8.1. General

All nondestructive examination shall be performed by ASNT certified personnel, and is to be performed prior to postweld heat treatment.

5.8.2. Specific Requirements

- a. Visual examination – all pressure welds and welds to pressure components shall be visually inspected, and are to be sufficiently free of undercut, arc strikes, porosity and spatter. Any indication that could be interpreted as a crack is to be removed.
- b. Radiographic examination – vessel weld seams shall be radiographed to a minimum of RT-3 as per ASME Section VIII, Div. 1.

5.8.3. Hydrotesting

Vessels shall be hydrotested in accordance with ASME code. Hydrotest water is to contain less than 50ppm chloride.

5.9. Postweld Heat Treatment

Postweld heat treatment, in accordance with ASME code, shall be included as recommended by HEI.

6. Shop Cleaning and Preparation for Shipment

6.1. Interior

Prior to the installation of stainless steel internals, the interior carbon steel surfaces of the deaerating and water storage sections shall be blast cleaned. Blasting shall be with silica free steel grit of 16 to 30 mesh size. Grit shall be completely free of all silica and silica compounds. After hydrostatic testing and drying with clean heated air, interiors shall be thoroughly cleaned and coated with a rust-preventive compound. The rust-preventive compound shall be completely water soluble. After coating, bags of activated alumina desiccant shall be distributed in both the deaerating and storage sections. The bags shall be secured to prevent movement during shipment. A warning notice to remove desiccant before placing the unit in operation shall be affixed on each manhole cover. Each section shall be provided with not less than 3 pounds of dry desiccant per 100 cubic feet of volume (1 kg of desiccant per 2.1 cubic meters of volume). Desiccant shall be purchased in airtight containers and not opened until the desiccant is ready for placement inside the vessels. Before or immediately after placement of desiccant, all shell connections and openings shall be covered with tight fitting closures. All closure edges shall then be sealed with an adhesive-backed, waterproof, cloth tape. Sealing shall be airtight and of adequate strength to remain so during shipment and storage.

6.2. Exterior

Exterior surfaces of the deaerating and water storage sections shall be blast cleaned per SSPC-SP6 and prime painted with inorganic zinc. An area 2 inches (50 mm) wide shall be left unpainted adjacent to field welded seams. Machined weld-end preparations shall be coated with consumable rust-preventive coating.

6.3. Preparation for shipment

Prior to shipment, flanged connections are to be sealed with bolted plywood covers and weld ends are to be sealed with plastic shipping caps.

The Deaerator and storage vessels shall be shipped as complete units as follows:

- Deaerating Section: Fully assembled with all spray nozzles, internal piping, baffles, and trays.
- Storage Section: Fully assembled with all internal piping and baffles

6.4. Nameplate

Nameplate stamping required by the ASME shall appear on unpainted stainless steel nameplates which shall be permanently attached to the deaerator on 4 inch (100 mm) extended brackets designed to clear the insulation. Nameplates with code stamps shall be affixed to both deaerator and water storage sections. Bracket details, location, and nameplate data shall be indicated on the drawings. Nameplates shall indicate that the vessels are designed for full vacuum.

7. Deaerator Insulation

- 7.1. Insulation to meet NFPA 90A & 90B. Maximum flame spread rating of 25 and maximum smoke developed rating of 50 in accordance with ASTM E84-15b, NFPA 255 and CAN/ULC-S102-07.
- 7.2. Deaerator to be field-insulated after installation, with fibre glass insulation meeting ASTM C612 Type IA and 1B. Thickness to be 1 1/2". Acceptable material: Johns Manville 800 Series Spin-Glass, Type 814, 3.0 pcf or approved equal.
- 7.3. Insulation to be clad with aluminum roll jacketing, c/w Poly-Kraft moisture barrier, embossed finish, 0.016" thick.
- 7.4. Fasten jacket with  $\phi 1/8$ " button head rivets and 22 Ga. stainless steel 'S' clips, 3/4" wide, 0.03" thick.

8. Submittals

- a. Product data: Submit manufacturer's standard technical data including rated capacity and operating conditions of selected model and installation instructions.
- b. Drawings: Submit drawings indicating dimensions, weights, required clearances, foundation loads, etc. Drawings to be submitted on paper and in electronic format.
- c. Operating and Maintenance data: The manuals shall contain drawings or pictures of equipment showing part names and numbers to facilitate the ordering of spare parts.
- d. Manufacturing Data books: At the conclusion of manufacturing, pertinent manufacturing documentation shall be compiled and submitted. Documentation is to include manufacturer's data reports, material test certificates, nondestructive examination records, heat treatment and hydrotest charts, and nameplate rubbings.
- e. Six (6) sets of each of the above shall be provided.

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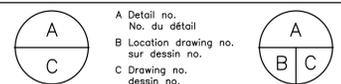


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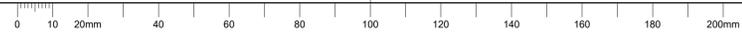
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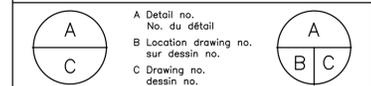
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project \_\_\_\_\_ projet \_\_\_\_\_

**BUILDING M-06  
 DEAERATOR REPLACEMENT**  
 MONTREAL ROAD CAMPUS

drawing \_\_\_\_\_ dessin \_\_\_\_\_  
**SPECIFICATIONS  
 PIPING SPECIFICATIONS**

designed \_\_\_\_\_ conçu \_\_\_\_\_ date 11/25/2020 date

drawn M. COHEN dessiné \_\_\_\_\_ scale N.T.S. échelle \_\_\_\_\_

checked \_\_\_\_\_ vérifié \_\_\_\_\_ sheet 1 of/de 1 feuille

approved \_\_\_\_\_ approuvé \_\_\_\_\_ W.O.no. A1-010981-04-01 D.T.no.

dwg.no. \_\_\_\_\_ dessin no.

**5889-M05**

Piping Design Data

All components must be suitable for continuous operation at the following design conditions in Table 1.1:

- Design Code: ASME B31.1, CSA B51, Ontario Building Code.
- All piping to be in conformance with all local/municipal, provincial, and national codes.
- All piping to be inspected as per the requirements of the authority having jurisdiction.
- All pipe, fittings, flanges, manual valves, automated valves, and all other pressure retaining parts shall conform to component standards listed in ASME B31.1 Table 126.1-1.

Service:	Condensate					
MAWP	[150 psig at 365°F]					
Temp. Limits	[-4°F to 366°F]					
Corrosion Allowance:	0.125" for welded fittings; 0.062" for Threaded Fittings					
ASME Rating	Class 150					
Material	Carbon Steel					
Design Code	ASME B31.1					
Item	Size	Rating	Type/Connection	Material	Standard	Notes
Pipe	≤ 2 1/2"	Sch. 80	Seamless, PE	ASTM A106 Gr. B	ASME B36.10	
	3" to 12"	Sch. 80	Seamless, BE	ASTM A106 Gr. B	ASME B36.10	
Fittings	≤ 2 1/2"	3000 Class	SW pr THD	ASTM A105N	ASME B16.11	
	3" to 12"	Sch. 80	BW	ASTM A234 Gr. WPB	ASME B16.9	
Flanges	≤ 2 1/2"	Class 150	RF THD, SW, or Blind	ASTM A105N	ASME B16.5	
	3" to 12"	Class 150	RFWN or Blind	ASTM A105N	ASME B16.5	
Gaskets	ALL			1/8" spiral wound 304SS graphite filled	ASME B16.20	
Bolts	ALL			Bolts: ASTM A193 Gr. B7 Nuts: ASTM A194 Gr. 2H Washers: ASTM F436	Dimensions: ASME B18.2 Threads: ASME B1.1 Class 2	

Installation of Piping

- Examination and inspection of all work covered under ASME B31.1 (latest), shall be per that code. All costs for inspection and testing shall be carried by the contractor.
- A pressure test shall be performed on new piping per ASME B31.1 along with any requirements by the authority having jurisdiction. If leaks are found piping to be repaired as required.
- Maintain clearances between pipes and structures for maintenance, both as directed and to manufacturer's recommendations.
- Provide vents as required at system high points to ensure air is purged from the piping system.
- Provide drains (whether indicated or not on contract drawings) at all low points of piping systems in order to facilitate proper drainage. Size drains accordingly. Provide isolating valve and capped valve outlet.
- Seal piping passing through walls/floors. Maintain all wall, floor, and any other fire separation ratings. All fire separations to be in compliance with the National and Provincial Building Code (latest).
- Connect branch lines into main headers using welding tees or welding outlet fittings. The branch outlet shall be consistent with the lines sizes as described above. All branch outlets shall conform to ASME B31.1.
- Cap open ends of piping during installation. Remove all foreign material from inside piping.
- Remove all burrs from piping. Clean scale and dirt.
- Grade nominally horizontal piping as required. Slope piping to drainage points.
- Revisions to location of piping require written approval of NRC Departmental Representative.
- Except where indicated otherwise, slope piping in direction of flow for positive drainage and venting.
- Do not use excessive force when reassembling piping and equipment. Report any flange misalignments greater than 1/8" to NRC Departmental Representative prior to assembly.

Pressure Tests

- Piping to be tested per ASME B31.1 and as per the local authority having jurisdiction.
- Testing to occur before piping, equipment and fittings are concealed.
- Contractor to bear all costs required for inspection test fees, apparatus, equipment, testing medium, freeze protection, retesting and making good any damage. NRC Departmental Representative to determine whether repair or replacement is appropriate.
- Insulate or conceal pipes only after approval and certification of tests by NRC Departmental Representative.
- Safety precautions in the event of pipe rupture should be in place to eliminate hazards to personnel in the proximity of piping being tested.
- Acceptance of a test and repair of any defects shall be per ASME B31.1 (latest) and NRC Departmental Representative.

Cleaning and Inspection

- Leave all joints in piping systems uncovered until all tests are completed and system inspected and approved by authority having jurisdiction.
- Remove all weld scale, dirt and debris. Thoroughly internally clean and inspect all pipes.

Labeling

- All piping to be labeled in accordance with CAN/CGSB-24.3-12

Piping Components & Specialties

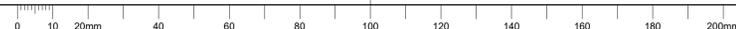
Pipe Insulation

- Insulation (including all service jacket) to meet NFPA 90A & 90B. Maximum flame spread rating of 25 and maximum smoke developed rating of 50 in accordance with ASTM E84-15b, NFPA 255 and CAN/ULC-S102-07.
- Insulation shall not flame, smolder, smoke or glow at in service temperature per ASTM C411-11.
- All piping to be insulated with fibre glass insulation meeting ASTM C547 Type I, with minimum 3.5 psf density for suitability with firestop assemblies requiring jacketed fiberglass pipe insulation having a product density at or above 3.5 psf, and has a factory applied vapor-barrier jacket meeting ASTM C1136. Acceptable material: Johns Manville Micro-lok HP insulation with factory applied vapor barrier jacket or approved equal. Fittings to be insulated with pre-formed fibre glass fittings or mitered segments. Mitred segments to have all joints sealed with fibre glass embedded vapor seal mastic and a 1/8" thick wet coat of vapour seal mastic.
- All condensate piping to have a piping insulation thickness of 1" for 1/2" to 3" diameter piping. Re-insulate modified piping matching thickness of existing or removed insulation.
- All piping, fittings, and valves to have white PVC jacketing meeting ASTM D1784, Class 16354-C. PVC jacketing to have maximum flame spread rating of 25 and maximum smoke developed rating of 50 in accordance with ASTM E84. Acceptable material: Johns Manville Zeston 2000 series PVC 20 mil thick, white jacketing or approved equal.
- All fittings and valves to be insulated and jacketed with Johns Manville Zeston 2000 PVC insulated fitting covers and Hi-Lo Temp insulation inserts or approved equal.
- All insulation and fittings to be installed per manufacturer's instructions.

Pipe Supports

- All piping and piping supports to be installed in order to allow for thermal movement. See notes on 5889-M02.
- Contractor to allow for movement and insulation shields at supports. All supports to have suitable insulation shields designed to prevent crushing of the insulation and provide proper pipe support.
- Contractor is responsible for proper attachment and adjustment of pipe supports to building structure.
- Adjust supports after system is in operation.
- Acceptable products: Grinnel, Piping Tech, Anvil or approved equal.

C



LEGEND



DEMOLISH



REUSE



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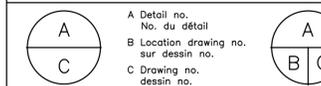
DEMOLITION NOTES

1. CONTRACTOR TO INFORM NRC AFTER DISASSEMBLY IF ANY EXISTING PIPING DISPLACES MORE THAN 1/8" IN ANY DIRECTION.



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project / projet

**BUILDING M-06  
 DEAERATOR REPLACEMENT**

MONTREAL ROAD CAMPUS

drawing / dessin  
**DEAERATOR REPLACEMENT  
 DEMO DRAWING**

designed / conçu date / date  
 11/25/2020

drawn / dessiné scale / échelle  
 M. BIGRAS N.T.S.

checked / vérifié sheet / feuille  
 M. COHEN 1 of/de 1

approved / approuvé W.O.no. / D.T.no.  
 A1-010981-04-01

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**5889-M06**

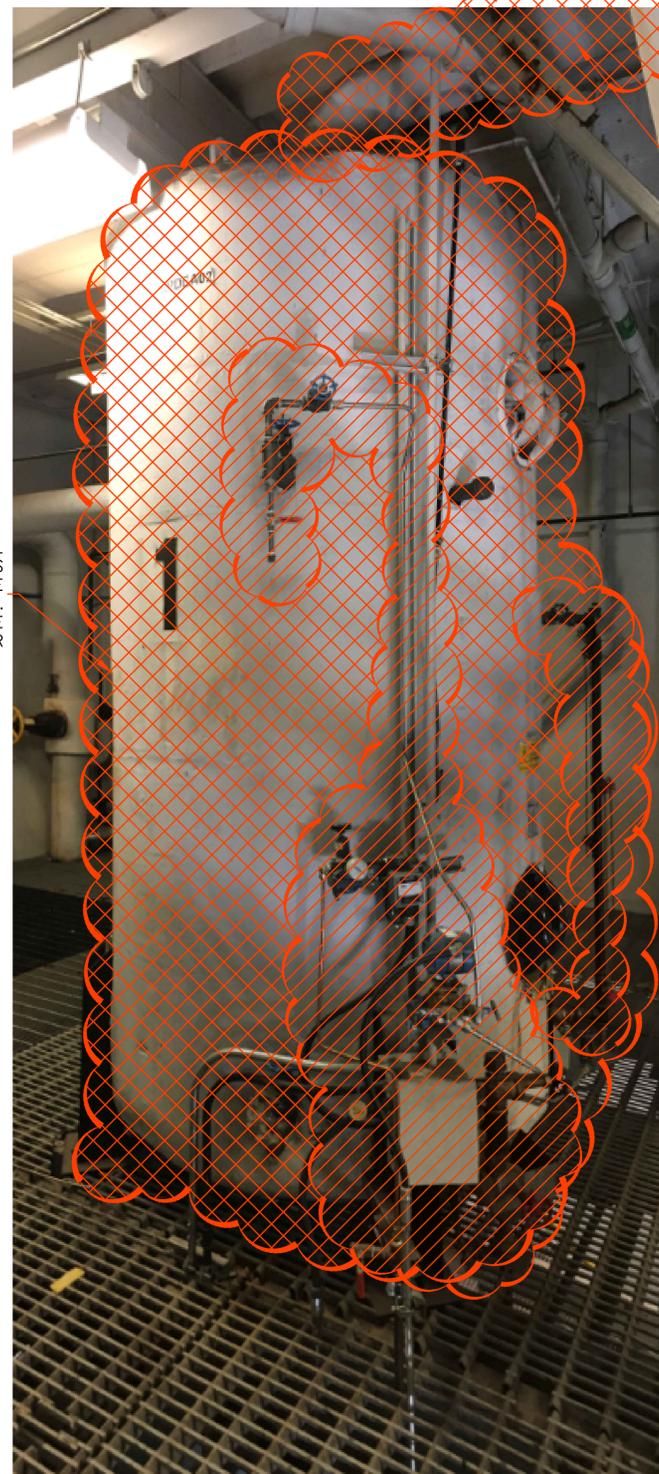


PHOTO 1: EXISTING DEAERATOR (HPDEA02)

EXISTING WATER SUPPLY TO BE REMOVED SEE PHOTO 4 ON DRAWING 5889-M07 FOR MORE DETAILS. REUSE PIPING IF POSSIBLE



PHOTO 2: EXISTING ROOF HATCH (INSIDE)

EXISTING VENT LINE TO BE DEMOLISHED AND HOLE PATCHED TO MATCH EXISTING. SEE DETAIL ON 5889-M09

EXISTING ROOF HATCH

EXISTING LINES UNDER ROOF HATCH TO BE TEMPORARILY REMOVED DURING THE REMOVAL AND INSTALLATION OF DEAREATORS.

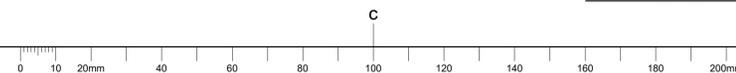
EXISTING DEAERATOR TO BE REMOVED THROUGH ROOF HATCH



PHOTO 3: EXISTING ROOF HATCH (OUTSIDE)

EXISTING VENT LINE TO BE DEMOLISHED

DEAERATOR TO BE REMOVED; ALL INSTRUMENTATION AND VALVES CONNECTED TO VESSEL TO BE RETURNED TO NRC. INSTRUMENTATION AND CONTROLS TO BE REMOVED BY CONTROLS CONTRACTOR



LEGEND



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C	C Drawing no. / dessin no.	C

project / projet

**BUILDING M-06  
 DEAERATOR REPLACEMENT**

MONTREAL ROAD CAMPUS

drawing / dessin

**DEAERATOR REPLACEMENT  
 DEMO DRAWING**

designed / conçu	date	11/25/2020	date
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drawn / dessiné	scale	N.T.S.	échelle
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checked / vérifié	sheet	1 of/de 1	feuille
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	A1-010981-04-01	

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**5889-M07**

TIE-P1  
 5889-1

EXISTING WATER SUPPLY TO BE REMOVED FROM EXISTING DEAERATOR UP TO TIE-POINT 5889-1, THEN MODIFIED TO SUIT NEW DEAERATOR. REUSE PIPING IF POSSIBLE

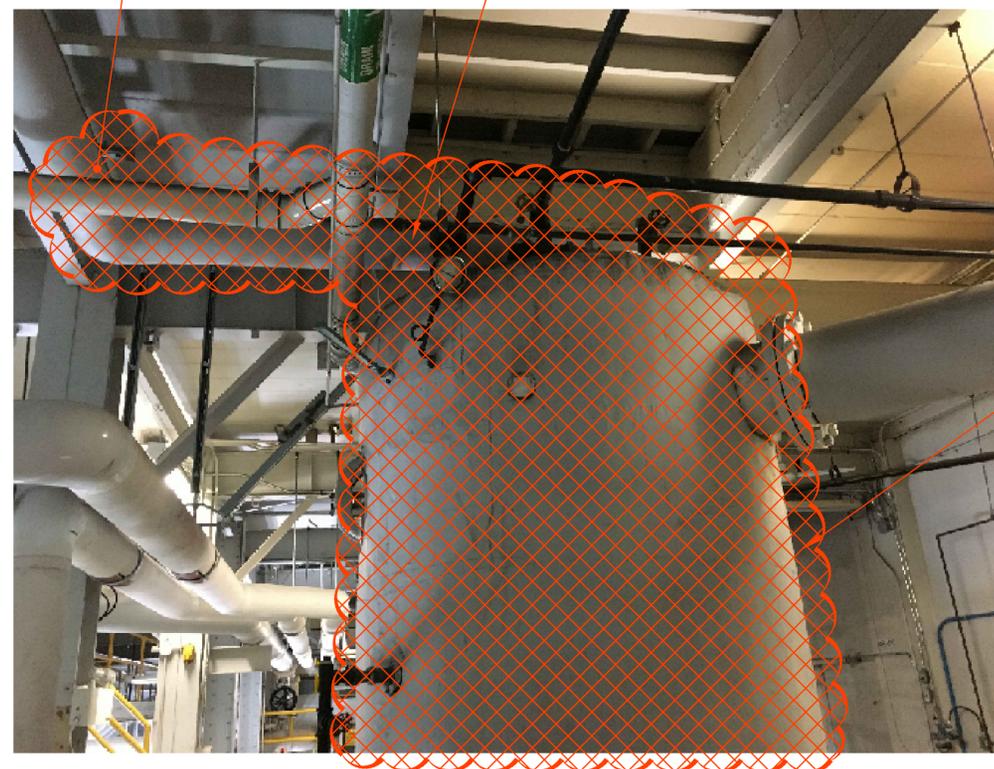


PHOTO 4: EXISTING DEAERATOR WATER SUPPLY

EXISTING DEAERATOR TO BE REMOVED

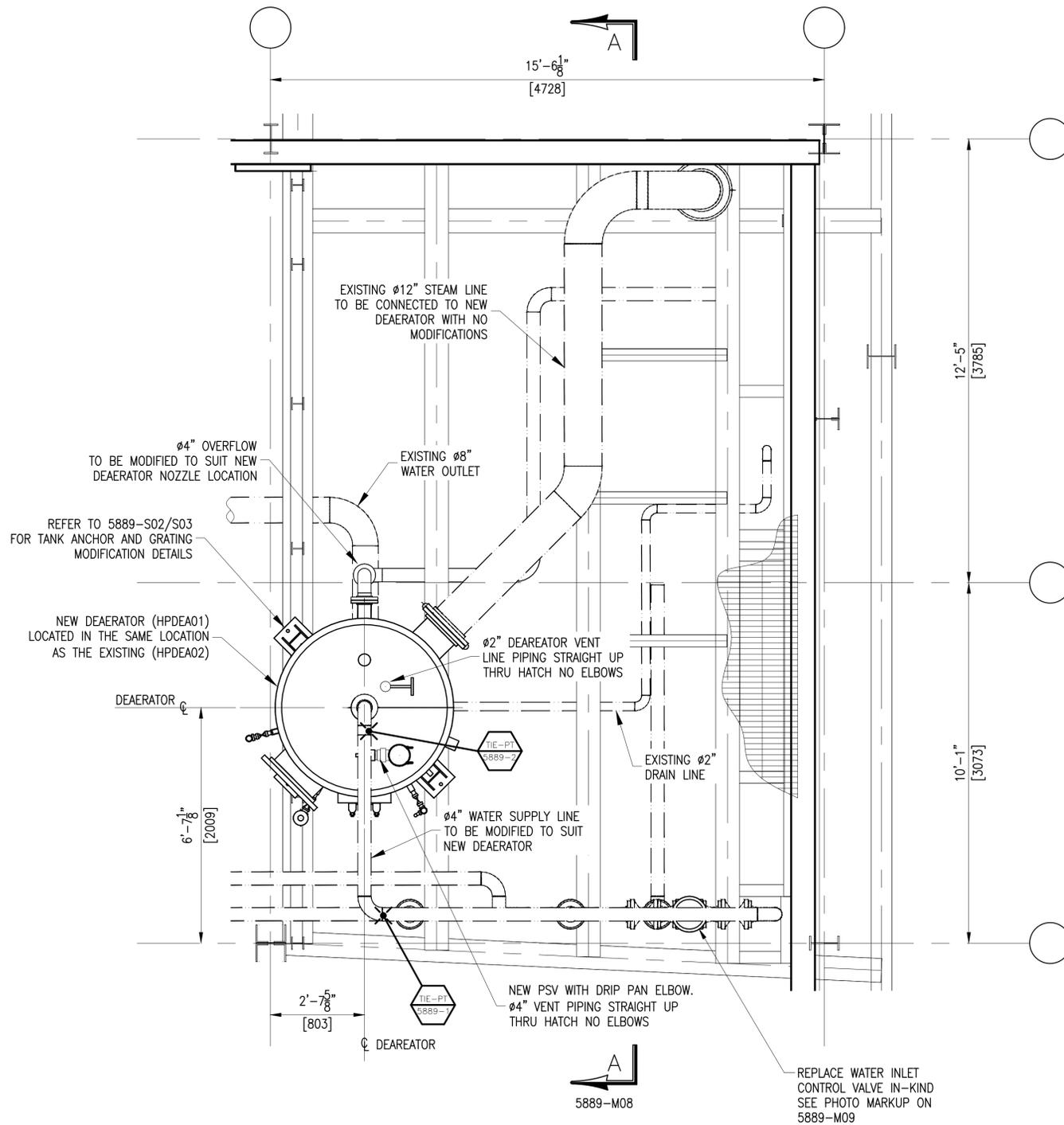


EXISTING DEAERATOR TO BE REMOVED

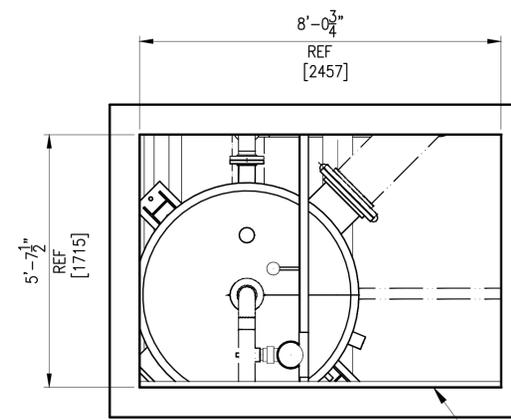
REMOVE EXISTING CHEMICAL FEED AND QUILL. NRC TO PROVIDE TEMPORARY CHEMICAL FEED TO EXISTING HOTWELL. COORDINATE WITH NRC DEPARTMENTAL REPRESENTATIVE TO ENSURE UNINTERRUPTED CHEMICAL FEED

PHOTO 5: EXISTING DEAERATOR OVERFLOW

C



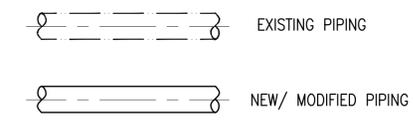
PLAN VIEW  
DEAERATOR PLATFORM



PLAN VIEW  
ROOF HATCH OPENING

INSTALL NEW DEAERATOR THROUGH EXISTING ROOF HATCH

LEGEND



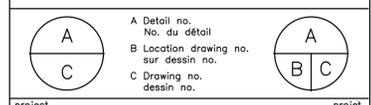
GENERAL NOTES

- CONTRACTOR TO VERIFY ALL DIMENSIONS AND CLEARANCES ON SITE PRIOR TO CONSTRUCTION AND REPORT ANY DISCREPANCIES AND/OR OMISSIONS TO DEPARTMENTAL REPRESENTATIVE.
- CONTRACTOR MUST VISIT THE SITE AND FULLY FAMILIARIZE THEMSELVES WITH THE SCOPE OF THE WORK PRIOR TO PROJECT COMMENCEMENT.
- ALL TRADES TO COORDINATE WORK ON SITE, WITH APPROVAL OF DEPARTMENTAL REPRESENTATIVE TO AVOID ANY CONFLICTS AND/OR INTERFERENCE.
- ANY AND ALL REQUIRED SHUTDOWNS SHALL BE COORDINATED WITH DEPARTMENTAL REPRESENTATIVE.
- INSTALLATION OF ALL SYSTEMS SHALL BE IN ACCORDANCE WITH APPLICABLE CODES AND STANDARDS.
- CONTRACTOR TO BE RESPONSIBLE FOR REINSTATEMENT AND REPAIR OF ANY DAMAGE CAUSED BY WORK.
- CONTRACTOR SHALL PREVENT THE SPREAD OF DUST AND DEBRIS BEYOND AREA OF WORK AND CLEAN ALL SURFACES AT COMPLETION.



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project  
**BUILDING M-06  
DEAERATOR REPLACEMENT**  
MONTREAL ROAD CAMPUS

drawing  
**DEAERATOR REPLACEMENT  
GENERAL ARRANGEMENT**

designed	conçu	date	11/24/2020	date
drawn	dessiné	scale	1/2"=1'-0"	échelle
checked	vérifié	sheet	1 of/de 1	feuille
approved	approuvé	W.O.no.	A1-010981-04-01	D.T.no.

dwg.no. 5889-M08 dessin no.

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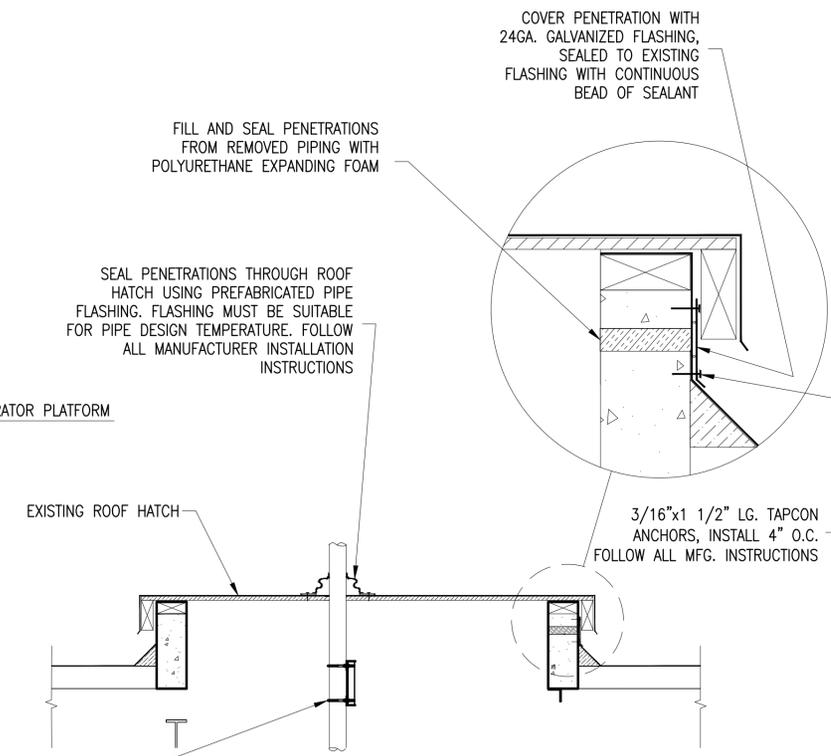
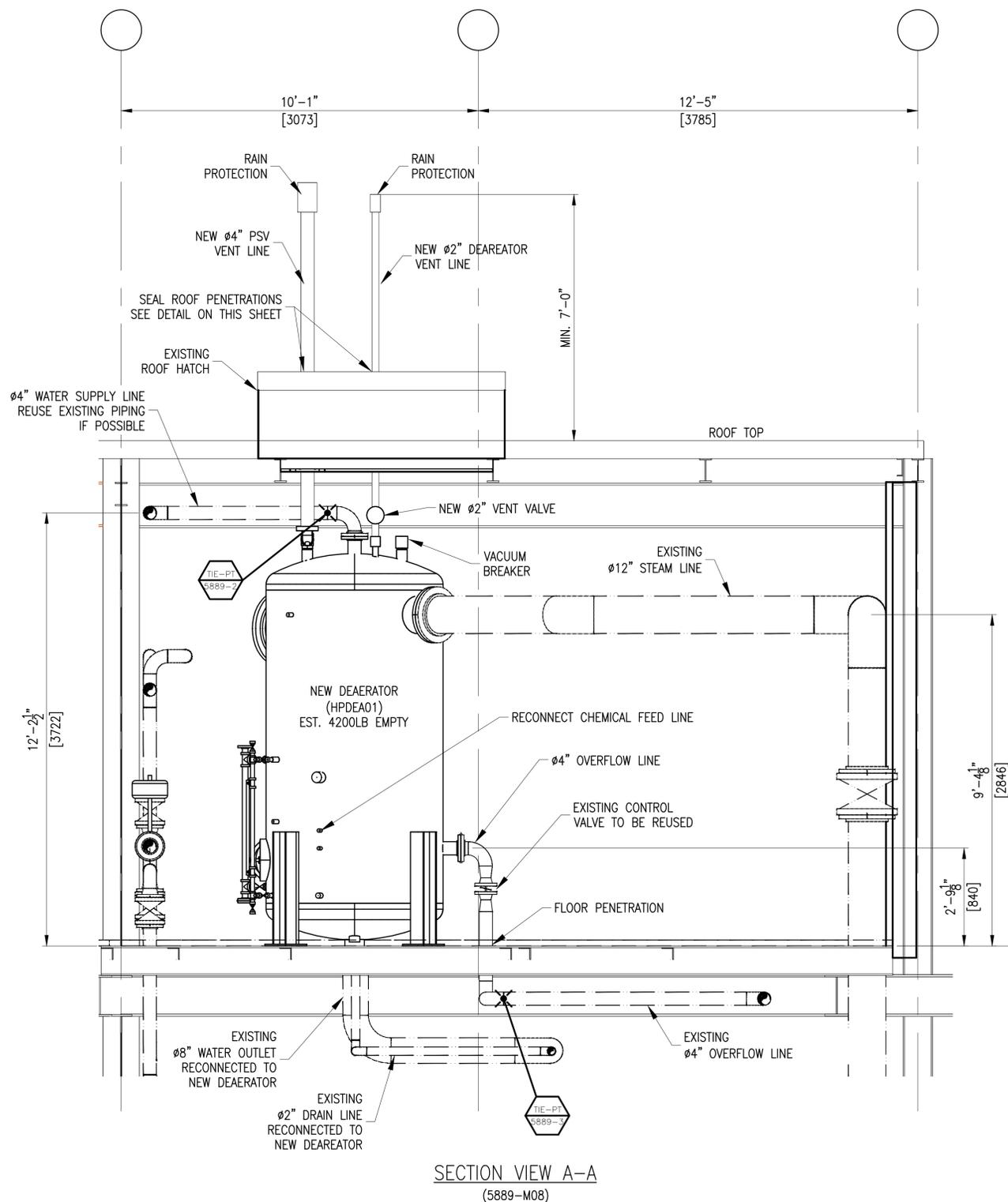
project: **BUILDING M-06 DEAEATOR REPLACEMENT**  
 MONTREAL ROAD CAMPUS  
 drawing: **DEAEATOR REPLACEMENT GENERAL ARRANGEMENT**

designed	conçu	date	11/24/2020	date
drawn	dessiné	scale	1/2"=1'-0"	échelle
checked	vérifié	sheet	1 of/de 1	feuille
approved	approuvé	W.O.no.	A1-010981-04-01	D.T.no.

dwg.no.: **5889-M09** dessin no.:



PHOTO 6: WATER LEVEL CONTROL VALVE (5889-M08)



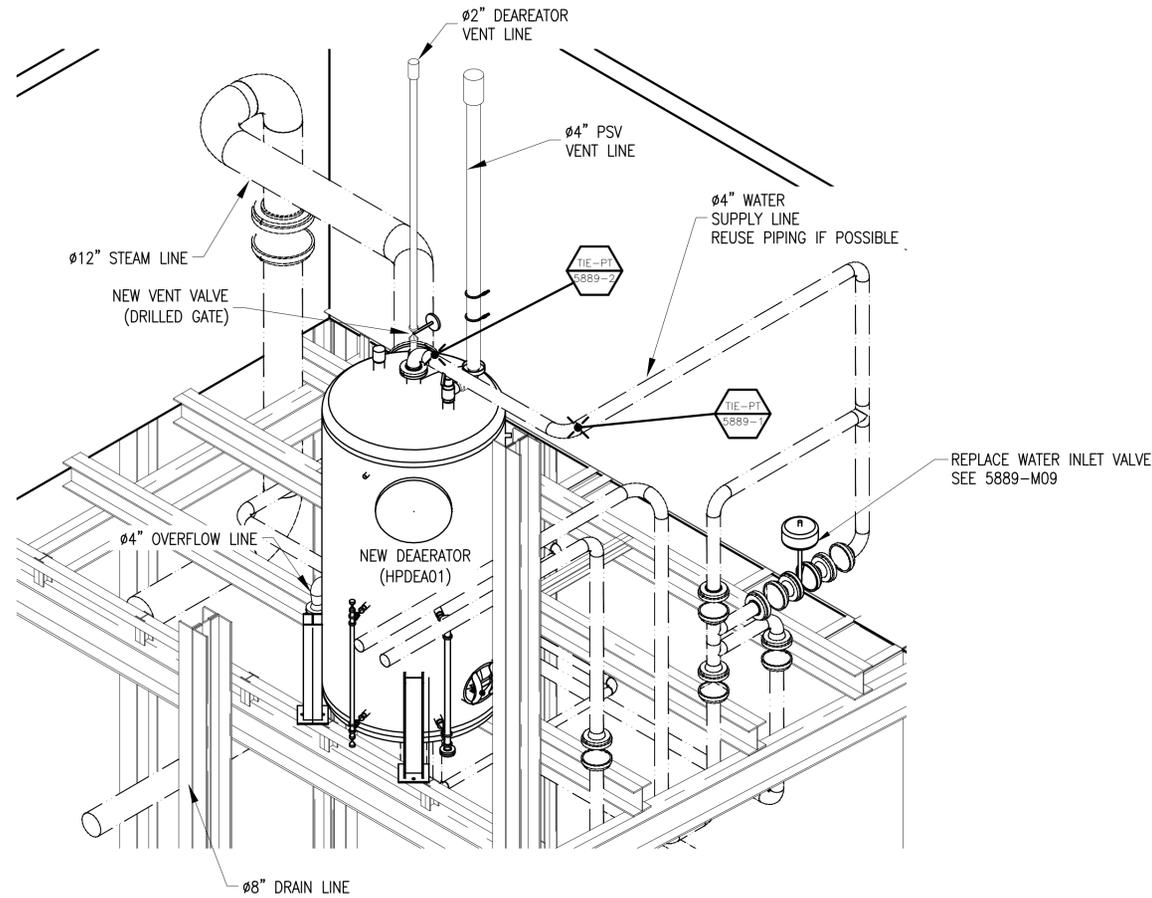
SUPPORT EACH NEW VENT LINE W/ (2) U-BOLTS SUPPORTED FROM L3"x3"x1/4" ANGLE WELDED BETWEEN EXISTING STRUCTURAL STEEL. ANGLE SPAN SHALL NOT EXCEED 6'-0". ALTERNATIVE SUPPORT METHODS ALSO ACCEPTABLE, CONTRACTOR TO SUBMIT SHOP DRAWING TO NRC FOR REVIEW PRIOR TO CONSTRUCTION

GENERAL NOTES

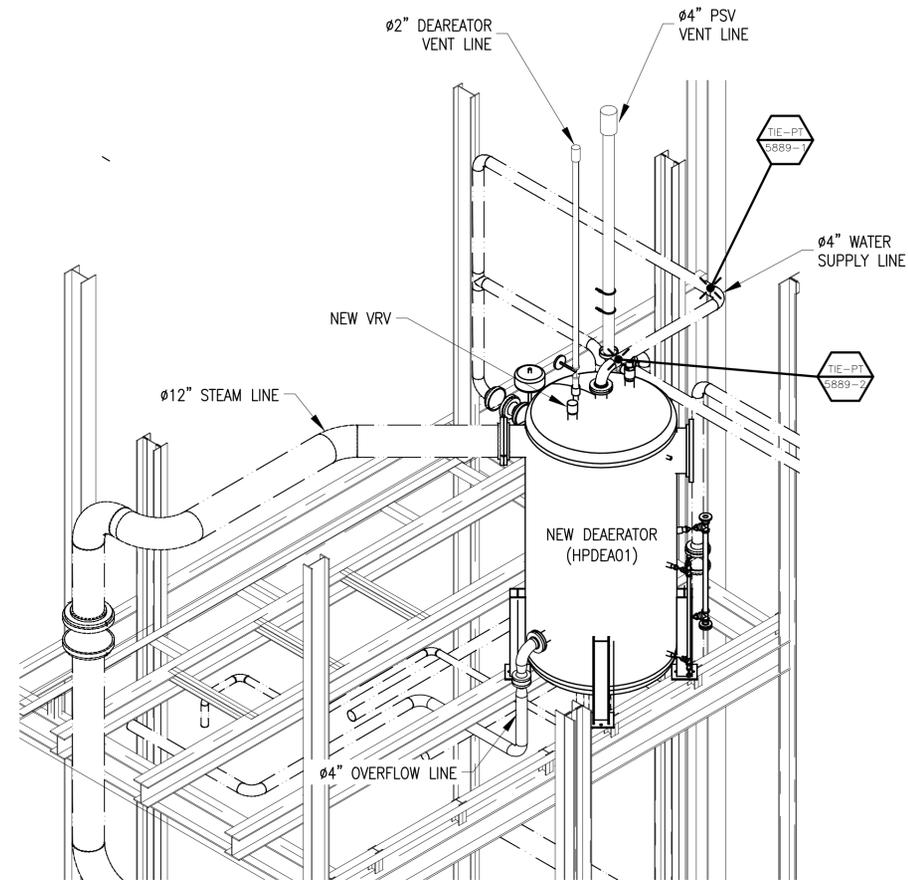
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ISOMETRIC VIEW 1  
 ROOF STEEL NOT SHOWN FOR CLARITY



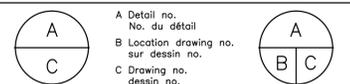
ISOMETRIC VIEW 2  
 ROOF STEEL & WALLS NOT SHOWN FOR CLARITY



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**BUILDING M-06  
 DEAERATOR REPLACEMENT**

MONTREAL ROAD CAMPUS

**DEAERATOR REPLACEMENT  
 GENERAL ARRANGEMENT**

designed: \_\_\_\_\_ conçu: \_\_\_\_\_ date: 11/24/2020 date: \_\_\_\_\_

drawn: M. BIGRAS dessiné: \_\_\_\_\_ scale: 1/2"=1'-0" échelle: \_\_\_\_\_

checked: M. COHEN vérifié: \_\_\_\_\_ sheet: 1 of/de 1 feuille: \_\_\_\_\_

approved: \_\_\_\_\_ approuvé: \_\_\_\_\_ W.O.no.: \_\_\_\_\_ D.T.no.: \_\_\_\_\_  
 A1-010981-04-01

dwg.no.: \_\_\_\_\_ dessin no.: \_\_\_\_\_

**5889-M10**

