Part 1 ADDENDUM NO.3

1.1 General

.1 This Addendum is issued prior to tender closing and shall become an integral part of the Tender, Specifications, Drawings and Contract Documents for this project.

.2 In the event of conflicts between the various Contract Documents, the order of precedence shall be as stipulated in the General Conditions of the Contract, except that this Addendum shall take overall precedence.

Part 2 Questions

Q: LEED is referenced throughout the specs. Is this a LEED Project?

A: No we will be LEED Shadowing the project

Q: In section 01 35 43 – 1.3.1 it mentions there is to be no burning of rubbish. On Section 31.11.00 – 2.1 #4 Says to "Dispose of unusable fell by burning or burying" Please advise.

A: No Burning or Burying on site all waste to be removed to local landfill

Q: Is the Culvert Material Polyethylene, corrugated steel, or Concrete?

A: Culvert Material is Corrugated Steel

Q: There is Rigid Insulation along the footings in the Garage, but not along the Foundation Walls. Is this accurate or an error?

A: Insulate the footings as per the Structural drawings and Geotechnical Report.

Q: The specification has a wood decking section (06 15 00), where on the building is this installed?

A: There is no Wood decking in the building

Q: The chain link fence at the RCMP Station is fastened with a base plate and anchor bolts (2/A4.4), is the fence at the garage fastened the same way?

A: No the Garage fence is conventional with buried posts

Q: Is the radio tower a guyed or self-supporting tower?

A: Tower is self-supporting

Q: What is the height of the radio tower?

A: The height of the radio Tower is 50'-0"

Q: What is the loading on the tower (antennas, etc.)?

A: The tower loading is to be the same as the attached tower from Churchill Manitoba with the exception being that the Island Lake Tower is 50'-0" Tall. Please note that in addition the tower the fall arrest equipment must be Ram Model 160389 (trolley /rail) fall Arrest.CSA Standard Z259.2.1 Class FRL. Previous Tower Manufacturers are WesTower and MAX Tower. Also note the tower is to be a design build by the tower manufacturer with the tower manufacturer supplying all drawings for both the tower and for the foundation system.

Q: Could you please specify what material is to be used for the blinds.

A: As per section 2.02 B we will be choosing one of the manufacturer's standard colors from the ranges shown in the specification a final decision has not yet been made at this time for the final fabric materials.

Part 3 Drawings

3.1 A2.2 Main Floor Plan – References

.1 Modified Millwork Tags

.2 See attached Drawing A2.2 Rev 02

3.2 M1.0 Main Floor Plumbing

.1 Only 1 hose reel required remove hose reel in room 132 hose reel in room 131 to remain.

.2 Modified LAV numbers in room 136 and 131 from LAV-3 to LAV-1

.3 Modified WC number in Room 136 to WC-1

.4 Added General Plumbing Note No. 5

.5 Modified Drawing Notes 11 and 12

3.3 M1.1 Crawl Space Plumbing

.1 Added expansion tank to Detail 2

.2 Added FD to plumbing fixture connection sizes

3.4 M2.0 – Main Floor Plan - HVAC

.1 Added return air ducts in room 101, 117, 114 and 118

.2 Modified air flows as noted

.3 Corrected locations of duct heaters room 120

.4 Corrected notes

.5 Added 1 KW baseboard C/W thermostat to room 117

.6 See attached M2.0 Rev 01

3.5 M2.2 – Mechanical Mezzanine and Garage Mechanical

.1 Added notes 9 and 10 to Detail 1

.2 See attached M2.2 Rev 01

3.6 M2.3 Details

.1 Added new diffuser to diffuser schedule

.2 Corrected drawing notes for detail 2 and 3

.3 Re-located duct heaters

.4 See attached M2.3 Rev 01

3.7 M3.0 – Main Floor Hydronics

.1 Clarified Hatch for Zone 6

.2 Clarified Hatch for Zone 5

.3 See attached M3.0 Rev 01

3.8 M5.0 – Schematics

.1 Updated Schematics

.2 See attached M5.0 Rev 01

Part 4 Specifications

4.1 Remove Section 22 42 02 – Plumbing Fixtures and insert new section as attached.

4.2 Remove Section 22 47 00 – Plumbing Equipment and insert new section as attached.

4.3 Remove Section 23 33 00 – Duct Work Accessories and insert new section as attached

4.4 Remove Section 23 34 16 – Exhaust Fans and insert new section as attached

4.5 Remove Section 23 54 10 – Fan Coils and Condensing Units and insert new section as attached

4.6 Remove Section 23 72 15 – Heat Recovery Ventilator and insert new section as attached

4.7 Remove section 25 90 00 – Sequence of Operations and insert new section as attached

Part 5 Detail Drawings - Volume 3 Specification Manual

5.1 Detail Drawing A1.06

.1 Add Note #10. All Steel to be Hot Dip Galvanized.

.2 Add Note #11. See Structural Sheet S1.1 Detail 7 for Concrete Details

5.2 Detail Drawing A2.02

.1 Delete Note No. 3

.2 Add Note No. 3: 12 Plywood

5.3 Detail Drawing A3.03

.1 Delete Note No. 12

.2 Add Note No. 12: 12 Plywood

5.1 Detail Drawing A3.04

.1 Delete Note No. 11

.2 Add Note No. 11: 12 Plywood

5.2 Detail Drawing A3.06

.1 Added 6 Mil AVB

.2 See attached detail A3.06 Rev 01

5.3 Detail Drawing A3.10

.1 Added 12 Plywood at Jamb

.2 See attached detail A3.10 Rev 01

5.4 Detail Drawing A3.12

.1 Remove Detail Drawing A3.12

.2 Insert New Detail Drawing A3.12 Rev 01

5.5 Detail Drawing A3.14

.1 Added Caulk at connection of siding and trim board.

.2 See attached detail drawing A3.14 Rev 01

5.6 Detail Drawing A3.17 and A3.19

.1 Added 6 Mil AVB

.2 See attached detail drawings A3.17 and A3.19 Rev 01

5.7 Detail Drawing A4.01

.1 Adjusted acoustic insulation details

.2 Detail Revised see attached A4.01 Rev 01

5.8 Detail Drawing A4.02

.1 Clarified slip joint at ceiling

.2 Detail Revised see attached A4.02 Rev 01

5.9 Detail Drawing A4.03

.1 Clarified slip joint at ceiling

.2 Detail Revised See attached A4.03 Rev 01

5.10 Detail Drawing A5.02

.1 Note 6 to read 6mil AVB

5.11 Detail Drawing A6.01

.1 Add Notes:

.1 Contractor to design ladder access to meet Workers Health and Safety requirements.
.2 Stringers and treads to Workers Health and Safety Requirements
.3 Supply Engineered sealed drawing for review prior to fabrication

.2 Add retractable post or grab bar at top of access ladder.

.3 Stringers to be round tube type.

5.12 Detail Drawing A7.21 and A7.21A

.1 All Hardwood to be Birch

.2 See revised detail drawings showing added stiffeners A7.21 Rev 01 and A7.21A Rev 01

5.13 Remove Detail Drawings A7.22, A7.23, A7.24 and A7.25

5.14 Insert Detail Drawings A7.22 Rev 01, A7.23 Rev 01, A7.24 Rev 01 and A7.25 Rev 01

5.15 Add Detail Drawings A7.41 and A7.42

Part 6 Clarifications and Additions

6.1 Note that as per section 07 21 016 Blanket Insulation - Roxul Mineral Fiber insulation is to be used for all Blanket insulation.

6.2 Glass Blocks for Windows for Rooms 127, 128, 129 and 130: To be Pittsburgh Corning "Vistabrik" Sand blast outer of outside course, Use Type "M" Mortar. No substitutions.

6.3 Steel Ruler in Room 133

.1 Standard of Acceptance: Oregon Wall Rule Model: SHR/FM-W1.5x80VU-TC, Security Height Rule, Inches/Feet and Centimeter graduations, 1 1/2" wide, reads 80"

6.4 Overhead Door: Door D36 to be 3962 wide x 3048 high.

6.5 NOTE: "Furniture purchases must be made through mandatory Standing Offers and/or Supply Arrangements with Public Works and Government Services Canada" See Website: http://publiservice.gc.ca/services/icpsss-spicsn/furniture/intro-e.html for more details.

6.6 Millwork Clarification:

.1 All the millwork in rooms 123, 135,137 and 138 are to have stainless steel countertops only all other millwork to be conventional. Stainless steel casework is not required in the project only stainless steel countertops.

6.7 Crawl Space Moisture Barrier

.1 Use Stego Wrap Vapour Barrier system under crawl space concrete slab. System to include Tape, Mastic, and barrier. System to be installed as per manufacturer's Instructions.

Part 7 Equals Requests

7.1 Reliable Overhead Door Systems Ltd. – Accepted See attached

7.2 Nu-West Construction Products – Accepted but the supplier is responsible for proving system proposed works as a complete system equal to the specified system as per Section 07 27 00.01 Part 2.1.2.

Part 8 Electrical

Drawing E1.1

Provide two additional poles and outdoor lighting fixtures along outside edges of lanes, at North end of site and South end of site. Adjust lighting locations shown for even spacing of fixtures. Provide one additional pole and outdoor lighting fixture appx 8m North of CSTE. Provide concrete bases for outdoor lighting poles. Bases to be minimum 450 diameter, bottom 2500 below grade, top 900 above grade, chamfered top edge, 6-15M vertical reinforcing and 10M ties on 305 centers, cast in anchor bolts and sleeves for wiring in and out.

For cabling and conduit outdoors, make provision for differential settling of earth, buildings, and other structures. Provide slack conductor length in wiring and cables, and expansion fittings in conduit.

Drawing E2.1

Provide occupancy sensors for lighting as follows. Occupancy sensors shall be dual technology passive infrared (PIR) and ultrasonic (US). Type OC1 shall be ceiling mount with gimbal adjustment. Type OC2 shall be suitable for wall mount or corner mount and shall be c/w power pack for switching circuits up to 20A. Type OC3 shall be a wall switch type sensor. Provide OC1 in rooms 102, 106 (two units), 116 (two units), 119, 122. Provide OC2 in rooms 101, 104, 107. Provide OC3 in rooms 108, 110, 111, 112, 113, 114, 123, 125, 126, 137. Type OC1 and OC2 shall be located for best coverage of rooms. Provide performance and features comparable to Douglas Diversa series. Products other than the named manufacturer are acceptable. Products shall be PowerSmart listed.

Drawing E3.1

Wire and connect ductless split system air conditioning unit AC-1 and corresponding condensing unit CU-4.

Mechanical shop drawings for the boiler system and associated circulation and zone pumps to be reviewed and submitted prior to ordering or installation of electrical for the system.

Provide cable tray in Room 117, lengthwise down center of room, min 2400AFF and max 2700 AFF. Coordinate with mechanical.

Receptacles in Room 117 shall be isolated ground. Provide J-hook adjacent to each ceiling receptacle for strain relief.

Wire and connect electric baseboard heater and remote TSTAT in Room 117. Provide 15A/1P circuit breaker in Panel D and 2-#12. See related mechanical entry in this Addendum.

Drawing E4.2

Luminaire Schedule: Revise Type L LED pole mount fixture to GLEON-AE-02-LED-E1-SL3 series.

Luminaire Schedule: Add Note 7: In areas with two lighting circuits per fixture, provide two ballasts per fixture for multi level lighting. Occupancy sensors in these areas shall be two pole.

Section 26 05 00 Common Work Results for Electrical

Add 2.10: This building is permitted to be of combustible construction. Per the NBC, wiring or cabling with combustible insulation, sheathes, or jackets shall be rated FT1, or enclosed in noncombustible raceway, or enclosed in nonmetallic raceway rated FT4. Wiring or cabling with combustible insulation, sheathes, or jackets that will be used to transmit data, voice, or sound and that are located in return air plenums shall be rated FT4 or enclosed in noncombustible raceway or enclosed in nonmetallic raceway rated FT4. All tbar ceiling areas are return air plenums.

Section 26 32 14 Power Generation Diesel - Winterized

See attached Request for Equivalent.

Section 28 31 01 Fire Detection and Alarm

Add item 3.1.13: For EST 6255-004 smoke detector guard, rotate conduit entrance cover 90 degrees to ensure no opening exists when installed.

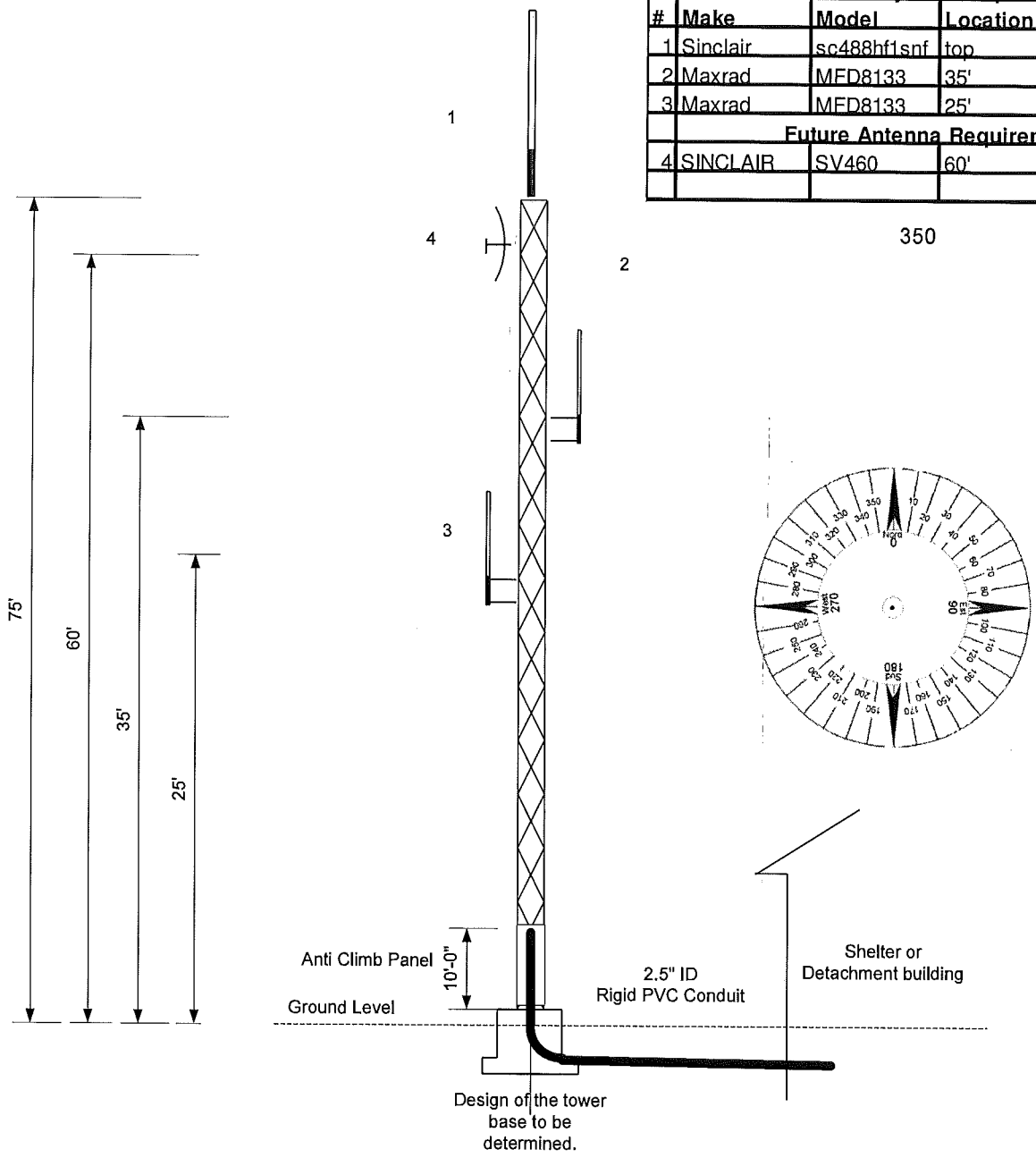
END OF SECTION

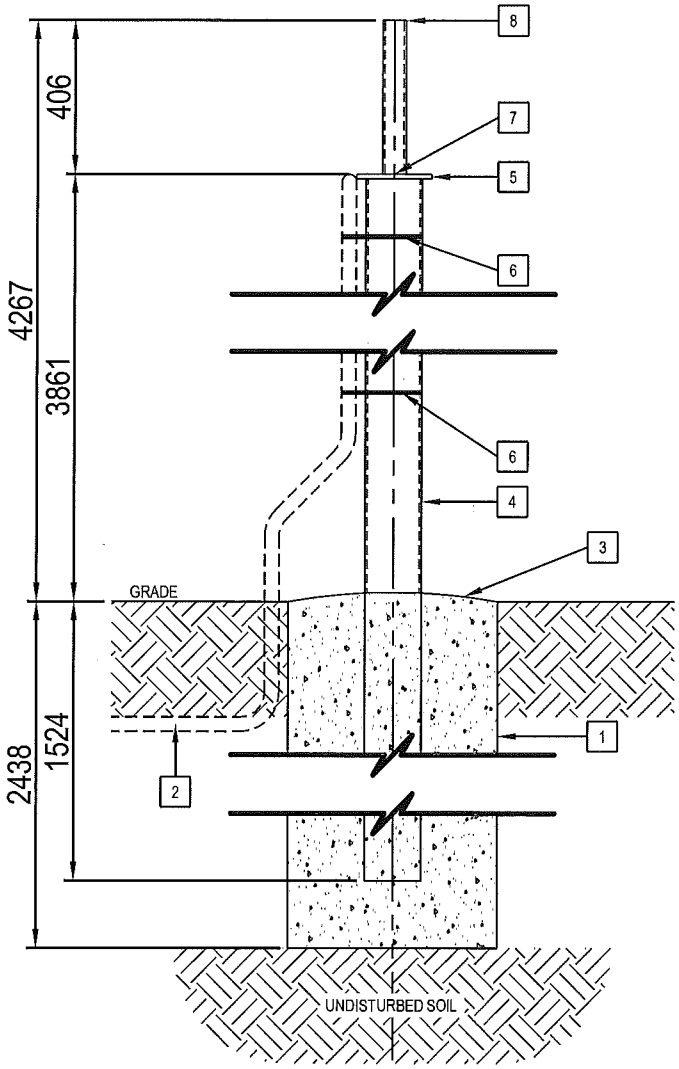
CHURCHILL

CHURCHILL				
	Lat:	N58-45-56	**Long:**	W094-09-42
	Wind:	600 pg	**Ice:**	40 mm
	Fall Arrest	Miller 8630-1	**Paint:**	NO
	Security	anti climb	**Lighting:**	NO
	Grounding	RCMP-CSS	**Cable:**	LMR 400
	TOWER	75'	**MODEL**	WESTOWER

Antenna System Required				
#	**Make**	**Model**	**Location**	**Bearing**
1	Sinclair	sc488hf1snf	top	center
2	Maxrad	MFD8133	35'	EAST
3	Maxrad	MFD8133	25'	EAST
	Future Antenna Requirement			
4	SINCLAIR	SV460	60'	TBD

350





NOTE:
1. ALL MATERIAL TO BE SHOP PRIMED AFTER SHOP WELDING.
2. ALL STEEL TO BE PAINTED BLACK (2 COATS)
3. DIMENSIONS ARE APPROXIMATE. TO BE VERIFIED ON SITE.
4. ALL PIPE TO BE SCHEDULE 40 UNLESS NOTED OTHERWISE (U.N.O.)
5. SECURELY WEATHERSEAL AROUND PENETRATION(S).
6. CONTRACTOR TO CARRY OUT ALL SERVICES LOCATES PRIOR TO INSTALLING MOUNT FOUNDATIONS.
7. PILE TO BE FOUNDED IN UNDISTURBED NATIVE MATERIAL WITH MINIMUM ALLOWABLE BEARING CAPACITY OF 1600 psf.
8. WHEN SONOTUBE IS REMOVED, ANY VOIDS AROUND PERIMETER OF CONCRETE PILE TO BE PATCHED WITH GROUT, SOIL SHALL BE GRADED SO THAT WATER FLOWS AWAY FROM PILE.
9. THE SITE SHALL BE LEFT IN A CLEAN AND NEAT CONDITION INCLUDING REMOVAL OF ALL EXCAVATED MATERIAL, AFTER ALL WORK HAS BEEN COMPLETED.
10. ALL STEEL TO BE GALVANIZED
11. SEE STRUCTURAL SHEET S1.1 DETAIL 7 FOR CONCRETE DETAILS

GROUND MOUNT FOUNDATION FOR ANTENNA

SCALE: 1:20

KEYNOTES:

1	559mmØ DRILLED CONCRETE CASSION 30 MPa CONCRETE, AIR ENTRAINED 5-7%, & 102mm SLUMP (± 25mm)
2	38mm I.D. BURIED PVC CONDUIT (IN TRENCH WHERE REQUIRED)
3	SLOPE TOP OF CONCRETE 25mm ± AWAY FROM POLE ALL AROUND
4	152mm SCH 40 PIPE (168 O.D.)
5	13mm PLATE WELDED ALL AROUND
6	CONDUIT STRAPPING (AS REQUIRED)
7	13mmØ DRAIN HOLE @ PLATE ELEVATION
8	64mm SCH 40 PIPE (73mm O.D.)

can tec
ENGINEERING AND DRAFTING
1948 MAIN STREET, WINNIPEG, MANITOBA Tel: (204) 943-7222 Fax: (204) 947-5717

PROJECT TITLE
ISLAND LAKE FACILITY BUILDING

SHEET TITLE
SATELLITE DISH DETAIL

DATE (YY MM DD)	SCALE	DRAWN BY	CHECKED BY
14 03 21	1:20	RS	RS

LOCATION
ISLAND LAKE, MANITOBA, CANADA

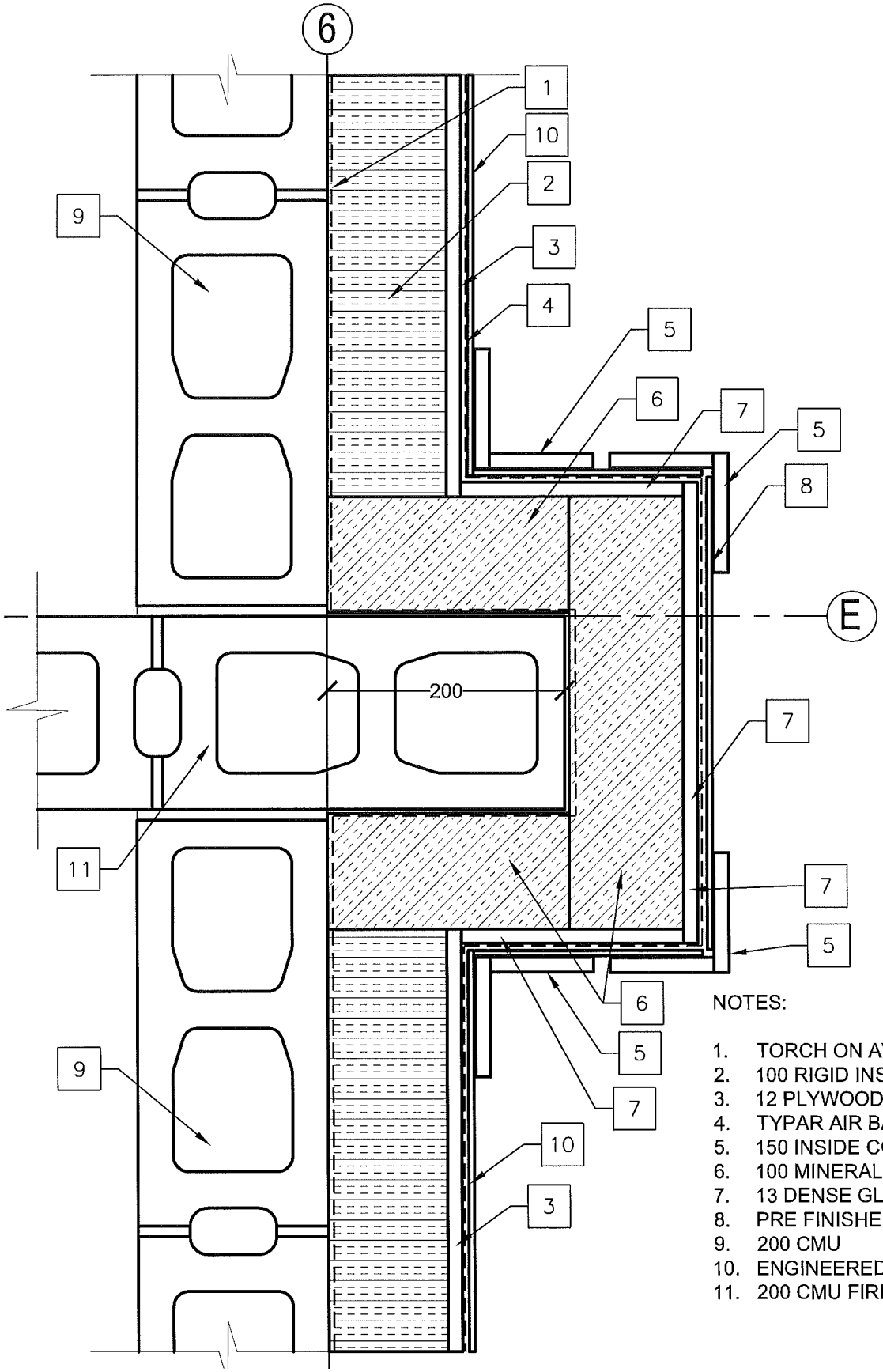
PROJECT TITLE
01

A1.06

JOB NO.
13-168-01-14

http://www.cantecservices.ca/

Last Save:2014-07-11 3:02 PM



NOTES:

1. TORCH ON AVB
2. 100 RIGID INSULATION
3. 12 PLYWOOD
4. TYPAR AIR BARRIER
5. 150 INSIDE CORNER BOARD
6. 100 MINERAL FIBER INSULATION
7. 13 DENSE GLASS
8. PRE FINISHED METAL CAP
9. 200 CMU
10. ENGINEERED SIDING
11. 200 CMU FIRE WALL

cantec
ENGINEERING AND DRAFTING
1948 MAIN STREET, WINNIPEG, MANITOBA Tel: (204) 943-7222 Fax: (204) 947-5717

PROJECT TITLE
ISLAND LAKE FACILITY BUILDING

REVISION NO. 01

SHEET TITLE
FIRE WALL DETAIL

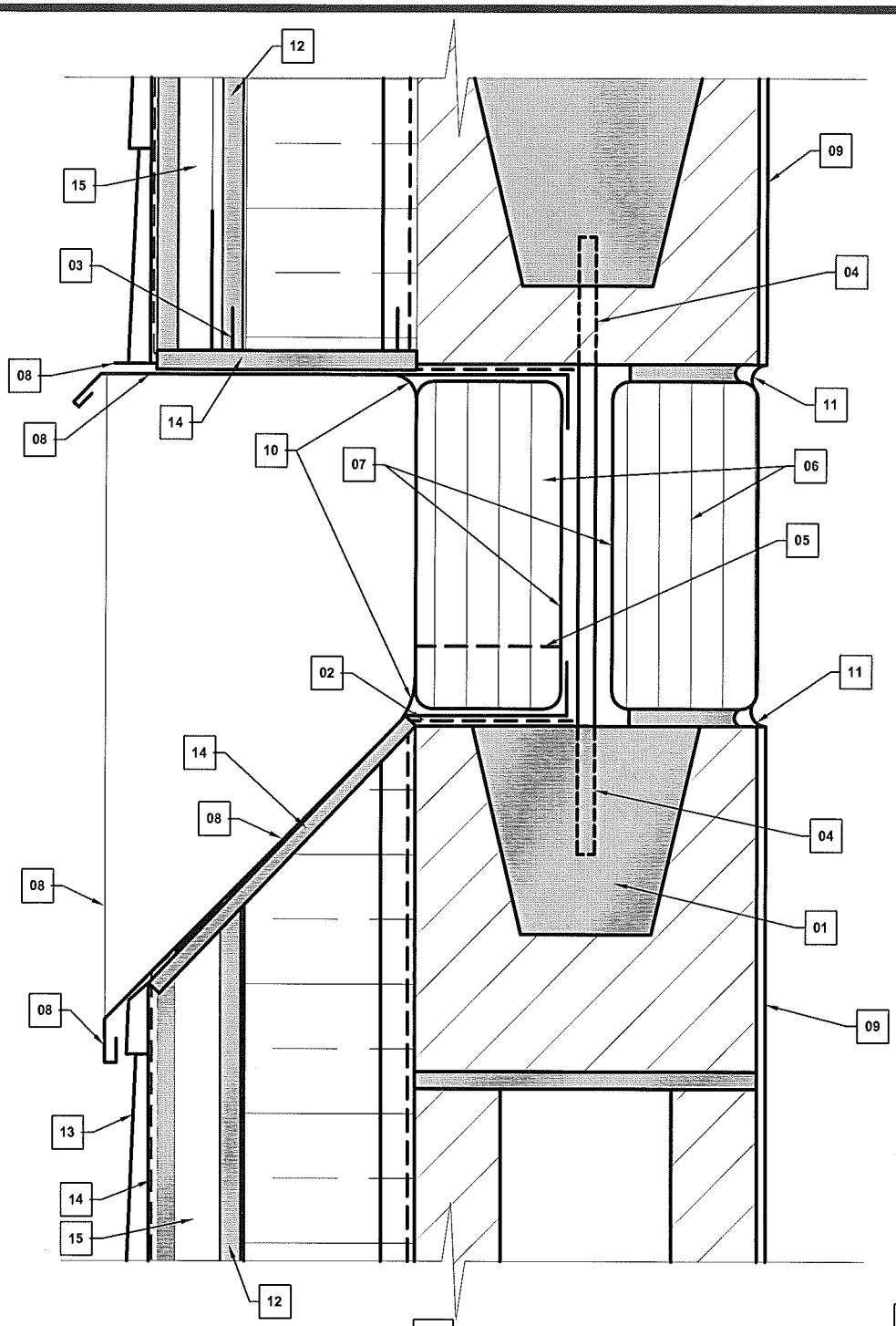
DATE (YY MM DD)	SCALE	DRAWN BY	CHECKED BY
14 03 21	1:25	RS	RS

LOCATION
ISLAND LAKE, MANITOBA

A2.02

JOB NO.
13-168-01-14

Last Save:2014-06-02 8:55 AM



KEYNOTES:

01	FILL CORE OF CONCRETE BLOCK WITH CONCRETE
02	AIR/VAPOUR BARRIER MEMBRANE CARRIED INTO ROUGH OPENING, AND OVER STEEL ANGLE
03	METAL CHANNELS, FRAMING OPENING
04	10M REINFORCING X 400mm LONG @ 200mm O.C., CENTRED ON EACH GLASS BLOCK
05	WEEPHOLE VENTS. PROVIDE TWO PER WINDOW OPENING IN VERTICAL JOINT
06	SOLID GLASS BLOCK UNITS
07	SANDBLAST THE INTERIOR FACE OF BOTH SIDES OF GLASS BLOCK
08	PRE-FINISHED METAL FLASHING
09	EPOXY COATING ON WALLS
10	SEALANT
11	EPOXY SEALANT
12	12 PLYWOOD
13	SIDING
14	AIR BARRIER
15	VERTICAL STRAPPING

can tec
ENGINEERING AND DRAFTING
1948 MAIN STREET, WINNIPEG, MANITOBA Tel: (204) 943-7222 Fax: (204) 947-5717

PROJECT TITLE
ISLAND.LAKE.FACILITY.BUILDING

REV.NO 01

SHEET TITLE
CELL GLASS BLOCK HEAD AND SILL

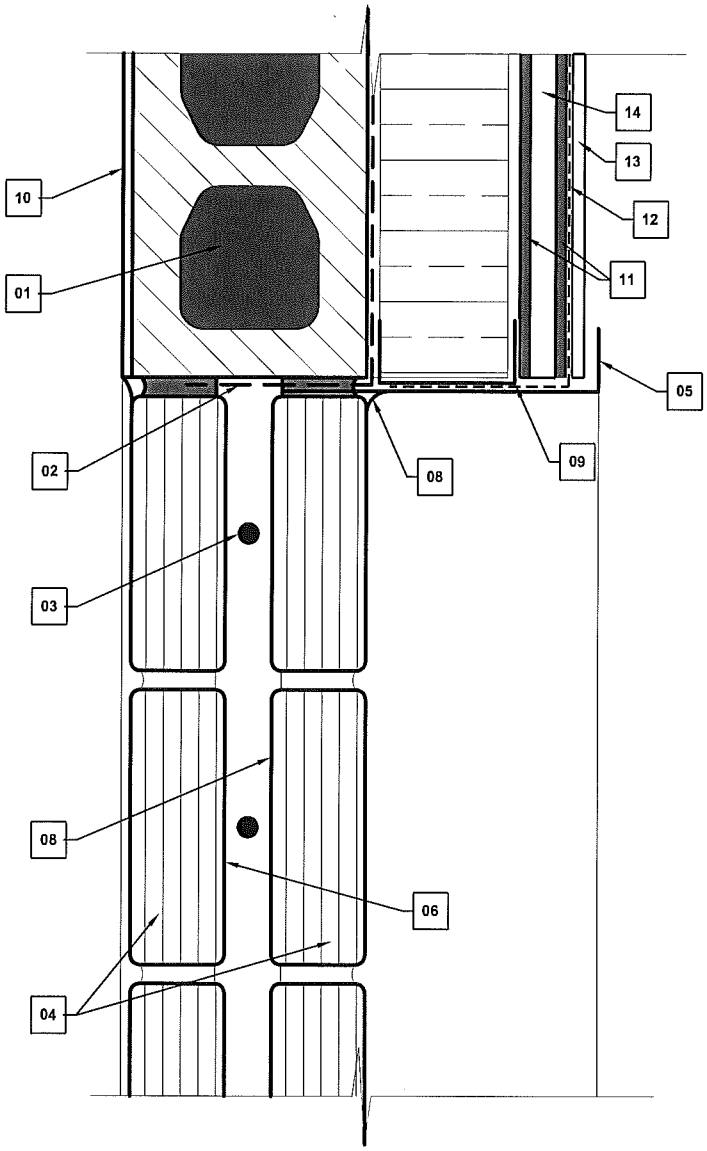
DATE (YY MM DD)	SCALE	DRAWN BY	CHECKED BY
14 03 21	N.T.S	RS	RS

LOCATION
ISLAND LAKE, MANITOBA

A3.03

JOB NO.
13-168-01-14

Last Save:2014-07-11 3:07 PM



KEYNOTES:

01	FILL CORE OF CONCRETE BLOCK WITH GROUT	06	ETCH OR SANDBLAST THE INTERIOR FACE OF BOTH WYTHES OF GLASS BLOCK	11	12 PLYWOOD
02	CARRY AIR/VAPUR BARRIER INTO ROUGH WINDOW OPENING AS SHOWN	07	EPOXY SEALANT	12	AIR BARRIER
03	10M REINFORCING X 400mm LONG @ 200mm O.C. CENTRED ON EACH GLASS BLOCK	08	SEALANT	13	SIDING
04	SOLID GLASS BLOCK UNITS	09	METAL CHANNELS, FRAMING OPENING	14	STRAPPING
05	PRE-FINISHED METAL FLASHING	10	EPOXY COATING ON WALLS		

cantec
ENGINEERING AND DRAFTING
1948 MAIN STREET, WINNIPEG, MANITOBA Tel: (204) 943-7222 Fax: (204) 947-5717

PROJECT TITLE
ISLAND LAKE FACILITY BUILDING

SHEET TITLE
CELL GLASS BLOCK WINDOW JAMB

DATE (YY MM DD)	SCALE	DRAWN BY	CHECKED BY
14 03 21	N.T.S	RS	RS

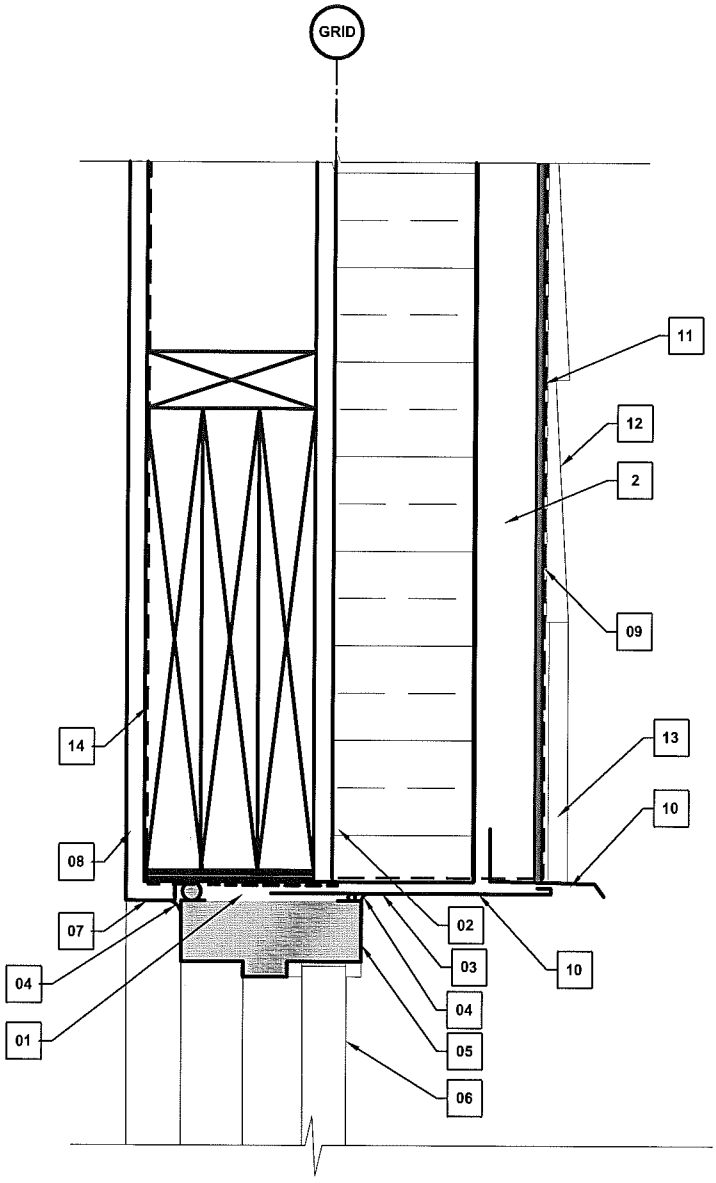
LOCATION
ISLAND LAKE, MANITOBA

REV.NO 01

A3.04

JOB NO.
13-168-01-14

Last Save:2014-05-12 4:48 PM



KEYNOTES:

01	FOAMED IN PLACE URETHANE INSULATION
02	VERTICAL STRAPPING
03	PRE-FINISHED METAL FLASHING
04	SEALANT AND FOAM ROD
05	PRESSED STEEL FRAME
06	EXTERIOR STEEL DOOR
07	CARRY GYPSUM BOARD INSIDE ROUGH OPENING
08	WOOD LINTEL
09	AIR BARRIER
10	PREFINISHED SHEET METAL FLASHING
11	13 PLYWOOD
12	SIDING
13	150 TRIM BOARD
14	6 MIL AVB

can tec
ENGINEERING AND DRAFTING
1948 MAIN STREET, WINNIPEG, MANITOBA Tel: (204) 943-7222 Fax: (204) 947-5717

PROJECT TITLE
ISLAND LAKE FACILITY BUILDING

SHEET TITLE
EXTERIOR DOOR HEAD

DATE (YY MM DD)	SCALE	DRAWN BY	CHECKED BY
14 03 21	N.T.S	RS	RS

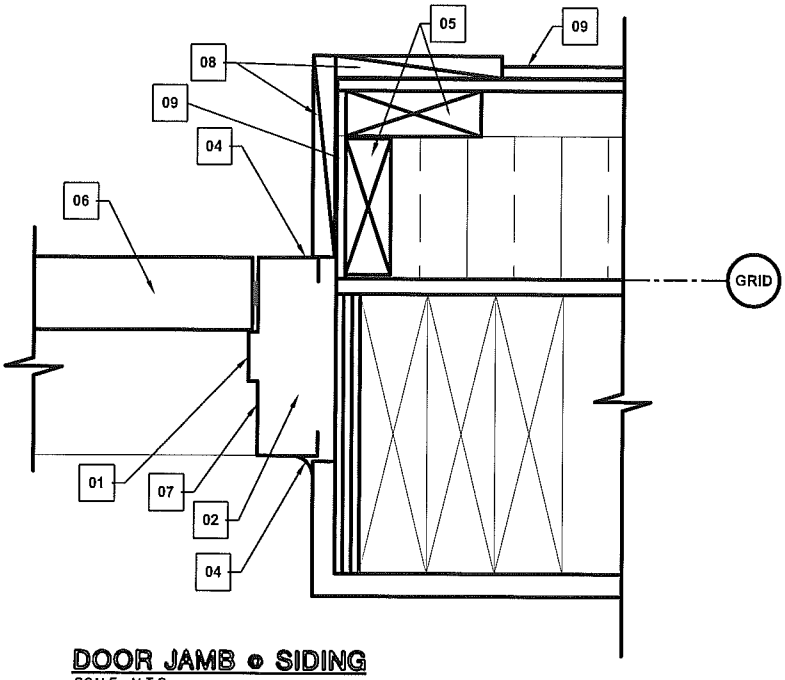
LOCATION
ISLAND LAKE, MANITOBA

REV.NO 01

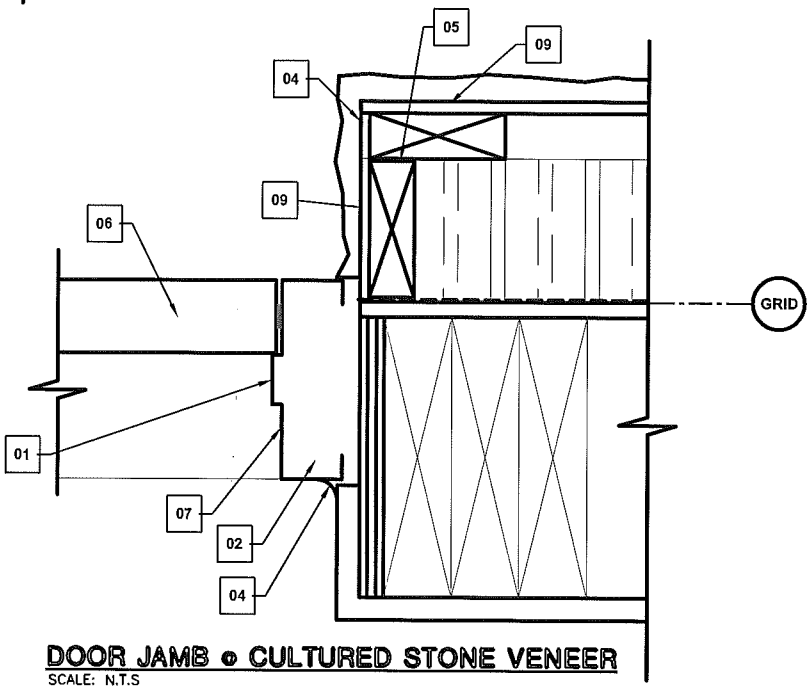
A3.06

JOB NO.
13-168-01-14

Last Save:2014-06-02 9:11 AM



DOOR JAMB @ SIDING
SCALE: N.T.S



DOOR JAMB @ CULTURED STONE VENEER
SCALE: N.T.S

KEYNOTES:

01	PRESSED STEEL FRAME, OFFSET FROM BUILDING FACE GROUT OR WEDGE IN AREA OF THE STRIKE BUCKET TO PREVENT SPREADING	05	WOOD BLOCKING	09	12 PLYWOOD
02	FOAMED-IN-PLACE URETHENE INSULATION	06	STEEL DOOR		
03	PREFINISHED METAL FLASHING	07	VERTICAL WOOD STRAPPING		
04	SEALANT	08	TRIM BOARD		

cantec
ENGINEERING AND DRAFTING
1948 MAIN STREET, WINNIPEG, MANITOBA Tel: (204) 943-7222 Fax: (204) 947-5717

PROJECT TITLE
ISLAND LAKE FACILITY BUILDING

SHEET TITLE
EXTERIOR DOOR JAMB AT WOOD STUD WALL

DATE (YY MM DD)	SCALE	DRAWN BY	CHECKED BY
14 03 21	N.T.S	RS	RS

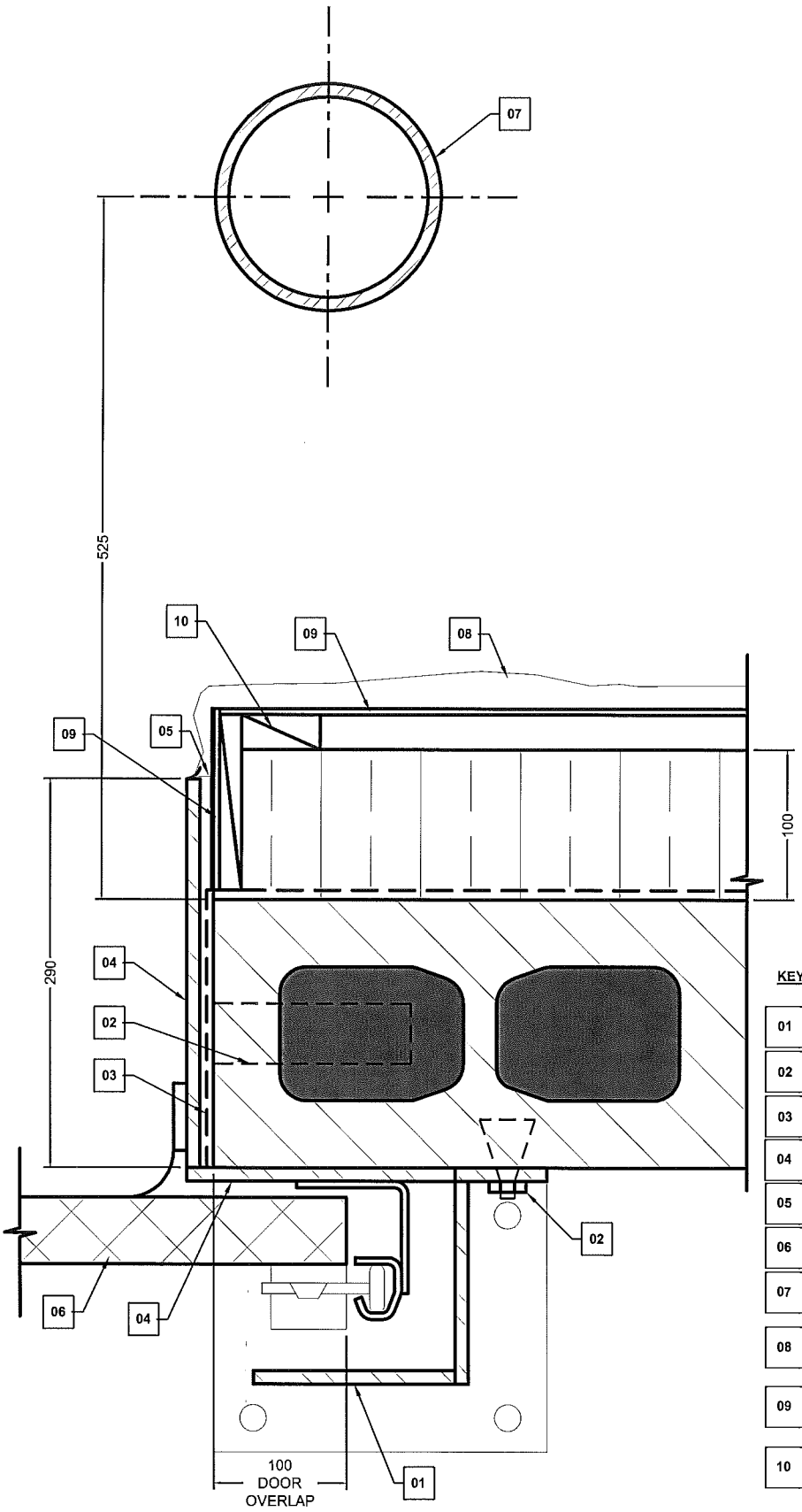
LOCATION
ISLAND LAKE, MANITOBA

REV.NO 01

A3.10

JOB NO.
13-168-01-14

Last Save:2014-07-11 3:18 PM



KEYNOTES:

01	5mm THICK STEEL FORMED SHEET, 1500mm HIGH TRACK GUARD FULLY WELDED TO STEEL BASE ANCHORED WITH 12mm DIAM. ANCHORS. PAINTED BRIGHT OSHA YELLOW
02	TRACK GUARD SECURED TO WALL WITH 4-9 mm DIAM ANCHORS
03	WRAP AIR/VAPOUR BARRIER AROUND JAMB OPENING
04	PAINTED 315 X 190 X 6 STEEL JAMB, FULL HEIGHT
05	SEALANT AND FOAM ROD
06	OVERHEAD DOOR
07	CONCRETE FILLED STEEL BOLLARD
08	CULTURED STONE
09	12 PLYWOOD
10	38 X 89 WOOD STRAPPING

cantec
ENGINEERING AND DRAFTING
1948 MAIN STREET, WINNIPEG, MANITOBA Tel: (204) 943-7222 Fax: (204) 947-5717

PROJECT TITLE
ISLAND LAKE FACILITY BUILDING

SHEET TITLE
OVERHEAD DOOR JAMB AT CULTURED STONE

DATE (YY MM DD)	SCALE	DRAWN BY	CHECKED BY
14 03 21	N.T.S	RS	RS

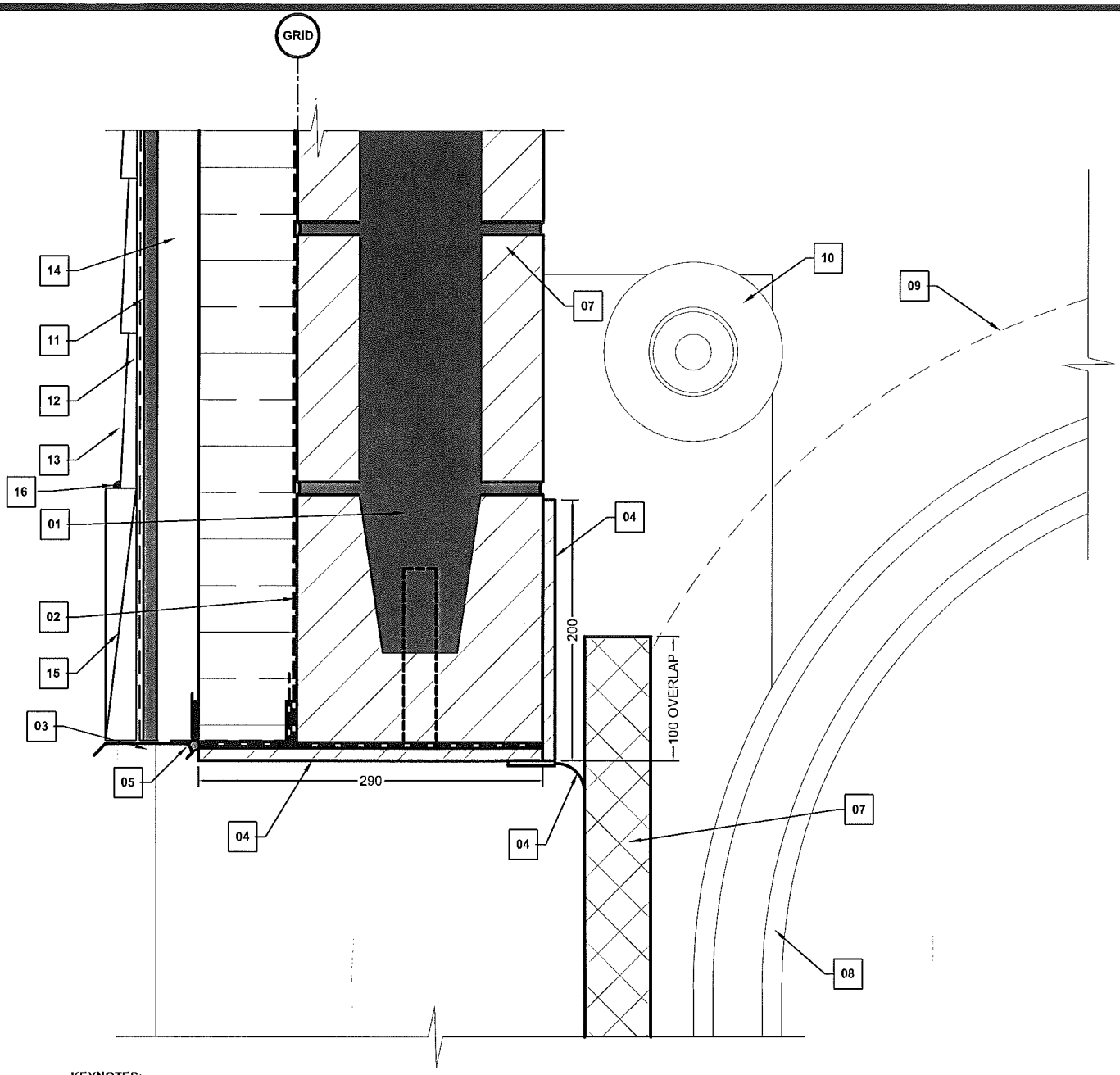
LOCATION
ISLAND LAKE, MANITOBA

REV.NO 01

A3.12

JOB NO.
13-168-01-14

Last Save:2014-07-11 3:25 PM



KEYNOTES:

01	CONCRETE BLOCK LINTEL - REFER TO STRUCTURAL
02	AIR/VAPOUR BARRIER MEMBRANE, CARRIED INTO ROUGH OPENING, AND OVER STEEL ANGLE
03	PRE-FINISHED METAL FLASHING
04	PRE-FINISHED 265 X 190 X 6 STEEL FRAME, FULL WIDTH - PAINTED
05	SEALANT AND FOAM ROD
06	WEATHER STRIPPING
07	OVERHEAD COILING DOOR
08	OVERHEAD DOOR TRACK
09	LINE OF DOOR TRAVEL
10	TORSION SPRING COUNTERBALANCE
11	13 PLYWOOD
12	AIR BARRIOR
13	ENGINEERED SIDING
14	VERTICAL STRAPPING
15	150 TRIM BOARD
16	CAULK TO SEAL

can tec
ENGINEERING AND DRAFTING
1948 MAIN STREET, WINNIPEG, MANITOBA Tel: (204) 943-7222 Fax: (204) 947-5717

PROJECT TITLE
ISLAND LAKE FACILITY BUILDING

SHEET TITLE
OVERHEAD DOOR HEAD

DATE (YY MM DD)	SCALE	DRAWN BY	CHECKED BY
14 03 21	N.T.S	RS	RS

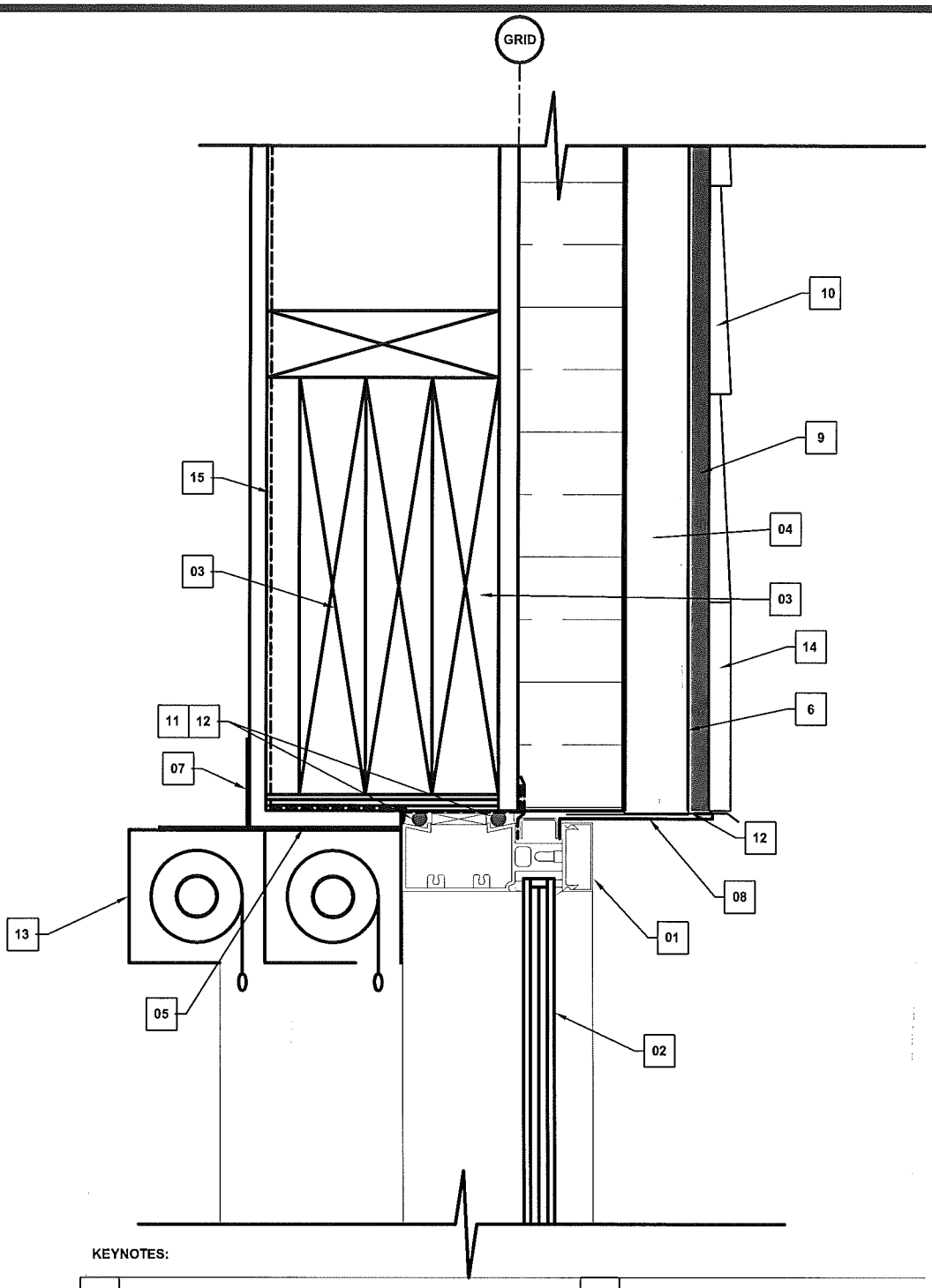
LOCATION
ISLAND LAKE, MANITOBA

REV.NO 01

A3.14

JOB NO.
13-168-01-14

Last Save:2014-07-11 3:41 PM



KEYNOTES:

01	ALUMINUM WINDOW	07	RIGHT ANGLE BRACKET, TO SUPPORT BLIND SYSTEM	13	BLINDS
02	SEALED TRIPPLE GLAZED GLASS UNIT	08	PRE-FINISHED METAL FLASHING	14	150 TRIM BOARD
03	WOOD LINTEL - REFER TO STRUCTURAL	09	13 PLYWOOD	15	6 mil AVB
04	VERTICAL STRAPPING	10	ENGINEERED SIDING		
05	CARRY GYPSUM BOARD INTO OPENING	11	FOAM ROD		
06	AIR BARRIER	12	SEALANT		

can tec
ENGINEERING AND DRAFTING
1948 MAIN STREET, WINNIPEG, MANITOBA Tel: (204) 943-7222 Fax: (204) 947-5717

PROJECT TITLE
ISLAND LAKE FACILITY BUILDING

SHEET TITLE
WINDOW HEAD

DATE (YY MM DD)	SCALE	DRAWN BY	CHECKED BY
14 03 21	N.T.S	RS	RS

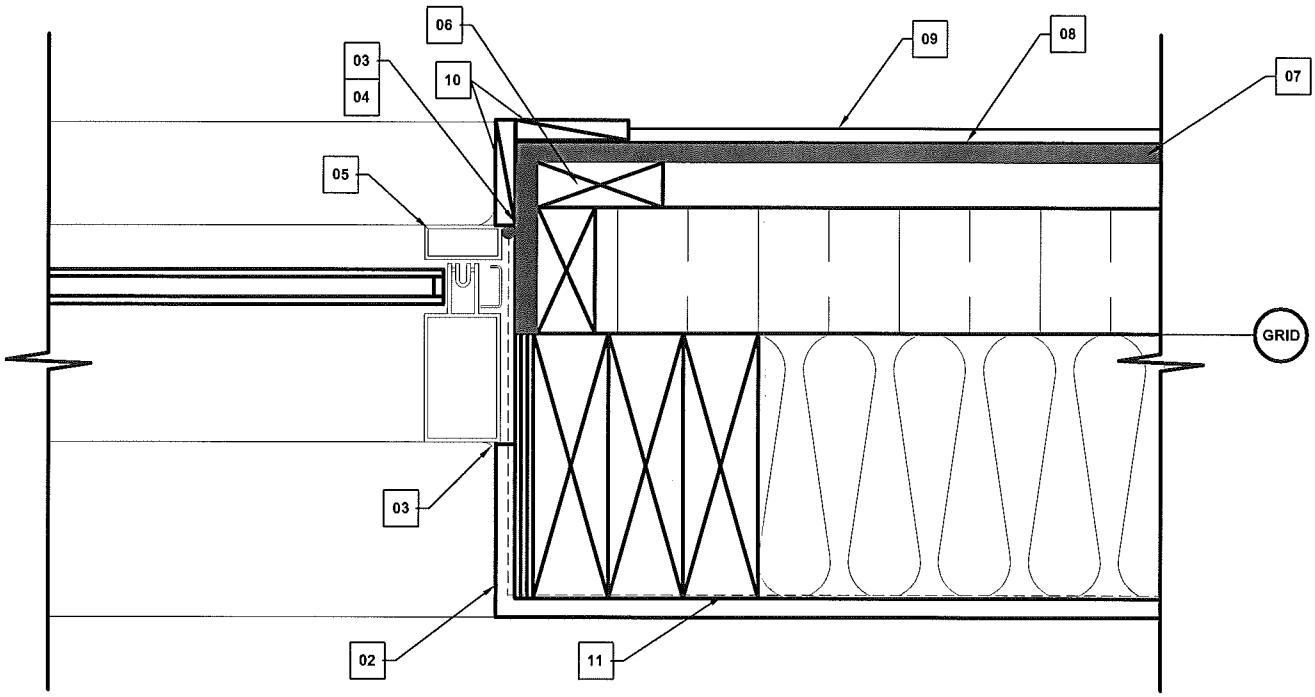
LOCATION
ISLAND LAKE, MANITOBA

REV.NO 01

A3.17

JOB NO.
13-168-01-14

Last Save:2014-06-02 10:39 AM



KEYNOTES:

01	EXTEND AIR/VAPOUR BARRIER INTO WINDOW FRAME & SECURE WITH ANTI-ROTATION BAR
02	CARRY GYPSUM BOARD INTO OPENING
03	SEALANT
04	FOAM ROD
05	ALUMINUM WINDOW
06	38X89 STRAPPING
07	13 PLYWOOD
08	AIR BARRIER
09	ENGINEERED SIDING
10	ENGINEERED TRIM BOARD
11	6 MIL AVB

cantec
ENGINEERING AND DRAFTING
1948 MAIN STREET, WINNIPEG, MANITOBA Tel: (204) 943-7222 Fax: (204) 947-5717

PROJECT TITLE
ISLAND LAKE FACILITY BUILDING

SHEET TITLE
WINDOW JAMB

DATE (YY MM DD)	SCALE	DRAWN BY	CHECKED BY
14 03 21	N.T.S	RS	RS

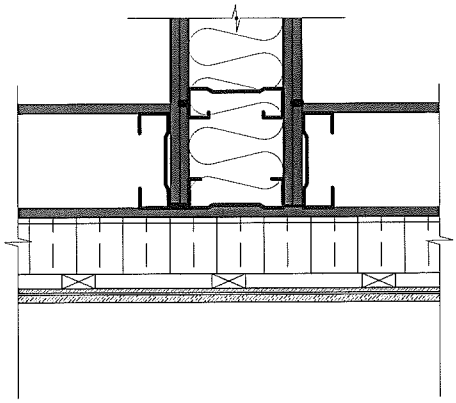
LOCATION
ISLAND LAKE, MANITOBA

REV.NO 01

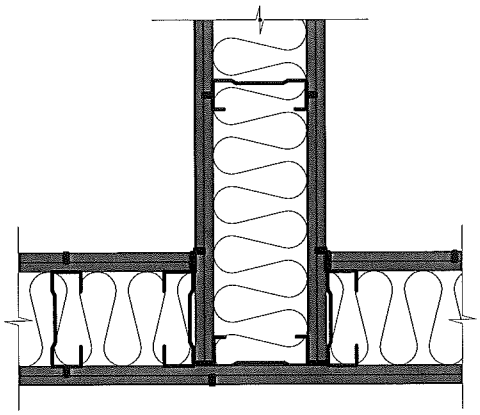
A3.19

JOB NO.
13-168-01-14

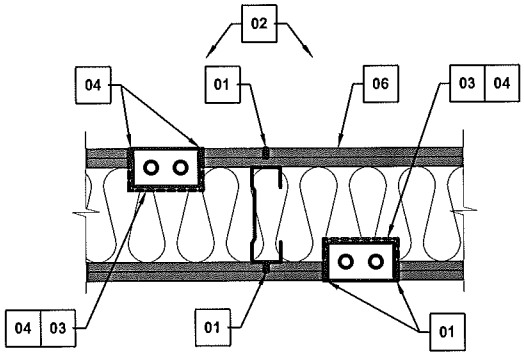
Last Save:2014-05-13 12:10 PM



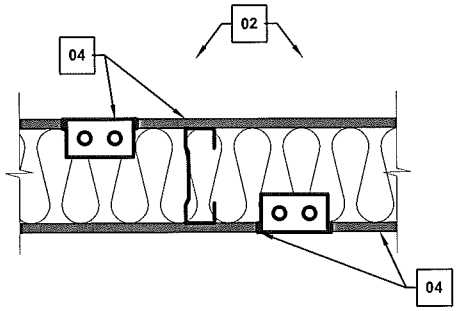
RATED ACOUSTIC PARTITION @ EXTERIOR WALL
SCALE: N.T.S



RATED ACOUSTIC, INTERIOR 'T' CONNECTION
SCALE: N.T.S

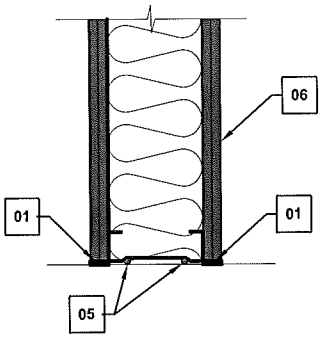


PLUG-INS WITHIN RATED ACOUSTIC PARTITION
SCALE: N.T.S



PLUG-INS WITHIN NON-RATED ACOUSTIC PARTITION
SCALE: N.T.S

GENERAL NOTED:
USE RESILIENT PIPE ATTACHMENTS FOR PLUMBING. DO NOT CONNECT OPPOSING LAYERS OF DRYWALL.



ACOUSTIC PARTITION CONNECTION
SCALE: N.T.S

STC 50 AND 53 RATED WALL ASSEMBLY BASED ON NATIONAL BUILDING CODE DESIGN #W6e AND W9c

KEYNOTES:

01	APPLY NON-HARDENING ACOUSTIC SEALANT TO PERIMETER OF EACH SHEET OF GYPSUM BOARD AND ANY WALL CONNECTIONS.
02	OFFSET ALL ELECTRICAL OUTLETS FROM ONE ANOTHER (EVEN IN UN-RATED PARTITIONS)
03	APPLY FLEXIBLE ACOUSTIC SHEETING TO BACK OF PLUG-IN BOX, SEAL AGAINST GYPSUM BOARD AND CONDUIT
04	APPLY SEALANT TO ANY PENETRATION THROUGH MEMBRANE AND/OR AROUND PLUG-IN BOX.
05	PLACE METAL STUD ON TWO BEADS OF ACOUSTIC SEALANT.
06	STAGGER 2ND LAYER OF GYPSUM BOARD JOINTS

cantec
ENGINEERING AND DRAFTING
1948 MAIN STREET, WINNIPEG, MANITOBA Tel: (204) 943-7222 Fax: (204) 947-5717

PROJECT TITLE
ISLAND LAKE FACILITY BUILDING

SHEET TITLE
ACOUSTIC PARTITION DETAILS

DATE (YY MM DD)	SCALE	DRAWN BY	CHECKED BY
14 03 21	N.T.S	RS	RS

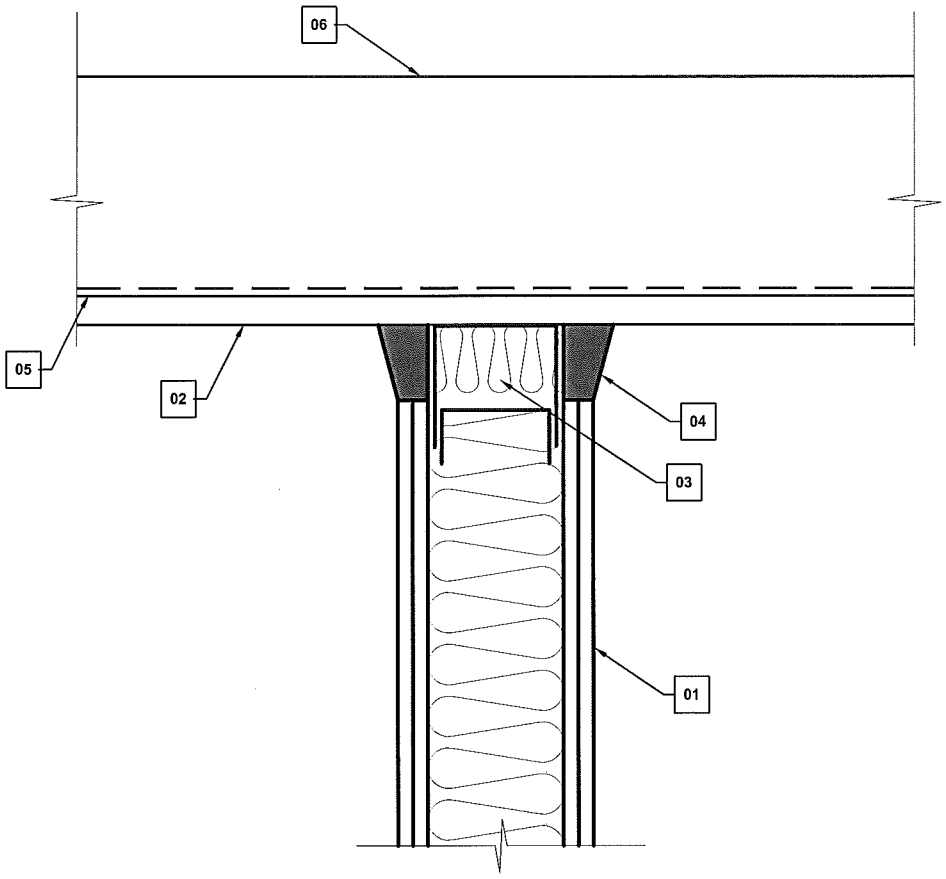
LOCATION
ISLAND LAKE, MANITOBA

REV.NO 01

A4.01

JOB NO.
13-168-01-14

Last Save:2014-06-04 9:26 AM



KEYNOTES:

01	FOR ACOUSTIC WALL TYPE - SEE PLANS
02	16mm F.G. DRYWALL
03	ACOUSTIC BATT INSULATION
04	ACOUSTIC SEALANT
05	6mil AVB
06	ROOF TRUSS

cantec
ENGINEERING AND DRAFTING
1948 MAIN STREET, WINNIPEG, MANITOBA Tel: (204) 943-7222 Fax: (204) 947-5717

PROJECT TITLE
ISLAND LAKE FACILITY BUILDING

SHEET TITLE
ACOUSTIC PARTITION AT U/S OF ROOF DECK

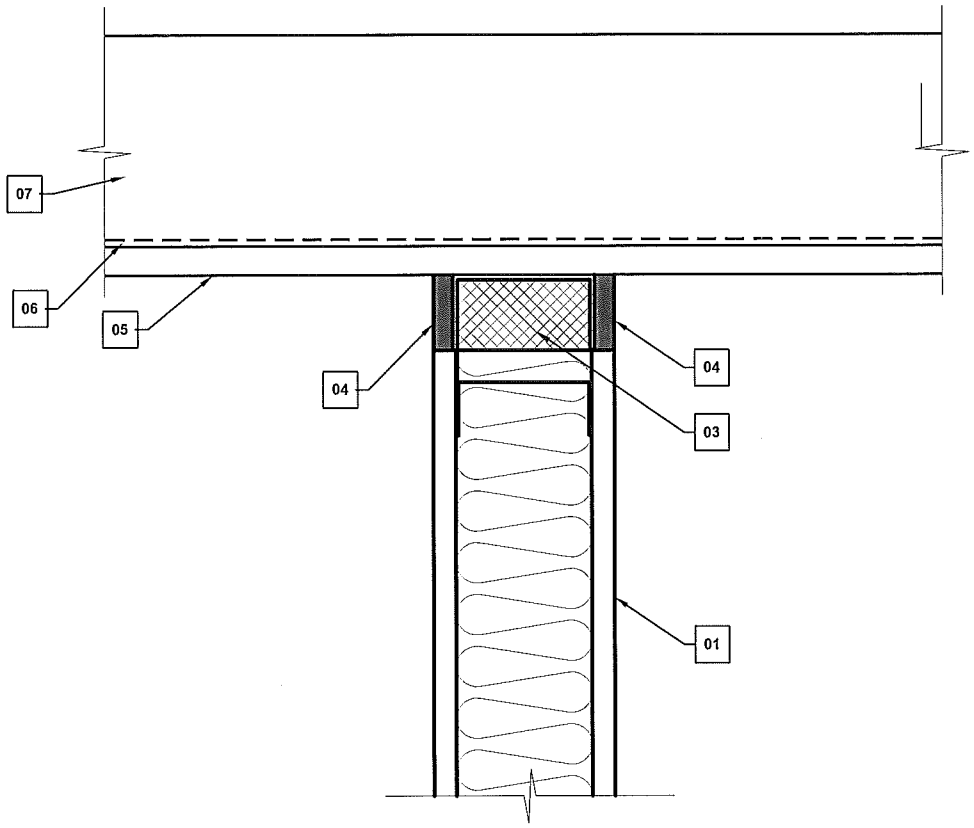
DATE (YY MM DD)	SCALE	DRAWN BY	CHECKED BY
14 03 21	N.T.S	RS	RS

LOCATION
ISLAND LAKE, MANITOBA

REV.NO 01

A4.02

JOB NO.
13-168-01-14



KEYNOTES:

01	FOR FIRE RATED WALL TYPE - SEE PLANS
02	PLYWOOD ROOF DECK - REFER TO STRUCTURAL
03	MINERAL FIBRE INSULATION
04	13mm THICK 3M FIRE STOP FB 2000 SEALANT OR HILTI CP 606 SEALANT
05	16mm F.G. DRYWALL
06	6mm AVB
07	ROOF TRUSS

cantec
ENGINEERING AND DRAFTING
1948 MAIN STREET, WINNIPEG, MANITOBA Tel: (204) 943-7222 Fax: (204) 947-5717

PROJECT TITLE
ISLAND LAKE FACILITY BUILDING

SHEET TITLE
FIRE RATED PARTITION AT U/S OF ROOF DECK

DATE (YY MM DD)	SCALE	DRAWN BY	CHECKED BY
14 03 21	N.T.S	RS	RS

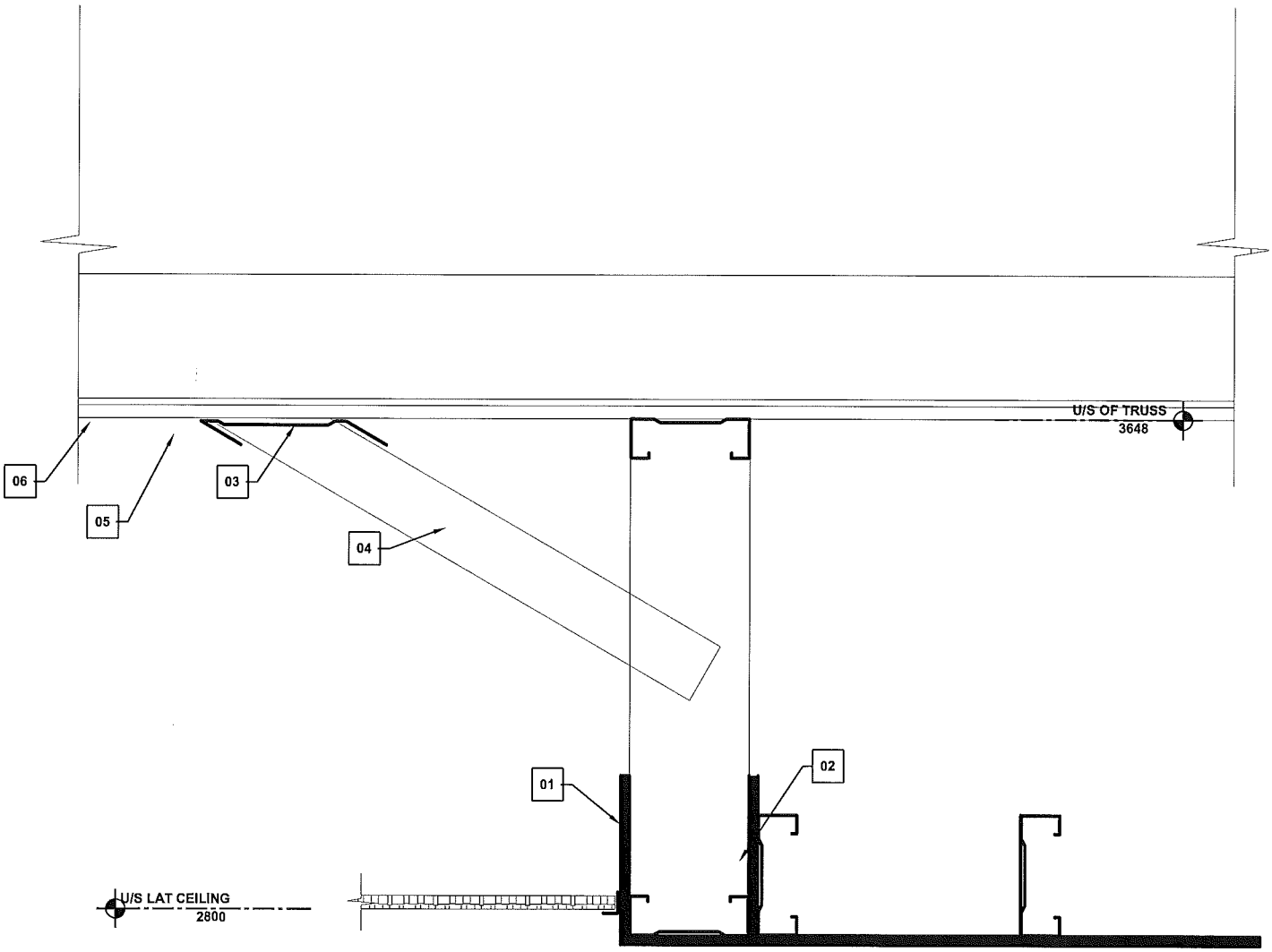
LOCATION
ISLAND LAKE, MANITOBA

REV.NO 01

A4.03

JOB NO.
13-168-01-14

Last Save:2014-06-02 10:54 AM



KEYNOTES:

01	13mm GYPSUM BOARD
02	152mm STEEL STUDS @ 400mm O.C.
03	152mm STEEL STUD TRACK, WITH FLANGES BENT
04	92mm STEEL STUD BRACING @ 800 O.C. WHEN LENGTH OF BULKHEAD IS OVER 1500mm
05	16mm DRYWALL
06	6mm AVB

cantec
ENGINEERING AND DRAFTING
1948 MAIN STREET, WINNIPEG, MANITOBA Tel: (204) 943-7222 Fax: (204) 947-5717

PROJECT TITLE
ISLAND LAKE FACILITY BUILDING

SHEET TITLE
BULKHEAD TRANSISION

DATE (YY MM DD)	SCALE	DRAWN BY	CHECKED BY
14 03 21	N.T.S	RS	RS

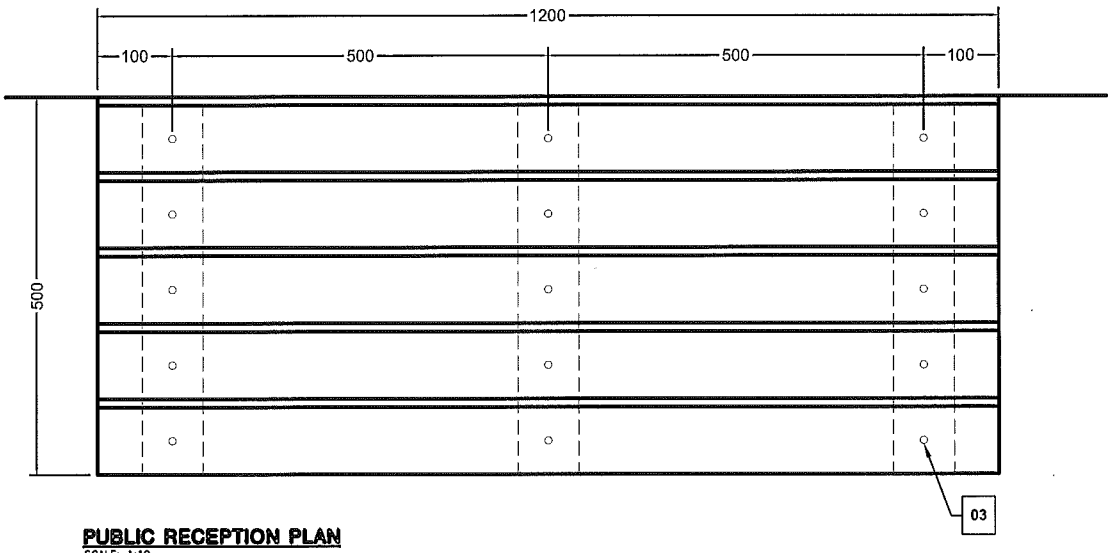
LOCATION
ISLAND LAKE, MANITOBA

REV.NO 01

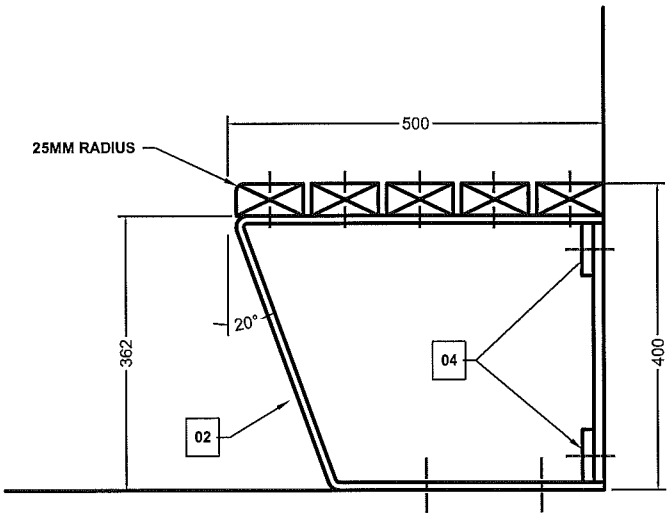
A5.02

JOB NO.
13-168-01-14

Last Save:2014-05-13 12:10 PM



PUBLIC RECEPTION PLAN
SCALE: 1:10



BENCH SECTION
SCALE: 1:10

KEYNOTES:

01	38 X 89 HARDWOOD, EASE CORNERS - CLEAR LACQUER FINISH
02	100 X 6 STEEL FLATBAR SUPPORTS MAX 1200 O.C. BOLTED TO FLOOR - POWDER COAT FINISH
03	10mm COUNTERSUNK CARRIAGE BOLTS
04	100 x 6 STIFFENING PLATE
05	SECURE TO WALL WITH 10MM BOLTS

can tec
ENGINEERING AND DRAFTING
1948 MAIN STREET, WINNIPEG, MANITOBA Tel: (204) 943-7222 Fax: (204) 947-5717

PROJECT TITLE
ISLAND.LAKE.FACILITY.BUILDING

SHEET TITLE
PUBLIC RECEPTION SEATING DETAILS

DATE (YY MM DD)	SCALE	DRAWN BY	CHECKED BY
14 03 21	N.T.S	RS	RS

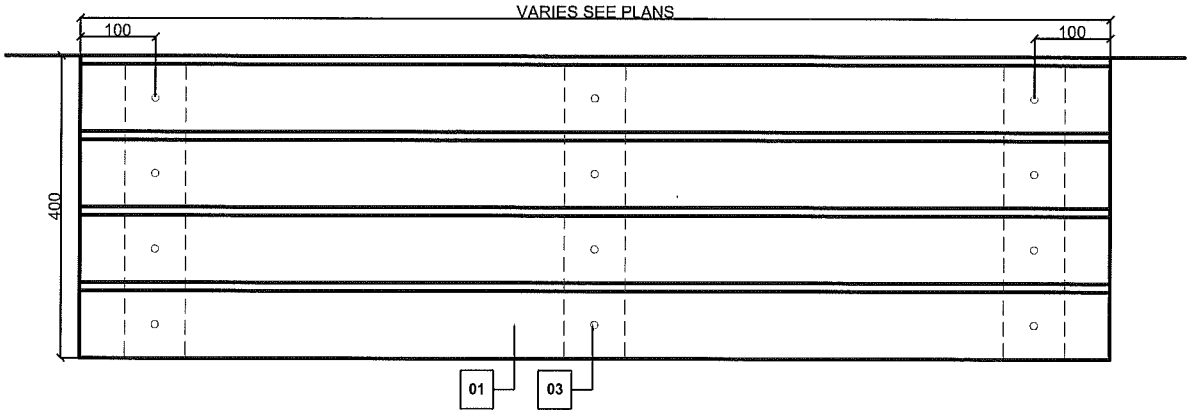
LOCATION
ISLAND LAKE, MANITOBA

REV.NO 01

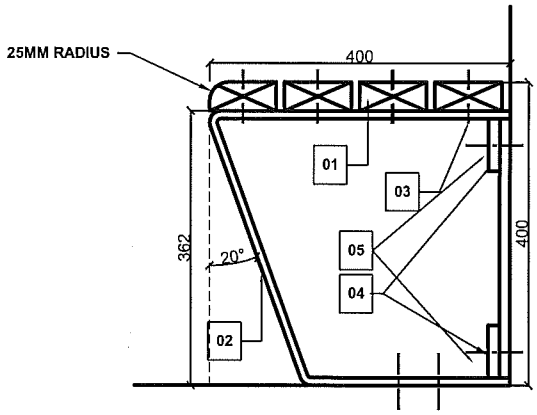
A7.21

JOB NO.
13-168-01-14

http://www.cantecservices.ca/



PLAN RM 110, 111, 113
SCALE: 1:10



BENCH SECTION
SCALE: 1:10

KEYNOTES:

01	38 X 89 HARDWOOD, EASE CORNERS - CLEAR LACQUER FINISH
02	100 X 6 STEEL FLATBAR SUPPORTS MAX 1200 O.C. BOLTED TO FLOOR - POWDER COAT FINISH
03	10mm COUNTERSUNK CARRIAGE BOLTS
04	100 x 6 STIFFENING PLATE
05	SECURE TO WALL WITH 10MM BOLTS

can tec
ENGINEERING AND DRAFTING
1948 MAIN STREET, WINNIPEG, MANITOBA Tel: (204) 943-7222 Fax: (204) 947-5717

PROJECT TITLE
ISLAND LAKE FACILITY BUILDING

SHEET TITLE
BENCH DETAIL RM 110, 111, 113

DATE (YY MM DD)	SCALE	DRAWN BY	CHECKED BY
14 03 21	N.T.S	RS	RS

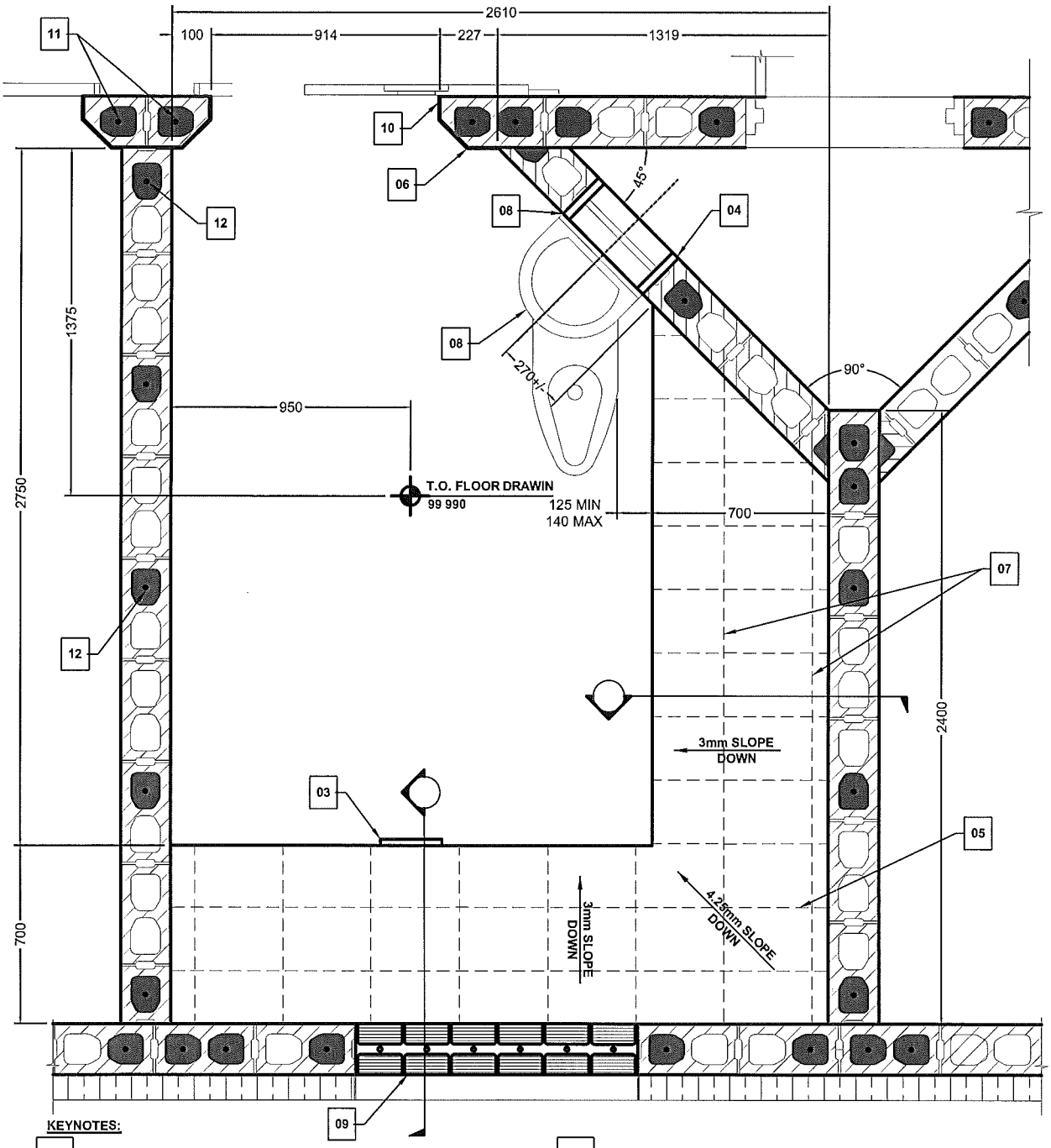
LOCATION
ISLAND LAKE, MANITOBA

REV.NO 01

A7.21A

JOB NO.
13-168-01-14

http://www.cantecservices.ca/



KEYNOTES:

01	SLOPE FLOOR TO DRAIN
02	FLOOR DRAIN C/W SECURITY SCREWS - REFER TO MECHANICAL DRAWINGS
03	SECURE S/A GRILLE CENTERED IN BUNK FACE
04	SECURITY SLEEVE - SET IN NON-SHRINK GROUT
05	10M REBAR @ 400 O.C.
06	EPOXY SEALANT, FULL PERIMETER OF FRAME, BOTH SIDES
07	10M CONTINUOUS REBAR TIED INTO WALL
08	EPOXY SEALANT
09	THREE, 200mm HIGH DIGITS PAINTED ON WALL 200mm BELOW GLASS BLOCK, DIGITS AS DIRECTED BY OWNER
10	MAX OF 3mm CLEARANCE BETWEEN DOOR AND FRAME
11	15M REBAR IN VOID, SURROUNDING FRAME. HIGH YIELD MORTAR FILL AROUND REBAR, AND 3 MORE VOIDS, SURROUNDING FRAME
12	15M VERTICAL REBAR, FROM FLOOR TO CONCRETE CEILING. HIGH YIELD MORTAR FILLED VOID - REFER TO STRUCTURAL

COORDINATE REINFORCING DETAILS WITH STRUCTURAL

can tec
ENGINEERING AND DRAFTING
1948 MAIN STREET, WINNIPEG, MANITOBA Tel: (204) 943-7222 Fax: (204) 947-5717

PROJECT TITLE
ISLAND.LAKE.FACILITY.BUILDING

SHEET TITLE
TYPICAL CELL FLOOR PLAN

DATE (YY MM DD)	SCALE	DRAWN BY	CHECKED BY
14 03 21	N.T.S	RS	RS

LOCATION
ISLAND LAKE, MANITOBA

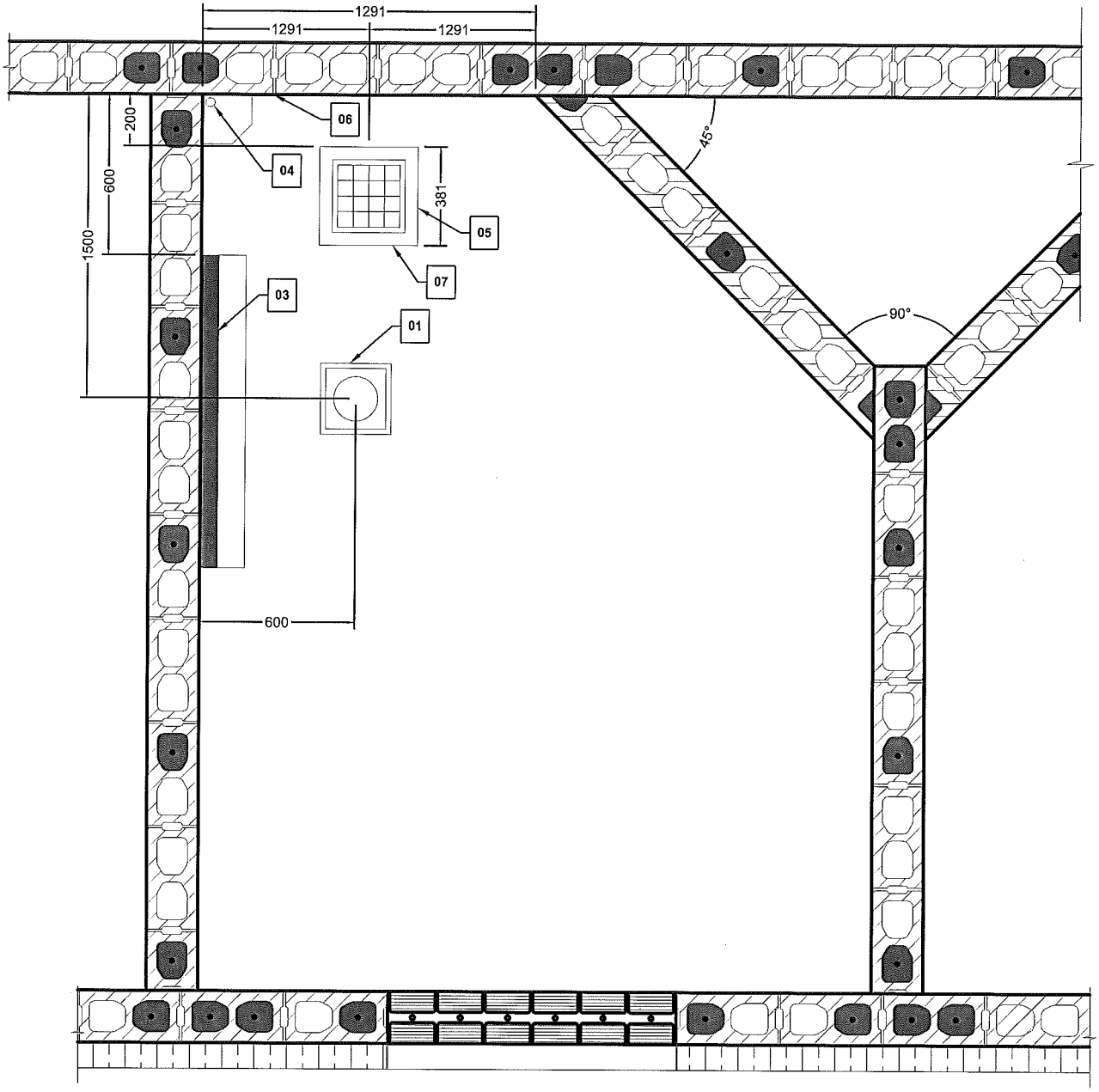
REV.NO 01

A7.22

JOB NO.
13-168-01-14

http://www.cantecservices.ca/

Last Save:2014-07-12 8:40 AM



KEYNOTES:

COORDINATE LOCATION FO ALL COMPONENTS WITH MECHANICAL & ELECTRICAL

KEYNOTES:

01	SMOKE DETECTOR & SECURITY CAGE. FILL GAPS BETWEEN MOUNTING PLATE AND CEILING WITH EPOXY SEALANT
02	NOT USED
03	LIGHT FIXTURE. EPOXY SEALANT TO PERIMETER OF
04	SUPPLY & INSTALL BATKO HOUSING AS PER DRAWING E3.1 NOTE 10
05	SECURE E/A GRILLE, EXHAUST DUCT
06	EPOXY SEALANT TO PERIMETER OF CCVE BRACKET
07	EPOXY SEALANT TO PERIMETER OF FLANGE

can tec
ENGINEERING AND DRAFTING
1948 MAIN STREET, WINNIPEG, MANITOBA Tel: (204) 943-7222 Fax: (204) 947-5717

PROJECT TITLE
ISLAND.LAKE.FACILITY.BUILDING

SHEET TITLE
TYPICAL CELL CEILING PLAN

DATE (YY MM DD)	SCALE	DRAWN BY	CHECKED BY
14 03 21	N.T.S	RS	RS

LOCATION
ISLAND LAKE, MANITOBA

REV.NO 01

A7.23

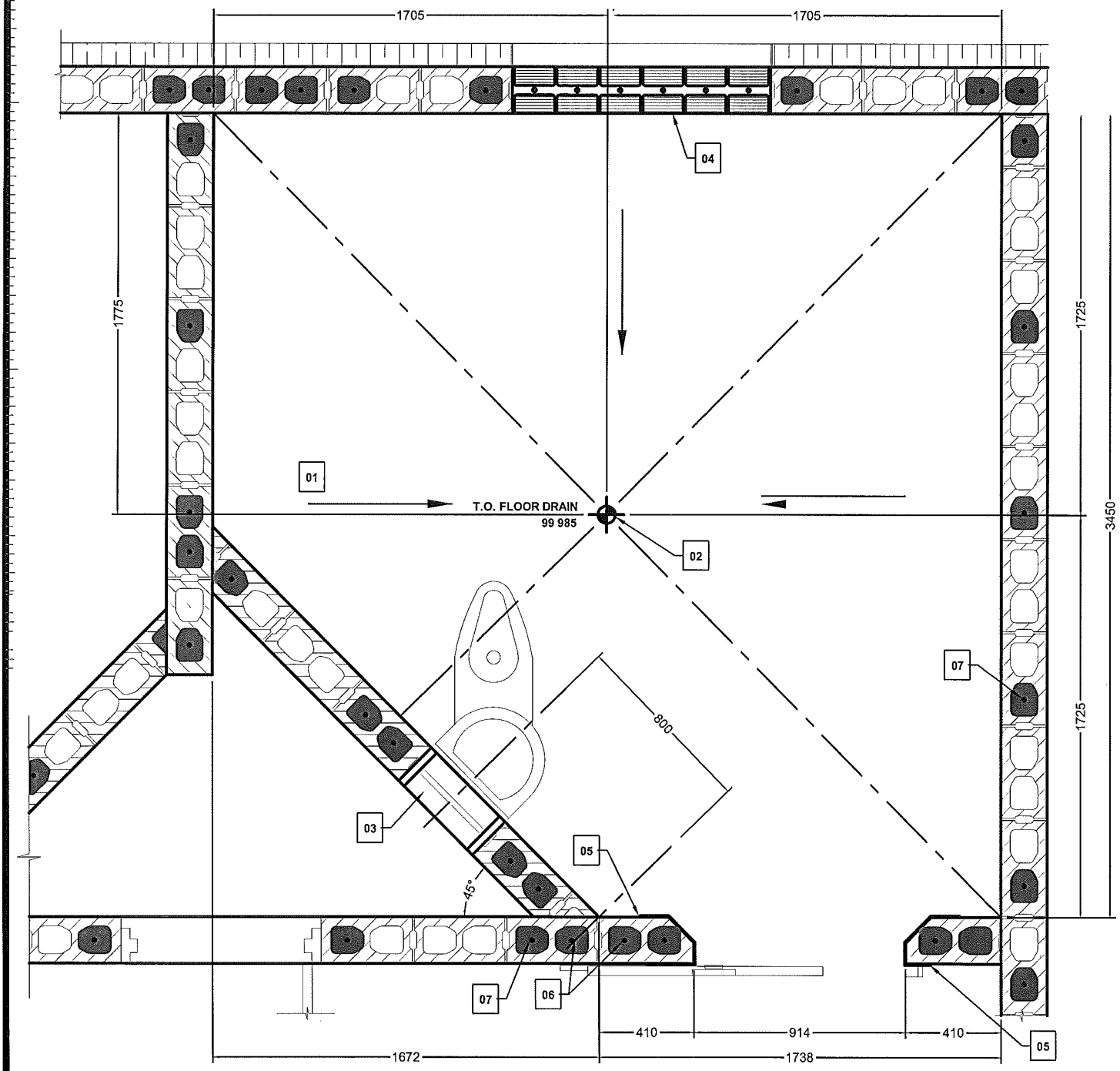
JOB NO.
13-168-01-14

THE GENERAL CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS PRIOR TO COMMENCEMENT OF WORK AND IS HELD RESPONSIBLE FOR REPORTING ANY DISCREPANCIES TO CAN-TEC SERVICES LTD. IMMEDIATELY

THIS DRAWING NOT TO BE SCALED.

http://www.cantecservices.ca/

Last Save:2014-06-02 1:33 PM



KEYNOTES:

01	SLOPE FLOOR TO DRAIN
02	FLOOR DRAIN C/W SECURITY SCREWS - REFER TO MEACHANICAL DRAWINGS
03	SECURITY SLEEVE - GROUT IN FRAME
04	THREE, 200mm HIGH DIGITS PAINTED ON WALL 200mm BELOW GLASS BLOCK, AS DIRECTED BY OWNER
05	EPOXY SEALANT, FULL PERIMETER OF FRAME, EACH SIDEM AND TOP OF HEADER CARRIAGE BOLTS
06	15M REBAR IN VOID, SURROUNDING FRAME. HIGH YIELD MORTAR FILL AROUND REBAR, AND 3 MORE VOIDS, SURROUNDING FRAME
07	15M VERTICAL REBAR, FROM FLOOR TO CONCRETE CEILING. HIGH YIELD MORTAR FILLED VOID - REFER TO STRUCTURAL

COORDINATE REINFORCING DETAILS WITH STRUCTURAL

can tec
ENGINEERING AND DRAFTING
1948 MAIN STREET, WINNIPEG, MANITOBA Tel: (204) 943-7222 Fax: (204) 947-5717

PROJECT TITLE
ISLAND.LAKE.FACILITY.BUILDING

SHEET TITLE
HOLDING CELL FLOOR PLAN

DATE (YY MM DD)	SCALE	DRAWN BY	CHECKED BY
14 03 21	N.T.S	RS	RS

LOCATION
ISLAND LAKE, MANITOBA

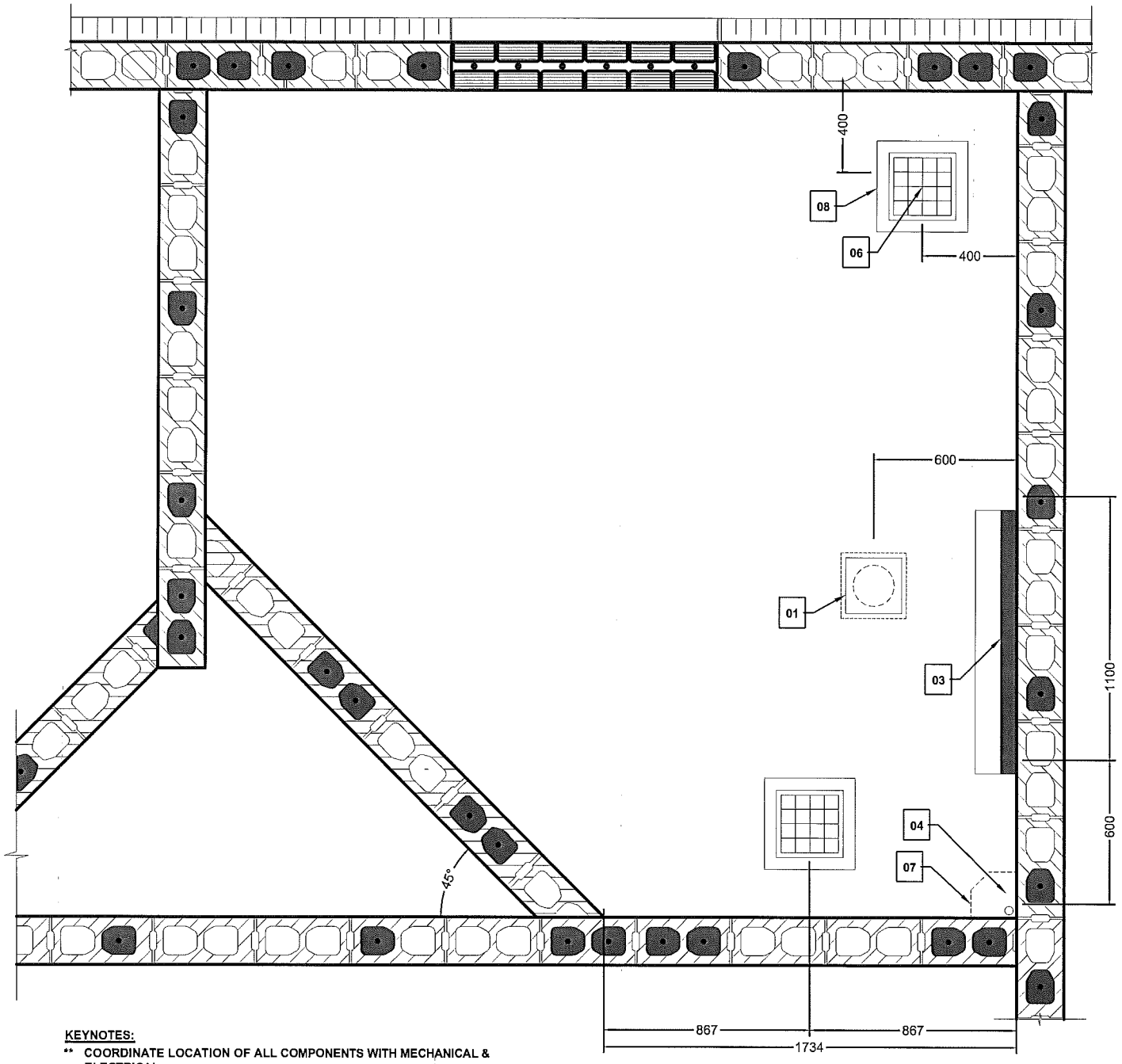
REV.NO 01

A7.24

JOB NO.
13-168-01-14

http://www.cantecservices.ca/

Last Save:2014-07-12 8:49 AM



KEYNOTES:

** COORDINATE LOCATION OF ALL COMPONENTS WITH MECHANICAL & ELECTRICAL

01	SMOKE DETECTOR & SECURITY CAGE. FILL GAPS BETWEEN MOUNTING PLATE AND CEILING WITH EPOXY SEALANT
02	NOT USED
03	LIGHT FIXTURE. EPOXY SEALANT TO PERIMETER
04	SUPPLY & INSTALL BATKO HOUSING AS PER DRAWING E3.1 NOTE 10
05	SECURE E/A GRILLE
06	SECURE S/A GRILLE
07	EPOXY SEALANT TO PERIMETER OF CCVE BRACKET
08	EPOXY SEALANT, TO PERIMETER OF FLANGE

can tec
ENGINEERING AND DRAFTING
1948 MAIN STREET, WINNIPEG, MANITOBA Tel: (204) 943-7222 Fax: (204) 947-5717

PROJECT TITLE
ISLAND.LAKE.FACILITY.BUILDING

SHEET TITLE
HOLDING CELL CEILING PLAN

DATE (YY MM DD)	SCALE	DRAWN BY	CHECKED BY
14 03 21	N.T.S	RS	RS

LOCATION
ISLAND LAKE, MANITOBA

REV.NO 01

A7.25

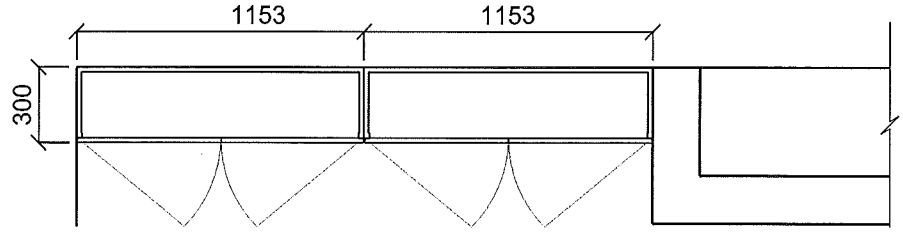
JOB NO.
13-168-01-14

THE GENERAL CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS PRIOR TO COMMENCEMENT OF WORK AND IS HELD RESPONSIBLE FOR REPORTING ANY DISCREPANCIES TO CAN-TEC SERVICES LTD. IMMEDIATELY.

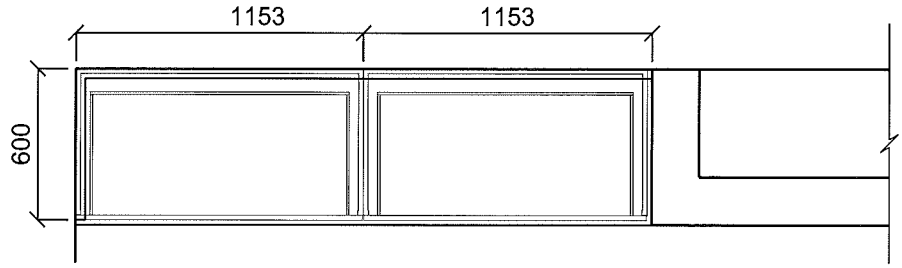
THIS DRAWING MUST NOT BE SCALED.

http://www.cantecservices.ca/

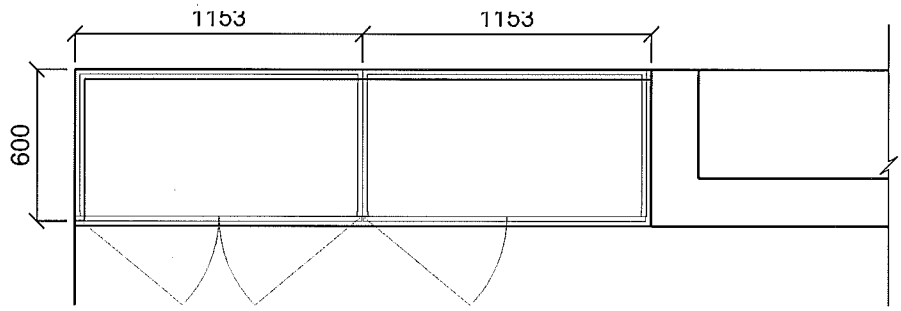
Last Save:2014-06-02 1:37 PM



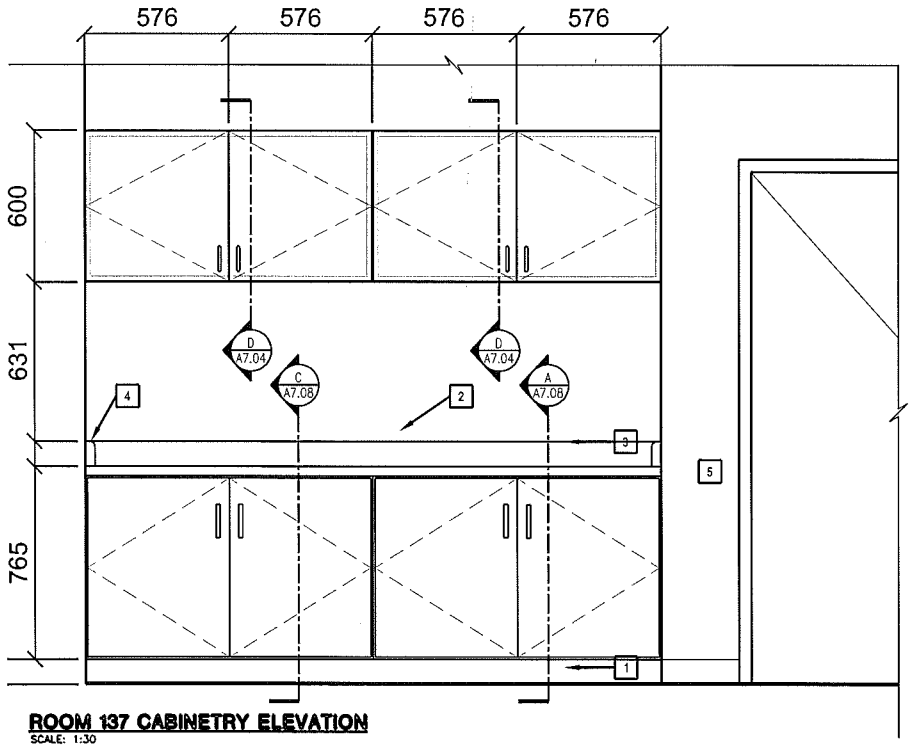
ROOM 137 UPPER CABINETRY
SCALE: 1:30



ROOM 137 BASE CABINETRY 1
SCALE: 1:30



ROOM 137 BASE CABINETRY 2
SCALE: 1:30



ROOM 137 CABINETRY ELEVATION
SCALE: 1:30

KEYNOTES:

1. RESILIENT BASE (100mm)
2. SEALANT @ ALL JOINTS
3. 100mm BACKSPLASH
4. 100mm SIDESPLASH @ CORNER LOCATIONS

can tec
ENGINEERING AND DRAFTING
1948 MAIN STREET, WINNIPEG, MANITOBA Tel: (204) 943-7222 Fax: (204) 947-5717

PROJECT TITLE
ISLAND LAKE FACILITY BUILDING

SHEET TITLE
ROOM 135 CABINETRY

DATE (YY MM DD)	SCALE	DRAWN BY	CHECKED BY
14 03 21	NTS	RS	RS

LOCATION
ISLAND LAKE, MANITOBA, CANADA

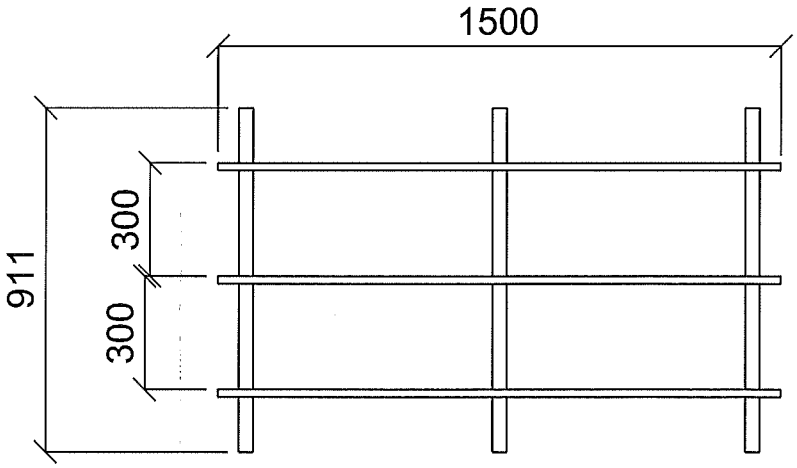
REVISION #: 00

A7.42

JOB NO.
13-168-01-14

http://www.cantecservices.ca/

Last Save:2014-07-13 1:48 PM



SHELVING TO BE 300 DEEP

cantec
ENGINEERING AND DRAFTING
1948 MAIN STREET, WINNIPEG, MANITOBA Tel: (204) 943-7222 Fax: (204) 947-5717

PROJECT TITLE
ISLAND LAKE FACILITY BUILDING

SHEET TITLE
TYPICAL SHELVING ROOM 114 AND 126

DATE (YY MM DD)	SCALE	DRAWN BY	CHECKED BY
14 03 21	NTS	RS	RS

LOCATION
ISLAND LAKE, MANITOBA, CANADA

REVISION #: 00

A7.43

JOB NO.
13-168-01-14

http://www.cantecservices.ca/

Last Save:2014-07-13 2:01 PM

Part 1 General

1.1 SECTION INCLUDES

.1 Water closets.

.2 Penal combi-units.

.3 Urinals.

.4 Lavatories.

.5 Sinks.

.6 Service sinks.

.7 Eye-wash

.8 Shower

.9 Hose Reel

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Administrative Requirements.

.2 Section 01 44 00 - Quality Assurance.

.3 Section 01 61 00 - Common Product Requirements.

.4 Section 01 78 10 - Execution Requirements.

.5 Section 07 92 00 - Joint Sealants: Seal fixtures to walls and floors.

.6 Section 23 05 29 - Supports And Anchors.

.7 Section 22 10 00 - Plumbing Piping.

.8 Section 22 42 01 - Plumbing Specialties.

.9 Section 22 47 00 - Plumbing Equipment.

.10 Section 26 05 80 - Equipment Wiring: Electrical characteristics and wiring connections.

1.3 REFERENCES

.1 ASME A112.6.1 - (Floor Affixed) Supports for Off-the-Floor Plumbing Fixtures for Public Use.

.2 ASME A112.18.1 - Plumbing Fixture Fittings.

□

.3 ASME A112.19.1 - Enamelled Cast Iron Plumbing Fixtures.

.4 ASME A112.19.2 - Vitreous China Plumbing Fixtures.

.5 ASME A112.19.3 - Stainless Steel Plumbing Fixtures (Designed for Residential Use).

.6 ASME A112.19.4 - Porcelain Enamelled Formed Steel Plumbing Fixtures.

.7 ASME A112.19.5 - Trim for Water-Closet Bowls, Tanks, and Urinals.

.8 NFPA 70 - National Electrical Code.

1.4 SUBMITTALS FOR REVIEW

.1 Section 01 33 00: Procedures for submittals.

.2 Product Data: Provide catalogue illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.

.3 Samples: Submit two lavatory supply fittings fixtures for colour matching sets of colour chips for each standard colour .

1.5 SUBMITTALS FOR INFORMATION

.1 Section 01 33 00: Procedures for submittals.

.2 Manufacturer's Instructions: Indicate installation methods and procedures.

1.6 SUBMITTALS AT PROJECT CLOSEOUT

.1 Section 01 78 10: Procedures for submittals.

.2 Maintenance Data: Include fixture trim exploded view and replacement parts lists.

.3 Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.7 QUALITY ASSURANCE

.1 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.8 REGULATORY REQUIREMENTS

.1 Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

1.9 DELIVERY, STORAGE, AND PROTECTION

.1 Section 01 61 00: Transport, handle, store, and protect products.

□

.2 Accept fixtures on site in factory packaging. Inspect for damage.

.3 Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

1.10 WARRANTY

.1 Section 01 78 10.

1.11 EXTRA MATERIALS

.1 Section 01 78 10.

.2 Supply two sets of faucet washers, Flush valve service kits, lavatory supply fittings, shower heads, toilet seats..

Part 2 Products

2.1 TANK TYPE WATER CLOSETS WC-1, 2, 3

.1 American Standard Cadet 3 right height elongated 419 mm high #2386.500.020 low consumption toilet, white vitreous china with Everclean antimicrobial surface, floor-mounted, siphon jet flush action, 6l per flush, raised sanitary bar and four point tank stabilization. Lined tank, unbolted tank cover, oversized flush valve with flapper, pilot valve water control (without float) for quiet refill, 12" rough-in, and 54mm fully glazed internal trapway, floor outlet, bolt caps. Centoco #820STSS.001 heavy duty toilet seat, for elongated bowl open front, white solid plastic, with cover, reinforced stainless steel check hinges, metal flat washers stainless steel posts and nuts. McGuire #H172BV toilet supply, chrome plated polished brass, ¼ turn ball valve angle stop, 13mm i.d. inlet x 127mm long rigid short horizontal integral copper sweat tube nipple, combination v.p. loose key handle, escutcheon and flexible copper riser. Floor flange (provide same material as connecting pipe drain) with all brass bolts and rubber gasket.

2.2 WATER/LAVATORY COMBO DF-1

.1 Combination water closet and lavatory for prison cell, floor type waste outlet one piece unit with welded components of 1.8mm 304 stainless steel with recessed paper holder. 1.8mm vertical cabinet enclosure reinforced with 3mm steel plate, angles and wall sleeve completely sound deadened. Exposed surfaces #4 finishes

.2 Water closet bowl: elongated, blowout type with back inlet and outlet, with integral flushing rim, complete with min. 76mm trap seal, capable of passing a 64mm ball and free of burrs, crevices and projections. Jet located at lowest point of upward leg trap.

.3 Lavatory top bowl: on piece of construction with perforated fast drain outlet and raised edges around rim and back, integral trap. Lavatory back with keyed depression for push button escutcheon and fastened with lock nut bo prevent removal from room side. Hot and cold vandal proof push button valves complete with lavatory spout. The water shall discharge from the spout in a downward direction and NOT upward.

□

.4 Self draining soap dish, no paper holders, nuts and mounting angles shall be included with the unit. No exposed fasteners in room allowed, all piping concealed.

.5 Concealed penal flushometer with remote controlled cast brass adjustable flush diaphragm valve, pressure loss check, vacuum breaker, renewable seat flush connection for 40 mm back spun and universal 25mm i.p./copper sweat inlet wheel handle angle stop

.1 Acceptable Materials

.1 Fixture: Acorn 1440

.2 Willoughby 1806 ECW-R/L-MOD-RCMP

2.3 WALL HUNG URINALS, U-1

.1 Urinal:

.1 Manufacturer: American Standard Model 6590.525 Ultra High Efficiency Urinal System.

.2 Other acceptable manufacturers offering equivalent products.

.1 Substitutions: Refer to Section 01 62 00.

.3 ASME A112.19.2; vitreous china, wall hung washout urinal with shields, integral trap, removable stainless steel strainer, 25 mm, top spud, steel supporting hanger.

.2 Exposed Flush Valve:

.1 Manufacturer: American Standard Selectronic Flush Valve.

.2 Other acceptable manufacturers offering equivalent products.

.1 Substitutions: Refer to Section 01 62 00.

2.4 LAVATORIES LAV-1, 2

.1 Vitreous China Counter Top Basin:

.1 Manufacturer: American Standard Aqualyn 0476028

.2 Substitutions: Refer to Section 01 62 00.

.2 Vitreous china, CSA B651 listed, self-rimming, with front overflow, gasket, swivel clamps, semi-oval or rectangular bowl, supply openings on 100mm centres. Sizes: 475 x 400 mm outside, 400 x 250mm nominal inside.

.2 Trim

.1 Moen M Dura 8228 chrome-plated cast brass 8"(400mm) widespread faucet. Handles shall be 4" wrist-blade with hot and cold indicators and affixed by vandal-resistant screws.

.3 Accessories:

.1 Chrome plated 1.3 mm brass P-trap with clean-out plug and arm with escutcheon.

.2 Offset waste with perforated open strainer plug and strainer.

.3 Screwdriver stops.

.4 Rigid supplies.

□

2.5 SINKS

.1 DOUBLE COMPARTMENT BOWL: S-1

.1 Manufacturer: Kindred LBD7508P-1/3

.2 Substitutions: Refer to Section 01 62 00.

.2 ASME A112.19.3; Double bowl sink with faucet ledge 18 GA SS. Self rimming. Exposed surfaces are satin finished. Spillway between bowls. Underside is fully sound dampened and undercoated. Complete with factory installed rim seal, installation kit and 3 ½" waste assembly. O.D. 56X84X20 cm outside dimensions. Faucet drilled for 3 hole 1 ½" diameter on 4" centers, 8" widespread.

.3 Trim:

.1 Manufacturer: DELTA 100LF-HDF

.2 Substitutions: Refer to Section 01 62 00.

.4 ASME A112.18.1; chrome plated brass supply with long swing spout, vandal proof water economy aerator with maximum 0.14 L/s flow, single lever handle.

.5 Accessories: 1.3 mm brass P-trap with clean-out plug and arm with escutcheon, wheel handle stop, flexible supplies.

.2 SINGLE COMPARTMENT BOWL: S-2

.1 Kindred Commercial LBS1306 S.S. sink, three hole with 4" centers, 8" wide spread , 15-7/16" x 15-1/6" x 6" (392mm x 384mm x 152mm) deep, counter mounted, back ledge, grade 18-8 type 302 stainless steel, single compartment, satin finished rim and bowl, self-rimming, with 1 1/2" (38mm)tail piece, sound deadening and mounting kit, 3-112" (89mm) crumb cup strainer with 1-112" (38mm) tail piece.

.2 Substitutions: Refer to Section 01 62 00.

.2 Trim:

.1 Moen model #8248 two handle faucet with 4" blades, brass construction with chrome plating, gooseneck swing spout, 2.2 GPM vandal proof aerator, and ceramic cartridge. Substitutions: Refer to Section 01 62 00.

.3 Accessories: 1.3 mm brass P-trap with clean-out plug and arm with escutcheon, wheel handle stop, flexible supplies.

.3 SINGLE COMPARTMENT BOWL: S-3

.1 Manufacturer: Kindred LBS4608P-1/3

.2 Substitutions: Refer to Section 01 62 00.

.2 ASME A112.19.3; Single bowl sink with faucet ledge 18 GA SS. 16" x 14" x 8" (406mm x 356mm x 203mm) deep. Self rimming. Exposed surfaces are satin finished. Underside is fully sound dampened and undercoated. Complete with factory installed rim seal, installation kit and 3 ½" waste assembly. Faucet drilled for 3 hole 1 ½" diameter on 4" centers, 8" widespread.

.3 Trim:

.1 Manufacturer: DELTA 100LF-HDF

.2 Substitutions: Refer to Section 01 62 00.

.4 ASME A112.18.1; chrome plated brass supply with long swing spout, vandal proof water economy aerator with maximum 0.14 L/s flow, single lever handle.

.5 Accessories: 1.3 mm brass P-trap with clean-out plug and arm with escutcheon, wheel handle stop, flexible supplies.

.4 SINGLE COMPARTMENT BOWL: S-4

.1 Manufacturer: Kindred LBS7808P-1/3

.2 Substitutions: Refer to Section 01 62 00.

.2 ASME A112.19.3; Single bowl sink with faucet ledge 18 GA SS. Self rimming. Exposed surfaces are satin finished. Spillway between bowls. Underside is fully sound dampened and undercoated. Complete with factory installed rim seal, installation kit and 3 ½" waste assembly. O.D. 43X71X20 cm outside dimensions. Faucet drilled for 3 hole 1 ½" diameter on 4" centers, 8" widespread.

.3 Trim:

.1 Manufacturer: DELTA 100LF-HDF

.2 Substitutions: Refer to Section 01 62 00.

.4 ASME A112.18.1; chrome plated brass supply with long swing spout, vandal proof water economy aerator with maximum 0.14 L/s flow, single lever handle.

.5 Accessories: 1.3 mm brass P-trap with clean-out plug and arm with escutcheon, wheel handle stop, flexible supplies.

2.6 SERVICE SINKS MS-1

.1 Bowl:

.1 Manufacturer: Crane: Model TSB-100

.1 Substitutions: Refer to Section 01 62 00.

.2 Trim:

.1 Manufacturer: Fiat 830-AA

.2 Other acceptable manufacturers offering equivalent products.

.1 Substitutions: Refer to Section 01 62 00.

.3 ASME A112.18.1 exposed wall type supply with lever handles, spout wall brace, vacuum breaker, hose end spout, strainers, eccentric adjustable inlets, integral screwdriver stops with covering caps and adjustable threaded wall flanges.

.3 Accessories:

.1 1.5 m of 13 mm diameter plain end reinforced plastic rubber hose.

.2 Hose clamp hanger.

.3 Mop hanger.

.4 Aluminum Bumper Guard

.5 Wall Guards

2.7 EMERGENCY EYE AND FACE WASH EW-1

.1 Manufacturer:

□

.1 Manufacturer: Haws Model 7360BT wall mount eyewash unit

.1 Substitutions: Refer to Section 01 62 00.

.2 ANSI Z358.1; wall-mounted, self-cleaning, non-clogging eye and face wash with quick opening, full-flow valves, stainless steel eye and face wash receptor, twin eye wash heads and face spray ring, stainless steel dust cover, copper alloy PVC control valve and fittings.

.3 Thermostatic Mixing valve:

.1 Haws #9201EW Emergency Supply Fixture For Eyewash/ Face wash, thermostatic temperature control valve, all brass and stainless steel design, with liquid-filled thermal motor, inlet check valve, safety shut-off should cold water supply fail, hot water failure will allow cold water flow through both the fixed and variable by-pass, outlet temperature gauge, 1/2" (13mm) NPT inlets and outlets. Tempered water factory set at 85°F (29°C) (Mixing Valve provides up to 7 GPM (26.6 LPM) at 30psi (246kPa) drop through valve), temperature range 70°F (21°C) to 90°F (32°C) with set point at 85°F (29°C).

.2 Cold water bypass, positive shut off on cold water failure, capacity of 38 litres per minute(10 gpm), dial thermometers reading 0 degree C to 50 degree C and union angle check stops on inlets

.3 Certified by CSA to meet ANSI Z358.1 Standard for emergency eyewash and shower equipment.

.4 Dust Cover

2.8 SHOWER SH-1

.1 Fiat Model: A6036.05LF100 1-Piece Acrylic Shower High gloss acrylic with fiberglass reinforcement Fold-up wheelchair seat Integrally molded soap dish and shelves 1-3/4" (44mm) Threshold (1) - 30" (76mm) x 1-1/2" (38mm) horizontal stainless steel grab bar (side wall) (1) - 48" (1219mm) x 1-1/2" (38mm) horizontal stainless steel grab bar (back wall) (1) - 1" (25mm) stainless steel curtain rod. Safety-textured floor pattern.

.2 Trim: Delta Model T17TH335 TempAssure® 17T Thermostatic cartridge • Thermostatic wax element maintains the outlet temperature to +/- 3.6 F • Polished chrome plated finish • Non-removeable red/blue temperature markings • Separate ROUGH-IN – R10700-UNWS required • ADA Compliant diverter handle • ADA Compliant lever volume control, field adjustable to limit rotation into hot water zone; temperature adjustment dial • In-wall diverter valve (R10700-UNWS ROUGH-IN) • Standard 24" Stainless Steel Bar with ADA Slide Handshower with Push Button Pause • Handshower Flow Rate MAX: 2.5 GPM @ 80 PSI (9.5 L/min @ 552 kPa) • Handshower Flow Rate MIN: 2.4 GPM @ 45 PSI (9.1 L/min @ 310 kPa) • Backflow protection provided by two integral check valves in handshower • Handle#: 5 - Metal Lever Volume Control Handle w/Temperature Adjustment • #3 Shower - Touch Clean™ Showerhead, Arm and Flange • #3 Shower Flow Rate MAX: 2.0 GPM @ 80 PSI (7.6 L/min @ 552 kPa) • #3 Shower Flow Rate MIN: 1.8 GPM @ 45 PSI (6.8 L/min @ 310 kPa)

2.9 SHOWER SH-2

.1 Acorn Model 17413-1750, recessed rear-mount penal shower head complete with following features: triple chrome plated brass construction, vandal resident, tapered body,

non-removable spray head complete with 0.16 lps flow rate. Nominal 30 degree angle spray complete with adjustable spray pattern. Stainless steel back plate. Provide rear access.

.2 Trim: Acudor Acorn Model 1741-03-M shower assembly complete with shower head. Remote mount pressure balancing temperature control box.

.1 Recessed rear mount penal metering valve complete with following features: stainless steel non-hold open push button and back plate. Single temperature metering valve complete with strainer, check stop, 0.16 L/s flow control and adjustable 15 second to 120 second time range. Pressure balanced mixing valve complete with temperature gauge, adjustable temperature limit stop set at 40 degrees Celsius and check stops. 75 mm dial 0-93 degrees Celsius thermometer. Ball type isolation valves. Steel shower control panel complete with key access hinged door, enamel finish to match wall, and identification in 25 mm letters on front. Shower valve to be accessible from adjacent Room.

.3 Thermostatic Mixing Valve: Symmons 7-102A, complete with wall mounting bracket

2.10 HOSE REEL

.1 Guardian Model 3621 swing out hose reel

.2 Thermostatic Mixing Valve: Symmons 7-200A, complete with wall mounting bracket

Part 3 Execution

3.1 EXAMINATION AND PREPARATION

.1 Section 01 70 00: Verification of existing conditions before starting work.

.2 Verify that walls and floor finishes are prepared and ready for installation of fixtures.

.3 Verify that electric power is available and of the correct characteristics.

.4 Confirm that millwork is constructed with adequate provision for the installation of counter top lavatories and sinks.

3.2 PREPARATION

.1 Rough-in fixture piping connections to minimum sizes indicated in fixture rough-in schedule for particular fixtures.

3.3 INSTALLATION

.1 Install each fixture with trap, easily removable for servicing and cleaning.

.2 Provide chrome plated rigid or flexible supplies to fixtures with loose key screwdriver stops, reducers, and escutcheons.

.3 Install components level and plumb.

□

.4 Install and secure fixtures in place with wall supports wall carriers and bolts.

.5 Seal fixtures to wall and floor surfaces with sealant as specified in Section 07 92 00, colour to match fixture.

.6 Solidly attach water closets to floor with lag screws. Lead flashing is not intended hold fixture in place.

3.4 INTERFACE WITH OTHER PRODUCTS

.1 Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.

3.5 ADJUSTING

.1 Section 01 78 10 - Execution Requirements: Adjusting installed work.

.2 Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

3.6 CLEANING

.1 Section 01 78 10 - Execution Requirements: Cleaning installed work.

.2 Clean plumbing fixtures and equipment.

3.7 PROTECTION OF FINISHED WORK

.1 Section 01 78 10 - Execution Requirements: Protecting installed work.

.2 Do not permit use of fixtures.

3.8 SCHEDULES

.1 Fixture Heights: Install fixtures to heights above finished floor as indicated.

- .1 Water Closet:
  - .1 Standard: 380 mm mm to top of bowl rim.
  - .2 Accessible: 455 mm mm to top of seat.
- .2 Water Closet Flush Valves:
  - .1 Standard: 280 mm mm min. above bowl rim.
  - .2 Recessed: 255 mm mm min. above bowl rim.
- .3 Urinal:
  - .1 Standard: 560 mm mm to top of bowl rim.
  - .2 Accessible: 430 mm mm to top of bowl rim.
- .4 Lavatory:
  - .1 Standard: 785 mm mm to top of basin rim.
  - .2 Accessible: 865 mm mm to top of basin rim.

□

.5 Drinking Fountain:

.1 Child: 760 mm mm to top of basin rim.

.2 Standard Adult: 1015 mm mm to top of basin rim.

.3 Accessible: 915 mm mm to top of spout.

.6 Shower Heads:

.1 Adult Male: 1765 mm mm to bottom of head.

.2 Adult Female: 1640 mm mm to bottom of head.

.3 Child: 1490 mm mm to bottom of head.

.7 Emergency Eye And Face Wash:

.1 Standard: 965 mm mm to receptor rim.

.8 Emergency Shower:

.1 Standard: 2130 mm mm to bottom of head.

.2 Fixture Rough-In

	Water Closet: (Flush Valve)	25 mm	100 mm	50 mm	
	Water Closet: (Tank Type)	15 mm	100 mm	50 mm	
	Bidet:	15 mm	15 mm	40 mm	32 mm
	Urinal: (Flush Valve)	20 mm	50 mm	40 mm	
	Urinal: (Tank Type)	15 mm	50 mm	40 mm	
	Lavatory:	15 mm	15 mm	40 mm	32 mm
	Sink:	15 mm	15 mm	40 mm	32 mm
	Service Sink:	15 mm	15 mm	50 mm	40 mm
	Service Sink:	15 mm	15 mm	80 mm	40 mm
	Drinking Fountain:	15 mm	32 mm	32 mm	
	Bathtub:	15 mm	15 mm	40 mm	32 mm
	Shower:	15 mm	15 mm	40 mm	32 mm

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Water Heaters.

.2 Pumps.

- .1 Hot water circulators.
- .2 Sump Pumps.
- .3 Sewage Ejectors.

.3 Water pressure booster system.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Administrative Requirements.

.2 Section 01 61 00 - Common Product Requirements.

.3 Section 01 78 10 - Execution Requirements.

.4 Section 23 05 48 - Vibration Isolation.

.5 Section 26 05 80 - Equipment Wiring: Electrical characteristics and wiring connections.

1.3 REFERENCES

.1 ASHRAE 90A - Energy Conservation in New Building Design.

.2 ASME Section 8D - Boilers and Pressure Vessel Codes - Rules for Construction of Pressure Vessels.

.3 UL 1453 - Electric Booster and Commercial Storage Tank Water Heaters.

.4 UL 174 - Household Electric Storage Tank Water Heaters.

.5 CAN/CSA C22.2 No.110, Construction and Test of Electric Storage Tank Water Heaters.

.6 CAN/CSA-C191, Performance of Electric Storage Tank Water Heaters for Household Service.

.1 CAN/CSA-C309, Performance Requirements for Glass-Lined Storage Tanks for Household Hot Water Service.

1.4 SUBMITTALS FOR REVIEW

.1 Section 01 33 00: Procedures for submittals.

.2 Product Data:

□

.1 Provide dimension drawings of water heaters indicating components and connections to other equipment and piping.

.2 Indicate pump type, capacity, power requirements.

.3 Provide certified pump curves showing pump performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable.

.4 Provide electrical characteristics and connection requirements.

.3 Shop Drawings:

.1 Indicate heat exchanger dimensions, size of tappings, and performance data.

.2 Indicate dimensions of tanks, tank lining methods, anchors, attachments, lifting points, tappings, and drains.

1.5 SUBMITTALS AT PROJECT CLOSEOUT

.1 Section 01 78 10: Procedures for submittals.

.2 Project Record Documents: Record actual locations of components.

.3 Operation and Maintenance Data: Include operation, maintenance, and inspection data, replacement part numbers and availability, and service depot location and telephone number.

.4 Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

.1 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

.2 Provide pumps with manufacturer's name, model number, and rating/capacity identified.

.3 Ensure products and installation of specified products are to recommendations and requirements of the following organizations:

.1 Canadian Standards Association (CSA).

.2 National Sanitation Foundation (NSF).

.3 American Society of Mechanical Engineers (ASME).

.4 National Board of Boiler and Pressure Vessel Inspectors (NBBPVI).

.5 National Electrical Manufacturers' Association (NEMA).

.6 Underwriters Laboratories of Canada (ULC).

.4 Ensure pumps operate at specified system fluid temperatures without vapour binding and cavitation, are non-overloading in parallel or individual operation, operate within 25 percent of midpoint of published maximum efficiency curve.

1.7 DELIVERY, STORAGE, AND PROTECTION

.1 Section 01 61 00: Transport, handle, store, and protect products.

□

.2 Provide temporary inlet and outlet caps. Maintain caps in place until installation.

1.8 WARRANTY

.1 Section 01 78 10.

.2 Provide five year manufacturer warranty for domestic water heaters, in-line circulator, submersible sump pumps, sewage ejectors.

Part 2 Products

2.1 COMMERCIAL ELECTRIC WATER HEATERS, HWT-1

.1 Manufacturer: One (1) of Giant 102A330.

.2 Other acceptable manufacturers offering equivalent products.

.1 Rheem-Ruud.

.2 Substitutions: [Refer to Section 01 62 00.]

.3 Type: Factory-assembled and wired, electric, vertical storage.

.4 Performance:

.1 Storage capacity: 80 gal.

.2 Heating element size: 30 kW.

.3 Minimum recovery rate: 460 Lph 56 degrees C temperature rise.

.4 Maximum working pressure: 865 kPa

.5 Electrical Characteristics:

.1 208 volts, three phase, 60 Hz.

.6 Tank: Welded steel ASME labelled pressure vessel, glass lined; thermally insulated with minimum 50 mm glass fibre encased in corrosion-resistant steel jacket; baked-on enamel finish.

.7 Controls: Automatic immersion water thermostat; externally adjustable temperature range from 16 to 82 degrees C, flanged or screw-in nichrome elements, high temperature limit thermostat.

.8 Controls: Ventilated control cabinet, factory-wired with solid state progressive sequencing step controller, fuses, magnetic contactors, control transformer, pilot lights indicating main power and heating steps, control circuit toggle switch, electronic low-water (probe-type) cut-off, high temperature limit thermostat, flush-mounted temperature and pressure gauges.

.9 Heating Elements: Flange-mounted immersion elements; individual elements sheathed with Incoloy corrosion-resistant metal alloy, rated less than 480 W/sq cm.

□

2.2 EXPANSION TANKS

.1 Manufacturer: Amtrol ST-8.

.2 Other acceptable manufacturers offering equivalent products.

.1 Watts.

.2 Substitutions: [Refer to Section 01 62 00.]

.3 Type: Therm-X-Trol replacable bladder ASME tank..

.4 Performance:

.1 Max working pressure: 150 psig

.2 Total Volume: 3.2 Gal.

.3 Maximum acceptance: 1.9 Gal.

2.3 HOT WATER RECIRCULATING PUMPS, P-4

.1 Manufacturer: Armstrong Astro 2 Series 225SS.

.2 Other acceptable manufacturers offering equivalent products.

.1 Taco.

.2 Substitutions: [Refer to Section 01 62 00.]

.3 Type: Factory-assembled and wired, 2-bolt flange connection, with 24h timer.

.4 Performance:

.1 10 GPM at 4' head.

.2 Max. water temperature 230F (110C).

.3 Max. working pressure 150 psi (1034 kPa).

.5 Electrical Characteristics:

.1 115 volts/60 Hz/1 phase, 0.6A, 83W. 1.5 m power cord.

.6 Controls: 12 hour analog clock with mechanical toggles for each 15min interval.

2.4 SUBMERSIBLE SUMP PUMPS, P-1,2

.1 Manufacturer: Liberty Model FL283.

.1 Substitutions: [Refer to Section 01 62 00.]

.2 Type: Completely submersible, vertical, centrifugal.

.3 Casing: Cast iron pump body and oil filled motor chamber.

.4 Impeller: Cast iron; semi-open non-clog, stainless steel shaft.

.5 Bearings: Ball bearings.

□

.6 Accessories: Oil resistant 25 foot cord and plug with three-prong connector for connection to electric wiring system including grounding connector.

.7 Servicing: Slide-away coupling consisting of discharge elbow secure to sump floor, movable bracket, guide pipe system, lifting chain and chain hooks.

.8 Controls: Motor control panel containing across-the-line electric motor starters with ambient compensated quick trip overloads in each phase with manual trip button and reset button, circuit breaker, control transformer, electro mechanical alternator, hand-off-automatic selector switches, pilot lights, high water alarm pilot light, reset button and alarm horn. Provide mercury switch liquid level controls, steel shell switch encased in polyurethane foam with cast iron weight for pump on (each pump), pump off (common), and alarm.

.9 Performance:

.1 Flow: 40 gpm , 21 feet lift.

.2 Motor: 1/2 hp , 115 volt, single phase, 60 Hz.

2.5 SUBMERSIBLE SEWAGE EJECTORS, P-4

.1 Manufacturer: Liberty Model FL202A2.

.1 Substitutions: [Refer to Section 01 62 00.]

.2 Type: Completely submersible, vertical, centrifugal.

.3 Casing: Cast iron pump body and oil filled motor chamber.

.4 Impeller: Cast iron; semi-open non-clog, stainless steel shaft.

.5 Bearings: Ball bearings.

.6 Accessories: Oil resistant 25 foot cord and plug with three-prong connector for connection to electric wiring system including grounding connector.

.7 Servicing: Slide-away coupling consisting of discharge elbow secure to sump floor, movable bracket, guide pipe system, lifting chain and chain hooks.

.8 Level Controls: pump shall be controlled by a wide angle mechanical float sealed in a PVC housing. The float shall have a series plug for manual by-pass operation.

.9 Controls: Motor control panel containing across-the-line electric motor starters with ambient compensated quick trip overloads in each phase with manual trip button and reset button, circuit breaker, control transformer, electro mechanical alternator, hand-off-automatic selector switches, pilot lights, high water alarm pilot light, reset button and alarm horn. Provide mercury switch liquid level controls, steel shell switch encased in polyurethane foam with cast iron weight for pump on (each pump), pump off (common), and alarm.

.10 Performance:

□

.1 Flow60 gpm, at 90 feet lift.

.2 Motor: 2 hp, 208V-230V volt, single phase, 60 Hz.

Part 3 Execution

3.1 INSTALLATION

.1 Install water heaters to manufacturer's instructions.

.2 Coordinate with plumbing piping and related electrical work to achieve operating system.

.3 Domestic Hot Water Storage Tanks:

.1 Provide steel pipe support, independent of building structural framing members.

.2 Clean and flush after installation. Seal until pipe connections are made.

.4 Pumps:

.1 Ensure shaft length allows sump pumps to be located minimum 600 mm below lowest invert into sump pit and minimum 150 mm clearance from bottom of sump pit.

.2 Provide air cock and drain connection on horizontal pump casings.

.3 Provide line sized isolating valve and strainer on suction and line sized soft seated check valve and balancing valve on discharge.

.4 Decrease from line size with long radius reducing elbows or reducers. Support piping adjacent to pump such that no weight is carried on pump casings. Provide supports under elbows on pump suction and discharge line sizes 100 mm and over.

.5 Ensure pumps operate at specified system fluid temperatures without vapour binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.

.6 Align and verify alignment of base mounted pumps prior to start-up.

END OF SECTION

□

Part 1 General

1.1 SECTION INCLUDES

.1 Air turning devices/extractors.

.2 Backdraft dampers.

.3 Combination fire and smoke dampers.

.4 Duct access doors.

.5 Duct test holes.

.6 Fire dampers.

.7 Flexible duct connections.

.8 Motorized Control dampers.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Administrative Requirements.

.2 Section 01 61 00 - Common Product Requirements.

.3 Section 01 78 10 - Execution Requirements.

.4 Section 23 05 48 - Vibration Isolation.

.5 Section 23 31 00 - Duct Work.

.6 Section 23 36 00 - Air Terminal Units: Pressure regulating damper assemblies.

.7 Section 26 05 80 - Equipment Wiring: Electrical characteristics and wiring connections.

1.3 REFERENCES

.1 NFPA 90A - Installation of Air Conditioning and Ventilating Systems.

.2 NFPA 92A - Smoke-Control Systems.

.3 SMACNA - HVAC Duct Construction Standards - Metal and Flexible.

.4 UL 33 - Heat Responsive Links for Fire-Protection Service.

.5 UL 555 - Fire Dampers.

.6 UL 555S - Smoke Dampers.

□

1.4 SUBMITTALS

.1 Section 01 33 00: Procedures for submittals.

.2 Shop Drawings: Indicate for shop fabricated assemblies including [volume control dampers] [duct access doors] [and] [duct test holes].

.3 Product Data: Provide for shop fabricated assemblies including [volume control dampers] [duct access doors] [duct test holes] [and] [hardware used]. Include electrical characteristics and connection requirements.

.4 Manufacturer's Installation Instructions: Indicate for [fire dampers] [and] [combination fire and smoke dampers].

1.5 PROJECT RECORD DOCUMENTS

.1 Section 01 78 10: Submittals for project closeout.

.2 Record actual locations of access doors and test holes.

1.6 QUALIFICATIONS

.1 Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.7 REGULATORY REQUIREMENTS

.1 Products Requiring Electrical Connection: Listed and classified by CSA as suitable for the purpose specified and indicated.

1.8 DELIVERY, STORAGE, AND HANDLING

.1 Section 01 61 00: Transport, handle, store, and protect products.

.2 Protect dampers from damage to operating linkages and blades.

1.9 EXTRA MATERIALS

.1 Section 01 78 10: Submittals for project closeout.

.2 Provide two of each size and type of fusible link.

Part 2 Products

2.1 BACKDRAFT DAMPERS.

.1 Manufacturers:

.1 Naylor

.2 Substitutions: Refer to Section 01 62 00.

□

.2 Gravity Backdraft Dampers, Size 450 x 450 mm or Smaller, Provided with Air Moving Equipment: Air moving equipment manufacturers standard construction.

.3 Multi-Blade, Parallel Action Gravity Balanced Backdraft Dampers: 1.5 mm thick galvanized steel, or extruded aluminum, with centre pivoted blades of maximum 150 mm width, with felt or flexible vinyl sealed edges, linked together in rattle-free manner with 90 degree stop, steel ball bearings, and plated steel pivot pin; adjustment device to permit setting for varying differential static pressure.

2.2 COMBINATION FIRE AND SMOKE DAMPERS

.1 Manufacturers:

.1 Accudoor.

.2 Substitutions: Refer to Section 01 62 00.

.2 Fabricate to NFPA 90A, UL 555, UL 555S, and as indicated.

.3 Provide factory sleeve and collar for each damper.

.4 Multiple Blade Dampers: Fabricate with 1.5 mm galvanized steel frame and blades, oil-impregnated bronze or stainless steel sleeve bearings and plated steel axles, stainless steel jamb seals, 3.2 x 12.7 mm plated steel concealed linkage, stainless steel closure spring, blade stops, and lock, and 12.7 mm actuator shaft.

.5 Operators: UL listed and labelled spring return pneumatic type suitable for operation on 0-140 kPa instrument air. electric type suitable for 120 volts, single phase, 60 Hz. Provide end switches to indicate damper position. Locate damper operator on interior exterior of duct and link to damper operating shaft.

.6 Normally Closed Smoke Responsive Fire Dampers: Curtain type, opening by gravity upon actuation of electro thermal link, flexible stainless steel blade edge seals to provide constant sealing pressure.

.7 Normally Open Smoke Responsive Fire Dampers: Curtain type, closing upon actuation of electro thermal link, flexible stainless steel blade edge seals to provide constant sealing pressure, stainless steel springs with locking devices to ensure positive closure for units mounted horizontally.

.8 Electro Thermal Link: Fusible link melting at 74 degrees C; 120 volts, single phase, 60 Hz; UL listed and labeled.

2.3 DUCT ACCESS DOORS

.1 Manufacturers:

.1 Naylor

.2 Substitutions: Refer to Section 01 62 00.

.2 Fabricate to SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.

□

.3 Fabrication: Rigid and close-fitting of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated duct work, install minimum 25 mm thick insulation with sheet metal cover.

.1 Less Than 300 mm Square: Secure with sash locks.

.2 Up to 450 mm Square: Provide two hinges and two sash locks.

.3 Up to 600 x 1200 mm: Three hinges and two compression latches with outside and inside handles.

.4 Larger Sizes: Provide an additional hinge.

.4 Access doors with sheet metal screw fasteners are not acceptable.

2.4 DUCT TEST HOLES

.1 Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.

2.5 FIRE DAMPERS

.1 Manufacturers:

.1 Naylor Model Type A or B

.2 Substitutions: Refer to Section 01 62 00.

.2 Fabricate to NFPA 90A and UL 555, and as indicated.

.3 Ceiling Dampers: Galvanized steel, 0.76 mm frame and 1.5 mm flap, two layers 3.2 mm ceramic fibre on top side , and one layer on bottom side for round flaps, with locking clip.

.4 Horizontal Dampers: Galvanized steel, 0.76 mm frame, stainless steel closure spring, and lightweight, heat retardant non-asbestos fabric blanket.

.5 Curtain Type Dampers: Galvanized steel with interlocking blades. Provide stainless steel closure springs and latches for horizontal installations closure under air flow conditions. Configure with blades out of air stream except for 250 Pa pressure class ducts up to 300 mm in height.

.6 Multiple Blade Dampers: 1.5 mm galvanized steel frame and blades, oil-impregnated bronze or stainless steel sleeve bearings and plated steel axles, 3.2 x 12.7 mm plated steel concealed linkage, stainless steel closure spring, blade stops, and lock.

.7 Fusible Links: UL 33, separate at 71 degrees C with adjustable link straps for combination fire/balancing dampers.

2.6 FLEXIBLE DUCT CONNECTIONS

.1 Manufacturers:

.1 Flexmaster

.2 Substitutions: Refer to Section 01 62 00.

□

.2 Fabricate to SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.

.3 Connector: Fabric crimped into metal edging strip.

.1 Fabric: UL listed fire-retardant neoprene coated woven glass fibre fabric to NFPA 90A, minimum density 1.0 kg/sq m.

.2 Net Fabric Width: Approximately 50 75 150 mm wide.

.3 Metal: 75 mm wide, 0.6 mm thick galvanized steel .

.4 Leaded Vinyl Sheet: Minimum 14 mm thick, 4.2 kg/sq m, 10 dB attenuation in 10 to 10,000 Hz range.

2.7 MOTORIZED CONTROL DAMPERS

.1 Manufacturers:

.1 Tamco Series 1000/Belimo

.2 Substitutions: Refer to Section 01 62 00.

.2 Aluminum air foil control damper.

.3 Flanged to duct.

.4 With Belimo actuator, NFBUP/NFXUP sized to match damper.

.5 Sized to match internal dimensions of duct.

Part 3 Execution

3.1 PREPARATION

.1 Verify that electric power is available and of the correct characteristics.

3.2 INSTALLATION

.1 Install accessories to manufacturer's instructions, NFPA 90A, and follow SMACNA HVAC Duct Construction Standards - Metal and Flexible. Refer to Section 23 31 00 for duct construction and pressure class.

.2 Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.

.3 Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, combination fire and smoke dampers, and elsewhere as indicated. Provide minimum 200 x 200 mm size for hand access, 450 x 450 mm size for shoulder access, and as indicated. Provide 100 x 100 mm for balancing dampers only. Review locations prior to fabrication.

.4 Provide duct test holes where indicated and required for testing and balancing purposes.

□

.5 Provide fire dampers , combination fire and smoke dampers and smoke dampers at locations indicated, where ducts and outlets pass through fire rated components , and where required by authorities having jurisdiction. Install with required perimeter mounting angles, sleeves, breakaway duct connections, corrosion resistant springs, bearings, bushings and hinges.

.6 Install smoke dampers and combination smoke and fire dampers to NFPA 92A.

.7 Demonstrate re-setting of fire dampers to Owner's representative.

.8 Provide flexible connections immediately adjacent to equipment in ducts associated with fans and motorized equipment , and supported by vibration isolators. Refer to Section 23 05 48. For fans developing static pressures of 1250 Pa and over, cover connections with leaded vinyl sheet, held in place with metal straps.

.9 Use splitter dampers only where indicated.

.10 Provide balancing dampers on high velocity systems where indicated. Refer to Section 23 36 00.

.11 Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.

END OF SECTION

□

Part 1 General

1.1 SECTION INCLUDES

.1 Inline centrifugal fans.

.2 Fan Accessories.

1.2 RELATED WORK

.1 Section 01 33 00 - Administrative Requirements.

.2 Section 01 61 00 - Common Product Requirements.

.3 Section 01 78 10 - Execution Requirements.

.4 Section 23 05 13 - Motors.

.5 Section 23 05 48 - Vibration Isolation.

.6 Section 23 07 13 - Duct Insulation.

.7 Section 23 31 00 - Duct Work.

.8 Section 23 33 00 - Duct Work Accessories: Backdraft dampers.

.9 Section 23 73 23 - Air Handling Units.

.10 Section 26 05 80 - Equipment Wiring: Electrical characteristics and wiring connections.

1.3 REFERENCES

.1 AFBMA 9 - Load Ratings and Fatigue Life for Ball Bearings.

.2 AFBMA 11 - Load Ratings and Fatigue Life for Roller Bearings.

.3 AMCA 99 - Standards Handbook.

.4 AMCA 210 - Laboratory Methods of Testing Fans for Aerodynamic Performance Rating.

.5 AMCA 300 - Reverberant Room Method for Sound Testing of Fans.

.6 AMCA 301 - Method of Calculating Fan Sound Ratings from Laboratory Test Data.

.7 SMACNA - HVAC Duct Construction Standards - Metal and Flexible.

1.4 SUBMITTALS

.1 Section 01 33 00: Procedures for submittals.

.2 Shop Drawings: Indicate assembly of centrifugal fans and accessories including fan curves with specified operating point clearly plotted, sound power levels for both fan inlet and outlet at rated capacity, and electrical characteristics and connection requirements.

.3 Product Data: Provide data on centrifugal fans and accessories including fan curves with specified operating point clearly plotted, sound power levels for both fan inlet and outlet at rated capacity, and electrical characteristics and connection requirements.

.4 Manufacturer's Installation Instructions.

1.5 OPERATION AND MAINTENANCE DATA

.1 Section 01 78 10: Submittals for project closeout.

.2 Maintenance Data: Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Section 01 61 00: Transport, handle, store, and protect products.

.2 .Protect motors, shafts, and bearings from weather and construction dust.

1.7 ENVIRONMENTAL REQUIREMENTS

.1 Do not operate fans for any purpose until ductwork is clean, filters in place, bearings lubricated, and fan has been test run under observation.

1.8 EXTRA MATERIALS

.1 Section 01 78 10: Submittals for project closeout.

Part 2 Products

2.1 MANUFACTURERS

.1 Greenheck [See Schedule] .

.2 Substitutions: [Refer to Section 01 61 00.]

2.2 GENERAL

.1 Performance Ratings: Conform to AMCA 210 [and bear the AMCA Certified Rating Seal.]

.2 Sound Ratings: AMCA 301, tested to AMCA 300 ,and bear AMCA Certified Sound Rating Seal.

.3 Fabrication: Conform to AMCA 99.

.4 Performance Base: Sea level conditions.

.5 Static and Dynamic Balance: Eliminate vibration or noise transmission to occupied areas.

.6 Performance: See Schedule

2.3 WHEEL AND INLET

.1 Backward Inclined: Steel or aluminum construction with smooth curved inlet flange, heavy back plate, backwardly curved blades welded or riveted to flange and back plate; cast iron [or cast steel] hub riveted to back plate and keyed to shaft with set screws.

.2 Forward Curved: Galvanized steel construction with inlet flange, back plate, shallow blades with inlet and tip curved forward in direction of airflow, mechanically secured to flange and back plate; steel hub swaged to back plate and keyed to shaft with set screw.

.3 Airfoil Wheel: Steel construction with smooth curved inlet flange, heavy back plate die formed hollow airfoil shaped blades continuously welded at tip flange, and back plate; cast iron or cast steel hub riveted to back plate and keyed to shaft with set screws.

.4 Radial: Steel construction with inlet flange, heavy reinforced back plate, plate blades with reinforcing gussets and wearing strips welded or riveted to back plate and flange; cast iron or cast steel hub riveted to back plate and keyed to shaft with set screws.

2.4 HOUSING

.1 Heavy gauge steel, spot welded [for AMCA 99 Class I and II fans, and continuously welded for Class III], adequately braced, designed to minimize turbulence with spun inlet bell and shaped cut-off.

.2 Factory finish before assembly with enamel or prime coat. For fans handling air downstream of humidifiers, [provide two additional coats of paint.] [fabricate of galvanized steel.] [Prime coating on aluminum parts is not required.]

.3 Provide bolted construction with horizontal flanged split housing [, where indicated].

.4 Fabricate plug fans without volute housing, with steel cabinet, lined. Refer to Section 23 07 13.

2.5 BEARINGS AND DRIVES

.1 Bearings: AFBMA 9, [L-10 life at 50,000 hours] [L-50 life at 100,000 hours] heavy duty pillow block type, self-aligning, grease-lubricated ball bearings, or AFBMA 11 [L-10 life at 120,000 hours] [L-50 life at 400,000 hours] pillow block type, self-aligning, grease-lubricated roller bearings.

.2 Shafts: Hot rolled steel, ground and polished, with key- way, protectively coated with lubricating oil, and shaft guard.

2.6 ELECTRICAL CHARACTERISTICS AND COMPONENTS

.1 Electrical Characteristics: See Schedule.

.2 Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to code.

2.7 ACCESSORIES

.1 Fixed Inlet Vanes: Steel construction with fixed cantilevered inlet guide vanes welded to inlet bell.

.2 Adjustable Inlet Vanes: Steel construction with blades [supported at both ends] [cantilevered] with two permanently lubricated bearings, variable mechanism [out of air stream] terminating in single control lever with control shaft for double width fans [and locking quadrant].

.3 Discharge Dampers: [Parallel] [Opposed] blade heavy duty steel damper assembly with blades constructed of two plates formed around and welded to shaft, channel frame, sealed ball bearings, with blades linked out of air stream to single control lever.

.4 Inlet/Outlet Screens: Galvanized steel welded grid.

.5 Access Doors: Shaped to conform to scroll, with quick opening latches and gaskets.

.6 Scroll Drain: <13 mm><<1/2 inch>> steel pipe coupling welded to low point of fan scroll.

Part 3 Execution

3.1 INSTALLATION

.1 Install to manufacturer's instructions.

.2 Install fans as indicated with resilient mountings and flexible electrical leads. Refer to Section 23 05 48.

.3 Install flexible connections specified in Section 23 33 00 between fan inlet and discharge ductwork. Ensure metal bands of connectors are parallel with minimum 25 mm flex between ductwork and fan while running.

.4 Install fan restraining snubbers as required. Refer to Section 23 05 48. Adjust snubbers to prevent tension in flexible connectors when fan is operating.

.5 Provide sheaves required for final air balance.

.6 Provide safety screen where inlet or outlet is exposed.

.7 Pipe scroll drains to nearest floor drain.

.8 Provide backdraft dampers on discharge of exhaust fans and as indicated. [Refer to Section 23 33 00.]

3.2 CENTRIFUGAL FAN SCHEDULE

Drawing Code	**EF-1**	**EF-2**	**EF-3,10**	**EF-4,5,6,8**
Location	Cells (Main exhaust fan)	Cells Rm 125 (pris.effects)	Cells Rm 126,136 (janitor, guard WR)	Cells Rm 127,128,129,138 (Cells, brth'lyzer rm)
Manufacturer	Greenheck	Greenheck	Greenheck	Greenheck
Model	SQ-100VG	SQ-75G	SQ-75G	SQ-75VG
Fan Type	Centrifugal	Centrifugal	Centrifugal	Centrifugal
Arrangement	Inline	Inline	Inline	Inline
Control	Low or high.	Continuous	Continuous	Low or high. Switch outside room
Air Flow Capacity (L/s)	486/225	47	23	47/23
Static Pressure (Pa)	125 Pa	65 Pa	65 Pa	65 Pa
Drive (belt/direct)	Direct	Direct	Direct	Direct
Electrical	115V/1ph/60 Hz	115V/1ph/60 Hz	115V/1ph/60Hz	115V/1ph/60Hz
Motor HP	¼ HP	1/50 HP	1/50 HP	1/6 HP
Accessories	Two-speed, Speed control, backdraft damper	Speed control, backdraft damper	Speed control, backdraft damper	Two speed, Speed control, backdraft damper

Drawing Code	**EF-9,11**	**EF-7**	**EF-12,13,15**	**EF-14**
Location	Cells Rm 128,134 (Shower,int'view)	Cells Rm 130 (Hold'g cell)	Rm 124 (Secure bay), crawlspace, garage	Crawlspace
Manufacturer	Greenheck	Greenheck	Greenheck	Greenheck
Model	SQ-75G	SQ-75VG	SQ-95G	BSQ-120-4
Fan Type	Centrifugal	Centrifugal	Centrifugal	Centrifugal
Arrangement	Inline	Inline	Inline	Inline
Control	On or off. Switch outside room.	Low or high. Switch outside room	CO monitor or humidity sensor	Humidity sensor
Air Flow Capacity (L/s)	47	61/30	190	550
Static Pressure (Pa)	65 Pa	125Pa	125Pa	125Pa
Drive (belt/direct)	Direct	Direct	Direct	Belt
Electrical	115V/1ph/60Hz	115V/1ph/60Hz	115V/1ph/60Hz	115V/1ph/60Hz
Motor HP	1/50 HP	1/6 HP	1/15 HP	¼ HP
Accessories	Speed control, backdraft damper	Two speed, Speed control, backdraft damper	Speed control, backdraft damper	Speed control, backdraft damper

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Fan Coils.

.2 Refrigerant cooling coils.

.3 Air cooled condensing units.

.4 Controls.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Administrative Requirements.

.2 Section 01 61 00 - Common Product Requirements.

.3 Section 01 78 10 - Execution Requirements.

.4 Section 23 07 13 - Duct Insulation: Duct Liner.

.5 Section 26 05 80 - Equipment Wiring: Electrical characteristics and wiring connections [and installation and wiring of thermostats and other controls components].

1.3 REFERENCES

.1 ARI 210/240 - Unitary Air-Conditioning and Air-Source Heat Pump Equipment.

.2 ARI 270 - Sound Rating of Outdoor Unitary Equipment.

.3 ARI 520 - Positive Displacement Condensing Units.

.4 ASHRAE 14 - Methods of Testing for Rating Positive Displacement Condensing Units.

.5 ASHRAE 15 - Safety Standard for Refrigeration Systems.

.6 ASHRAE 90A - Energy Conservation in New Building Design.

.7 ASHRAE 103 - Method of Testing for Annual Fuel Utilization Efficiency of Residential Central Furnaces and Boilers.

.8 NFPA 90A - Installation of Air Conditioning and Ventilating Systems.

.9 NFPA 90B - Installation of Warm Air Heating and Air-Conditioning Systems.

.10 UL 207 - Refrigerant-Containing Components and Accessories, Non-electrical.

.11 UL 303 - Refrigeration and Air-Conditioning Condensing and Compressor Units.

1.4 SUBMITTALS FOR REVIEW

.1 Section 01 33 00: Procedures for submittals.

.2 Product Data: Provide rated capacities, weights, accessories, electrical nameplate data, and wiring diagrams.

.3 Shop Drawings: Indicate assembly, required clearances, and location and size of field connections.

1.5 SUBMITTALS FOR INFORMATION

.1 Section 01 33 00: Procedures for submittals.

.2 Design Data: Indicate refrigerant pipe sizing.

.3 Manufacturer's Instructions: Indicate rigging, assembly, and installation instructions.

1.6 SUBMITTALS AT PROJECT CLOSEOUT

.1 Section 01 78 10: Submittals for project closeout.

.2 Project Record Documents: Record actual locations of components and connections.

.3 Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listing.

.4 Warranty: Submit manufacturers warranty and ensure forms have been filled out in Owners name and registered with manufacturer.

1.7 QUALITY ASSURANCE

.1 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

.2 Installer Qualifications: Company specializing in performing the work of this section approved by manufacturer.

1.8 REGULATORY REQUIREMENTS

.1 Products Requiring Electrical Connection: Listed and classified by CSA as suitable for the purpose specified and indicated.

1.9 WARRANTY

.1 Section 01 78 10: Submittals for project closeout.

.2 Provide [five] year manufacturers warranty for [condensing units] [compressors].

1.10 EXTRA MATERIALS

.1 Section 01 78 10: Submittals for project closeout.

.2 Provide [two] of filters for each furnace.

Part 2 Products

2.1 ELECTRIC FAN COILS

.1 Manufacturer: Carrier Model FB4C (See Schedule).

.1 Other acceptable manufacturers offering equivalent products.

.2 Substitutions: [Refer to Section 01 62 00.]

.2 Units: Self-contained, packaged, factory assembled, pre-wired unit consisting of cabinet, supply fan, heating element, controls, air filter, and accessories; wired for single power connection with control transformer.

.1 Air Flow Configuration: [Upflow].

.2 Heating: Electric.

.3 Electric Refrigeration: Refrigerant cooling coil and outdoor package containing compressor, condenser coil and condenser fan.

.3 Cabinet: Steel with baked enamel finish, easily removed and secured access doors, glass fibre insulation and reflective liner.

.4 Supply Fan: Centrifugal type rubber mounted with direct drive motor.

.5 Motor: Refer to Section 23 05 13; 1750 rpm [single speed] [two-speed] [multi-speed].

.6 Electric Heater: Helix wound bare nichrome wire heating elements arranged in incremental states of 5 kW each, with porcelain insulators.

.7 Electric Heater Operating Controls:

.1 Low voltage adjustable room thermostat energized heater stages in sequence with pre-determined delay between heating stages.

.2 High limit temperature control de-energizes heating elements, automatic resets.

.3 Supply fan starts before electric elements are energized and continues operating after thermostat is satisfied until bonnet temperature reaches minimum setting. Include manual switch for continuous fan operation.

.4 Outdoor thermostat locks out some heating elements until outdoor temperature drops.

.8 Air Filters: 25 mm glass fibre, disposable type arranged for easy replacement.

.9 Performance:

.1 Refer to Furnace Schedule.

2.2 CONDENSING UNITS

.1 Manufacturer: Carrier Model 24ABB3.

.1 Other acceptable manufacturers offering equivalent products.

.1 Carrier Model 24ABB3.

.2 Substitutions: [Refer to Section 01 62 00.]

.2 Construction and Ratings: To ARI 210/240 [, and UL 207 and UL 303]. Testing: ASHRAE 14.

.3 Compressor: [ARI 520;] hermetic, [two speed 1800 and] 3600 rpm, resiliently mounted integral with condenser, with positive lubrication, crankcase heater, high pressure control, motor overload protection, service valves and drier. Provide time delay control to prevent short cycling [and rapid speed changes].

.4 Refrigeration Accessories: Filter Drier, high pressure switch (manual reset), low pressure switch (automatic reset), service valves and gauge ports, thermometer well (in liquid line). [Provide thermostatic expansion valves.] [Provide refrigerant lines, factory cleaned, dried, pressurized and sealed, with insulated suction line.] [Provide reversing valves on heat pump units.]

.5 Air Cooled Condenser: [ARI 520;] aluminum fin and copper tube coil, with direct drive axial propeller fan resiliently mounted, galvanized fan guard.

.1 Rated cooling output: 60000 Btuh.

.6 Electrical Characteristics:

.1 208 volts, single phase, 60 Hz.

.2 Disconnect Switch: Factory mount disconnect switch on equipment to Section 26 05 80.

.7 Refrigeration Operating Controls

.1 Room Thermostat: Cycles condensing unit and supply fan to maintain room temperature setting.

2.3 THERMOSTATS

.1 Manufacturer: Carrier Model 32CSCPACHP-FC.

.1 Other acceptable manufacturers offering equivalent products.

.2 Substitutions: [Refer to Section 01 62 00.]

.2 Adjustable Room Thermostat: Low voltage, to control electric heater stages in sequence with delay between stages, compressor and condenser fan and supply fan to maintain temperature setting. Include system selector switch (heat-off-cool) and fan control switch (auto-on).

.3 Electric solid state microcomputer based room thermostat with remote sensor:

.1 Automatic switching from heating to cooling.

.2 Preferential rate control to minimize overshoot and deviation from setpoint.

.3 Set-up for four separate temperatures per day.

.4 Instant override of setpoint for continuous or timed period from one hour to 31 days.

.5 Short cycle protection.

.6 Programming based on weekdays, Saturday and Sunday OR every day of the week.

.7 Selection features including degree F or degree C display, 12 or 24 hour clock, keyboard disable, remote sensor, fan on-auto.

.8 Battery replacement without program loss.

.9 Thermostat display:

.1 Time of day.

.2 Actual room temperature.

.3 Programmed temperature.

.4 Programmed time.

.5 Duration of timed override.

.6 Day of week.

.7 System mode indication: heating, cooling, auto, off, fan auto, fan on.

Part 3 Execution

3.1 EXAMINATION

.1 Section 01 10 13: Verification of existing conditions before starting work.

.2 Verify that floors are ready for installation of units and openings are as indicated on shop drawings. Verify that supports for air cooled condensers are completed.

.3 Verify that proper power supply is available for furnace and condenser package.

3.2 INSTALLATION

.1 Install to [NFPA 90A] [and] [NFPA 90B].

.2 Install refrigeration systems to ASHRAE 15.

.3 Pipe drain from cooling coils to nearest floor drain.

.4 Mount air cooled condenser-compressor package as shown on drawings.

3.3 DEMONSTRATION AND INSTRUCTIONS

.1 Section 01 78 10: Demonstrating installed work.

.2 Supply initial charge of refrigerant and oil for each refrigeration system. Replace losses of oil or refrigerant prior to end of correction period.

.3 Charge system with refrigerant and test entire system for leaks after completion of installation. Repair leaks, put system into operation, and test equipment performance.

.4 Shut-down system if initial start-up and testing takes place in winter and machines are to remain inoperative. Repeat start-up and testing operation at beginning of first cooling season.

.5 Provide cooling season start-up, and winter season shut-down for first year of operation.

.6 Inspect and test for refrigerant leaks during first year of operation.

3.4 SCHEDULES

.1 Fan coils

	Drawing Code	**FC-1**	**FC-2**	**FC-3**
	Location	Offices	Members area	Cells
	Manufacturer	Carrier	Carrier	Carrier
	Furnace Model	FB4CN060L00	FB4CNP060L00	FB4CNP030000
	Heating Type	electric	electric	electric
	Heating Output	27 kW	27 kW	20 kW
		208/3 phase/60Hz	208/3 phase/60Hz	208/3 phase/60Hz
	Airflow Capacity (L/s)	900	900	424
	External Static Pressure	0.5	0.5	0.5
	Cooling Coil Model	5 TON	5 TON	2.5 TON
	Accessories	Filter kit	Filter kit	Filter kit

.2 CONDENSING UNITS

	Drawing Code	**CU-1**	**CU-2**	**CU-3**
	Location	Cells	Members area	Offices
	Manufacturer	Carrier	Carrier	Carrier
	Model Number	24ABB360A003	24ABB348A003	24ABB330A003
	Cooling			
	Capacity	5 tons	4 tons	2.5 tons
	Accessories	TC-PAC01 (Programmable AC control)		
	Electrical characteristics	208V/1 phase/60Hz	208V/1 phase/60Hz	208V/1 phase/60Hz

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Heat Recovery Ventilators.

.2 Duct Heaters.

1.2 RELATED SECTIONS

.1 Section 01 33 00 – Submittal Procedures.

.2 Section 01 74 21 – Construction/Demolition Waste Management and Disposal

.3 Section 01 78 00 – Closeout Submittals.

.4 Section 23 33 00 – Air Duct Accessories.

.5 Section 23 33 15 – Dampers - Operating.

1.3 REFERENCES

.1 American Bearing Manufacturer's Association (ABMA)

.1 ANSI/ABMA 9 Load Ratings and Fatique Life for Ball Bearings.

.2 ANSI/ABMA 11 Load Ratings and Fatique Life for Roller Bearings.

.2 Air Movement and Control Association (AMCA)

.1 AMCA 210, Laboratory Method of Testing Fans for Aerodynamic Performance Rating (ASHRAE).

.2 AMCA 300 Reverberaut Room Method for Sound Testing of Fans.

.3 American National Standards Institute/Air-Conditioning and Refrigeration Institute (ANSI/ARI)

.1 ANSI/ARI 430, Central Station Air Handling Units.

.4 American Society of Heating Refrigeration and Air-Conditioning Engineers (ASHRAE)

.1 ASHRAE 68, Laboratory Method of Testing to Determine the Sound Power in a Duct.

.2 ASHRAE 84, Method of Testing Air-to-Air Exchangers.

.5 Canadian General Standards Board (CGSB)

.1 CAN/CGSB 1.181, Ready-Mixed Organic Zinc-Rich Coating.

.6 Canadian Standards Association (CSA)

.1 CSA B52 Mechanical Refrigeration Code.

.7 National Electrical Manufacturer's Association (NEMA)

.1 NEMA MG1 Motors and Generators

.2 NEMA ICS 7-1 Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable Speed Drive Systems.

.8 Provincial Boiler, Pressure Vessel and Compressed Gas Regulations.

.9 Sheet Metal and Air-Conditioning Contractors' National Association (SMACNA).

1.4 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit shop drawings and product data in accordance with Section 01 33 00 - Submittal Procedures.

.2 Indicate following: fan, fan curves showing point of operation, motor drive, bearings, filters, mixing box, dampers, VAV, coil, include performance data.

1.5 CLOSEOUT SUBMITTALS

.1 Provide operation and maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

.2 Include following: fan, bearings, motor, damper, VAV control, air volume, total cooling, sensible cooling, EDB, EWB, OAT.

1.6 EXTRA MATERIALS

.1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.

.2 Provide one spare set of filters.

.3 Provide list of individual manufacturer's recommended spare parts for equipment such as bearings and seals, and addresses of suppliers, together with list of specialized tools necessary for adjusting, repairing or replacing, for placement into operating manual.

.4 Spare filters: in addition to filters installed for startup and commissioning. Immediately prior to acceptance by Owner's Representative, supply 1 complete set of filters for each filter unit or filter bank.

PART 2 PRODUCTS

2.1 HEAT RECOVERY VENTILATORS

.1 Manufacturer: Aldes Model See Schedule.

.1 Lifebreath.

.2 Substitutions: Not permitted.

2.2 GENERAL

.1 Heat exchanger, cross-flow type such that fresh air intake and stale air outflow openings are on opposite sides of HRV, or on top. (Requirement to properly fit into mechanical room.)

.2 Unit to be self contained with all necessary controls and wiring to facilitate a single point connect. Provide disconnect and vibration isolators.

2.3 CABINET, FANS AND FILTERS

.1 Casing: galvanized, pre-painted steel with foil faced insulation. Double wall construction.

.2 Provide full size access doors to allow for periodic maintenance and inspection. Door construction, same as unit with compression type handles and resilient gaskets.

.3 Drain pans to be formed sections, recessed, fabricated from 1.2 mm stainless steel 304. Piped to nearest floor drain.

.4 Fans: centrifugal type with double blowers and motors rated for single phase 208 V. Separate Motor for the supply and exhaust fan.

.5 Filers: medium efficiency in the supply and exhaust air streams.

.6 Minimum 55% effectiveness in heating.

2.4 ELECTRIC DUCT HEATER

.1 Provide electric duct heater with SCR for tempering air. Thermolec. 208Volts /3 phase/60Hz.

.2 With air flow sensor and inline thermostat.

.3 Install as shown on drawings.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Install units in accordance with manufacturer's instructions and as indicated.

.2 Ensure adequate clearance for servicing and maintenance.

.3 Continuous operation, to be interlocked with fan coil operation.

3.2 SCHEDULES

.1 HEAT RECOVERY VENTILATORS

	Drawing Code	**HRV-1**	**HRV-2**
	Location	Offices	Members area
	Manufacturer	Aldes	Aldes
	Model	H650-Fi	H1100A-Fi
		115/1 phase/60Hz	115/1 phase/60Hz
	Airflow Capacity (L/s)	142	467
	External Static Pressure	0.4	0.5
	Accessories	Filter kit, speed control	Filter kit, speed control

.2 DUCT HEATERS

	Drawing Code	**DH-1**	**DH-2A**	**DH-2A**	**DH-3**
	Associated equipment	HRV-1	HRV-2	HRV-2	FC-3
	Manufacturer	Thermolec	Thermolec	Thermolec	Thermolec
	Output	7 kW	20 kW	15 kW	10 kW
	Location	See M2.0	See M2.0	See M2.0	See M2.2
	Temperature setting	0 C	0 C	21 C	21 C
	Electrical characteristics	208V/3 phase/60Hz	208V/3 phase/60Hz	208V/3 phase/60Hz	208V/3 phase/60Hz

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Cabinet unit heaters.

.2 Electric heaters.

.3 Electric Baseboard heaters.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Administrative Requirements.

.2 Section 01 44 00 - Quality Assurance.

.3 Section 01 61 00 - Common Product Requirements.

.4 Section 01 78 10 - Execution Requirements.

.5 Section 25 90 00 - Sequence Of Operation.

.6 Section 26 05 80 - Equipment Wiring:

- .1 Electrical characteristics and wiring connections.
- .2 Installation of room thermostats.
- .3 Electrical supply to units.

1.3 SUBMITTALS FOR REVIEW

.1 Section 01 33 00: Procedures for submittals.

.2 Product Data: Provide typical catalogue of information including arrangements.

.3 Shop Drawings:

- .1 Indicate cross sections of cabinets, grilles, bracing and reinforcing, and typical elevations.
- .2 Submit schedules of equipment and enclosures typically indicating length and number of pieces of element and enclosure, corner pieces, end caps, cap strips, access doors, pilaster covers, and comparison of specified heat required to actual heat output provided.
- .3 Indicate mechanical and electrical service locations and requirements.,

1.4 SUBMITTALS FOR INFORMATION

.1 Section 01 33 00: Submittals for information.

.2 Manufacturer's Instructions: Indicate installation instructions and recommendations.

1.5 SUBMITTALS AT PROJECT CLOSEOUT

.1 Section 01 78 10: Submittals for project closeout.

.2 Project Record Documents: Record actual locations of components and locations of access doors in radiation cabinets required for access or valving.

.3 Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listings.

.4 Warranty: Submit manufacturer warranty and ensure forms have been completed in Owners name and registered with manufacturer.

1.6 QUALITY ASSURANCE

.1 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.7 REGULATORY REQUIREMENTS

.1 Products Requiring Electrical Connection: Listed and classified by CSA as suitable for the purpose specified and indicated.

1.8 WARRANTY

.1 Section 01 78 10: Submittals for project closeout.

.2 Provide one year manufacturer's warranty.

Part 2 Products

2.1 CABINET UNIT HEATERS

.1 Manufacturer: Ouellett.

.2 Other acceptable manufacturers offering equivalent products.

.1 Substitutions: Refer to Section 01 62 00.

.3 Coils: Durable tubular heating element with fins.

.4 Cabinet: 18 GA steel with exposed corners and edges rounded, and integral bottom air outlet.

.5 Finish: Factory applied baked epoxy/polyester paint as selected on visible surfaces of enclosure or cabinet.

.6 Fans: Centrifugal forward-curved double-width wheels, statically and dynamically balanced, direct driven, 160cfm.

.7 Control: Built-in thermostat with tamperproof control knob, factory wired, located in cabinet.

.8 Electrical Characteristics: See Schedule.

2.2 ELECTRIC UNIT HEATERS

.1 Manufacturer: Modine.

.2 Other acceptable manufacturers offering equivalent products.

.1 Ouellett.

.2 Substitutions: Refer to Section 01 62 00.

.3 Assembly: UL listed and labelled assembly with terminal box and cover, and built-in controls.

.4 Heating Elements: Enclosed copper tube, aluminum finned element of coiled nickel-chrome resistance wire centred in tubes and embedded in refractory material. Exposed helical coil of nickel-chrome resistance wire with refractory ceramic support bushings.

.5 Cabinet: 1.2 mm steel with easily removed front panel with integral air outlet and inlet grilles.

.6 Element Hangers: Quiet operating, ball bearing cradle type providing unrestricted longitudinal movement, on enclosure brackets.

.7 Fan: Direct drive propeller type, statically and dynamically balanced, with fan guard.

.8 Motor: Permanently lubricated, sleeve bearings for horizontal models, ball bearings for vertical models.

.9 Control: Separate fan speed switch and thermostat heat selector switch, factory wired, with switches built-in behind cover. Provide thermal overload.

.10 Electrical Characteristics: See Schedule

.1 Disconnect Switch: Factory mount disconnect switch.

.2 Refer to Section 26 05 80.

2.3 ELECTRIC BASEBOARD, BB-1

.1 Manufacturer: Ouellet Model OPR 1000.

.2 Other acceptable manufacturers offering equivalent products.

.1 Substitutions: [Refer to Section 01 62 00.]

.3 Assembly: CSA listed and labelled with terminal box and cover.

.4 Control: Wall mounted electric thermostat.

.5 Electrical Characteristics:

.1 1 kW.

.2 120 volts, single phase, 60 Hz.

.3 Refer to Section 26 05 80.

Part 3 Execution

3.1 INSTALLATION

.1 Install to manufacturer's instructions.

.2 Install equipment exposed to finished areas after walls and ceiling are finished and painted. Avoid damage.

.3 Protection: Provide finished cabinet units with protective covers during balance of construction.

.4 Unit Heaters: Hang from building structure, with pipe hangers anchored to building, not from piping. Mount as high as possible to maintain greatest headroom unless otherwise indicated.

.5 Cabinet Unit Heaters: Install as indicated. Coordinate to assure correct recess size for recessed units.

.6 Install electric heating equipment including devices provided by manufacturer but not factory-mounted. Provide copy of manufacturer's wiring diagram submittal. Install electrical wiring to manufacturer's submittals and Section 26 05 80.

3.2 CLEANING

.1 After construction is completed, including painting, clean exposed surfaces of units. Vacuum clean coils and inside of cabinets.

.2 Touch-up marred or scratched surfaces of factory-finished cabinets, using finish materials provided by manufacturer.

.3 Install new filters.

3.3 SCHEDULES

.1 Cabinet Unit Heaters

Drawing Code	FF-1	FF-2	FF-3	F-4
Location	Main entrance (Rm 100)	Rear exit (Rm 109)	Cell exit door (Rm 133)	Mech'l rm exit (Rm 120)
Manufacturer	Ouellett	Ouellett	Ouellett	Ouellett
Model	OACU02008	OACU02008	OACP02000	OACU01502
Arrangement	Wall mount, recessed	Wall mount, recessed	Ceiling mount, recessed	Wall mount, recessed
Heat Output	2000W	2000W	2000W/1500W	1500W
Fan	160cfm	160cfm	160cfm	160cfm
Voltage/ Phase	208V/ 1PH	208V/ 1PH	240-208V/ 1PH	120V/ 1PH

.2 Electric Unit Heaters

Drawing Code	**UH-1,2**	**UH-3,4,5,6,7,8,9**	**UH-10,11**	**UH-12**	**UH-13**
Location	Rm 124	Crawlspace	Garage	Garage	Mech'l mezzanine
Manufacturer	Modine	Modine	Modine	Modine	Modine
Model	HER150	HER50	HER100	HER50	HER50
Heat Output	15000W	5000W	10000W	5000W	5000W
Fan	830cfm	530cfm	530cfm	530cfm	530cfm
Voltage	208V	208V	208V	208V	208V
Phase	3	3	3	3	3

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Sequence of operation:

- .1 Cabinet Heaters.
- .2 LAN Room Air Conditioning.
- .3 Fan coil units.
- .4 Motorized Dampers.
- .5 Exhaust fans – general
- .6 Crawlspace exhaust
- .7 Secure Bay and Garage Exhaust
- .8 Heat recovery ventilators
- .9 Electric Heating Coils
- .10 Hydronic Heating.
- .11 Unit heaters.
- .12 Sump pumps.
- .13 Sewage ejector pump.
- .14 Lift Pumps.
- .15 Hot water recirculation pump.
- .16 Domestic Hot Water Electric Tank.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Administrative Requirements.

.2 Section 01 44 00 - Quality Assurance.

.3 Section 01 61 00 - Common Product Requirements.

.4 Section 01 78 10 - Execution Requirements.

.5 Section 25 30 00 - Instruments And Control Elements.

.6 Section 25 50 01 - Analog Control Equipment.

.7 Section 25 50 02 - Digital Control Equipment.

.8 Section 26 05 80 - Equipment Wiring: Electrical characteristics and wiring connections.

1.3 SYSTEM DESCRIPTION

.1 This section defines the manner and method by which controls function.

.2 Requirements for each type of control system operation are specified.

□

.3 Equipment, devices, and system components required for control systems are specified in other Sections.

1.4 SUBMITTALS FOR REVIEW

.1 Section 01 33 00: Procedures for submittals.

.2 Shop Drawings: Indicate mechanical system controlled and control system components.

.1 Label with settings, adjustable range of control and limits. Include written description of control sequence.

.2 Include flow diagrams for each control system, graphically depicting control logic.

.3 Include draft copies of graphic displays indicating mechanical system components, control system components, and controlled function status and value.

1.5 SUBMITTALS AT PROJECT CLOSEOUT

.1 Section 01 78 10: Submittals for project closeout.

.2 Project Record Documents: Record actual locations of components and set points of controls, including changes to sequences made after submission of shop drawings.

Part 2 Products

2.1 Not Used

.1 Not Used

Part 3 Execution

3.1 CABINET HEATERS

.1 Single temperature thermostat mounted in cabinet return air set 20 degrees C maintains constant space temperature by cycling unit fan motor and electric heating elements. Integral thermostat continues fan operation until element temperature falls below 38 degrees C.

3.2 LAN ROOM AIR CONDITIONING

.1 On room temperatures above 24 degrees C, ductless air conditioning unit shall cycle on and off to maintain room temperature. Year round operation.

3.3 FAN COIL UNITS

.1 These units provide tempered air to three different zones in the building. FC-1 provides air to the offices and administrative area. FC-2 provides air to the central members' area and services rooms. FC-3 provides air to the cells area. Fresh air from HRV's (for FC-1 and 2) is introduced to the fan coils via the return air duct. Fresh air for FC-3 comes from a direct fresh air intake. The fan coils provide tempered air during heating season, and

will provide building cooling during cooling season. The fan coils shall be switchable between heating and cooling mode at the room thermostat, both manually and automatically. The fan coils are sized to be able to provide building heat if the hydronic system fails. FC-1 and FC-2 shall run continuously, and will shut down on fire alarm.

.2 FC-3 will operate in 2 modes: a) Full-speed 100% outside air mode or b) Partial recirculation mode, depending on the exhaust fan operation. There are 3 types of exhaust fans in the cell area: those operating continuously, those with an ON/OFF switch, and those with a LOW/HIGH switch.

.1 When all exhaust fans in the cell area that have ON/OFF or LOW/HIGH controls, are set to ON or HIGH, FC-3 will operate in 100% OA mode and the damper in the return air duct will remain closed in this mode. EF-1 will operate at full speed.

.2 When only some of the exhaust fans are set to HIGH or ON, FC-3 will operate at 100% OA mode, the damper in the return air duct will remain closed, and the damper for the relief duct in the patrol corridor will open. EF-1 will operate at full speed.

.3 When all cell exhaust fans with switches are set to OFF or LOW, FC-3 will operate in partial recirculation mode, the fresh air intake damper will close to halfway, and the return air damper will open. The damper for the relief duct in the patrol corridor will be closed. EF-1 will operate at low speed.

.3 During heating season, a supply air thermostat set at 21 degrees C (adjustable) maintains constant supply air temperature by staging electric heater coils.

.4 During cooling season, area thermostats maintain constant room temperature by cycling DX cooling coils.

.5 These units will be shut down upon fire alarm.

3.4 MOTORIZED DAMPERS

.1 Three motorized dampers are used to control the airflow in the cell area depending upon exhaust fan and fan coil settings. See Fan Coil section for more details.

3.5 EXHAUST FANS – GENERAL

.1 All fans will be shut down upon fire alarm.

.2 Exhaust fan: EF-1

.1 Fan shall be two speed motor, with automatic hi/low switching.

.2 Fan shall run continuously during occupied mode to maintain cell negative pressure relative to guard areas. See Fan Coil section for more details.

.3 Cells and Breathalyzer room exhaust fans: EF-4,5,6,7,8

.1 Fans shall be two speed motors, with manual hi/low switching.

.2 Fans shall run continuously during occupied mode in low speed to maintain cell negative pressure relative to guard areas.

.4 Exhaust fans: EF-2,3,10 (Janitor's room, prisoner effects, guard washroom)

□

.1 Fans shall be one speed motors. Fans shall run continuously.

.5 Exhaust fans: EF-9, 11 (shower, interview room)

.1 Fan shall be one speed motor, interlocked with the shower room light switch. Fan to run continuously when shower room light is on.

.6 Washroom/Changeroom/Workout room/Shower exhausts;

.1 Exhaust shall be by heat recovery ventilator exhaust. This exhaust shall run continuously to maintain negative pressure relative to common areas.

3.6 CRAWLSPACE EXHAUST FANS: EF-13, 14

.1 Outside temperature sensor and dew point sensor monitors outdoor temperature and dewpoint and the crawlspace mounted humidistat monitors crawlspace humidity. When outdoor temperature is greater than 5C AND the relative humidity in the crawlspace is higher than 90%, AND the dew point of the exterior air is less than the crawlspace temperature, the crawlspace ventilation system is activated. The motorised damper for the outdoor air intake is opened and when fully open an end switch sends a signal to the exhaust fan to start operation. Exhaust fan operation will cease and the air intake will close when the humidity in the crawlspace is reduced to 50%.

3.7 SECURE BAY AND GARAGE EXHAUST, EF-12, 15

.1 When the remote CO/NOx Sensor reaches the first alarm set point (25PPM for CO and 0.7PPM for NOx) the exhaust fan is to start and the motorized damper open. The fan is to run until the sensor reads 0ppm, at which point it will stop and the motorized damper will close.

.2 If the CO/NOx level does not drop, but rises so the sensor reaches the second alarm set point (75 PPM for CO and 2PPM for NOx), the alarm located in the garage will sound. The exhaust will continue to run. The motorized damper will remain open.

3.8 HEAT RECOVERY VENTILATORS

.1 Heat recovery ventilators are used to provide fresh air to the members' area and administrative area. HRV-1 provides 300cfm to FC-1 (for admin area) and HRV-2 provides 900cfm to FC-2 (members' area and service rooms).

.2 The heat recovery ventilators will run continuously to provide fresh air and exhaust. These units will be shut down on fire alarm.

.3 These units will have an electric in-duct coil located in the outdoor air intake for defrost, to ensure 100% ventilation at all times. This electric coil will be cycled on off to maintain -5 degrees C air temperature, and will have a failsafe air switch (sail switch) to keep the coil from heating should the air system fail. This control shall be by standalone SCR control based on air temperature sensing.

□

3.9 ELECTRIC HEATING COILS

.1 Electric in-duct coil on heat recovery ventilators' fresh air intake (7kW DH for HRV-1 and 20kW DH for HRV-2) shall cycle on/off as enabled from a duct air temperature sensor to maintain outdoor air temperature above zero Celsius for defrost of heat exchanger, and to maintain ventilation during heat recovery ventilator operation.

.2 15 kW Electric in-duct coil on HRV-2 fresh air supply duct and 10kW DH on FC-3 intake air duct shall cycle on/off as enabled from duct air temperature sensor to maintain air temperature to respective fan coils at 21C as a supplement to the fan coil heat. When the fan coil is switched from heating mode to cooling mode, this supplemental duct heater shall be de-energized.

.3 All electric coils shall have air flow and hi limit safety controls.

3.10 HYDRONIC HEATING

.1 Boiler Loop Control

- .1 When outdoor temperature is 10C (adjustable) or lower, enable boilers. Control heating water supply temperature at 31 degrees C.
- .2 Alternate use of boilers – every Wed at 12 noon and every Sunday at midnight. If one boiler fails, then switch to the other boiler and generate an alarm.
- .3 Boiler loop to run continuously when boiler in operation.

.2 Primary Loop control

- .1 Loop pump operates continuously.
- .2 Flow control valve will open and close to maintain primary loop temperature at 31 degrees C.
- .3 Flow switch in heating pump discharge provides on/off indication.
- .4 On outside temperatures above 10 degrees C, de-energize loop pumps and suppress alarm.

.3 Zone Loop control

- .1 Loop pump to operate continuously.
- .2 On call for heat from zone thermostat, control valve will open and allow water from primary loop to circulate through zone loop. When call for heat is satisfied, control valve will close.
- .3 Flow switch in heating water circuit on no flow conditions indicates alarm.
- .4 On outside temperatures above 10 degrees C, de-energize loop pumps and suppress alarm.

3.11 UNIT HEATERS – SECURE/GARAGE BAY

.1 Single temperature electric room thermostat maintains constant space temperature of 20 degrees C by cycling electric heaters and unit fan motor.

□

3.12 SUMP PUMPS

.1 Pit shall have hi level alarm, and shall have a trouble light indicator for hi level located at front reception desk or other room as noted by owner. Hi level alarm shall indicate when sump pits are at 75% capacity.

.2 Sump pumps shall operate automatically when sump levels rise above sump float trigger.

3.13 SEWAGE EJECTOR PUMPS

.1 Tank shall have hi level alarm, and shall have a trouble light indicator for hi level located at front reception desk or other room as noted by owner. Hi level alarm shall indicate when tank at 75% capacity.

.2 Sewage pumps shall operate automatically when sewage tank levels rise above pump float trigger.

3.14 LIFT PUMPS

.1 Tank shall have hi level alarm, and shall have a trouble light indicator for hi level located at front reception desk or other room as noted by owner. Hi level alarm shall indicate when tanks at 75% capacity.

.2 Lift pumps shall operate automatically when sewage tank levels rise above pump float trigger.

3.15 DOMESTIC HOT WATER RECIRCULATION PUMP

.1 Pump shall run continuously on, toggled on/off by switch. 24h timer with 15min intervals available to reduce pump operation while meeting hot water needs.

3.16 DOMESTIC HOT WATER ELECTRIC TANK

.1 Hot water tanks shall maintain 60 degrees C in water storage by cycling on/off electric immersion heaters as enabled from immersion aqua stat, all as a package from manufacturer.

END OF SECTION

□