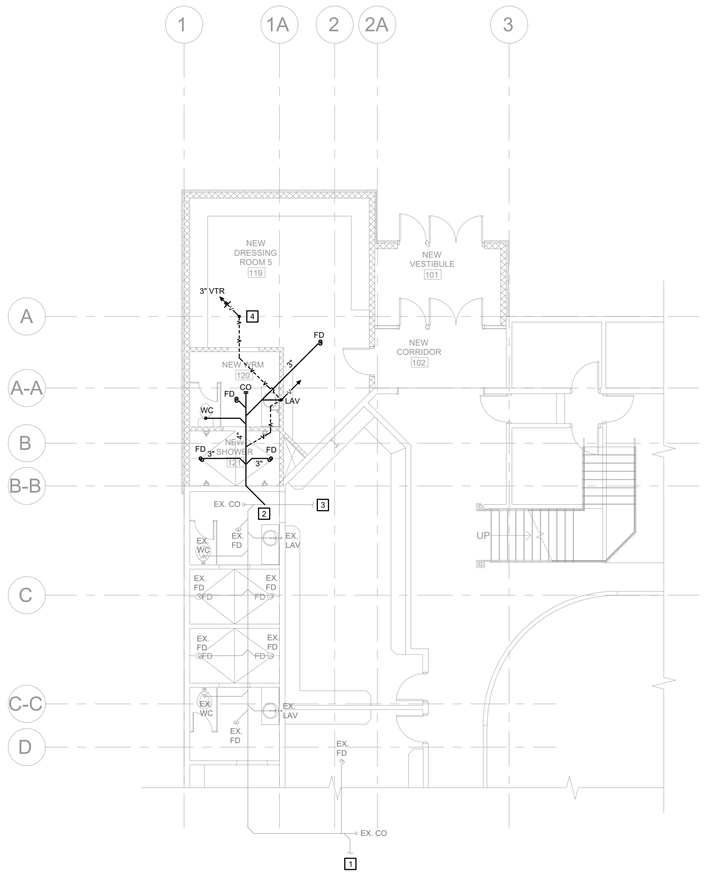
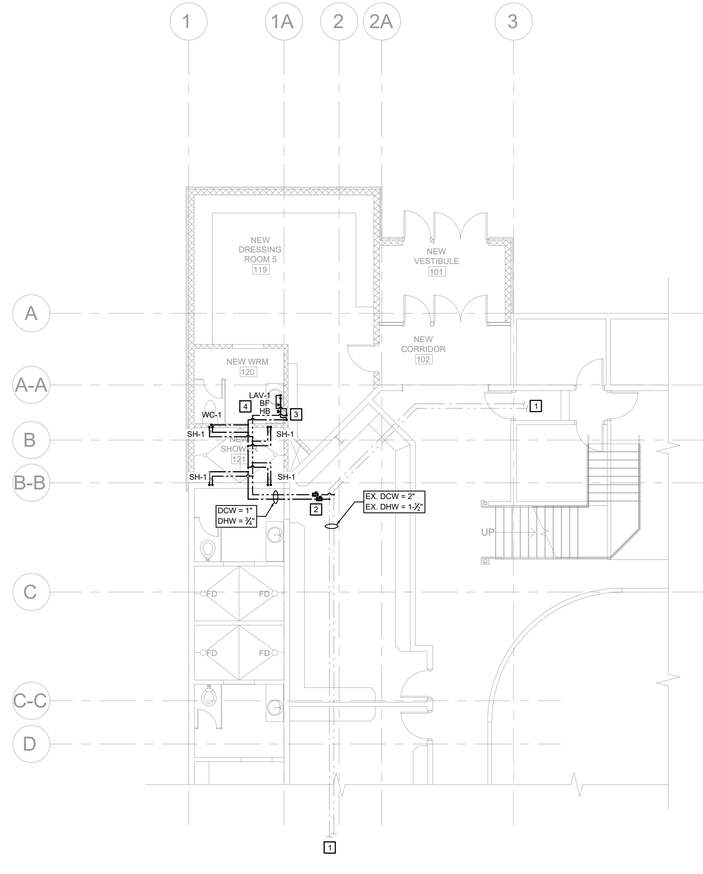


1 M1.0 Foundation Plumbing Layout
scale 1/8" = 1'-0"



2 M1.0 Main Floor Plumbing Layout
scale 1/8" = 1'-0"

FOUNDATION PLUMBING NOTES:

1. EXISTING SANITARY LINE CONTINUES TO EXISTING PLUMBING.
2. TIE-IN TO EXISTING SANITARY LINES; CONTRACTOR TO VERIFY THE LOCATION AND ELEVATION OF EXISTING SANITARY PIPES.
3. EXISTING SANITARY LINE CONTINUES TO EXISTING PLUMBING.
4. OFFSET PLUMBING VENT TO PROVIDE 10'-0" CLEARANCE FROM INTAKE AIR FOR ROOFTOP EQUIPMENT; VENT CONTINUED ON MECHANICAL ROOF PLAN.

MAIN FLOOR PLUMBING NOTES:

1. EXISTING WATER LINES CONTINUE TO EXISTING PLUMBING.
2. TIE-IN TO EXISTING WATER LINES AT CEILING; PROVIDE ACCESS PANEL AND ISOLATION VALVES FOR NEW DCW AND DHW LINES. REFER TO DETAIL 1 ON M3.0 FOR WATER PIPING SCHEMATIC.
3. ¾" DCW AND ½" DHW LINES DROP BELOW COUNTER.
4. INSTALL ¾" DCW LINE FOR HOSE BIBB AND ½" DCW LINE FOR BOTTLE FILLING STATION BELOW COUNTER.

GENERAL CONSTRUCTION NOTES:

1. DRAWINGS ARE DIAGRAMMATIC, CONTRACTORS SHALL BE RESPONSIBLE FOR CONFIRMING ALL SITE CONDITIONS AND COORDINATION WITH OTHER TRADES PRIOR TO COMMENCING WORK.
2. ALL WORK AND MATERIALS SHALL COMPLY WITH THE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS AND ALL LOCAL CODES AND REGULATIONS.
3. CONTRACTOR TO CONFIRM THE LOCATION OF EXISTING BURIED SERVICES TO THE BUILDING.
4. CONTRACTOR TO SITE CONFIRM ALL STORM, SANITARY AND WATER LINE ROUGH INS.
5. ALL PIPING, TUBING, DUCTS, WIRING, CONDUITS, ETC. PASSING THROUGH FIRE RATED SEPARATIONS SHALL BE SMOKE AND FIRE PROOFED WITH ULC APPROVED MATERIALS IN ACCORDANCE WITH CAN4-S115 AND ASTM E8814 STANDARDS AND WHICH MEET THE REQUIREMENTS OF THE PROVINCIAL BUILDING CODE.
6. CONTRACTOR TO CONFIRM ALL REQUIREMENTS, LOCATIONS, CONDITIONS, AND DIMENSIONS PRIOR TO COMMENCING WORK. COORDINATE ALL MECHANICAL INSTALLATIONS WITH ARCHITECTURAL, STRUCTURAL AND ELECTRICAL LAYOUTS, CONFIRM EXACT LOCATIONS AND METHODS FOR PIPING, DUCTWORK AND EQUIPMENT SUPPORTS ON THE SITE PRIOR TO INSTALLATIONS.

Bearsto & Associates
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60 YEARS

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SEAL

PROFESSIONAL ENGINEER ALBERTA
DANIEL WONG
2023-03-27

VALIDATION

PERMIT TO PRACTICE
BEAIRSTO & ASSOCIATES ENGINEERING LTD.

RM SIGNATURE: _____

RM APEGA ID #: _____

DATE: _____

PERMIT NUMBER : P243
The Association of Professional Engineers and Geoscientists of Alberta (APEGA)

OWNER

PROJECT

Drumheller Memorial Arena Dressing Room Addition

No.	Description	Date
4	Issued for Tender	Mar 27, 2023
3	Issued for Building Permit	Mar 27, 2023
2	Issued for Review	Mar 16, 2023
1	Issued for Review	Mar 10, 2023

NOTES:
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4. ALL WORK MUST COMPLY WITH THE MOST RECENT EDITION OF THE APPLICABLE BUILDING CODE, AND ANY OTHER GOVERNING AUTHORITY.

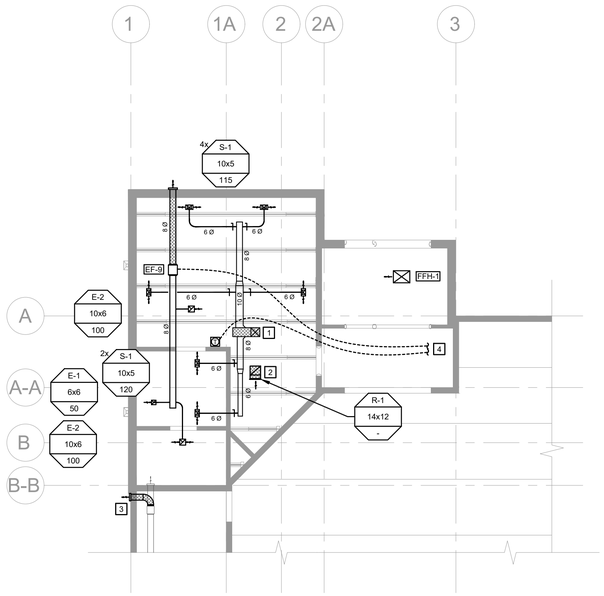
DRAWN BY:	D. Wong, P.Eng.
CHECKED BY:	D. McGrath, P.Eng.
ENGINEER:	D. Wong, P.Eng.
PROJECT No:	22CEBD1000
DATE:	March 2023
SCALE:	As Indicated

DESCRIPTION

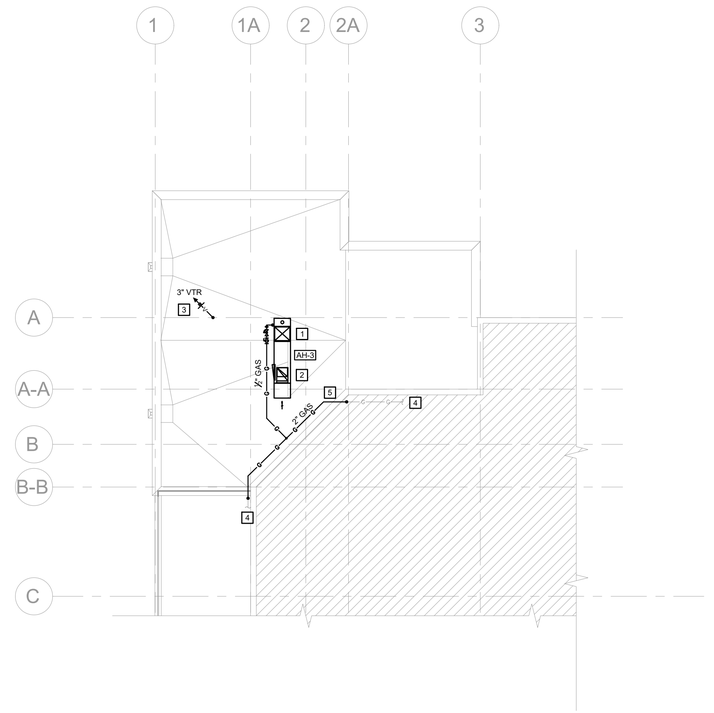
Foundation & Main Floor Plumbing Layout

DRAWING NO. M1.0

SHEET 1 / 4



1 M2.0 Main Floor HVAC Layout
scale 1/8" = 1'-0"



2 M2.0 Mechanical Roof Layout
scale 1/8" = 1'-0"

MAIN FLOOR HVAC LAYOUT NOTES:

1. 12x12 SUPPLY DUCT CONTINUES TO AH-3 ABOVE.
2. 14x12 RETURN DUCT CONTINUES TO AH-3 ABOVE.
3. REDIRECT EXISTING EXHAUST DUCT TO NORTH WALL; PROVIDE NEW WALL CAP VENT WITH BACKDRAFT DAMPER AND BIRDSCREEN.
4. CONNECT TO AH-3 CONTROLS IN EXISTING MECHANICAL ROOM.

MECHANICAL ROOF PLAN NOTES:

1. 12x12 SUPPLY DUCT CONTINUED ON MAIN FLOOR BELOW.
2. 14x12 RETURN DUCT CONTINUED ON MAIN FLOOR BELOW.
3. SANITARY VENT CONTINUED ON MAIN FLOOR PLUMBING LAYOUT.
4. GAS LINE CONTINUES TO EXISTING GAS DISTRIBUTION PLUMBING.
5. REDIRECT EXISTING PLUMBING ABOVE ROOF OF BUILDING ADDITION.

GENERAL CONSTRUCTION NOTES:

1. DRAWINGS ARE DIAGRAMMATIC, CONTRACTORS SHALL BE RESPONSIBLE FOR CONFIRMING ALL SITE CONDITIONS AND COORDINATION WITH OTHER TRADES PRIOR TO COMMENCING WORK.
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3. CONTRACTOR TO CONFIRM THE LOCATION OF EXISTING BURIED SERVICES TO THE BUILDING.
4. CONTRACTOR TO SITE CONFIRM ALL STORM, SANITARY AND WATER LINE ROUGH INS.
5. ALL PIPING, TUBING, DUCTS, WIRING, CONDUITS, ETC. PASSING THROUGH FIRE RATED SEPARATIONS SHALL BE SMOKE AND FIRE PROOFED WITH ULC APPROVED MATERIALS IN ACCORDANCE WITH CAN4-S115 AND ASTM EB814 STANDARDS AND WHICH MEET THE REQUIREMENTS OF THE PROVINCIAL BUILDING CODE.
6. CONTRACTOR TO CONFIRM ALL REQUIREMENTS, LOCATIONS, CONDITIONS, AND DIMENSIONS PRIOR TO COMMENCING WORK. COORDINATE ALL MECHANICAL INSTALLATIONS WITH ARCHITECTURAL, STRUCTURAL AND ELECTRICAL LAYOUTS, CONFIRM EXACT LOCATIONS AND METHODS FOR PIPING, DUCTWORK AND EQUIPMENT SUPPORTS ON THE SITE PRIOR TO INSTALLATIONS.

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DANIEL WONG
2023-03-27

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RM SIGNATURE: _____

RM APEGA ID #: _____

DATE: _____

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The Association of Professional Engineers and Geoscientists of Alberta (APEGA)

OWNER

PROJECT

Drumheller Memorial Arena
Dressing Room Addition

No.	Description	Date
4	Issued for Tender	Mar 27, 2023
3	Issued for Building Permit	Mar 27, 2023
2	Issued for Review	Mar 16, 2023
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DRAWN BY:	D. Wong, P.Eng.
CHECKED BY:	D. McGrath, P.Eng.
ENGINEER:	D. Wong, P.Eng.
PROJECT No:	22CEBD1000
DATE:	March 2023
SCALE:	As Indicated

DESCRIPTION

Main Floor HVAC Layout &
Mechanical Roof Plan

DRAWING NO. M2.0

SHEET 2 / 4

INDIRECT GAS FIRED AIR HANDLING UNIT SCHEDULE

TAG	MAKE	MODEL	SERVES	LOCATION	SUPPLY AIRFLOW (CFM)	SUPPLY ESP (in.W.C.)	SUPPLY MOTOR (HP)	OUTDOOR AIRFLOW (%)	OUTDOOR AIRFLOW (CFM)	RETURN AIRFLOW (CFM)	RETURN ESP (in.W.C.)	RETURN MOTOR (HP)	VFD (Y/N)	HEAT EXCHANGER				FILTERS		ELECTRICAL			WEIGHT (LBS)	INTERLOCKS	NOTES
														HEATING INPUT (MBH)	HEATING OUTPUT (MBH)	EAT (°F)	LAT (°F)	PRE-FILTER	FINAL FILTER	(V/Ph/Hz)	MCA	MOCP			
AH-3	ENG. AIR	RTS-65-SS-MA-O	DRESSING ROOM 5	ROOFTOP	700	0.27 "	1.0	64.0%	250	450	0.11 "	0.5	N	58.5	46.8	-38	72	MERV 8	MERV 13	208/3/60	8.0	15	450	SEE NOTE 1	1 - 7

NOTES:
1. ACTIVATED BY SEPARATE WALL MOUNTED THERMOSTAT C/W LOCKABLE COVER AND BY ROOM OCCUPANCY SENSORS. COORDINATE WITH ELECTRICAL CONTRACTOR.
2. SUPPLY TEMPERATURE TO BE ADJUSTED AT THE CONTROL PANEL OF THE UNIT.
3. MIXED AIR OPERATION.
4. SINGLE POINT WIRING. PROVIDE UNIT WITH NON-FUSED DISCONNECT SWITCH.
5. MECHANICAL CONTRACTOR TO VERIFY UNIT VOLTAGE PRIOR TO ORDERING
6. UNIT TO BE SUPPLIED WITH STANDALONE FACTORY SUPPLIED CONTROLS PANEL. PROVIDE REMOTE PANEL IN MECHANICAL ROOM WITH (A) GENERAL ALARM INDICATORS (B) HEAT ON-OFF INDICATORS (C) OPERATION INDICATORS (D) CLOGGED FILTERS INDICATORS AND (E) REMOTE ON/OFF(SCHEDULER OVERRIDE)
7. MOUNT NEW UNIT ON 24 INCH ROOF CURB.

FORCED FLOW, BASEBOARD & UNIT HEATER SCHEDULE (ELECTRIC)

TAG	MAKE	MODEL	LOCATION	DESCRIPTION	MIN. CEILING / WALL DEPTH	HEATING CAPACITY (kW)	ELECTRICAL (V/Ph/Hz)	NOTES
FFH-1	OUELLET	OACP4808	VESTIBULE	ELECTRIC CEILING HEATER - RECESSED	4 ⅛	4.0	208/1/60	1, 2

NOTES:
1. COLOR: WHITE.
2. UNIT C/W BUILT-IN THERMOSTAT AND RECESSED INTO CEILING.

AIR TERMINAL SCHEDULE

TAG	MAKE	MODEL	FUNCTION	DESCRIPTION	NOTES
S-1	E.H. PRICE	510D	SUPPLY	10"x5" LOUVERED SUPPLY GRILLE, DOUBLE DEFLECTION @ 45°	1, 2
E-1	E.H. PRICE	530D	EXHAUST	6"x6" LOUVERED GRILLE, ½" SPACING @ 45° DEFLECTION WITH BALANCING DAMPER	1, 2
E-2	E.H. PRICE	530D	EXHAUST	10"x6" LOUVERED GRILLE, ½" SPACING @ 45° DEFLECTION WITH BALANCING DAMPER	1, 2
R-1	E.H. PRICE	535	RETURN	14"x12" LOUVERED GRILLE, ½" SPACING @ 45° DEFLECTION	1

NOTES:
1. WALL AND CEILING MOUNTED SUPPLY GRILLES AND REGISTERS TO BE WHITE UNLESS OTHERWISE SPECIFIED.
2. PROVIDE ROUND TO RECTANGULAR TRANSITION BOOT AS REQUIRED.

EXHAUST FAN SCHEDULE

TAG	MAKE	MODEL	TYPE	FUNCTION	AIR CAPACITY (CFM)	E.S.P. (IN.WC)	SONES	MOTOR (HP)	ELECTRICAL (V/Ph/Hz)	DRIVE	NOTES
EF-9	GREENHECK	SQ 070-G	INLINE	EXHAUST	250	0.10 "	5.1	1/50	120/1/60	DIRECT	1, 2

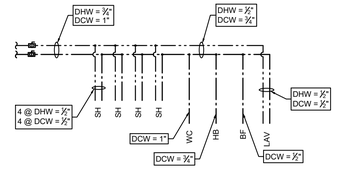
NOTES:
1. EXHAUST FAN TO OPERATE ON SAME SWITCH AS LIGHTS AND OCCUPANCY SENSORS.
2. INTERLOCK FAN WITH AIR HANDLING UNIT (AH-3).

PLUMBING FIXTURE SCHEDULE

TYPE	FIXTURE	SPECIFICATION
BF	BOTTLE FILLING STATION	KINGSTON BRASS Condord #KS8191DL Single-Handle Deck Mount Water Faucet, Polished Chrome. Connect to domestic cold water line and install faucet on countertop adjacent to washroom lavatory sink.
CO	CLEAN OUT	ZURN Z1400 Heavy duty adjustable floor cleanout
		ZURN Z1441 Wall clean out with smooth access cover
FD	FLOOR DRAIN (FINISHED AREAS)	WATTS FD-100-C Floor Drain with Round Heavy Duty Strainer Cast iron body, adjustable head, nickel bronze strainer, integral seepage pan & clamping collar. Use square strainer in tiled areas & round strainer elsewhere. c/w trap seal primer
HB	HOSE BIB	WATTS #SC8-4 Cast Brass Hose Bibb, ¾" F-NPT, with Separate Tamper-proof Vacuum Breaker and Backflow Protection. Install beneath sink in washroom.
LAV-1	SELF-RIMMING - DROP-IN BASIN	AMERICAN STANDARD #0419.111EC.020 Cadet Everclean Oval Countertop Sink, Single Hole Centerset, Self-Rimming / Drop-in, Color: white. AMERICAN STANDARD #1340.119 Pillar Tap Metering Faucet with Extended Spout, 0.5 GPM, Non-Aerated Spray, Chrome. SLOAN #MIX-135-A, Below Deck Thermostatic Water Mixing Valve w/ Integral Check Valves. MCGUIRE #155WC Offset Open Grid Drain. MCGUIRE #LFBV170, Polished Brass Faucet Supplies. MCGUIRE #8872C, P-Trap.
SH-1	SHOWER	BRADLEY #WS-1X-AST-S20 Pivoting Wall Shower with AirPushbutton Metering Valve, Stainless Steel, Adjustable Metering up to 45 Seconds, Standard 6' Height, 2.0 GPM Showerhead, Sloped Top, Vandal Resistant Screws, Thermostatic Mixing Valve (TMV).
WC-1	FLOOR MOUNTED TOILET	AMERICAN STANDARD MADERA FLOWISE #3461.001, Floor Mounted, Top Spud Inlet, Elongated Bowl, 16 ½" (419 mm) ADA High Toilet, White Vitreous China. SLOAN #111-1.6 Manual Flush Valve, 1-½" Top Spud, 1.6 GPF, Polished Chrome. AMERICAN STANDARD #5901.100SS, Elongated Heavy Duty Open Front Seat (less cover) with Self-Sustaining Hinge and Everclean Surface, Color: white.

PLUMBING FIXTURE ROUGH-IN SCHEDULE

TAG	DESCRIPTION	COLD WATER	HOT WATER	DRAIN	VENT	DRAIN UNDERGROUND
DW	DISHWASHER (DOM)	-	½"	1½"	1¼"	2"
FD	FLOOR DRAIN	-	-	3"	1½"	3"
HB	HOSE BIBB	¾"	-	-	-	-
LAV	LAVATORY	½"	½"	1½"	1¼"	2"
MOP	MOP SINK	½"	½"	2"	1½"	2"
RAD	RADON RISER	-	-	-	-	4"
SK	SINK	½"	½"	1½"	1¼"	2"
SH	SHOWER	½"	½"	2"	1½"	2"
MOP	MOP SINK	½"	½"	2"	1½"	2"
WC	WATER CLOSET (TANK)	½"	-	3"	1½"	4"



1 M3.0 WATER PIPING SCHEMATIC
NOT TO SCALE

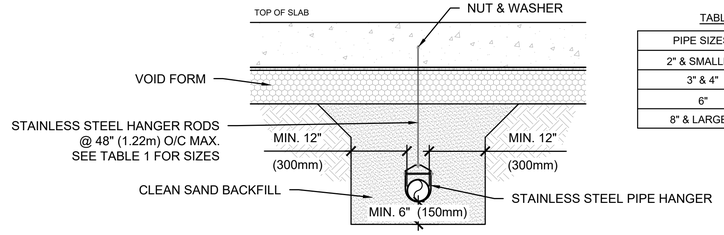


TABLE 1 : HANGER RODS

PIPE SIZES	MINIMUM ROD SIZE
2" & SMALLER	⅜"
3" & 4"	½"
6"	⅝"
8" & LARGER	¾"

INSTALLATION TO MEET CURRENT ASTM STANDARDS F2536

2 M3.0 TYP. SUSPENDED UNDERGROUND PIPE DETAIL
NOT TO SCALE

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DANIEL WONG
2023-03-27

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OWNER

PROJECT

Drumheller Memorial Arena Dressing Room Addition

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DRAWN BY:	D. Wong, P.Eng.
CHECKED BY:	D. McGrath, P.Eng.
ENGINEER:	D. Wong, P.Eng.
PROJECT No:	22CEBD1000
DATE:	March 2023
SCALE:	As Indicated

DESCRIPTION

Mechanical Equipment Schedules & Details

DRAWING NO. M3.0

SHEET 3 / 4

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2023-03-27 11:47:43 AM

A. GENERAL REQUIREMENTS

1. Provide for complete, fully tested and operational mechanical systems with facilities and services and in compliance with all applicable codes and standards and to the satisfaction of the Authority Having Jurisdiction (A.H.J).
2. Include all labor, materials, tools and equipment required to install, test and commission mechanical system as described herein. Make all necessary connections to equipment supplied by others.
3. Refer to the Site Plan and Servicing Plan for general requirements and site work.
4. Obtain all permits, give all notices and pay all fees so that the work specified herein may be expedited. Furnish all certificates requested by the Owner or Engineer. Pay all fees for mechanical permits.
5. Review all civil, architectural, structural, mechanical and electrical drawings and specifications prior to submitting tender and report in writing any discrepancies to the Engineer.
6. Base tenders on the products as specified. Requests for substitutions and alternates shall be submitted in writing to the Engineer for approval.
7. The Mechanical specifications complement the Mechanical Drawings provided. Should discrepancies exist between the drawings and specifications obtain clarification from the Engineer.
8. Be professional and responsible for any damage caused to the Owner's or other's work, property or personnel. Cover floors and other work with protective coverings. Repair all damage from carrying out work without expense to the Owner. Carry all necessary insurance.
9. Prior to fabrication, Contractor shall field measure existing conditions and all other installation requirements and co-ordinate with all parties involved. Review and confirm all related drawings to ensure the dimensions noted are compatible. All discrepancies shall be brought to the attention of the Engineer in writing.
10. Provide legible shop drawings for all equipment in PDF format. Shop drawings shall not include copies of faxed information. Identify material(s) and/or equipment(s), as tagged in the drawings, by manufacturer and model number. Include copies of applicable brochure or catalogue material. Maintenance and operating manuals are not suitable submittal material. When alternates are requested from the contractor, clearly mark submittal material using arrows, underlining or circling to show differences from specified. Do not order equipment or material until the Engineer has reviewed and approved shop drawings. Engineer's review will be for conformity with the design concept and criteria. The Contractor remains solely responsible for ensuring that the material(s) and/or equipment(s) meet or exceed the requirements of any and all related construction documents, and that the materials suit the site conditions and fitment.
11. Confirm location, size, and invert of each necessary service connections to and from the building or site with the A.H.J prior to commencing any work. Be responsible for establishing all required grades and/or elevations when connecting mechanical equipment, ductwork, piping, drains etc.
13. Provide all sleeves and information on all openings required in the structure to enable installation of the mechanical systems. Sleeves shall be provided by the mechanical trade for all pipes passing through fire-rated walls and floors, and potentially wet floors. Sleeves shall be standard weight steel pipe. Sleeves or openings not properly located shall be relocated at no additional cost to the Owner.
14. This Contractor shall be responsible for providing Smoke and Fire stopping sealant for all mechanical wall and floor penetrations through fire-rated assemblies.
15. Coordinate with the General Contractor regarding locations of all holes, pipes, ducts etc. Do no damage to critically loaded structural elements. Do no cutting of structural components without obtaining prior written approval from the Structural Engineer.
16. Coordinate with the General Contractor for all backfilling with sand or other approved material to a minimum of 300 mm over pipe or as necessary to protect the mechanical installation. Ensure pipe lays on 300 mm compacted sand or undisturbed soil
17. The drawings indicate the general location and routing for the ductwork and pipes which are to be installed. Where the required ductwork and piping is not shown on the plans or only shown diagrammatically, the ductwork and pipes shall be installed in such a way as to conserve head room and interfere as little as possible. All ductwork and pipes which are to be concealed shall be installed neatly and closely to the building structure so that necessary furring can be kept as small as possible.
18. Materials and equipment installed shall be new and free from defects. Follow the recommended installation details and procedures for all equipment as found in the suppliers technical data, supplemented by details given herein by these specifications and in the drawings. Provide a certificate of guarantee of workmanship and material for one year from the date of acceptance. Where equipment has an extended manufacturer's warranty, these documents shall be registered in the Owner's name and turned over to the Owner at the time of building acceptance.
19. Do not use the permanent system for temporary heating or other purposes without written permission from the Owner and/or Consultant.
20. Contractor is responsible to inform the Engineer of the job progress and coordinate time for site reviews, 48 hours in advance notice is required. Prior to substantial completion site review, Contractor to provide in writing certifying work is complete, including a list of work not complete at the time of the site viewing.
21. Keep in the site office one (1) set of full size prints and specifications on which all changes and deviations shall be recorded daily. At the completion of the project provide the Owner with two (2) copies of marked up "As-Built Plans", one (1) digital PDF copy and three (3) copies of maintenance manuals in 3-ring binders, appropriately marked with job name on front cover and spine. Manuals to include a written system description and operating procedures, valve tag list, test certificates, maintenance schedules, and a list of subcontractors and equipment suppliers, c/w addresses and phone numbers. Instruct the Owner in the operation of the Mechanical System.
22. Tag all valves and equipment and post a tag list in the Mechanical Room. Provide numbered brass or plastic tags for valves and lamacoid labels for equipment. Identify all piping and ductwork (size, service & flow direction) with stencilled painting.
23. Provide hangers and supports to secure pipes, prevent vibration, maintain grade by adjustment, provide for expansion and contraction and appear neat. Install supports of strength and rigidity to suit loading without unduly stressing the structure. Trapeze hangers may be used where several pipes run at the same elevation. Provide provisions for preventing bi-metallic contact. Hanger size and spacing shall conform to the National Plumbing code of Canada Table 2.3.4.5. Pipe under the building in the fill shall be supported continuously, by bedding in sand.
24. Provide adequately sized hinged access doors for maintenance or adjustment of all parts of the mechanical systems (concealed valves, cleanouts, traps, air vents, balancing & fire dampers, etc). Where equipment is concealed by a continuous structural or architectural surface, supply access doors of design to suit the surface in which they are to be installed. When located in walls or floors forming part of the fire separation, provide ULC rated and labelled units. Material shall be of ⅛" (3mm) core thickness bonderized steel complete with heavy duty rust resistant concealed hinges, positive locking and self-opening screw driver lock. Insulated ductwork access doors shall have minimum 1 inch thick insulation installed with suitable sheet metal cover frame.
25. Provide and install all necessary waterproof flashing and counter-flashing where mechanical pipes, ducts or parts penetrate roof, floor membranes and/or walls required to be watertight.
26. Test all equipment and materials as required to demonstrate its proper operation. Maintain current written logs, data, and records on site of all pressure and performance tests. Provide results to Engineer in writing.
27. After the mechanical installation is complete and pressure tested, conduct performance tests to demonstrate that the installed systems and equipment meet specified requirements, and carry out the final adjustments to suit exact building conditions. Provide commissioning reports to Engineer in writing.
28. Obtain all certificates of approval and compliance from the A.H.J. The work will not be considered complete until these certificates have been delivered to the Owner.
29. Test, adjust and thoroughly clean the entire mechanical system before final inspection. Submit in writing a declaration that all work has been completed prior to final acceptance.
30. Prior to substantial performance field review the Contractor shall provide a list of outstanding deficiencies.

B. PIPING

1. Provide and install all domestic water, drainage and vent piping to meet the requirements of the National Plumbing Code of Canada 2015 (N.P.C.C – 2015). All gas piping shall meet the requirements of CAN/CSA Standard B149.1
2. Verify exact tie in connection to sanitary service on site. Confirm inverts with the General Contractor and Authorities Having Jurisdiction to ensure that these can be properly connected with sufficient slope for adequate drainage.
3. Piping specifications

Installation	Pipe	Fitting
Domestic Water Piping		
Above Grade	Type "L" hard Copper	Wrought, Bronze or Cast with 95-5 Lead-free Solder Joints
	Cross Linked Polyethylene (PEX)	Crimped O-ring, Brass insert with crimp ring.
Below Grade	Up to 2" : Type "K" Soft copper Cross Linked Polyethylene (PEX)	Flared Joints Crimped O-ring, Brass insert with crimp ring, no joints under slab
	4" + : PVC Pressure Pipe	Gasket Joint
Sanitary Drainage and Vent Piping		
Above Grade	"M" or "DWV" Copper	Wrought or Cast with 50-50 Solder Joints
	Cast Iron	Gasket with Stainless Steel Coupling
Below Grade	Cast Iron	Gasket with Stainless Steel Coupling
	Plastic ABS or PVC	Plastic c/w Solvent Joint
Storm Drainage Piping		
Above Grade (Inside Building)	Plastic ABS or PVC	Plastic c/w Solvent Joint
Below Grade (Inside Building)	Plastic ABS or PVC	Plastic c/w Solvent Joint
Outside Building	Plastic PVC SDR Series	Gasket Joints
Gas Piping		
Above Grade	Schedule 40, Black Steel	Malleable Screwed or Butt Welded Joints
Below Grade	Schedule 40, Black Steel Yellow Jacket	Butt Welded Joints
	Plastic	Fusion Welded
Heating Piping		
	Copper Type "M"	Wrought Copper with 50-50 Solder Joints
	Schedule 40, Black Steel	Malleable Screwed (up to 2")
		Butt Welded or Grooved Joints (over 2")
Radiant Floor Tubing	PEX-A Cross-linked Polyethylene tubing with oxygen diffusion barrier	No joints under slab
Equipment Drains and Overflow		
	Schedule 40, Galv. Steel	Malleable Screwed
	Copper Type "M"	Wrought or Cast with 50-50 Solder Joint
Compressor Air Piping		
Above Grade	Schedule 40, Black Steel	Malleable Screwed (up to 2")
		Butt Welded or Grooved Joints (over 2")

Notes:
Sanitary, vent and storm drainage piping above grade may be PVC (IPEX system XFR 15-50) with fire stopping where acceptable by code. Plastic ABS or PVC DWV Pipe may be used in shop area only for above grade drainage.

4. Where below grade sanitary and storm drainage systems is shown on the drawing and/or required, the Mechanical Contractor shall be responsible for all saw cutting of the floor slab, excavation, gravel bed and install pipe compacted backfill to underside of concrete floor. Pouring of the floor shall be the responsibility of the General Contractor.
5. Provide and install cleanouts for building drain in all straight runs of sewers, at the end of all branches, at the base of all riser lines, on all exposed or accessible traps (except water closets) further at the entry of the building at all points in the system where so indicated or called for, or where necessary to remove obstruction. Provide brass ring and cover to suit floor finish. Install cleanouts in accessible locations.
6. Every fixture shall have its own isolation valves, trap and vent in accordance with N.P.C.C – 2010.
7. Sanitary vents shall extend a minimum of 300mm above finished roof and be insulated prior to penetrating the roof assembly.
8. Provide bronze body ball valves for isolation and drains for all systems, sizes up to 2", and butterfly valves for sizes larger than 2", globe valves for throttling service.
9. Prime coat and paint all outdoor gas piping grey or yellow. All indoor gas piping shall be painted yellow or marked with yellow banding (min. 1" (25 mm) thickness) at intervals not exceeding 20ft (6m).
10. Provide water hammer arrestors to prevent water hammer. Follow manufacturer's installation requirements and guidelines. Provide on hot and cold water supplies to each fixture or group of fixtures.
11. Whenever dissimilar metals are joined or supported, the piping shall have non-conducting connections or hangers to prevent bi-metallic corrosion.
12. All premise and fixture backflow preventers shall meet the requirements of CAN/CSA B64-10.
13. Purge and clean all piping prior to commissioning.
14. Provide balancing of hydronic systems. Check all pumps for proper flow and terminal units for output capacity.
15. Provide and install all structural work and equipment required to control expansion and contraction of piping. Include angles or channels as required to rigidly anchor piping.
16. Test all piping systems in accordance with N.P.C.C – 2015.
17. Install sanitary and storm drainage piping with a minimum slope of 1:50, unless noted otherwise.

C. VENTILATION SYSTEMS

1. Construct ductwork to standards as recommended in the latest issue of ASHRAE guide, Duct Construction Standards by SMACNA
2. Verify ceiling space / height for duct clearance and installation constraints. Report in writing any discrepancies to the Engineer.
3. Except as indicated, all tees, bends and elbows shall be constructed to a minimum radius of 1.5 times the duct width measured from the centre. If impossible, use approved air foil turning vanes in rectangular elbows. Where acoustical lining is used the turning vanes shall be perforated metal type packed with fibreglass. Changes in duct sizes shall be gradual, not exceeding 15 degrees wherever possible.
4. Duct sizes shown are inside clear dimensions. Modify outside dimensions as required when ductwork requires acoustic insulation.
5. Connect diffusers or troffer boots to low pressure ducts with 1 m maximum length of flexible duct. Do not use flexible ducts to change direction.
6. Provide ULC labelled and approved fire dampers at all points where ductwork penetrates fire rated assemblies. Provide approved fire stop flaps where outlets penetrate a membrane ceiling forming part of a fire rated assembly. Fire dampers shall be dynamic and curtain type with curtain out of the airstream. Provide duct breakaway joint as per SMACNA at both sides of the damper. Provide adequately sized access doors on both sides of the fire damper.
7. Provide and install balancing dampers as noted on the drawings include airflow balanced set point indicator on supply, return and exhaust systems branches as close as possible to the trunk duct.
8. Air balancing is required for the entire system. Contractor is responsible for engaging a third party agency specializing in this work. Verify all grilles and diffusers for proper air flow and all fans and blowers for proper air delivery. Follow AABC specifications for Testing and Balancing HVAC systems. Submit balance report to Engineer for review prior to substantial completion.
9. Ducts associated with fans and equipment subject to forced vibration shall be installed with flexible connections immediately adjacent to the equipment.
9. All fans shall be statically & dynamically balanced such that noise and/or vibration transmission is minimized and not disruptive to equipment and occupants.
10. Paint visible ductwork and screens behind outlets matte black unless otherwise specified. Grilles shall have finish compatible with the finished surface they are intended to be set into and as selected by the Owner.
11. Provide all breeching and chimneys for all gas fired equipment as required in accordance with CAN/CSA B149.1. Provide venting materials required to suit the specific equipment application, as per manufacturer's venting guidelines.

D. INSULATION

1. All insulating material, flexible connectors, combustible coverings etc. shall have flame spread ratings and smoke development classification not exceeding current code requirements.
2. Ensure insulation is continuous through inside walls. Pack around pies with fire proof self supporting insulation materials, properly sealed. Ensure entire installation meets industry standards and applicable codes.
3. Provide canvas recovery jacket on all indoor exposed insulation. Aluminum or PVC recovery in wet areas or where exposed to the elements or subject to damage. Foil-faced vapour insulation on supply ducts, cold ducts and cold pipes.
4. Combustion air and fresh air: 1" foil faced vapour insulation throughout.
5. Air ductwork for heating & cooling applications:
   - 5.1. Min. 2" thermal insulation c/w foil vapour proof jacket with a minimum Thermal Resistance 0.88 m2/ °C / W.
   - 5.2. Min. 1" thermal insulation for ducts delivering warm air only.
   - 5.3. For exposed ductwork in finished areas, use thermal duct liner or double-wall duct.
   - 5.4. Ducts located outside of the building envelope shall have maximum overall thermal transmittance of 0.210 W/m^2·K.
6. Exhaust and return ducts located within conditioned space do not require insulation.
7. Exhaust ducts: 1" foil faced vapour proof insulation within 80" of roof or wall outlet. Ducts within cold attic spaces shall be insulated for their entire length.
8. Acoustic Lining:
   - 8.1. Provide 1" Internal acoustic insulation upstream and downstream a minimum of 10'-0" from all supply, return, and exhaust fans ½ HP or larger.
   - 8.2. Provide 1" Internal acoustic insulation where shown hatched on drawings and details.
9. Domestic Cold Water Piping: 1" thermal insulation throughout c/w foil vapour proof jacket or PVC jacket in high moisture areas.
10. Roof drains and plumbing vents: Insulate all horizontal rainwater leaders. ½" foil faced vapour proof insulation within 80" of roof outlet. Ducts within cold attic spaces shall be insulated for their entire length.
11. Refrigeration: ½" Armaflex insulation.Outdoor installations to be protected with two coats of WB Armaflex Finish
12. Breeching: 1 ½" insulation throughout.
13. Plumbing Insulation

Minimum Thickness of Piping Insulation for HVAC Systems								
Type of System	Design Operating Temperature Range, °C	Thermal conductivity of Insulation		Nominal pipe Diameter, inches (mm)				
		Conductivity Range, W/ m·°C	Mean Rating Temperature, °C	Runouts ≤ 2 (51)	≤ 1 (25.4)	1 ¼ to 2 (32 to 51)	2 ½ to 4 (64 to 102)	≥ 5 (127)
				Minimum Thickness of Piping Insulation, (mm)				
Heating Systems	> 177	0.046-0.049	121	38.1	63.5	63.5	76.2	88.9
	122-177	0.042-0.045	93	38.1	50.8	63.5	63.5	88.9
	94-121	0.039-0.043	65	25.4	38.1	38.1	50.8	50.8
	61-93	0.036-0.042	52	25.4	25.4	25.4	38.1	38.1
	41-60	0.035-0.040	38	25.4	25.4	25.4	25.4	38.1
Cooling Systems	5-13	0.033-0.039	24	25.4	25.4	25.4	25.4	25.4
	< 5	0.033-0.039	24	25.4	25.4	38.1	38.1	38.1
- HVAC piping located outside of the building envelope shall be insulated to the level specified above for heating systems conveying fluid with design operating temperatures above 177 °C. - Insulation of piping conveying chilled fluid shall be provided with foil vapour proof jacket								

Minimum Thickness of Piping Insulation for Service Water Heating Systems (Domestic Hot Water & Re-Circulation Piping)								
Location of Piping	Thermal conductivity of Insulation		Nominal pipe Diameter, inches (mm)					
	Conductivity Range, W/ m·°C	Mean Rating Temperature, °C	Runouts ≤ 2 (51)	≤ 1 (25.4)	1 ¼ to 2 (32 to 51)	2 ½ to 4 (64 to 102)	≥ 5 (127)	
			Minimum Thickness of Piping Insulation, (mm)					
Conditioned Space	0.035-0.040	38	25.4	25.4	25.4	38.1	38.1	
Unconditioned space or outside	0.046-0.049	38	38.1	63.5	63.5	76.2	88.9	

E. CONTROLS & EQUIPMENT

1. Provide and install complete system of automatic controls for mechanical systems supplied and installed by firms specializing in this type of work.
2. Provide shop drawings including complete operating date, system drawings, wiring diagrams and written detailed operational description of sequences and engineering data on each control system component.
3. Provide and install Control Systems consisting of thermostats, control valves, damper operators, indicating devices, interface equipment and other apparatus required to operate mechanical system and to perform functions specified. Provide the necessary components to connect factory supplied controls with certain equipment where such controls are specified.
4. Provide valves in accordance with general valve specification. Provide position indicators on valves and pilot position on sequenced valves.
5. Provide all transformers and wiring downstream of transformers. All 24V wiring and programming by Mechanical Contractor. Wiring of transformers to be by Electrical Contractor.
6. Provide appropriately sized regulators for all gas equipment compatible with input gas and manufacturer's requirements. All regulators in enclosed spaces shall be non-venting or vent shall be piped outside of the building.

F. LABELING

1. Equipment

   Identify all equipment including, but not limited to fans, pumps, motors, AHU's and their related starters by means of an engraved two-ply plastic I.D. plate. equipment I.D. plates shall have white characters on black background unless otherwise identified. All plates shall be sized to accommodate required description, lettering to be upper case block style. Locate conspicuously and secure with self adhesive tape. Recognized abbreviations will be acceptable, other proposed abbreviations to be approved by the Consultant. Lamacoid plates and coil marks to be supplied and installed by the mechanical contractor.

2. Pipes/ Valves

   Labeling shall conform to ASME/ANSI 13.1

   Pipes shall be marked: a) adjacent to all valves & flanges b) at both sides of floor or wall penetrations c) adjacent to changes in directions d) every 25' to 50' intervals on straight runs. Indicate pipe content direction of flow with matching markers & arrows. Provide a pipe marker at each valve to indicate proper identification of pipe contents. For valves/pipes less than ¾" in diameter, a permanently legible tag is required. Label all pipe branch take-offs (risers) according to the drawings. At the mechanical room provide as built diagrams on the wall identifying clearly all equipment, valves etc.

MECHANICAL SYMBOL LEGEND

PIPING SYSTEMS	
	BURIED SANITARY SEWER
	OVERHEAD SANITARY SEWER
SAN-O	BURIED SANITARY SEWER TO THE OIL INTERCEPTOR
GT	BURIED SANITARY SEWER TO GREASE TRAP
	BURIED WATER
RWL	RAINWATER LEADER
WT	WEEPING TILE
	RADON
V	PLUMBING VENT LINE
	DOMESTIC COLD WATER
	DOMESTIC HOT WATER
	DOMESTIC HOT WATER RETURN
G	NATURAL GAS LINE
VALVES AND FITTINGS	
	ISOLATION BALL VALVE
	PRESSURE REDUCING VALVE (PRV)
	UNION COUPLING
CO	CLEAN OUT
	PLUMBING CONTINUED
	PLUMBING VENT RISER
	PLUMBING VENT THRU ROOF
FIXTURES	
FD	FLOOR DRAIN
	ROUGH INS
HB	INTERIOR HOSE BIBB C/W VACUUM BREAKER
WC-1	PLUMBING FIXTURE (TYPE NOTED)
DUCTWORK	
	SUPPLY AIR DIFFUSERS
	SIDEWALL SUPPLY AIR OUTLETS
	CEILING RELIEF AIR INLETS
	CEILING EXHAUST AIR INLETS
FD BD M	FD: ULC RATED FIRE DAMPER BD: BACKDRAFT DAMPER M : MOTORIZED DAMPER
	BALANCING DAMPER
	APPROVED TURNING VANES
	ULC RATED FLEXIBLE DUCT CONNECTORS
	1" ACOUSTIC DUCT INSULATION
SYMBOLS	
T T	THERMOSTAT (LOCKABLE COVER / NO COVER)
H H	HUMIDISTAT (LOCKABLE COVER / NO COVER)
CO CO2 NO2	CO = CARBON MONOXIDE SENSOR CO_2 = CARBON DIOXIDE SENSOR NO_2 = NITROGEN DIOXIDE SENSOR
1	NOTES REFERENCE NUMBER
S-0 SIZE FLOW / R-0 SIZE -	AIR TERMINAL TAGS (S/A, R/A, T/A GRILLES, DIFFUSERS AND REGISTERS)

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DANIEL WONG
2023-03-27

VALIDATION

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The Association of Professional Engineers and Geoscientists of Alberta (APEGA)

OWNER

PROJECT

Drumheller Memorial Arena Dressing Room Addition

No.	Description	Date
4	Issued for Tender	Mar 27, 2023
3	Issued for Building Permit	Mar 27, 2023
2	Issued for Review	Mar 16, 2023
1	Issued for Review	Mar 10, 2023

NOTES:
1. THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION UNTIL SIGNED AND SEALED OR ADVISED IN WRITING BY THE ENGINEER.
2. DO NOT SCALE THIS DRAWING.
3. VERIFY ALL DIMENSIONS, DATUMS, AND LEVELS PRIOR TO COMMENCEMENT OF WORK. REPORT ANY DISCREPANCIES OR OMISSIONS TO THE DESIGNER IMMEDIATELY.
4. ALL WORK MUST COMPLY WITH THE MOST RECENT EDITION OF THE APPLICABLE BUILDING CODE, AND ANY OTHER GOVERNING AUTHORITY.

DRAWN BY:	D. Wong, P.Eng.
CHECKED BY:	D. McGrath, P.Eng.
ENGINEER:	D. Wong, P.Eng.
PROJECT No:	22CEBD1000
DATE:	March 2023
SCALE:	As Indicated

DESCRIPTION

Mechanical Specifications

DRAWING NO. **M4.0**

SHEET 4 / 4

2023-03-27 11:47:45 AM