GENERAL

SYMBOL	DESCRIPTION
SA	SUPPLY AIR (DOWN)
RA	RETURN AIR (DOWN)
EA	EXHAUST AIR (DOWN)
TA	TRANSFER AIR (DOWN)
OA	OUTDOOR AIR (DOWN)
SA	SUPPLY AIR (UP)
RA	RETURN AIR (UP)
EA	EXHAUST AIR (UP)
TA	TRANSFER AIR (UP)
OA	OUTDOOR AIR (UP)
F	FIRE DAMPER
M	MOTORIZED DAMPER
BDD	BACKDRAFT DAMPER
	BALANCING DAMPER
	DUCT FLEXIBLE CONNECTION
	AIR FLOW DIRECTION
	FAN/BLOWER
	TURNING VANES

MECHANICAL EQUIPMENT

ABBREVIATIONS	DESCRIPTION
VFD	VARIABLE FREQUENCY DRIVE
BDD	BACK DRAFT DAMPER
BFP	BACK FLOW PREVENTOR
BV	BALL VALVE
EA	EXHAUST AIR
EF	EXHAUST FAN
EUH	ELECTRICAL UNIT HEATER
FEX	FIRE EXTINGUISHER
L	LOUVER
MAU	MAKE-UP AIR UNIT
MD	MOTORIZED DAMPER
OA	OUTSIDE AIR
RA	RETURN AIR
SA	SUPPLY AIR
SF	SUPPLY FAN

MISC. ABBREVIATIONS

NO	NORMALLY OPEN
NC	NORMALLY CLOSED
TYP	TYPICAL
AFF	ABOVE FINISHED FLOOR
EL	ELEVATION

FIRE PROTECTION EQUIPMENT

SYMBOL	DESCRIPTION
	FIRE EXTINGUISHER

VALVES AND PIPING SYMBOLS

SYMBOL	DESCRIPTION
	GATE VALVE (NORMALLY OPEN)
	GATE VALVE (NORMALLY CLOSED)
	PLUG VALVE (NORMALLY OPEN)
	PLUG VALVE (NORMALLY CLOSED)
	BALL VALVE (NORMALLY OPEN)
	BALL VALVE (NORMALLY CLOSED)
	CHECK VALVE
RP	REDUCED PRESSURE BACKFLOW PREVENTER
	UNION
	FLANGE
OR	CONCENTRIC REDUCER
	ECCENTRIC REDUCER
	STRAINER
	CAP
	PRESSURE GAUGE
	THERMOMETER W/ WELL
	GAS COCK
	VENTED PRESSURE REGULATOR

PLUMBING & DRAINAGE

SYMBOL	DESCRIPTION
HB	HOSE BIBB
	DIRECTION OF FLUID FLOW

PLUMBING FIXTURES

ABBREVIATIONS	DESCRIPTION
HB	HOSE BIBB
HR	HOSE REEL
NFHB	NON-FREEZE HOSE BIB

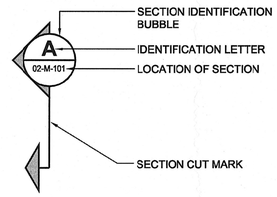
PIPING IDENTIFICATION

SYMBOL	DESCRIPTION
DCW	DOMESTIC COLD WATER SUPPLY
NG	NATURAL GAS
	PIPE DROP
	PIPE RISE
	PIPE TEE DOWN
	PIPE TEE UP
	FLOW DIRECTION

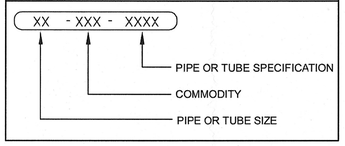
CONTROL SYMBOLS

SYMBOL	DESCRIPTION
T	THERMOSTAT
TS	TEMPERATURE SENSOR
TT	TEMPERATURE TRANSMITTER
FZ	FREEZE STAT
M	MOTOR
DENOTES NUMBER OF WIRES REQUIRED	THREE PHASE WIRING
	SINGLE PHASE WIRING BY DIVISION 16
	CONTROL WIRING BY DIVISION 15
	CONTROL WIRING (LOW VOLTAGE)
	CONTROL WIRING (LINE VOLTAGE)
G	GAS METER
M OR	WATER METER

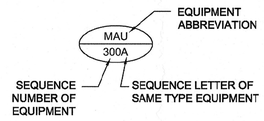
SECTION CUT MARK



PIPE IDENTIFICATION



MOTORIZED EQUIPMENT TAG



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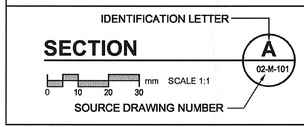

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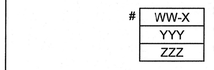
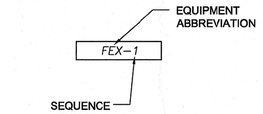
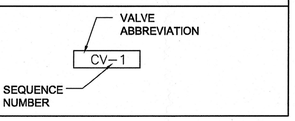


# :	QUANTITY (x2, x3, x4 ...)
WW :	AIR TYPE ABBREVIATION
X :	SEQUENCE NUMBER IN A TYPE
YYY :	AIR SECTION SIZE (mm x mm)
ZZZ :	AIR FLOW (l/s)

NON-MOTORIZED EQUIPMENT AND ACCESSORY TAG



VALVE TAG IDENTIFICATION



DESIGN TEMPERATURES FOR WINNIPEG, MANITOBA PER NATIONAL BUILDING CODE OF CANADA 2010

APPENDIX C:
WINTER: -35°C
SUMMER OPERATION: 30°C DRY BULB, 23°C WET BULB

INDOOR HEATING DESIGN TEMPERATURES:
CONTROL ROOM: 15°C
GENERATOR ROOM: 15°C
WETWELL: 10°C

INDOOR SUMMER COOLING DESIGN TEMPERATURES:
CONTROL ROOM: MAXIMUM 8°C TEMPERATURE RISE OVER OUTDOOR AMBIENT TEMPERATURE BY FREE COOLING.
GENERATOR ROOM: MAXIMUM 8°C TEMPERATURE RISE OVER OUTDOOR AMBIENT TEMPERATURE BY FREE COOLING.
WETWELL: N/A

ALL CHAMBERS BELOW ELEVATION 233.0 M ASL ARE HAZARDOUS AREAS DEFINED BY THE CANADIAN ELECTRICAL CODE AS CLASS 1 ZONE 1, DUE TO THE POSSIBLE PRESENCE OF FLAMMABLE LIQUIDS, GASES OR VAPOURS.. ELECTRICAL EQUIPMENT AND CONTROL COMPONENTS IN THIS AREA ARE TO BE EXPLOSION PROOF OR INTRINSICALLY SAFE DEVICES AND WIRING. REFER TO ELECTRICAL FOR SPECIFIC REQUIREMENTS. VENTILATION OF THESE SPACES IS NOT NORMALLY REQUIRED, AND IS ONLY PROVIDED IN THE WETWELL CHAMBER FOR USE WHEN OPERATORS MUST ENTER THE WETWELL, OR WHEN LEL DETECTORS INDICATE AN INCREASING LEVEL OF FLAMMABLE GASES OR VAPOURS IN THE WETWELL. REFER TO THE SEQUENCE OF OPERATION IN THE SPECIFICATIONS FOR FURTHER DETAILS.

THE CONTROL ROOM IS A PRESSURIZED ENVIRONMENT WHICH IS MAINTAINED AT 25Pa POSITIVE PRESSURE WITH RESPECT TO THE OUTDOORS VIA VENTILATION AIR. NO PENETRATIONS TO THE WETWELL BELOW ARE PERMITTED TO BE LEFT OPEN, AND ALL CABLES AND PIPING PENETRATIONS ARE TO BE SEALED GAS-TIGHT. THE SPACE HAS BEEN DESIGNED TO NFPA 496 ON THE BASIS THAT ONLY ONE STANDARD (914 X 2130mm) DOOR WILL BE OPEN AT ANY TIME WHEN THE OUTDOOR AIR TEMPERATURE IS BELOW 0°C, EITHER TO OUTDOORS OR TO THE GENERATOR ROOM. WHEN THE OUTDOOR AIR TEMPERATURE IS ABOVE 0°C, THE DOUBLE DOORS TO THE CONTROL ROOM MAY BE OPENED SIMULTANEOUSLY WITH THE GENERATOR ROOM DOOR IF REQUIRED. REFER TO THE SEQUENCE OF OPERATION IN THE SPECIFICATIONS FOR FURTHER DETAILS.

THE STANDBY GENERATOR IS DESIGNED TO OPERATE ON NATURAL GAS AND CAN START AT ANY TIME. IN ACCORDANCE WITH NFPA 37, THE GENERATOR ROOM IS CONTINUOUSLY VENTILATED WHEN THE ENGINE IS NOT RUNNING TO PREVENT THE BUILD-UP OF GASES, MISTS AND OTHER POTENTIALLY FLAMMABLE OR EXPLOSIVE CONDITIONS. THIS VENTILATION FAN WILL CEASE OPERATIONS WHEN NORMAL POWER IS NOT AVAILABLE, AND THE GENERATOR RADIATOR FAN WILL PROVIDE THE REQUIRED VENTILATION DURING OPERATION. UPON ENGINE SHUT-DOWN, THE AUXILIARY COOLING FAN WILL DISCHARGE AIR TO THE OUTDOORS AND USE OUTDOOR AIR TO COOL THE ROOM WHILE THE ENGINE IS COOLING DOWN, OR IN CASE SOLAR HEAT GAINS RAISE THE ROOM TEMPERATURE ABOVE SETPOINT.

NATURAL GAS SUPPLY, GENERATOR ROOM COOLING AND ENGINE EXHAUST SYSTEMS HAVE BEEN DESIGNED FOR THE MOST DEMANDING REQUIREMENTS OF THE FOLLOWING TWO 300 kW NATURAL GAS GENERATOR MANUFACTURERS AND MODELS:
CUMMINS MODEL GTA19 G CC.
KOHLER MODEL 300RZXB.

MAXIMUM RADIATOR AIRFLOW AND EXTERNAL RESISTANCE: 16,990 l/s AT 125 Pa
MAXIMUM COMBUSTION AIRFLOW: 566 l/s
MAXIMUM EXHAUST GAS FLOW AND TEMPERATURE: 957 l/s AT 681°C - (CUMMINS)
MAXIMUM NATURAL GAS FLOW AT 100% LOAD: 114.9 CUBIC METERS PER HOUR
MAXIMUM HEAT REJECTED TO THE GENERATOR ROOM: 111.3 kW TOTAL (ENGINE, ALTERNATOR AND EXHAUST - (CUMMINS)
MAXIMUM HEAT REJECTION FROM ENGINE: 73 kW
MAXIMUM HEAT REJECTION FROM ALTERNATOR: 29 kW
MAXIMUM HEAT REJECTION FROM EXHAUST SYSTEM: 10 kW

CURBS PROVIDED AT THE BASE OF THE FOUR WALLS OF THE STANDBY GENERATOR ROOM FORM A CONTAINMENT FOR ANY LIQUID DISCHARGES FROM THE ENGINE AND PREVENT DISCHARGE TO THE ENVIRONMENT. MAINTENANCE OF THE FLOOR COATING WILL BE REQUIRED. REFER TO THE SPECIFICATIONS.

CODES AND STANDARDS REFERENCED:

I) NATIONAL BUILDING CODE OF CANADA 2010 AS AMENDED BY THE MANITOBA BUILDING CODE, REGULATION 31/2011 AND SUBSEQUENT REVISIONS.

II) NATIONAL FIRE CODE OF CANADA 2010 AS AMENDED BY THE MANITOBA FIRE CODE, REGULATION 155/2011 AND SUBSEQUENT REVISIONS.

III) NATIONAL PLUMBING CODE OF CANADA 2010 AS AMENDED BY THE MANITOBA PLUMBING CODE REGULATION 32/2011 AND SUBSEQUENT REVISIONS.

IV) NFPA 10-2007, STANDARD FOR PORTABLE FIRE EXTINGUISHER.

V) NFPA 37-2006, STANDARD FOR THE INSTALLATION OF STATIONERY COMBUSTION ENGINES AND GAS TURBINES.

VI) NFPA 90A-2002, STANDARD FOR THE INSTALLATION OF AIR-CONDITIONING AND VENTILATING SYSTEM.

VII) NFPA 90B-2002, STANDARD FOR THE INSTALLATION OF WARM AIR HEATING AND AIR-CONDITIONING SYSTEMS.

VII) NFPA 211-2006, STANDARD FOR CHIMNEYS, FIREPLACES, VENTS AND SOLID FUEL-BURNING APPLIANCES.

IX) NFPA 496-2008, STANDARD FOR PURGED AND PRESSURIZED ENCLOSURES FOR ELECTRICAL EQUIPMENT.

X) NFPA 820-2008, STANDARD FOR FIRE PROTECTION IN WASTEWATER TREATMENT AND COLLECTION FACILITIES.

XI) CSA-B51-09, BOILER, PRESSURE VESSEL AND PRESSURE PIPING CODE.

XII) CSA-B149.1-05, NATURAL GAS AND PROPANE INSTALLATION CODE.

XIII) SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE, 3RD EDITION, 2005.

XIV) ASHRAE FUNDAMENTALS HANDBOOK, 2013.

XX) ANSI/ASHRAE STANDARD 62-2001, VENTILATION FOR ACCEPTABLE INDOOR AIR QUALITY.

GENERAL NOTES:

1. DO NOT SCALE DRAWINGS. DIMENSIONS PROVIDED TAKE PRECEDENCE OVER DRAWN SIZE.
2. VERIFY ALL DIMENSIONS SHOWN PRIOR TO COMMENCING CONSTRUCTION.
3. LOCATE ALL CONCEALED BUILDING SERVICES AND PROTECT THEM AT ALL TIMES DURING CONSTRUCTION WORK.
4. COORDINATE SHUT-DOWN OF ANY EXISTING SYSTEM WITH THE APPROPRIATE UTILITY OR THE CONTRACT ADMINISTRATOR IF REQUIRED DURING INSTALLATION WORK. PROVIDE FOR THE SAFE RECONNECTION AND RECOMMISSIONING OF ANY EXISTING SYSTEMS DISCONNECTED OR SHUT-DOWN THROUGH ANY WORK ACTIVITY RELATED TO THE CONSTRUCTION. PLACE SAFETY FIRST.
5. DETAILS SHOWING THE COMPLETED INSTALLATION DO NOT INDICATE COMPONENTS WHICH MAY BE REQUIRED FOR SAFETY DURING CONSTRUCTION.
6. PROVIDE ALL LABOUR, MATERIALS, TOOLS PLANT AND EQUIPMENT NECESSARY TO EXECUTE ALL THE WORK SHOWN AND REQUIRED BY THE REFERENCED CODES, STANDARDS, AND REGULATIONS, OR ANY APPLICABLE BY-LAWS IN FORCE IN THE LOCALE OF THE WORK, AND THE AUTHORITY HAVING JURISDICTION.
7. THE INSTALLER WILL FILE APPLICATION FOR AND PAY ANY FEES, LEVIES, AND DUES RELATED TO PERMITS FOR THE WORK IN THIS CONTRACT.
8. THE INSTALLER SHALL BE A LICENSED AND AUTHORIZED INDIVIDUAL OR FIRM, AND SHALL USE ONLY EXPERIENCED AND SKILLED WORKERS.
9. ALL EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
10. PROVIDE FOR THE SAFETY AND GOOD CONDITION OF ALL MATERIALS AND EQUIPMENT UNTIL FINAL ACCEPTANCE BY THE OWNER. PROTECT ALL MATERIALS AND EQUIPMENT FROM DAMAGE, WHETHER NEW OR EXISTING. PROVIDE PROPER AND ADEQUATE STORAGE FACILITIES DURING THE PROGRESS OF THE WORK, IN WHICH TO STORE MATERIALS RECEIVED AND SUPPLIES THAT HAVE NOT BEEN CONSUMED.
11. ALL EQUIPMENT, PIPING, FINISHED SURFACES, AND EQUIPMENT SHALL HAVE ALL GREASE, ADHESIVE SHIPPING LABELS, AND FOREIGN MATERIALS REMOVED.
12. REMOVE FROM THE PREMISES ALL UNUSED MATERIAL AND DEBRIS RESULTING FROM THE PERFORMANCE OF THE WORK.
13. UNLESS OTHERWISE SPECIFIED HEREIN, ALL BREAKERS, DISCONNECT SWITCHES, AND POWER WIRING SHALL BE FURNISHED AS SPECIFIED BY ELECTRICAL.
14. THE INSTALLER SHALL FURNISH AND INSTALL ALL MINOR ITEMS WHICH ARE OBVIOUSLY AND REASONABLY NECESSARY TO COMPLETE THE INSTALLATION AND USUALLY INCLUDED IN SIMILAR WORK EVEN THOUGH NOT SPECIFICALLY MENTIONED ON THE DRAWINGS AND IN THE SPECIFICATION DOCUMENTS. SUCH ITEMS WOULD INCLUDE BUT ARE NOT LIMITED TO BOLTS, NUTS, WASHERS, ANCHORS, FLASHING, SEALANTS, KEYS, TOOLS, BRACKETS, SLEEVES, DRAINS, AIR VENTS, AND MINOR OFFSETS IN DUCTWORK OR PIPING BECAUSE OF SITE CONDITIONS, ETC.
15. PROVIDE OPERATION AND MAINTENANCE INFORMATION ON THE EQUIPMENT AND MATERIALS PROVIDED AND INSTALLED UNDER THIS CONTRACT. INFORMATION SHALL BE BOUND IN BINDERS WITH AN INDEX, LIST OF VENDORS FOR REPLACEMENT PARTS, RECOMMENDED SPARE PARTS LISTS, COPY OF ANY SHOP DRAWINGS, TECHNICAL DOCUMENTS, EXPLODED VIEW DIAGRAMS, AND TROUBLE-SHOOTING INSTRUCTIONS. PROVIDE RECORD OF ACTUAL SETTINGS AND/OR NORMAL OPERATING SETPOINTS AS LEFT ON SITE. ORGANIZE IN THE BINDER USING TAB SHEETS TO SEPARATE MAJOR ITEMS, SLEEVES OR LAMINATION TO PROTECT IMPORTANT DOCUMENTS AND DRAWINGS, AND PROVIDE PROJECT REFERENCE SLIP-SHEETS AND SPINE IDENTIFICATION ON THE BINDERS.
16. MAINTAIN A SET OF PRINTS OF THE CONTRACT DOCUMENTS ON SITE AND RECORD ALL DEVIATIONS AND CHANGES MADE THERE-ON. THE OWNER WILL PROVIDE AN ADDITIONAL SET OF PRINTS FOR THE RECORD INFORMATION TO BE NEATLY AND CLEARLY TRANSFERRED TO USING HIGH CONTRAST COLOURS, SUCH AS RED, GREEN AND BLUE. SUBMIT A SET OF MARKED UP PRINTS TO THE CONTRACT ADMINISTRATOR AT THE COMPLETION OF THE WORK, ALONG WITH SUPPORTING SKETCHES AND DOCUMENTATION RELATED TO THE CHANGES MADE, SUCH THAT THE CITY OF WINNIPEG WILL HAVE A COMPLETE SET OF DOCUMENTS REFLECTING THE FINAL AS-CONSTRUCTED CONDITIONS LEFT ON SITE.

BID OPPORTUNITY NO. 712-2013

LOCATION APPROVED
UNDERGROUND STRUCTURES

SUPV. U/G STRUCTURES COMMITTEE _____ DATE _____

NOTE:
LOCATION OF UNDERGROUND STRUCTURES AS SHOWN ARE BASED ON THE BEST INFORMATION AVAILABLE. BUT NO GUARANTEE IS GIVEN THAT ALL EXISTING UTILITIES ARE SHOWN OR THAT THE GIVEN LOCATIONS ARE EXACT. CONFIRMATION OF EXISTENCE AND EXACT LOCATION OF ALL SERVICES MUST BE OBTAINED FROM THE INDIVIDUAL UTILITIES BEFORE PROCEEDING WITH CONSTRUCTION.

APEGM
Certificate of Authorization
AECOM Canada Ltd.
No. 4671 Date: 2013 Oct 15

B.M.
ELEV.

NO.	REVISIONS	DATE	BY
0	ISSUED FOR TENDER	2013/10/15	DRL

AECOM

DESIGNED BY	RT	CHECKED BY	CC
DRAWN BY	DRL	APPROVED BY	
HOR. SCALE:	NTS	RELEASED FOR CONSTRUCTION BY:	
VERTICAL:			
DATE	2013-07-12	DATE	

ENGINEER'S SEAL
PROVINCE OF MANITOBA
B.M. PETERSON
2013 Oct 15
REGISTERED PROFESSIONAL ENGINEER

CONSULTANT DRAWING NO.
60273041-SHT-01-CON3-M-0001.DWG

Winnipeg

THE CITY OF WINNIPEG
PUBLIC WORKS DEPARTMENT

PLESSIS ROAD TWINNING AND GRADE SEPARATION AT CN REDDITT SUBDIVISION CONTRACT 3

CITY DRAWING NUMBER: U238-2014-2341

SHEET 01 OF 05

MECHANICAL
LEGENDS, NOTES AND ABBREVIATIONS

M-0001 0

A1 - 841x594

2013-07-11

AECOM REVIEW | DRFT CHK

C:\DOCUMENTS AND SETTINGS\STEPNJAS\APPLICATION DATA\AUTODESK\C3D 2012\ENU\PLOTTERS\PLOT STYLES\D65C-H-B&C.CTB

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