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ELECTRICAL

CIVIL

CABIN COMFORT & ENVIRONMENT RESEARCH (CCER) FACILITY

1200 MONTREAL ROAD, OTTAWA, ONTARIO

ISSUED FOR TENDER
MAY 29TH, 2015

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National Research Council Canada
Administrative Services and Property Management Branch
Conseil national de recherches Canada
Division des services administratifs et gestion de l'immobilier

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ONTARIO ASSOCIATION OF ARCHITECTS
MAY 29 2015
JONATHAN D. HUGHES
LICENCE
1671

No.	Date	Revision	By / Par.
0	29 05 2015	ISSUED FOR TENDER	SD

Date Printed — Date imprimée

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

A Detail no. No. du détail
B Location drawing no. sur dessin no.
C Drawing no. dessin no.

project / projet
NRC CABIN COMFORT + ENVIRONMENTAL RESEARCH FACILITY

MONTREAL ROAD CAMPUS

drawing / dessin
FRONT COVER

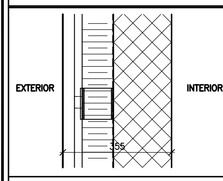
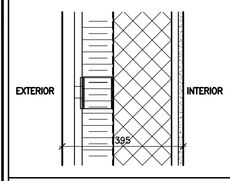
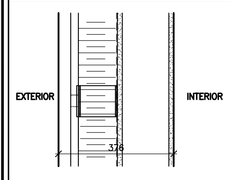
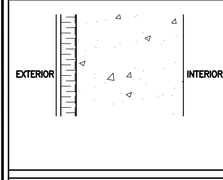
designed / conçu: S.DUNDERDALE	date / date: MAY '15
drawn / dessiné: S.DUNDERDALE	scale / échelle: NTS
checked / vérifié: J.HUGHES	sheet / of/de: A00 of/de 14 feuille
approved / approuvé	W.O.no. / D.T.no.

dwg.no. / dessin no.
3788-A00

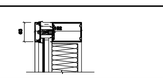
ASPM A0 (1189x841)

C
0 10 20mm 40 60 80 100 120 140 160 180 200mm

EXTERIOR WALL TYPES

GRAPHICS (N.T.S.)	TYPE	CONSTRUCTION	NOTES
	W-1	METAL SHEET SIDING WITH EXPOSED FASTENERS ON BLOCKWORK • 38mm PREFINISHED VERTICAL METAL SHEET SIDING (PNL-1) • 25mm HORIZONTAL TOP HAT 20ga @ 600 o/c • 102mm CASCADIA FIBREGLASS THERMAL SPACERS @ 400 o/c HORIZONTALLY & 600 o/c VERTICALLY • 102mm MINERAL FIBRE INSULATION • AIR/VAPOUR BARRIER MEMBRANE • 190mm REINF. CONCRETE BLOCK	EXTERIOR WALL AT WEST ADDITION
	W-2 W-2a W-2b	METAL SIDING WITH HIDDEN FASTENERS ON BLOCKWORK • 40mm PREFINISHED VERTICAL METAL SIDING (PNL-2) • 25mm HORIZONTAL TOP HAT 20ga @ 600 o/c • 102mm CASCADIA FIBREGLASS THERMAL SPACERS @ 400 o/c HORIZONTALLY & 600 o/c VERTICALLY • 102mm MINERAL FIBRE INSULATION • AIR/VAPOUR BARRIER MEMBRANE • 190mm REINF. CONCRETE BLOCK • 22mm METAL FURRING CHANNELS @ 400mm O/C MAX. • 16mm GYPSUM BOARD • AS ABOVE WITHOUT 22mm FURRING & INTERNAL GYPSUM • AS W-2 WITH 127mm THERMAL SPACERS & 127mm MINERAL FIBRE INSULATION ON 200mm REINFORCED CONCRETE	EXTERIOR WALL AT EAST ADDITION
	W-3	METAL SIDING with HIDDEN FASTENERS ON LIGHTWEIGHT STEEL FRAMING • 40mm PREFINISHED VERTICAL METAL SIDING (PNL-2) • 25mm HORIZONTAL TOP HAT 20ga @ 600 o/c • 127mm CASCADIA FIBREGLASS THERMAL SPACERS @ 400 o/c HORIZONTALLY & 600 o/c VERTICALLY • 127mm MINERAL FIBRE INSULATION • AIR/VAPOUR BARRIER MEMBRANE • 16mm EXTERIOR GRADE SHEATHING • 152mm METAL STUD FRAMING @ 400mm O/C MAX. • 1 LAYERS 16mm GYPSUM BOARD	EXTERIOR WALL AT MAIN ENTRANCE
	W-4 W-4a	• 16mm PROTECTION BOARD (BELOW GRADE)/PARGING (ABOVE GRADE) & 50mm RIGID INSULATION (EXTENDS 1200mm BELOW GRADE) • WATERPROOFING MEMBRANE (TAKEN TO BASE OF FOOTING) • FOUNDATION WALL (REFER TO STRUCTURAL) • 16mm PROTECTION BOARD (BELOW GRADE)/PARGING (ABOVE GRADE) & 50mm RIGID INSULATION (EXTENDS TO FOOTING) • WATERPROOFING MEMBRANE (WRAPS FOOTING & LAPS SLAB MEMBRANE — WHERE PRESENT) • FOUNDATION WALL (REFER TO STRUCTURAL)	FOUNDATION INSULATION & WATERPROOFING MIN R10

WINDOW TYPES

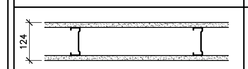
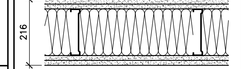
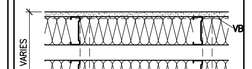
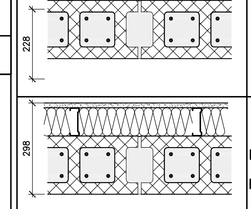
	W-1	• 152mm CURTAIN WALL FRAMING (CURTAIN WALL MEMBERS TO BE ENGINEERED) WITH DOUBLE GLAZED VISION PANELS, SPANDREL PANELS & INSULATED BACK PAN	ENTRANCE CURTAIN WALLING MIN R10
	W-2	• HIGH PERFORMANCE ALUMINUM WINDOW WITH DOUBLE GLAZED VISION PANELS	

NOTES:
1.ALL PARTITIONS EXTEND FROM FLOOR SLAB TO FLOOR SLAB/ROOF SLAB.
2.MOISTURE RESISTANT GWB TO BE SUBSTITUTED AS NECESSARY IN BATHROOMS.
3.WALLS EXTEND TO DECK OR SLAB WITH DEFLECTION TRACK OR CHANNEL.
4.INNER LAYERS OF GWB SHOULD BE CAREFULLY FITTED & TAPED BUT ARE NOT REQUIRED TO BE SANDED.
5.GWB JOINTS SHOULD BE STAGGERED.
6.NOTES IN BRACKETS SHOW ACTUAL PROPERTIES.
7.ALL INTERIOR PLYWOOD TO BE FIRE RETARDANT

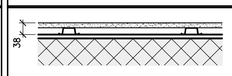
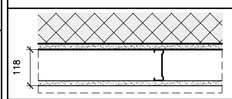
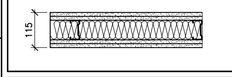
THE FOLLOWING NOTES APPLY TO ALL WALLS WITH 45+ STC RATING:

1.INNER AND OUTER LAYERS OF GWB SHOULD HAVE NO GAPS OVER 6mm.
2.CAULKING SHOULD BE DONE ON EACH LAYER OF GWB AT TOP & BOTTOM & SIDES.
3.USE ONLY RED COLOURED FIRE RATED CAULK (ie. TREMSTOP ACRYLIC). WHERE CAULKING MAY BE VISIBLE, USE THE SAME FIRE RATED CAULK IN WHITE COLOUR.
4.CAULKING FOR ANY GAP OVER 6mm MUST BE OVER ROD BACKUP.
5.ELECTRICAL BOXES ON OPPOSING FACES OF A WALL SHOULD BE LOCATED IN SEPARATE STUD CAVITIES.
6.USE ONLY PRE-GANGED ELECTRICAL BOXES. DO NOT GANG ELECTRICAL BOXES.
7.FIBERGLASS BATT SHOULD BE RUN BEHIND & AROUND ALL ELECTRICAL BOXES WHERE POSSIBLE (ie. DOUBLE WALLS)
8. ALL PENETRATIONS THROUGH RATED WALLS MUST BE SEALED AIR-TIGHT WITH A COMBINATION OF JOINT COMPOUND AND FIRE RATED CAULK.
9. BLOCKING MUST NOT CONNECT ONE FACE OF THE WALL WITH THE OTHER.
10. CONDUIT PENETRATIONS SHOULD BE RESTRICTED TO THE SMALLEST DIAMETER POSSIBLE FOR THE APPLICATION. MULTIPLE SMALL CONDUITS SPACED TO ALLOW SEALING OF EACH IS PREFERABLE TO SINGLE LARGE DIAMETER CONDUITS OR ONES RUN TIGHT TO THE SLABS.
11. ALL CONDUIT PENETRATIONS MUST BE SEALED AIR TIGHT.
12.GWB CONTRACTOR TO MAKE FINAL INSPECTION OF PENETRATION SEALING AFTER ALL THE COMMUNICATION WIRING IS IN PLACE.

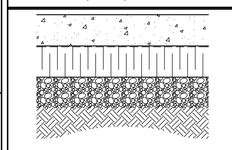
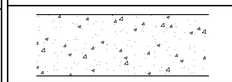
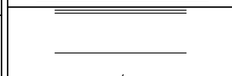
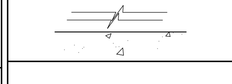
INTERIOR PARTITION TYPES

GRAPHICS (N.T.S.)	TYPE	CONSTRUCTION	REQ'D FRR/STC	NOTES
	P-1	• 16mm GYPSUM BOARD • 64mm STEEL STUDS @ 400mm O/C • 16mm GYPSUM BOARD		GENERAL USE
	P-2 P-2a	• 16mm GYPSUM BOARD • 92mm STEEL STUDS @ 400mm O/C • 16mm GYPSUM BOARD SAME AS P2 BUT WITH GYPSUM ONE SIDE ONLY		ULC DES W453 or W407 or UL DES U419 or U465
	P-3	• 16mm TYPE X- GYPSUM BOARD • 152mm STEEL STUDS @ 400mm O/C • 16mm TYPE – X GYPSUM BOARD	45min FRR	GENERAL USE NBC S12a (STC 41)
	P-4 P-4a	• 2-LAYERS 16mm TYPE-X GYPSUM BOARD • 92mm STEEL STUDS @ 600mm O/C • 90mm MINERAL FIBRE INSULATION • 2-LAYERS 16mm TYPE-X GYPSUM BOARD VAPOUR BARRIER RQ'D BTWN RWS127/126 & 133, AND ALSO BTWN 122 & 123, TO BE INSTALLED TOWARDS RM 127/128/122. • AS ABOVE WITH 19mm PLYWOOD BACKING FIXED TO STUDS BEHIND GWB IN RM 138	STC 56	BETWEEN OFFICE AND CORRIDOR NBC S6a (2hr FRR) INSULATION TO HAVE MIN R VALUE 4.1/INCH
	P-5	• 2-LAYERS 16mm TYPE-X GYPSUM BOARD • 92mm STEEL STUDS @ 600mm O/C • 90mm MINERAL FIBRE INSULATION • 13mm RESILIENT CHANNEL • 16mm TYPE-X GYPSUM BOARD	STC 54	BETWEEN OFFICES NBC S12A (N/A)
	P-6	• 2-LAYERS 16mm TYPE-X GYPSUM BOARD • 152mm STEEL STUDS @ 600mm O/C • 150mm MINERAL FIBRE INSULATION • 2-LAYERS 16mm TYPE-X GYPSUM BOARD	STC 59	NBC S9a (2hr FRR)
	P-7	• 16mm GYPSUM BOARD • 92mm STEEL STUDS @ 600mm O/C. • 75mm MINERAL FIBRE INSULATION • PLUMBING SPACE • 92mm STEEL STUDS @ 600mm O/C. • 75mm MINERAL FIBRE INSULATION (MIN R VALUE 4.1/INCH) • 16mm GYPSUM BOARD VAPOUR BARRIER RQ'D BTWN RWS128 & 133 ONLY. TO BE INSTALLED TOWARDS RM 128. SEE A04.	STC 61	BETWEEN WASHROOMS INSULATION TO HAVE MIN R VALUE 4.1/INCH UL 445 (1hr FRR)
	P-8	• 190mm REINFORCED CONCRETE BLOCK WALL	1hr FRR STC MIN 50	NBC B1b (1.5hr FRR)
	P-9 P-9a P-9b	• 16mm GYPSUM BOARD • 22mm METAL FURRING CHANNELS @ 400mm O/C MAX. • 190mm REINFORCED CONCRETE BLOCK • AS ABOVE WITH 19mm PLYWOOD BACKING IN LIEU OF GWB • AS P-9 WITH 19mm PLYWOOD BACKING FIXED TO CHANNELS BEHIND GWB	1hr FRR STC MIN 50	UL U914
	P-10 P-10a P-10b	• 16mm GWB • 92mm STEEL STUDS @ 400 O.C • 90mm MINERAL FIBRE INSULATION • 190mm REINFORCED CONCRETE BLOCK • AS ABOVE WITH 19mm PLYWOOD BACKING FIXED TO STUDS BEHIND GWB AS P10a WITH • 22mm METAL FURRING CHANNELS @ 400mm O.C MAX • 19mm PLYWOOD BACKING • 16mm GWB ALL FIXED TO THE OPPOSITE SIDE OF B/WORK	1hr FRR STC MIN 53	
	P-11 P-11a	• 16mm GYPSUM BOARD • 64mm STEEL STUDS @ 400mm O/C • 190mm REINFORCED CONCRETE BLOCK • A/V BARRIER MEMBRANE • 102mm CASCADIA FIBREGLASS THERMAL SPACERS @ 400 o/c HORIZONTALLY & 600 o/c VERTICALLY • 102mm MINERAL FIBRE INSULATION (MIS-2) • 25mm HORIZONTAL TOP HAT 20ga @ 600 o/c • 16mm GYPSUM BOARD (CAVITY TO BE VENTED TOP AND BTM) AS ABOVE WITH 19mm PLYWOOD BACKING FIXED TO STUDS BEHIND GWB ON CONDITIONED SIDE	45 MIN FRR STC MIN 53	INTERIOR WALL WITH EXTERIOR WALL FEATURES (1hr FRR) NBC B7

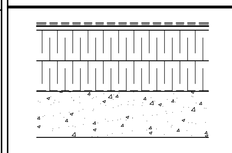
FURRING TYPES

GRAPHICS (N.T.S.)	TYPE	CONSTRUCTION	NOTES
	F-1 F-1a F-1b	• 16mm GYPSUM BOARD • 22mm FURRING CHANNELS @ 400mm O/C • ON EXISTING EXTERIOR WALLS • AS ABOVE WITH 19mm PLYWOOD BACKING FIXED FRAMING BEHIND GWB • AS F-1 WITH 19mm PLYWOOD BACKING IN LIEU OF GWB & FIXED BACK TO NEW WALLS	
	F-2 F-2a F-2b	• 16mm GYPSUM BOARD • 64mm METAL STUDS @ 400mm O/C • AS ABOVE WITH POLYETHYLENE RETARDER ON INTERIOR OF 85mm MINERAL FIBRE INSULATION & MOISTURE BARRIER ON CONCRETE • AS F-2a WITH 19mm PLYWOOD BACKING FIXED TO STUDS BEHIND GWB	
	F-3	• EXTERIOR FRAMING, INSULATION & CLADDING REMOVED • 16mm GYPSUM BOARD • 102mm STEEL STUDS @ 400mm O/C WITH 64mm STEEL STUDS @ 400mm O/C BELOW • FIXED BACK TO EXISTING ASSUMED STRUCTURE	
	F-4	• 2 LAYERS 13mm TYPE-X GYPSUM BOARD • 64mm STEEL STUDS @ 600mm O/C • 89mm MINERAL FIBRE INSULATION • 2-LAYERS 13mm TYPE-X GYPSUM BOARD • FIXED BACK TO EXISTING STRUCTURE & ADJACENT TO EXISTING GLASS BLOCK WINDOW/PORTHOLE	45 min FRR/ STC 53 FIRE & STC RATED INFILL ASSEMBLY TO SUIT SIZE OF EXISTING GLASS BLOCK WINDOW OPENINGS/PORTHOLE (1.5h) NBC S3c

FLOOR TYPES

GRAPHICS (N.T.S.)	TYPE	CONSTRUCTION	NOTES
	FL-1 FL-1a	NEW SLAB ON GRADE • REINFORCED CONCRETE FLOOR SLAB PER STRUCTURAL • VAPOUR BARRIER • 75MM RIGID INSULATION TAKEN 600MM INTO THE BUILDING PERIMETER • COMPACTED GRANULAR BASE PER STRUCTURAL. NEW SLAB BELOW GRADE • REINFORCED CONCRETE FLOOR SLAB PER STRUCTURAL • WATERPROOF MEMBRANE • 75MM RIGID INSULATION TAKEN 600MM INTO THE BUILDING PERIMETER • 50MM COMPACTED GRANULAR BASE PER STRUCTURAL • 100MM OF 19MM CLEARSTONE • BEDROCK	MIN R15
	FL-2	NEW INFILL FLOOR • REINFORCED POURED CONCRETE; REFER TO STRUCTURAL FOR THICKNESS	AT MAIN FLOOR LEVEL
	FL-3	NEW RECESSED FLOOR • REMOVABLE FLOOR PANELS & RAISED FLOOR SYSTEM – N.I.C • REINFORCED LOWER CONCRETE FLOOR SLAB– REFER TO STRUCTURAL	AT FLEXIBLE CABIN LABORATORY
	FL-4	• SELF LEVELLING CONCRETE TOPPING/FLOOR UNDERLAYMENT ON EXISTING BASPH FLOOR – REFER TO 03 54 16 (MIN 3mm THK)	AT LOWER FLOOR

ROOF TYPES

GRAPHICS (N.T.S.)	TYPE	CONSTRUCTION	NOTES
	R-1	NEW ROOF STRUCTURE • 2-PLY MOD-BIT ROOFING SYSTEM • 13mm PROTECTION BOARD • POLYISO INSULATION; MIN 2% GRADIENT, AVG 150mm THK (USE TAPERED INSULATION AS NECESSARY FOR CRICKETS/ROOF SLOPE) • VAPOUR BARRIER MEMBRANE • REINFORCED POURED CONCRETE ROOF SLAB/ CONCRETE ON STEEL DECK; REFER TO STRUCTURAL	MIN R30
	R-2	EXISTING ROOF STRUCTURE • 2-PLY MOD-BIT ROOFING SYSTEM • 13mm PROTECTION BOARD • SLOPED RIGID INSULATION; MIN 50mm AT LOW POINTS • VAPOUR BARRIER MEMBRANE • EXISTING CONCRETE ROOF SLAB	EXISTING ROOF BUILD UP TO BE VERIFIED ON SITE PRIOR TO CONSTRUCTION

NAME PROJECT- NRC CABIN COMFORT FIRE AND LIFE SAFETY AUDIT			
ITEM	2010 NATIONAL BUILDING CODE DATA MATRIX		NBC Reference
			References are to Division B unless noted (A) for Division A or (C) for Division C.
			NBC (Part 3
1	PROJECT DESCRIPTION: EXISTING BUILDING ADDITION & RENOVATION		1.1.2.[A]
2	MAJOR OCCUPANCY - BUSINESS & PERSONAL USE, SECONDARY: INDUSTRIAL		3.2.2.58/3.2.2.81
3	BUILDING AREA (m2)	Existing: 1908m2 Renovated plus addition: 884m2 Total: 2792 m2	1.4.1.2. [A]
4	NUMBER OF STOREYS	Above grade: 1 Below grade: 1	1.4.1.2. [A] & 3.2.1.1.
5	NUMBER OF STREETS/ FIRE FIGHTER ACCESS: ONE REQUIRED ADJACENT TO THE PRINCIPAL ENTRANCE. FIRE DEPARTMENT ACCESS ROUTE IS PROVIDED AT THE SOUTH SIDE OF THE BUILDING		3.2.2.10. & 3.2.5.
6	BUILDING CLASSIFICATION -MAJOR GROUP D- BUSINESS& PERSONAL USE,UP TO 3 STOREYS; SECONDARY: GROUP F - DIVISION 3, UP TO FOUR STOREYS		3.2.2.58. Building area less than 3000m2, faces 2 streets 3.2.2.81. Building area less than 3000m2, faces 2 streets
7	SPRINKLER SYSTEM: THE BUILDING IS NOT SPRINKLERED		3.2.2.58/3.2.2.81
8	FIRE ALARM: THE BUILDING IS PROVIDED WITH A FIRE ALARM		3.2.4. This will be extended to cover the new additions
9	WATER SERVICE/SUPPLY. THE EXISTING BUILDING IS ON THE MUNICIPAL SUPPLY		3.2.5.7
10	HIGH BUILDING: THE BUILDING HEIGHT(AS PER NBC REQUIREMENT) IS LESS THAN 36m, NEW ADDITIONS ARE NOT CONSIDERED A HIGH BUILDING		3.2.6.
11	CONSTRUCTION RESTRICTIONS: REQUIRED TO BE OF COMBUSTIBLE /NONCOMBUSTIBLE CONSTRUCTION		3.2.2.58/3.2.2.81
12	OCCUPANT LOAD BASED ON NBC		m2/person
13	Lower Floor Main Floor Total	Occupancy: D/F	Load: 21 persons Load: 106 persons Load: 127 persons 3.1.17.1.
14	REQUIRED FIRE RESISTANCE RATING (FRR)	Horizontal Assemblies FRR (Minutes) Floor shall be fire separations and require 45 minutes FRR if combustible Mezzanines 45 minutes if combustible Roof 45 minutes if combustible Supporting Members 45 minutes if combustible and supporting a FR assembly	3.2.2.58/3.2.2.81
15	SPATIAL SEPARATION- CONSTRUCTION OF EXTERIOR WALLS		3.2.3.

Wall	Area of EBF (m2)	L.D (m)	Permitted Max.% of Openings	Proposed % of Openings	FRR (Hours)	Type of Cladding required	Type of Construction req'd
North	approx 108m2	50m min approx to c/l of road	100%	37%	N/A	Combustible/ Non combustible	Combustible/ Non combustible
South	approx 50m2	N/A to ex. building only	N/A	22%	N/A	Combustible/ Non combustible	Combustible/ Non combustible
East	approx 444m2	25m min approx to c/l of road	100%	14%	N/A	Combustible/ Non combustible	Combustible/ Non combustible
West	(11.5m2 - new add) approx 493m2	(1.9m min - new add) 4.8m approx to c/l of alley	14% (new add) 18%	0 (new add) 3.6% (inc. ex windows)	1 hr	Non combustible	Combustible/ Non combustible

Note: Area of EBF includes existing building EBF aswell as new additions.

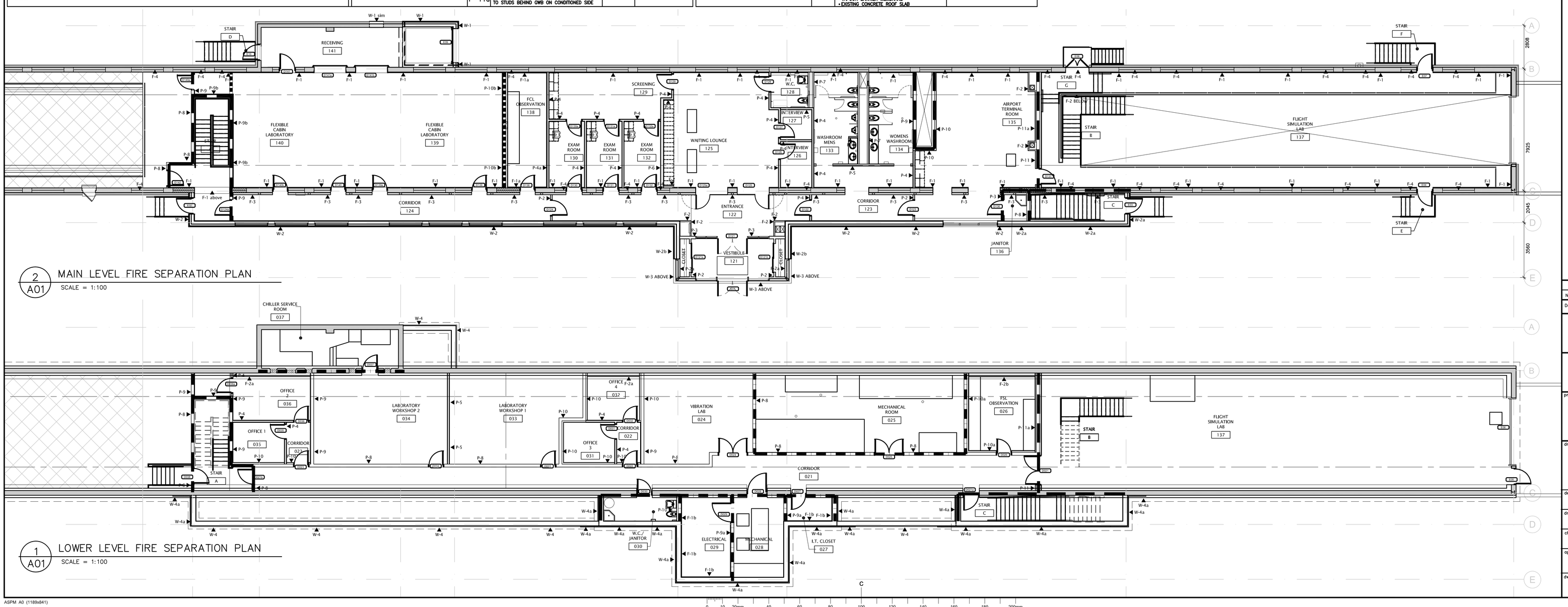
FIRE RESISTANCE RATING

1HR RATING
45 MIN RATING (BLOCK INFILL BETWEEN MAIN FL. & RECESSED FLOOR) SEE ALSO 10/A06 FOR SECTION

FIRE RATING
Floor shall be a fire separation, and requires 45 minutes if combustible
Mezzanines 45 minutes if combustible
Roof 45 minutes if combustible
Supporting Members
45 minutes if combustible or supporting a FR assembly

* NOTE:
ALL DOORS AND FRAMES BETWEEN RATED WALLS TO BE LABELLED TO IDENTIFY THE TESTING LABORATORY & INSTALLED IN CONFORMANCE WITH NFPA 80

All junctions between fire rated walls and other parts of the building to maintain the fire resistance of the fire rated wall.
Openings and service penetrations through these walls/ floors to be kept to a minimum.
Appropriate Fire-stopping to be applied to close any imperfection of fit or design tolerance between construction elements and components, service openings and ventilation ducts.
Building elements should not be built into, carried through or across the ends of, or over the top of a fire rated wall in such a way as to impair the fire resistance between relevant parts of the building.
The continuity of a *fire separation* shall be maintained where it abuts another fire separation, a floor, a ceiling, or an exterior wall assembly.



ASPM A0 (1189x841)

National Research Council Canada / Conseil national de recherches Canada
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GENERAL NOTES

- CONTRACTORS TO CHECK AND VERIFY ALL DIMENSIONS ON SITE PRIOR TO DEMOLITION OR CONSTRUCTION AND REPORT ANY ERRORS OR OMISSIONS TO DEPARTMENTAL REPRESENTATIVE.
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- PROVIDE ALL LABOUR AND MATERIAL REQUIRED TO FORM A COMPLETE, FUNCTIONAL SYSTEM AS DESCRIBED ON DRAWINGS.

LEGEND :

AREA N.I.C.

EXISTING BUILDING ELEMENT

NORR
ARCHITECTS ENGINEERS PLANNERS
NORR Limited
An Ingenium Group Company

ONTARIO ASSOCIATION OF ARCHITECTS
MAY 29 2015
JONATHAN D. HUGHES
LICENCE
5074

No.	Date	Revision	By/ Par.
0	29 05 2015	ISSUED FOR TENDER	SD

Date Printed / Date imprimée

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

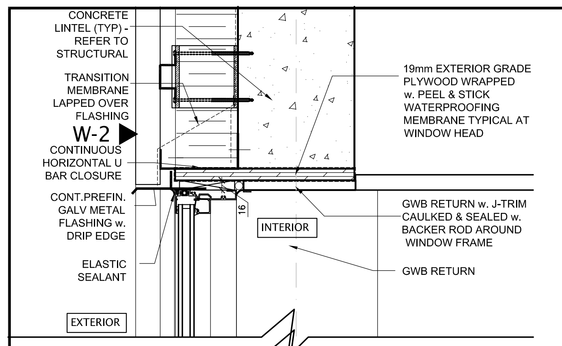
A Detail no. No. du détail
B Location drawing no. sur dessin no.
C Drawing no. dessin no.

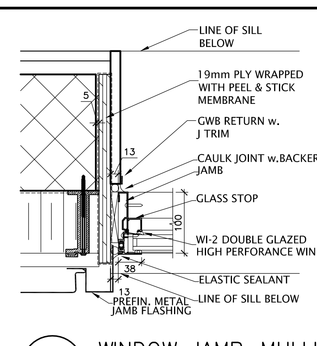
project / projet
NRC CABIN COMFORT + ENVIRONMENTAL RESEARCH FACILITY
MONTREAL ROAD CAMPUS

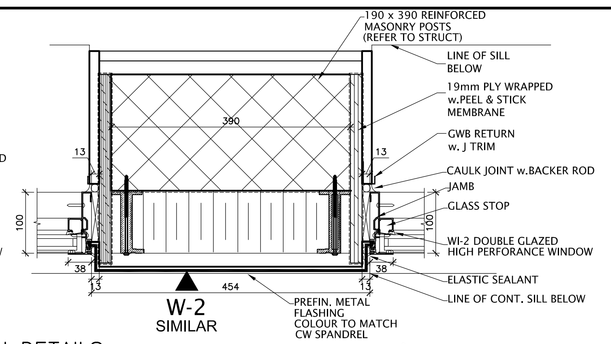
drawing / dessin
ASSEMBLIES & FIRE SEPARATION PLANS

designed / conçu	S.DUNDERDALE	date	MAY '15
drawn / dessiné	S.DUNDERDALE	scale / échelle	1100
checked / vérifié	J.HUGHES	sheet / feuille	A01 of/de 14
approved / approuvé		W.O.no.	D.T.no.

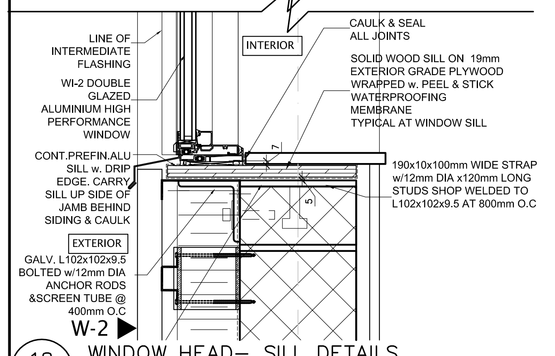
dwg.no. / dessin no.
3788-A01



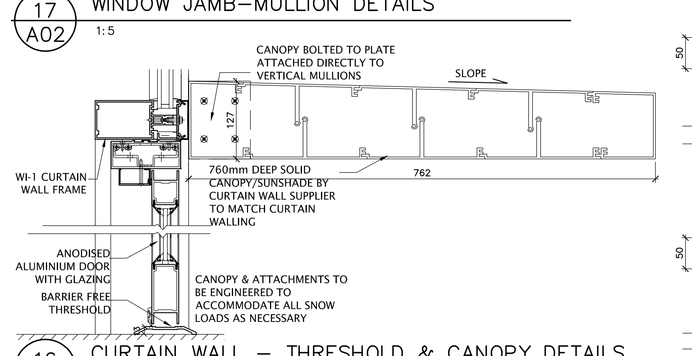




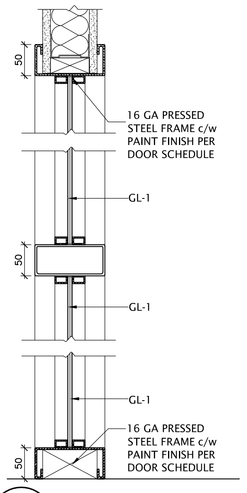
17 A02 WINDOW JAMB—MULLION DETAILS 1:5



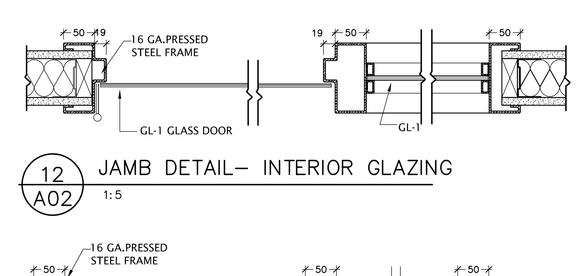
18 A02 WINDOW HEAD— SILL DETAILS 1:5



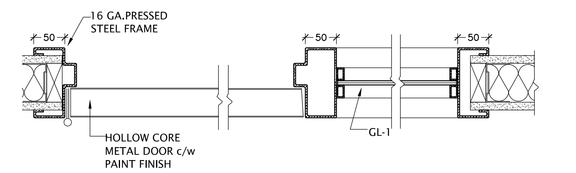
16 A02 CURTAIN WALL — THRESHOLD & CANOPY DETAILS 1:5



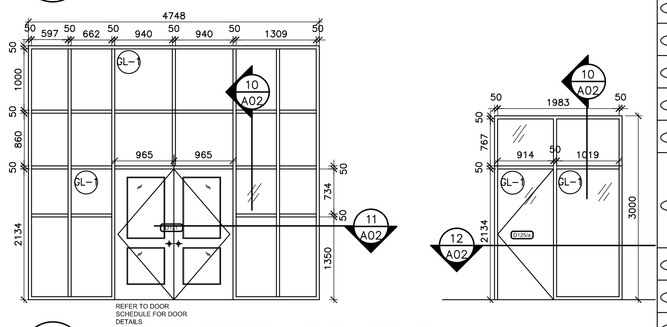
10 A02 HEAD — INT. GLAZING 1:5



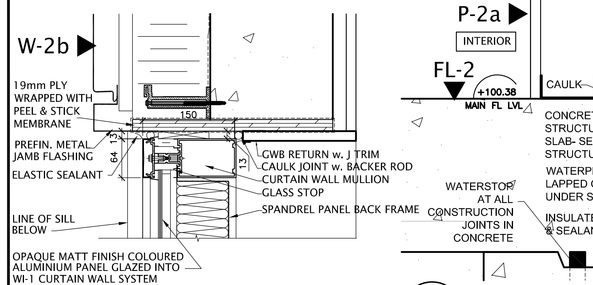
12 A02 JAMB DETAIL— INTERIOR GLAZING 1:5

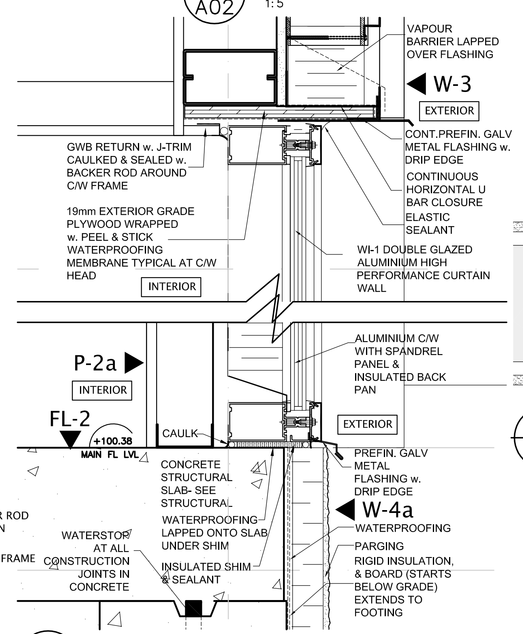


11 A02 JAMB DETAIL— INTERIOR GLAZING 1:5

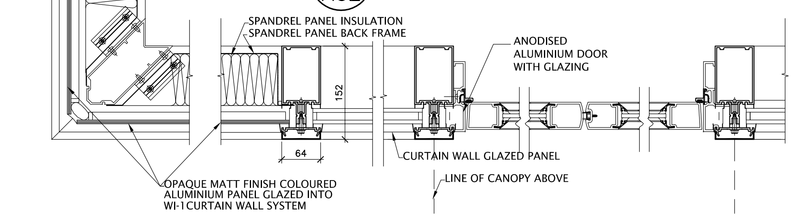


9 A02 INTERIOR SCREEN ELEVATIONS 1:50

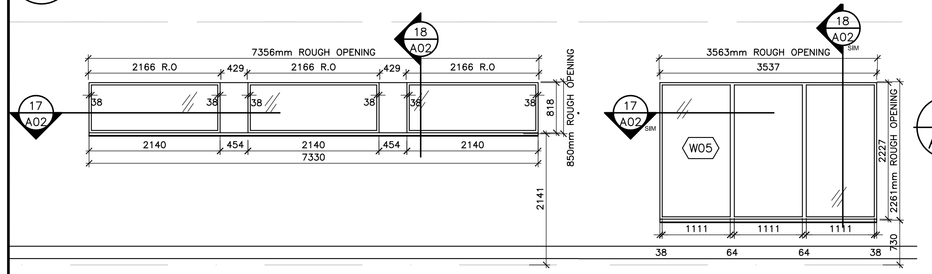


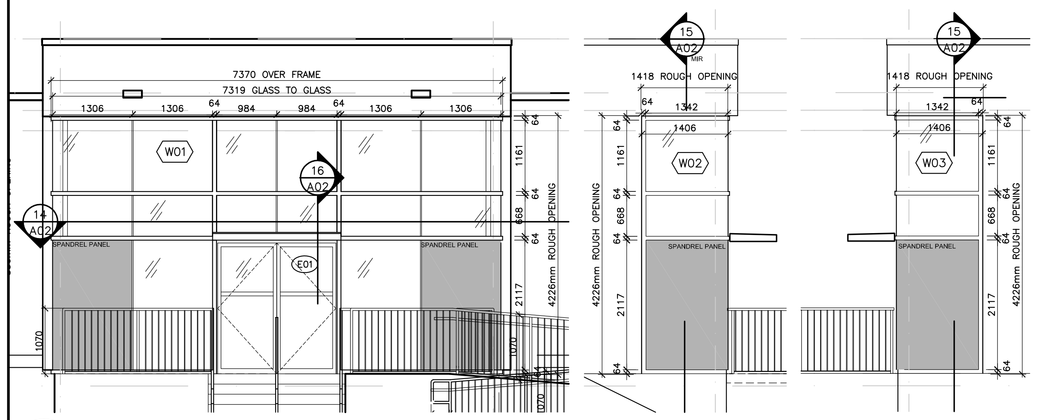


15 A02 CURTAIN WALL HEAD & SILL DETAILS 1:5

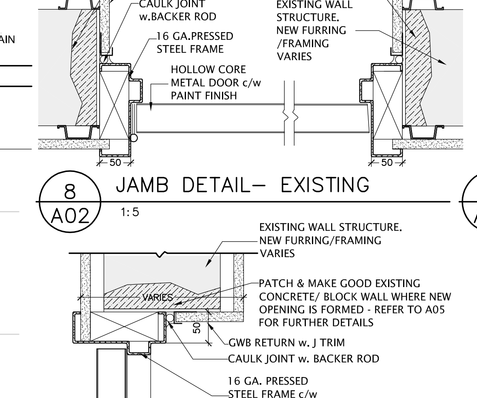


14 A02 CURTAIN WALL JAMB/PLAN DETAILS 1:5

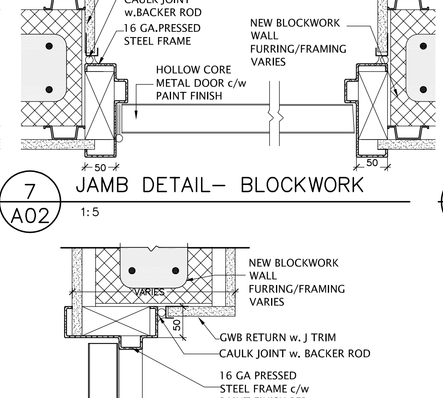




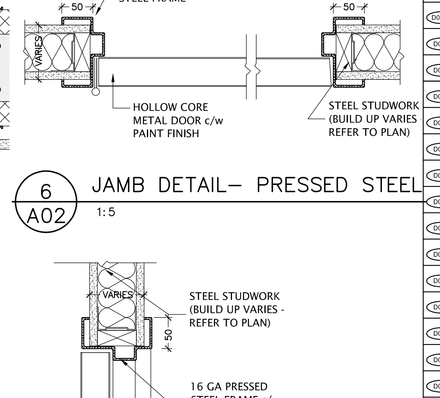
13 A02 WINDOW ELEVATIONS 1:50



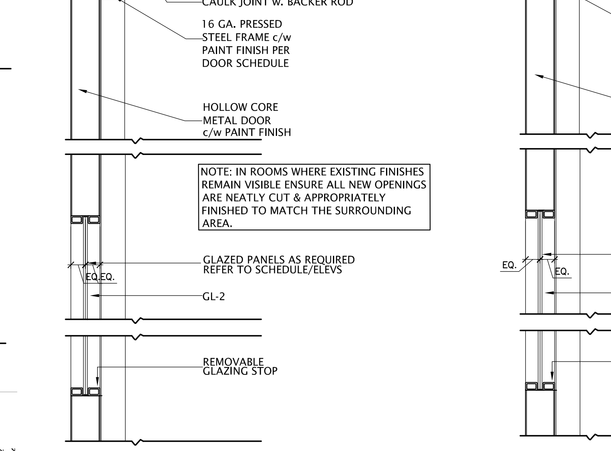
8 A02 JAMB DETAIL— EXISTING 1:5



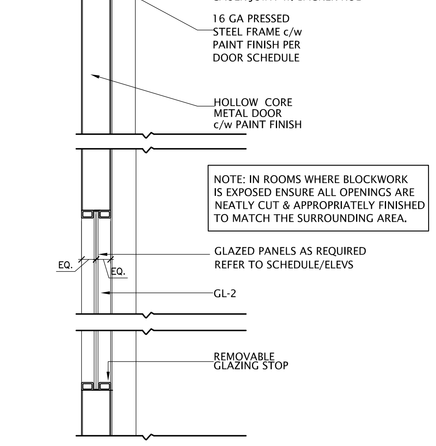
7 A02 JAMB DETAIL— BLOCKWORK 1:5



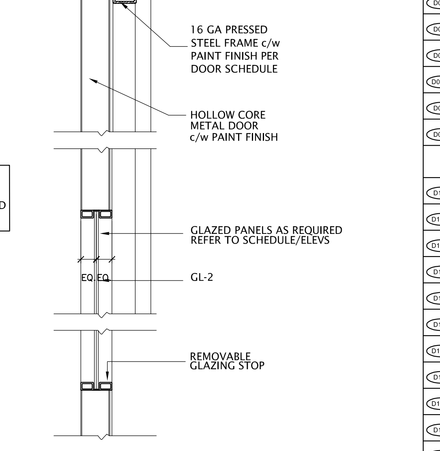
6 A02 JAMB DETAIL— PRESSED STEEL 1:5



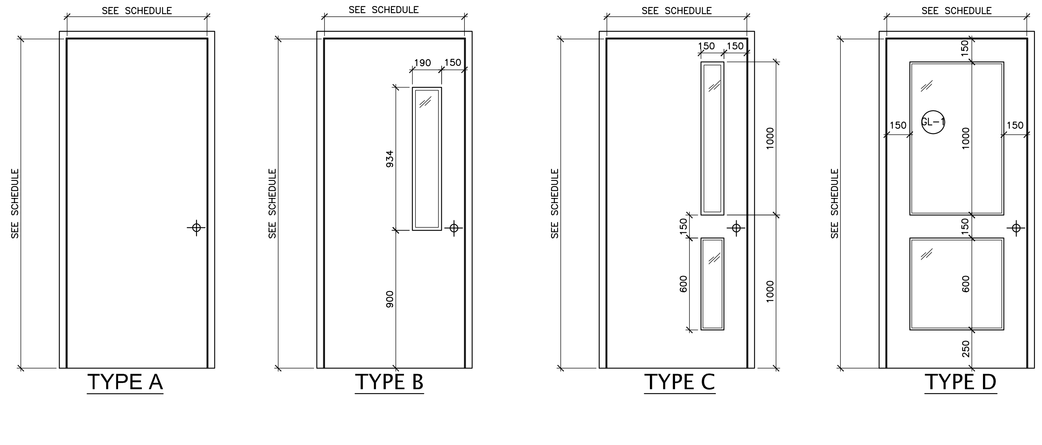
5 A02 HEAD DETAIL — EXISTING WALL 1:5



4 A02 HEAD DETAIL—BLOCKWORK 1:5



3 A02 HEAD DETAIL— PRESSED STEEL 1:5



2 A02 DOOR ELEVATIONS 1:20

DOOR AND FRAME SCHEDULE

NO.	ROOM	DOORS TYPE	DOORS QUANTITY	DOORS WIDTH	DOORS HEIGHT	DOORS THICKNESS	DOORS SWING	DOORS FINISH	FRAMES TYPE	FRAMES THROAT	FRAMES FINISH	FIRE RATING OF DOORSET (mins)	HEAD DETAIL ON A02	JAMB DETAIL ON A02	COMMENTS
	EXTERIOR DOORS														
101	MAIN ENTRANCE	CW	2	965	2134	50	RHRA LHR	AL	CW	CW	AL				POWER DOOR OPERATOR EXTERIOR GRADE DOOR
102	STAIR A - EXIT	A	1	965	2134	45	RH	PT	HM	W2	PT				EXTERIOR GRADE DOOR
103	STAIR C - EXIT	A	1	965	2134	45	LH	PT	HM	W2a	PT				EXTERIOR GRADE DOOR
104	STAIR E -EXIT	A	1	965	2134	45	LH	PT	HM	EX	PT				EXTERIOR GRADE DOOR
105	FLIGHT SIMULATION LAB - MAN DOOR (EXIT)	A	1	965	2134	45	RH	PT	HM	EX	PT				EXTERIOR GRADE DOOR
106	FLIGHT SIMULATION LAB - ROLLING DOOR	RL	1	4254	3937	45			HM	EX					22 GAUGE ROLLER DOOR SYSTEM - MANUFACTURED BY KINNEAR, STYLE - THERMO-TITE, MODEL FH-ST CHAIN, 75mm FLAT SLAT INSULATED,SHUTTER RIGHT SIDE MOUNTED CHAIN HOIST OPERATED, WEATHERSEAL SHUTTER WITH HOOD BAFFLE / JAMB & HEADER SWEEP TYPE WEATHERSTRIPPING / COMPRESSION BULB TYPE DOOR BOTTOM / INTERNAL GUIDE SEAL, EX.DOOR TO BE TEMP. REMOVED & RETAINED, TO BE REFITTED W/ NEW SECTIONS, TRACK, JAMBS & HEAD FRAMING, SPRINGS & HOUSING TO SUIT ADDITIONAL LENGTH REQ'D, MOTOR TO BE ADJUSTED TO ACCOMODATE NEW LOADS.
107	STAIR F -EXIT	A	1	965	2134	45	RH	PT	HM	EX	PT				EXTERIOR GRADE DOOR
108	FLIGHT SIMULATION LAB - EXISTING EXIT	EX	2	EX	EX	EX	EX	PT	EX	EX	PT	EX	EX	EX	EXISTING DOOR - REPAINT TO MATCH OTHER EXIT DOORS
109	RECEIVING - OVERHEAD DOOR	OH	1	2260	3000	45		SP		W1	SP				OVERHEAD DOOR SYSTEM - MECH OPERATED
110	STAIR D - EXIT	A	1	965	2134	45	LH	PT	HM	EX	PT				EXTERIOR GRADE DOOR
	LOWER FLOOR														
0021	CORRIDOR 021	C	2	965 865	2134	45	LHR RHR	PT	HM	P11	PT	45	4	7	45min FIRE RATED DOOR SET WITH G,W,G INSULATED DOOR
0021a	STAIR C - LOWER FLOOR	B	1	965	2134	45	RH	PT	HM	EX	PT	45	5	8	45min FIRE RATED DOOR SET WITH G,W,G
0021b	STAIR A - LOWER FLOOR	B	1	965	2134	45	RH	PT	HM	P8	PT	45	4	7	45min FIRE RATED DOOR SET WITH G,W,G
0022	CORRIDOR 022	C	1	914	2134	45	RH	PT	HM	P10	PT		4	7	
0023	CORRIDOR 023	C	1	914	2134	45	RH	PT	HM	P10	PT		4	7	
0024	VIBRATION LAB	B	2	914	2134	45	LH RH	PT	HM	P8	PT		4	7	PRIVACY FILM
0025	MECHANICAL ROOM	A	2	914	2134	45	LH RH	PT	HM	P8	PT	45	4	7	45min FIRE RATED DOOR SET
0026	FSL OBSERVATION	B	1	914	2134	45	LH	PT	HM	P10a	PT		4	7	PRIVACY FILM
0027	IT CLOSET	A	1	914	2134	45	RH	PT	HM	EX	PT	45	5	8	45min FIRE RATED DOOR SET
0028	MECHANICAL ROOM	A	1	1220	2134	45	LHR	PT	HM	EX	PT	45	5	8	45min FIRE RATED DOOR SET
0029	ELECTRICAL ROOM	A	1	1220	2134	45	RH	PT	HM	P8	PT	45	4	7	45min FIRE RATED DOOR SET
0030	WC/JANITOR	A	1	914	2134	45	RHR	PT	HM	EX	PT	45	5	8	45min FIRE RATED DOOR SET
0031	OFFICE 3	B	1	914	2134	45	RH	PT	HM	P4	PT		3	6	PRIVACY FILM
0032	OFFICE 4	B	1	914	2134	45	RH	PT	HM	P4	PT		3	6	PRIVACY FILM
0033	LAB WORKSHOP 1	B	1	914	2134	45	RH	PT	HM	P8	PT		4	7	PRIVACY FILM
0034	LAB WORKSHOP 2	B	1	914	2134	45	RH	PT	HM	P8	PT		4	7	PRIVACY FILM
0035	OFFICE 1	B	1	914	2134	45	RH	PT	HM	P4	PT		3	6	PRIVACY FILM
0036	OFFICE 2	A	1	914	2134	45	LH	PT	HM	P4	PT		3	6	
0037	CHILLER SERVICE ROOM	A	1	965	1850	45	RH	PT	HM	EX	PT	45	5	8	45min FIRE RATED DOOR SET, VERIFY HEIGHT ON SITE.
0038	UNUSED SPACE/STAIR A	B	1	965	2134	45	RH	PT	HM	P8	PT	45	4	7	45min FIRE RATED DOOR SET WITH G,W,G
	MAIN FLOOR														
0101	VESTIBULE	D	2	965	2134	45	LHR RHR	PT	HM	P3	PT		3	6	POWER DOOR OPERATOR WITH SIDELIGHT - SEE DETAIL 9/A02
0101a	VESTIBULE - CLOSET	A	2	1016	2050	45		PT	HM	P2	PT		3	6	SLIDING DOORS
0101b	VESTIBULE - CLOSET	A	2	1016	2050	45		PT	HM	P2	PT		3	6	SLIDING DOORS
0102	ENTRANCE	B	1	965	2134	45	RHR	PT	HM	P4	PT		3	6	POWER DOOR OPERATOR INSULATED DOOR
0123	CORRIDOR 123	D	1	965	2134	45	RHR	PT	HM	P2	PT		3	6	POWER DOOR OPERATOR
0124	CORRIDOR 124	D	1	965	2134	45	LHR	PT	HM	P2	PT		3	6	POWER DOOR OPERATOR
0124a	CORRIDOR 124/STAIR A	B	1	965	2134	45	LH	PT	HM	P9	PT	45	4	7	45min FIRE RATED DOOR SET WITH G,W,G
0125	WAITING LOUNGE	GL	1	914	2134	45	RHR	GL	HM	EX	PT		5	8	GLAZED DOOR WITH SIDELIGHT - SEE DETAIL 9/A02
0125a	WAITING LOUNGE	GL	1	914	2134	45	LHR	GL	HM	EX	PT		5	8	GLAZED DOOR WITH SIDELIGHT - SEE DETAIL 9/A02
0126	INTERVIEW	B	1	965	2134	45	LH	PT	HM	P4	PT		3	6	
0127	INTERVIEW	B	1	914	2134	45	RH	PT	HM	P4	PT		3	6	
0128	UNIVERSAL	A	1	965	2134	45	LHR	PT	HM	P4	PT		3	6	POWER DOOR OPERATOR
0129	SCREENING	B	1	965	2134	45	RH	PT	HM	P4	PT		3	6	POWER DOOR OPERATOR
0130	EXAM ROOM	A	1	965	2134	45	RH	PT	HM	EX	PT		5	8	
0130a	EXAM ROOM	A	1	965	2134	45	LH	PT	HM	P4	PT		3	6	
0131	EXAM ROOM	A	1	965	2134	45	RH	PT	HM	EX	PT		5	8	
0131a	EXAM ROOM	A	1	965	2134	45	LH	PT	HM	P4	PT		3	6	
0132	EXAM ROOM	A	1	965	2134	45	RH	PT	HM	EX	PT		5	8	
0132a	EXAM ROOM	A	1	965	2134	45	LH	PT	HM	P4	PT		3	6	
0136	JANITOR	A	1	914	2134	45	RHR	PT	HM	P3	PT	45	3	6	45min FIRE RATED DOOR SET
0137	FLIGHT SIMULATION LAB	B	1	965	2134	45	RH	PT	HM	P11	PT	45	4	7	45min FIRE RATED DOOR SET WITH G,W,G INSULATED DOOR
0138	FCL OBSERVATION	B	1	914	2134	45	RH	PT	HM	EX	PT		5	8	PRIVACY FILM
0139	FLEXIBLE CABIN LABORATORY	B	1	914	2134	45	RH	PT	HM	EX	PT		5	8	PRIVACY FILM
0139a	FLEXIBLE CABIN LABORATORY	B	1	914	2134	45	LH	PT	HM	EX	PT		5	8	PRIVACY FILM
0140	FLEXIBLE CABIN LABORATORY	B	1	914	2134	45	RH	PT	HM	EX	PT		5	8	PRIVACY FILM
0140a	FLEXIBLE CABIN LABORATORY	B	1	914	2134	45	LHR	PT	HM	P8	PT	45	4	7	45min FIRE RATED DOOR SET WITH G,W,G PRIVACY FILM AMBICO STC 52 RATED DOOR
0140b	FLEXIBLE CABIN LABORATORY	B	1	914	2134	45	LH	PT	HM	EX	PT		5	8	PRIVACY FILM
0141	RECEIVING	B	1	965	2134	45	LH	PT	HM	EX	PT		5	8	PRIVACY FILM
0141a	RECEIVING	RL	1	2033	2975	45		SP		EX	SP				ROLLER DOOR SYSTEM (STRUCTURAL OPENING SIZES GIVEN)
0141b	RECEIVING	RL	1	2033	2975	45		SP		EX	SP				ROLLER DOOR SYSTEM (STRUCTURAL OPENING SIZES GIVEN)
0142	STAIR A	B	1	965	2134	45	RH	PT	HM	P8	PT	45	4	7	45min FIRE RATED DOOR SET WITH G,W,G

NOTE:
ALL DOORS TO BE IN FULL COMPLIANCE WITH THE CURRENT N.B.C AND CAN/CSA B651-90 ACCESSIBILITY DESIGN STANDARDS AND INSTALLED IN CONFORMANCE WITH THE NFPA 80.
FIRE DOORS AND OTHER OPENING PROTECTIVES SHALL HAVE LABELS/CLASSIFICATION MARKS TO IDENTIFY LABORATORY TESTING.
ALSO REFER TO HARDWARE SCHEDULE 08 71 00

1 A02 DOOR SCHEDULE NTS

ASPM A0 (1189x841)

National Research Council Canada | Conseil national de recherches Canada
Administrative Services and Property Management Branch | Division des services administratifs et gestion de l'immobilier
NRC · CNRC

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- PROVIDE ALL LABOUR AND MATERIAL REQUIRED TO FORM A COMPLETE, FUNCTIONAL SYSTEM AS DESCRIBED ON DRAWINGS.
- REFER ALSO TO 00 01 30 LIST OF MATERIALS & 08 71 00 DOOR HARDWARE

LEGEND :

EXISTING BUILDING ELEMENT

AL ALUMINIUM
CW CURTAIN WALL
EX EXISTING
GL FULLY GLAZED
G,W,G GEORGIAN WIRED GLASS
HM HOLLOW METAL
OH OVERHEAD DOOR
PT PAINTED STEEL
RL ROLLER DOOR
SP SHOP PRIMED

NORR
ARCHITECTS ENGINEERS PLANNERS
NORR Limited
An Ingenium Company

ONTARIO ASSOCIATION OF ARCHITECTS
MAY 29 2015
JONATHAN D. HUGHES
LICENCE
9674

No.	Date	Revision	By Par.
0	29 05 2015	ISSUED FOR TENDER	SD

Date Printed | Date imprimée

- Verify all dimensions and site conditions and be responsible for same
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A Detail no. No. du détail
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C Drawing no. dessin no.

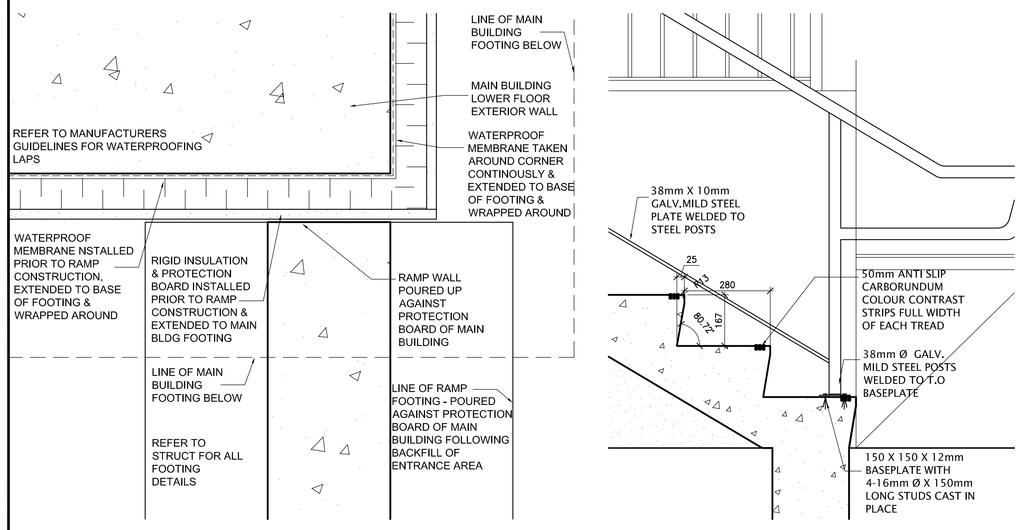
project / projet
NRC CABIN COMFORT + ENVIRONMENTAL RESEARCH FACILITY

MONTREAL ROAD CAMPUS

drawing / dessin
WINDOW & DOOR SCHEDULES

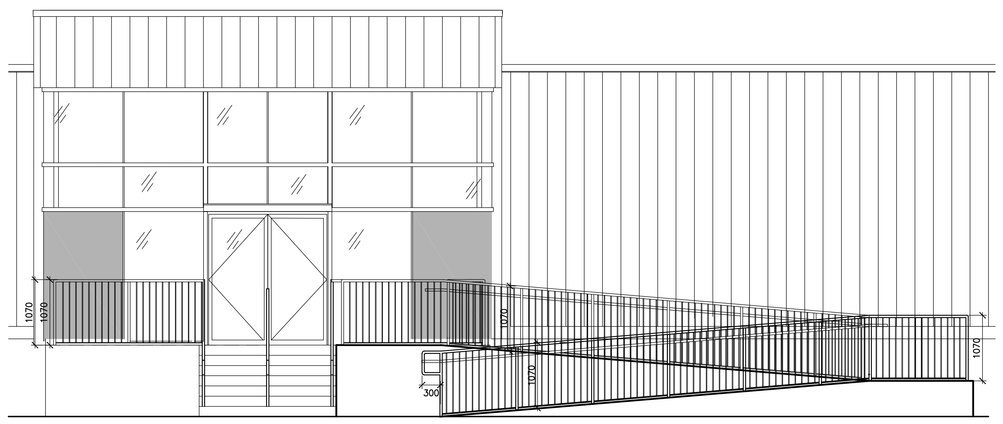
designed / conçu	S.DUNDERDALE	date	MAY '15
drawn / dessiné	S.DUNDERDALE	scale	1:20/1:50/1:5
checked / vérifié	J.HUGHES	sheet	A02 of/de 14
approved / approuvé		W.O.no.	D.T.no.

dwg.no. / dessin no.
3788-A02

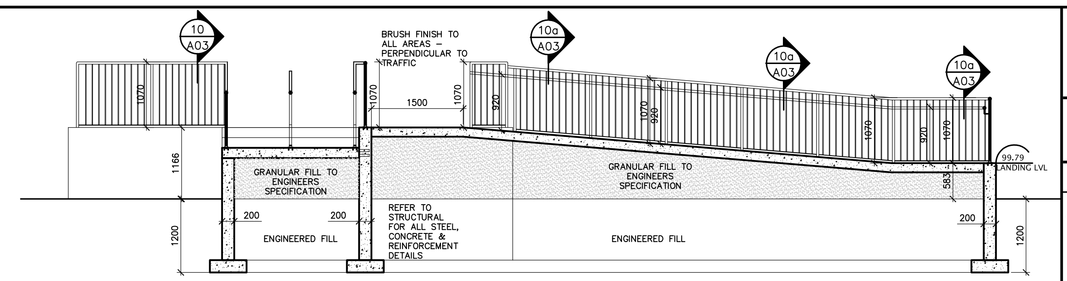


12 A03 PLAN DETAIL – RAMP WALL/MAIN BUILDING.
SCALE = 1:5

11 A03 TYPICAL STAIR DETAIL
SCALE = 1:10



8 A03 ENTRANCE RAMP/ STAIR ELEVATION
SCALE = 1:50



4 A03 ENTRANCE RAMP SECTION
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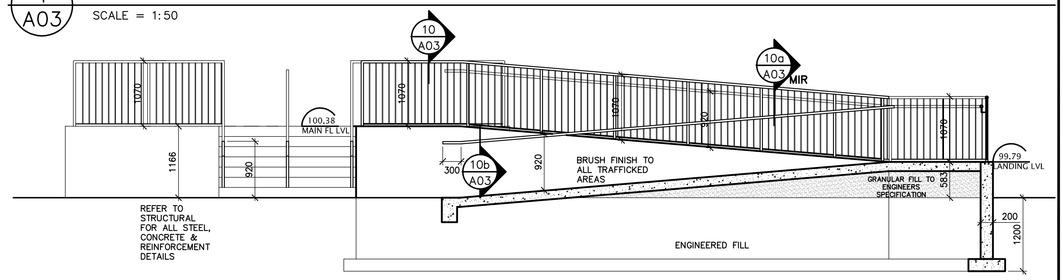

3 A03 ENTRANCE RAMP SECTION
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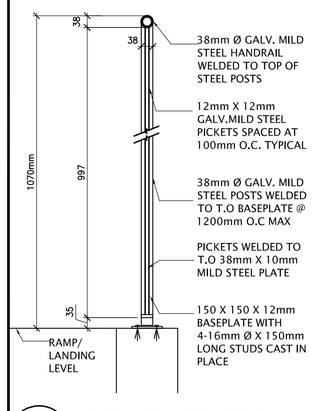

10 A03 TYP. GUARD DETAIL
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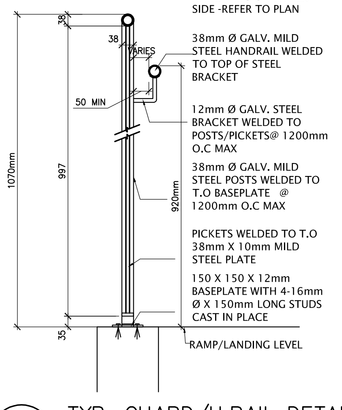
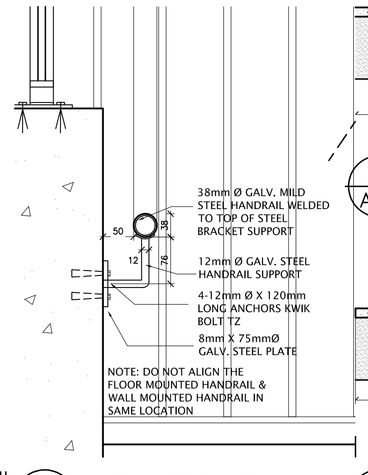


10a A03 TYP. GUARD/H.RAIL DETAIL
SCALE = 1:10



10b A03 H.RAIL DETAIL@WALL
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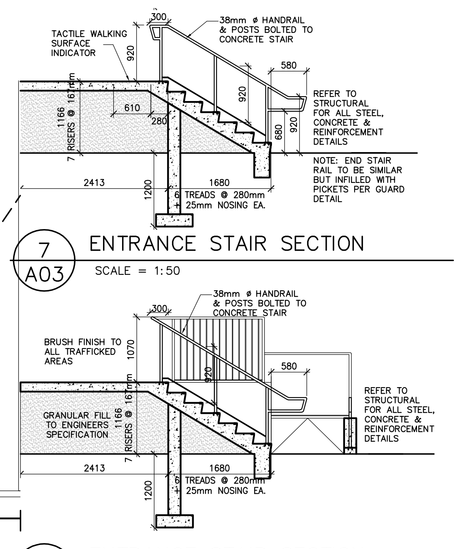
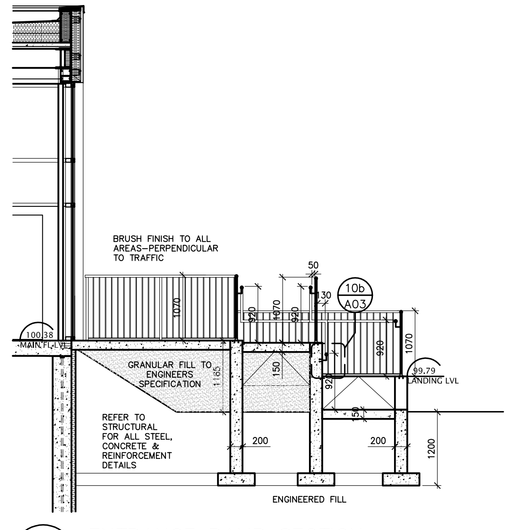


7 A03 ENTRANCE STAIR SECTION
SCALE = 1:50

6 A03 ENTRANCE STAIR SECTION
SCALE = 1:50



5 A03 ENTRANCE RAMP SECTION
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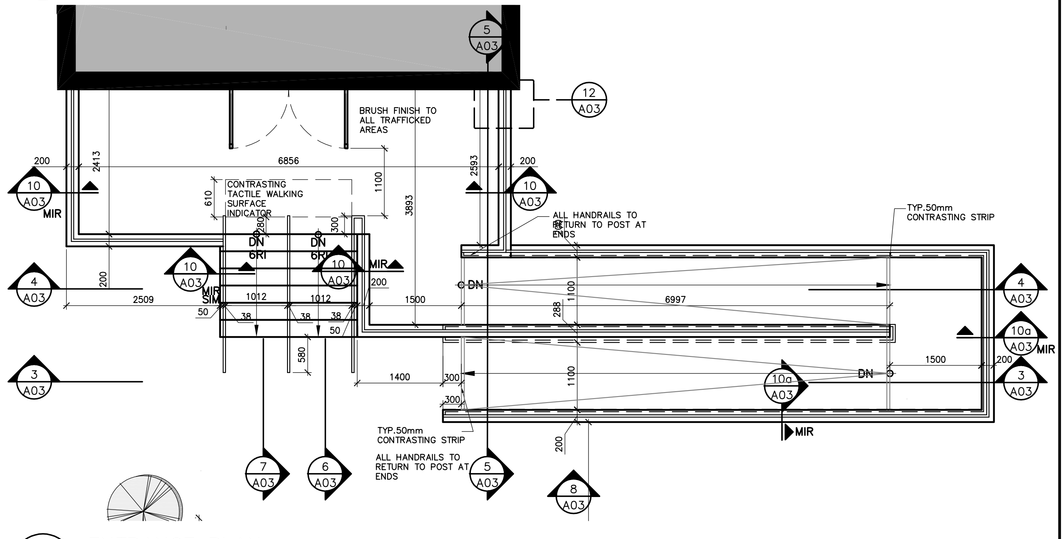

2 A03 ENTRANCE PLAN
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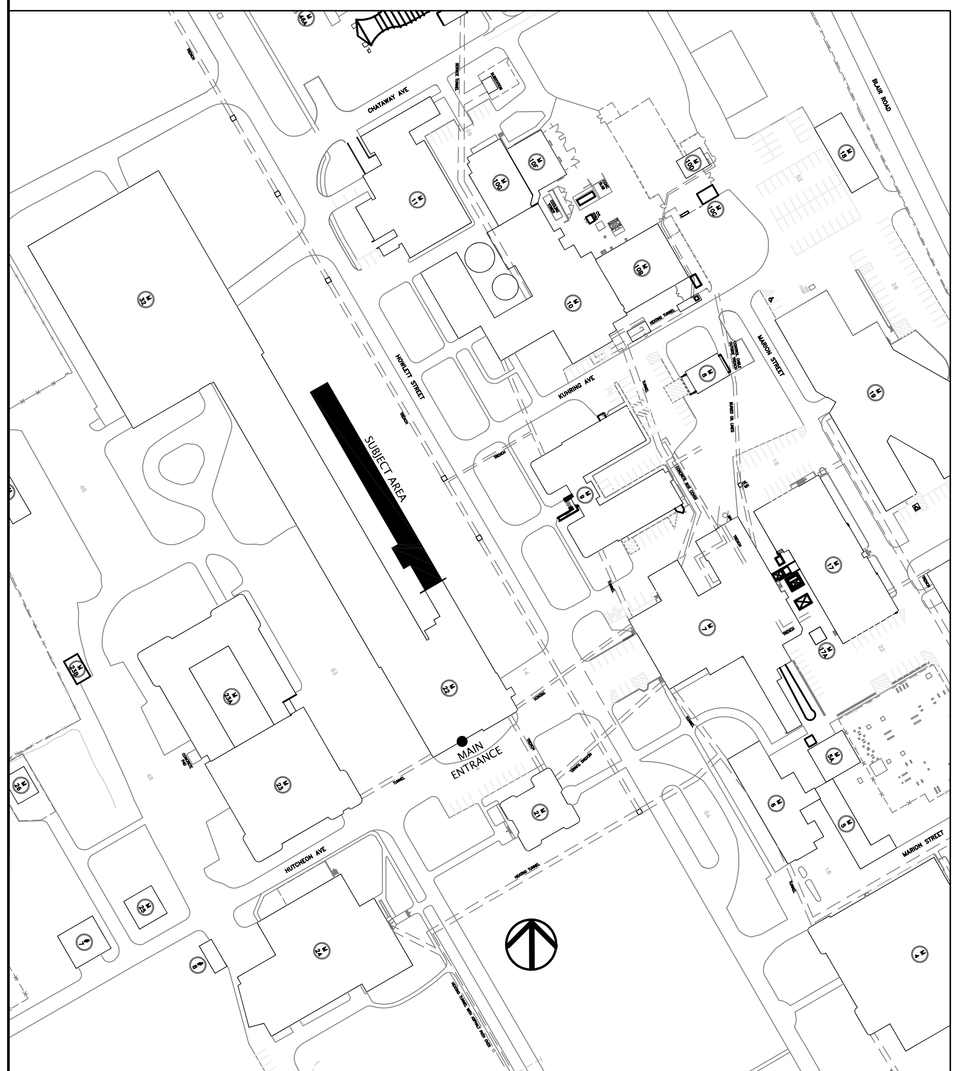

9 A03 LOCATION PLAN
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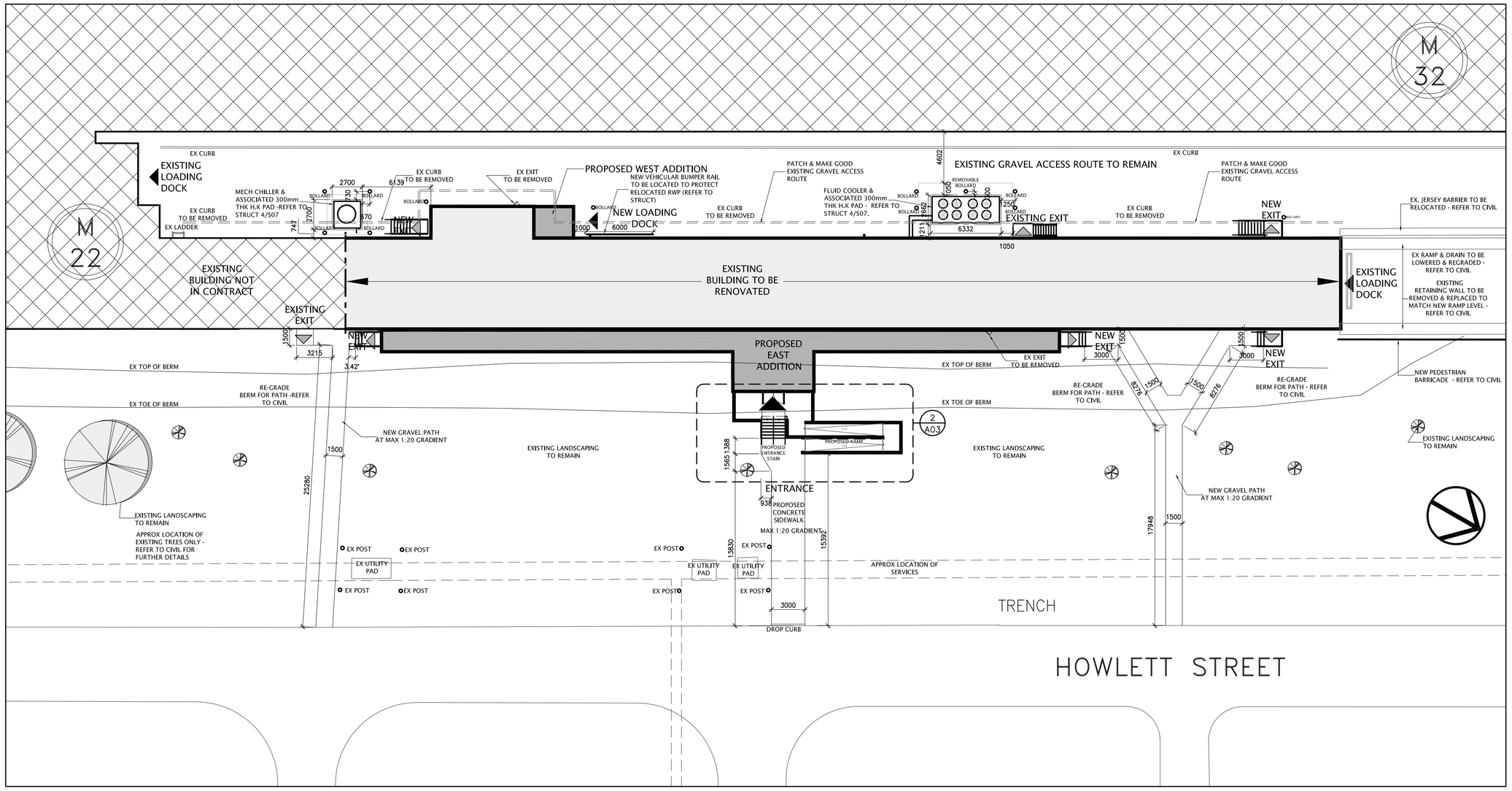

1 A03 SITE PLAN
SCALE = 1:200

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GENERAL NOTES

- CONTRACTORS TO CHECK AND VERIFY ALL DIMENSIONS ON SITE PRIOR TO DEMOLITION OR CONSTRUCTION AND REPORT ANY ERRORS OR OMISSIONS TO DEPARTMENTAL REPRESENTATIVE.
- CONTRACTORS MUST VISIT THE SITE & FULLY FAMILIARIZE THEMSELVES WITH THE SCOPE OF THE WORK.
- PREVENT THE SPREAD OF DUST & DEBRIS BEYOND THE WORK AREA AND CLEAN ALL SURFACES AT COMPLETION.
- MAKE GOOD ALL SURFACES AFFECTED BY THIS WORK.
- COORDINATE ALL SHUTDOWNS WITH THE DEPARTMENTAL REPRESENTATIVE.
- PROVIDE ALL LABOUR AND MATERIAL REQUIRED TO FORM A COMPLETE, FUNCTIONAL SYSTEM AS DESCRIBED ON DRAWINGS.
- ALL EXTERIOR LEVELS & DIMENSIONS ARE APPROXIMATE ONLY AND TO BE VERIFIED ON SITE PRIOR TO COMMENCING CONSTRUCTION. ANY DISCREPANCIES TO BE REPORTED TO THE DEPARTMENTAL REPRESENTATIVE.
- CONTRACTOR TO ENSURE FULL CO-ORDINATION WITH PROPOSED CIVIL WORKS/UTILITIES PROVISION.
- CONTRACTOR TO ENSURE FULL ACCESS TO/EXIT FROM ALL SURROUNDING AREAS OF THE PROPERTY/S IS MAINTAINED DURING CONSTRUCTION. ANY REQUIRED RESTRICTIONS AND ASSOC.TIMESCALES SHOULD BE IMMEDIATELY NOTIFIED TO THE DEPARTMENTAL REPRESENTATIVE & A STRATEGY AGREED UPON.
- REFER TO CIVIL PACKAGE FOR ALL LEVELS/TREE REMOVAL/SITE SPECIFIC DETAILS ASWELL AS ALL ACCESS RAMP & ASSOCIATED RETAINING WALL DETAILS

ARCHITECTURAL NOTES:

LEGEND :

- AREA N.I.C.
- EXISTING BUILDING ELEMENT
- NEW BUILDING ELEMENT
- EXISTING TREE TO BE REMOVED
- EXISTING TREE TO BE RETAINED
- ENTRANCE
- EXIT

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ONTARIO ASSOCIATION OF ARCHITECTS
MAY 29 2015
JONATHAN D. HUGHES
LICENCE
5674

No.	Date	Revision	By/Par.
0	29 05 2015	ISSUED FOR TENDER	JD

Date Printed / Date Imprimée

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

A Detail no. No. du détail
B Location drawing no. sur dessin no.
C Drawing no. dessin no.

project / projet
NRC CABIN COMFORT + ENVIRONMENTAL RESEARCH FACILITY

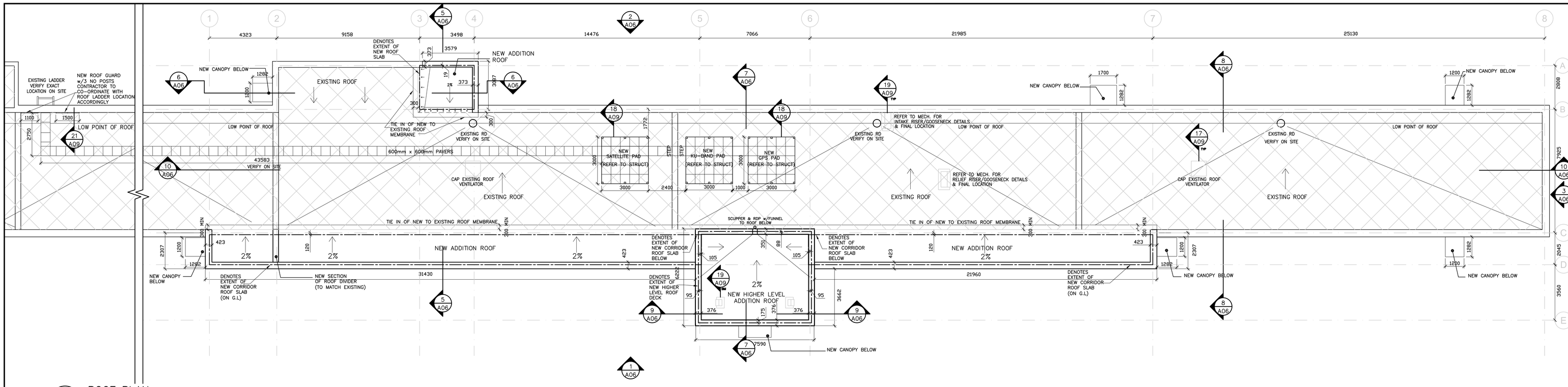
MONTREAL ROAD CAMPUS

drawing / dessin
SITE PLAN & ENTRANCE DETAILS

designed / conçu	S.DUNDERDALE	date / date	MAY '15
drawn / dessiné	S.DUNDERDALE	scale / échelle	1:200/1:50/1:1250
checked / vérifié	J.HUGHES	sheet / feuille	A03 of/de 14
approved / approuvé		W.O.no.	D.T.no.

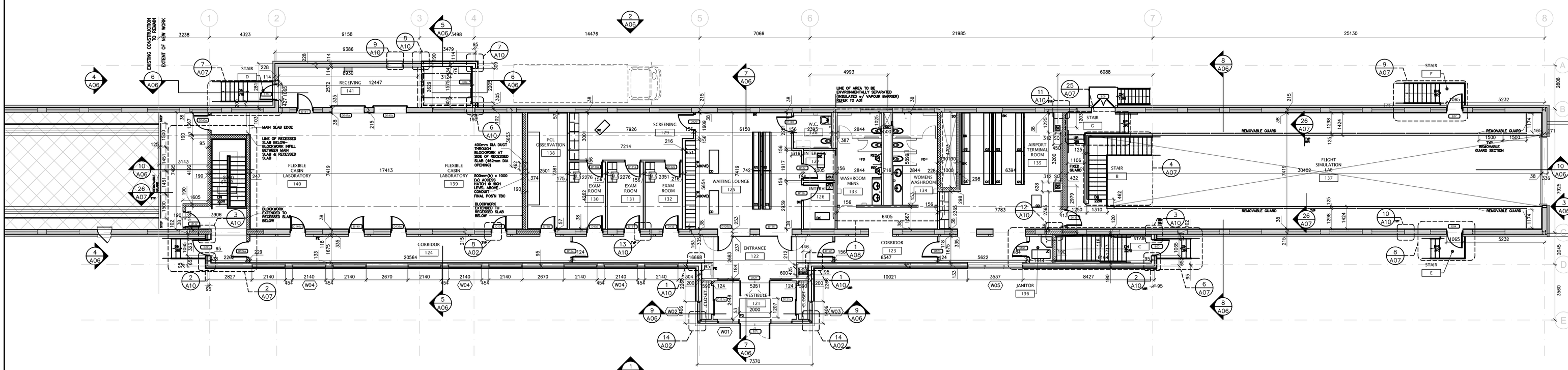
dwg.no. / dessin no.
3788-A03

ASPM A0 (1189x841)



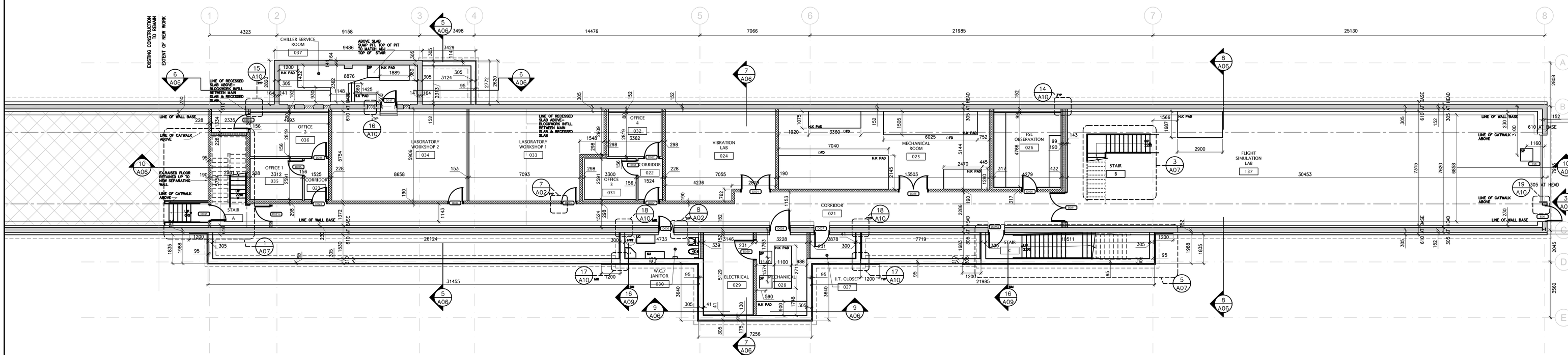
3 A04 ROOF PLAN

SCALE = 1:100



2 A04 MAIN LEVEL PLAN

SCALE = 1:100



1 A04 LOWER LEVEL PLAN

SCALE = 1:100

ASPM A0 (1189x841)

0 10 20mm 40 60 80 100 120 140 160 180 200mm

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GENERAL NOTES

- CONTRACTORS TO CHECK AND VERIFY ALL DIMENSIONS ON SITE PRIOR TO DEMOLITION OR CONSTRUCTION AND REPORT ANY ERRORS OR OMISSIONS TO DEPARTMENTAL REPRESENTATIVE.
- CONTRACTORS MUST VISIT THE SITE & FULLY FAMILIARIZE THEMSELVES WITH THE SCOPE OF THE WORK.
- PREVENT THE SPREAD OF DUST & DEBRIS BEYOND THE WORK AREA AND CLEAN ALL SURFACES AT COMPLETION.
- MAKE GOOD ALL SURFACES AFFECTED BY THIS WORK. FOR CUTTING AND PATCHING IN OTHER AREAS OF THE EXISTING BUILDING IN RELATION TO ELECTRICAL/MECHANICAL TIE INS – PLEASE REFER TO M/E SERIES DRAWINGS.
- COORDINATE ALL SHUTDOWNS WITH THE DEPARTMENTAL REPRESENTATIVE.
- PROVIDE ALL LABOUR AND MATERIAL REQUIRED TO FORM A COMPLETE, FUNCTIONAL SYSTEM AS DESCRIBED ON DRAWINGS.
- FOR INTERNAL DRAINAGE, HEATING & VENTILATION REFER TO MECHANICAL. FOR STEELWORK/CONCRETE/SLABS/ FOUNDATIONS/REINFORCEMENT/LOAD BEARING PARTITIONS/ LINTELS & ALL STRUCTURAL ELEMENTS – REFER TO STRUCTURAL. FOR INTERNAL/EXTERNAL LIGHTING, POWER, FIRE ALARM, COMMS ETC REFER TO ELECTRICAL.
- CONTRACTOR TO ENSURE FULL CO-ORDINATION WITH MECHANICAL DUCT/SUMP PIT LOCATIONS, SIZES & TOLERANCES PRIOR TO FORMING ANY SLAB OPENINGS IN EXISTING /NEW ELEMENTS. CONTRACTOR TO ENSURE FULL CO-ORDINATION WITH MECH EQUIPMENT PRIOR TO FORMING HK PADS/ ROOFTOP CURBS. (ALL DIMS SHOWN ARE NOMINAL).

FLOOR PLANS

- ALL EXTERNAL DIMENSIONS TAKEN TO WINDOW/DOOR FRAMES & OUTSIDE EDGE OF STRUCTURAL CONCRETE/BLOCK WALLS
- ALL INTERNAL DIMENSIONS TAKEN TO OUTSIDE EDGE OF PARTITION/CWS
- ALL EXISTING BUILDING DIMENSIONS ARE APPROXIMATED ONLY AND TO BE VERIFIED ON SITE PRIOR TO COMMENCING WORKS
- REFER TO A05 FOR EXISTING BUILDING DEMOLITIONS.

ROOF PLANS

- EXACT ROOF BUILD UP; ROOF DRAIN, LADDER, VENTILATOR & OWSJ POSITIONS TO BE VERIFIED ON SITE PRIOR TO COMMENCING WORKS. CONTRACTOR TO ENSURE FINAL CO-ORDINATION BETWEEN PROPOSED OPENINGS & EXISTING ELEMENTS.
- CONTRACTOR TO ENSURE ALL PROPOSED ROOFING (MIN 2% GRADIENT) TIES IN WITH EXISTING & ALL SECTIONS ARE FULLY CO-ORDINATED WITH NO LARGE LEVEL DIFFERENCES BETWEEN AREAS.

LEGEND :

- AREA N.I.C.
- EXISTING BUILDING ELEMENT
- BLOCK/ CONCRETE INFILL – REFER TO A05 FOR FULL DETAILS

BK	19mm PLYWOOD BACKING RQ'D FOR TV MOUNTING. APPROX. 1M X 2M. MOUNTING HEIGHT & FINAL POSITION TBC BY CLIENT.
CD	CHECK IN TYPE DESK
DK	DESK
FD	FLOOR DRAIN
FE	FIRE EXTINGUISHER (RECESSED/SEMI RECESSED ONLY – FOR ALL OTHERS REFER TO MECH)
FG	RECESSED FLOOR GRILLE
GS	GANGED SEATING
H.K PAD	100mm THK CONCRETE HOUSE KEEPING PAD REFER TO MECH & STRUCT DETAIL TDC-18
HWT	HOT WATER TANK
JC	JANITORS CART
MSU	MOBILE STORAGE UNIT
REC	RECESS IN FLOOR SLAB FOR URINAL – REFER TO MANUFACTURERS DETAILS
RD	ROOF DRAIN
RDP	ROOF DRAIN PIPE
SO	SLAB OPENING
SP	SUMP PIT
SU	SHELVING UNIT

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ONTARIO ASSOCIATION OF ARCHITECTS
may 29 2015
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LICENCE 5074

No.	Date	Revision	By Par
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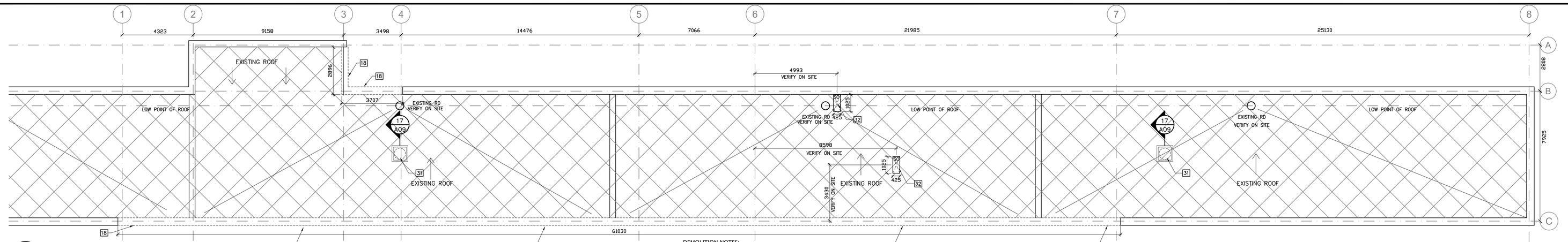
drawing / dessin
ROOF PLAN
MAIN LEVEL PLAN
LOWER LEVEL PLAN

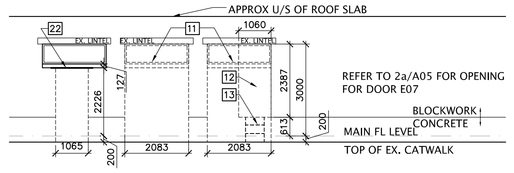
designed / conçu	S.DUNDERDALE	date	MAY '15
drawn / dessiné	S.DUNDERDALE	scale / échelle	1:100
checked / vérifié	J.HUGHES	sheet	A04 of/de 14
approved / approuvé		W.O.no.	D.T.no.

dwg.no. / dessin no.
3788-A04



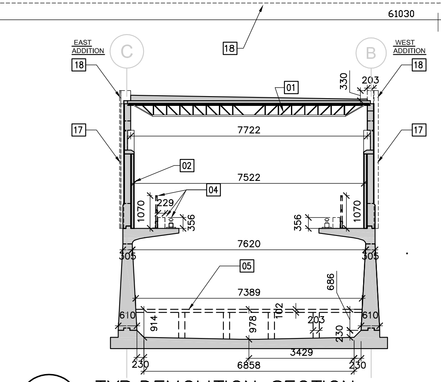
3 A05 ROOF LEVEL DEMOLITION PLAN

SCALE = 1:100



2b A05 DEMOLITION ELEV – WEST

SCALE = 1:100



2c A05 TYP.DEMOLITION SECTION

SCALE = 1:100

DEMOLITION NOTES:

01 RETAIN EXISTING OWJ's

02 RETAIN EXISTING CEMENT PLASTER TO WALLS

03 RETAIN EXISTING DOOR & STAIR

04 EXISTING CONCRETE CURB, STEEL GUARDS & STEEL RAIL TO BE DEMOLISHED.

05 DEMOLISH EXISTING RAISED ACCESS FLOOR: APPROX 100mm THK CONCRETE FLOOR POURED ON A METAL DECK. DEMOLISH ASSOCIATED 4 X 200mm THK CONCRETE WALLS RUNNING LENGTH OF BUILDING

06 CUT OPENING IN EXISTING RAISED FLOOR FOR NEW STAIR

07 CUT BACK ADDITIONAL SLAB PER STRUCTURAL & REPLACE

08 DEMOLISH EXISTING CONCRETE WALL TO FORM OPENING - REFER TO A02 FOR DOOR OPENING HEIGHTS DETAILS. REFER TO S06 FOR LINTEL INFO. ALL OPENINGS TO BE PATCHED AND MADE GOOD, & THRESHOLDS TO BE LEVEL THROUGHOUT.

09 DEMOLISH EXISTING CONCRETE & BLOCKWORK WALL TO FORM OPENING - REFER TO A02/S06 FOR DETAILS

10 ADDITIONAL DEMOLITION OF EXISTING CONCRETE & BLOCKWORK WALL TO ALLOW FOR NEW CONCRETE JAMBS - REFER TO STRUCT

11 HIGH LEVEL GLASS BLOCK WINDOW & CONCRETE SILL TO BE REMOVED

12 EXISTING DOOR & FRAME TO BE REMOVED

13 EXISTING STEEL STAIR TO BE REMOVED

14 EXISTING WOOD STAIR TO BE REMOVED

15 DEMOLISH SECTION OF EXISTING CONCRETE CATWALK TO ALLOW FOR RECESSED SLAB

16 DEMOLISH SECTION OF EXISTING CONCRETE CATWALK TO ALLOW FOR MECH. RISER

17 CAREFULLY CUT AND REMOVE EXISTING METAL CLADDING, FLASHINGS, INSULATION AND METAL FRAMING FROM EXTERIOR WALLS (LEAVE EXT. RENDER INTACT)

18 DEMOLISH EXISTING BLOCKWORK PARAPET,CAP FLASHING & ROOF SLAB AS NECESSARY (REFER TO STRUCT)

19 OPENING TO BE INFILLED WITH BLOCKWORK TO MATCH EXISTING WALL DEPTH

20 DEMOLISH EXISTING GLAZED PORTHOLE & INFILL OPENING WITH CONCRETE TO MATCH EXISTING WALL DEPTH

21 NEW CONCRETE LINTEL - REFER TO STRUCTURAL

22 NEW STEEL PLATE LINTEL - REFER TO STRUCTURAL

23 TEMPORARILY REMOVE & RETAIN EXISTING ROLLER DOOR, FITTINGS, JAMBS & HEAD FRAMING & HOUSING.

24 DEMOLISH TOP OF FOUNDATION WALL TO ALLOW FOR LOWERED FLOOR/ EXT RAMP LEVELS & NEW SECTIONS TO BE ADDED TO THE EXISTING ROLLER DOOR. REFER TO 14/A09

25 PROP ROLLER DOOR OPENING LINTEL. CAREFULLY DEMOLISH STRIP OF CONCRETE & BLOCKWORK ABOVE AS SHOWN. REFER TO STRUCT FOR DETAILS. REFER ALSO TO 19/A10. CUT BACK CATWALK TO ALLOW ACCESS. HIGH LEVEL CLADDING TO BE RETAINED IN PLACE.

26 DEMOLISH TOP OF FOUNDATION WALL TO ALLOW FOR LOWERED FLOOR/ EXT RAMP LEVELS & NEW MAN DOOR

27 DEMOLISH TOP OF LOWER FLOOR EXT.CONCRETE WALL SUFFICIENT TO ACCOMODATE NEW MAIN FLOOR SLAB

28 DEMOLISH EXISTING CONCRETE & BLOCKWORK WALL INC. EXISTING METAL CLADDING, FLASHINGS, INSULATION AND METAL FRAMING TO THE LOWER LEVEL.

29 CAREFULLY DEMOLISH EXISTING CONCRETE SURROUND & METAL FLASHINGS TO RAINWATER PIPE (PIPE TO BE REROUTED - REFER TO MECH)

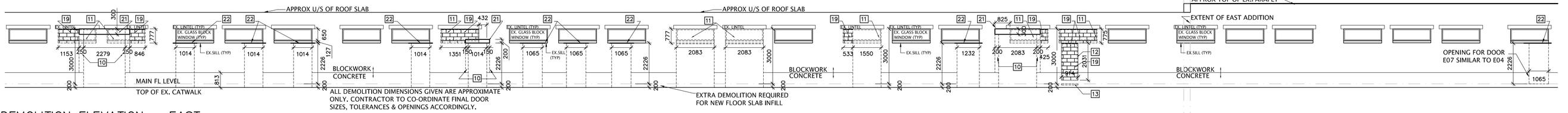
30 DEMOLISH EX. CONCRETE WALL & PORTHOLE w/ GLAZING TO FORM OPENING. REFER TO A02 FOR DOOR OPENING HEIGHT & A06 FOR DOOR POSITION

31 EXISTING ROOF VENTILATOR TO BE REMOVED. VERIFY LOCATION ON SITE

32 CUT NEW OPENING IN EXISTING ROOF SLAB FOR MECH RISER. REFER TO MECH FOR DETAILS & FINAL LOCATION. TO BE CO-ORDINATED ON SITE WITH EXISTING OWSJ POSITION.

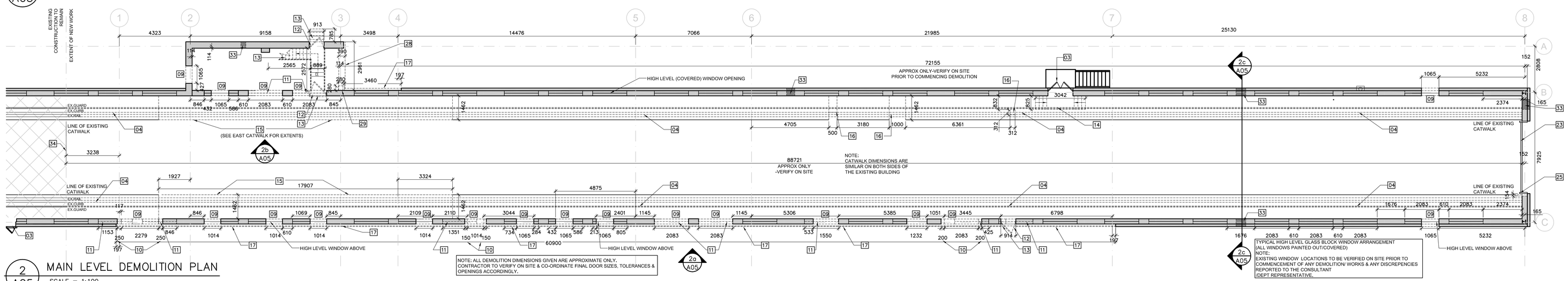
33 CUT NEW OPENING IN EXISTING EXTERIOR WALL FOR MECH LOUVRE. REFER TO STRUCT FOR LINTEL DETAILS. REFER TO A06 FOR HEIGHT & SHAPE. REFER TO MECH FOR FINAL DIMENSIONS

34 PROVIDE TEMPORARY HOARDING BETWEEN AREA TO BE RENOVATED AND AREA N.I.C



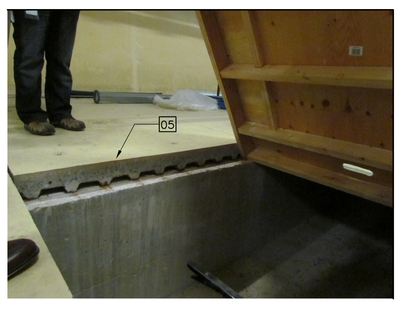
2a A05 DEMOLITION ELEVATION – EAST

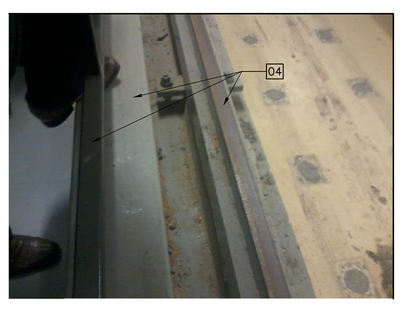
SCALE = 1:100

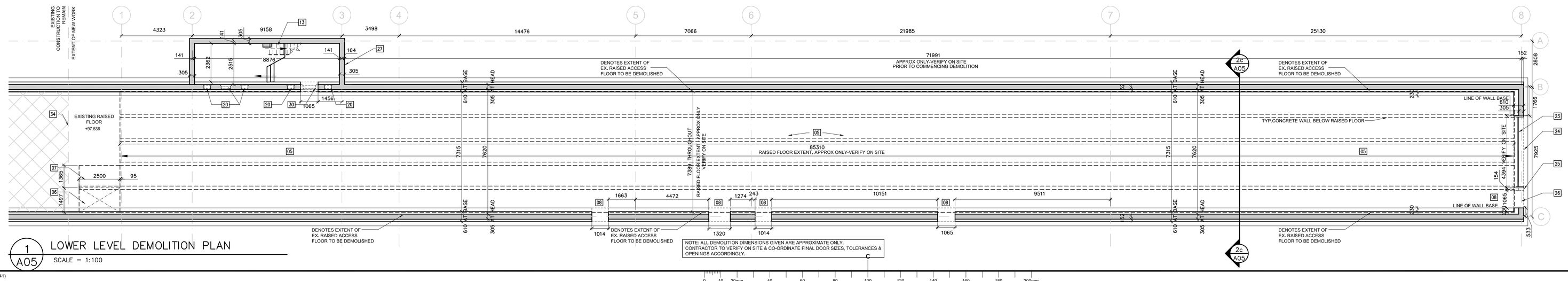


2 A05 MAIN LEVEL DEMOLITION PLAN

SCALE = 1:100







1 A05 LOWER LEVEL DEMOLITION PLAN

SCALE = 1:100

0 10 20mm 40 60 80 100 120 140 160 180 200mm

ASPM A0 (1189x841)

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GENERAL NOTES

- ALL DIMENSIONS RELATIVE TO THE EXISTING BUILDING & OPENINGS ARE APPROXIMATE ONLY. CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS ON SITE PRIOR TO COMMENCEMENT OF ANY DEMOLITION OR CONSTRUCTION WORKS AND REPORT ANY ERRORS OR OMISSIONS TO THE CONSULTANT/DEPARTMENTAL REPRESENTATIVE.
- CONTRACTORS MUST VISIT THE SITE & FULLY FAMILIARIZE THEMSELVES WITH THE SCOPE OF THE WORK.
- PREVENT THE SPREAD OF DUST & DEBRIS BEYOND THE WORK AREA AND CLEAN ALL SURFACES AT COMPLETION.
- MAKE GOOD ALL SURFACES AFFECTED BY THIS WORK, PATCH AND MAKE GOOD ANY EXISTING ELEMENTS TO REMAIN THAT ARE DAMAGED BY THIS CONTRACT. IN ROOMS WHERE EXISTING FINISHES REMAIN VISIBLE ENSURE ALL NEW OPENINGS ARE NEATLY CUT & APPROPRIATELY FINISHED. JUNCTIONS WITH NEW ELEMENTS SHOULD BE PATCHED AS NECESSARY & NEATLY FINISHED.
- COORDINATE ALL SHUTDOWNS WITH THE DEPARTMENTAL REPRESENTATIVE.
- PROVIDE ALL LABOUR AND MATERIAL REQUIRED TO FORM A COMPLETE, FUNCTIONAL SYSTEM AS DESCRIBED ON DRAWINGS.
- THE EXISTING BUILDING IS TO REMAIN OPERATIONAL DURING CONSTRUCTION. CONTRACTOR TO CO-ORDINATE WORKS ACCORDINGLY. ALL TEMP BARRIERS/ACCESS TO BE INSTALLED BY CONTRACTOR. EXISTING EXIT &/ EXIT STAIR REMOVAL TO BE FULLY CONSIDERED & DIRECTLY CO-ORDINATED WITH THE CLIENT. ALL EXIT FACILITIES SHOULD BE MAINTAINED AT ALL TIMES. CONTRACTOR TO PROVIDE TEMP ALTERNATIVE EXITS WHERE AN EXISTING EXIT IS BLOCKED OFF/DELETED DUE TO CONTRUCTION ACTIVITIES.
- REFER TO E SERIES DRAWINGS FOR ELECTRICAL DEMOLITION DRAWINGS. REFER TO M SERIES DRAWINGS FOR MECHANICAL DEMOLITION DRAWINGS. REFER TO S SERIES DRAWINGS FOR STRUCTURAL DEMOLITION DRAWINGS.
- ALL DIMENSIONS GIVEN FOR DEMOLITIONS TO CREATE NEW DOOR OPENINGS GIVEN AS OVER FRAME SIZES ONLY. CONTRACTOR TO CO-ORDINATE WITH DOOR SUPPLIER & ENSURE ALL TOLERANCES REQUIRED ARE ACCOMMODATED ACCORDINGLY.
- REFER TO MECH./ELEC DRAWINGS FOR ALL UTILITY CONNECTIONS TO THE MAIN BUILDING. PATCH & MAKE GOOD ANY EXISTING ELEMENTS TO REMAIN THAT ARE DAMAGED BY THIS CONTRACT. ANY PENETRATIONS THROUGH FIRE RATED WALLS SHOULD BE FIRESTOPPED ACCORDINGLY.
- REFERENCE SHOULD ALSO BE MADE TO THE DESIGNATED SUBSTANCE SURVEY/REPORT FOR THIS PROPERTY PRIOR TO COMMENCEMENT OF ANY DEMOLITIONS OR WORKS WITHIN THE BUILDING. CONTRACTORS SHOULD ENSURE ALL PRECAUTIONARY MEASURES AS DETAILED ARE FOLLOWED.
- PROVIDE TEMPORARY 50mm x 100mm TIMBER FRAMING & PLYWOOD HOARDING TO ANY TEMPORARY OPENINGS TO PROVIDE SECURITY & WEATHER PROTECTION. PROVIDE TEMPORARY HOARDING BETWEEN AREA TO BE RENOVATED & AREA N.I.C
- ALL DEMOLITIONS REQUIRED FOR MECHANICAL OPENINGS TO BE VERIFIED ON SITE & CO-ORDINATED WITH MECH SUB TRADES PRIOR TO BREAKING INTO THE EXISTING BUILDING FABRIC.

LEGEND :

- AREA N.I.C.
- EXISTING WALLS/ELEMENT TO BE REMOVED
- EXISTING WALLS TO REMAIN
- OPENINGS TO BE INFILLED– SEE A10
- EXISTING DOOR AND FRAME TO BE DEMOLISHED
- EXISTING DOOR AND FRAME TO REMAIN

NORR ARCHITECTS ENGINEERS PLANNERS

NORR Limited
An Ingenium Group Company

ONTARIO ASSOCIATION OF ARCHITECTS
MAY 29 2015
JONATHAN D. HUGHES
LICENCE
5274

No.	Date	Revision	By / Par.
0	29 05 2015	ISSUED FOR TENDER	SD

Date Printed | Date imprimée

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

A Detail no. No. du détail
B Location drawing no. sur dessin no.
C Drawing no. dessin no.

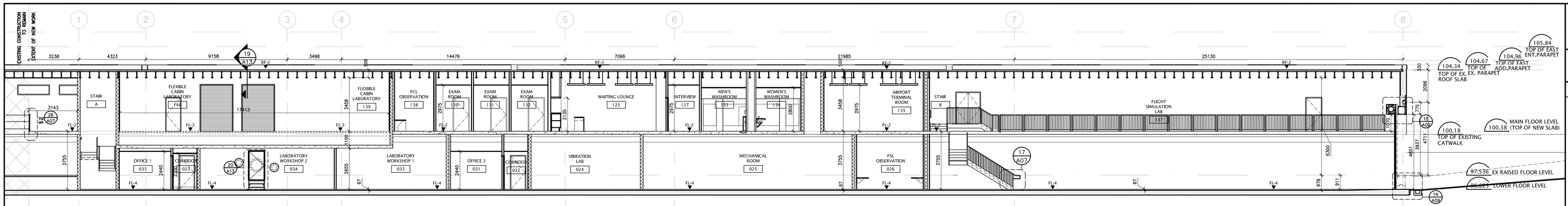
project / projet
NRC CABIN COMFORT + ENVIRONMENTAL RESEARCH FACILITY

MONTREAL ROAD CAMPUS

drawing / dessin
DEMOLITION PLANS

designed / conçu	S.DUNDERDALE	date / date	MAY '15
drawn / dessiné	S.DUNDERDALE	scale / échelle	1:100/1:50
checked / vérifié	J.HUGHES	sheet / feuille	A05 of/de 14
approved / approuvé		W.O.no.	D.T.no.

dwg.no. / dessin no.
3788-A05



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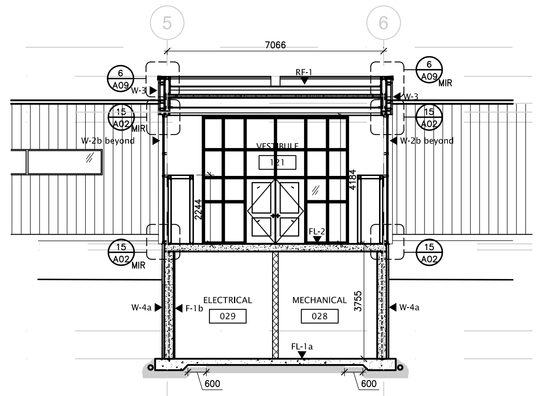

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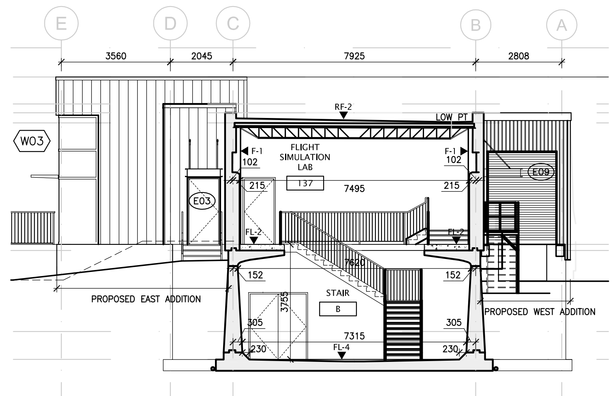

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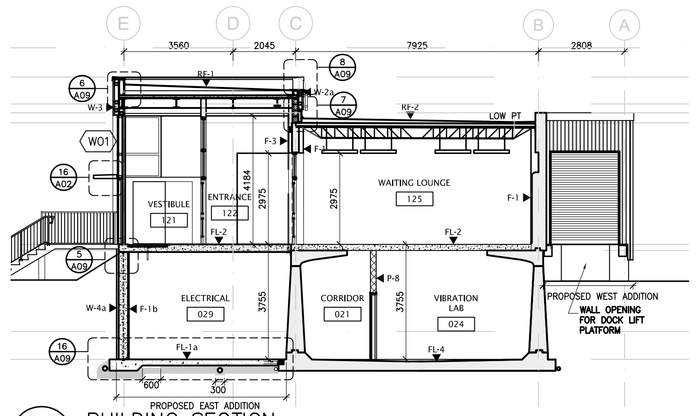

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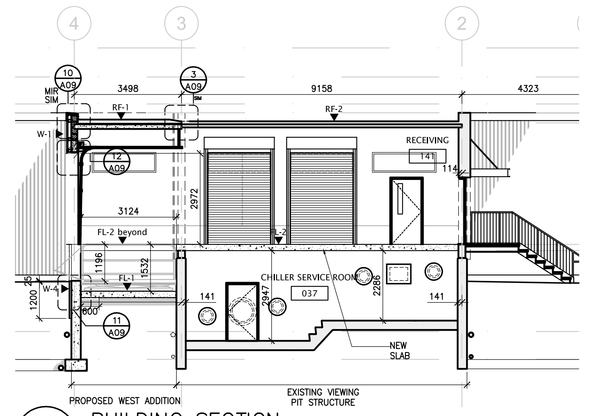

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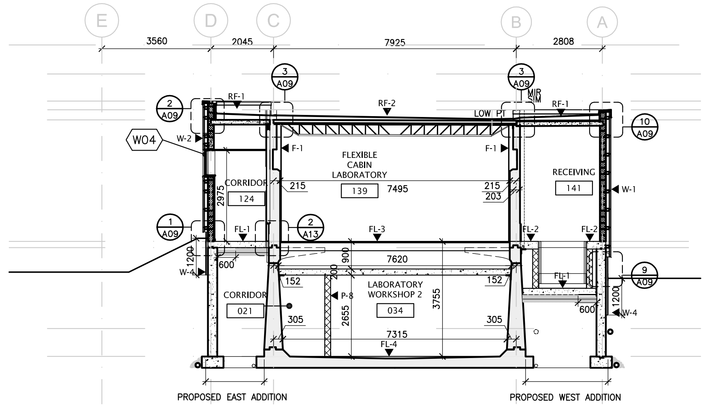

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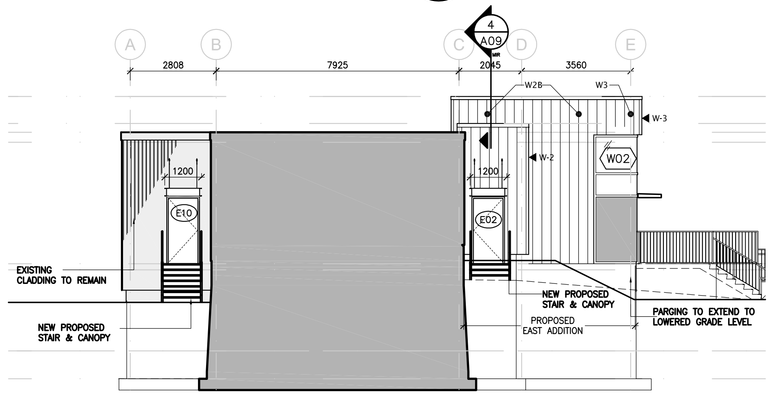

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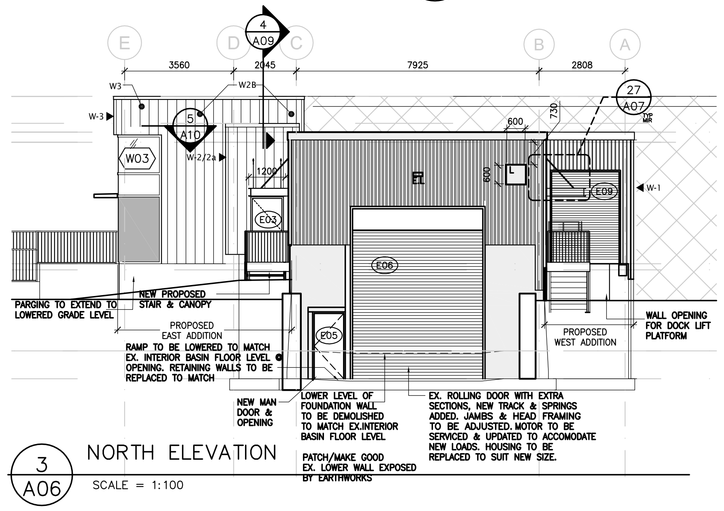

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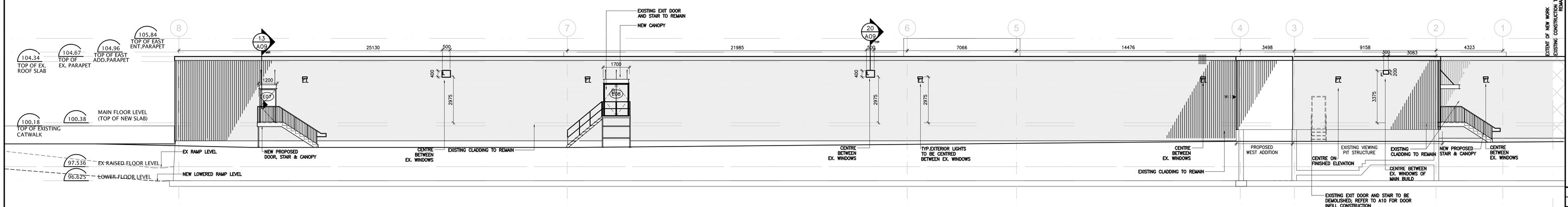

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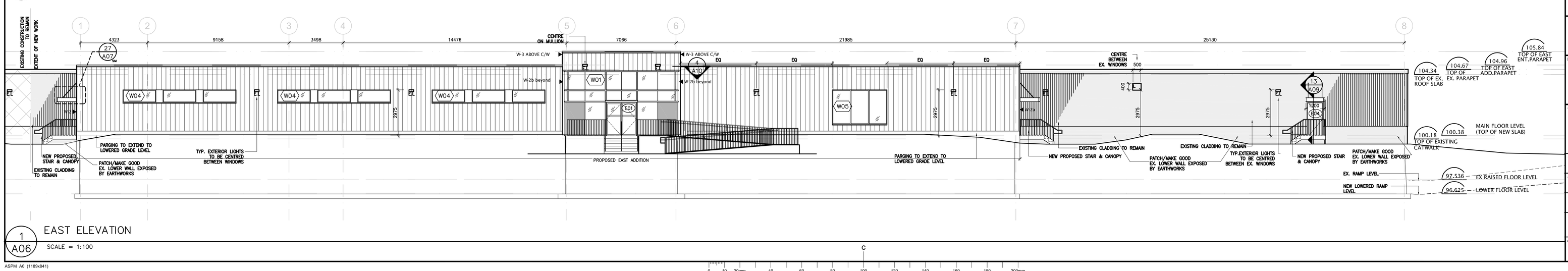

1 A06 EAST ELEVATION
SCALE = 1:100

ASPM A0 (1189x841)

0 10 20mm 40 60 80 100 120 140 160 180 200mm

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Administrative Services and Property Management Branch | Division des services administratifs et gestion de l'immobilier

NRC · CNRC

GENERAL NOTES

- CONTRACTORS TO CHECK AND VERIFY ALL DIMENSIONS ON SITE PRIOR TO DEMOLITION OR CONSTRUCTION AND REPORT ANY ERRORS OR OMISSIONS TO DEPARTMENTAL REPRESENTATIVE.
- CONTRACTORS MUST VISIT THE SITE & FULLY FAMILIARIZE THEMSELVES WITH THE SCOPE OF THE WORK.
- PREVENT THE SPREAD OF DUST & DEBRIS BEYOND THE WORK AREA AND CLEAN ALL SURFACES AT COMPLETION.
- MAKE GOOD ALL SURFACES AFFECTED BY THIS WORK.
- COORDINATE ALL SHUTDOWNS WITH THE DEPARTMENTAL REPRESENTATIVE.
- PROVIDE ALL LABOUR AND MATERIAL REQUIRED TO FORM A COMPLETE, FUNCTIONAL SYSTEM AS DESCRIBED ON DRAWINGS.
- NOTE– INSULATION HAS BEEN OMITTED FOR CLARITY ON SECTIONS
- ALL EXTERIOR LIGHTS/LOUVRES TO BE CO-ORDINATED WITH EXISTING GLASS BLOCK WINDOW & OWSJ POSITIONS
- EXACT EXISTING BUILDING WALL BUILD UP & LOCATION OF EXISTING OWSJ's/GLASS BLOCK WINDOWS TO BE VERIFIED ON SITE PRIOR TO COMMENCING WORKS AND ANY DISCREPANCIES REPORTED TO THE DEPT.REPRESENTATIVE.
- ALL EARTHWORKS ARE INDICATIVE ONLY – REFER TO CIVIL FOR ALL EXTERIOR GRADE LEVELS/DETAILS

LEGEND :

AREA N.I.C.

EXISTING BUILDING ELEMENT

E.L EXTERIOR LIGHT (REFER TO ELEC)
L LOUVRE (REFER TO MECH)

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ONTARIO ASSOCIATION OF ARCHITECTS
MAY 29 2015
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No.	Date	Revision	By/Par.
0	29 05 2015	ISSUED FOR TENDER	SD

Date Printed / Date imprimée

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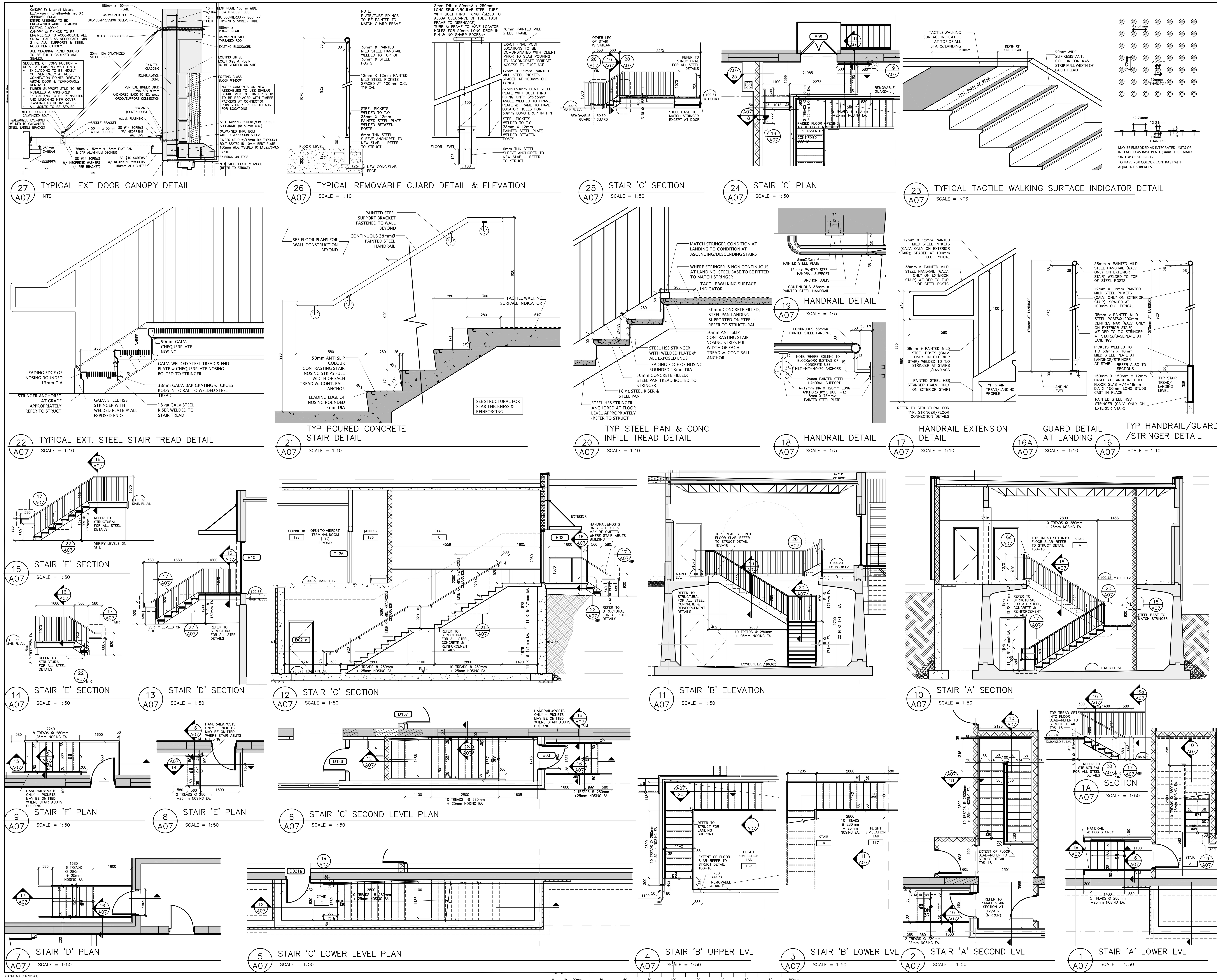
project / projet
NRC CABIN COMFORT + ENVIRONMENTAL RESEARCH FACILITY

MONTREAL ROAD CAMPUS

drawing / dessin
BUILDING ELEVATIONS AND SECTIONS

designed / conçu	date / date
S.DUNDERDALE	MAY '15
drawn / dessiné	scale / échelle
S.DUNDERDALE	1:100
checked / vérifié	sheet / feuille
J.HUGHES	A06 of/de 14
approved / approuvé	W.O.no. / D.T.no.

dwg.no. / dessin no.
3788-A06


27 A07 TYPICAL EXT DOOR CANOPY DETAIL NTS
26 A07 TYPICAL REMOVABLE GUARD DETAIL & ELEVATION SCALE = 1:10
25 A07 STAIR 'G' SECTION SCALE = 1:50
24 A07 STAIR 'G' PLAN SCALE = 1:50
23 A07 TYPICAL TACTILE WALKING SURFACE INDICATOR DETAIL SCALE = NTS
22 A07 TYPICAL EXT. STEEL STAIR TREAD DETAIL SCALE = 1:10
21 A07 TYP POURED CONCRETE STAIR DETAIL SCALE = 1:10
20 A07 TYP STEEL PAN & CONC INFILL TREAD DETAIL SCALE = 1:10
19 A07 HANDRAIL DETAIL SCALE = 1:5
18 A07 HANDRAIL DETAIL SCALE = 1:5
17 A07 HANDRAIL EXTENSION DETAIL SCALE = 1:10
16A A07 GUARD DETAIL AT LANDING SCALE = 1:10
16 A07 TYP HANDRAIL/GUARD /STRINGER DETAIL SCALE = 1:10
15 A07 STAIR 'F' SECTION SCALE = 1:50
14 A07 STAIR 'E' SECTION SCALE = 1:50
13 A07 STAIR 'D' SECTION SCALE = 1:50
12 A07 STAIR 'C' SECTION SCALE = 1:50
11 A07 STAIR 'B' ELEVATION SCALE = 1:50
10 A07 STAIR 'A' SECTION SCALE = 1:50
1A A07 SECTION SCALE = 1:50
9 A07 STAIR 'F' PLAN SCALE = 1:50
8 A07 STAIR 'E' PLAN SCALE = 1:50
6 A07 STAIR 'C' SECOND LEVEL PLAN SCALE = 1:50
7 A07 STAIR 'D' PLAN SCALE = 1:50
5 A07 STAIR 'C' LOWER LEVEL PLAN SCALE = 1:50
4 A07 STAIR 'B' UPPER LVL SCALE = 1:50
3 A07 STAIR 'B' LOWER LVL SCALE = 1:50
2 A07 STAIR 'A' SECOND LVL SCALE = 1:50
1 A07 STAIR 'A' LOWER LVL SCALE = 1:50

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- COORDINATE ALL SHUTDOWNS WITH THE DEPARTMENTAL REPRESENTATIVE.
- PROVIDE ALL LABOUR AND MATERIAL REQUIRED TO FORM A COMPLETE, FUNCTIONAL SYSTEM AS DESCRIBED ON DRAWINGS.
- ALL STAIRS TO COMPLY WITH NBC STANDARDS
- ALL EXTERIOR GRADE LEVELS TO BE VERIFIED ON SITE PRIOR TO MANUFACTURE OF EXTERIOR STAIRS. ANY DISCREPANCIES TO BE REPORTED TO THE NRC DEPARTMENTAL REPRESENTATIVE/ CONSULTANT ACCORDINGLY

STAIR NOTES

- HANDRAILS TO BE CONTINUOUS AROUND LANDINGS AND AROUND INSIDE EDGES OF STAIRS
- AT TOP OF STAIR EXTEND HANDRAILS AT LEAST 300mm PARALLEL TO FLOOR SURFACE
- AT BOTTOM OF STAIR CONTINUE HANDRAIL SLOPE FOR DISTANCE EQUAL TO ONE TREAD DEPTH AND EXTEND 300mm PARALLEL TO FLOOR SURFACE
- TACTILE WALKING SURFACE INDICATOR TO BE INSTALLED AT TOPS OF EACH FLIGHT OF STAIRS/LANDINGS
- PROVIDE ADEQUATE BLOCKING FOR WALL MOUNTED HANDRAILS
- REFER TO STRUCTURAL DRAWINGS FOR ALL STEEL, REINFORCEMENT, & CONCRETE DETAILS

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ONTARIO ASSOCIATION OF ARCHITECTS
MAY 29 2015
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5674

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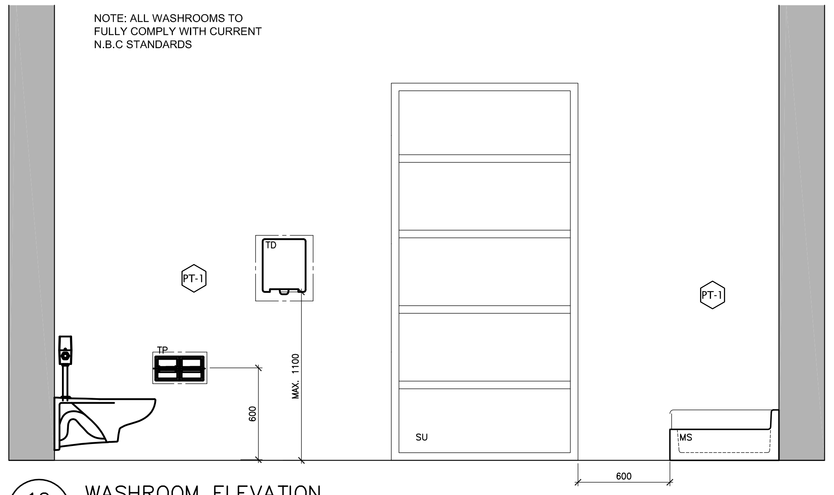
project / projet: NRC CABIN COMFORT + ENVIRONMENTAL RESEARCH FACILITY
MONTREAL ROAD CAMPUS

drawing / dessin: STAIR PLANS, SECTIONS & DETAILS

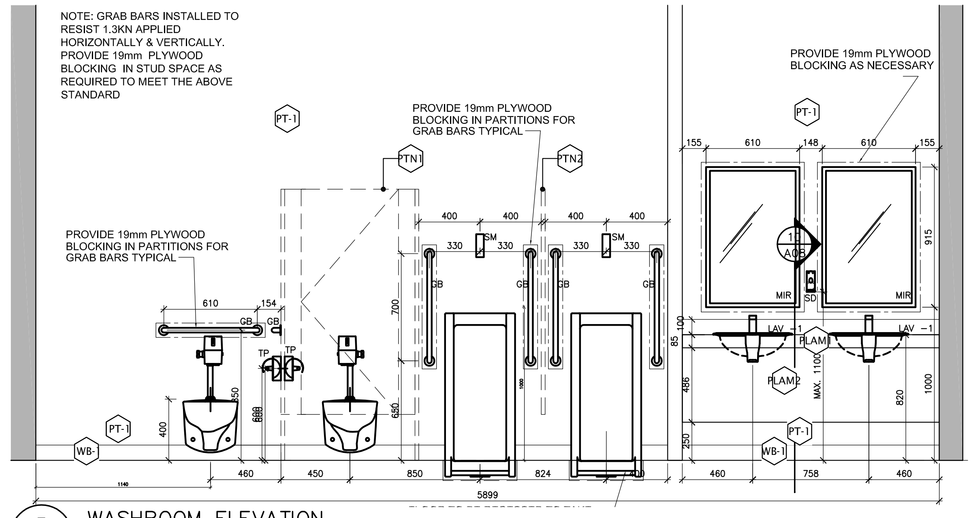
designed / conçu: S.DUNDERDALE	date / date: MAY '15
drawn / dessiné: S.DUNDERDALE	scale / échelle: 1:50/1:10/1:5
checked / vérifié: J.HUGHES	sheet / feuille: A07 of/de 12
approved / approuvé:	W.O.no. / D.T.no.

dwg.no. / dessin no.: 3788-A07

ASPM A0 (1189x841)



12 A08 WASHROOM ELEVATION
SCALE = 1:20



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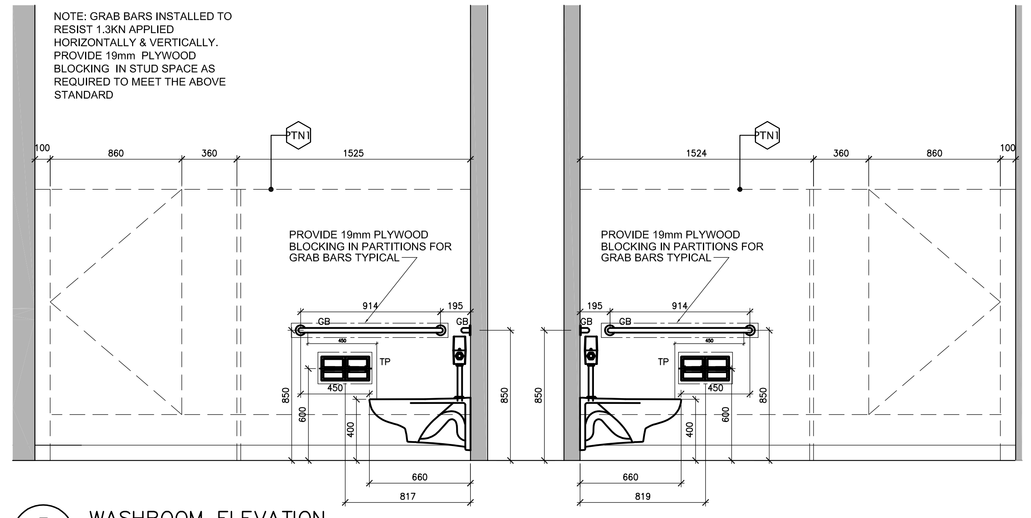

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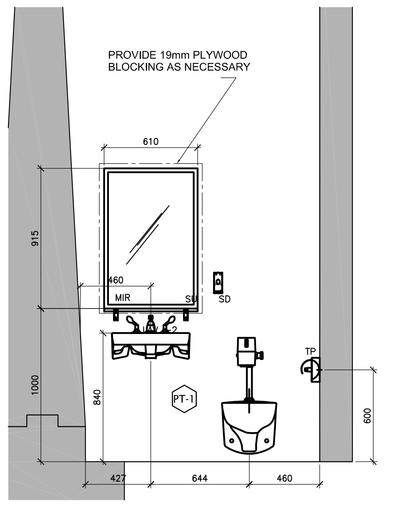

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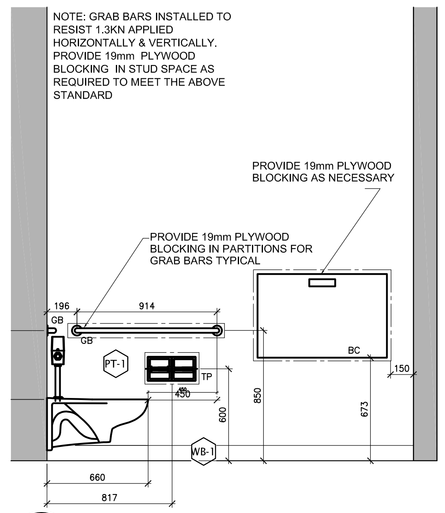

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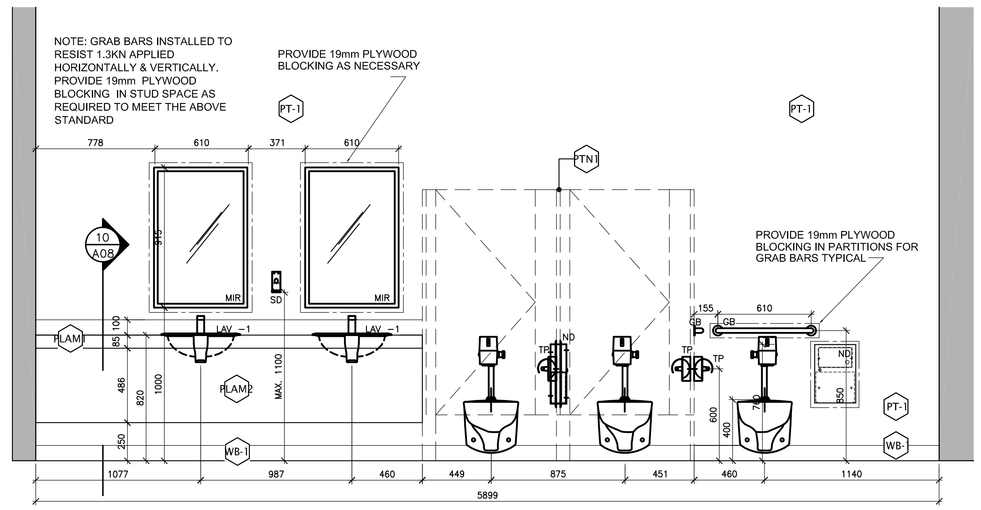

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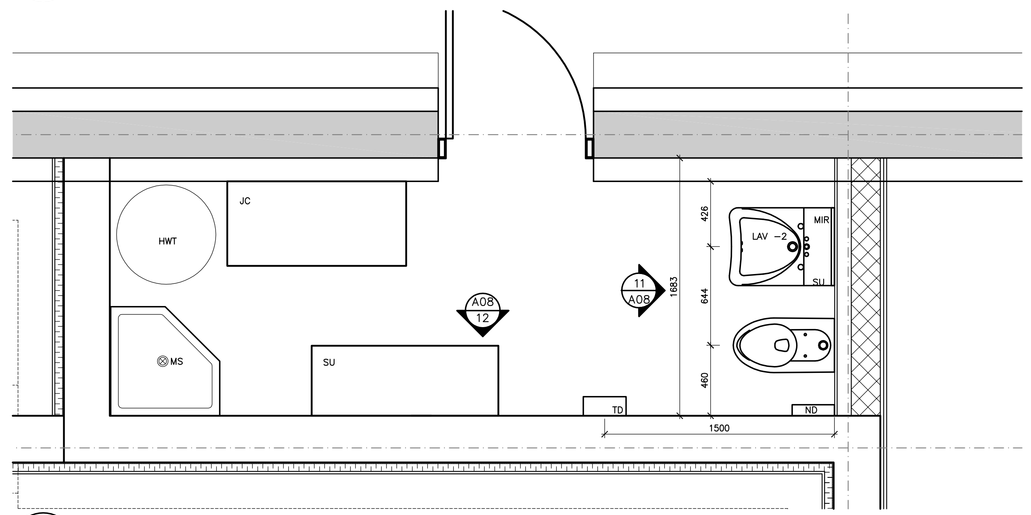

2 A08 WASHROOM PLAN – LOWER FLOOR
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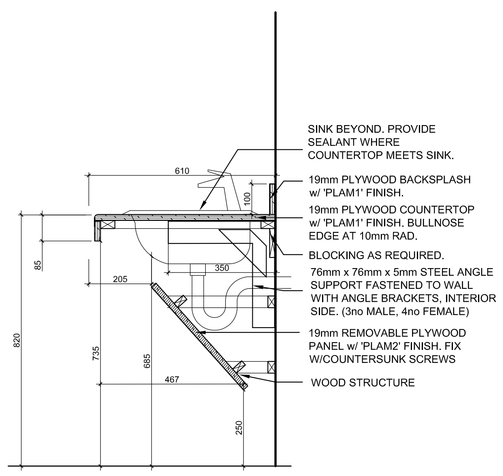

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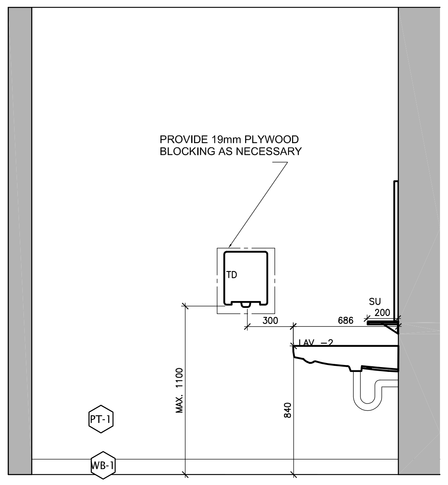

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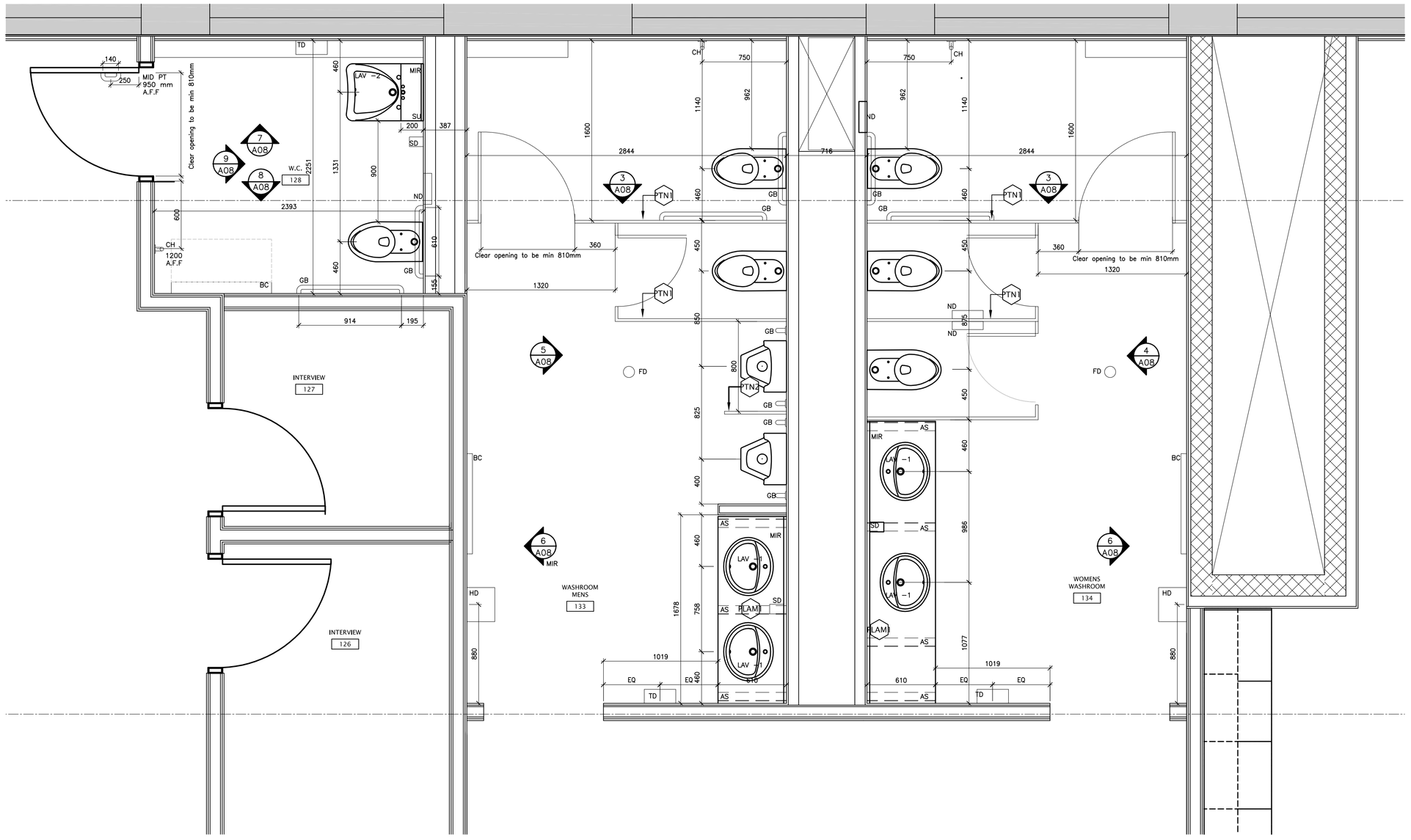

1 A08 WASHROOM PLAN – MAIN FLOOR
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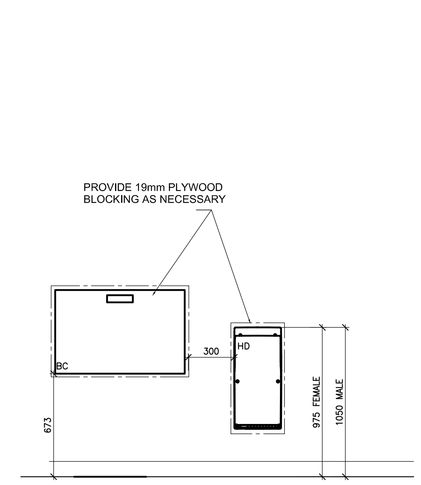

9 A08 WASHROOM ELEVATION
SCALE = 1:20

6 A08 WASHROOM ELEVATION
SCALE = 1:20

ASPM A0 (1189x841)

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- REFER ALSO TO 00 01 30 – LIST OF MATERIALS
- SOAP, TOILET PAPER & TOWEL DISPENSER TO BE SUPPLIED BY CLIENT AND INSTALLED BY CONTRACTOR
- ALL WASHROOMS TO FULLY COMPLY WITH CURRENT N.B.C STANDARDS & BARRIER FREE GUIDELINES

WASHROOM LEGEND:
AS ANGLE SUPPORT
BC BABY CHANGING TABLE
CH COAT HOOK
GB GRAB BAR
HD HANDDRYER
HWT HOT WATER TANK
JC JANITORS CART
LAV-1/2 SINKS REFER TO MECH
MIR MIRROR
MS MOPSINK
ND NAPKIN RECEPTACLE
PTN TOILET PARTITION
TD PAPER TOWEL DISPENSER & RECEPTACLE
TP TOILET PAPER DISPENSER
SD SOAP DISPENSER
SM STRIP MARK (COLOUR CONTRASTED)
SU SHELVING UNIT

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MONTREAL ROAD CAMPUS

drawing / dessin
WASHROOM PLANS & ELEVATIONS & MILLWORK

designed / conçu	S.DUNDERDALE	date	MAY '15
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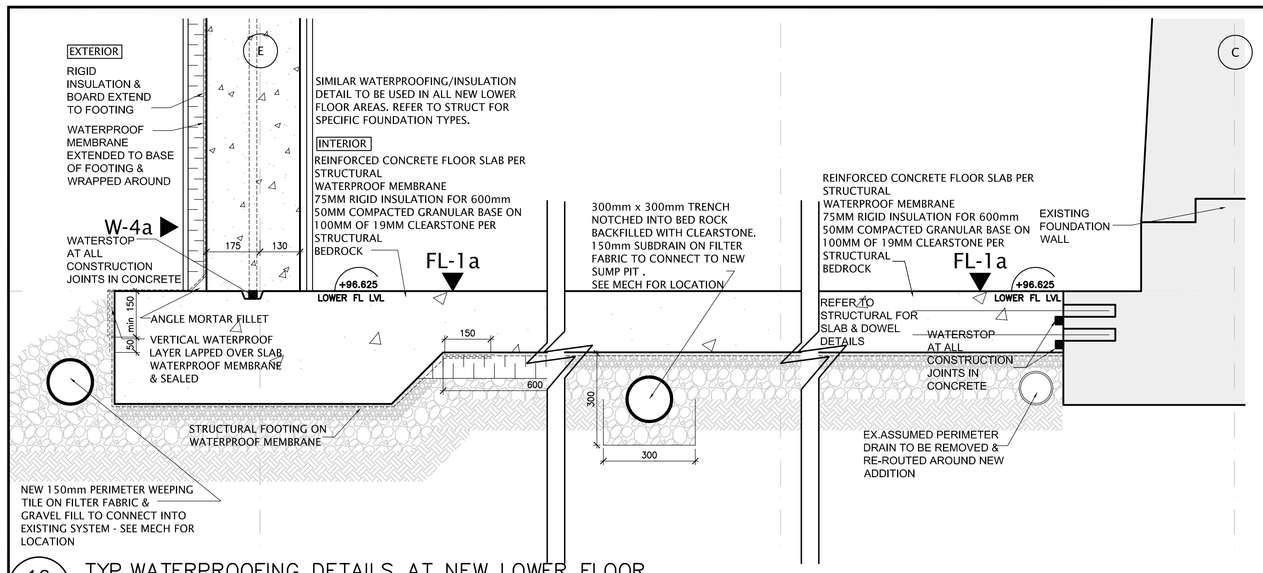
approved / approuvé		W.O.no.	D.T.no.

dwg.no. / dessin no.
3788-A08



16 A09 TYP.WATERPROOFING DETAILS AT NEW LOWER FLOOR

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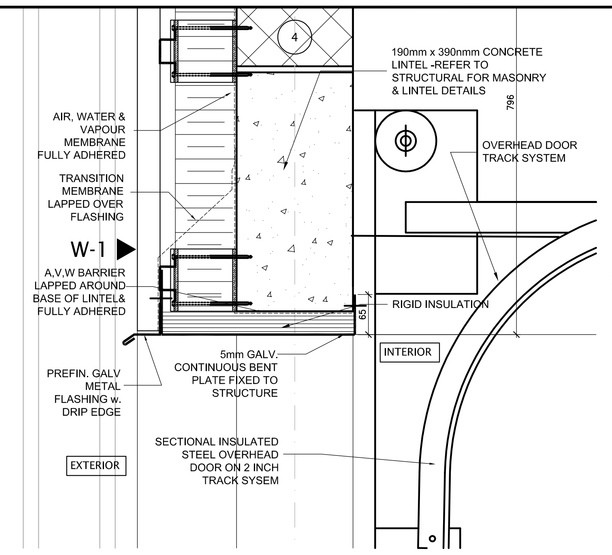
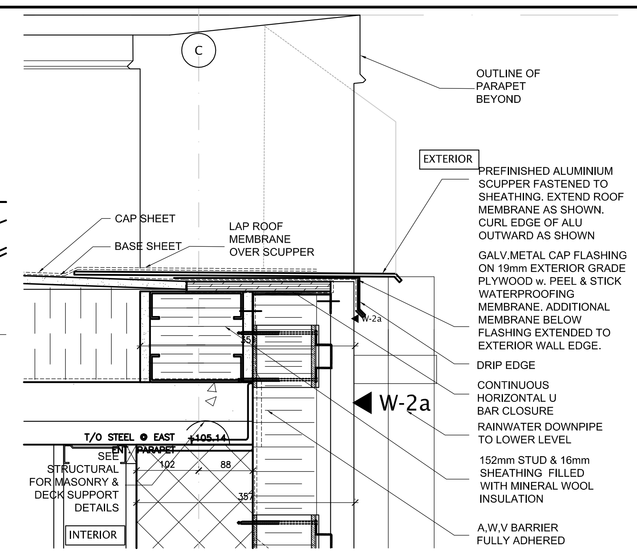


12 A09 OVERHEAD DOOR HEAD DETAIL

SCALE = 1:5



8 A09 ROOF EDGE DETAIL AT ENTRANCE

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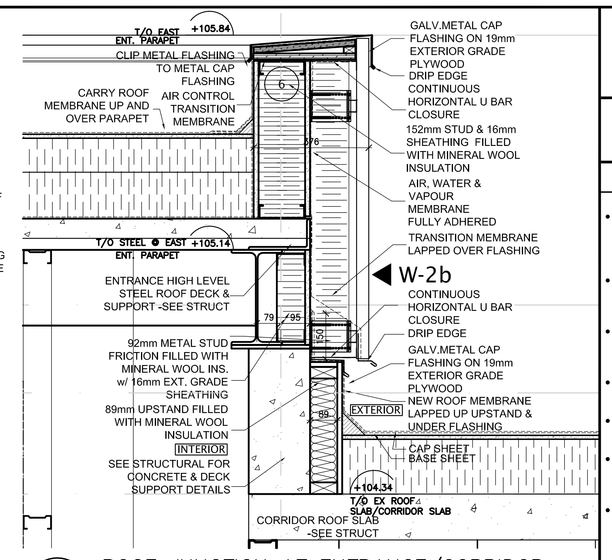

4 A09 ROOF JUNCTION AT ENTRANCE/CORRIDOR

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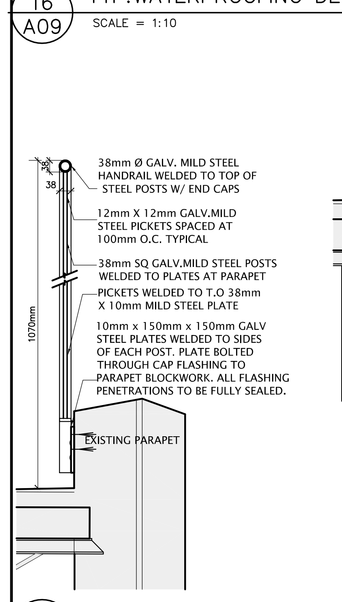

21 A09 ROOF GUARD DETAIL

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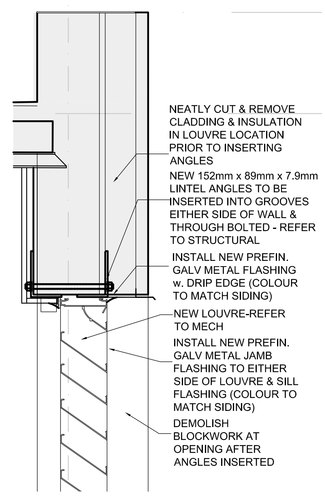

20 A09 TYP LOUVRE DETAIL

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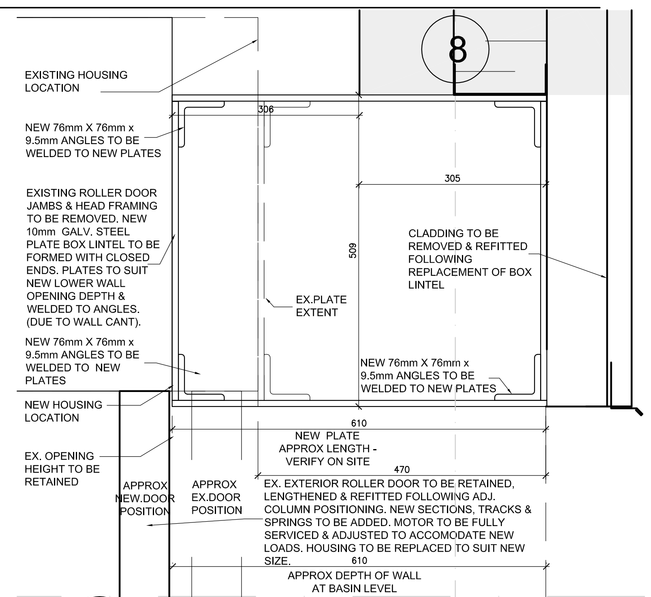
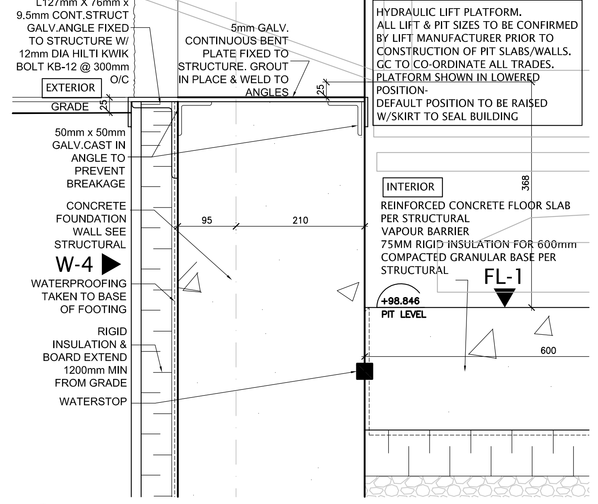


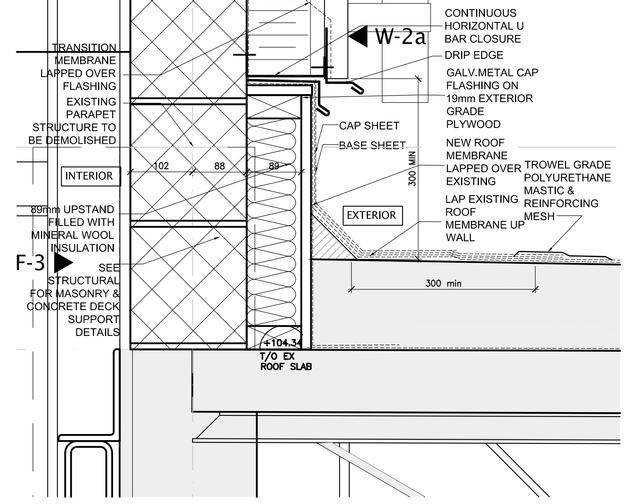
15 A09 ROLLER DOOR HEAD DETAIL @ FLIGHT SIM LAB

SCALE = 1:5



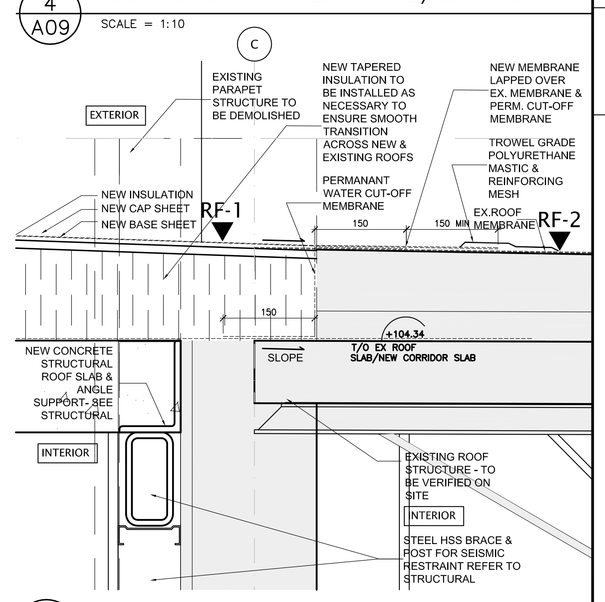
11 A09 OVERHEAD DOOR THRESHOLD DETAIL

SCALE = 1:5



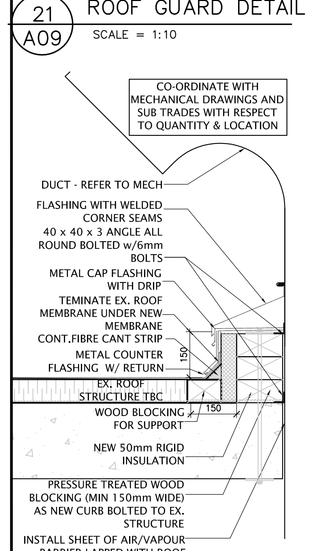
7 A09 ENTRANCE ROOF CONNECTION DETAIL

SCALE = 1:5



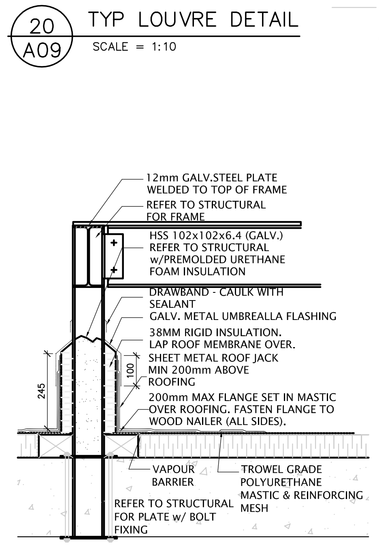
3 A09 ROOF CONNECTION DETAIL AT EAST CORRIDOR

SCALE = 1:5



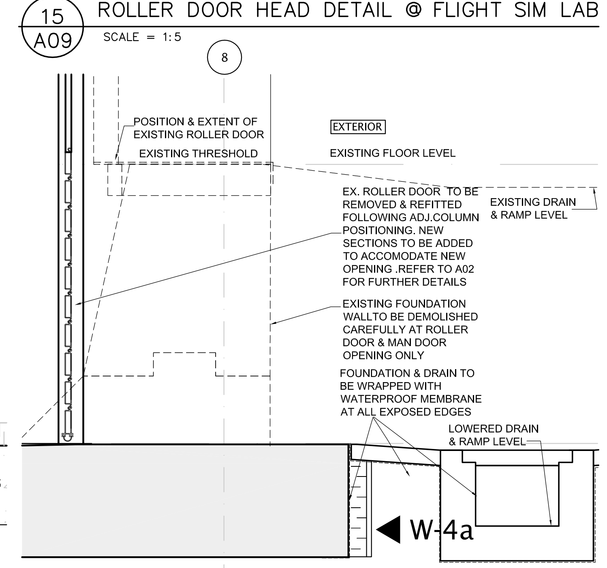
19 A09 DUCT PENETRATION DETAIL

SCALE = 1:10



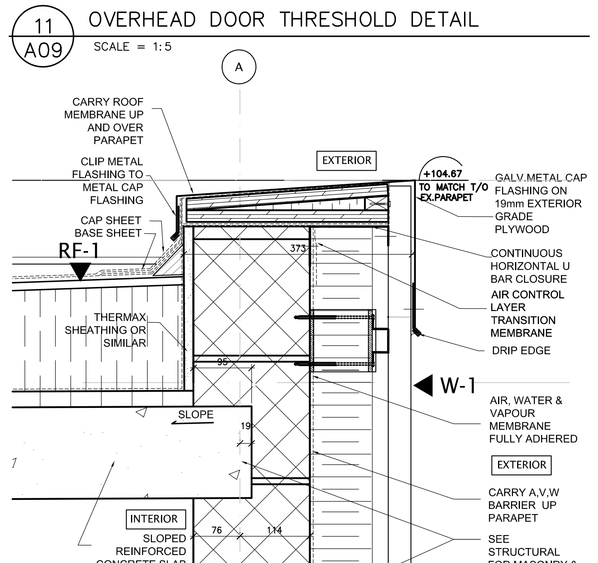
18 A09 SATELLITE MOUNTING

SCALE = 1:10



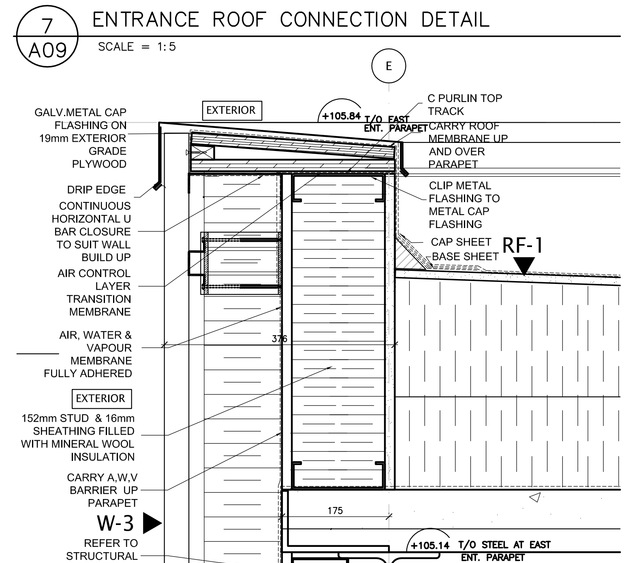
14 A09 BASE DETAIL AT FLIGHT SIM. ROLLER DOOR

SCALE = 1:10



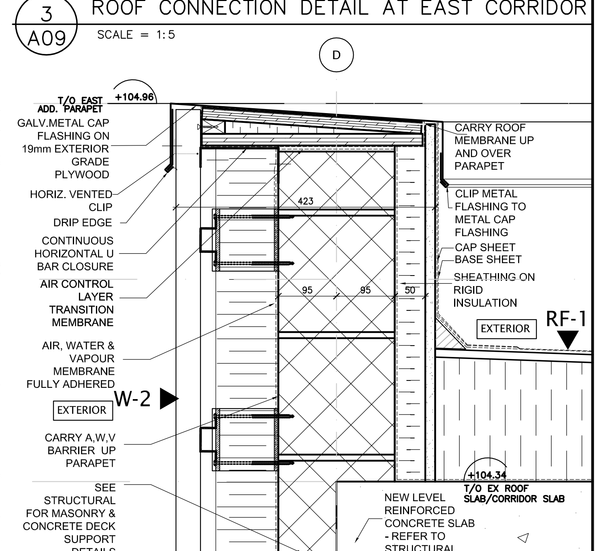
10 A09 PARAPET DETAIL– WEST ADDITION

SCALE = 1:5



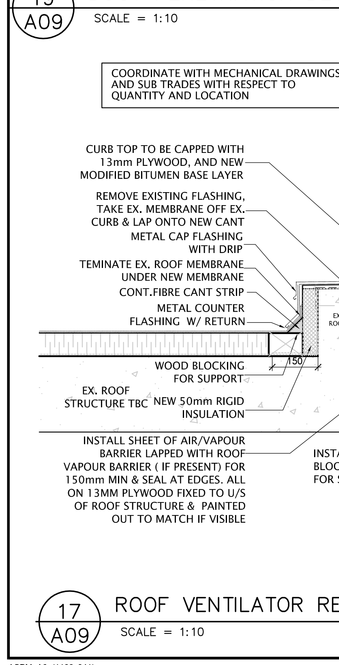
6 A09 PARAPET DETAIL AT ENTRANCE

SCALE = 1:5



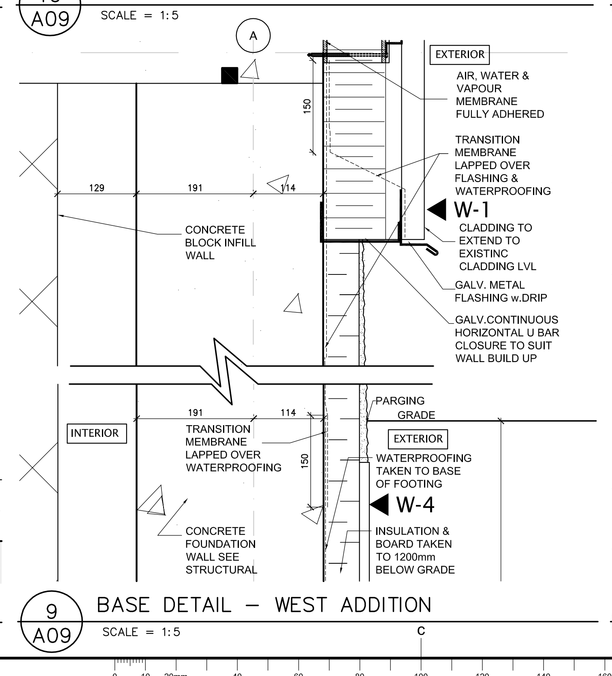
2 A09 PARAPET DETAIL –EAST ADDITION

SCALE = 1:5



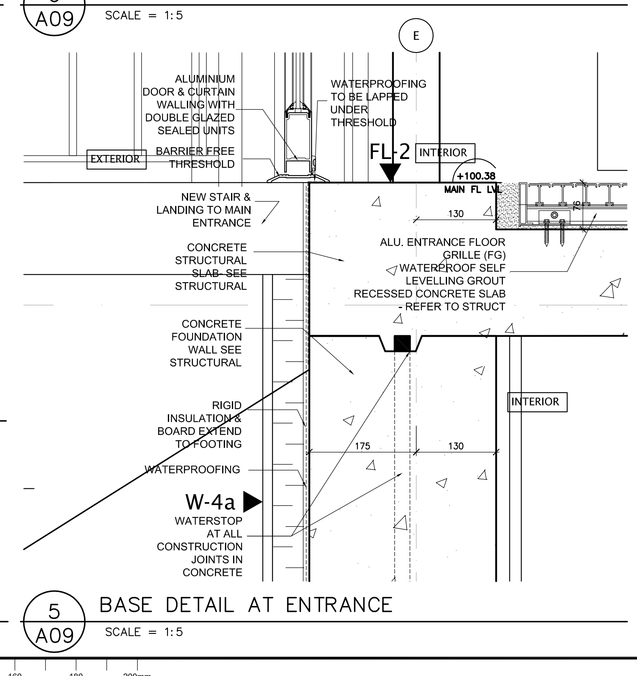
17 A09 ROOF VENTILATOR REMOVAL DETAIL

SCALE = 1:10



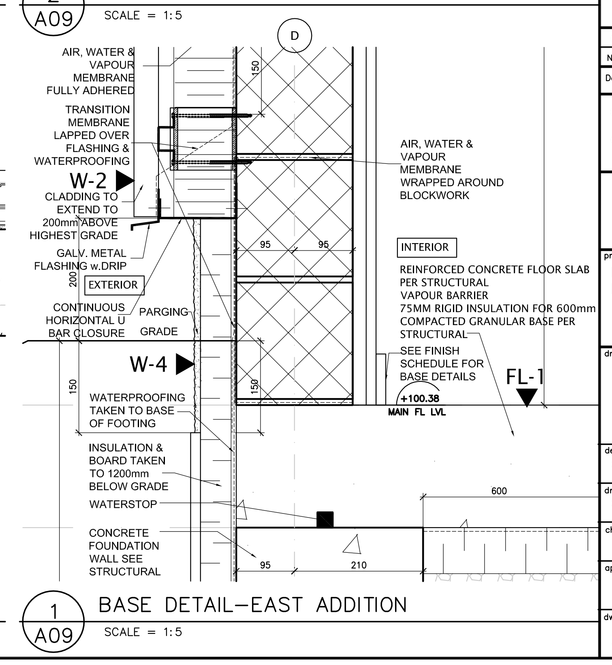
9 A09 BASE DETAIL – WEST ADDITION

SCALE = 1:5



5 A09 BASE DETAIL AT ENTRANCE

SCALE = 1:5



1 A09 BASE DETAIL–EAST ADDITION

SCALE = 1:5

0 10 20mm 40 60 80 100 120 140 160 180 200mm

National Research Council Canada
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NRC · CNRC

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LEGEND :

EXISTING BUILDING ELEMENT

NORR
ARCHITECTS ENGINEERS PLANNERS
NORR Limited
An Ingenium Group Company

ONTARIO ASSOCIATION OF ARCHITECTS
may 29 2015
JONATHAN D. HUGHES
LICENCE 5674

No.	Date	Revision	By/Par.
0	29 05 2015	ISSUED FOR TENDER	SD

Date Printed / Date imprimé

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

A Detail no. No. du détail
B Location drawing no. sur dessin no.
C Drawing no. dessin no.

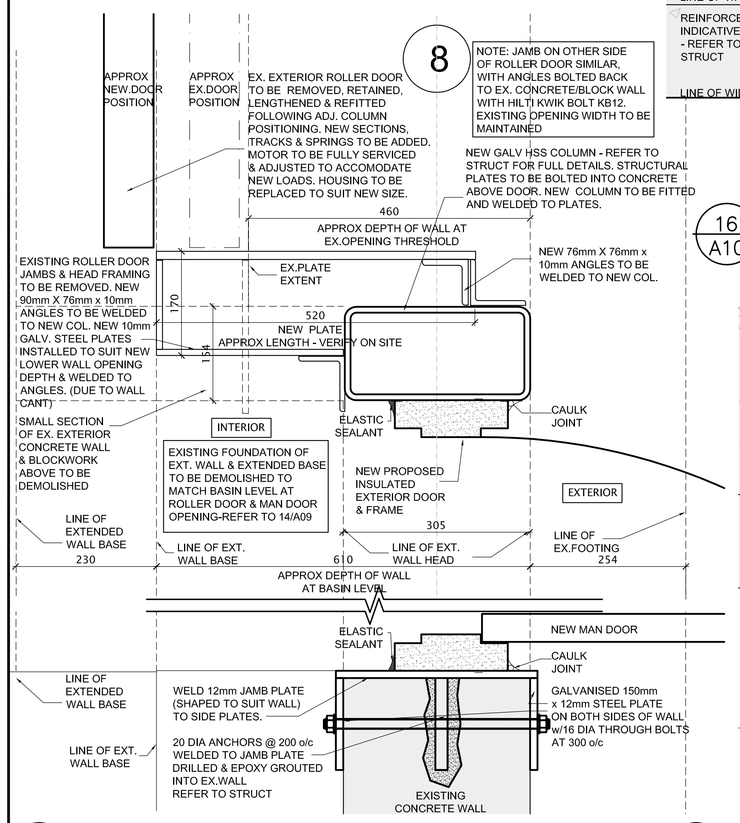
project / projet
NRC CABIN COMFORT + ENVIRONMENTAL RESEARCH FACILITY
MONTREAL ROAD CAMPUS

drawing / dessin
EXTERIOR DETAILS

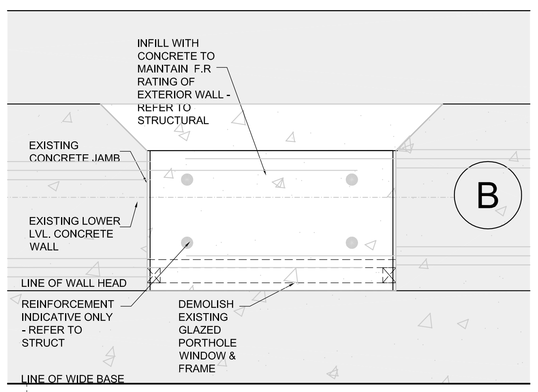
designed / conçu	date	date
S.DUNDERDALE	MAY '15	
drawn / dessiné	scale / échelle	
S.DUNDERDALE	1:10/15	
checked / vérifié	sheet / feuille	
J.HUGHES	A09 of/de 14	
approved / approuvé	W.O.no.	D.T.no.

dwg.no. / dessin no.
3788-A09

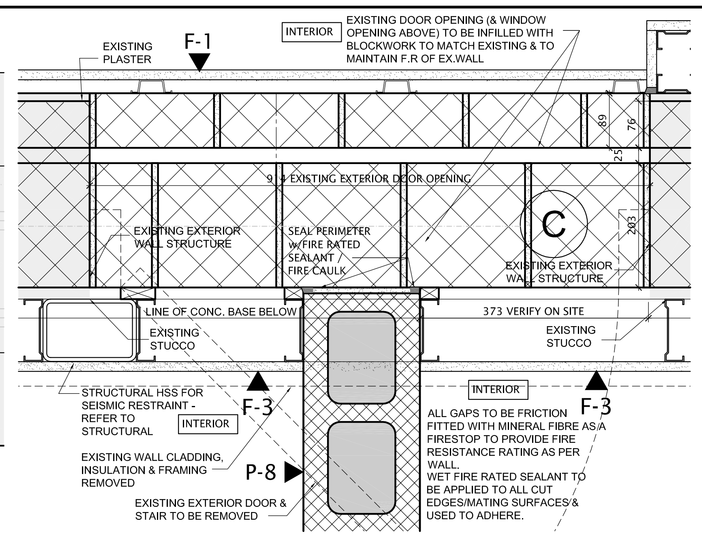
ASPM A0 (1189x841)



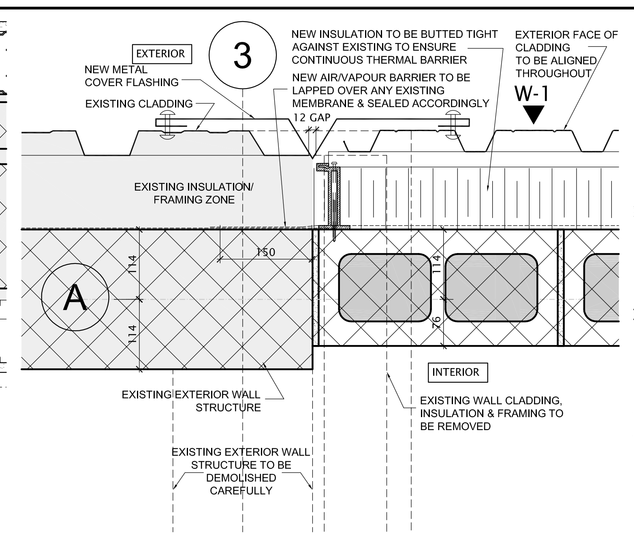
19 A10 NEW MAN DOOR AT FLIGHT.SIM LAB
SCALE = 1:5



16 A10 TYP. F.R INFILL @ VIEWING PORTHOLES
SCALE = 1:5



12 A10 INFILL DETAIL AT F.R PARTITION/EX.EAST DOOR
SCALE = 1:5



8 A10 WEST ADDITION (RECEIVING) CONNECTION DETAIL
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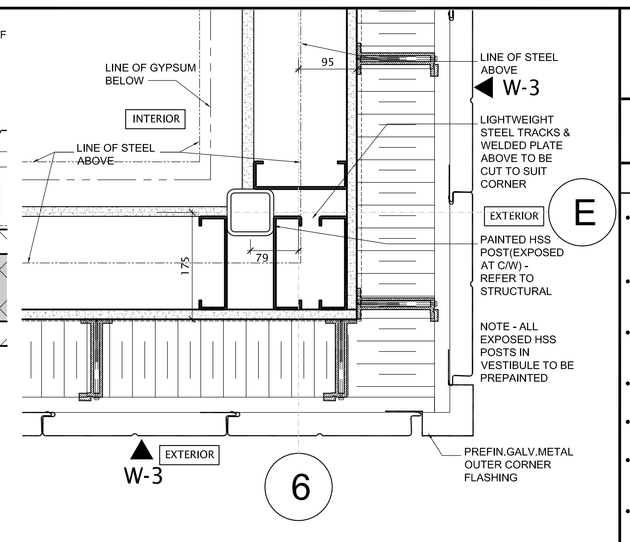
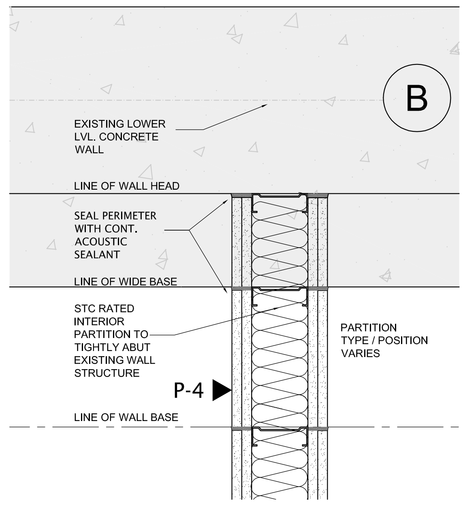


4 A10 EXT.CORNER DETAIL ABOVE C/W AT ENTRANCE
SCALE = 1:5



15 A10 TYP.JUNCTION@STC PARTITION/EX.LOWER LVL.WALL
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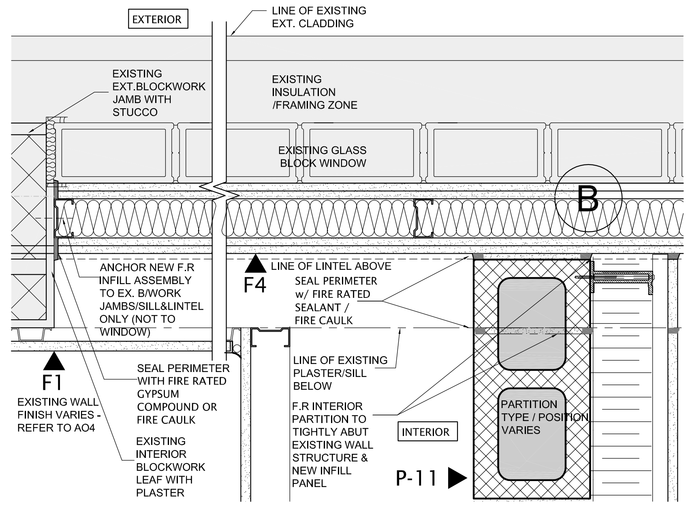

11 A10 TYP.JUNCTION @ F.R PARTITION/EX GLASS BLOCK
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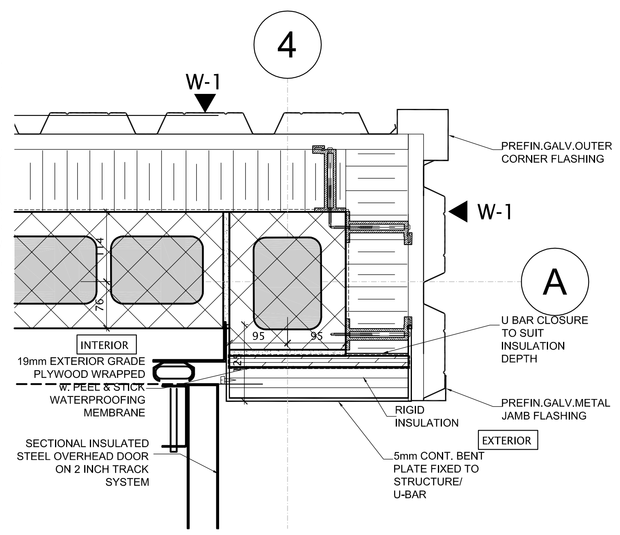
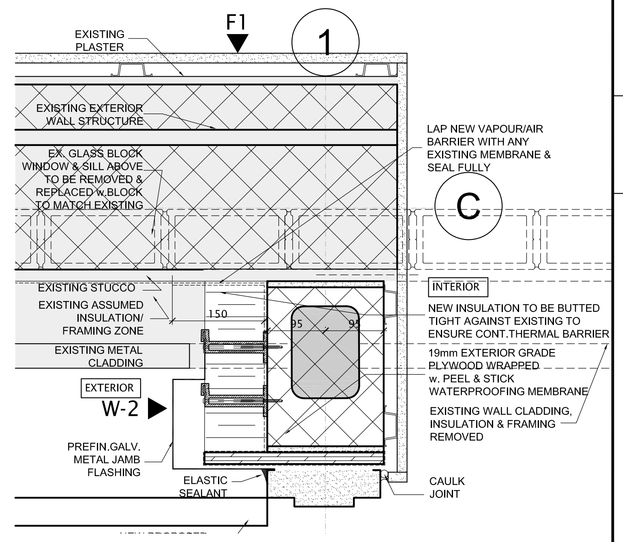
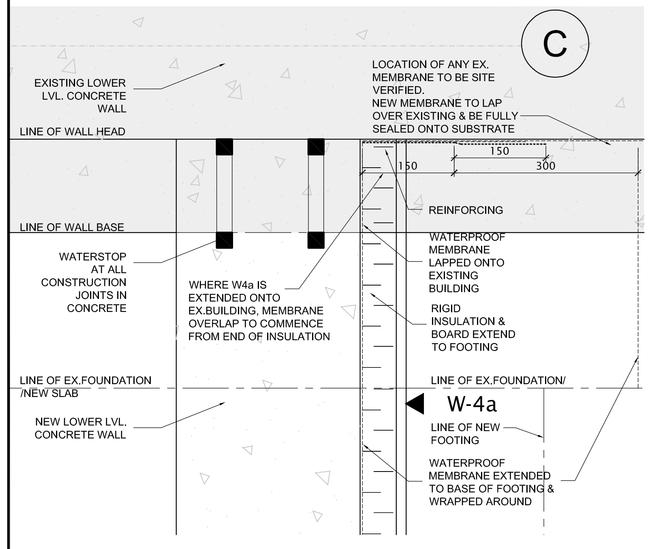


7 A10 WEST ADDITION–EXTERIOR CORNER/JAMB DETAIL
SCALE = 1:5



3 A10 CONNECTION DETAIL–EAST ADDITION TO EX.WALL
SCALE = 1:5



18 A10 TYP.WATERPROOFING TERMINATION DETAIL AT EX.WALL
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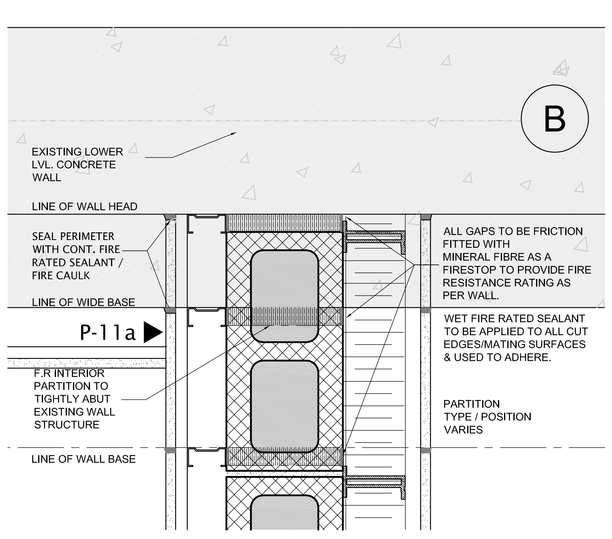

14 A10 TYP.JUNCTION@F.R PARTITION/EX.LOWER LVL.WALL
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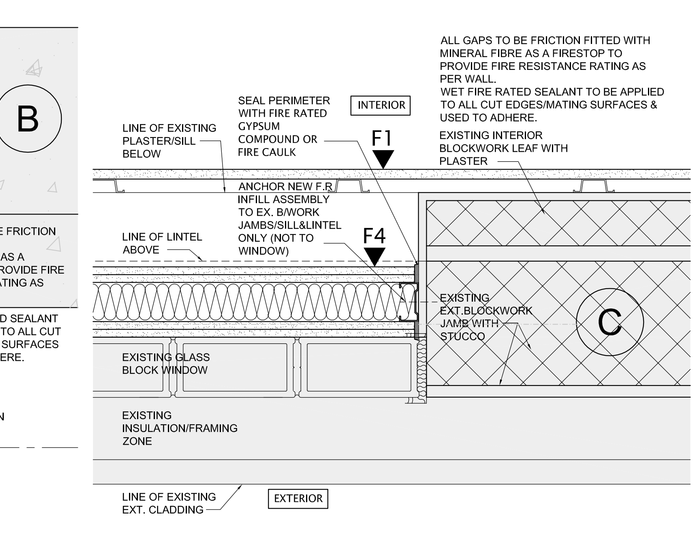

10 A10 TYP.F/R INFILL AT EX. GLASS BLOCK WINDOW
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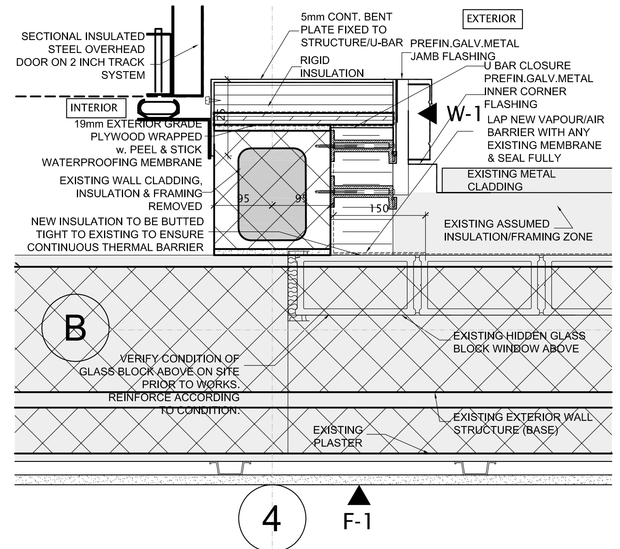

6 A10 CONNECTION DETAIL–WEST ADDITION TO EXISTING
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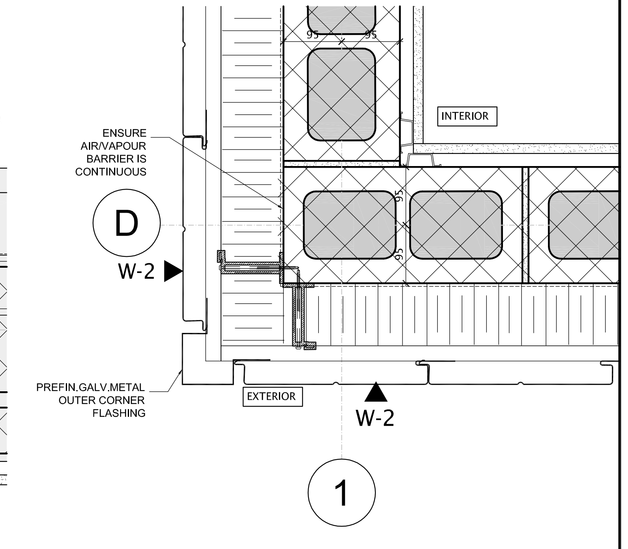
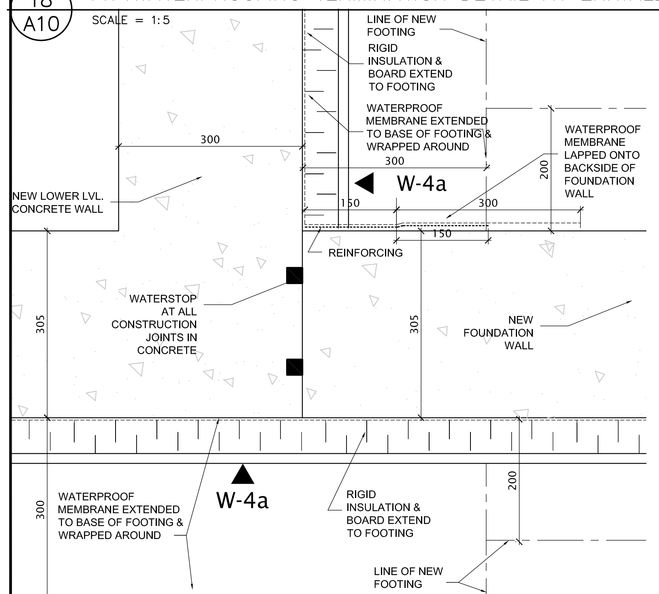
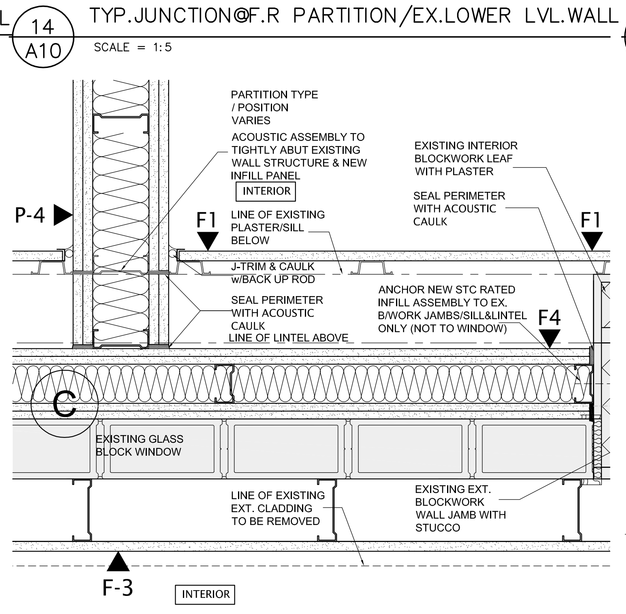


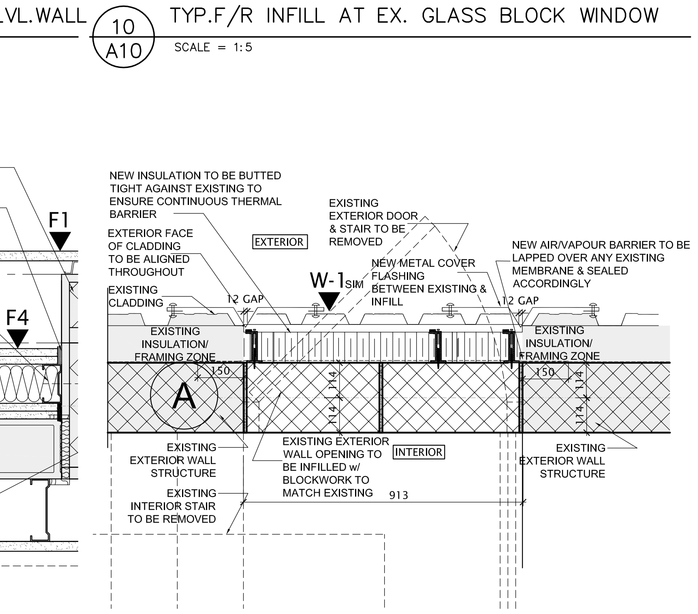
2 A10 EAST ADDITION–TYP. EXTERNAL CORNER DETAIL
SCALE = 1:5



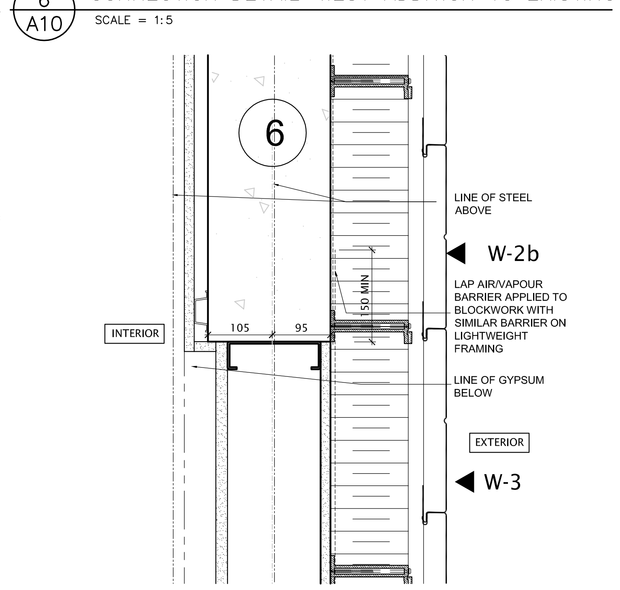
17 A10 TYP.WATERPROOFING DETAIL@NEW LOWER LVL WALL/FOUND.
SCALE = 1:5



13 A10 TYP.JUNCTION@STC PARTITION & EX.GLASS BLOCK
SCALE = 1:5



9 A10 INFILL DETAIL AT EXISTING WEST DOOR
SCALE = 1:10



5 A10 HIGH LEVEL JUNCTION W–2b/W3 ABOVE C/W
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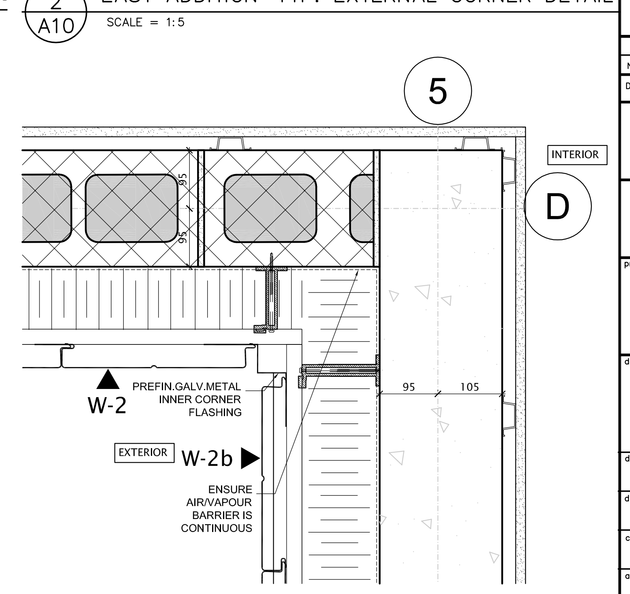

1 A10 EAST ADDITION–TYP.INTERNAL CORNER DETAIL
SCALE = 1:5

0 10 20mm 40 60 80 100 120 140 160 180 200mm

ASPM A0 (1189x841)

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LEGEND :

EXISTING BUILDING ELEMENT

NORR
ARCHITECTS ENGINEERS PLANNERS
NORR Limited
An Ingenium Group Company

ONTARIO ASSOCIATION OF ARCHITECTS
MAY 29 2015
JONATHAN D. HUGHES
LICENCE
3033

No.	Date	Revision	By/ Par.
0	29 05 2015	ISSUED FOR TENDER	SD

Date Printed | Date imprimée

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

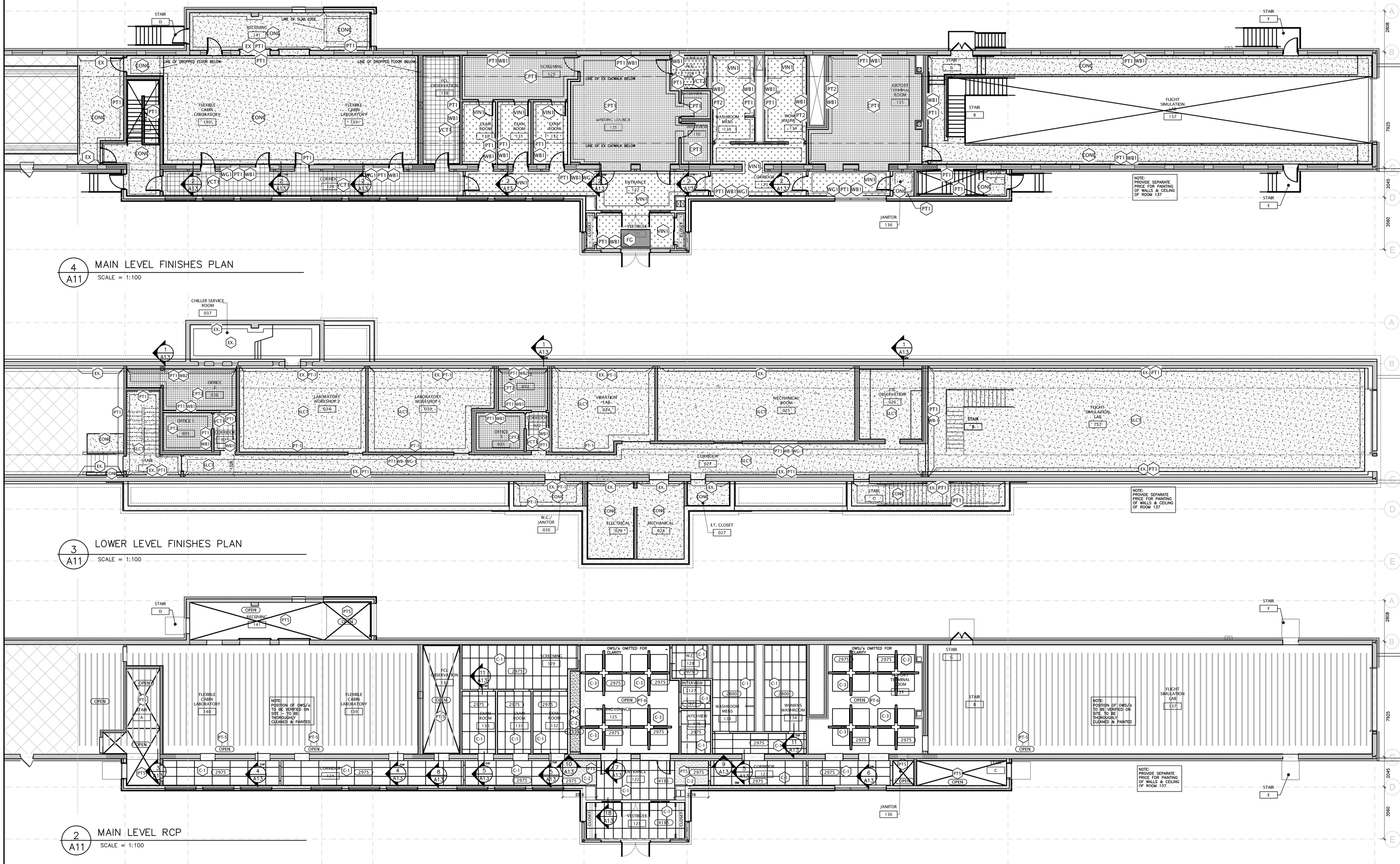
A Detail no. No. du détail
B Location drawing no. sur dessin no.
C Drawing no. dessin no.

project / projet
NRC CABIN COMFORT + ENVIRONMENTAL RESEARCH FACILITY
MONTREAL ROAD CAMPUS

drawing / dessin
PLAN DETAILS

designed / conçu	date	date
S.DUNDERDALE	MAY '15	
drawn / dessiné	scale / échelle	
S.DUNDERDALE	1\10/15	
checked / vérifié	sheet / feuille	
J.HUGHES	A10 of/de 14	
approved / approuvé	W.O.no.	D.T.no.

dwg.no. / dessin no.
3788-A10



4 A11 MAIN LEVEL FINISHES PLAN

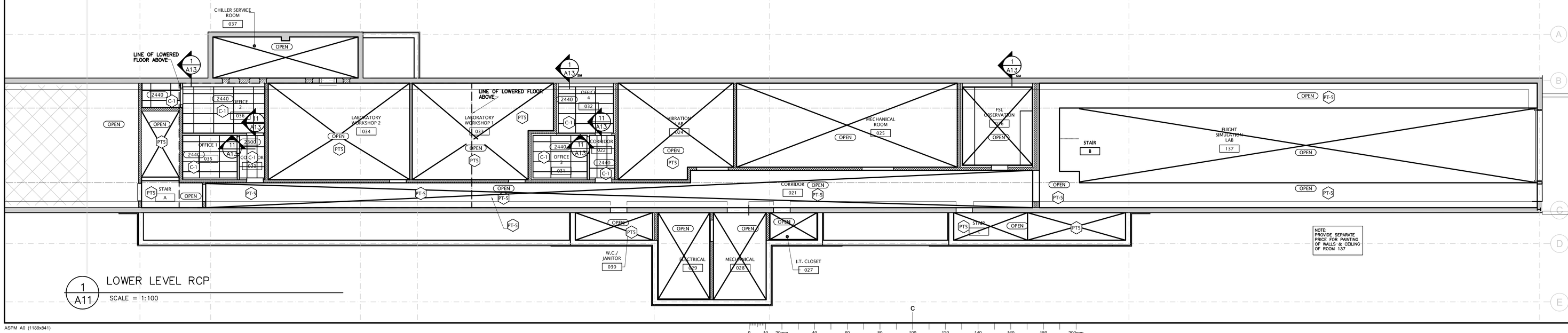
SCALE = 1:100

3 A11 LOWER LEVEL FINISHES PLAN

SCALE = 1:100

2 A11 MAIN LEVEL RCP

SCALE = 1:100



1 A11 LOWER LEVEL RCP

SCALE = 1:100

ASPM A0 (1189x841)

0 10 20mm 40 60 80 100 120 140 160 180 200mm

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- COORDINATE ALL SHUTDOWNS WITH THE DEPARTMENTAL REPRESENTATIVE.
- PROVIDE ALL LABOUR AND MATERIAL REQUIRED TO FORM A COMPLETE, FUNCTIONAL SYSTEM AS DESCRIBED ON DRAWINGS.
- TYPICAL DETAIL REFERENCES ARE NOT EXHAUSTIVE, EXAMPLES OF USAGE PROVIDED ONLY. REFER TO A01 FOR ALL WALL TYPES.
- PATCH AND MAKE GOOD ANY EXISTING ELEMENTS TO REMAIN THAT ARE DAMAGED BY THIS CONTRACT. IN ROOMS WHERE EXISTING FINISHES REMAIN VISIBLE ENSURE ALL NEW OPENINGS ARE NEATLY CUT & APPROPRIATELY FINISHED. JUNCTIONS WITH NEW ELEMENTS SHOULD BE PATCHED AS NECESSARY & NEATLY FINISHED.

GENERAL LEGEND :

AREA N.I.C.

EXISTING BUILDING ELEMENT

FINISHES LEGEND:
* REFER TO 00 01 30 LIST OF MATERIALS

- EX EXISTING
- C-1 1200mm X 610mm CEILING TILES
- C-2 GYPSUM CEILING
- C-3 SUSPENDED ACOUSTIC CLOUD
- CONC UNTREATED CONCRETE FLOOR
- PT1 CARPET TILE
- PT2 CARPET TILE
- FG FLOOR GRILLE
- PT1 GENERAL PAINT
- PT2 ACCENT PAINT
- PT3 DOOR PAINT
- PT4 DOOR FRAME PAINT
- PT5 CEILING PAINT
- PT6 CEILING PAINT
- SLC SELF LEVELLING CONCRETE TOPPING
- VCT1 VCT [VINYL COMPOSITE TILE]
- VCT2 VCT [VINYL COMPOSITE TILE]
- VIN1 HOMOGENOUS COMPOSITE TILE
- WB1 RUBBER WALL BASE
- WG1 WALL GUARD

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ONTARIO ASSOCIATION OF ARCHITECTS
MAY 29 2015
JONATHAN D. HUGHES
LICENCE 3074

No.	Date	Revision	By: Par:
0	29 05 2015	ISSUED FOR TENDER	SD

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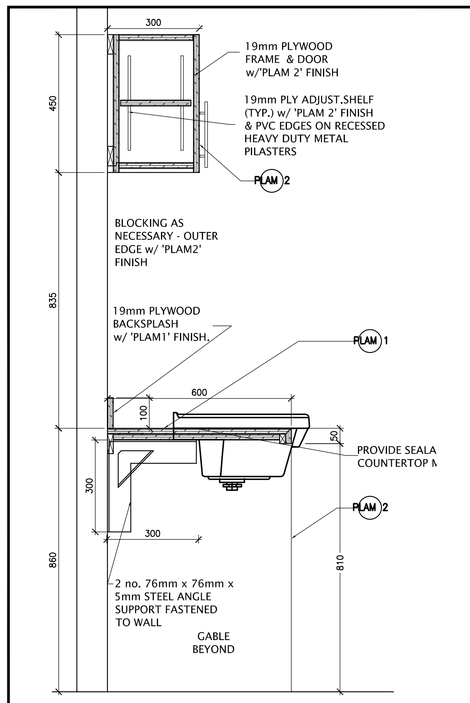
project / projet
NRC CABIN COMFORT + ENVIRONMENTAL RESEARCH FACILITY

MONTREAL ROAD CAMPUS

drawing / dessin
REFLECTED CEILING PLANS & FINISHES PLANS

designed / conçu	date / date
S.DUNDERDALE	MAY '15
drawn / dessiné	scale / échelle
S.DUNDERDALE	1:100
checked / vérifié	sheet / feuille
J.HUGHES	A11 of/de 14
approved / approuvé	W.O.no. / D.T.no.

dwg.no. / dessin no.
3788-A11



15 A12 MILLWORK SECTION
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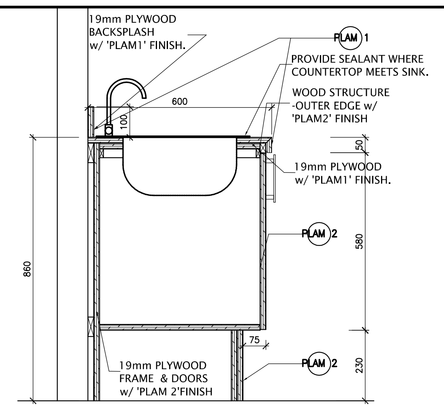
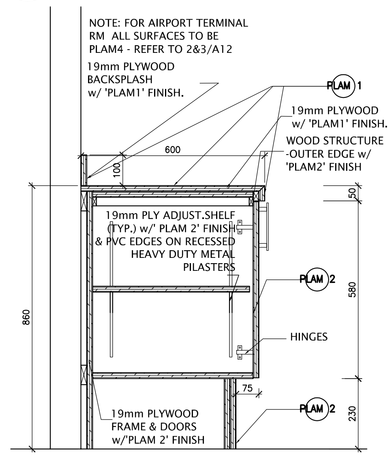
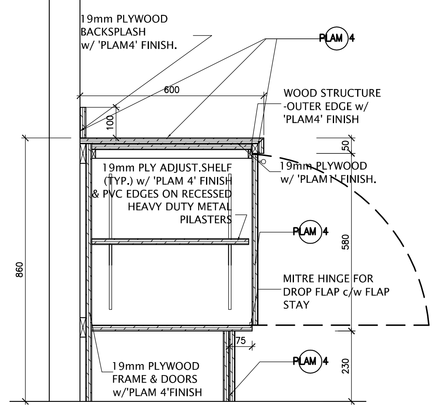


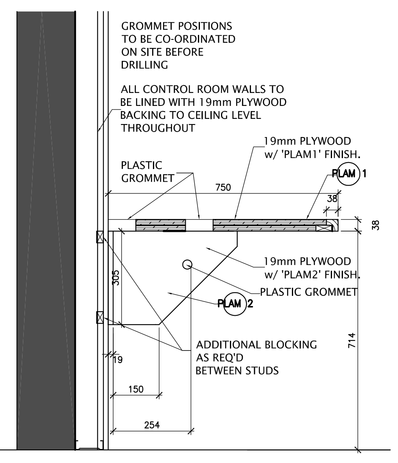
11 A12 MILLWORK SECTION
SCALE = 1:10



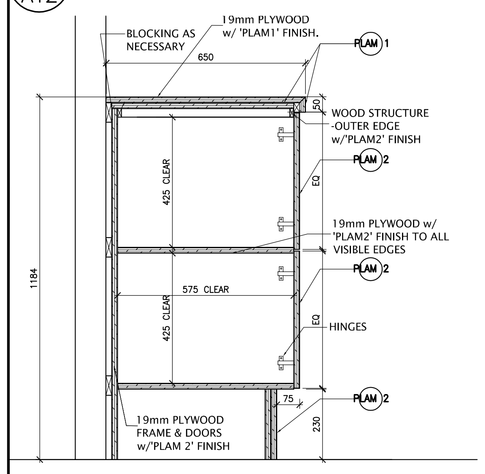
10 A12 MILLWORK SECTION
SCALE = 1:10



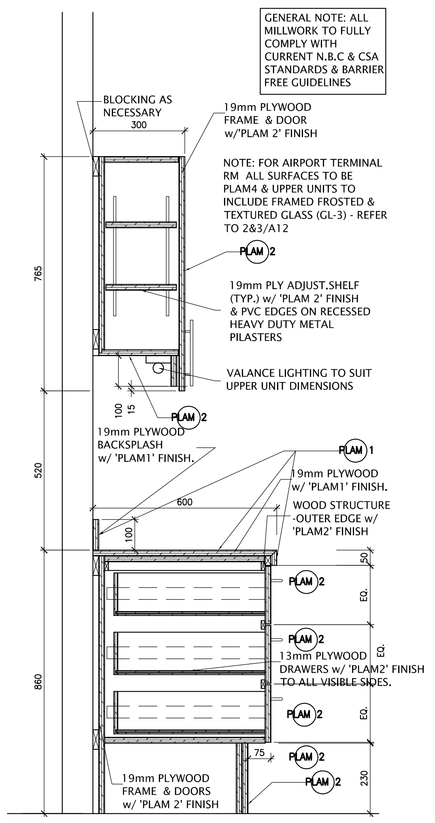
14 A12 MILLWORK SECTION
SCALE = 1:10



13 A12 MILLWORK SECTION
SCALE = 1:10

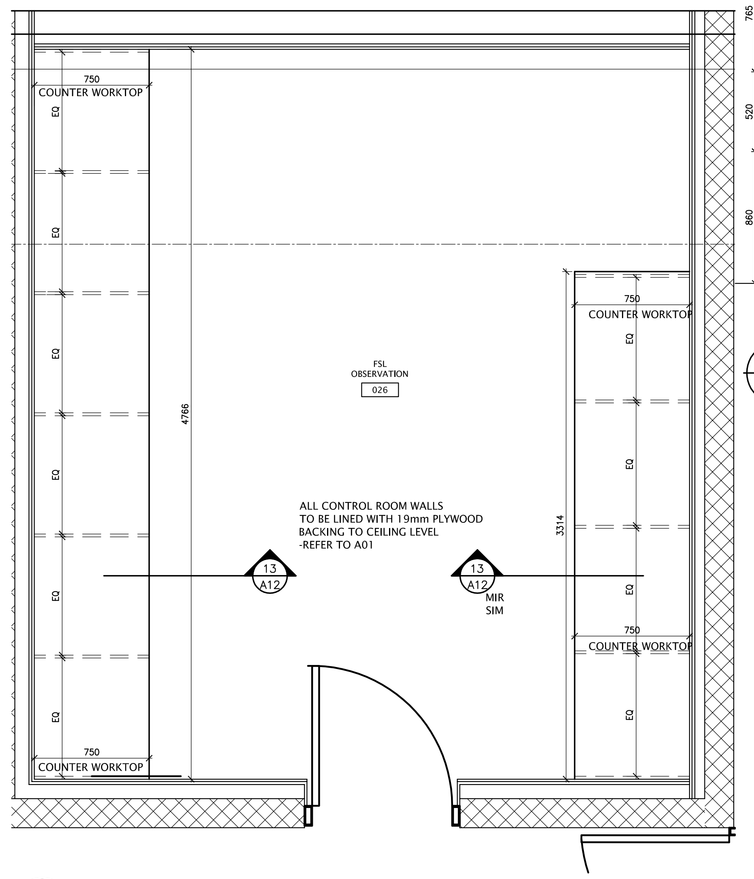


12 A12 WAITING LOUNGE LOCKER SECTION
SCALE = 1:10

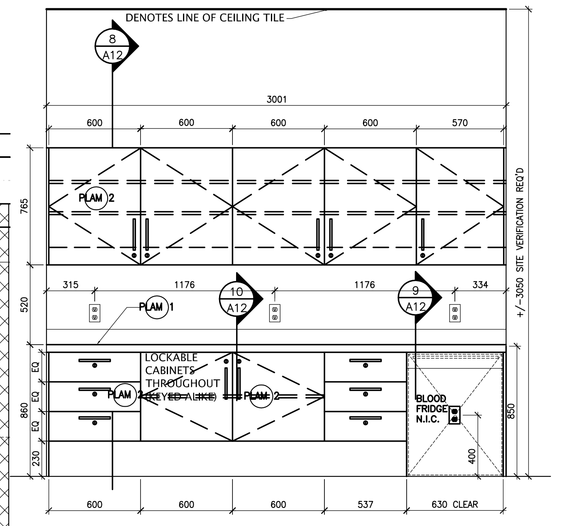


9 A12 MILLWORK SECTION
SCALE = 1:10

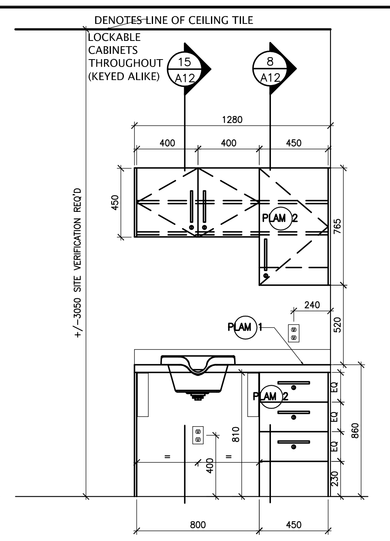
8 A12 MILLWORK SECTION
SCALE = 1:10



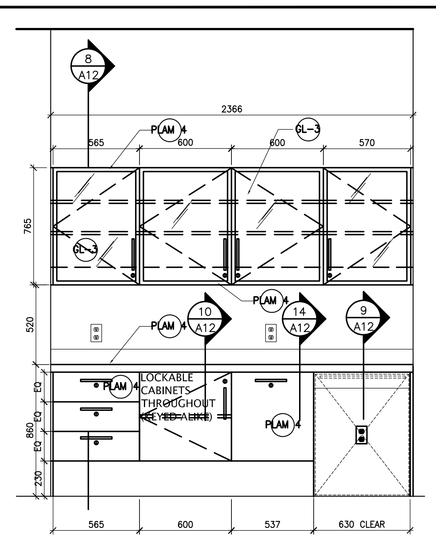
7 A12 MILLWORK PLAN – LOWER FLOOR
SCALE = 1:20



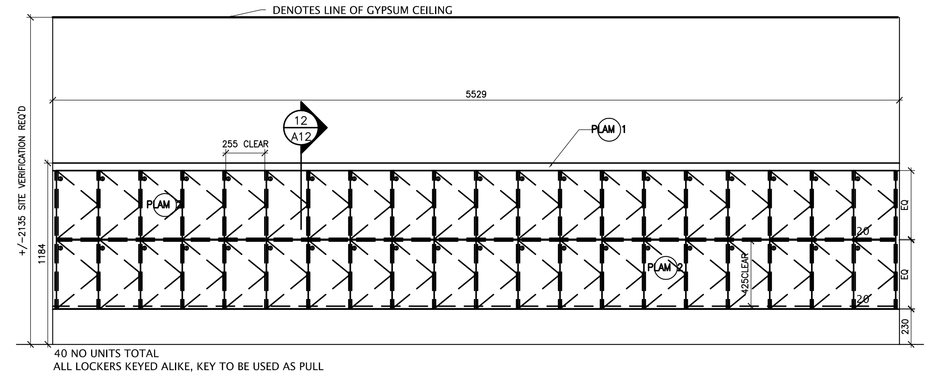
6 A12 SCREENING RM MILLWORK ELEVATION
SCALE = 1:20



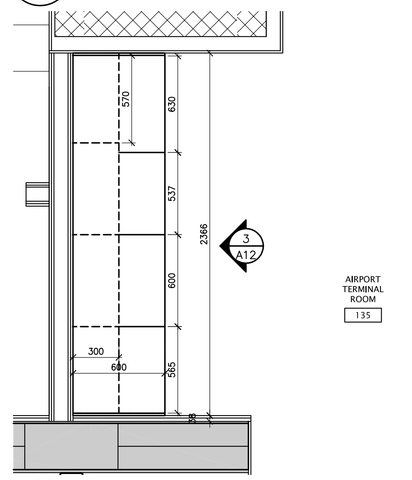
5 A12 TYP.EXAM RM MILLWORK ELEV.
SCALE = 1:20



3 A12 AIRPORT TERMINAL MILLWORK ELEV.
SCALE = 1:20



4 A12 WAITING LOUNGE LOCKER ELEVATION
SCALE = 1:20



2 A12 MILLWORK PLAN–MAIN FLOOR
SCALE = 1:20

1 A12 MILLWORK PLAN – MAIN FLOOR
SCALE = 1:20

0 10 20mm 40 60 80 100 120 140 160 180 200mm

ASPM A0 (1189x841)

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Division des services administratifs et gestion de l'immobilier

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GENERAL NOTES

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- PREVENT THE SPREAD OF DUST & DEBRIS BEYOND THE WORK AREA AND CLEAN ALL SURFACES AT COMPLETION.
- MAKE GOOD ALL SURFACES AFFECTED BY THIS WORK.
- COORDINATE ALL SHUTDOWNS WITH THE DEPARTMENTAL REPRESENTATIVE.
- PROVIDE ALL LABOUR AND MATERIAL REQUIRED TO FORM A COMPLETE, FUNCTIONAL SYSTEM AS DESCRIBED ON DRAWINGS.
- ALL MILLWORK SIZES TO BE SITE VERIFIED
- ALL MILLWORK TO FULLY COMPLY WITH CURRENT N.B.C AND C.S.A STANDARDS & BARRIER FREE GUIDELINES
- REFER TO 00 01 30 LIST OF MATERIALS FOR FINISHES

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ARCHITECTS ENGINEERS PLANNERS
NORR Limited
An Ingenium Group Company

ONTARIO ASSOCIATION OF ARCHITECTS
MAY 21 2015
JONATHAN D. HUGHES
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5674

No.	Date	Revision	By/Par.
0	29 05 2015	ISSUED FOR TENDER	SD

Date Printed / Date imprimé

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

A Detail no. No. du détail
B Location drawing no. sur dessin no.
C Drawing no. dessin no.

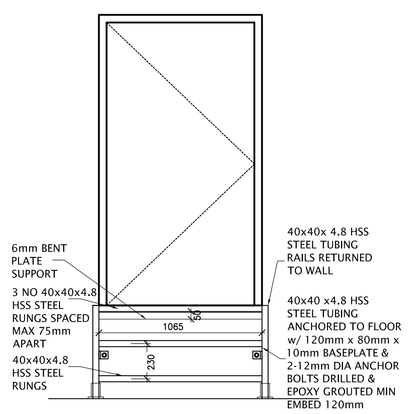
project / projet
NRC CABIN COMFORT + ENVIRONMENTAL RESEARCH FACILITY

MONTREAL ROAD CAMPUS

drawing / dessin
MILLWORK PLANS, SECTIONS & ELEVATIONS

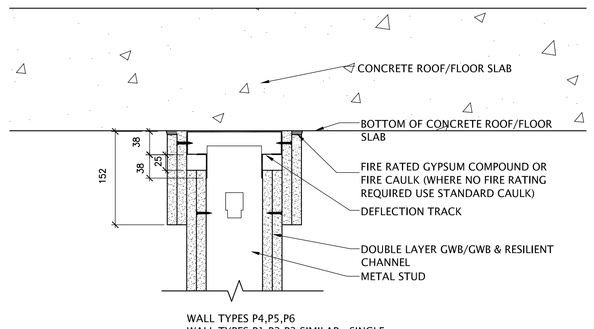
designed / conçu	S.DUNDERDALE	date	MAY '15
drawn / dessiné	S.DUNDERDALE	scale / échelle	1:20/1:10
checked / vérifié	J.HUGHES	sheet / feuille	A12 of/de 14
approved / approuvé		W.O.no.	D.T.no.

dwg.no. / dessin no.
3788-A12



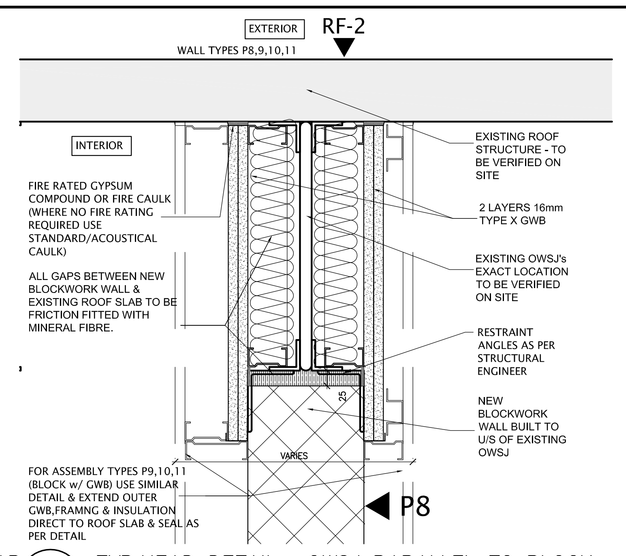
20 A13 LADDER DETAIL

SCALE = 1:20



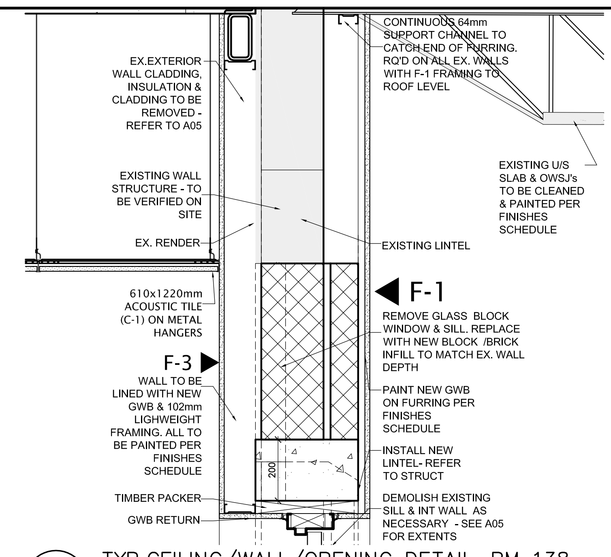
16 A13 TYP.WALL HEAD DETAIL–PARTITION TO CONC SLAB

SCALE = 1:5



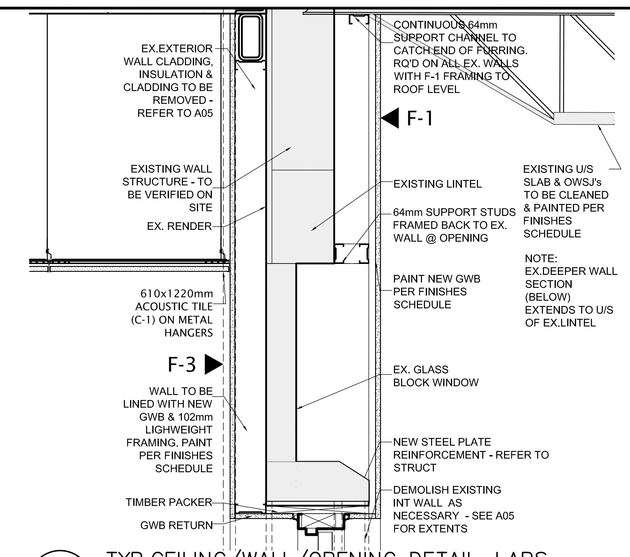
12 A13 TYP.HEAD DETAIL –OWSJ PARALLEL TO BLOCK

SCALE = 1:5



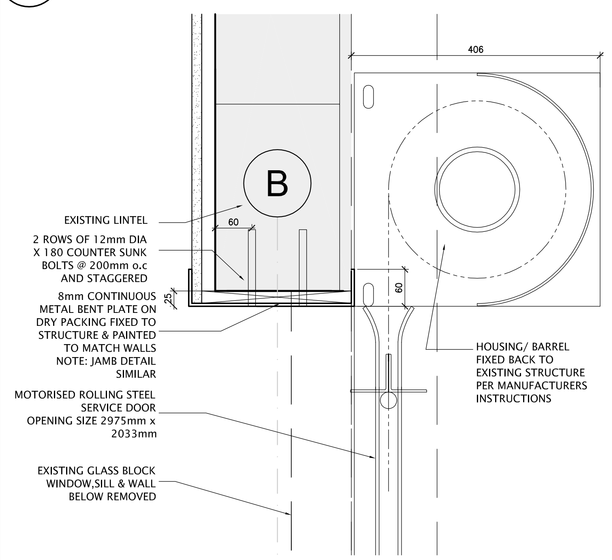
8 A13 TYP.CEILING/WALL/OPENING DETAIL–RM 138

SCALE = 1:10



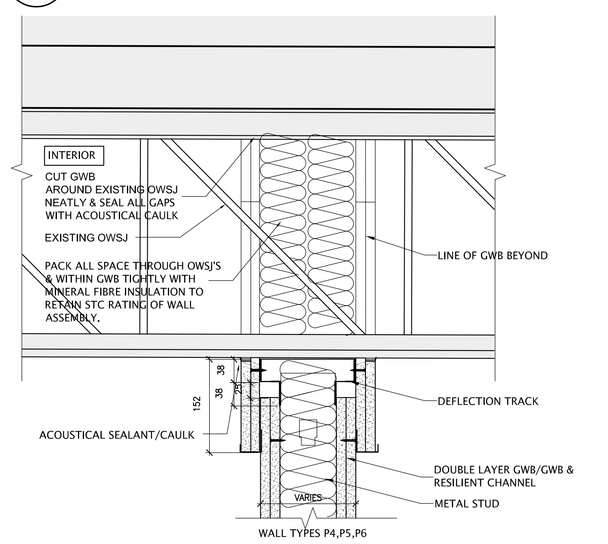
4 A13 TYP.CEILING/WALL/OPENING DETAIL–LABS

SCALE = 1:10



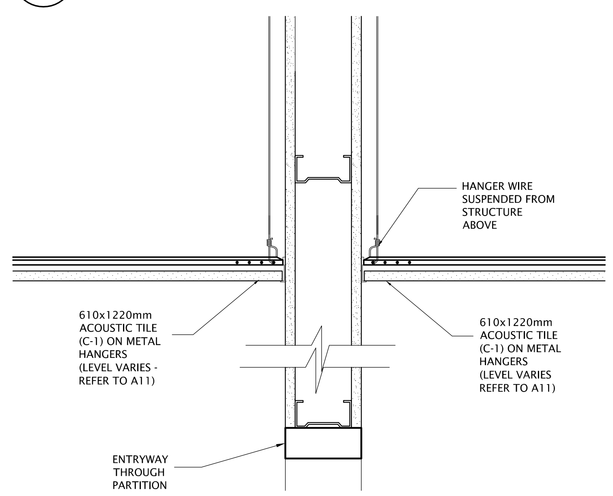
19 A13 RECEIVING AREA ROLLER DOOR HEAD DETAIL

SCALE = 1:5



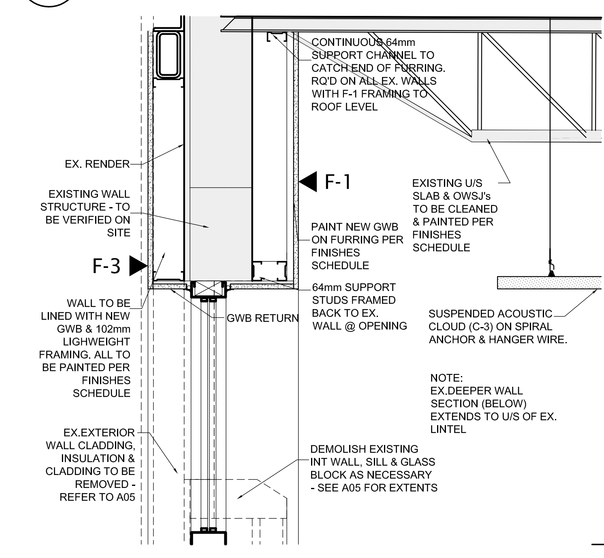
15 A13 TYP.WALL HEAD DETAIL–OWSJ PERP TO PARTITION

SCALE = 1:5



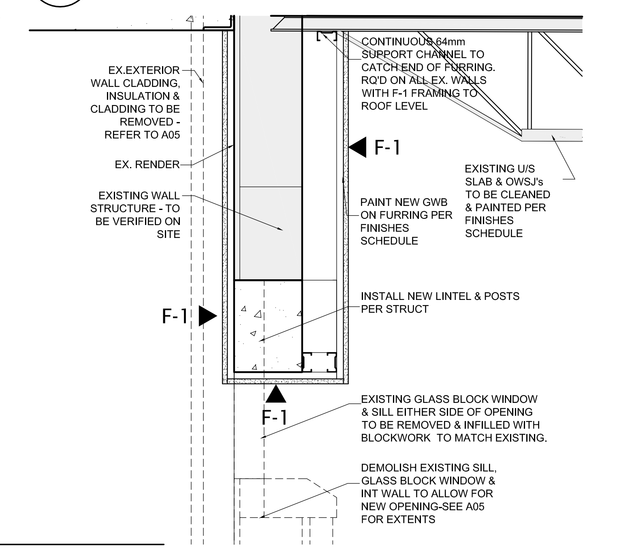
11 A13 TYPICAL CEILING TRANSITION DETAIL

SCALE = 1:5



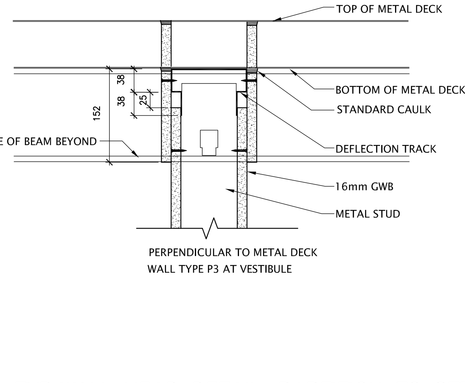
7 A13 TYP.CEILING/WALL/OPENING DETAIL – RM 125

SCALE = 1:10



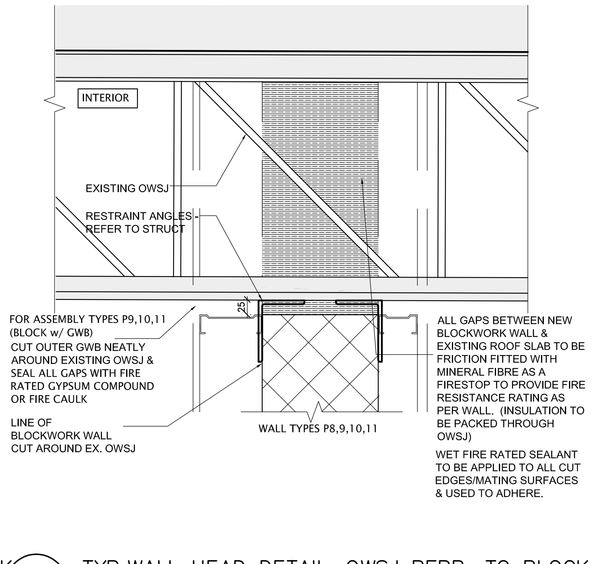
3 A13 TYP.CEILING/WALL/OPENING DETAIL AT STAIR A

SCALE = 1:10



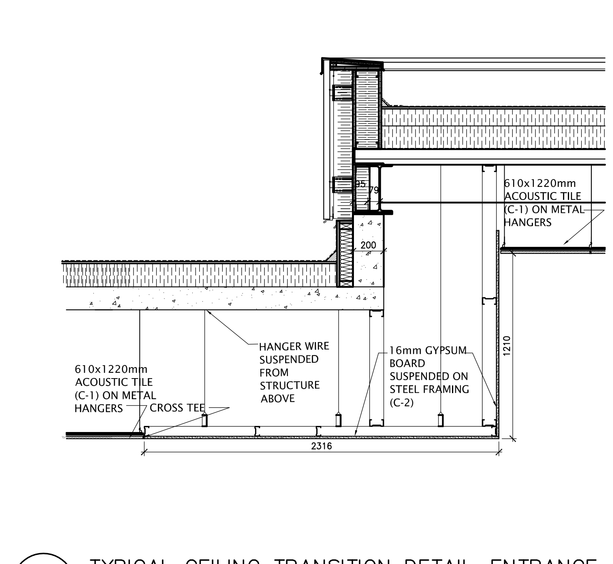
18 A13 TYP.WALL HEAD DETAIL–PARTITION TO STEEL DECK

SCALE = 1:5



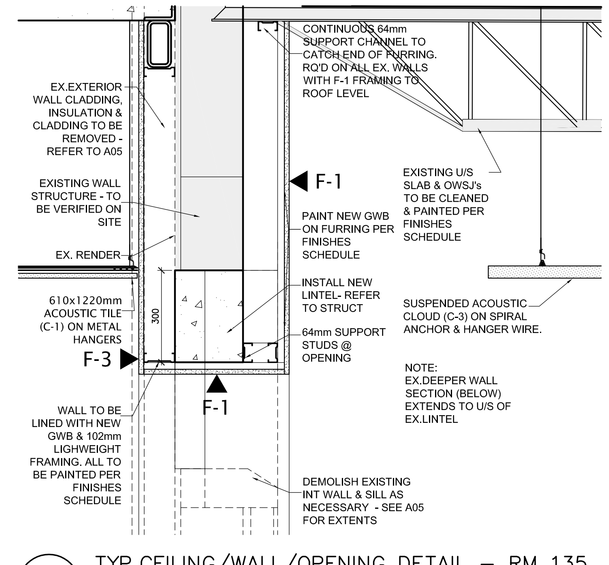
14 A13 TYP.WALL HEAD DETAIL–OWSJ PERP. TO BLOCK

SCALE = 1:5



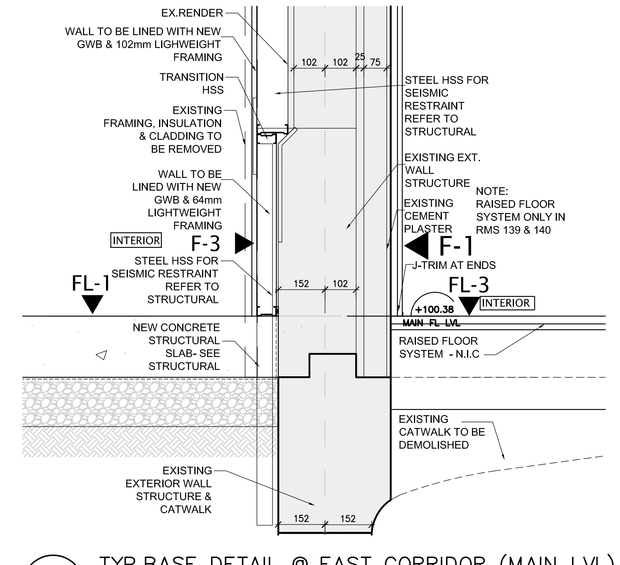
10 A13 TYPICAL CEILING TRANSITION DETAIL–ENTRANCE

SCALE = 1:20



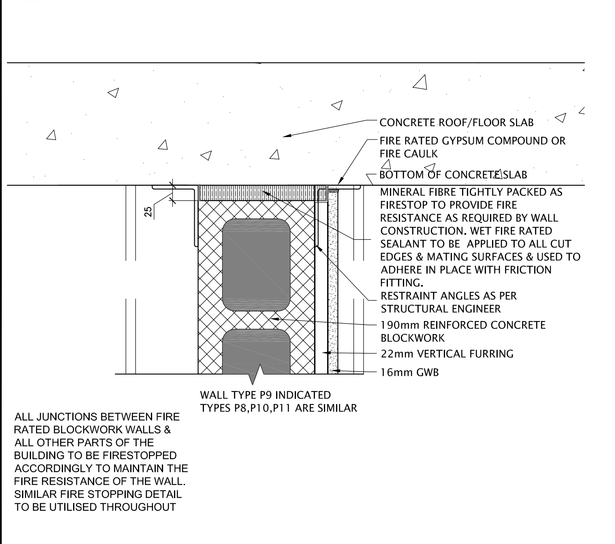
6 A13 TYP.CEILING/WALL/OPENING DETAIL – RM 135

SCALE = 1:10



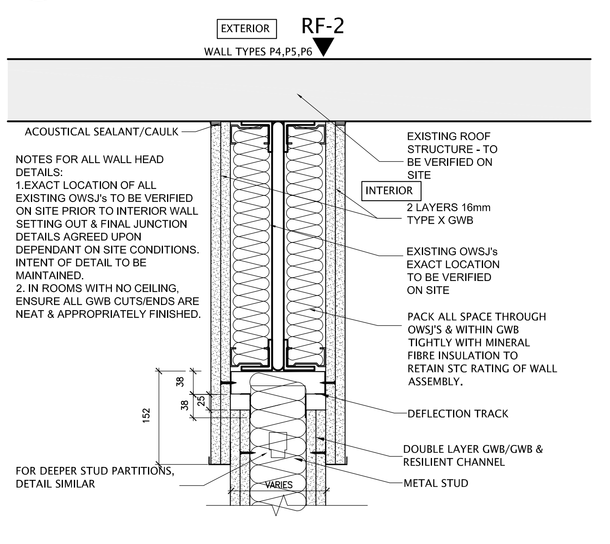
2 A13 TYP.BASE DETAIL @ EAST CORRIDOR (MAIN LVL)

SCALE = 1:10



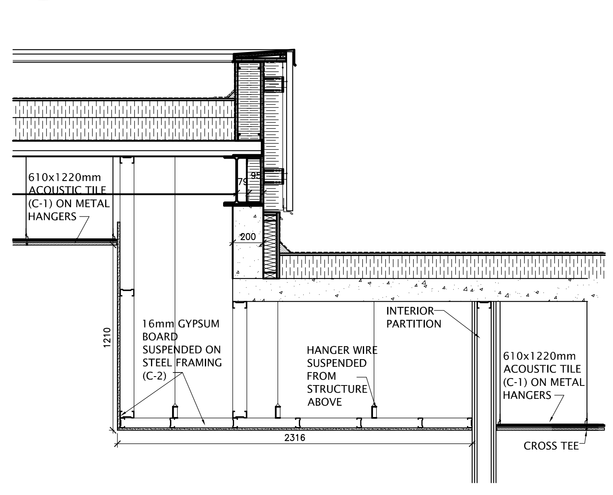
17 A13 TYP.WALL HEAD DETAIL–BLOCK TO CONC SLAB

SCALE = 1:5



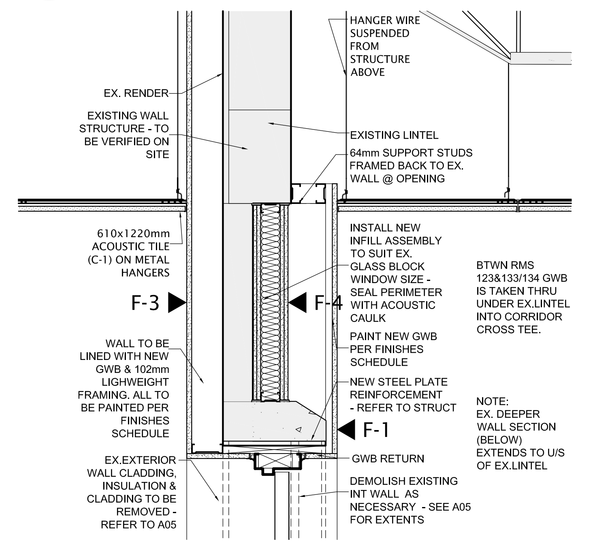
13 A13 TYP.HEAD DETAIL–OWSJ PARALLEL TO PARTITION

SCALE = 1:5



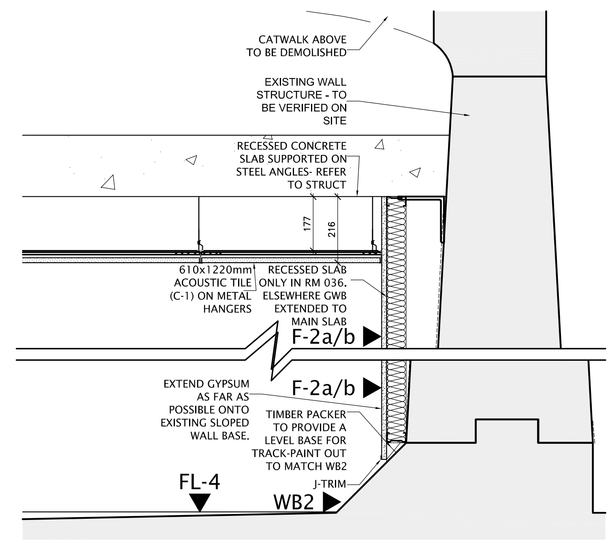
9 A13 TYPICAL CEILING TRANSITION DETAIL–ENTRANCE

SCALE = 1:20



5 A13 TYP.CEILING/WALL/OPENING DETAIL – OFFICES

SCALE = 1:10



1 A13 TYP.CEILING/WALL/FL.DETAIL–LOWER LVL.OFFICES

SCALE = 1:10

0 10 20mm 40 60 80 100 120 140 160 180 200mm

ASPM A0 (1189x841)

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- CONTRACTORS MUST VISIT THE SITE & FULLY FAMILIARIZE THEMSELVES WITH THE SCOPE OF THE WORK.
- PREVENT THE SPREAD OF DUST & DEBRIS BEYOND THE WORK AREA AND CLEAN ALL SURFACES AT COMPLETION.
- MAKE GOOD ALL SURFACES AFFECTED BY THIS WORK,PATCH AND MAKE GOOD ANY EXISTING ELEMENTS TO REMAIN THAT ARE DAMAGED BY THIS CONTRACT. IN ROOMS WHERE EXISTING FINISHES REMAIN VISIBLE ENSURE ALL NEW OPENINGS ARE NEATLY CUT & APPROPRIATELY FINISHED. JUNCTIONS WITH NEW ELEMENTS SHOULD BE PATCHED AS NECESSARY & NEATLY FINISHED.
- COORDINATE ALL SHUTDOWNS WITH THE DEPARTMENTAL REPRESENTATIVE.
- PROVIDE ALL LABOUR AND MATERIAL REQUIRED TO FORM A COMPLETE, FUNCTIONAL SYSTEM AS DESCRIBED ON DRAWINGS.
- DETAILS ARE TYPICAL ONLY – REFER TO A11 FOR ALL WALL/ FLOOR FINISHES PER ROOM AND A01 FOR ALL WALL TYPES.
- REFER TO A05 FOR ALL DEMOLITION EXTENTS AND STRUCTURAL DRAWINGS FOR ALL LINTEL /ANGLE/PLATE/STEELWORK REQUIREMENTS
- EXACT EXISTING WALL BUILD UP & LOCATION OF EXISTING OWSJ's TO BE VERIFIED ON SITE PRIOR TO INTERIOR WALL SETTING OUT.
- REFER ALSO TO 00 01 30 – LIST OF MATERIALS

LEGEND :

EXISTING BUILDING ELEMENT

NORR
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NORR Limited
An Ingenium Group Company

ONTARIO ASSOCIATION OF ARCHITECTS
MAY 29 2015
JONATHAN D. HUGHES
LICENCE
3032

No.	Date	Revision	By-Par.
0	29 05 2015	ISSUED FOR TENDER	SD

Date Printed | Date imprimée

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

A Detail no. No. du détail
B Location drawing no. sur dessin no.
C Drawing no. dessin no.

project / projet
NRC CABIN COMFORT + ENVIRONMENTAL RESEARCH FACILITY

MONTREAL ROAD CAMPUS

drawing / dessin
INTERIOR DETAILS

designed / conçu	date / date
S.DUNDERDALE	MAY '15
drawn / dessiné	scale / échelle
S.DUNDERDALE	1:20/1:10/1:5
checked / vérifié	sheet / feuille
J.HUGHES	A13 of/de 14
approved / approuvé	W.O.no. / D.T.no.

dwg.no. / dessin no.
3788-A13

GENERAL NOTES

GENERAL

1. WHERE DOCUMENTS ARE REFERENCED IN THE GENERAL AND DESIGN NOTES, THEY SHALL BE THE LATEST EDITIONS, UNLESS OTHERWISE NOTED OR SHOWN.
2. READ STRUCTURAL DRAWINGS IN CONJUNCTION WITH SEPARATELY BOUND SPECIFICATIONS AND ALL OTHER CONTRACT DOCUMENTS.
3. BEFORE PROCEEDING WITH WORK, CHECK ALL THE DIMENSIONS SHOWN ON STRUCTURAL DRAWINGS AGAINST ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS AND EXISTING SITE CONDITIONS. REPORT INCONSISTENCIES TO CONSULTANT BEFORE PROCEEDING WITH THE WORK.
4. CHECK AND VERIFY IN THE FIELD ALL SIZES AND DIMENSIONS INVOLVING THE EXISTING STRUCTURE AND COORDINATE WITH NEW CONSTRUCTION.
5. VERIFY AND OBTAIN PRIOR APPROVAL OF DIMENSIONS AND LOCATIONS OF ALL OPENINGS, PIPE SLEEVES, SLOTS, TRENCHES AND ELECTRICAL FLOOR DUCTS AS REQUIRED BY OTHER TRADES.
6. NO OPENINGS OTHER THAN THOSE SHOWN ON THE DRAWINGS SHALL BE MADE THROUGH SLABS, BEAMS OR BEARING WALLS, UNLESS PRIOR APPROVAL IS OBTAINED FROM THE CONSULTANT.
7. DO NOT EXCEED DURING CONSTRUCTION, DESIGN LIVE LOADS SHOWN ON PLANS, REDUCED AS NECESSARY UNTIL MATERIALS REACH DESIGN STRENGTH.
8. DIMENSIONS ARE IN MILLIMETRES (INCHES) UNLESS NOTED OTHERWISE. ELEVATIONS ARE IN METERS UNLESS NOTED OTHERWISE.
9. SCALES NOTED ON DRAWINGS ARE FOR GENERAL INFORMATION ONLY.
10. DO NOT SCALE DRAWINGS.
11. TYPICAL STRUCTURAL DETAILS SHOWN IN DRAWING SERIES S02 SHALL GOVERN THE WORK. IF DETAILS DIFFER ON OTHER DRAWINGS, THE MOST STRINGENT GOVERNS.
12. ALL MECHANICAL SYSTEMS SUSPENDED LOADS EXCEEDING 50 kg SHALL BE REVIEWED BY THE STRUCTURAL ENGINEER PRIOR TO INSTALLATION UNLESS SPECIFICALLY DETAILED OR NOTED ON THE STRUCTURAL DRAWINGS.
13. UNIT FLOOR AND ROOF LOADINGS GIVEN ON DRAWINGS ARE UNFACTORED. MEMBER FORCES GIVEN ON DRAWINGS ARE FACTORED.
14. DO NOT DISTURB EXISTING FOUNDATIONS ADJACENT TO THE PROPOSED CONSTRUCTION. MAKE GOOD ANY DAMAGE.

CONSTRUCTION

1. THE CONTRACTOR SHALL PROPOSE A FULL METHODOLOGY FOR EXECUTING THE WORK
2. THE CONTRACTOR SHALL DEMONSTRATE THE STABILITY AND SAFETY OF ALL ELEMENTS OF THE BUILDING DURING EVERY STAGE OF CONSTRUCTION.

MATERIALS

1. SEE SPECIFICATIONS FOR CLASS OF CONCRETE AND OTHER REQUIREMENTS.

   CONCRETE STRENGTH:
   - SLABS AND BEAMS .... 35 MPa
   - COLUMNS.................................... 35 MPa
   - FOOTINGS.................................. 30 MPa
   - SLAB ON GRADE.......................... 30 MPa
   - BASEMENT WALLS...................... 35 MPa
   - SHEAR WALLS............................ 35 MPa
   - CONC. FILL, MUD SLABS.............. 15 MPa
   - SIDEWALKS AND SOG EXPOSED TO SALT ..... 32 MPa (C-2)
   - STRUCTURAL MEMBERS EXPOSED TO SALT .. 35 MPa (C-1)
   - OTHER....................................... 35 MPa
2. STRUCTURAL STEEL:
   - STRUCTURAL WIDE FLANGES AND WELDED WIDE FLANGE SHAPES (W, WWF) TO CONFORM TO CSA/CAN-G40.20/G40.21 GRADE 350W.
   - CHANNELS AND ANGLES (C, L) CSA/CAN-G40.20/G40.21 GRADE 300W.
   - ALL PLATE AND PLATE FABRICATED MEMBERS TO CONFORM TO CSA/CAN-G40.20/G40.21 GRADE 350W.
   - HOLLOW STRUCTURAL SECTIONS (HSS) TO CONFORM TO CSA/CAN-G40.20/G40.21 CLASS C UNLESS NOTED OTHERWISE.
3. REINFORCEMENT: CONFORM TO CSA G30 SERIES, fy = 400 MPa FOR ALL CONCRETE REINFORCEMENT EXCEPT fy = 440 MPa FOR WELDED WIRE FABRIC. PROVIDE WELDED WIRE FABRIC IN FLAT SHEETS ONLY. ALL REINFORCEMENT IS TO BE 'BLACK' EXCEPT WHERE THE SUFFIX 'C' IS USED TO DESIGNATE EPOXY COATED REINFORCEMENT.
4. REINFORCING BAR AREAS ARE 100, 200, 300, 500, 700, 1000, 1500 AND 2500 sq. mm FOR BAR DESIGNATIONS 10, 15, 20, 25, 30, 35, 45 AND 55, RESPECTIVELY.
5. ANCHOR BOLTS: CONFORM TO ASTM A307 UNLESS OTHERWISE NOTED OR SHOWN.
6. STRUCTURAL BOLTS, NUTS AND WASHERS: CONFORM TO ASTM A325M.
7. STRUCTURAL ALUMINIUM FRAMING: CONFORM TO ASTM HA SERIES.
8. NON-SHRINK GROUT: COMPRESSIVE STRENGTH
   - MISCELLANEOUS USE..................................35 MPa (@ 28 DAYS)
9. FOUNDATION INSULATION: EXTRUDED POLYSTYRENE WITH A MINIMUM COMPRESSIVE STRENGTH OF 0.24 MPa UNLESS OTHERWISE NOTED.

FOUNDATIONS

1. REFER TO GEOTECHNICAL REPORT BY STANTEL CONSULTING DATED ....
2. WHERE FOOTINGS BEAR ON ROCK, PROTECT THE BEARING SURFACE WITH A 65mm MUD SLAB WITHIN MAXIMUM 7 DAYS OF EXPOSURE. OBTAIN SOIL CONSULTANTS APPROVAL PRIOR TO MUD SLAB PLACEMENT.
3. CARRY EXTERIOR FOOTINGS DOWN 1200 mm MINIMUM BELOW FINISHED GRADE. PROTECT FOOTINGS EXPOSED TO FROST DURING CONSTRUCTION WITH 1200 mm OF EARTH OR ITS EQUIVALENT TO PREVENT FREEZING OF SOIL UNDER FOOTINGS.
4. DO NOT EXCEED A RISE OF 7 IN A RUN OF 10 IN THE LINE OF SLOPE BETWEEN ADJACENT EXCAVATIONS EXCEPT IN BEDROCK AND AS EXPLICITLY SHOWN ON DRAWINGS. MAXIMUM STEP 600 mm APPROXIMATELY.
5. INSULATION IS SHOWN WHERE REQUIRED FOR PROTECTION OF THE FOUNDATIONS FROM DAMAGE DUE TO FROST ACTION ONLY. REFER TO ARCHITECTURAL DRAWINGS FOR FOUNDATION INSULATION NOT SHOWN ON THE STRUCTURAL DRAWINGS.
6. DO NOT PLACE BACKFILL AGAINST WALLS RETAINING EARTH (OTHER THAN CANTILEVER WALLS) UNTIL THE WALLS AND THE FLOOR CONSTRUCTIONS AT TOP AND BOTTOM OF THE WALLS HAVE BEEN CAST AND ATTAINED 100% OF THEIR DESIGN STRENGTH.
7. WHERE BACKFILL IS PLACED ON EACH SIDE OF FOUNDATION WALLS, DO NOT EXCEED A GRADE DIFFERENCE OF 600 mm (2'-0").
8. CONTRACTOR TO PROVIDE ALL NECESSARY TEMPORARY BRACING OF NEW CONSTRUCTION AND MEASURES TO PREVENT DAMAGE TO THE STRUCTURE BY HEAVY EQUIPMENT. USE LIGHT, HAND-OPERATED COMPACTING EQUIPMENT TO COMPACT BACKFILL ADJACENT TO FOUNDATION WALLS OR RETAINING WALLS.
9. IT IS THE RESPONSIBILITY OF CONTRACTOR TO VERIFY THE GEOTECHNICAL INFORMATION AND TO OBTAIN HIS OWN DATA AND TO POINT DISCREPANCIES TO THE CONSULTANT WHERE THEY OCCUR.
10. ALL SHOP DRAWINGS FOR DESIGN OF SHORING SYSTEM MUST BE STAMPED AND SIGNED BY A PROFESSIONAL ENGINEER.

SLAB ON GRADE

1. UNDERSLAB FILL SHALL CONSIST OF A MINIMUM OF 200mm (8") OF GRANULAR B MATERIAL COMPACTED TO 98% STANDARD PROCTOR MAXIMUM DRY DENSITY UNLESS NOTED OTHERWISE IN DRAWINGS.
2. PLACE SLABS-ON-GRADE ON MATERIAL CAPABLE OF SUSTAINING 25 kPa SURCHARGE WITHOUT SETTLEMENT RELATIVE TO THE BUILDING FOUNDATIONS.

CONCRETE AND REINFORCEMENT

1. UNLESS OTHERWISE NOTED, ALL DOWELS SHALL HAVE A MINIMUM EMBEDMENT EQUIVALENT TO THE STRAIGHT TENSION EMBEDMENT LENGTH CORRESPONDING TO THE SIZE OF BAR. DOWELS FROM WALLS TO SLABS SHALL HAVE A MINIMUM EMBEDMENT OF 600 mm INTO WALLS AND SLABS UNLESS OTHERWISE NOTED OR SHOWN.
2. PROVIDE DOWELS TO WALLS AND COLUMNS SIMILAR IN NUMBER, SIZE AND SPACING TO THE VERTICAL STEEL IN THE WALL OR COLUMN ABOVE UNLESS OTHERWISE NOTED OR SHOWN.
3. TACK WELDING OF REINFORCEMENT IS NOT PERMITTED. WELDED SPLICES IN REINFORCING BARS WILL ONLY BE PERMITTED IF EXPLICITLY SHOWN ON THE STRUCTURAL DRAWINGS OR IF WRITTEN APPROVAL IS GIVEN BY THE CONSULTANT.
4. ALL REINFORCEMENT SHALL BE SECURELY HELD IN PROPER POSITION WHILE POURING CONCRETE. CHAIRS, TIES, SPACERS, ADDITIONAL BARS AND STIRRUPS SHALL BE PROVIDED BY THE CONTRACTOR TO FURNISH SUPPORT FOR ALL REINFORCEMENT.
5. CONSTRUCTION JOINTS SHALL BE DOWELED, KEYED AND THOROUGHLY CLEANED. ALL CONSTRUCTION JOINTS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE TYPICAL CONSTRUCTION JOINT DETAILS SHOWN ON THE STRUCTURAL DRAWINGS.
6. CONSTRUCTION JOINTS:
   a) HORIZONTAL CONSTRUCTION JOINTS SHALL NOT BE MADE IN BEAMS UNLESS SHOWN OR REVIEWED AND APPROVED BY THE CONSULTANT.
   b) VERTICAL CONSTRUCTION JOINTS MAY BE MADE ONLY AT MIDSPAN OF BEAMS OR SLABS UNLESS OTHERWISE NOTED OR SHOWN OR DIRECTED, AND THEIR LOCATION SHALL BE REVIEWED AND APPROVED BY THE CONSULTANT.
   c) REFER TO SPECIFICATIONS FOR POUR LENGTH LIMITATIONS.
7. PROVIDE WATERSTOPS AT ALL CONSTRUCTION JOINTS IN ELEMENTS RETAINING EARTH OR EXPOSED TO WEATHER.
8. OPENINGS, SLEEVES, EMBEDDED DUCTS:
   a) NO SLEEVES SHALL BE PLACED VERTICALLY OR HORIZONTALLY THROUGH BEAMS UNLESS REVIEWED AND APPROVED BY THE CONSULTANT.
   b) NO OPENINGS SHALL BE MADE IN FLAT PLATE OR FLAT SLAB COLUMN STRIPS EXCEPT AS SHOWN ON TYPICAL DETAIL AND PLANS OR UNLESS REVIEWED AND APPROVED BY THE CONSULTANT.
9. MINIMUM LAP OF WELDED WIRE FABRIC SHALL BE 150 mm (6") OR ONE FULL MESH, WHICHEVER IS GREATER.
10. COORDINATE AND INSTALL ALL REQUIRED EMBEDDED ITEMS, INSETS SLEEVES, POCKETS, ETC. AS REQUIRED PRIOR TO PLACEMENT OF CONCRETE.
11. ALL CONCRETE SURFACES INDICATED AS "AEC" ON THE PLANS AND SECTIONS SHALL COMPLY WITH REQUIREMENTS FOR ARCHITECTURALLY EXPOSED CONCRETE, SEE SPECIFICATIONS.

STRUCTURAL STEEL

1. PROVIDE MINIMUM BEARING OF 200 mm FOR ALL STEEL BEAMS BEARING ON CONCRETE AND A MINIMUM OF 100 mm ON STRUCTURAL STEEL, UNLESS OTHERWISE NOTED ON PLAN.
2. CENTRE BEARING PLATES UNDER BEAMS UNLESS OTHERWISE NOTED OR SHOWN.
3. BEARING PLATE DIMENSION GIVEN FIRST INDICATES SIDE PARALLEL TO BEAM WEB.
4. NO STRUCTURAL STEEL SHALL BE CUT IN THE FIELD UNLESS REVIEWED AND APPROVED BY THE CONSULTANT.
5. ALL WELDS EXPOSED TO VIEW SHALL BE GROUND SMOOTH EXCEPT AS NOTED IN THE SPECIFICATIONS.
6. REFER TO TYPICAL DETAIL TD-1 FOR ABBREVIATIONS USED FOR THE CONNECTION FORCES GIVEN ON THE DRAWINGS. FORCES INDICATED ARE FACTORED LOADS UNLESS OTHERWISE NOTED OR SHOWN. SUBSCRIPTS D, L, W AND Q REFER TO DEAD, LIVE, WIND AND EARTHQUAKE LOADS, RESPECTIVELY.
7. WHERE MOMENT CONNECTIONS ARE CALLED FOR BUT VALUES ARE NOT INDICATED, DESIGN CONNECTIONS FOR FULL MOMENT CAPACITY OF THE SMALLER MEMBER JOINED.
8. SPLICES SHALL BE DESIGNED TO DEVELOP THE FULL CAPACITY OF THE MEMBER AT THE POINT OF THE SPLICE. MEMBERS SHALL NOT BE SPLICED AT POINTS OF MAXIMUM STRESS. NO SPLICES SHALL BE MADE UNLESS SHOWN ON THE DRAWINGS OR REVIEWED AND APPROVED BY THE CONSULTANT.
9. PROVIDE WELDED STIFFENER PLATES ON BOTH SIDES OF THE WEB OF BEAMS AT POINTS OF CONCENTRATED LOAD INCLUDING BEAMS SUPPORTING COLUMNS OR RUNNING OVER TOPS OF COLUMNS.
10. CONNECT ALL COLUMNS TO THE BASE PLATES FOR THE LARGER OF THE FOLLOWING FORCES IN ADDITION TO THE OTHER FORCES SHOWN:
    a) AT BRACING FOR THE HORIZONTAL COMPONENT OF THE BRACING LOAD.
    b) FOR 3% OF THE FACTORED VERTICAL COLUMN LOAD APPLIED HORIZONTALLY.
11. SHAPE AND SIZE OF GUSSET PLATES TO CLEAR ARCHITECTURAL FINISHES AND MECHANICAL DUCTS AND PIPES.
12. PROVIDE ALL ANCHOR BOLTS, CAST-IN PLATES WITH STUDS AND DRILLED ANCHORS REQUIRED TO CONNECT STRUCTURAL STEEL TO CAST-IN-PLACE CONCRETE.
13. WHERE TIE JOISTS ARE INDICATED, DESIGN TOP AND BOTTOM CHORDS AND CONNECT TO COLUMNS TO SAFELY DEVELOP LOADS SHOWN OR A MINIMUM OF 25 kN (6 kips) IN TENSION AND IN COMPRESSION.
14. PROVIDE SUFFICIENT CAMBER TO JOISTS TO ENSURE "0" CAMBER AFTER APPLICATION OF ALL DEAD LOADS SHOWN. ADJUST STIFFNESS AND REQUIRED CAMBER OF JOISTS ADJACENT TO MASONRY WALLS, STEEL BEAMS OF SHORTER SPAN AND THE LIKE TO PERMIT THE PROPER FASTENING OF THE STEEL DECK. AS A GUIDE, LIMIT THE DEFLECTION OF THE ADJACENT JOIST, UNDER ALL DEAD LOADS, TO L/120, WHERE 'L' IS THE SPAN OF THE STEEL DECK PERPENDICULAR TO THE JOISTS.
15. MAINTAIN TEMPORARY BRACING UNTIL COMPLETION OF ENTIRE STRUCTURE INCLUDING ROOF DECKS AND OTHER ELEMENTS WHICH ARE PART OF THE LATERAL LOAD RESISTING SYSTEM.
16. PROVIDE CAMBER TO BEAMS, GIRDERS AND TRUSSES AS SHOWN ON BEAM SCHEDULES AND DRAWINGS. CAMBERS SHOWN ARE FOR ERECTED IN-PLACE CONDITION OF MEMBERS BEFORE INSTALLATION OF STEEL DECK. WHERE CONCRETE ON STEEL DECK IS CALLED FOR, SCREED SLAB TO SUIT BEAM CAMBERS.
17. INSTALL 75x75x8 mm (3x3x5/16") ANGLE SEATS FOR STEEL DECK AT CONNECTIONS, AT COLUMNS OR OTHER IRREGULARITIES, TO PROVIDE SUPPORT TO THE RIBS OF THE DECK.
18. BOLT HOLES IN STEEL SHALL BE 3 mm (1/8") LARGER IN DIAMETER THAN NOMINAL SIZE OF BOLT USED, EXCEPT AS NOTED. PROVIDE NOT LESS THAN 2-M20 A325 BOLTS IN ANY BOLTED CONNECTION.
19. ALL WELDS SHALL CONFORM TO W59-03 AND ALL WELDERS SHALL BE CERTIFIED IN CONFORMANCE WITH W47.1-03.
20. WELD LENGTHS CALLED FOR ON PLANS ARE THE NET EFFECTIVE LENGTH REQUIRED. WHERE LENGTH OF WELD IS NOT SHOWN IT SHALL BE FULL LENGTH OF JOINT. ALL BUTT WELDS SHALL BE FULL PENETRATION UNLESS NOTED OTHERWISE.
21. ALL STRUCTURAL STEEL INDICATED AS "AESS" ON THE PLANS AND SECTIONS SHALL COMPLY WITH THE PROVISIONS OF THE CISC GUIDELINES FOR SPECIFYING ARCHITECTURAL EXPOSED STRUCTURAL STEEL CATEGORY 3 UNLESS OTHERWISE NOTED.
22. ALL BEAMS, EXCEPT CANTILEVER BEAMS SHALL BE FABRICATED AND ERECTED WITH NATURAL CAMBER UP. ALL CANTILEVER BEAMS SHALL BE FABRICATED AND ERECTED SO THAT THE NATURAL CAMBER RAISES THE CANTILEVER END.
23. ALL STEEL EXPOSED TO THE EXTERIOR ENVIRONMENT SHALL BE HOT-DIP GALVANIZED UNLESS OTHERWISE NOTED.
24. STRUCTURAL STEEL MEMBERS SUPPORTING LOADS SHALL BE FIREPROOFED IN ACCORDANCE WITH REQUIREMENTS SHOWN ON ARCHITECTURAL DRAWINGS AND SPECIFICATIONS.

FORMWORK

1. FORMWORK SHALL CONFORM TO THE REQUIREMENTS OF C.S.A. SPECIFICATION A23M AND A.C.I. SP.4.
2. FORMWORK SHALL BE DESIGNED BY A REGISTERED PROFESSIONAL ENGINEER OF THE PROVINCE OF ONTARIO TO WITHSTAND ALL SUPERIMPOSED LOADS DURING CONSTRUCTION.
3. SHORING, RE-SHORING AND CONSTRUCTION LOADS SHALL BE CONTROLLED TO ENSURE THAT NO STRUCTURAL ELEMENT IS OVERSTRESSED.
4. MAKE NECESSARY ALLOWANCE FOR FORMWORK CREEP AND DEFLECTION AND ADJUST ACCORDINGLY TO ACHIEVE THE ELEVATION FOR THE COMPLETION OF THE JOB.
5. CONSTRUCTION JOINTS SHALL BE MADE AND LOCATED AND SO AS NOT TO IMPAIR THE STRENGTH OF THE STRUCTURE.
6. IF CONSTRUCTION JOINTS ARE NOT SPECIFICALLY LOCATED AND THERE IS ANY DOUBT OR DISCREPANCY REGARDING THE LOCATION, THE CONTRACTOR SHALL INFORM AND OBTAIN APPROVAL OF THE CONSULTANT BEFORE PROCEEDING WITH THE WORK.
7. INDICATE THE CONSTRUCTION JOINTS AND POURING SEQUENCES FOR THE REVIEW OF THE CONSULTANT PRIOR TO PLACING OF CONCRETE.
8. THE CONTRACTOR SHALL MAKE NECESSARY ALLOWANCE FOR ANY VARIATION AND/OR ANY REVISIONS MADE ON ACCOUNT OF SUB-TRADES AND PRODUCT SELECTION FOR THE COMPLETION OF THE PROJECT.

MASONRY WALLS

1. DESIGN OF MASONRY IS IN ACCORDANCE WITH CSA S304.1-04 – "DESIGN OF MASONRY STRUCTURES."
2. CONSTRUCT MASONRY IN ACCORDANCE WITH CSA STANDARD A371-04., "MASONRY CONSTRUCTION FOR BUILDINGS
3. DO NOT CUT HOLES THROUGH MASONRY BEARING WALLS, OTHER THAN HOLES SHOWN ON STRUCTURAL DRAWINGS, UNLESS APPROVED BY CONSULTANT.
4. REFER TO SPECIFICATIONS FOR BLOCK MATERIAL, GROUT PROPERTIES AND OTHER REQUIREMENTS.

ANCHOR INSTALLATION IN EXISTING CONCRETE

1. COMPLY WITH MANUFACTURER GUIDELINES FOR ANCHOR INSTALLATION
2. INSTALLER SHALL BE TRAINED BY ANCHOR MANUFACTURER.
3. CONTINUOUS SPECIAL INSPECTION IS REQUIRED FOR ALL ADHESIVE ANCHORS AND EXPANSION ANCHORS. INSPECT AND PULL TEST EXPANSION ANCHORS AND ADHESIVE (EPOXY) ANCHORS ACCORDING TO MANUFACTURER'S WRITTEN RECOMMENDATIONS.

DESIGN AND ERECTION OF TEMPORARY WORK

1. DESIGN OF TEMPORARY WORK SHALL BE PREPARED BY A LICENSED PROFESSIONAL ENGINEER RESIGTERED IN ONTARIO WITH DEMONSTRATED EXPERIENCE IN SIMILAR SIZE AND SCOPE OF TEMPORARY WORKS.
2. SUBMIT DRAWINGS AND CALCULATIONS SEALED BY THE CONTRACTOR'S PROFESSIONAL ENGINEER SHOWING COMPLETE DESIGN INCLUDING TEMPORARY CONDITIONS, FINAL CONDITIONS AND SEQUENCE OF WORK.
3. PROTECTIVE MEASURES SHALL BE TAKEN TO ENSURE THE SAFETY OF THE TEMPORARY WORK DURING CONSTRUCTION ACTIVITIES.

TESTING AND INSPECTION

1. THE CONTRACTOR SHALL ARRANGE FOR THE FOLLOWING ITEMS TO BE INSPECTED AND/OR TESTED BY AN INDEPENDENT THIRD-PARTY INSPECTION/TESTING AGENCY ACCEPTABLE TO THE OWNER AND THE CONSULTANT. COPIES OF ALL TEST REPORTS SHALL BE FORWARDED TO THE OWNER AND CONSULTANT ON THE SAME DAYS TESTS ARE MADE. THE ITEMS TO BE TESTED SHALL INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING.
2. GEOTECHNICAL:
   PERFORM ALL TESTING AND INSPECTION (COMPACTION, BEARING CAPACITY PILE INSTALLATION, SUBGRADE PREPARATION ETC.) AS PER THE REQUIREMENTS OF THE DRAWINGS AND THE GEOTECHNICAL REPORT.
3. CONCRETE:
   CONCRETE TO BE TESTED IN ACCORDANCE WITH THE REQUIREMENTS OF CSA A23.1 AND A23.2, INCLUDING THE REQUIREMENTS FOR AIR, SLUMP AND AGE PRIOR TO BEING USED. CONTRACTOR TO MAINTAIN RECORDS OF POUR DATES, TESTING PERFORMED, CLASS OF CONCRETE USED AND TEST RESULTS FOR ALL ITEMS POURED. RESULTS OF CYLINDER STRENGTH TESTING TO BE SENT TO OWNER AND CONSULTANT. ALL MIX DESIGNS TO BE REVIEWED AND APPROVED BY TESTING AGENCY.
4. MASONRY:
   SAMPLE AND TEST JOB-MIXED GROUT IN ACCORDANCE WITH CSA A179 AND CSA S304.1. TEST FREQUENCY TO BE IN ACCORDANCE WITH S304.1. CONTRACTOR TO SUBMIT LABORATORY TEST REPORTS OF MANUFACTURER FOR CONCRETE MASONRY UNITS.
5. STRUCTURAL STEEL AND STEEL DECK:
   PERFORM VISUAL INSPECTION OF ALL WELDS, TORQUE TESTING OF BOLTED CONNECTIONS AND CHECK ON BEARING, PLUMBNESS, ALIGNMENT AND PAINTING. BASIS OF INSPECTION SHALL BE FINAL REVIEWED SHOP DRAWINGS. PERFORM NON-DESTRUCTIVE TESTING OF WELDS WHERE RESULTS OF VISUAL INSPECTION ARE NOT ACCEPTABLE OR INCONCLUSIVE.
6. REINFORCING STEEL:
   INSPECTION OF REBAR PLACEMENT, SIZES AND CONFORMANCE WITH REVIEWED SHOPDRAWINGS SHALL BE MADE BY AN INSPECTION AGENCY. CONTRACTOR SHALL ADDITIONALLY ADVISE CONSULTANT OF MAIN PLANNED POURS, AT LEAST 24 HOURS PRIOR TO CONCRETE PLACEMENT.

DESIGN NOTES

1. GENERAL

   1.1. THE STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE ONTARIO BUILDING CODE, 2006 EDITION AND THE NATIONAL BUILDING CODE OF CANADA, 2005 EDITION

   1.2. ALL REINFORCED CONCRETE ELEMENTS HAVE BEEN DESIGNED IN ACCORDANCE WITH CSA/CAN3-A23.3, "DESIGN OF CONCRETE STRUCTURES".

   1.3. ALL STRUCTURAL STEEL ELEMENTS HAVE BEEN DESIGNED IN ACCORDANCE WITH CSA/CAN3-S16.1, "LIMIT STATES DESIGN OF STEEL STRUCTURES".

   1.3.1. THE STRUCTURAL STEEL DESIGN IS BASED ON "SIMPLE" CONSTRUCTION.
   1.3.2. THE CONNECTIONS ARE ASSUMED TO BE BEARING TYPE JOINTS, UNLESS OTHERWISE NOTED. THE BOLTS SHALL BE BROUGHT TO A SNUG-TIGHT CONDITION AS DEFINED IN ASTM A325-06.

   1.4. LIVE LOADS AND OTHER LOADS:

   1.4.1. SUPERIMPOSED DEAD LOADS AND LIVE LOADS ARE SHOWN ON FLOOR PLANS. VALUES GIVEN ARE UNFACTORED SERVICE LOADS UNLESS OTHERWISE NOTED OR SHOWN.
   1.4.2. LIVE LOADS ON STRUCTURAL ELEMENTS HAVE BEEN REDUCED AS PERMITTED BY CODE.

2. SEISMIC LOADS ON STRUCTURAL FRAME.
   - Sa (0.2) = 0.633
   - Sa (0.5) = 0.309
   - Sa (1.0) = 0.138
   - Sa (2.0) = 0.046
   - BASE SHEAR, $V = \frac{S * Ta * Mv * Ie * W}{Rd * Ro}$
   - SITE CLASSIFICATION FOR SEISMIC SITE RESPONSE = B
   - SITE COEFFICIENT Fa = 1.14, Fv = 1.36

   MODIFICATION FACTORS
   - Ie = (EARTHQUAKE IMPORTANCE FACTOR) = 1.0
   - Rd = (DUCTILITY FACTOR) = 1.3
   - Ro = (OVERSTRENGTH FACTOR) = 1.5
   - Mv = (HIGHER MODE FACTOR) = 1.0

3. WIND LOADS ON STRUCTURAL FRAME.
   - WIND PRESSURE IN ACCORDANCE WITH OBC 2006
   - THE REFERENCE VELOCITY WIND PRESSURE, q IS EQUAL TO ...kPa
   - MINIMUM EXTERIOR WIND PRESSURE = ...kPa

4. LIVE LOADS ON ROOF

   4.1. THE ROOF AREAS HAVE BEEN DESIGNED TO RESIST SNOW, RAIN AND WIND LOADS IN ACCORDANCE WITH THE ONTARIO BUILDING CODE, 2006 EDITION AND THE NATIONAL BUILDING CODE OF CANADA, 2010 EDITION, WHICHEVER PRODUCES THE MORE UNFAVOURABLE EFFECT. THE DESIGN PARAMETERS FOR THESE LOADS ARE AS NOTED BELOW:

   4.2. SNOW LOAD:
   - THE GROUND SNOW LOAD OF 2.32kPa, HAVE BEEN CONSIDERED IN THE DESIGN OF THE ROOF AREAS.
     S = Is [Ss (Cb * Cw * Cs * Ca) + Sr]
   - ADDITIONAL SNOW ACCUMULATIONS ADJACENT TO HIGHER WALLS, ROOFS AND MECHANICAL UNITS ARE INDICATED ON THE PLANS.

5. EARTH PRESSURE ON FOUNDATION WALLS

   5.1. WALLS RETAINING EARTH ARE DESIGNED TO SAFELY WITHSTAND A HORIZONTAL PRESSURE (P IN kPa) AT ANY DEPTH (h IN m) GIVEN BY THE EXPRESSION:

   P = K (gh + q)
   WHERE THE:
   AT REST SOIL PRESSURE COEFFICIENT, Ko = 0.45
   ACTIVE SOIL PRESSURE COEFFICIENT, Ka = 0.33
   SPECIFIC GRAVITY OF SOIL, g = 20.5 kN/m³
   SURCHARGE, q = 12 kPa

   5.2. THE WALLS HAVE BEEN DESIGNED ASSUMING FREE DRAINING BACKFILL WHICH DOES NOT PERMIT THE BUILD-UP OF HYDROSTATIC PRESSURE.

STRUCTURAL ABBREVIATIONS

TD-1

AB	ANCHOR BOLT	MAX	MAXIMUM
ADJ	ADJUSTABLE	MC	MOMENT CONNECTION
ALT	ALTERNATE	MECH	MECHANICAL
ARCH	ARCHITECTURAL	MEZZ	MEZZANINE
AIFB	ASPHALT IMPREGNATED FIBREBOARD	MID	MIDDLE
B, BOTT	BOTTOM	MISC	MISCELLANEOUS
BC	ELEV BOTT. OF CAISSON	MIN	MINIMUM
BET	BETWEEN	ML	MIDDLE LAYER
BEW	BOTTOM EACH WAY	m	METRE
BLDG	BUILDING	m2	SQUARE METRE
BLL	BOTTOM LOWER LAYER	mm	MILLIMETRE
BM	BEAM	mm2	SQUARE MILLIMETRE
BMB	BENDING MOMENT BAR	MPa	MEGAPASCAL
BPL	BEARING/BASE PLATE	NBC	NATIONAL BUILDING CODE OF CANADA
BRG	BEARING	NCB	NO COLUMN BELOW
BSMT	BASEMENT	NF	NEAR FACE
BUL	BOTTOM UPPER LAYER	NIC	NOT IN CONTRACT
C	CHANNEL	NTS	NOT TO SCALE
c/c	CENTRE TO CENTRE	o/c	ON CENTRE
C/W	CONNECT WITH	o/o	OUT TO OUT
CA	COLUMN ABOVE	OBC	ONTARIO BUILDING CODE
CB	COLUMN BELOW	OPNG	OPENING
CANTIL, CANT	CANTILEVER	OPP	OPPOSITE
CF	CONCRETE FIREPROOFED	OWSJ	OPEN WEB STEEL JOIST
CJ	CONTROL JOINT	PC	PRECAST
CL	CLEAR	Pf; Cf; Tf; Mf; Vf	FACTORED LOADS
℄	CENTRE LINE	P; T; C; V; M	UNFACTORED LOADS
COMP	COMPOSITE	PL	PLATE
COL	COLUMN	PROJ	PROJECTION
CONC	CONCRETE	P/T	POST TENSIONED
CONST JT	CONSTRUCTION JOINT	PVC	POLYVINYL CHLORIDE
CONT	CONTINUOUS	R	REACTION, RADIUS
DET	DETAIL	REF	REFERENCE
D FIR	DOUGLAS FIR	REM	REMAINDER
DIA	DIAMETER	REQ'D	REQUIRED
DIM	DIMENSION	REV	REVISION
DIAG	DIAGONAL	RE	RIGHT END
DL	DEAD LOAD	REINF	REINFORCEMENT
DO, "	DITTO	S	STANDARD BEAM
DP	DEEP	S.S.	SINGLE STIRRUP
DWG	DRAWING	SDF	STEP DOWN FOOTING
DWL	DOWEL	SECT	SECTION
DN	DOWN	SF	SPRAY FIREPROOFED
D.S.	DOUBLE STIRRUPS	SIM	SIMILAR
EA	EACH	SL	SLAB
EC	EPOXY COATED	SOG	SLAB ON GRADE
EE	EACH END	SP	SPANDREL; SPRUCE
EF	EACH FACE	SPEC	SPECIFICATION
EJ, EXP.JT.	EXPANSION JOINT	STD	STANDARD
EL, ELEV	ELEVATION	STRUCT	STRUCTURAL
ELEC, ELECT	ELECTRICAL	STIFF	STIFFENER
EMBED	EMBEDMENT	SQ	SQUARE
EQ	EQUAL	ST	STRAIGHT
EW	EACH WAY	STIR	STIRRUP
EX, EXIST	EXISTING	t	THICKNESS
EXT	EXTERIOR	T	TOP
FIN	FINISHED	T&B	TOP AND BOTTOM
FL	FLOOR	TC	ELEV TOP OF CAISSON
FTG	FOOTING	TEMP	TEMPERATURE
FMC	FULL MOMENT CONNECTION	TEW	TOP EACH WAY
fy	YIELD STRENGTH	TJ	TIE JOIST
f'c	COMPRESSIVE STRENGTH OF CONC	TLE	TOP LEFT END
FF	FAR FACE	TLL	TOP LOWER LAYER
GALV	GALVANIZED	TRE	TOP RIGHT END
GA	GAUGE	TUL	TOP UPPER LAYER
GL	GRIDLINE	TYP	TYPICAL
HEE	HOOK EACH END	T/O	TOP OF
HH	HOOK-HOOK (HOOK EACH END)	TOS	TOP OF SLAB
HIF	HORIZONTAL INSIDE FACE	TSB	TENSION SPLICE CLASS B
HOF	HORIZONTAL OUTSIDE FACE	USF	UNDERSIDE OF FOOTING
HOR, HORIZ	HORIZONTAL	U/S	UNDERSIDE
HEF	HORIZONTAL EACH FACE	U/N	UNLESS NOTED
HSS	HOLLOW STRUCTURAL SECTION	UL	UPPER LAYER
HP	HIGH POINT	UPT	UPTURNED
INT	INTERIOR	VERT	VERTICAL
ID	INSIDE DIAMETER	VBF	VERTICAL BRACED FRAME
k	KILO	VEF	VERTICAL EACH FACE
kN	KILONEWTON	VOF	VERTICAL OUTSIDE FACE
kPa	KILOPASCAL	VIF	VERTICAL INSIDE FACE
Ld	TENSION ANCHORAGE LENGTH	VSC	VERTICALLY SLOTTED CONNECTION
LE	LEFT END	W	WIDE FLANGE BEAM
LG	LONG/LENGTH	WP	WALL PLATE OR WORKING POINT
LL	LIVE LOAD	WT	STRUCTURAL TEE
LLV	LONG LEG VERTICAL	WWF	WELDED WIRE FABRIC
LLH	LONG LEG HORIZONTAL	WWF	WELDED WIDE FLANGE
L	SINGLE ANGLE		
⅃L	DOUBLE ANGLES		
LP	LOW POINT		

National Research Council Canada — Conseil national de recherches Canada
Administrative Services and Property Management Branch — Division des services administratifs et gestion de l'immobilier

NRC · CNRC

- CONTRACTORS TO CHECK AND VERIFY ALL DIMENSIONS ON SITE PRIOR TO DEMOLITION OR CONSTRUCTION AND REPORT ANY ERRORS OR OMISSIONS TO DEPARTMENTAL REPRESENTATIVE.
- CONTRACTORS MUST VISIT THE SITE & FULLY FAMILIARIZE THEMSELVES WITH THE SCOPE OF THE WORK.
- PREVENT THE SPREAD OF DUST & DEBRIS BEYOND THE WORK AREA AND CLEAN ALL SURFACES AT COMPLETION.
- MAKE GOOD ALL SURFACES AFFECTED BY THIS WORK.
- COORDINATE ALL SHUTDOWNS WITH THE DEPARTMENTAL REPRESENTATIVE.
- PROVIDE ALL LABOUR AND MATERIAL REQUIRED TO FORM A COMPLETE, FUNCTIONAL SYSTEM AS DESCRIBED ON DRAWINGS.

NORR
ARCHITECTS ENGINEERS PLANNERS
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KEY PLAN

No.	Date	Revision	By: Par:
0	29 05 2015	ISSUED FOR TENDER	

Date Printed 15 MAY 2015 — Date imprimée

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

A Detail no. / No. du détail
B Location drawing no. / sur dessin no.
C Drawing no. / dessin no.

project / projet: NRC CABIN COMFORT + ENVIRONMENTAL RESEARCH FACILITY

MONTREAL ROAD CAMPUS

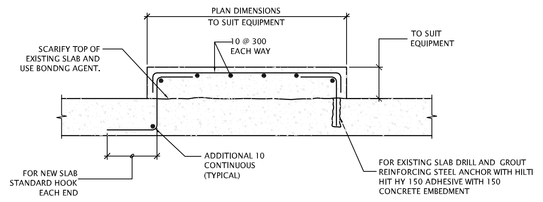
drawing / dessin: GENERAL NOTES

designed / conçu	G. ALEXANDER	date / date	MAY 2015
drawn / dessiné	V. JANUSZKO	scale / échelle	NTS
checked / vérifié	H. SAFFARINI	sheet / feuille	1 of/de 8
approved / approuvé		W.O.no. / D.T.no.	

dwg.no. / dessin no.: 3788-S00

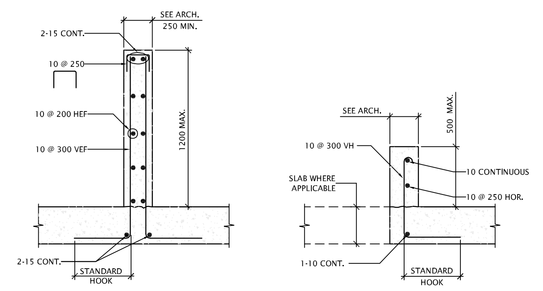
ASPM A0 (1189x841)

PAD AND CURB DETAILS — TDC-18



PADS

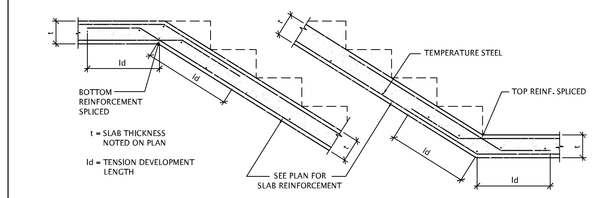
FOR LOCATION AND SIZE SEE ARCHITECTURAL, MECHANICAL AND/OR ELECTRICAL DRAWINGS



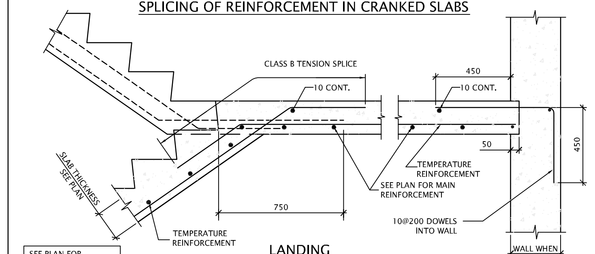
CURBS

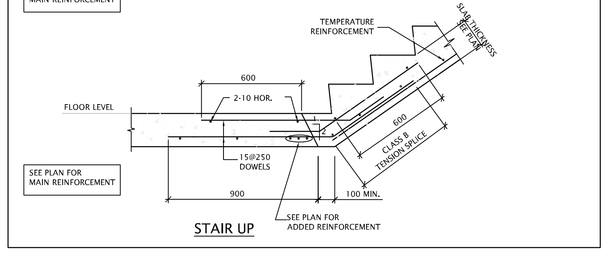
FOR LOCATION AND SIZE SEE ARCHITECTURAL, MECHANICAL AND/OR ELECTRICAL DRAWINGS

CONCRETE STAIR DETAILS — TDC-17



SPLICING OF REINFORCEMENT IN CRANKED SLABS





STAIR UP

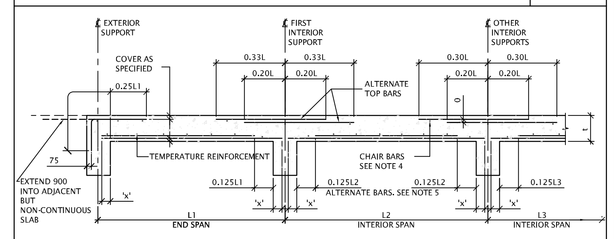
TEMPERATURE REINFORCEMENT FOR CONCRETE SLABS, COVER SLABS AND TOPPINGS — TDC-14

	CONCRETE THICKNESS (mm)	REINFORCEMENT
TOPPINGS & COVER SLAB	50	152 x 152 - MW13.3 x MW13.3
	65	152 x 152 - MW18.7 x MW18.7
	75	152 x 152 - MW25.8 x MW25.8
	90	152 x 152 - MW25.8 x MW25.8
	100	102 x 102 - MW13.3 x MW13.3
SLABS	100	10@500
	110	10@450
	120	10@400
	130	10@350
	140	10@350
	150	10@300
	160	10@300
	170	10@250
	180	10@250
	190	10@250
	200	10@250
	210	10@200
	220	10@200
	230	10@200
	240	10@200
	250	10@200
	260	15@350
	270	15@350
	280	15@350
	290	15@300
	300	15@300

NOTES:

1. UNLESS OTHERWISE NOTED PROVIDE TEMPERATURE REINFORCEMENT IN CONCRETE SLABS, COVER SLABS AND TOPPINGS AS SHOWN IN THIS TABLE.
2. UNLESS OTHERWISE NOTED, PLACE TEMPERATURE REINFORCEMENT PERPENDICULAR TO MAIN REINFORCEMENT IN ONE WAY SLABS, WHERE MAIN REINFORCEMENT CONSISTS OF TOP AND BOTTOM BARS, PLACE TEMPERATURE REINFORCEMENT ALTERNATELY AT TOP AND BOTTOM.
3. UNLESS OTHERWISE NOTED, PROVIDE WELDED WIRE FABRIC IN FLAT SHEETS.
4. PROVIDE REINFORCEMENT FOR CONCRETE TOPPING WHICH IS PLACED OVER A SLIP SHEET OR MEMBRANE. TEMPERATURE REINFORCEMENT IS NOT REQUIRED WHERE CONCRETE TOPPINGS ARE PLACED AND BONDED DIRECTLY ON CONCRETE SLABS.
5. UNLESS OTHERWISE NOTED, PLACE WELDED WIRE FABRIC WITH 25 mm TOP COVER. LAP REBARS WITH CLASS 'B' LAP SPLICE. LAP END OF WELDED WIRE FABRIC SUCH THAT THE OVERLAP MEASURED BETWEEN THE OUTERMOST CORSS-WIRES OF EACH FABRIC SHEET SHALL NOT BE LESS THAN ONE SPACING OF CROSS-WIRE PLUS 50 mm.
6. UNLESS OTHERWISE NOTED, PROVIDE EDGE OF ALL SLABS WITH 2-15 CONTINUOUS.
7. IN UNHEATED AREAS, INCREASE REINFORCEMENT BY 25%.

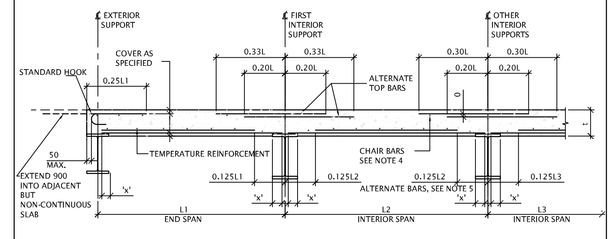
ONE WAY SLABS - REINFORCEMENT DETAILS — TDC-9



L IS GREATER OF TWO ADJACENT SPANS

SLAB SUPPORTED ON CONCRETE BEAMS OR WALLS

'x' = 10 BAR DIAMETERS 150 MIN SEE NOTE 6.



L IS GREATER OF TWO ADJACENT SPANS

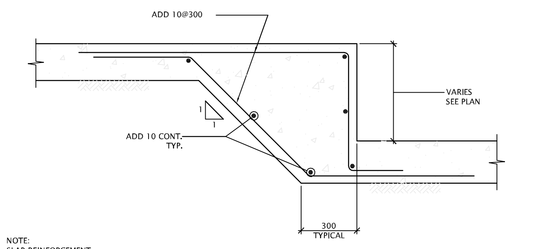
SLAB SUPPORTED ON STEEL BEAMS

'x' = 10 BAR DIAMETERS 150 MIN SEE NOTE 6.

NOTE:

1. UNLESS OTHERWISE SHOWN OR NOTED ON PLAN, PLACE REINFORCING IN ONE-WAY SLABS AS SHOWN ABOVE.
2. MAXIMUM BAR SPACING IS 3t BUT NOT GREATER THAN 500, WHERE t IS THE SLAB THICKNESS.
3. PROVIDE 2-15 x 1800 LONG TOP BARS ACROSS RE-ENTRANT CORNERS UNLESS OTHERWISE SHOWN.
4. PROVIDE BAR SUPPORTS AND ACCESSORIES TO THE REQUIREMENTS OF CSA-A23.1-09.
5. ALTERNATE BOTTOM BARS AT INTERIOR SUPPORTS MAY BE STOPPED SHORT OF THE SUPPORTS PROVIDED THAT MAXIMUM SPACING OF BARS TERMINATING OVER THE SUPPORT IS LESS THAN 450.
6. WHERE MINIMUM EMBEDMENT IS NOT POSSIBLE PROVIDE A STANDARD 90° HOOK LAID FLAT.

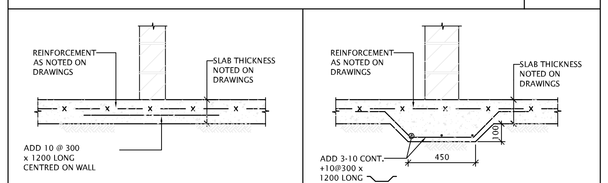
CHANGE IN ELEVATION OF S.O.G. AND TRENCH DETAILS — TDC-6



NOTE:
SLAB REINFORCEMENT NOT SHOWN FOR CLARITY.

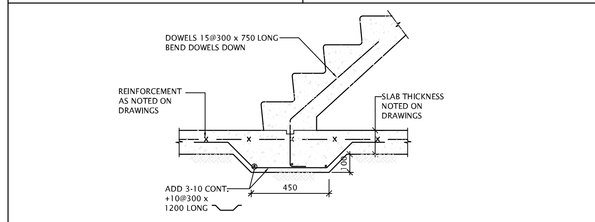
CHANGE IN ELEVATION-SLAB ON GRADE

SLAB ON GRADE DETAILS -ADDITIONAL REINFORCEMENT — TDC-5

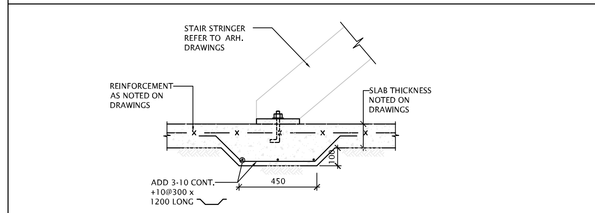


MASONARY PARTITIONS ≤ 150

TYPICAL THICKENING UNDER MASONARY PARTITIONS ≥ 150

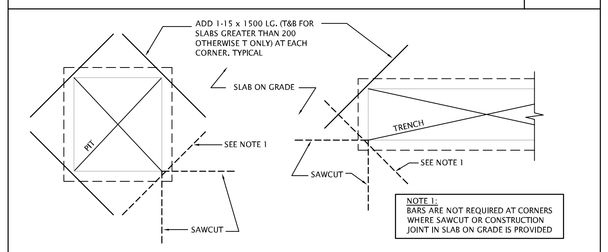


TYPICAL THICKENING UNDER CONCRETE STAIRS

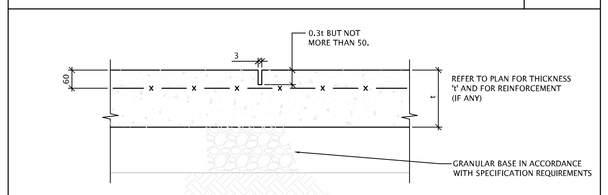


TYPICAL THICKENING UNDER STEEL STAIRS

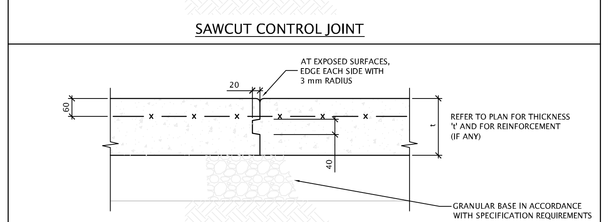
CRACK CONTROL REINFORCEMENT IN SLAB ON GRADE — TDC-4



SLAB ON GRADE - JOINT DETAILS — TDC-3

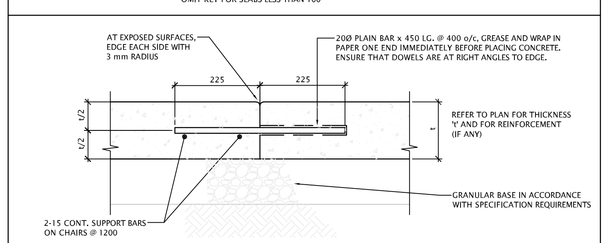


SAWCUT CONTROL JOINT



KEYED CONSTRUCTION JOINT

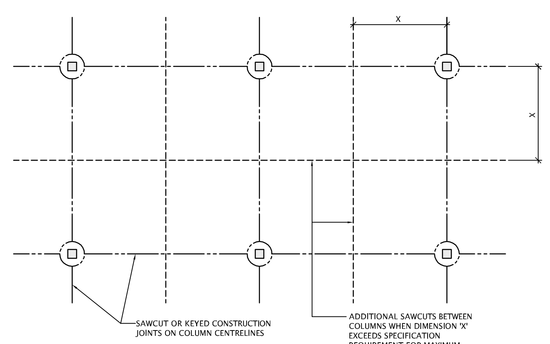
OMIT KEY FOR SLABS LESS THAN 100



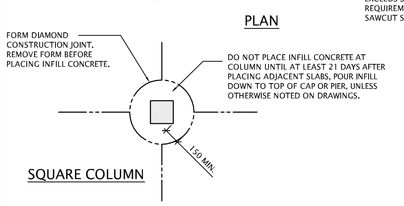
DOWELED CONSTRUCTION JOINT

FOR SLAB GREATER THAN 100

SLAB ON GRADE - AREA PLACEMENT — TDC-1



PLAN



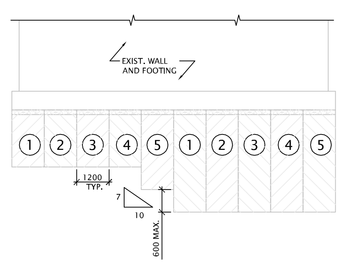
SQUARE COLUMN

JOINTS AT COLUMNS

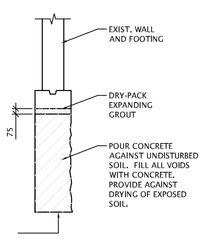
NOTES:

1. FORM AROUND COLUMNS. (NOT REQUIRED AT CIRCULAR COLUMNS)
2. "X" = 30 TIMES SLAB THICKNESS, EXCEPT WHERE CONCRETE IS PROPORTIONED FOR MAXIMUM BULK DENSITY IN ACCORDANCE WITH SPECIFICATION "X" = 40 TIMES SLAB THICKNESS UNLESS NOTED OTHERWISE.
3. PLACE SLAB AREA NO LARGER THAN CAN BE FINISHED IN ONE DAY.
4. SAWCUT CONTROL JOINTS IN ACCORDANCE WITH SPECIFICATION REQUIREMENTS.
5. LIMIT RATIO OF LENGTH TO WIDTH OF ANY SAWCUT PANEL TO 1.5 MAXIMUM.
6. REFER TO TYPICAL SLAB ON GRADE JOINT DETAIL FOR REQUIRED DEPTH OF SLAB SAWCUT.
7. FILL SAWCUT JOINTS IN ACCORDANCE WITH SPECIFICATION REQUIREMENTS.

UNDERPINNING DETAILS — TDF-10



ELEVATION



SECTION

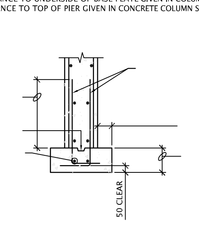
NOTES:

1. UNDERPINNING SHALL BE CONSTRUCTED
   a) NOT LESS THAN 3 STAGES UP TO 3000 DEEP
   b) NOT LESS THAN 5 STAGES OVER 3000
2. SECTIONS MARKED ① SHALL BE EXCAVATED, CONCRETE POURED AGAINST UNDISTURBED SOIL AND ALLOWED TO GAIN 70% OF SPECIFIED STRENGTH.
3. RAM 75 DRY-PACK EXPANDING GROUT UNDER EXISTING FOUNDATION AND ALLOW TO GAIN 70% OF SPECIFIED STRENGTH.
4. PROCEED WITH SECTIONS MARKED ② AND FOLLOWING COMPLETION OF EACH SECTION DO ③, ④, AND ⑤.
5. UNDERPINNING SHALL NOT STEP VERTICALLY GREAT THAN 600.
6. 7 TO 10 SLOPE FROM ADJACENT EXCAVATION SHALL BE MAINTAINED.
7. CONCRETE f'c = 25 MPa, TYPE 10 CEMENT
   SLUMP ..... 100 MAX.
   AGGREGATE ..... 80 MAX.

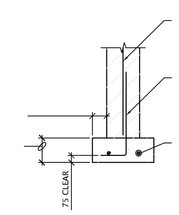
COLUMN AND WALL FOOTING DETAILS — TDF-2

NOTES:

1. SIZE AND REINFORCEMENT FOR PIERS AND FOOTINGS GIVEN IN SCHEDULE OR ON PLAN.
2. FOR PIERS 1800 HIGH OR MORE, PROVIDE DOWELS FROM FOOTING TO PIER, TO MATCH PIER REINFORCEMENT. EXTEND DOWELS TO BOTTOM OF FOOTING AND HOOK.
3. FOR PIERS LESS THAN 1800 HIGH, EXTEND PIER REINFORCEMENT TO THE BOTTOM OF FOOTING AND HOOK.
4. WHERE THERE IS NO PIER, CONSIDER THE CONCRETE COLUMN AS A PIER GREATER THAN 1800 HIGH. REFER TO NOTE 2.
5. WHERE COLUMN BAR SPLICE LENGTH IS GREATER THAN PIER HEIGHT, EXTEND COLUMN DOWELS TO BOTTOM OF FOOTING AND HOOK.
6. FOR SPLICE LENGTHS, SEE CONCRETE COLUMN TYPICAL DETAILS.
7. WHERE NO PIER REINFORCING IS NOTED, PROVIDE VERTICAL STEEL OF 0.5X OR 4-15 DOWELS (WHICHEVER IS GREATER) FROM FOOTING INTO PIER.
8. A - DISTANCE TO UNDERSIDE OF BASE PLATE GIVEN IN COLUMN SCHEDULE OR ON PLAN. B - DISTANCE TO TOP OF PIER GIVEN IN CONCRETE COLUMN SCHEDULE.

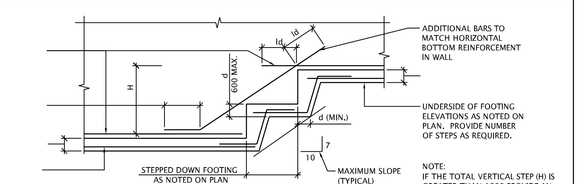


FOOTING UNDER REINFORCED CONCRETE WALL

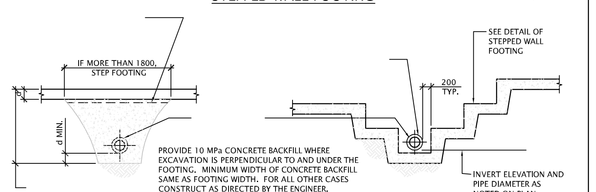


FOOTING UNDER MASONRY WALL

STEPPED WALL FOOTING AND EXCAVATION SLOPES — TDF-1

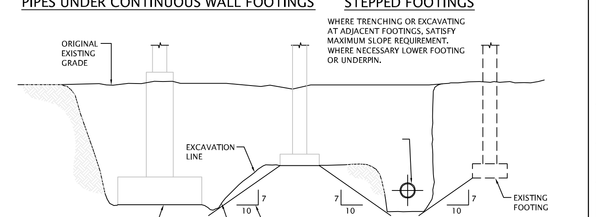


STEPPED WALL FOOTING



PIPES UNDER CONTINUOUS WALL FOOTINGS

PIPES REQUIRING STEPPED FOOTINGS



MAXIMUM SLOPE AT EXCAVATIONS

National Research Council Canada
Administrative Services and Property Management Branch

Conseil national de recherches Canada
Division des services administratifs et gestion de l'immobilier

NRC · CNRC

- CONTRACTORS TO CHECK AND VERIFY ALL DIMENSIONS ON SITE PRIOR TO DEMOLITION OR CONSTRUCTION AND REPORT ANY ERRORS OR OMISSIONS TO DEPARTMENTAL REPRESENTATIVE.
- CONTRACTORS MUST VISIT THE SITE & FULLY FAMILIARIZE THEMSELVES WITH THE SCOPE OF THE WORK.
- PREVENT THE SPREAD OF DUST & DEBRIS BEYOND THE WORK AREA AND CLEAN ALL SURFACES AT COMPLETION.
- MAKE GOOD ALL SURFACES AFFECTED BY THIS WORK.
- COORDINATE ALL SHUTDOWNS WITH THE DEPARTMENTAL REPRESENTATIVE.
- PROVIDE ALL LABOUR AND MATERIAL REQUIRED TO FORM A COMPLETE, FUNCTIONAL SYSTEM AS DESCRIBED ON DRAWINGS.

NORR
ARCHITECTS ENGINEERS PLANNERS
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KEY PLAN

No.	Date	Revision	By/ Par
0	29 05 2015	ISSUED FOR TENDER	

Date Printed 15 MAY 2015 — Date imprimée

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

A Detail no. No. du détail
B Location drawing no. sur dessin no.
C Drawing no. dessin no.

project / projet
NRC CABIN COMFORT + ENVIRONMENTAL RESEARCH FACILITY

MONTREAL ROAD CAMPUS

drawing / dessin
TYPICAL DETAILS 1

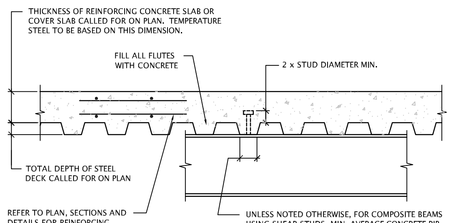
designed / conçu	G. ALEXANDER	date	MAY 2015
drawn / dessiné	V. JANUSZKO	scale / échelle	NTS
checked / vérifié	H. SAFFARINI	sheet / feuille	2 of/de 8
approved / approuvé		W.O.no.	D.T.no.

dwg.no. / dessin no.
3788-S01

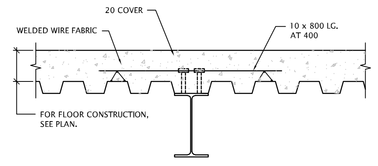
ASPM A0 (1189x841)

0 10 20mm 40 60 80 100 120 140 160 180 200mm

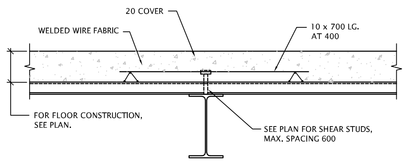
CONCRETE PLACED OVER STEEL DECK — TDS-9



COVER SLAB DETAIL OVER COMPOSITE STEEL BEAM



STEEL DECK PARALLEL TO BEAM



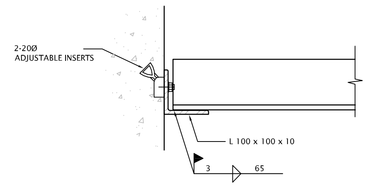
STEEL DECK PERPENDICULAR TO BEAM

STEEL LINTEL SCHEDULE — TDS-8

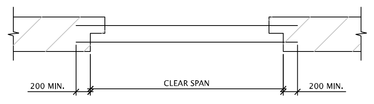
CLEAR SPAN	200 WALL		250 WALL		300 WALL	
	TYPE	MATERIAL	TYPE	MATERIAL	TYPE	MATERIAL
UP TO 1200		2-Ls 90x90x8		2-Ls 100x100x8		3-Ls 90x90x8
1200 TO 1800		2-Ls 100x90x8		2-Ls100x100x10		3-Ls 125x90x8
1800 TO 2100		2-Ls 125x90x10		2-Ls 150x100x8		3-Ls 150x90x8

NOTES:

1. USE ONLY FOR WALLS OR PARTITIONS 200 OR OVER.
2. USE LINTELS ON THIS TYPICAL DETAIL ONLY IF THE HEIGHT OF THE MASONRY ABOVE THE OPENING IS EQUAL TO OR GREATER THAN HALF THE CLEAR SPAN OF THE OPENING AND IF THERE ARE NO CONCENTRATED LOAD DIRECTLY ABOVE THE OPENING.
3. MINIMUM BEARING FOR LINTELS SHALL BE 200. SEE PLAN BELOW.
4. PROVIDE STEEL PACKING PLATES TO ENSURE EVEN BEARING.
5. FOR OPENINGS OVER 1200 IN WIDTH, BOLT DOUBLE ANGLES BACK TO BACK USING 16 BOLTS AT 75Ø c/c COMMENCING 75 FROM EACH END. ALTERNATIVELY, 5 x 50 LONG FILLET WELDS AT 75Ø TOP AND BOTTOM MAY BE USED IN PLACE OF BOLTS.
6. WHERE LINTELS ABUT CONCRETE COLUMNS OR CONCRETE WALLS, PROVIDE SEAT ANGLE AS SHOWN BELOW. WHERE LINTELS ABUT STEEL COLUMNS, WELD SEAT ANGLE TO THE COLUMN.

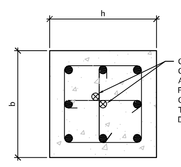


SEAT ANGLE DETAIL

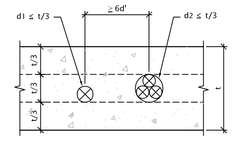


PLAN

EMBEDDED CONDUITS AND PIPES — TDC-45



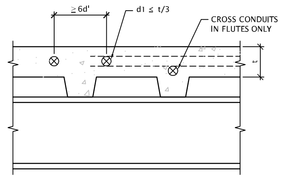
COLUMN (PLAN)



NOTES:

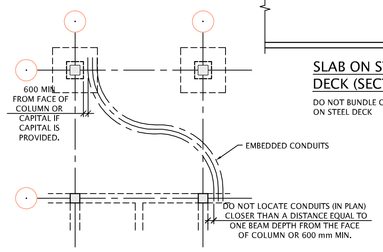
1. OUTSIDE DIAMETER OF CONDUIT (d 1) OR BUNDLE OF CONDUITS SHALL NOT EXCEED 1/3 SLAB THICKNESS.
2. CONDUITS SHALL BE PLACED IN MIDDLE THIRD OF SLAB DEPTH.
3. d IS LARGER OF d1 AND d2.

SLAB OR WALL (SECTION)



SLAB ON STEEL DECK (SECTION)

DO NOT BUNDLE CONDUITS IN CONCRETE SLAB ON STEEL DECK



PART PLAN

TENSION DEVELOPMENT LENGTH AND TENSION LAP SPLICES (Fy = 400 MPa) — TDC-36

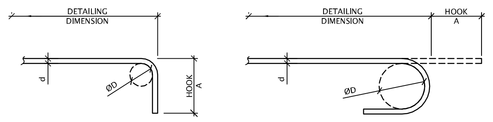
CONCRETE	25 MPa		30 MPa		35 MPa		40 MPa		45 MPa		50 MPa		CONCRETE
SPLICE	CLASS A, Ld	CLASS B	CLASS A, Ld	CLASS B	CLASS A, Ld	CLASS B	CLASS A, Ld	CLASS B	CLASS A, Ld	CLASS B	CLASS A, Ld	CLASS B	SPLICE
BAR	TABLE 1: UNCOATED, OTHER THAN TOP BARS												BAR
10	300	380	300	350	300	320	300	300	300	280	300	300	10
15	440	570	400	520	370	480	350	450	330	420	310	400	15
20	580	750	530	690	490	640	460	600	430	560	410	530	20
25	900	1170	830	1070	760	990	720	930	670	880	640	830	25
30	1080	1410	990	1290	920	1190	860	1110	810	1050	770	1000	30
35	1260	1640	1150	1500	1070	1390	1000	1300	940	1220	890	1160	35
	TABLE 2: UNCOATED, TOP BARS												
10	380	490	350	450	320	420	300	390	280	370	300	350	10
15	570	730	520	670	480	620	450	580	420	550	400	520	15
20	750	980	690	890	640	830	600	770	560	730	530	690	20
25	1170	1530	1070	1390	990	1290	930	1210	880	1140	830	1080	25
30	1410	1830	1290	1670	1190	1550	1110	1450	1050	1360	1000	1290	30
35	1640	2130	1500	1950	1390	1800	1300	1690	1220	1590	1160	1510	35
	TABLE 3: EPOXY-COATED BARS, OTHER THAN TOP BARS												
10	440	570	400	520	370	480	350	450	330	420	310	400	10
15	650	850	600	770	550	720	520	670	490	630	460	600	15
20	870	1130	790	1030	730	950	690	890	650	840	610	800	20
25	1350	1760	1240	1610	1140	1490	1070	1390	1010	1310	960	1240	25
30	1620	2110	1480	1930	1370	1780	1280	1670	1210	1570	1150	1490	30
35	1890	2460	1730	2250	1600	2080	1500	1950	1410	1840	1340	1740	35
	TABLE 4: EPOXY-COATED TOP BARS												
10	490	640	450	590	420	540	390	510	370	480	350	450	10
15	760	960	670	880	620	810	580	760	550	720	520	680	15
20	980	1280	900	1170	830	1080	780	1010	730	950	700	900	20
25	1530	1990	1400	1820	1300	1690	1210	1580	1140	1490	1090	1410	25
30	1840	2390	1680	2180	1560	2020	1460	1890	1370	1780	1300	1690	30
35	2150	2790	1960	2550	1810	2360	1700	2210	1600	2080	1520	1970	35

NOTES:

1. USE FOLLOWING TENSION LAP SPLICE LENGTHS UNLESS NOTED OTHERWISE ON DRAWINGS.
2. TENSION DEVELOPMENT LENGTHS, Ld, DENOTED AS TENSION LAP SPLICE CLASS A.
3. FOR COLUMNS, USE COLUMN TENSION SPLICE TYPICAL DETAIL.
4. TOP BARS ARE BARS WITH MORE THAN 300 OF CONCRETE CAST BELOW SPLICE.
5. CLEAR COVER NOT LESS THAN d_b , CLEAR SPACING NOT LESS THAN $2d_b$.
6. FOR STRUCTURAL LOW-DENSITY CONCRETE, INCREASE SPLICE LENGTHS BY 30%.
7. FOR STRUCTURAL SEMI-LOW-DENSITY CONCRETE, INCREASE SPLICE LENGTHS BY 20%.

REINFORCING STEEL BAR AND STANDARD HOOK DIMENSIONS FOR DEFORMED BARS WITH Fy = 400 MPa — TDC-39

BAR SIZE	MASS	DIA.	AREA	STANDARD HOOK			STIRRUP AND TIE HOOKS (90˚)	
				BEND	A			
	kg/m	d	mm2	D	90˚	180˚	D	A
T8	0.395	8	50	50	130	120	30	85
T10	0.617	10	79	60	160	130	40	90
T12	0.888	12	113	70	190	150	50	110
T16	1.580	16	201	95	260	180	65	145
T20	2.47	20	314	120	320	220		
T25	3.86	25	491	150	400	280		
T32	6.31	32	804	260	550	420		
T40	9.87	40	1257	400	720	640		



STANDARD 90˚ HOOK — STANDARD 180˚ HOOK

MINIMUM DEVELOPMENT AND LAP SPLICE LENGTHS IN COMPRESSION — TDC-35

BAR SIZE	Fy MPa	DEVELOPMENT LENGTHS (ℓdc)			LAP SPLICE
		f'c = 20 MPa	f'c = 25 MPa	f'c = 30 MPa	f'c = 30 MPa
10	400	240	220	200	300
10	500	300	270	250	430
15	400	340	310	280	440
15	500	430	380	350	640
20	400	420	370	340	590
20	500	520	470	430	850
25	400	540	480	440	730
25	500	680	600	550	1070
30	400	640	570	530	880
30	500	800	720	660	1280
35	400	770	690	630	1030
35	500	960	860	790	1490
45	400	940	840	770	
45	500	1170	1050	960	
55	400	1210	1080	990	
55	500	1510	1350	1240	

NOTES :

1. VALUES GIVEN ARE FOR NORMAL WEIGHT CONCRETE AND DEFORMED BARS ONLY AND ARE TO BE MODIFIED ACCORDING TO THE FOLLOWING APPLICABLE FACTORS.
2. LAP SPLICES ARE NOT PERMITTED FOR BAR SIZES 45 AND 55.
3. ' ℓ_d' DENOTES MINIMUM DEVELOPMENT LENGTH FOR EMBEDMENT OF DOWELS IN COMPRESSION.
4. INCREASE LAP SPLICE LENGTHS FOR f'c LESS THAN 20 MPa BY A FACTOR OF 1.33.
5. MINIMUM LAP SPLICE AND DEVELOPMENT LENGTHS MAY BE REDUCED UNDER THE FOLLOWING SPECIAL CONDITIONS BY THE FACTORS SHOWN:
   (a) EXCESS AREA OF STEEL ..... (AS REQUIRED/AS PROVIDED)
   USE 1.0 UNLESS NOTED OTHERWISE.
   (b) BARS ENCLOSED WITH A SPIRAL WHICH HAS A MINIMUM WIRE DIA. OF 6 AND 100 MAXIMUM PITCH 0.75
6. AFTER APPLYING ALL APPLICABLE FACTORS OF NOTES 4 AND 5, THE LAP SPLICE LENGTHS SHALL NOT BE MADE LESS THAN 300 AND THE DEVELOPMENT LENGTHS SHALL NOT BE MADE LESS THAN 200.

CONCRETE COVER TO REINFORCING STEEL — TDC-34

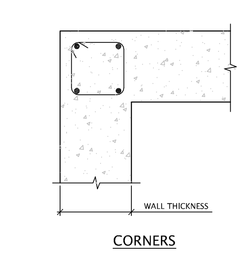
	MINIMUM COVER CAN3-A23.1	COVER FOR FIRE-RESISTANCE RATING			
		1.5 h	2 h	3 h	4 h
CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH	75	75	75	75	75
CONCRETE CAST AGAINST FORMS, BUT EXPOSED TO EARTH OR WEATHER: 15 BARS, 16Ø WIRE, AND SMALLER, STIRRUPS, TIES, AND SPIRAL	40	40	40	40	40
COLUMN PRINCIPAL REINFORCEMENT	50	50	50	65	75
20 TO 55 BARS, AND ALL OTHER BARS	50	50	50	50	50
CONCRETE NOT EXPOSED TO WEATHER, OR NOT IN CONTACT WITH GROUND: 35 BARS AND SMALLER FOR SLABS AND WALLS SEE NOTE #3	20	20	25	35	40
FOR JOISTS	20	25	25	40	50
BEAM PRINCIPAL REINFORCEMENT	40	40	40	40	50
COLUMN PRINCIPAL REINFORCEMENT	40	50	50	65	75
STIRRUPS, TIES, SPIRALS, AND ALL OTHER BARS	40	40	40	40	40

NOTES:

1. FOR CAST-IN-PLACE (NON-PRESTRESSED) CONCRETE, PROVIDE MINIMUM CONCRETE COVER TO REINFORCEMENT ACCORDING TO CAN3-A23.1 UNLESS OTHERWISE NOTED ON DRAWINGS.
2. WHERE THE FIRE-RESISTANCE RATING OF A COLUMN EXCEEDS 2 HOURS, ADD WELDED WIRE MESH, MINIMUM 102 x 102 - MW3.2 x MW3.2, MIDWAY IN CONCRETE COVER,
3. FOR SHORT WALLS WHERE INDICATED ON THE DRAWING, PROVIDE COVER AS FOR COLUMNS.

MINIMUM CONCRETE WALL REINFORCEMENT U/N — TDC-33

MARK	VERT BARS EA FACE As=.0015Ag	HORZ EA FACE		REMARK
		HEATED AREAS As=.002Ag	UNHEATED AREAS As=.003Ag	
W150A	10@450	10@325		1 LAYER
W200A	10@325	10@500		1 LAYER
W200	10@500	10@500	10@325	
W250	10@500	10@400	15@500	
W300	10@450	10@325	15@450	
W350	10@375	10@275	15@375	
W400	10@325	15@500	15@325	
W450	10@300	15@450	15@300	
W500	10@250	15@400		
W550	10@250	15@350		
W600	15@450	15@325		
W650	15@400	15@300		
W700	15@375	15@275		
W750	15@350	15@250		



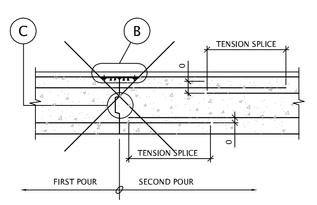
WALLS UP TO 200 THICK

CORNERS — WALLS THICKER THAN 200

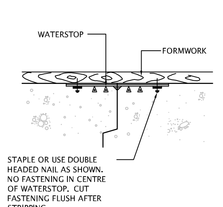
NOTES:

1. IN ALL WALLS PROVIDE AT LEAST THE REINFORCEMENT SHOWN IN THE SCHEDULE ABOVE TOGETHER WITH REINFORCEMENT NOTED TO BE ADDED.
2. WALL MARKS DENOTE THICKNESS OF WALLS AND CORRESPONDING REINFORCEMENT.
3. SEE ALSO RELATED DETAILS AND NOTES ON DRAWINGS.
4. AT ENDS OF WALLS CONFORM TO DETAILS SHOWN ABOVE UNLESS OTHERWISE NOTED ON DRAWINGS.

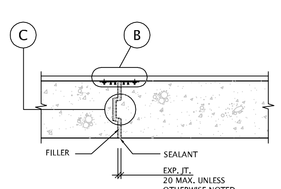
CONCRETE WALL JOINT DETAILS — TDC-30



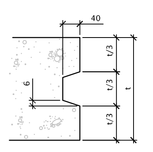
CONSTRUCTION JOINT



DETAIL "B"

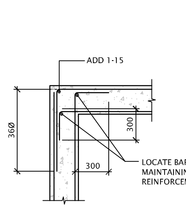


EXPANSION JOINT



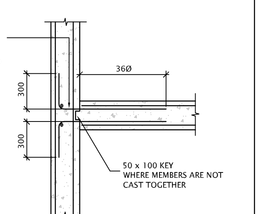
DETAIL " C "

WALL REINFORCEMENT DETAILS — TDC-29



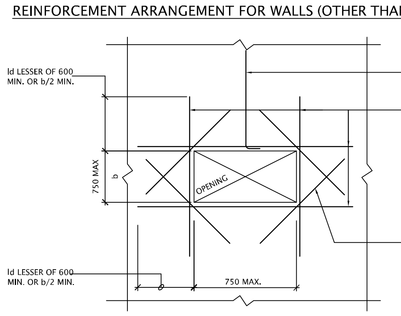
LOCATE BARS AS SHOWN WHILE MAINTAINING VERTICAL WALL REINFORCEMENT.

LAPPING AT CORNERS



DOWELING AT INTERSECTING WALLS

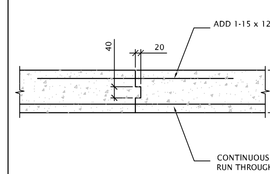
REINFORCEMENT ARRANGEMENT FOR WALLS (OTHER THAN SHEAR WALLS)



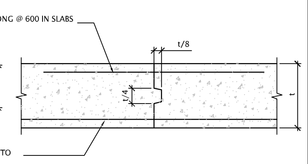
NOTE: FOR OPENINGS UNDER 450 x 450 RESPACE MAIN REINFORCING AND ADD 1-15 x 1200 LONG DIAGONAL AT EACH CORNER FOR EVERY 200 OF WALL THICKNESS OR PORTION THEREOF.

OPENING IN WALL

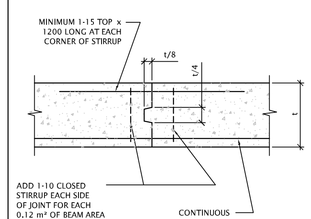
BEAM AND SLAB CONSTRUCTION JOINT DETAILS — TDC-23



FOR SLABS "t" = 150 OR LESS

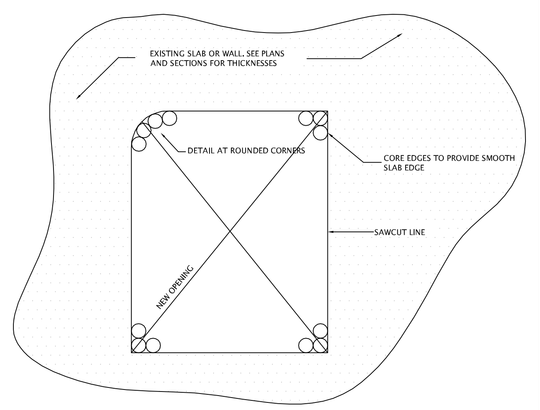


FOR SLABS "t" OVER 150



BEAMS UP TO 450 DEPTH

CUTTING NEW OPENING IN EXISTING SLAB — TDC-21



PROCEDURE:

1. LAYOUT SAWCUT PATTERN. VERIFY SLAB REINFORCEMENT TO ACCOMODATE CUT IS IN PLACE BEFORE ANY CUT.
2. CORE 1500 HOLES AT EACH CORNER FOR NEW OPENING. DO NOT DRILL BEYOND LIMITS OF OPENING.
3. SAWCUT NEW OPENING AS SHOWN ON PLAN OR SECTIONS. DO NOT OVERCUT BEYOND CORED HOLES.

OPENINGS AND SLEEVES IN SLAB — TDC-20

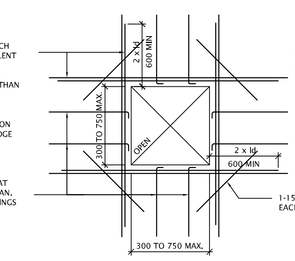
NOTES:

1. UNLESS OTHERWISE NOTED ON STRUCTURAL DRAWINGS:
   A) REINFORCE AROUND OPENINGS AND SLEEVES AS PER DETAILS BELOW.
   B) DO NOT MAKE OPENINGS OR SLEEVES LARGER THAN THE MAXIMUM DIMENSIONS NOTED BELOW AND DO NOT LOCATE OPENINGS OR SLEEVES OTHER THAN WHERE INDICATED ON PLAN WITHOUT PRIOR APPROVAL FROM THE CONSULTANT.
2. OPENINGS AND SLEEVE SIZES AND LOCATIONS TO BE RESTRICTED TO THE FOLLOWING:
   A) ONE WAY AND TWO-WAY SLABS: MAXIMUM OPENING SIZE 750 SQUARE
   B) FLAT SLABS:
      (i) DO NOT MAKE OPENINGS OR PLACE SLEEVES WITHIN TWICE THE SLAB DEPTH FROM THE FACE OF A COLUMN OR EDGE OF A CAPITAL.
      (ii) MAXIMUM WIDTH OF STRIP INTERRUPTED BY OPENINGS OR SLEEVES:
      - IN AREAS OF INTERSECTION OF TWO COLUMN STRIPS - NOT GREATER THAN 1/8 OF THE SMALLER COLUMN STRIP,
      - IN AREAS OF INTERSECTION OF A COLUMN STRIP WITH A MIDDLE STRIP - NOT GREATER THAN 1/4 OF THE SMALLER STRIP,
      - IN AREAS OF INTERSECTION OF TWO MIDDLE STRIPS - NOT GREATER THAN - 1/2 OF THE SMALLER STRIP.

ADD REINFORCING ON EACH SIDE OF OPENING EQUIVALENT TO 1/2 OF THE AREA OF REINFORCING CUT BY THE OPENING, BUT NOT LESS THAN 2-15 TOP AND BOTTOM.

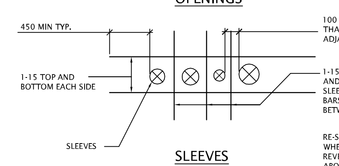
EXTEND STANDARD TENSION DEVELOPMENT BEYOND EDGE OF OPENING

SLAB REINFORCING BARS AT SPACING SPECIFIED ON PLAN, HOOK TOP BARS AT OPENINGS



NOTE: FOR OPENINGS LESS THAN 300x300 RE-SPACE MAIN REINFORCING AND ADD 1-15 x 1500 LONG TOP AND BOTTOM EACH SIDE

OPENINGS



RE-SPACE MAIN REINFORCING WHERE THIS IS NOT POSSIBLE REVERT TO OPENINGS DETAIL ABOVE

SLEEVES

National Research Council Canada — Conseil national de recherches Canada
Administrative Services and Property Management Branch — Division des services administratifs et gestion de l'immobilier
NRC · CNRC

- CONTRACTORS TO CHECK AND VERIFY ALL DIMENSIONS ON SITE PRIOR TO DEMOLITION OR CONSTRUCTION AND REPORT ANY ERRORS OR OMISSIONS TO DEPARTMENTAL REPRESENTATIVE.
- CONTRACTORS MUST VISIT THE SITE & FULLY FAMILIARIZE THEMSELVES WITH THE SCOPE OF THE WORK.
- PREVENT THE SPREAD OF DUST & DEBRIS BEYOND THE WORK AREA AND CLEAN ALL SURFACES AT COMPLETION.
- MAKE GOOD ALL SURFACES AFFECTED BY THIS WORK.
- COORDINATE ALL SHUTDOWNS WITH THE DEPARTMENTAL REPRESENTATIVE.
- PROVIDE ALL LABOUR AND MATERIAL REQUIRED TO FORM A COMPLETE, FUNCTIONAL SYSTEM AS DESCRIBED ON DRAWINGS.

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100128940
May 22, 15
PROVINCE OF ONTARIO

No.	Date	Revision	By/Par.
0	29 05 2015	ISSUED FOR TENDER	

Date Printed 15 MAY 2015 — Date imprimée

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

A Detail no. No. du détail
B Location drawing no. sur dessin no.
C Drawing no. dessin no.

project / projet
NRC CABIN COMFORT + ENVIRONMENTAL RESEARCH FACILITY
MONTREAL ROAD CAMPUS

drawing / dessin
TYPICAL DETAILS 2

designed / conçu	date	date
G. ALEXANDER	MAY 2015	
drawn / dessiné	scale / échelle	
V. JANUSZKO	NTS	
checked / vérifié	sheet / de / de	feuille
H. SAFFARINI	3 of/de 8	
approved / approuvé	W.O.no.	D.T.no.

dwg.no. 3788-S02 — dessin no.

ASPM A0 (1189x841)

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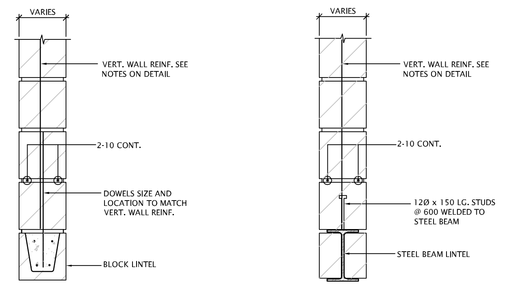
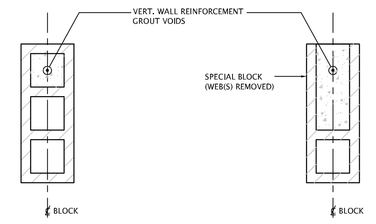
EARTHQUAKE REINFORCEMENT FOR MASONRY WALLS — TDM-8



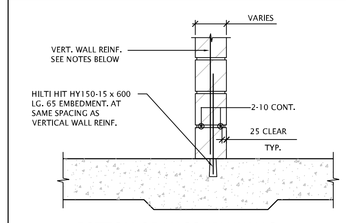
TYPICAL DETAIL AT BLOCK LINTEL SHOWING PLACEMENT OF VERTICAL REINFORCEMENT

DETAIL AT STEEL BEAM LINTEL SHOWING PLACEMENT OF VERTICAL REINFORCEMENT

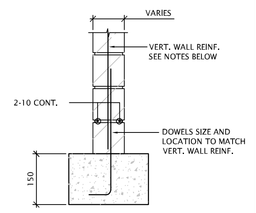


PLAN DETAILS OF BLOCKS SHOWING PLACEMENT OF VERTICAL REINFORCEMENT

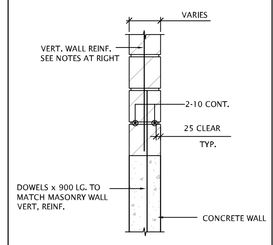
EARTHQUAKE ANCHORAGE FOR MASONRY WALLS (BOTTOM) — TDM-7



BOTTOM OF MASONRY WALLS ON REINF. CONCRETE SLABS



BOTTOM OF MASONRY WALLS ON CONCRETE FOOTINGS



BOTTOM OF MASONRY WALLS ON REINF. CONCRETE WALLS

SEISMIC MASONRY REINFORCEMENT

NOTES:

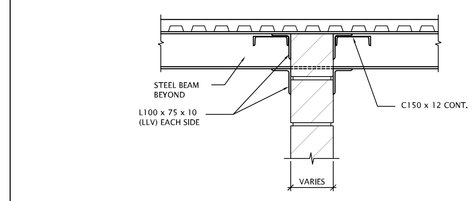
PROVIDE VERTICAL AND HORIZONTAL REINFORCEMENT IN HOLLOW CLAY TILE AND CONCRETE UNIT MASONRY BLOCK WALLS WITH UNSUPPORTED HEIGHT 3000 OR OVER:

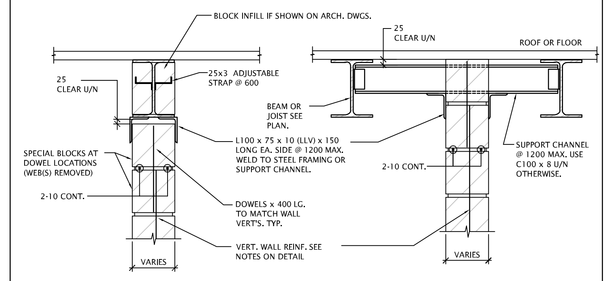
- BAR REINF.: DEFORM BARS OF 400 MPa YIELD STRENGTH.
- VERT. REINF.: VERTICAL BARS
- HORIZ. REINF.: TRUSS TYPE MASONRY REINFORCEMENT.
- SPACING OF REINFORCEMENT

WALL THICKNESS	VERT. BARS	HORIZ. BARS
100	10 @ 800	3.65 mm @ 400
150	10 @ 800	4.75 mm @ 200
200	10 @ 600	4.75 mm @ 200
250	10 @ 400	4.75 mm @ 200
300	15 @ 600	4.75 mm @ 200

- LAP VERT. REINF. 450 MIN. AND HORIZ. REINF. 150 MIN. AT SPLICES.
- FILL REINFORCED CORES WITH 20 MPa CONCRETE.
- PROVIDE 2-10 BARS ALL AROUND OPENINGS. EXTEND BARS 600 BEYOND EDGES OF OPENINGS.
- PROVIDE 2-10 CONT. BARS AT TOP AND BOTTOM OF WALLS AND PARTITIONS AS DETAILED AND EACH SIDE OF CONTROL JOINTS.

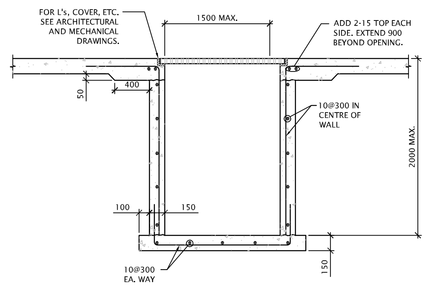
EARTHQUAKE ANCHORAGE FOR MASONRY WALLS (TOP) — TDM-6





TYPICAL EARTHQUAKE ANCHORAGE AT TOP OF MASONRY WALLS WHERE STRUCTURAL STEEL OCCURS

SUMP PIT DETAILS — TDF-11



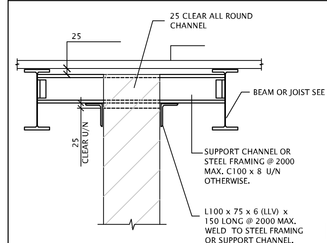
REINFORCEMENT FOR MASONRY PARTITIONS — TDM-4

HOLLOW BLOCK THICKNESS	HORIZ. REINF. VERT. SPACING	VERTICAL REINFORCING
90	LADDER REINFORCING (As=21 mm²) @ 400 mm	1-10 @ 1200 mm IN CENTRE OF WALL
140	LADDER REINFORCING (As=21 mm²) @ 400 mm	1-10 @ 1200 mm IN CENTRE OF WALL
190	LADDER REINFORCING (As=21 mm²) @ 400 mm	1-15 @ 1200 mm IN CENTRE OF WALL

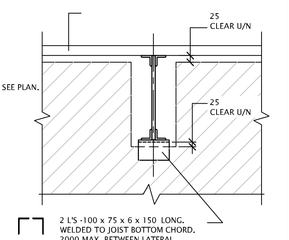
NOTES:

1. REFER TO GENERAL NOTES ON DRAWING SERIES 501.
2. HOLLOW LIGHT WEIGHT BLOCK.
3. GROUT CELLS CONTAINING BARS.
4. REFER TO SPECIFICATIONS AND DETAILS FOR SUPPORT AT TOP OF PARTITIONS.

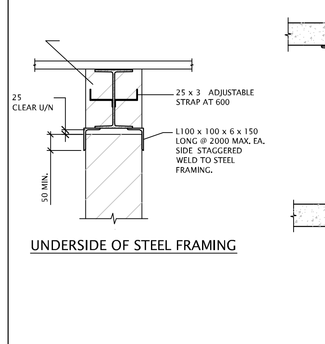
LATERAL SUPPORT AT TOP OF MASONRY WALLS — TDM-2



UNDERSIDE OF STEEL FRAMING



AT PARTITION PERPENDICULAR TO JOIST OR BEAM



UNDERSIDE OF STEEL FRAMING

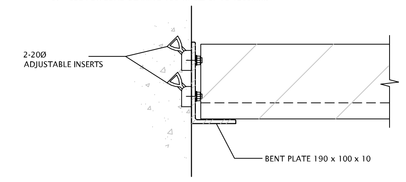
UNDERSIDE OF CONCRETE FRAMING

CONCRETE BLOCK LINTEL — TDM-1

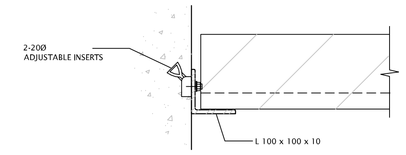
CLEAR SPAN	LINTEL UNIT	90 WALL	140 WALL	190 WALL	240 WALL	290 WALL
190 DEEP LINTEL						
UP TO 1200	190	1-10 B	1-10 B	2-10 B	2-10 B	3-10 B
1200 TO 1800	190	1-15 B	2-10 B	2-15 B	2-15 B	3-15 B
1800 TO 2400	190	1-15 T&B	2-15 T&B	2-15 T&B	2-15 T&B	3-15 T&B
390 DEEP LINTEL						
2400 TO 3000	390	1-15 B	1-15 B	2-15 B	2-15 B	3-15 B

NOTES:

1. USE ONLY FOR NON-LOAD BEARING MASONRY WALLS AND LINTEL SPANS UP TO 1200mm IN LOAD-BEARING WALLS.
2. USE LINTELS ON THIS TYPICAL DETAIL ONLY IF THE HEIGHT OF THE MASONRY ABOVE THE OPENING IS EQUAL TO OR GREATER THAN HALF THE CLEAR SPAN OF THE OPENING AND IF THERE ARE NO CONCENTRATED LOAD DIRECTLY ABOVE THE LINTEL.
3. CONCRETE FILL FOR LINTELS TO HAVE MINIMUM 20 MPa COMPRESSIVE STRENGTH AT 28 DAYS.
4. WHERE LINTELS ABUT CONCRETE COLUMNS OR CONCRETE WALLS, PROVIDE SEAT ANGLE AS SHOWN BELOW. WHERE LINTELS ABUT STEEL COLUMNS, WELD SEAT ANGLE TO THE COLUMN.
5. USE FOR LOAD BEARING 190 WALLS UP TO 1200mm.

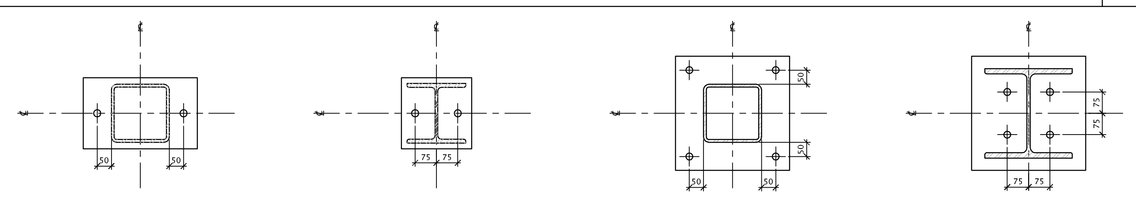


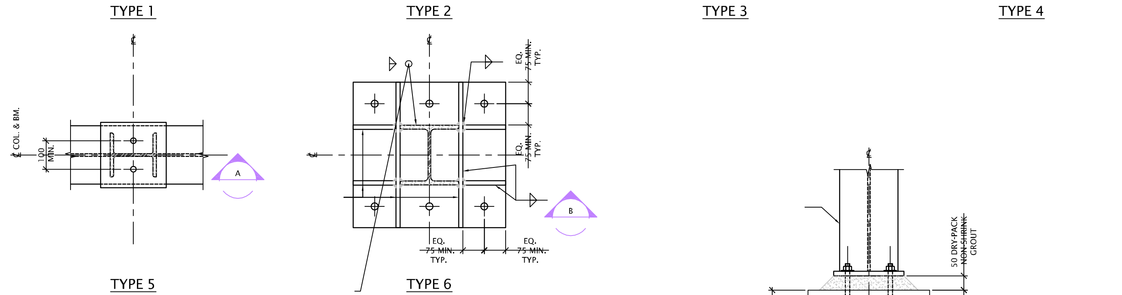
SEAT DETAIL FOR LINTELS GRATER THAN 150 WIDE

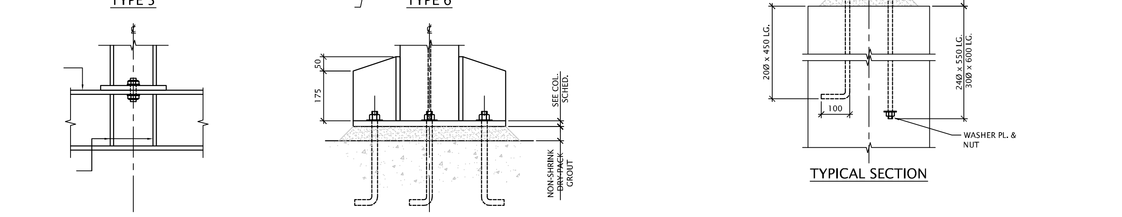


SEAT ANGLE DETAIL FOR LINTELS UP TO 150 WIDE

TYPICAL BASE PLATE DETAILS — TDS-21

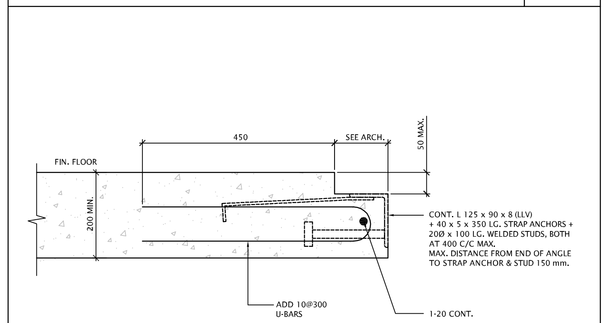




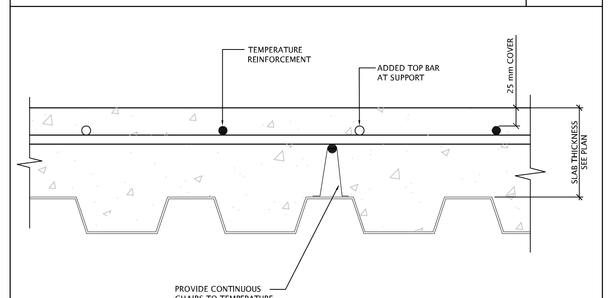


TYPICAL SECTION

ANCHORAGE FOR STEEL STAIR — TDS-18



CONCRETE SLAB ON STEEL DECK — TDS-10



NOTES:

1. PROVIDE 10 REINFORCEMENT FOR SLAB THICKNESS UP TO 100 mm. PROVIDE 15 REINFORCEMENT FOR SLAB THICKNESS OVER 100 mm.
2. TOP CONTINUOUS BARS @ 300 WITH MINIMUM 450 LAP AT MIDSPAN AS REQUIRED AND TOP BARS @ WITH LENGTH OF 1/3 OF CENTRE TO CENTRE DISTANCE BETWEEN SUPPORTS, PLACE ON CENTRELINE OF SUPPORT AND ALTERNATE WITH CONTINUOUS TOP BARS.
3. AT DISCONTINUOUS END OF SLABS, AT OPENINGS, AT EXPANSION JOINTS, ETC., ADD 800 LONG ——— TOP BARS @ 300.
4. TOP TEMPERATURE BARS @ 400 (MINIMUM 450 LAP).
5. AT OPENINGS, PROVIDE 800 LONG ——— TOP BARS @ 400 PERPENDICULAR TO THE SPAN.
6. OVER SUPPORTS PARALLEL TO THE SPAN OF THE DECK, ADD 1800 LONG TOP BARS @ 400 CENTRED AT SUPPORTS.
7. LIVE LOADS FOR STEEL DECK FORM TO BE WEIGHT OF WET CONCRETE PLUS 1.0 kPa CONSTRUCTION ALLOWANCE.
8. CONSTRUCTION JOINTS TO BE LOCATED ON CENTRELINE OF SUPPORTS.

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KEY PLAN

LICENSED PROFESSIONAL ENGINEER
H. SAFFARINI
100128946
May 22, 15
PROVINCE OF ONTARIO

No.	Date	Revision	By/Par.
0	29 05 2015	ISSUED FOR TENDER	

Date Printed 15 MAY 2015 — Date imprimée

- Verify all dimensions and site conditions and be responsible for same
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A Detail no. No. du détail
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project / projet
NRC CABIN COMFORT + ENVIRONMENTAL RESEARCH FACILITY
MONTREAL ROAD CAMPUS

drawing / dessin
TYPICAL DETAILS 3

designed / conçu	G. ALEXANDER	date	MAY 2015
drawn / dessiné	V. JANUSZKO	scale / échelle	NTS
checked / vérifié	H. SAFFARINI	sheet / feuille	4 of/de 8
approved / approuvé		W.O.no.	D.T.no.

dwg.no. / dessin no.
3788-S03

ASPM A0 (1189x841)

C

0 10 20mm 40 60 80 100 120 140 160 180 200mm

METHODOLOGY FOR TRENCHING AND REINSTATING EXISTING BASE SLAB WHERE PIPES ARE EMBEDDED.

a. SCAN THE SLAB FOR EXISTING REINFORCING AND ROUTE THE PIPE.
b. CHIP OUT THE CONCRETE TO A DEPTH LESS THAN 300MM ALONG THE PIPE ROUTE LEAVING THE REINFORCEMENT IN PLACE.
c. INSTALL THE PIPE AND AVOID CUTTING EXISTING REINFORCING AS MUCH AS POSSIBLE.
d. AT LOCATION WHERE REINFORCEMENT IS CUT DRILL AND EPOXY GROUT DOWEL BARS IN TO EXISTING CONCRETE ON BOTH SIDES OF TRENCH AND SPLICE THE BARS.
e. REINSTATE THE CHIPPED CONCRETE WITH NON-SHRINK CONCRETE.

NOTE:
EXISTING SURFACE PREPARATION:
FOLLOW SELF-LEVELLING UNDERLAYMENT MANUFACTURER'S INSTRUCTIONS. REFER TO SPEC.

3/S04 FOUNDATION PLAN
SCALE = 1:100

A/S04 DETAIL
SCALE = 1:10

3/S04 MAIN LEVEL FLOOR PLAN
SCALE = 1:100

3/S04 ROOF PLAN
SCALE = 1:100

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May 27, 15
PROVINCE OF ONTARIO

No.	Date	Revision	By/Par.
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Date Printed 15 MAY 2015 — Date imprimée

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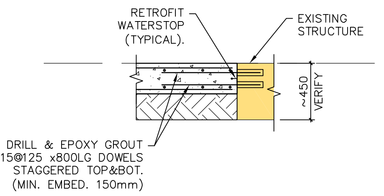
MONTREAL ROAD CAMPUS

drawing / dessin
ROOF PLAN
MAIN LEVEL PLAN
LOWER LEVEL PLAN

designed / conçu	date / date
G. ALEXANDER	MAY 2015
drawn / dessiné	scale / échelle
V. JANUSZKO	1:100
checked / vérifié	sheet / feuille
H. SAFFARINI	5 of/de 8
approved / approuvé	W.O.no. / D.T.no.

dwg.no. / dessin no.
3788-S04

ASPM A0 (1189x841)



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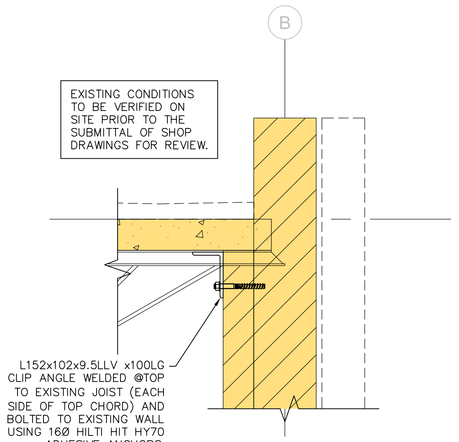

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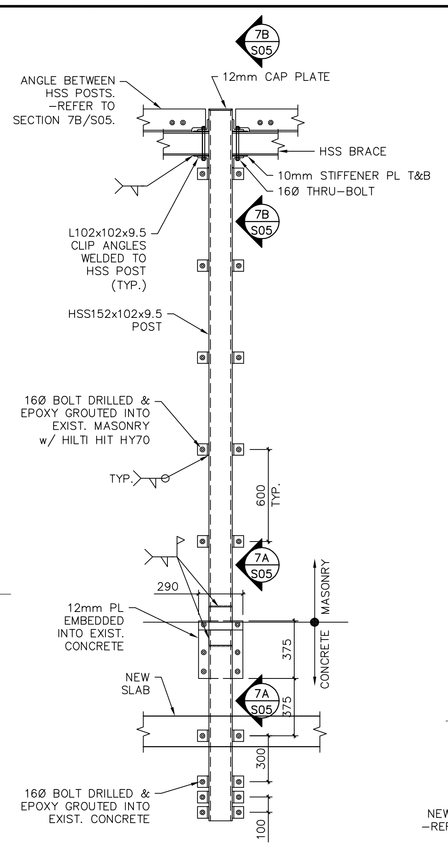
BETWEEN GRIDS 1 AND 7



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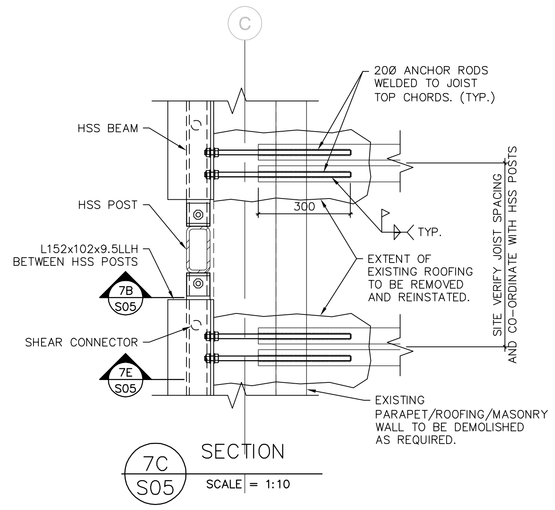

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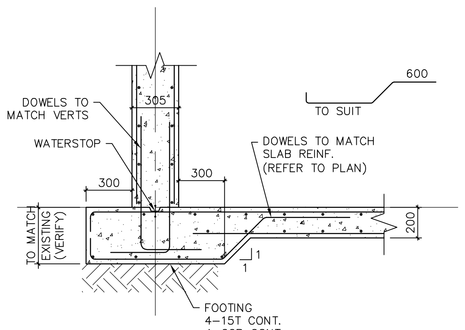

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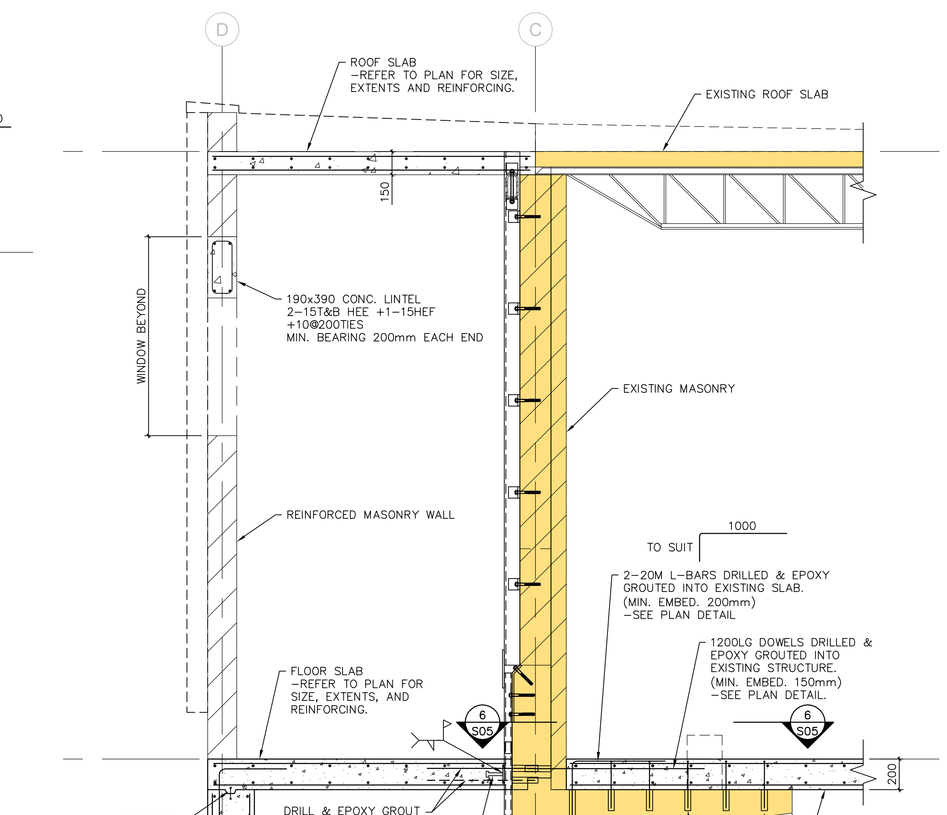

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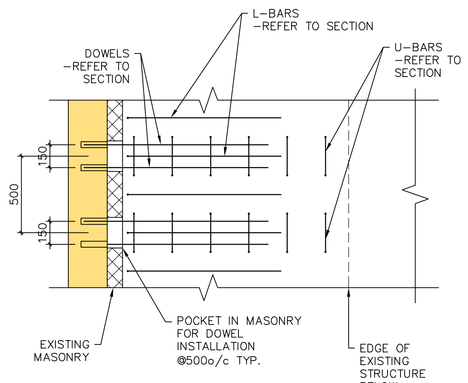
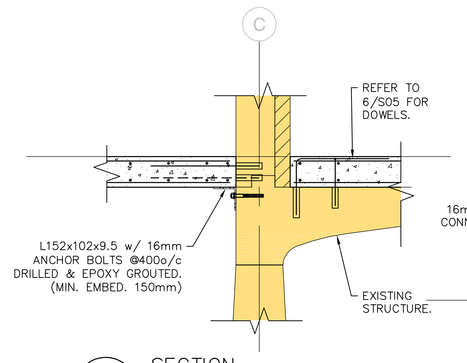


TYP. DETAIL AT NEW SLAB/ EXIST. WALL BOTH SIDES
6 S05 SCALE = 1:20



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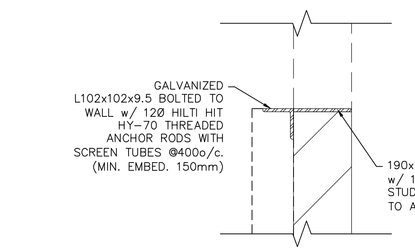

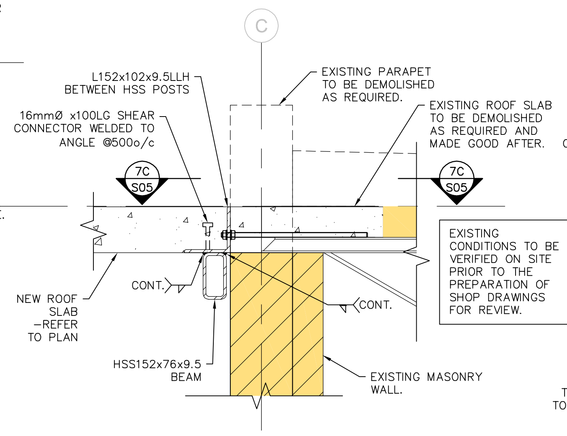

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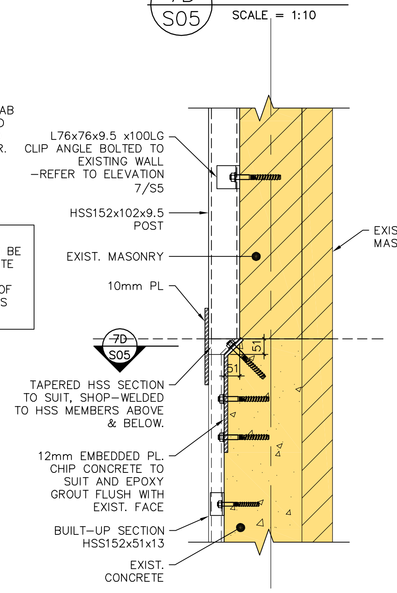

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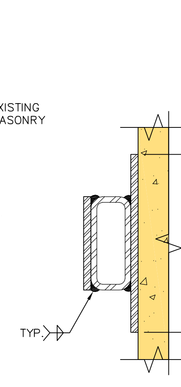

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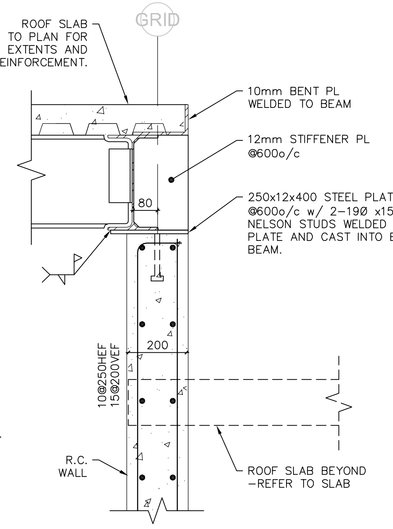
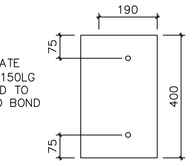
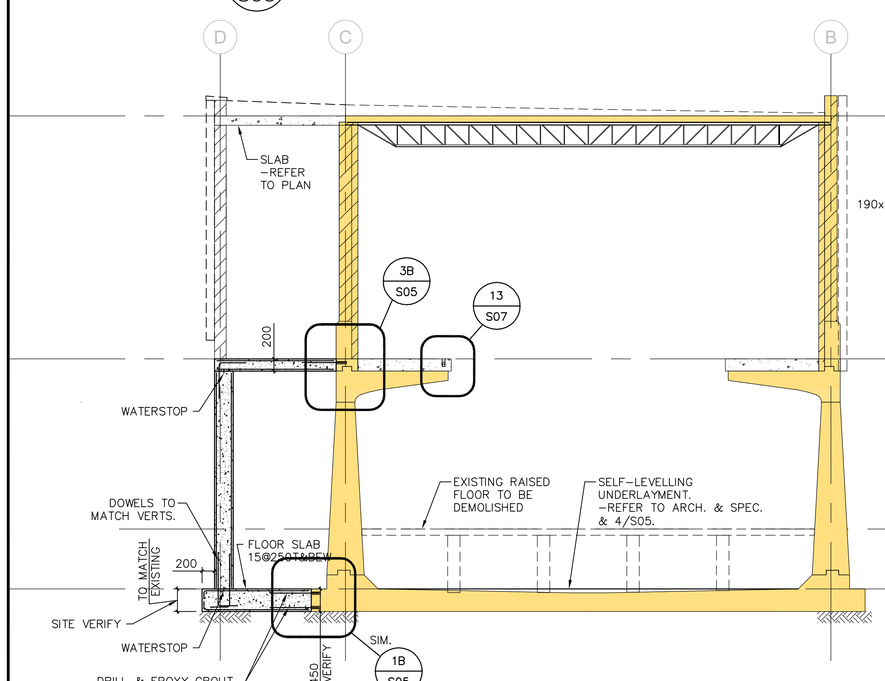




5 S05 SECTION
SCALE = 1:10

7C S05 SECTION
SCALE = 1:10



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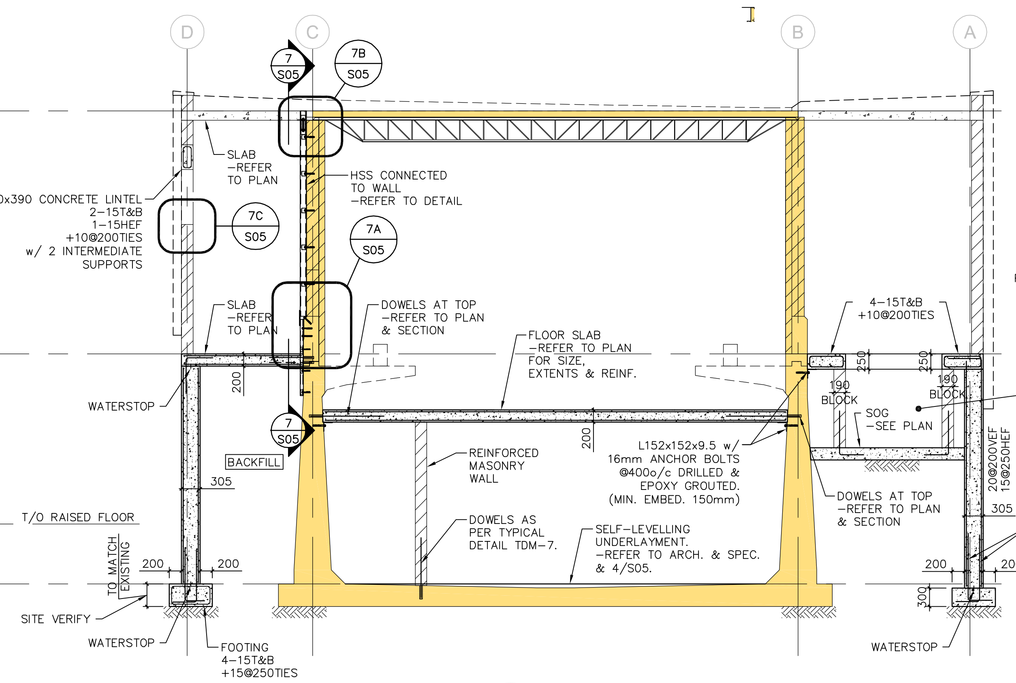

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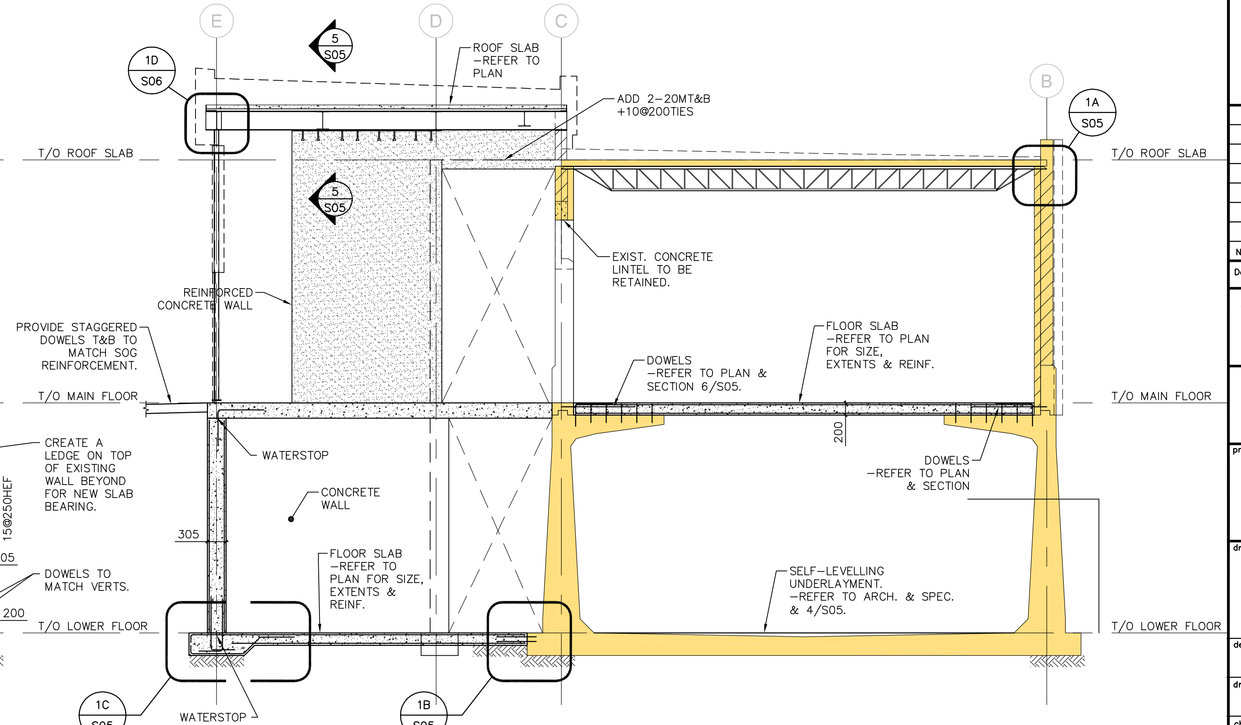

1 S05 SECTION
SCALE = 1:50

ASPM A0 (1189x841)

0 10 20mm 40 60 80 100 120 140 160 180 200mm

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KEY PLAN

LICENSED PROFESSIONAL ENGINEER H. SAFFARINI 100128946 May 22, 15 PROVINCE OF ONTARIO

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Date Printed 15 MAY 2015 | Date imprimée

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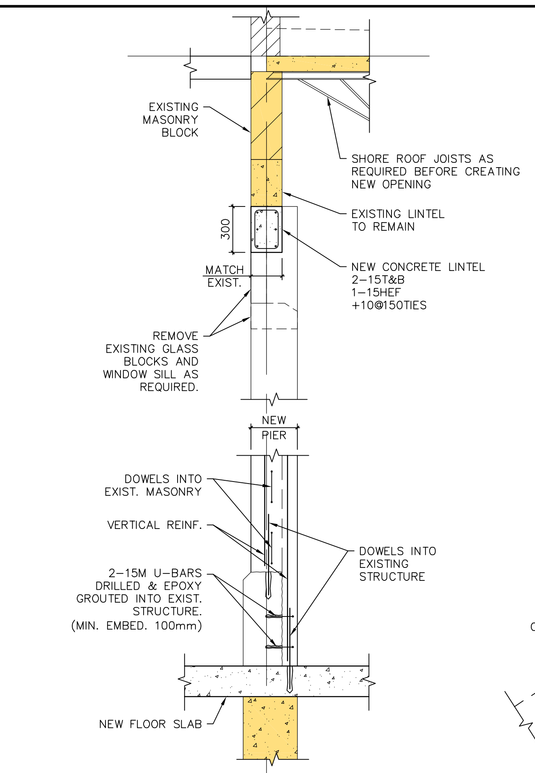
NRC CABIN COMFORT + ENVIRONMENTAL RESEARCH FACILITY

MONTREAL ROAD CAMPUS

drawing / dessin
SECTIONS & DETAILS 1

designed / conçu	date / date
G. ALEXANDER	MAY 2015
drawn / dessiné	scale / échelle
V. JANUSZKO	AS NOTED
checked / vérifié	sheet / feuille
H. SAFFARINI	6 of/de 8
approved / approuvé	W.O.no. / D.T.no.

dwg.no. / dessin no.
3788-S05



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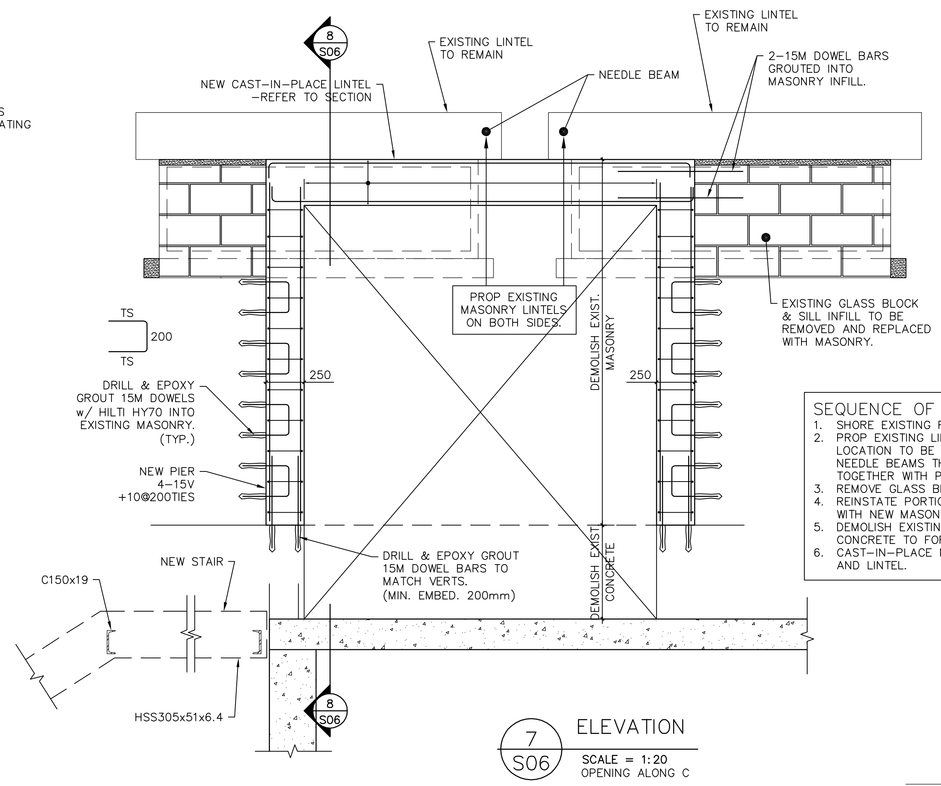
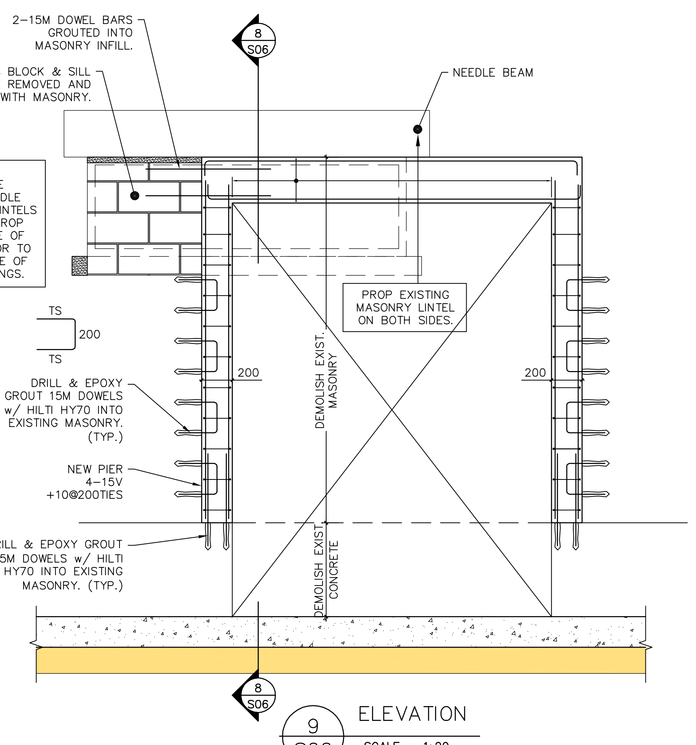


7 S06 ELEVATION
SCALE = 1:20
OPENING ALONG C

NOTE:
FOR ALL EXISTING LINTELS WHERE PROPPING IS REQUIRED, USE NEEDLE BEAMS THROUGH THE EXISTING LINTELS AT THE LINTEL SUPPORTS AND PROP THE NEEDLE BEAM ON EACH SIDE OF THE EXISTING LINTEL. CONTRACTOR TO SUBMIT PROPOSAL FOR SEQUENCE OF CONSTRUCTION AND SHOP DRAWINGS.

SEQUENCE OF CONSTRUCTION:
1. SHORE EXISTING ROOF JOISTS.
2. PROP EXISTING LINTELS AT BEARING LOCATION TO BE DEMOLISHED USING NEEDLE BEAMS THROUGH LINTEL TOGETHER WITH PROPS ON EITHER SIDE.
3. REMOVE GLASS BLOCKS.
4. REINSTATE PORTION OF GLASS BLOCK WITH NEW MASONRY.
5. DEMOLISH EXISTING MASONRY AND CONCRETE TO FORM NEW OPENING.
6. CAST-IN-PLACE NEW CONCRETE JAMBS AND LINTEL.



9 S06 ELEVATION
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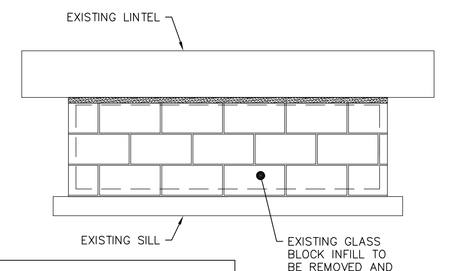
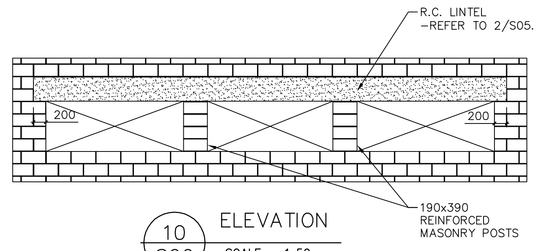
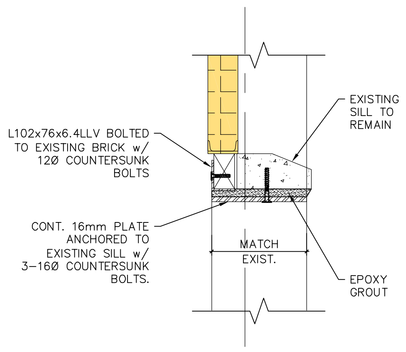


NOTE:
REMOVE EXISTING GLASS BLOCKS AND WINDOW SILL IF REQUIRED AND CLOSE THE OPENING WITH MASONRY. REMOVE ADJACENT MASONRY AS REQUIRED TO FORM KEYS.

4 S06 TYP. WINDOW CLOSURE DETAIL
SCALE = 1:20

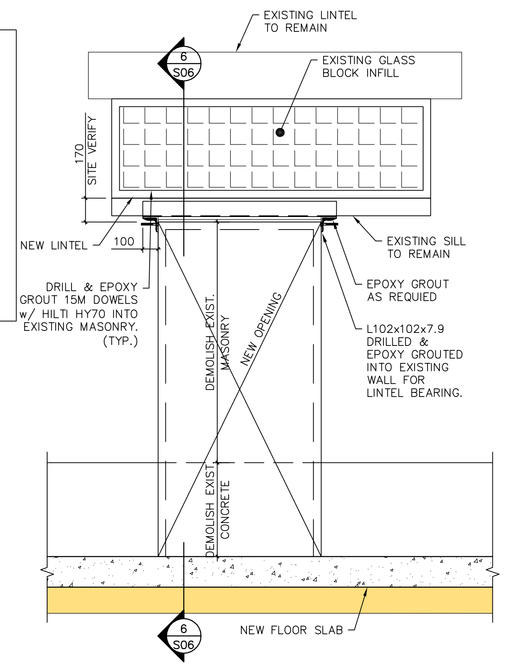


10 S06 ELEVATION
SCALE = 1:50

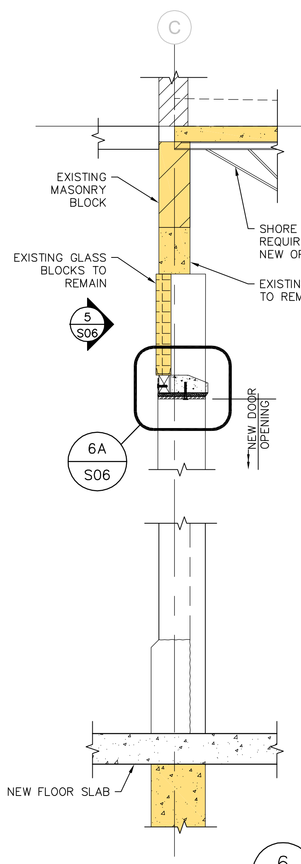


6A S06 SECTION
SCALE = 1:10

SEQUENCE OF CONSTRUCTION (5/S06)
1. CAREFULLY REMOVE THE EXISTING PARGING TO EXPOSE THE GLASS BLOCK SUPPORTS.
2. CREATE GROOVE BETWEEN THE BRICK SUPPORT AND MASONRY TO FACILITATE INSTALLATION OF NEW ANGLE AND INSTALL THE NEW HORIZONTAL ANGLE.
3. CUT THE CENTER THIRD PART OF NEW OPENING FOR THE WIDTH OF NEW LINTEL PLATE.
4. INSTALL THE NEW LINTEL PLATE NORMAL TO THE NEW WALL OPENING AND PROP THE LINTEL PLATE ALIGNING THE CENTER OF OPENING AND CENTER OF LINTEL PLATE WITH THE PROP.
5. CUT THE MASONRY ON BOTH SIDES OF PROP TO FORM THE FULL NEW OPENING.
6. INSTALL ANGLES AT NEW LINTEL BEARING LOCATIONS.
7. INSTALL NEW LINTEL PLATE IN ITS FINAL POSITION BY ROTATING AND WELDING LINTEL PLATE TO THE INSTALLED BEARING ANGLES.
8. GROUT OR REINSTATE THE CUT/DAMAGED MASONRY BLOCKS

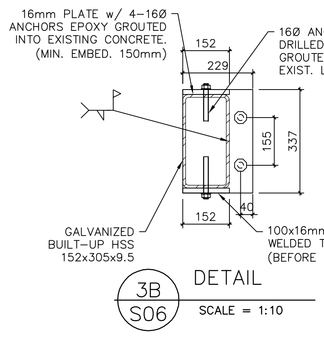


5 S06 TYP. EXIST. OPENING INFILL ABOVE NEW DOOR
SCALE = 1:20

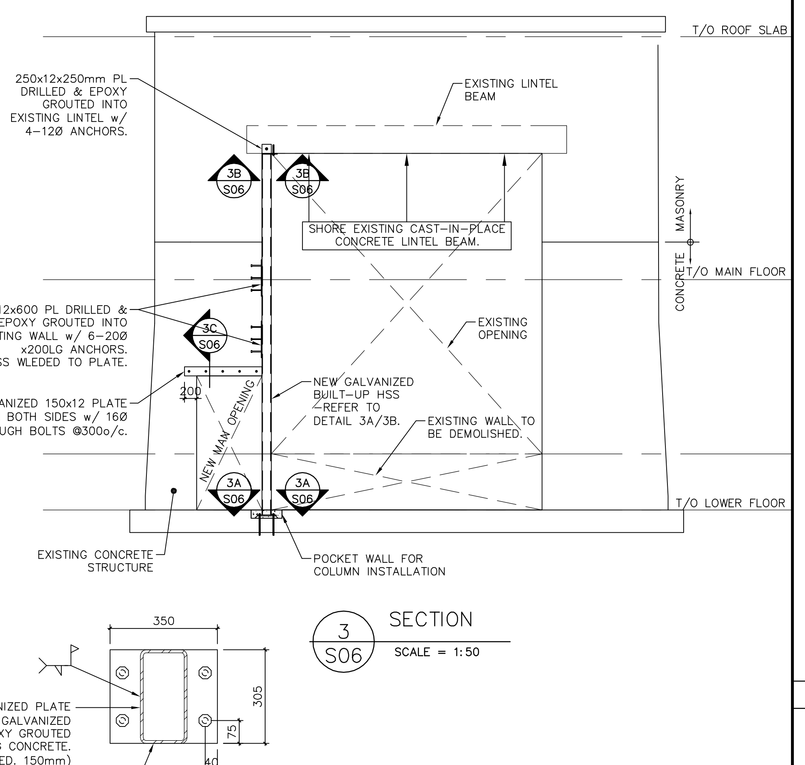


6 S06 SECTION
SCALE = 1:20

SEQUENCE OF CONSTRUCTION (3/S06)
1. CAREFULLY REMOVE EXISTING ROLLING SHUTTER.
2. CUT THE CATWALK SLAB FROM THE WALL AT LOCATION OF NEW STEEL COLUMN.
3. SHORE THE EXISTING OPENING'S LINTEL BEAM.
4. CAREFULLY REMOVE THE VERTICAL STRIP OF CONCRETE/MASONRY TO WIDEN THE EXISTING OPENING ENOUGH FOR NEW COLUMN INSTALLATION.
5. INSTALL PLATES WITH WELDED ANCHORS ON THE CUT FACE OF CONCRETE WALL AS SHOWN.
6. INSTALL THE NEW HSS COLUMN TIGHT AGAINST THE INSTALLED PLATES TO SUPPORT THE LINTEL BEAM.
7. WELD STEEL HSS COLUMN TO THE INSTALLED PLATES.
8. INSTALL NEW REINFORCING PLATES ON BOTH SIDES OF WALL ABOVE THE MAN OPENING.
9. WELD ONE END OF THE PLATE TO THE NEW HSS COLUMN.
10. CUT THE NEW MAN OPENING IN THE EXISTING CONCRETE WALL.
11. WELD THE BOTTOM PLATE TO THE BOTTOM OF THE REINFORCING PLATES.

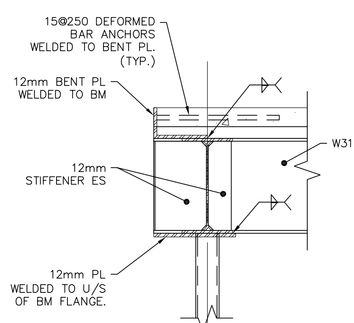


3B S06 DETAIL
SCALE = 1:10



3 S06 SECTION
SCALE = 1:50

3A S06 DETAIL
SCALE = 1:10



1D S06 SECTION
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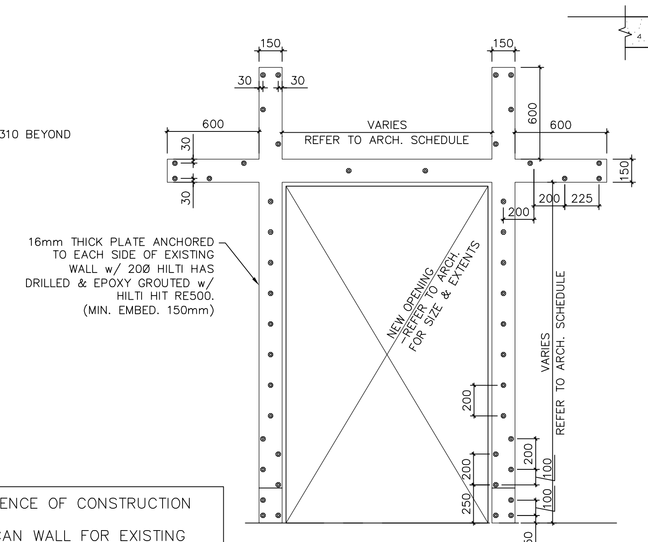
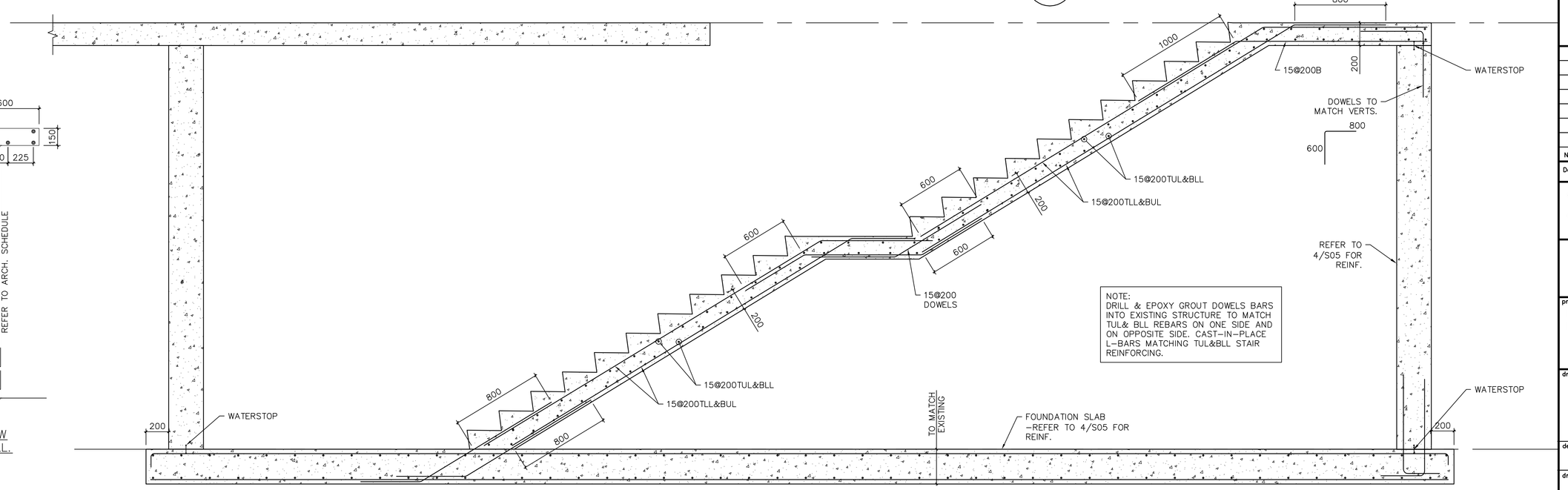


TYPICAL REINFORCING DETAIL AT NEW OPENIGN IN EXISTING CONCRETE WALL.

2 S06 SECTION
SCALE = 1:20

SEQUENCE OF CONSTRUCTION
1. SCAN WALL FOR EXISTING REINFORCING BARS.
2. LOCATE ANCHORS TO AVOID INTERFERING WITH REINFORCING BARS.
3. INSTALL REINFORCING PLATES ON BOTH SIDES OF THE EXISTING WALL.
4. CUT THE REQUIRED WALL OPENING CLEAR OF THE REINFORCING PLATE.



1 S06 SECTION
SCALE = 1:20

C
0 10 20mm 40 60 80 100 120 140 160 180 200mm

ASPM A0 (1189x841)

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- MAKE GOOD ALL SURFACES AFFECTED BY THIS WORK.
- COORDINATE ALL SHUTDOWNS WITH THE DEPARTMENTAL REPRESENTATIVE.
- PROVIDE ALL LABOUR AND MATERIAL REQUIRED TO FORM A COMPLETE, FUNCTIONAL SYSTEM AS DESCRIBED ON DRAWINGS.

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KEY PLAN

LICENSED PROFESSIONAL ENGINEER
H. SAFFARINI
100128946
May 22, 15
PROVINCE OF ONTARIO

No.	Date	Revision	By/Par.
0	29 05 2015	ISSUED FOR TENDER	

Date Printed 15 MAY 2015 — Date imprimée

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

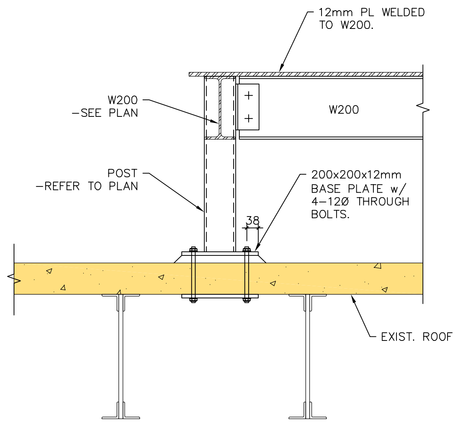
A Detail no. No. du détail
B Location drawing no. sur dessin no.
C Drawing no. dessin no.

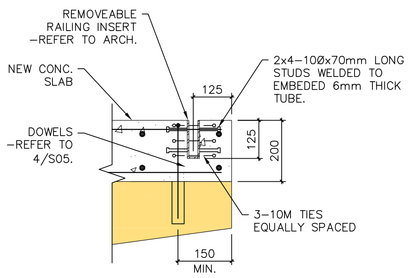
project / projet
NRC CABIN COMFORT + ENVIRONMENTAL RESEARCH FACILITY
MONTREAL ROAD CAMPUS

drawing / dessin
SECTIONS & DETAILS 2

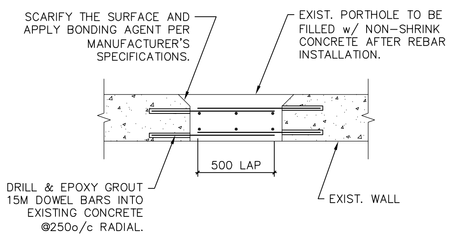
designed / conçu	date / date
G. ALEXANDER	MAY 2015
drawn / dessiné	scale / échelle
V. JANUSZKO	AS NOTED
checked / vérifié	sheet / feuille
H. SAFFARINI	7 of/de 8
approved / approuvé	W.O.no. / D.T.no.

dwg.no. / dessin no.
3788-S06

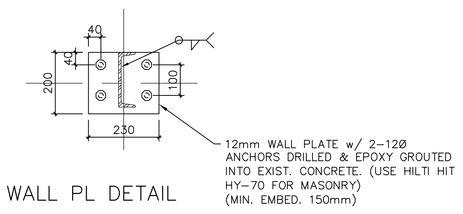




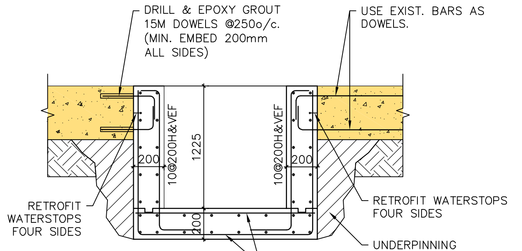
13 S07 SECTION
SCALE = 1:10



16 S07 PORTHOLE INFILL
SCALE = 1:20



A S07 WALL PL DETAIL
SCALE = 1:10



15 S07 SUMP PIT SECTION
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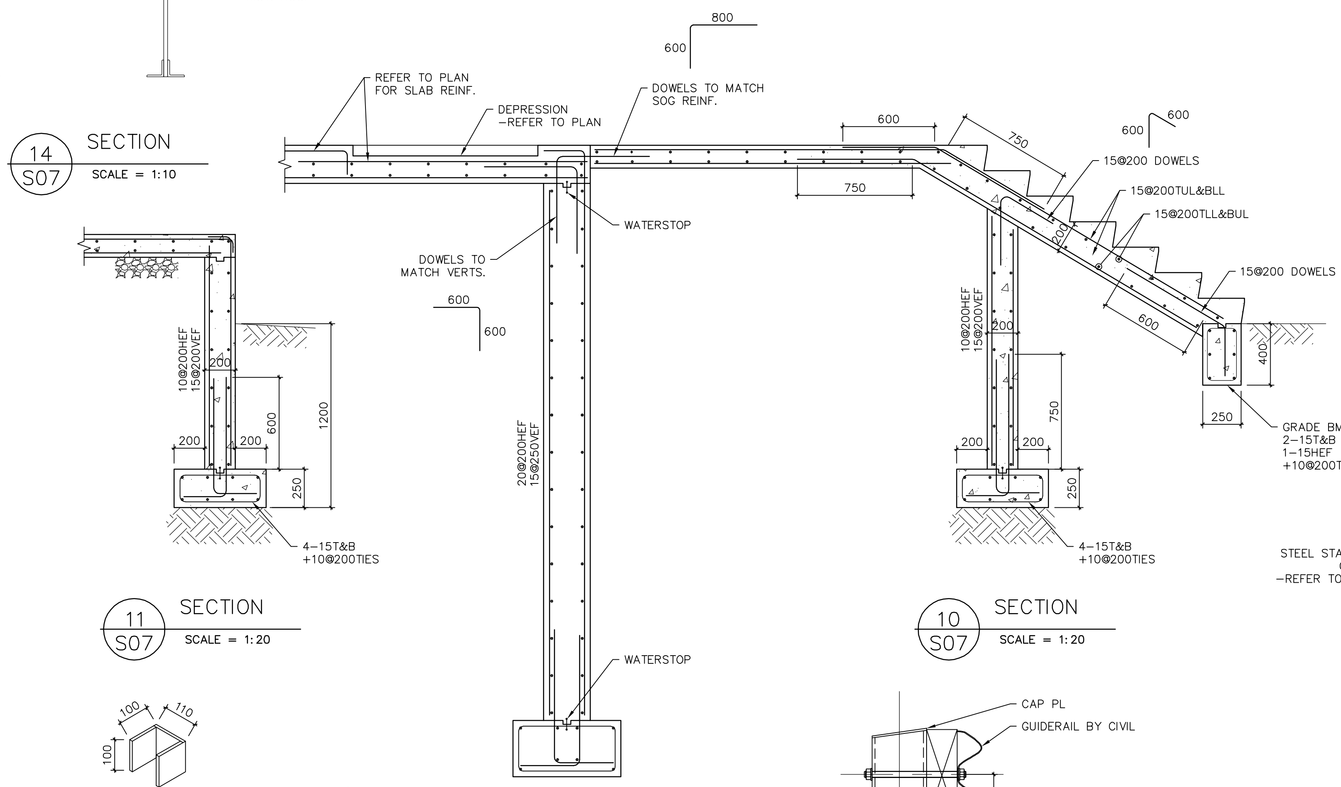

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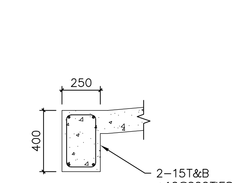
SCALE = 1:10

11 S07 SECTION
SCALE = 1:20



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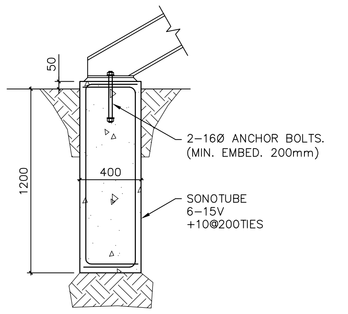
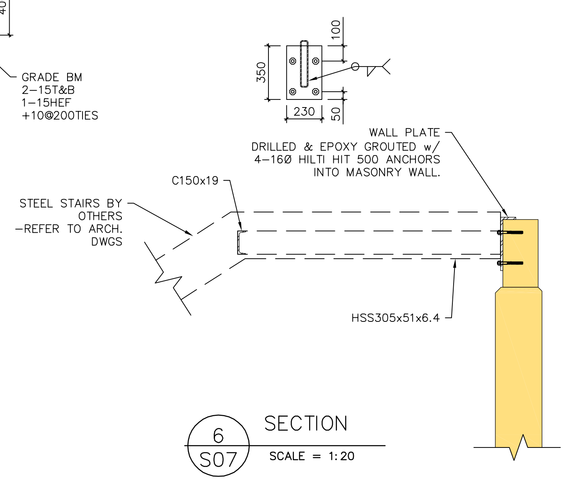
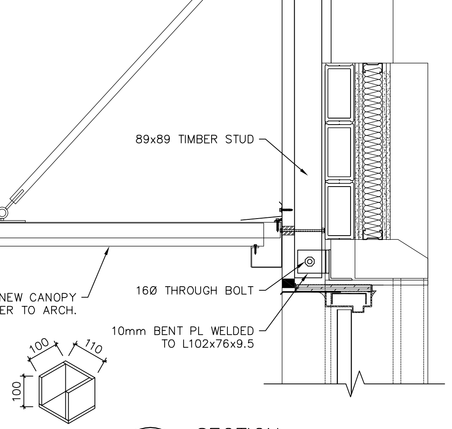


7 S07 TYP. EXTERIOR STEEL STAIR SUPPORT
SCALE = 1:20



6 S07 SECTION
SCALE = 1:20

5 S07 SECTION
SCALE = 1:20



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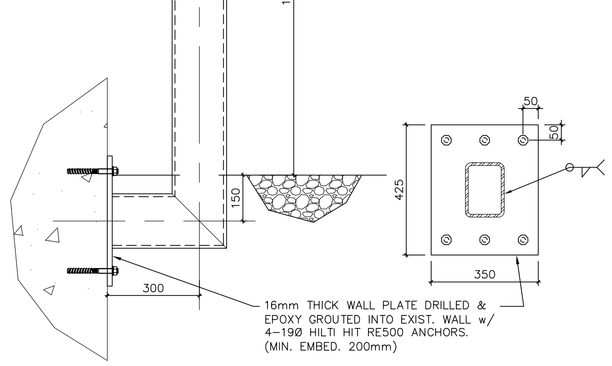
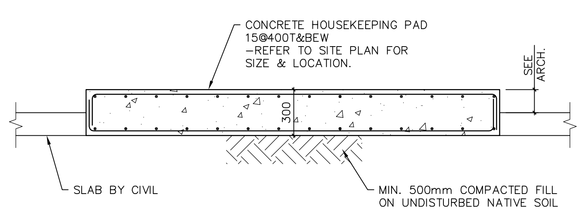


17 S07 GUIDERAIL DETAIL
SCALE = 1:10



4 S07 HOUSEKEEPING PAD SECTION
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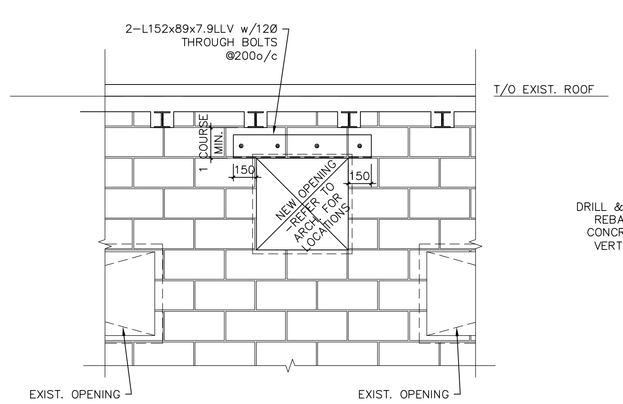
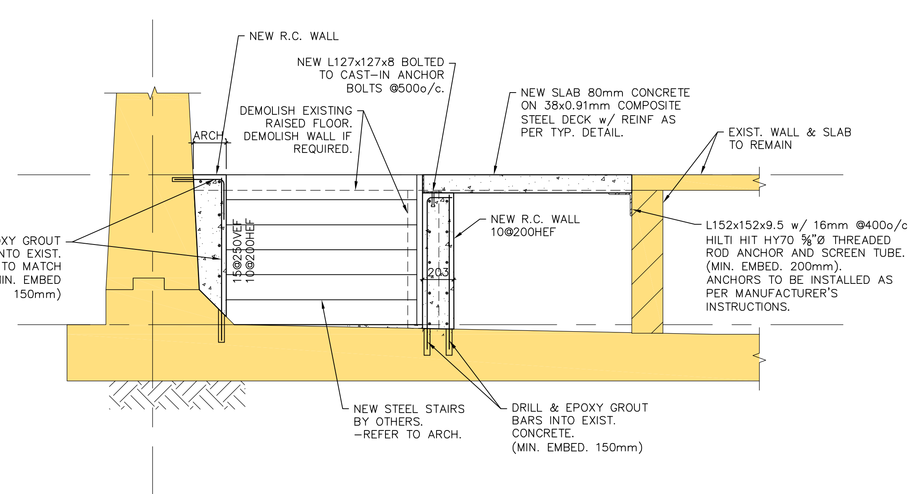


3 S07 ELEVATION AT LOUVRES
SCALE = 1:20

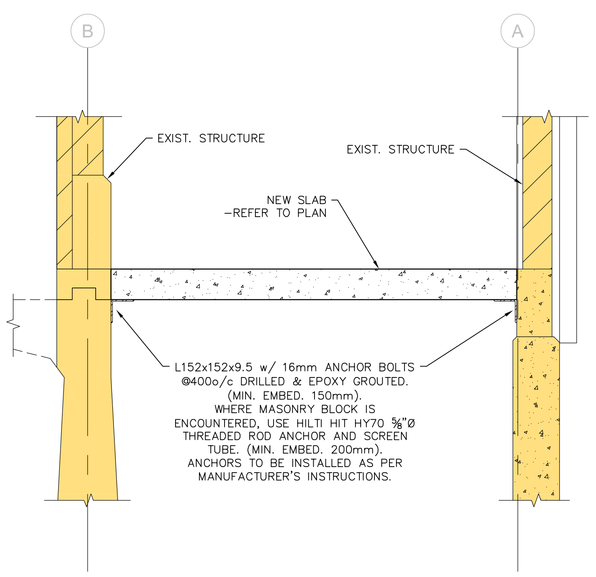
SEQUENCE OF CONSTRUCTION

1. CREATE GROOVE BETWEEN CONCRETE BLOCKS AT LOCATION OF NEW LOUVRE OPENING ON BOTH SIDES OF WALL.
2. INSERT L152x89x7.9LLV, ON EITHER SIDE OF WALL INTO THE GROOVE.
3. INSTALL THROUGH BOLTS @200o/c
4. CUT OPENING IN MASONRY WITHOUT DISTURBING NEW LINTEL.



2 S07 SECTION
SCALE = 1:20

SITE VERIFY LOCATION OF EXISTING WALL AND REPLACE WALL AND SLAB ONLY IF NECESSARY.



1 S07 SECTION
SCALE = 1:20

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KEY PLAN

LICENSED PROFESSIONAL ENGINEER H. SAFFARINI 100128946 May 27, 15 PROVINCE OF ONTARIO

No.	Date	Revision	By/Par
0	29 05 2015	ISSUED FOR TENDER	

Date Printed 15 MAY 2015 — Date imprimée

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NRC CABIN COMFORT + ENVIRONMENTAL RESEARCH FACILITY
MONTREAL ROAD CAMPUS

drawing / dessin
SECTIONS & DETAILS 3

designed / conçu	G. ALEXANDER	date / date	MAY 2015
drawn / dessiné	V. JANUSZKO	scale / échelle	AS NOTED
checked / vérifié	H. SAFFARINI	sheet / of/de	8 / 8
approved / approuvé		W.O.no.	D.T.no.

dwg.no. / dessin no.
3788-S07

ASPM A0 (1189x841)

C
0 10 20mm 40 60 80 100 120 140 160 180 200mm

ABBREVIATIONS

PLUMBING/ FIRE PROTECTION

DESIGNATION	SERVICE
B	BATH
BD	BIDET
BFP	BACKFLOW PREVENTER
BMS	BUILDING MANAGEMENT SYSTEM
BOP	BOTTOM OF PIPE
CB	CATCH BASIN
CO	CLEAN OUT
CS	CUP SINK
CTE	CONNECT TO EXISTING
C/W	COMPLETE WITH
DCW	DOMESTIC COLD WATER
DHW	DOMESTIC HOT WATER
DHWR	DOMESTIC HOT WATER RECIRCULATION
DF	DRINKING FOUNTAIN
DN	DOWN
DPAV	DRY PIPE ALARM VALVE
DTW	DOMESTIC TEMPERED WATER
ELEV.	ELEVATION
ESH	EMERGENCY SHOWER
EEW	EMERGENCY EYE WASH
FA	FROM ABOVE
FB	FROM BELOW
FD	FLOOR DRAIN
FFD	FUNNEL FLOOR DRAIN
FS	WATER FLOW SWITCH
FE	FIRE EXTINGUISHER
HB	HOSE BIBB
HD	HUB DRAIN
INV.	INVERT
JS	JANITOR SINK
L	LAVATORY
LS	LABORATORY SINK
MH	MAINTENANCE HOLE
MS	MOP SINK
NFWH	NON FREEZE WALL HYDRANT
NIC	NOT IN CONTRACT
NPW	NON POTABLE WATER
PIV	POST INDICATOR VALVE
RD	ROOF DRAIN
RWL	RAIN WATER LEADER
S	SINK
SV	SUPERVISED VALVE
SFCV	SPRINKLER FLOOR CONTROL VALVE
SH	SHOWER
SS	SERVICE SINK
SST	SOIL STACK
STV	STACK VENT
TA	TO ABOVE
TB	TO BELOW
THB	THRUST BLOCK
T.O.P.	TOP OF PIPE
U	URINAL
U/C	UNDER CUT
V	VENT PIPE
VPTR	VENT PIPE THROUGH ROOF
VST	VENT STACK

ABBREVIATIONS

DESIGNATION	SERVICE
WC	WATER CLOSET
WM	WATER METER
WST	WASTE STACK
WFS	WATER FLOW SWITCH
WPAV	WET PIPE ALARM VALVE

HEATING

BBH	BASEBOARD HEATER
CBV	CIRCUIT BALANCING VALVE
CH	CABINET HEATER
COND.	CONDENSATE
FC	FAN COIL UNIT
HC	HEATING COIL
HWR	HEATING WATER RETURN
HWS	HEATING WATER SUPPLY
P	PUMP
PH	PREHEAT COIL
PRV	PRESSURE REDUCING VALVE
UH	UNIT HEATER
VB	VACUUM BREAKER
WF	WALL FIN
WH	WATER HEATER

ABBREVIATIONS

DESIGNATION	SERVICE

AIR CONDITIONING

AC	AIR CONDITIONING UNIT
AD	ACCESS DOOR
AH	AIR HANDLING UNIT
AP	ACCESS PANEL
BD	BALANCING DAMPER
BDD	BACK DRAFT DAMPER
CC	COOLING COIL
DG	DOOR GRILLE
EA	EXHAUST AIR
EF	EXHAUST AIR FAN
EG	EXHAUST AIR GRILLE
ER	EXHAUST AIR REGISTER
FMS	AIR FLOW MEASURING STATION
FSD	FIRE & SMOKE DAMPER
FD	FIRE DAMPER
FSF	FIRE STOP FLAP
GC	GLYCOL COIL
MAU	MAKEUP AIR UNIT
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
RA	RETURN AIR
RF	RETURN AIR FAN
RG	RETURN AIR GRILLE
RH	REHEAT COIL
RR	RETURN AIR REGISTER
SA	SUPPLY AIR
SD	SPLITTER DAMPER
SF	SUPPLY AIR FAN
SMD	SMOKE DAMPER
SR	SUPPLY AIR REGISTER
VAV	VARIABLE VOLUME BOX
VD	VOLUME DAMPER
WMS	WIREMESH SCREEN

CONTROLS

AI	ANALOG INPUT
AO	ANALOG OUTPUT
BI	BINARY INPUT
BO	BINARY OUTPUT

PLUMBING LEGEND

DESIGNATION	SERVICE
CA	COMPRESSED AIR
	DOMESTIC COLD WATER
	DOMESTIC HOT WATER
	DOMESTIC HOT WATER RECIRCULATION
D	DRAIN
PD	PUMPED DRAIN
SAN	SANITARY ABOVE GRADE OR FLOOR
SAN	SANITARY BELOW GRADE OR FLOOR
ST	STORM ABOVE GRADE OR FLOOR
ST	STORM BELOW GRADE OR FLOOR
V	VENT
VAC	VACUUM
WV	WET VACUUM LINE

HYDRONIC LEGEND

DESIGNATION	SERVICE
BHSS	BUILDING HEATING SYSTEM SUPPLY
BHSR	BUILDING HEATING SYSTEM RETURN
BCSS	BUILDING COOLING SYSTEM SUPPLY
BCSR	BUILDING COOLING SYSTEM RETURN
C	CONDENSATE
C###	CONDENSATE PRESSURE ###kPa
CS	CONDENSER WATER SUPPLY
CR	CONDENSER WATER RETURN
	DIRECTION OF WATER FLOW
HPS	HIGH PRESSURE STEAM
LPS	LOW PRESSURE STEAM
LPC	LOW PRESSURE CONDENSATE
PCSS	PROCESS COOLING SYSTEM SUPPLY
PCSR	PROCESS COOLING SYSTEM RETURN
PC	PUMPED CONDENSATE
S	STEAM
S###	STEAM PRESSURE ###kPa
RS	REFRIGERATION SUCTION
RL	REFRIGERATION LIQUID
RHG	REFRIGERATION HOT GAS

SYMBOLS

DESIGNATION	SERVICE
	2-WAY CONTROL VALVE
	3-WAY CONTROL VALVE
	ANCHOR POINT
AAV	AUTOMATIC AIR VENT
BWV	BACK WATER VALVE (FOR SEWAGE)
	BALL VALVE
FT	FLOAT AND THERMOSTATIC STEAM TRAP
	INVERTED BUCKET TYPE STEAM TRAP
	BUTTERFLY VALVE
	BUTTERFLY VALVE
CBV	CIRCUIT BALANCING VALVE
	CHECK VALVE
	CONCENTRIC FITTING
	ECCENTRIC FITTING
	ELECTRIC VALVE OR DAMPER ACTUATOR
	EXPANSION JOINT
	FLOAT LEVEL CONTROL VALVE
O FD	FLOOR DRAIN
	F & T TYPE STEAM TRAP
	FLOAT LEVEL SWITCH
	GATE VALVE
	GLOBE VALVE
	LOCKSHIELD VALVE
	OS&Y VALVE
	PLUG VALVE
	PRESSURE REDUCING VALVE
PG	PRESSURE GAUGE WITH GAUGE COCK
	PIPE DN
	PIPE UP
	PIPE SLEEVED THROUGH BEAM
	RELIEF VALVE
O.R.D. O.R.C.	ROOF DRAIN OR PLUMBING FIXTURE ON LEVEL ABOVE
	SOLENOID VALVE
	STRAINER
	THERMOMETER
	UNION
VB	VACUUM BREAKER
	VALVE ACTUATOR (PNEUMATIC OR ELECTRIC)
	STEAM MOISTURE SEPARATOR

SYMBOLS

DESIGNATION	SERVICE
A	AIR SAMPLING SENSOR
	BALL DRIP
BFP	BACKFLOW PREVENTOR (REDUCED PRESSURE TYPE)
COTO	CLEANOUT TURNED UP THROUGH FLOOR
COCO	CLEANOUT ABOVE GRADE OR FLOOR
CTR	CONTROL TRANSFORMER AND LOW V WIRE
	EQUIPMENT SWITCH
H	HUMIDISTAT OR HUMIDITY SENSOR
HB	HOSE BIBB
	HOSE END DRAIN VALVE
	EXPANSION JOINT
P	PRESSURE SWITCH
FE	PORTABLE FIRE EXTINGUISHER
	PUMP
	UNIT HEATER HORIZONTAL
	UNIT HEATER DOWNBLAST
	PIPE GUIDE
	PIPE ANCHOR
	RETURN OR EXHAUST DUCT UP
	RETURN OR EXHAUST DUCT DN
	SUPPLY DUCT UP
	SUPPLY DUCT DN
T	THERMOSTAT ON INSULATION
T	THERMOSTAT OR TEMPERATURE SENSOR
TC	TEST COCK
FS	WATER FLOW SWITCH
	WET VACUUM OUTLET

SYMBOLS

DESIGNATION	SERVICE
	ACOUSTICAL DUCT LINING
	APPARATUS HUNG FROM STRUCTURE ABOVE
BDD	BACKDRAFT DAMPER
BD	BALANCING DAMPER
BT	BUBBLE TIGHT DUCT
CV	CONSTANT VOLUME BOX
	DIFFUSER/REGISTER TYPE
	NECK SIZE
	AIRFLOW
CAP	DUCT CAPPED CONNECTION
	DUCT SILENCER
D	DROP IN DUCT
E	EQUIPMENT TAG (REFER TO SCHEDULES)
	EQUIPMENT NUMBER
	FAN
	FAN POWERED VAV BOX C/W SILENCER
FD	FIRE DAMPER
	FLEXIBLE DUCT CONNECTION
	FLEXIBLE PIPE/DUCT
H C	HEATING OR COOLING COIL
	MOTORIZED OPPOSED BLADE CONTROL DAMPER
	BUBBLE TIGHT DAMPER
	OPEN ENDED DUCT WITH WIRE MESH SCREEN
	POINT TYPE
	CONTROLLED PARAMETER
	RADIATION OR WALL-FIN HEATER TYPE
	HEATER LENGTH
	HEATING CAPACITY
R	RISE IN DUCT
	RETURN OR EXHAUST AIR GRILLE OR REGISTER
	SUPPLY AIR LINEAR SLOT PLENUM AND DIFFUSER
	SUPPLY AIR DIFFUSERS
	TURNING VANES
VD	VOLUME DAMPER
	VAV BOX C/W SILENCER
	VAV BYPASS
	VAV BOX
	WALL PROPELLER FAN
	DUCT SPOOL PIECE

DEMOLITION LEGEND

DESIGNATION	SERVICE
	REMOVE EXISTING PIPE
	REMOVE EQUIPMENT
	REMOVE EXISTING DUCT
	REMOVE EXIST. GRILLE/DIFFUSER

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dwg.no. / dessin no.
3788-M01

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C

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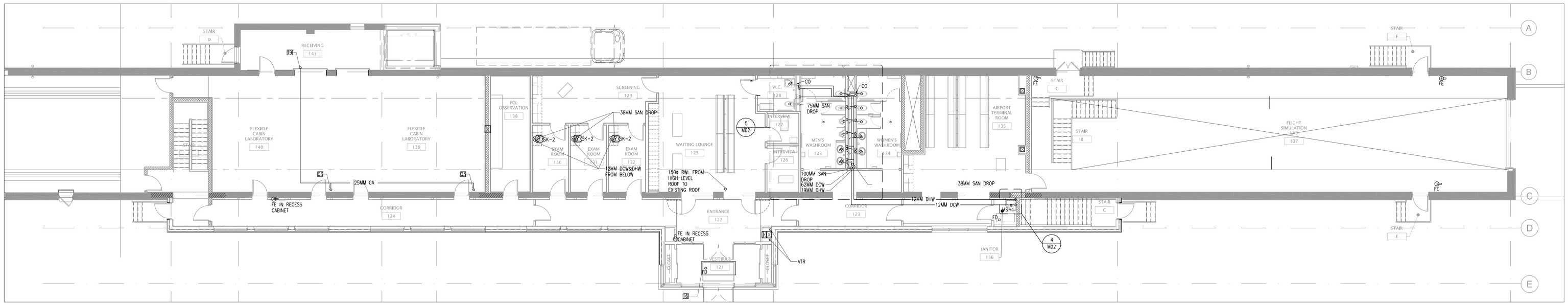
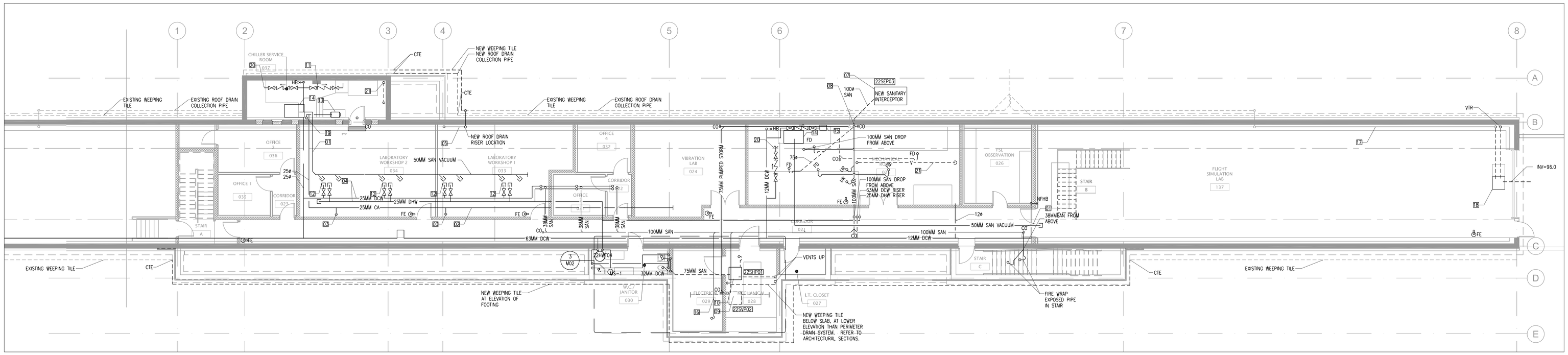


1 M02 UPPER LEVEL PLUMBING
SCALE = 1:100



2 M02 LOWER LEVEL PLUMBING
SCALE = 1:100

GENERAL NOTES:

1. PLUMBING VENTING NOT COMPLETELY SHOWN. PROVIDE VENTING IN ACCORDANCE WITH PART 7 OF THE OBC.
2. PROVIDE SHUT OFF VALVES AT ALL FIXTURE SUPPLY CONNECTIONS
3. INSULATE ALL SUPPLY DUCT, DHW, DHWR PIPING IN ACCORDANCE WITH SPECIFICATIONS.
4. COORDINATE SYSTEM SHUTDOWN FOR PLUMBING TIE-INS WITH OWNER
5. RUNOUTS TO FIXTURES TO MATCH PIPE SIZES ON PLUMBING FIXTURE CONNECTION SCHEDULE.
6. ALL FLOOR DRAINS TO BE COMPLETE WITH TRAP SEAL PRIMERS.

DRAWING NOTES:

01 VACUUM SANITARY FROM AIRCRAFT LAVATORIES

02 COMPRESSED AIR MAIN IN RECESSED FLOOR OF FCL FOR MOVING FLOOR SYSTEM

03 12ø COMPRESSED AIR DROP TO QUICK CONNECT ON WORKSHOP WALL WITH 150MM DIRT LEG WITH VALVE.

04 25ø DCW AND DHW IN RECESSED FLOOR OF FCL FOR AIRCRAFT LAVATORY

05 OFFSET EXISTING ROOF DRAIN RISER IN CEILING SPACE OF UPPER LEVEL AND CONNECT TO NEW ROOF DRAIN RISER.

06 NOT USED.

07 NEW SANITARY INTERCEPTOR BELOW GRADE

08 CORE THROUGH EXISTING 600MM THICK BUILDING FOUNDATION WALL. SEAL PENETRATIONS AROUND PIPE WATERTIGHT.

09 800X800X1030MM DEEP WEEPING TILE SUMP PIT C/W CHECKERPLATE COVER AND GASKET. VENT AND DISCHARGE PIPE TO OFFSET UNDERNEATH SLAB TO WALL.

10 800X800X925MM DEEP SANITARY SUMP PIT C/W CHECKERPLATE COVER AND GASKET. VENT AND DISCHARGE PIPING TO OFFSET UNDER SLAB TO WALL.

11 25ø DCW MAKEUP TO PIPING SYSTEMS.

12 BALL VALVES AND THREADED HOSE ENDS W/ END CAP AND CHAIN FOR LABORATORY USE. EACH ROUGH-IN TO BE COMPLETE WITH TWO 50MM SANITARY VACUUM, A 19MM DCW AND 19MM DHW CAPPED CONNECTION.

13 COMPRESSED AIR RECEIVER, MOTORS, DRYER.

14 SANITARY VACUUM WASTE RECEIVER. RECEIVER PROVIDED BY NRC. CONTRACTOR TO INSTALL TANK AND VACUUM ACCESSORIES AND SERVICE CONNECTIONS INCLUDING DRAIN, WATER AND VACUUM WASTE PIPING.

15 ELECTRIC HUMIDIFIER.

16 BOOT CLEANER; REFER TO ARCHITECTURAL DRAWINGS FOR DETAILS.

17 PROVIDE HEAT TRACING OF ENTIRE SANITARY PIPE RUN. INSULATE PIPING.

18 800X800X1225 DEEP TRENCH DRAIN SUMP PIT C/W CHECKERPLATE COVER AND GASKET. DISCHARGE PIPING TO OFFSET IN SLAB TO WALL. VENT UP THROUGH ROOF.

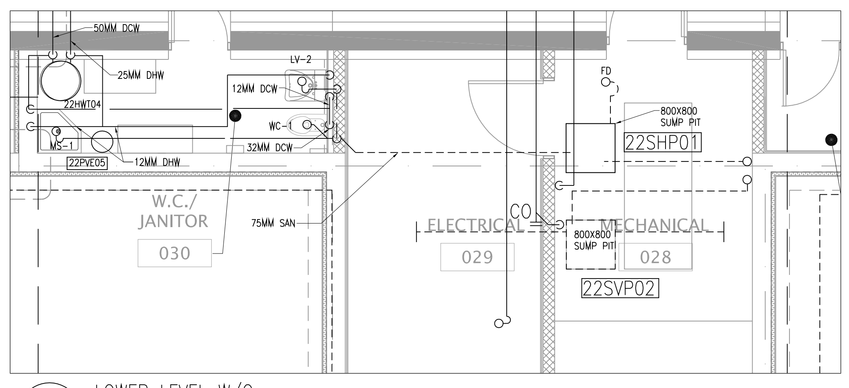
19 25MM¢ COMPRESSED AIR RISER

20 25ø DCW MAKEUP TO HYDRONIC SYSTEM

21 75ø CONDENSATE RECEIVER VNET UP THROUGH ROOF.

PLUMBING FIXTURE CONNECTION SCHEDULE

TAG	DCW	DHW	SAN	VENT
WC	25	—	75	38
LAV	12	12	32	32
SK	12	12	38	32
UR	19	—	38	32
MS	12	12	75	38



3 M02 LOWER LEVEL W/C
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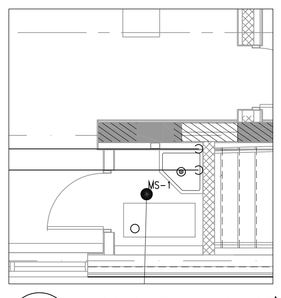

4 M02 UPPER LEVEL JANITOR'S CLOSET
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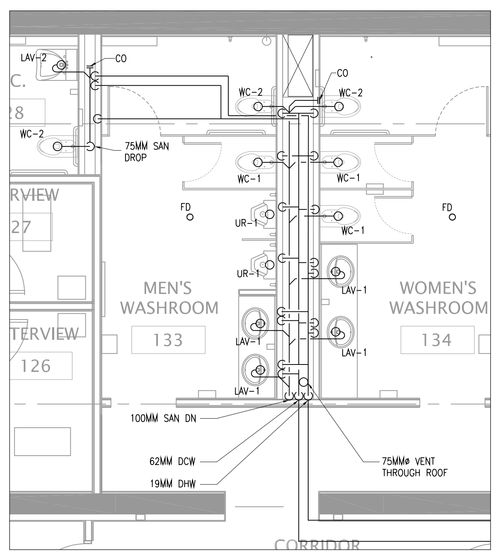

5 M02 UPPER LEVEL W/C
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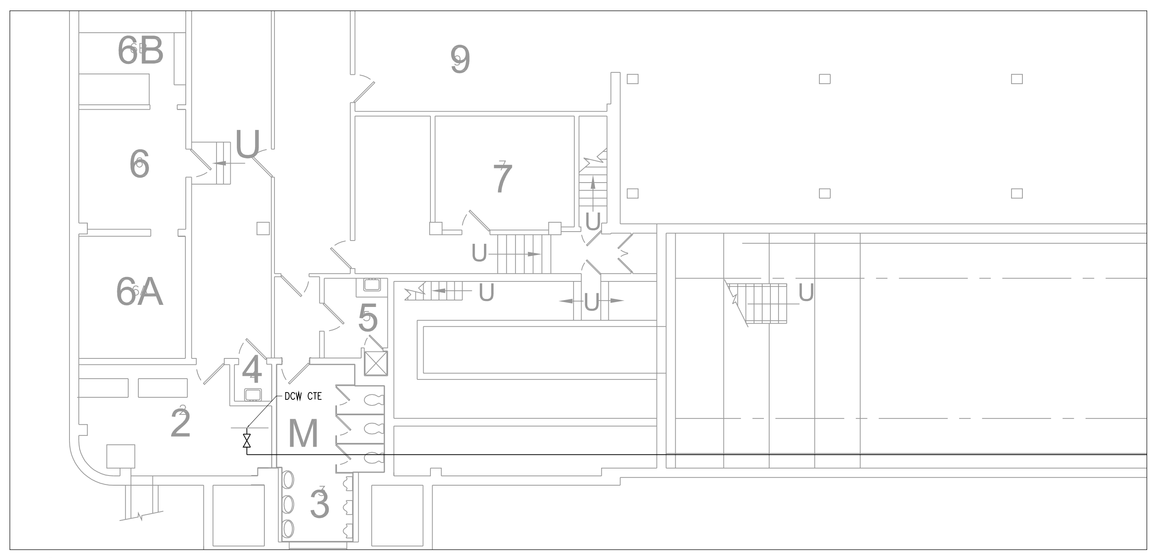

6 M02 DCW CONNECTION
SCALE = 1:100

C

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PROFESSIONAL ENGINEER C. C. PAI PROVINCE OF ONTARIO

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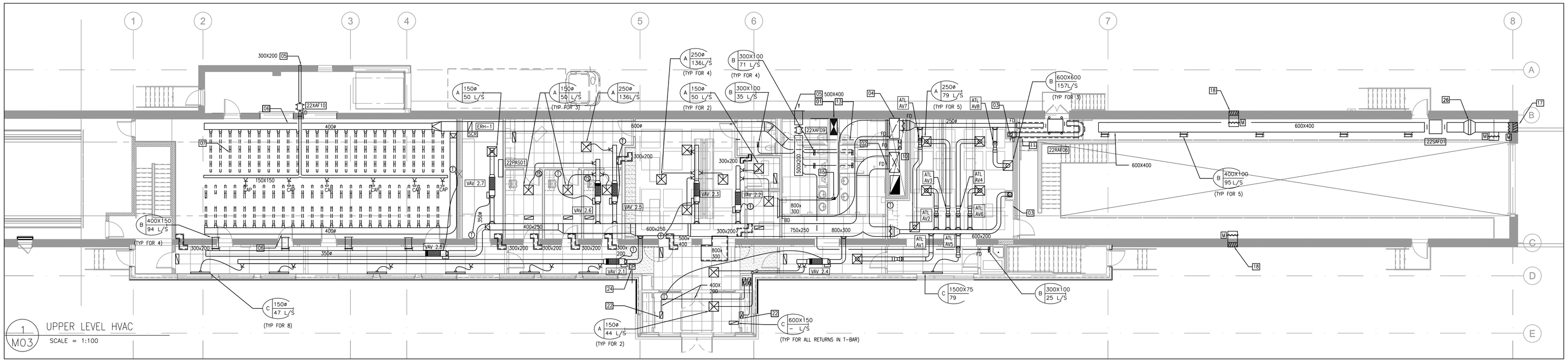

1 / MO3 UPPER LEVEL HVAC
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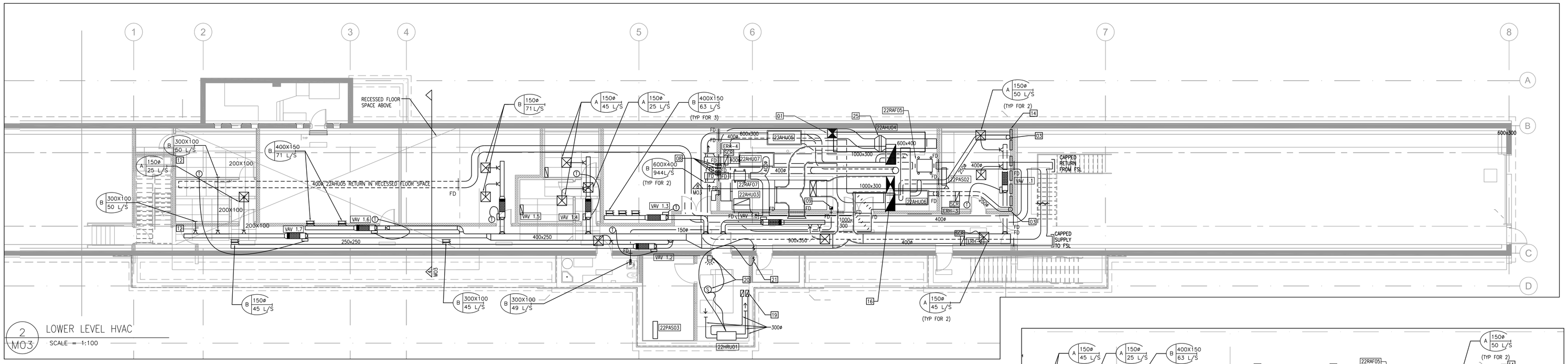

2 / MO3 LOWER LEVEL HVAC
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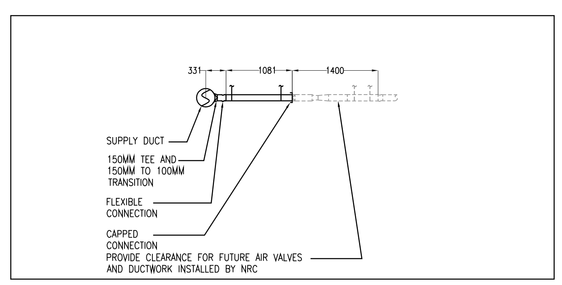

3 / MO3 FLEXIBLE CABIN LAB AIR VALVE INSTALLATION
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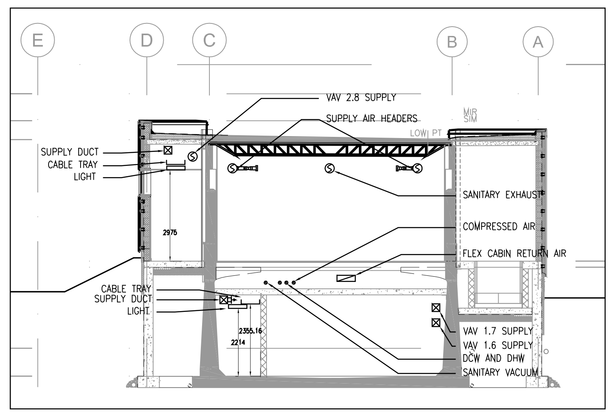

4 / MO3 FLEXIBLE CABIN LAB SECTION
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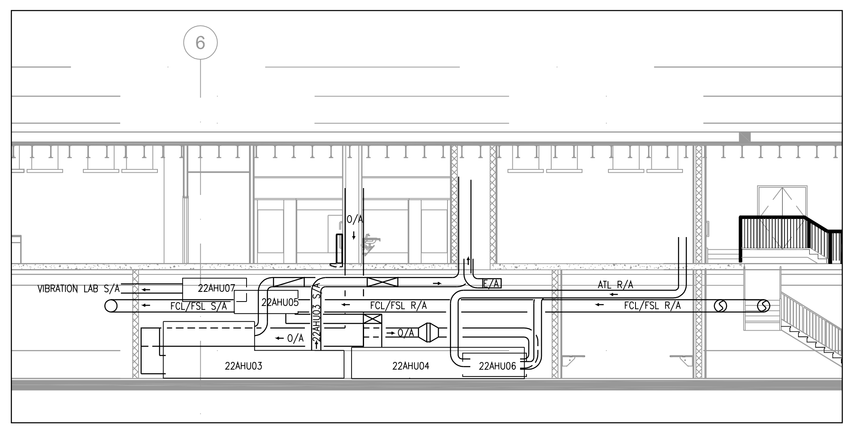

8 / MO3 MECHANICAL ROOM SECTION
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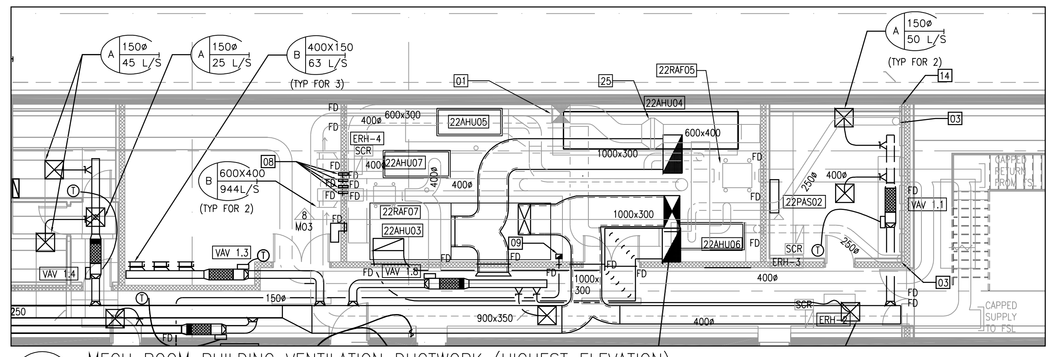
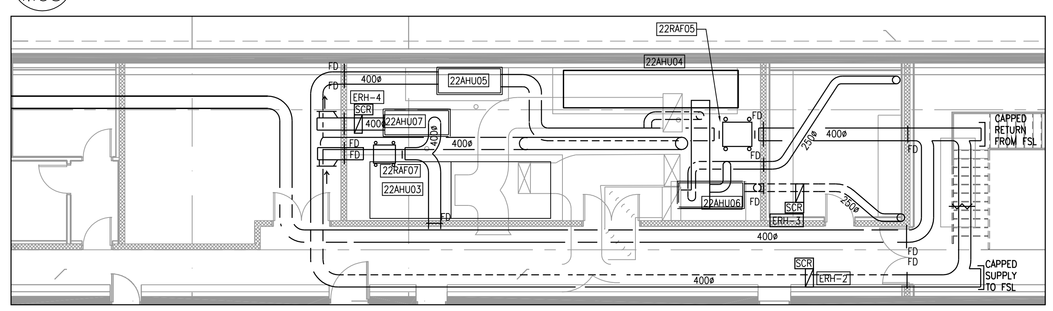
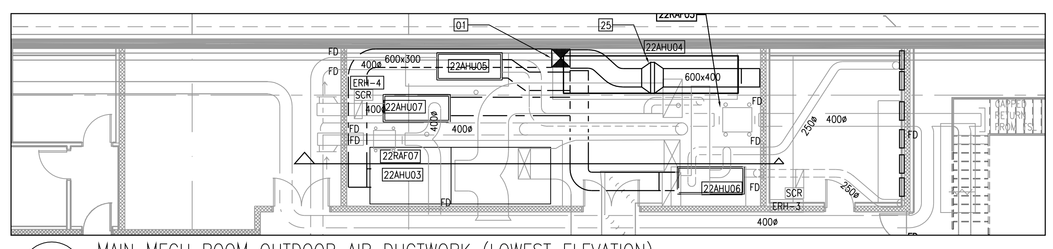


5 / MO3 MECH ROOM BUILDING VENTILATION DUCTWORK (HIGHEST ELEVATION)
SCALE = 1:100



6 / MO3 MAIN MECH ROOM LABS DUCTWORK (MIDDLE ELEVATION)
SCALE = 1:100



7 / MO3 MAIN MECH ROOM OUTDOOR AIR DUCTWORK (LOWEST ELEVATION)
SCALE = 1:100

MECHANICAL GENERAL NOTES:

01 DUCT RUNOUTS TO DIFFUSERS TO BE SAME SIZE AS DIFFUSER NECK SIZE
02 MAXIMUM LENGTH OF FLEXIBLE DUCTWORK TO BE 1M.
03 VAV INLET DUCTWORK TO MATCH INLET SIZE OF BOX AS INDICATED ON SCHEDULE ON DWG M08

MECHANICAL PLAN NOTES:

01 OUTDOOR AIR RISER TRANSITIONING TO 1000X400 THROUGH WASHROOM CHASE AND UP THROUGH ROOF C/W GOOSENECK AND BIRDSCREEN. C/W FIRE DAMPER AT FLOOR.
02 1000X400 BUILDING SUPPLY AIR RISER
03 AIRPORT TERMINAL LAB DUCT RISER COMPLETE WITH FIRE DAMPERS.
04 1000X400 BUILDING RETURN DUCT RISER
05 EXHAUST AIR LOUVRE AND 300MM DEEP PLENUM WITH INSULATED ISOLATION DAMPER.
06 400ø DUCT HEADER WITH 100ø CAPPED TEES AT 300MM CENTRES. EAST AND WEST AIR VALVES TO BE OFFSET.
07 AIR VALVES FOR FLEXIBLE CABIN SETUP. REFER TO DETAIL 3/MO3
08 100ø SUPPLY ROD DUCT SLEEVES AND FIRE DAMPERS FOR OWNER SUPPLIED BLOWERS. DUCT SLEEVES AT FLOOR LEVEL.
09 200x150 EXHAUST DUCT UP
10 EXHAUST DUCT THROUGH ROOF. PROVIDE GOOSENECK WITH BIRDSCREEN.
11 PROVIDE EXTERNAL THERMAL INSULATION.
12 DUCT INTO 300X100 FACE SIDEWALL GRILLE IN SIDE OF BULKHEAD.
13 TRANSITION TO 600X300 AT DUCT CROSSOVER.
14 PROVIDE SIX RALSTON METAL N1-362407 600X900 BAS CONTROL BINS. COORDINATE WITH ELECTRICAL PANELS ON THIS WALL.
15 EXHAUST DUCT FROM LOWER LEVEL
16 1000X400 EXHAUST AIR DUCT RISER
17 500X400 AIR INTAKE LOUVRES WITH 300 DEEP PLENUMS C/W INSULATED ISOLATION DAMPERS.
18 500X400 EXHAUST AIR LOUVRE WITH 300 DEEP PLENUM C/W INSULATED ISOLATION DAMPER.
19 REFRIGERATION VENTILATION SUPPLY AND EXHAUST UP. PROVIDE FIRE DAMPERS IN SLAB.
20 PROVIDE WALL-MOUNTED REFRIGERANT VAPOUR DETECTOR AND RELAY MODULE TO SOUND AUDIBLE ALARM AND ENGAGE 22HRU01 TO HIGH SPEED AT REFRIGERANT CONCENTRATIONS ABOVE 1000PPM
21 PROVIDE READILY ACCESSIBLE INDEPENDENT FAN SWITCHES INSIDE AND OUTSIDE REFRIGERATION EQUIPMENT ROOM CAPABLE OF STARTING BUT NOT STOPPING HRV-1.
22 400x200 OUTDOOR AIR GOOSENECK WITH BIRDSCREEN AND INSULATED ISOLATION DAMPER HARD WIRE INTERLOCKED WITH HRV-1.
23 22HRU01 TO RUN CONTINUOUSLY AT 1/2 SPEED. REFRIGERANT SENSOR SIGNAL OR LOCAL SWITCH TO ENGAGE HRV TO HIGH SPEED.
24 BUILDING DIFFERENTIAL PRESSURE SENSOR
25 STEAM PREHEAT COIL FOR 22AHU04 IN DUCT ABOVE UNIT. REFER TO DUCT HEATING COIL SCHEDULE.
26 GLYCOL HEATING COIL FOR 22SAF01. REFER TO DUCT HEATING COIL SCHEDULE.

0 10 20mm 40 60 80 100 120 140 160 180 200mm

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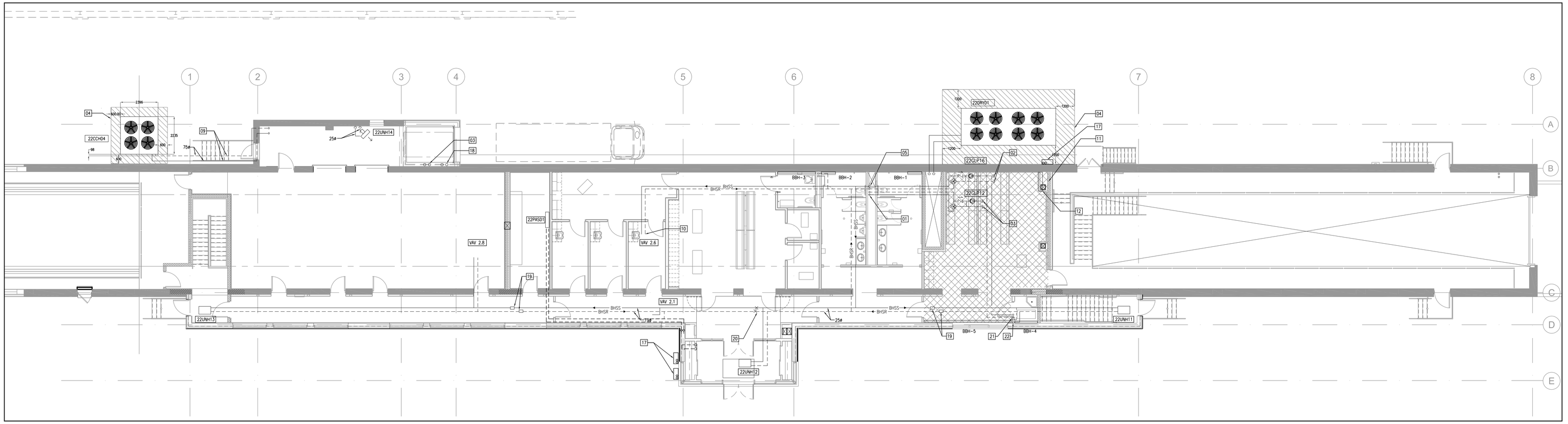
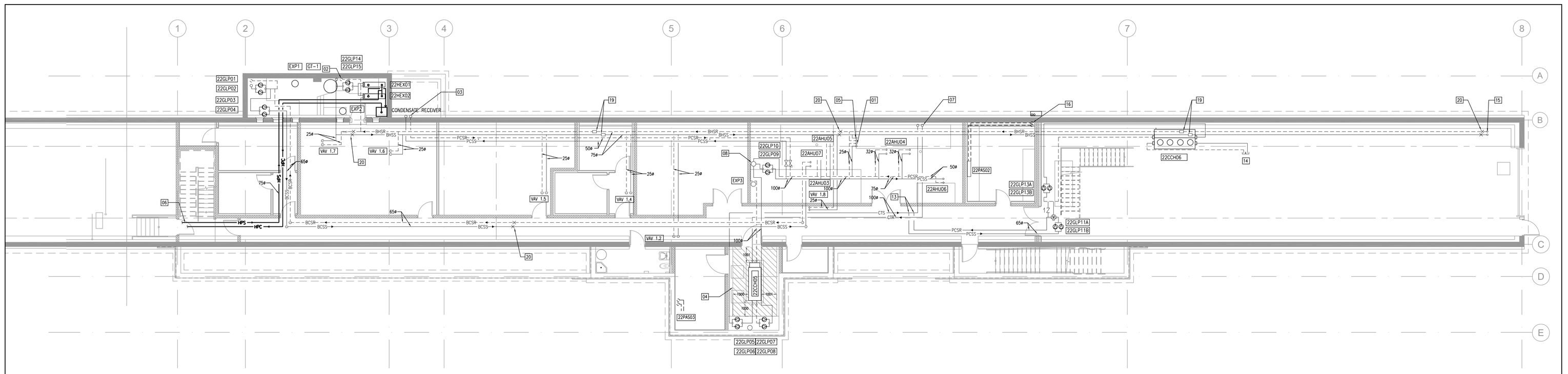


1 M04 UPPER LEVEL PIPING

SCALE = 1:100



2 M04 LOWER LEVEL PIPING

SCALE = 1:100

MECHANICAL GENERAL NOTES:

01 ALL FLOOR-MOUNTED EQUIPMENT TO BE ON 100MM HIGH HOUSEKEEPING PADS.

02 INSULATE ALL HOT AND COLD WATER AND GLYCOL PIPING.

MECHANICAL PLAN NOTES:

01 CHILLED GLYCOL SUPPLY AND RETURN UP IN WASHROOM PLUMBING CHASE TO SERVE UPPER FLOOR.

02 BHSS/R UP TO UNIT HEATER.

03 CHILLED GLYCOL SERVICE TO FLEXIBLE CABIN LABORATORY.

04 EQUIPMENT SERVICE CLEARANCE.

05 GLYCOL SUPPLY AND RETURN UP TO UPPER LEVEL.

06 STEAM PIPING CONTINUED ON DRAWING M05.

07 CONDENSER WATER PIPING UP TO 22DRY01.

08 CHILLED GLYCOL SYSTEM LOW LOSS HEADER.

09 PIPING MOUNTED TO WALL 600MM ABOVE GRADE. PIPING TO BE STACKED AND ROUTED BETWEEN EXTERIOR STAIR AND WALL.

10 CONNECTION TO REHEAT COIL (TYPICAL)

11 AREA OF IN-FLOOR HEATING.

12 IN-FLOOR RADIANT HEATING MANIFOLD CABINET AT FLOOR LEVEL.

13 CLOSELY-SPACED TEES MAXIMUM 300MM APART.

14 PROVIDE 50Ø CAPPED TEES FOR FUTURE CHILLER CONNECTION.

15 BUILDING HEATING SUPPLY UP TO DUCT HEATING COIL ABOVE CATWALK.

16 REFRIGERANT PIPE UP.

17 CONDENSING UNIT ON WALL.

18 PROVIDE TWO 74MM SLEEVES THROUGH SLAB FOR FUTURE PIPING.

19 PROVIDE EXPANSION JOINT AND PIPE GUIDES IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. ANCHORS TO BE EQUIVALENT TO METAFLEX SMALL DIAMETER COMPENSATORS WITH 50MM COMPRESSION. FLANGED CONNECTIONS FOR 50MM PIPE SIZE AND OVER. THREADED CONNECTIONS FOR 38MM AND UNDER.

20 PROVIDE PIPE ANCHORS.

21 19MM SERVICE TO BBH-5

22 19MM SERVICE TO BBH-4

C

0 10 20mm 40 60 80 100 120 140 160 180 200mm

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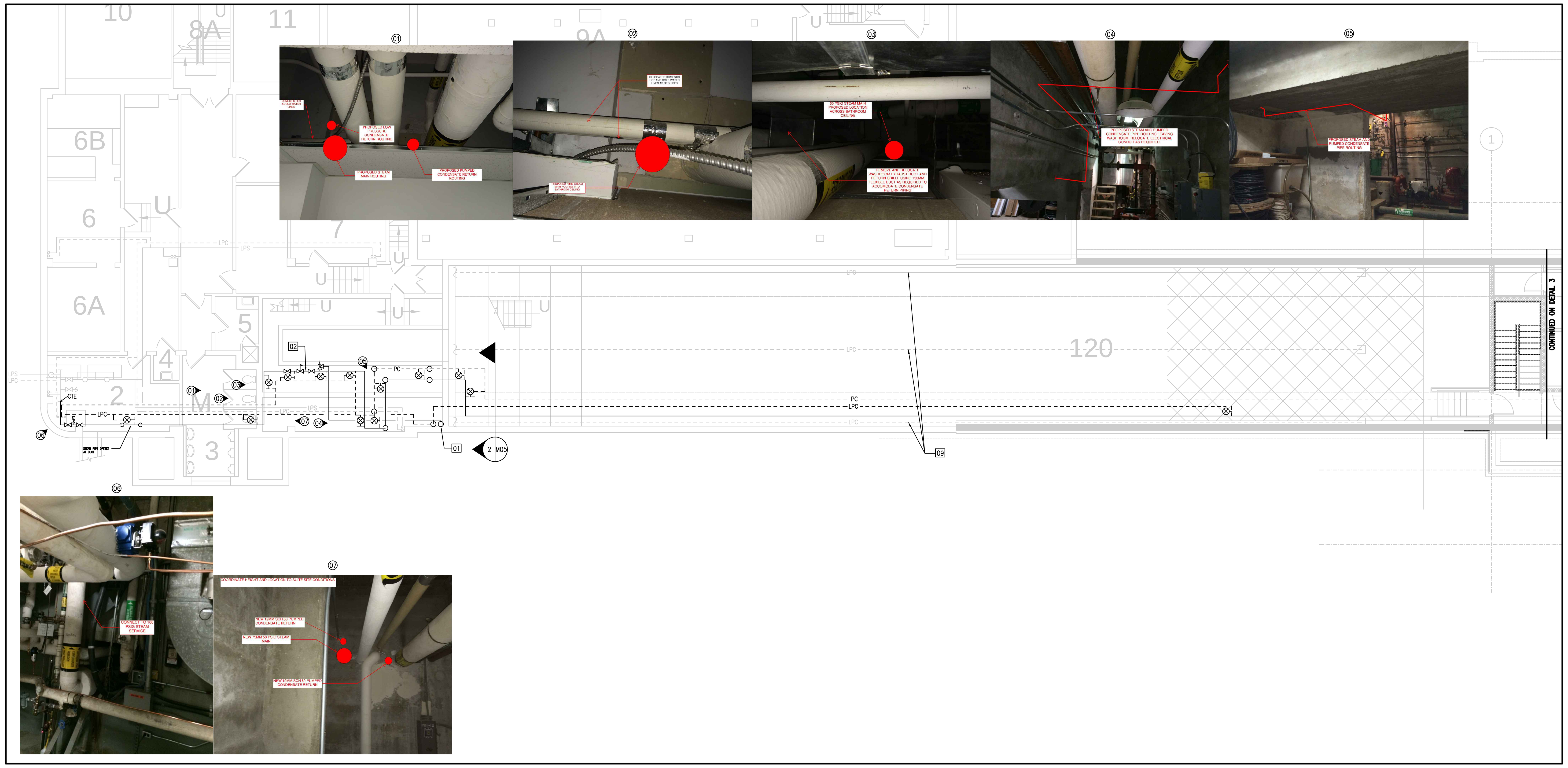

1 / M05 BASEMENT AND FIRST FLOOR STEAM PIPING
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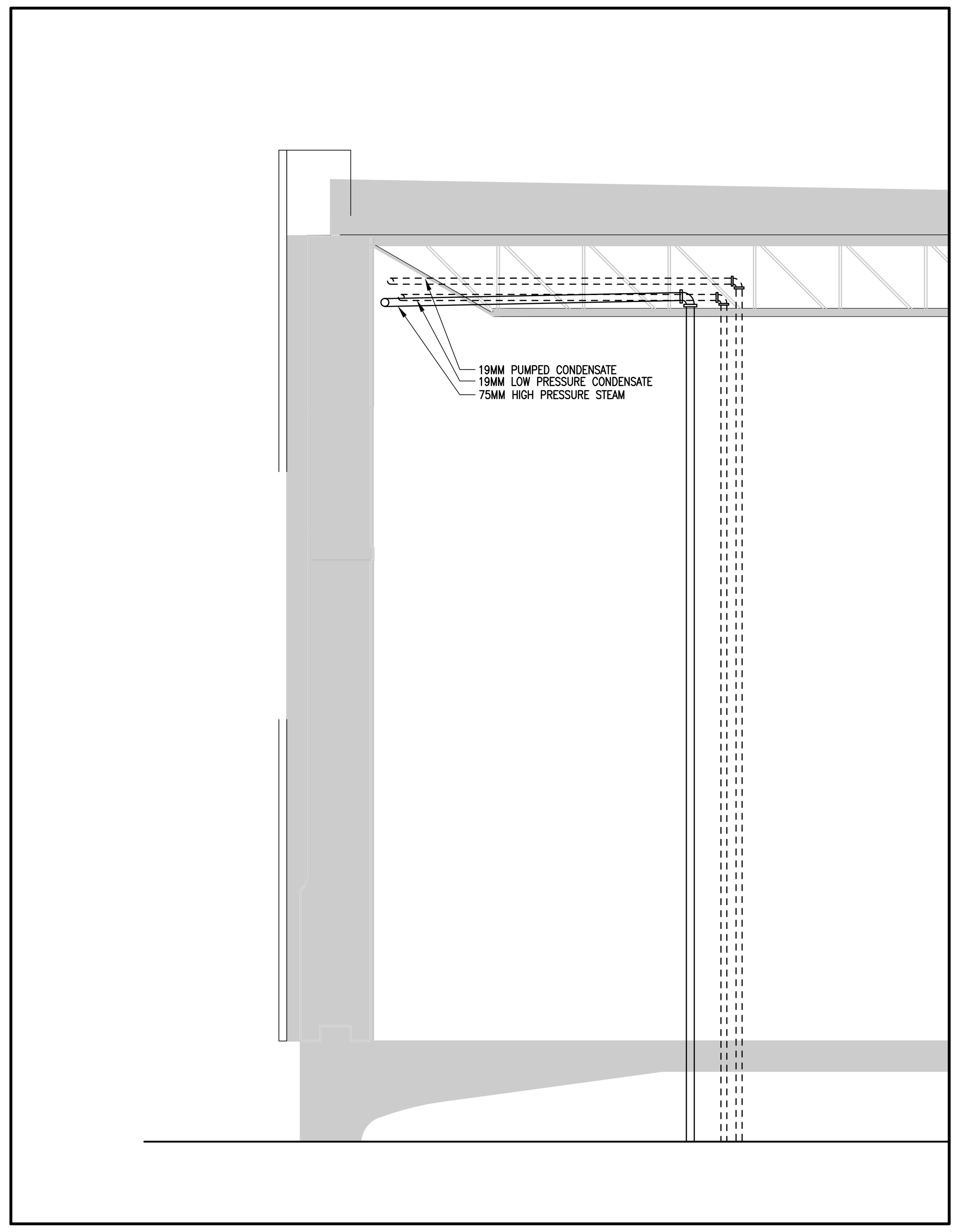

2 / M05 STEAM & CONDENSATE RISER DETAIL
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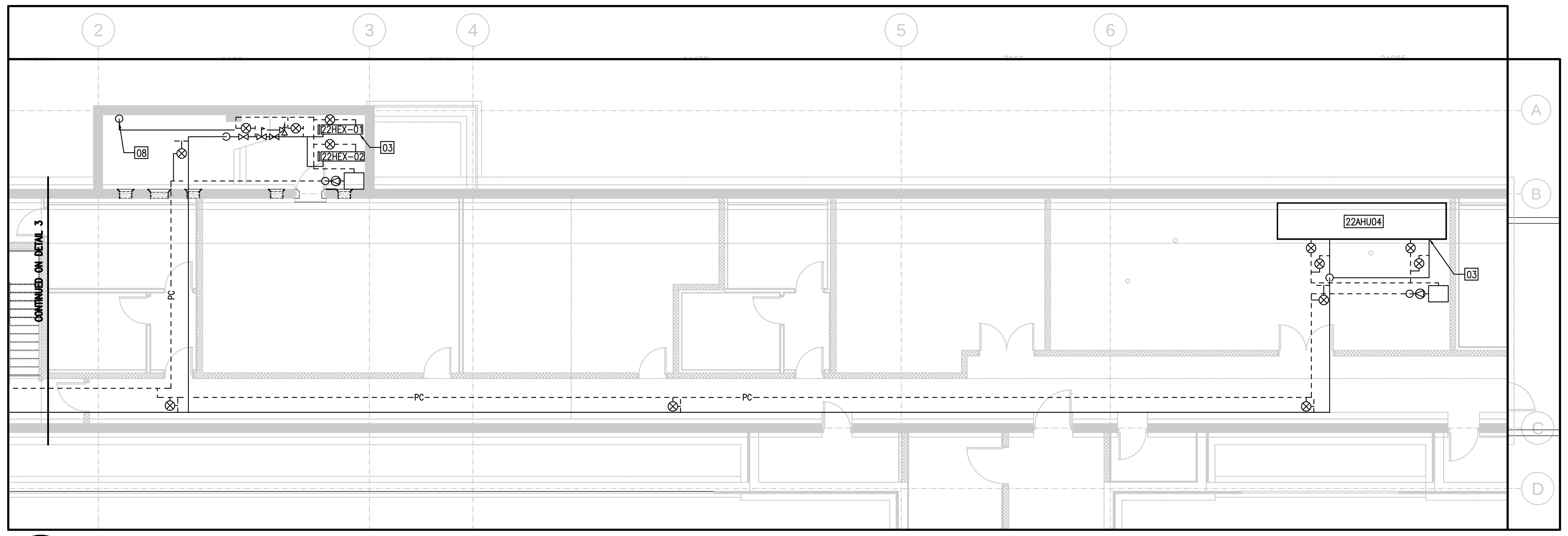


3 / M05 BASEMENT AND FIRST FLOOR STEAM PIPING
SCALE = 1:100

MECHANICAL GENERAL NOTES:

01 PROVIDE STEAM TRAPS, AS INDICATED IN DETAIL 5 OF DRAWING M10, BEFORE ANY CHANGE IN ELEVATION AND BEND.

02 PROVIDE STEAM TRAPS AFTER ANY PIECE OF EQUIPMENT AS PER DETAIL 01 OF DRAWING M09.

03 REFER TO DETAIL 07 OF DRAWING M10 FOR STEAM AND CONDENSATE SCHEMATIC.

04 INSTALLATION OF EXPANSION JOINTS, PIPE ANCHORS AND PIPE GUIDES TO BE IN ACCORDANCE WITH EXPANSION JOINT MANUFACTURERS ASSOCIATIONS STANDARDS.

MECHANICAL PLAN NOTES:

01 ROUTE PRESSURE RELIEF VALVE PIPING ALONG EXTERIOR TO CORNER OF BASEMENT AS INDICATED. BRING STRAIGHT UP THROUGH TO ROOF FROM CORNER. COORDINATE WITH ARCHITECTURAL AND STRUCTURAL FOR ROOF PENETRATION. ONCE COMPLETE REPAIR ROOF TO AS BUILD CONDITION. REFER TO ARCHITECTURAL FOR PIPE SHIELDING IN OCCUPIED SPACE.

02 PRESSURE REDUCING VALVE STATION. REFER TO TO DETAILS 06 & 07 OF DRAWING M10 FOR PIPING SCHEMATIC. ENSURE THAT PRV STATION DOES NOT INTERFERE WITH REQUIRED, 1M, CLEARANCES OF NEARBY ELECTRICAL EQUIPMENT.

03 REFER TO DETAIL 07 OF DRAWING M10 FOR STEAM AND CONDENSATE PIPING SCHEMATIC FOR HEAT EXCHANGERS AND AIR HANDLING UNIT.

04 DOWNWARD SLOPE IN DIRECTION OF FLOW TO THE EXTENT POSSIBLE (NOT > 50MM/3048MM RUN)

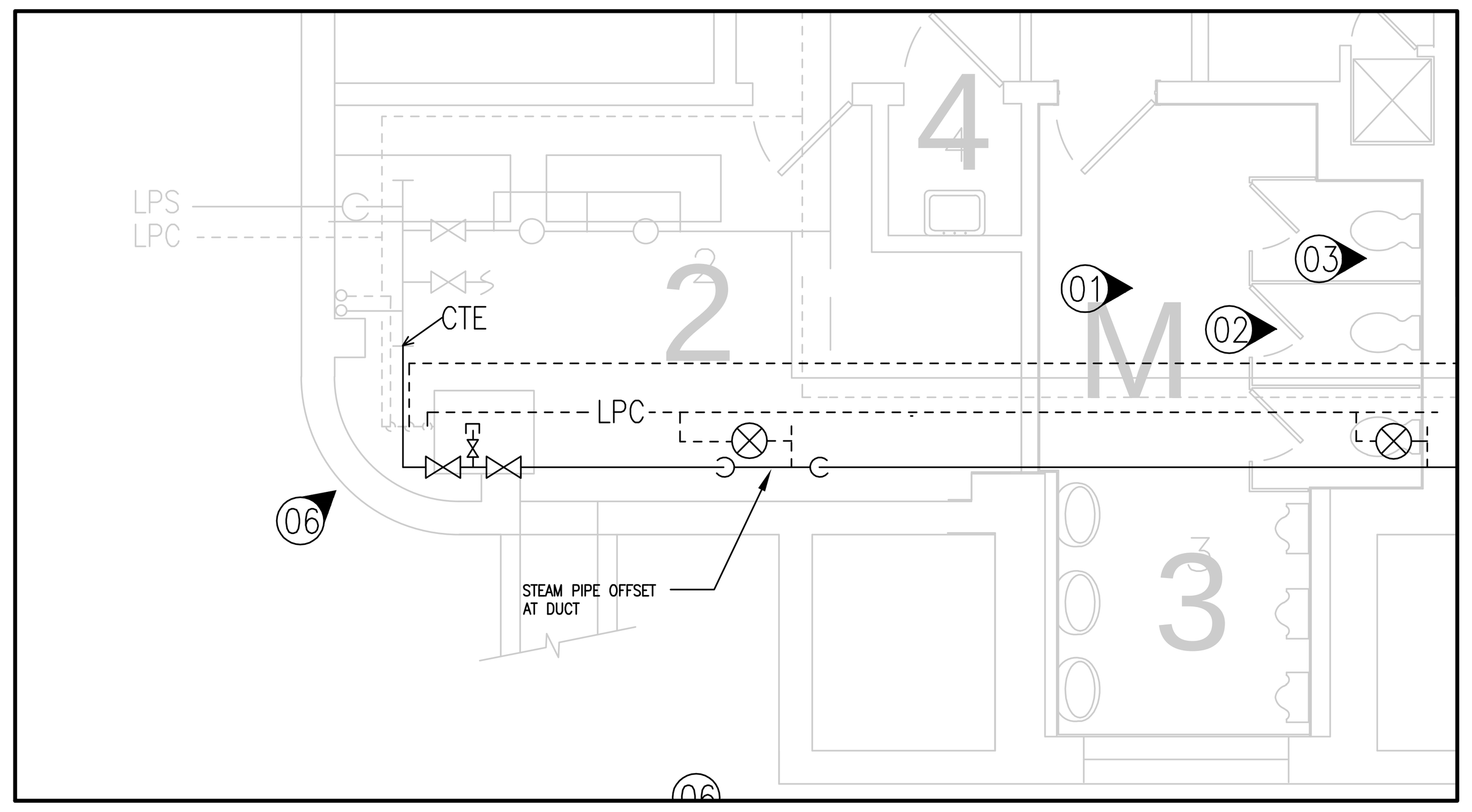
05 COORDINATE INSTALLATION OF HIGH PRESSURE STEAM, LOW PRESSURE CONDENSATE AND PUMPED CONDENSATE WITH SITE CONDITIONS PRIOR TO THE START OF ANY WORK.

06 TYPICAL: PIPE GUIDES MUST BE FASTENED TO UNDERSIDE OF SLAB AND NOT THE JOISTS. PROVIDE EXTENSION FOR PIPE GUIDES TO ANCHOR TO SLAB IN AREAS WHERE IT IS REQUIRED. INSTALLATION OF GUIDES AND EXTENSION SHALL BE IN ACCORDANCE WITH EXPANSION JOINT MANUFACTURERS ASSOCIATION.

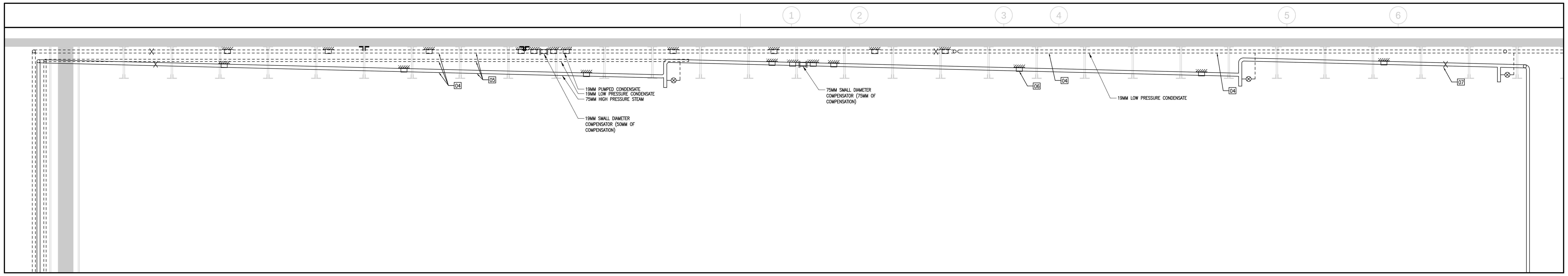
07 TYPICAL: PIPE ANCHORS MUST BE FASTENED TO UNDERSIDE OF SLAB AND NOT THE JOISTS. PROVIDE EXTENSION FOR PIPE GUIDES TO ANCHOR TO SLAB IN AREAS WHERE IT IS REQUIRED. INSTALLATION OF GUIDES AND EXTENSION SHALL BE IN ACCORDANCE WITH EXPANSION JOINT MANUFACTURERS ASSOCIATION.

08 ROUTE PRESSURE RELIEF PIPING UP THROUGH LOADING DOCK AND OUT THROUGH ROOF. COORDINATE WITH ARCHITECTURAL AND STRUCTURAL FOR ROOF PENETRATION. ONCE COMPLETE REPAIR ROOF TO AS-BUILD CONDITION.

09 REINSULATE EXISTING PIPING.



5 / M05 ENLARGED MECHANICAL ROOM STEAM PLAN
SCALE = 1:50



4 / M05 FIRST FLOOR STEAM PIPING ELEVATION DETAIL
SCALE = 1:100

C

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NRC·CNRC

GENERAL NOTES

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- CONTRACTORS MUST VISIT THE SITE & FULLY FAMILIARIZE THEMSELVES WITH THE SCOPE OF THE WORK.
- PREVENT THE SPREAD OF DUST & DEBRIS BEYOND THE WORK AREA AND CLEAN ALL SURFACES AT COMPLETION.
- MAKE GOOD ALL SURFACES AFFECTED BY THIS WORK.
- COORDINATE ALL SHUTDOWNS WITH THE DEPARTMENTAL REPRESENTATIVE.
- PROVIDE ALL LABOUR AND MATERIAL REQUIRED TO FORM A COMPLETE, FUNCTIONAL SYSTEM AS DESCRIBED ON DRAWINGS.

REGISTERED PROFESSIONAL ENGINEER C. C. PAI PROVINCE OF ONTARIO

No.	Date	Revision	By: Par:
0	29 05 2015	ISSUED FOR TENDER	

Date Printed 18 MAY 2011 Date imprimée

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

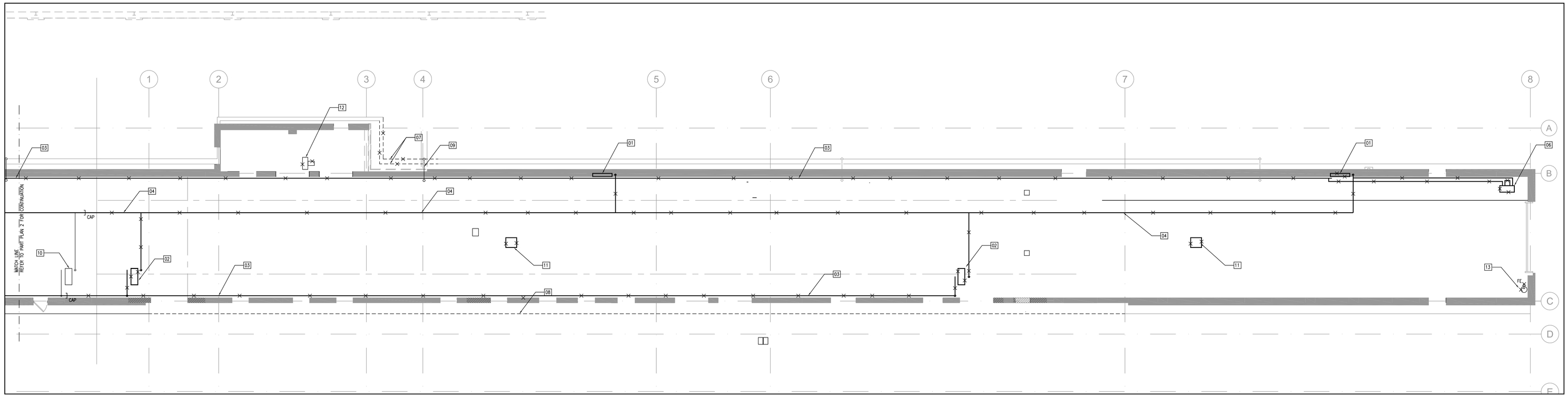
A Detail no. / No. du détail
B Location drawing no. / sur dessin no.
C Drawing no. / dessin no.

project / projet: NRC CABIN COMFORT + ENVIRONMENTAL RESEARCH FACILITY

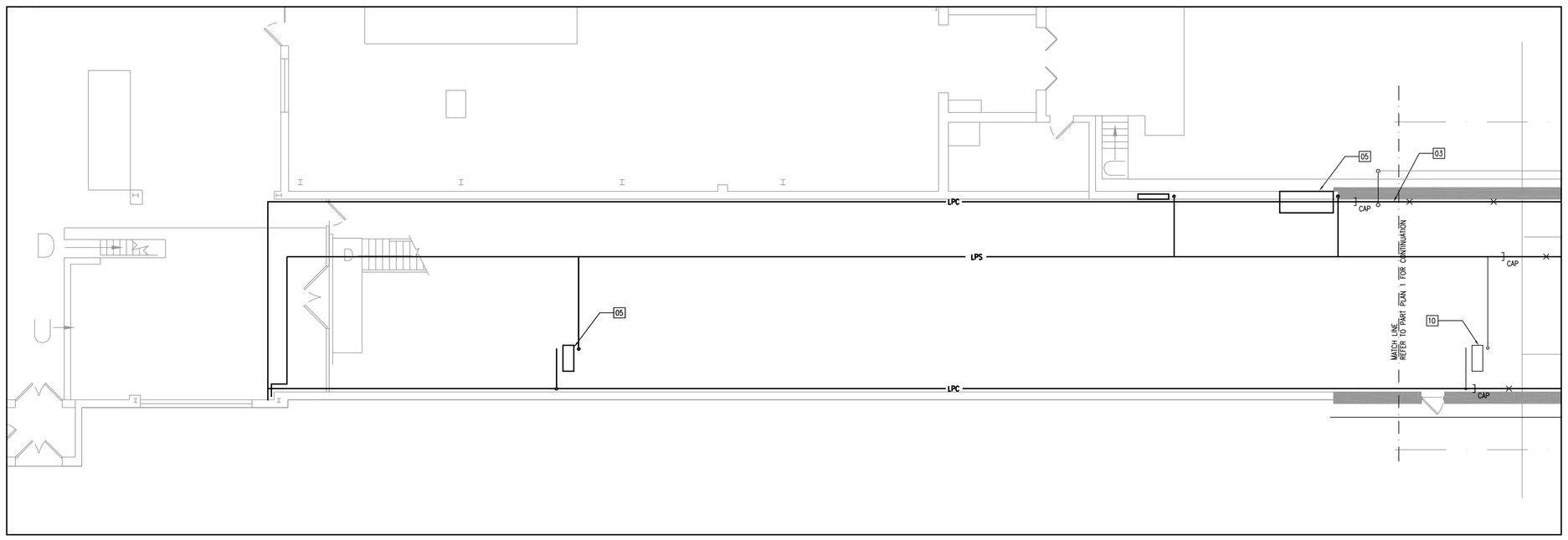
drawing / dessin: BASEMENT AND FIRST FLOOR STEAM PIPING

designed / conçu	M. PILIC	date	MAY '15
drawn / dessiné	M. PILIC	scale / échelle	1 : 100
checked / vérifié	KC	sheet / feuille	of/de
approved / approuvé		W.O.no.	D.T.no.

dwg.no. / dessin no.: 3788-M05



1 MO6 UPPER LEVEL DEMOLITION
SCALE = 1:100



2 MO6 UPPER LEVEL DEMOLITION
SCALE = 1:100

GENERAL NOTES:

01 PROVIDE 24H NOTICE BEFORE SHUTDOWN OF SYSTEMS. COORDINATE SHUTDOWNS WITH NRC IN ACCORDANCE WITH SPECIFICATION SECTION 00 10 00.

02 ALL REMOVED PIPING AND ACCESSORIES TO BE DISPOSED OF BY CONTRACTOR.

03 EXISTING STEAM AND CONDENSATE PIPING INSULATION CONTAINS ASBESTOS. INSULATION TO BE ABATED BEFORE DEMOLITION.

PLAN NOTES:

01 EXISTING STEAM CABINET UNIT HEATER TO BE REMOVED COMPLETE WITH ALL CONTROLS, PIPING, TRAPS.

02 EXISTING CEILING-MOUNT UNIT HEATER TO BE REMOVED COMPLETE WITH ALL CONTROLS, PIPING, TRAPS.

03 CONDENSATE PIPING AT CATWALK TO BE REMOVED.

04 STEAM SUPPLY MAIN AT HIGH LEVEL TO BE REMOVED.

05 EXISTING UH TO REMAIN.

06 EXISTING UH TO BE REMOVED AND TURNED OVER TO NRC.

07 REMOVE DASHED SECTION OF WEEPING TILE AND ROOF DRAIN COLLECTION PIPE IN ORDER TO FACILITATE NEW CONSTRUCTION.

08 REMOVE DASHED SECTION OF WEEPING TILE IN ORDER TO FACILITATE NEW CONSTRUCTION.

09 RELOCATE ROOF DRAIN RISER, REFER TO DRAWING M02 FOR NEW LOCATION AND ROUTING.

10 EXISTING UNIT HEATER TO BE REINSTALLED IN FUTURE ADJACENT TENANT SPACE. PROVIDE NEW HANGER RODS, SPRING ISOLATORS, STEAM CONTROL VALVE, CONDENSATE TRAP AND ISOLATION VALVES.

11 EXISTING ROOFTOP VENTILATOR, ELECTRICAL FEED AND CONTROLS TO BE REMOVED. OPENING THROUGH ROOF TO BE SEALED. REFER TO DRAWING A09.

12 EXISTING ELECTRICAL UNIT HEATER TO BE REMOVED. POWER, CONTROLS AND SUPPORTS TO BE REMOVED BACK TO PANELS AND STRUCTURE.

13 EXISTING FIRE EXTINGUISHER AT LOW LEVEL BELOW CATWALK TO BE REMOVED AND TURNED OVER TO NRC.

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KEY PLAN

No.	Date	Revision	By: Par:
0	29 05 2015	ISSUED FOR TENDER	

Date Printed 18 MAY 2011 | Date Imprimée

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C Drawing no. dessin no.

project / projet
NRC CABIN COMFORT + ENVIRONMENTAL RESEARCH FACILITY

MONTREAL ROAD CAMPUS

drawing / dessin
MECHANICAL DEMOLITION

designed / conçu	KC	date / date	MAY '15
drawn / dessiné	ALM	scale / échelle	AS SHOWN
checked / vérifié	KC	sheet / feuille	of/de
approved / approuvé		W.O.no.	D.T.no.

dwg.no. / dessin no.
3788-M06

ASPM A0 (1189x841)

C
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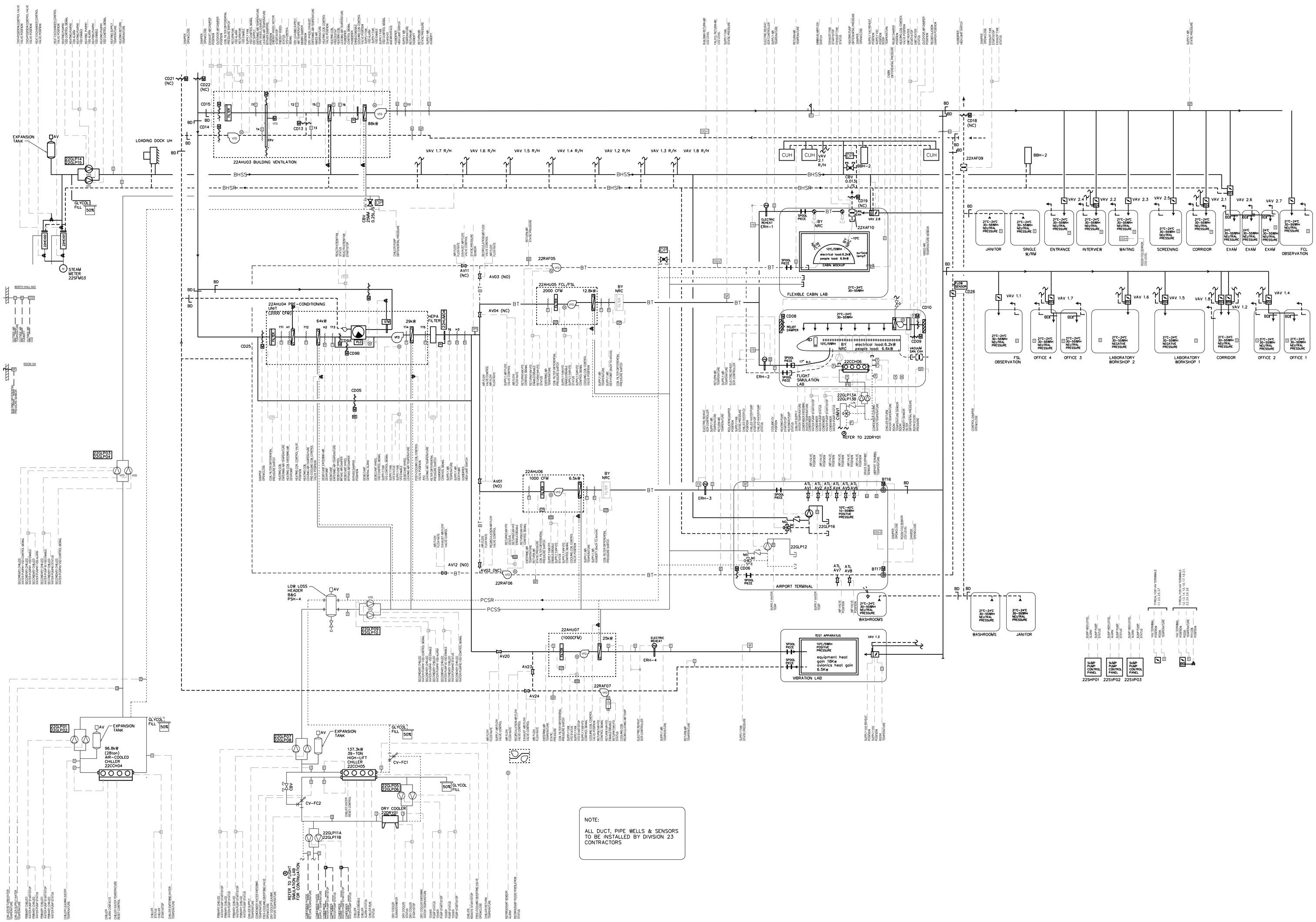

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C. P. PAU — PROFESSIONAL ENGINEER — PROVINCE OF ONTARIO

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Date Printed 30 OCT 2014 — Date imprimée

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project / projet
NRC CABIN COMFORT + ENVIRONMENTAL RESEARCH FACILITY

MONTREAL ROAD CAMPUS

drawing / dessin
MECHANICAL SCHEMATIC

designed / conçu	KC	date / date	MAY '15
drawn / dessiné	ALM	scale / échelle	AS SHOWN
checked / vérifié	KC	sheet / feuille	of/de
approved / approuvé		W.O.no.	D.T.no.

dwg.no. / dessin no.
3788-M07

ASPM A0 (1189x841)

0 10 20mm 40 60 80 100 120 140 160 180 200mm

PUMP SCHEDULE

No.	Service	Model	L/s	GPM	kPa	FT WC	BHP	MOTOR HP	Min. Effy	VFD	EMERG. POWER	V/PH/HZ - Speed	Comments
22GLP01	BUILDING CHILLER PRIMARY LOOP PUMPS DUTY	B&G SERIES 80-SC 1.5X1.5X6.5	5	80	180	60	2.37	3		N		575/3/60 - 1750	2
22GLP02	BUILDING CHILLER PRIMARY LOOP PUMPS STANDBY	B&G SERIES 80-SC 1.5X1.5X6.5	5	80	180	60	2.37	3		N		575/3/60 - 1750	2
22GLP03	BUILDING CHILLED WATER SECONDARY DISTRIBUTION DUTY	B&G SERIES e-90 1.25AAB	3.78	60	165	55	1.27	2		Y		575/3/60 - 1750	2
22GLP04	BUILDING CHILLED WATER SECONDARY DISTRIBUTION STANDBY	B&G SERIES e-90 1.25AAB	3.78	60	165	55	1.27	2		Y		575/3/60 - 1750	2
22GLP05	LABS CONDENSER WATER PUMPS DUTY	B&G 2BD SERIES e-1510	11	175	165	55	3.28	5		N		575/3/60 - 1750	2
22GLP06	LABS CONDENSER WATER PUMPS STANDBY	B&G 2BD SERIES e-1510	11	175	165	55	3.28	5		N		575/3/60 - 1750	2
22GLP07	LABS CHILLER PRIMARY LOOP PUMP DUTY	B&G 2ADes SERIES e-1510	9.5	150	120	40	1.89	2		N		575/3/60 - 1750	2
22GLP08	LABS CHILLER PRIMARY LOOP PUMP STANDBY	B&G 2ADes SERIES e-1510	9.5	150	120	40	1.89	2		N		575/3/60 - 1750	2
22GLP09	LABS SECONDARY CHILLED WATER DISTRIBUTION DUTY	B&G 2ADes SERIES e-1510	9.14	145	120	40	1.86	2		Y		575/3/60 - 1750	2
22GLP10	LABS SECONDARY CHILLED WATER DISTRIBUTION STANDBY	B&G 2ADes SERIES e-1510	9.14	145	120	40	1.86	2		Y		575/3/60 - 1750	2
22GLP11A	FUSELAGE CONDENSER WATER PUMP	B&G 1.5AB SERIES e-90	2.8	45	120	40	0.76	1.5		N		575/3/60 - 1750	2
22GLP11A	FUSELAGE CONDENSER WATER PUMP	B&G 1.5AB SERIES e-90	2.8	45	120	40	0.76	1.5		N		575/3/60 - 1750	2
22GLP12	AIRPORT TERMINAL ROOM COOLING	B&G PL-55	0.63	10	105	35	0.21	0.4		N		120V/1/60 - 3250	2
22GLP13A	FUSELAGE PRIMARY CONDENSER PUMP	B&G 1.5AB SERIES e-90	2.8	45	120	40	0.76	1.5		N		575/3/60 - 1750	2
22GLP13A	FUSELAGE PRIMARY CONDENSER PUMP	B&G 1.5AB SERIES e-90	2.8	45	120	40	0.76	1.5		N		575/3/60 - 1750	2
22GLP14	BUILDING GLYCOL DISTRIBUTION DUTY	B&G 2AAC SERIES e-90	7.9	125	164	55	2.41	3		Y		575/3/60 - 1750	2
22GLP15	BUILDING GLYCOL DISTRIBUTION STANDBY	B&G 2AAC SERIES e-90	7.9	125	164	55	2.41	3		Y		575/3/60 - 1750	2
22GLP16	AIRPORT TERMINAL ROOM HEATING	B&G PL-55	0.63	10	105	35	0.21	0.4		N		120V/1/60 - 3250	2
22SHP01	SANITARY SUMP PUMP DUTY	HYDROMATIC SHEF 50	3.15	50	60	20		0.5		N		120V/1/60 - 3250	6
22SHP02	SANITARY SUMP PUMP STANDBY	HYDROMATIC SHEF 50	3.15	50	60	20		0.5		N		120V/1/60 - 3250	6
22SVP02	WEEPING TILE SUMP PUMP DUTY	HYDROMATIC SHEF 50	3.15	50	60	20		0.5		N		120V/1/60 - 3250	6
22SVP03	WEEPING TILE SUMP PUMP STANDBY	HYDROMATIC SHEF 50	3.15	50	60	20		0.5		N		120V/1/60 - 3250	6
22SVP03	TRENCH DRAIN SUMP PUMP DUTY	HYDROMATIC SHEF 50	3.15	50	60	20		0.5		N		120V/1/60 - 3250	6
22SVP04	TRENCH DRAIN SUMP PUMP STANDBY	HYDROMATIC SHEF 50	3.15	50	60	20		0.5		N		120V/1/60 - 3250	6

Notes:
1 ALL BRONZE CONSTRUCTION
2 COMPLETE WITH FLOWTREX VALVE AND SUCTION GUIDE
3 EXTRA HIGH EFFICIENCY MOTOR
4 INTERNAL FLOAT SWITCH
5 EMERGENCY POWER
6 COMPLETE SUMP PIT CONTROLLER PACKAGE WITH FLOATS
7 PART OF DOMESTIC WATER BOOSTER PACKAGE C/W CONTROLLER
8 PART OF COMPLETE PUMP PACKAGE C/W CONTROLLER, STRAINER, RELIEF VALVE AS PER (TSSA / NFPA) REQUIREMENTS

AIR VALVES

TAG	TYPE	SERVICE	MAKE	MODEL	SIZE (INLET) mm	(IN.)	AIR FLOW MAX L/S	MAX (CFM)	MIN L/S	MIN (CFM)	OFF L/S	OFF (CFM)	NOTES
FLOOR		ZONE / ROOM#											
CD01	VENTURI	AHU06 SUPPLY	PHOENIX	LOW PRESSURE SHUT-OFF	125	5	472	1,000	0	-		0	
CD02	VENTURI	AHU06 RETURN	PHOENIX	LOW PRESSURE SHUT-OFF	175	7	472	1,000	0	-		0	
CD03	VENTURI	AHU05RETURN	PHOENIX	LOW PRESSURE SHUT-OFF	150	6	944	2,000	0	-		0	
CD04	VENTURI	AHU05 SUPPLY	PHOENIX	LOW PRESSURE SHUT-OFF	125	5	944	2,000	0	-		0	
CD11	VENTURI	AHU05 EXHAUST	PHOENIX	LOW PRESSURE SHUT-OFF	150	6	944	2,000	0	-		0	
CD12	VENTURI	AHU06 EXHAUST	PHOENIX	LOW PRESSURE SHUT-OFF	150	6	472	1,000	0	-		0	
CD20	VENTURI	AHU07 SUPPLY	PHOENIX	LOW PRESSURE SHUT-OFF	125	5	944	2,000	0	-		0	
CD23	VENTURI	AHU07 RETURN	PHOENIX	LOW PRESSURE SHUT-OFF	125	5	944	2,000	0	-			
CD24	VENTURI	AHU07 EXHAUST	PHOENIX	LOW PRESSURE SHUT-OFF	125	5	944	2,000	0	-			
ATLAV1	VENTURI	AIRPORT TERMINAL LOUNGE	PRICE	VVA	250	10	79	167	24	50		0	
ATLAV2	VENTURI	AIRPORT TERMINAL LOUNGE	PRICE	VVA	250	10	79	167	24	50		0	
ATLAV3	VENTURI	AIRPORT TERMINAL LOUNGE	PRICE	VVA	250	10	79	167	24	50		0	
ATLAV4	VENTURI	AIRPORT TERMINAL LOUNGE	PRICE	VVA	250	10	79	167	24	50		0	
ATLAV5	VENTURI	AIRPORT TERMINAL LOUNGE	PRICE	VVA	250	10	79	167	24	50		0	
ATLAV6	VENTURI	AIRPORT TERMINAL LOUNGE	PRICE	VVA	250	10	79	167	24	50		0	
ATLAV7	VENTURI	AIRPORT TERMINAL LOUNGE	PRICE	VVA	250	10	157	333	71	150		0	
ATLAV8	VENTURI	AIRPORT TERMINAL LOUNGE	PRICE	VVA	250	10	157	333	71	150		0	

Note: to be provided complete with all required accessories and components to constitute a complete and working installation in accordance with manufacturer's recommendation

AIR HANDLING UNITS SCHEDULE

General info / Fan section:

TAG	SYSTEM	LOCATION	MANUF.	TYPE	SUPPLY BHP	SUPPLY MOTOR HP	EXHAUST BHP	EXHAUST MOTOR HP	ELECT. V/P/C	FLOW L/S	FLOW CFM	E.S.P. Pa	E.S.P. IN WC
22AHU03	GENERAL BUILDING CONDITIONING	BASEMENT MECH ROOM	AAON	PACKAGED CHILLED GLYCOL/HOT GLYCOL	7.47	10.0	3.9	5.0	575/3/60	3,070	6,500	500	2
22AHU04	LABS PRE-CONDITIONING	BASEMENT MECH ROOM	MUNTERS	STEAM DESICCANT CHILLED WATER PRE AND POST COOL STEAM HEAT	3.9	5.0			575/3/60	940	2,000	500	2
22AHU05	FLEXIBLE CABIN / FUSELAGE LAB	BASEMENT MECH ROOM	AAON	HORIZONTAL AHU		8			575/3/60	940	2,000	875	3.5
22AHU06	AIRPORT TERMINAL LAB	BASEMENT MECH ROOM	AAON	HORIZONTAL AHU	1.76	2.3			575/3/60	470	1,000	875	3.5
22AHU07	VIBRATION LAB	BASEMENT MECH ROOM	AAON	HORIZONTAL AHU	1.76	8			575/3/60	940	2000	875	3.5

Heating coil section:

TAG	COIL DUTY	SENSIBLE LOAD MBH	SENSIBLE LOAD KW	Ent Air Temp db Deg. F.	Leaving Air Temp db Deg. F.	Fluid Type	Ent Fluid Temp Deg. F.	Ent Fluid Temp Deg. C.	Lv Fluid Temp Deg. F.	Lv Fluid Temp Deg. C.	FLOW GPM	FLOW L/S	PRESSURED ROP KPA
22AHU03	PRE-HEAT COIL	251	73.50	20	55	GLYCOL	180.0	82.0	160.0	71.1	25.10	1.584	11,350
22AHU04	PRE-HEAT COIL	133.92	39.21	-12	50	STEAM	175.0	79.4	160.0	71.1	17.86	1.127	
22AHU05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
22AHU06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
22AHU07	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

Cooling coil #1:

TAG	COIL DUTY	SENSIBLE LOAD MBH	SENSIBLE LOAD KW	LATENT LOAD MBH	LATENT LOAD KW	COIL Ent Air Temp wb/db Deg. F.	COIL Leaving Air Temp wb/db Deg. F.	Fluid Type	Ent Fluid Temp Deg. F.	Ent Fluid Temp Deg. C.	Lv Fluid Temp Deg. F.	Lv Fluid Temp Deg. C.	FLOW GPM	FLOW L/S
22AHU03	COOLING COIL	181.47	53.17	80.44	23.57	80/67	54.5/53.9	GLYCOL	46.0	7.8	56.0	13.3	52.10	3.287
22AHU04	PRE-COOLING COIL	218099				95	45	GLYCOL	35.0	1.7	45.0	7.2	43.10	2.719
22AHU05	COOLING COIL	126.6223	37.1	21	6	75/62	55/54	GLYCOL	35.0	1.7	45.0	7.2	30	1.89
22AHU06	COOLING COIL	11.9455	3.5	10.239	3	75/62	55/54	GLYCOL	35.0	1.7	45.0	7.2	4.6	0.29
22AHU07	COOLING COIL	85	25	0	0	75/62	55/54	GLYCOL	35.0	1.7	45.0	7.2	18	1.13

Desiccant section:

TAG	MOISTURE REMOVAL LB/HR	MOISTURE REMOVAL KG/HR	SA HUMID %RH	REACTIVATION ENERGY MBH	REACTIVATION ENERGY KW	REACTIVATION AIRFLOW CFM	REACTIVATION AIRFLOW L/S	HP	ENTERING AIR TEMP Deg. F.	ENTERING AIR TEMP Deg. C.	LEAVING AIR TEMP Deg. F.	LEAVING AIR TEMP Deg. C.
22AHU03	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
22AHU04			5	120,288.000	35.200	601.000	284.000	3.000	45.000		89.000	
22AHU05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
22AHU06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
22AHU07	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Cooling coil #2:

TAG	COIL DUTY	SENSIBLE LOAD MBH	SENSIBLE LOAD KW	LATENT LOAD MBH	LATENT LOAD KW	COIL Ent Air Temp wb/db Deg. F.	COIL Leaving Air Temp wb/db Deg. F.	Fluid Type	Ent Fluid Temp Deg. F.	Ent Fluid Temp Deg. C.	Lv Fluid Temp Deg. F.	Lv Fluid Temp Deg. C.	FLOW GPM	FLOW L/S
22AHU03	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
22AHU04	POST-COOLING COIL	97442	28.55			94	65/40	GLYCOL	46.0	7.8	56.0	13.3	19.00	1.199
22AHU05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
22AHU06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
22AHU07	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Energy recovery section:

TAG	AIRFLOW CFM	AIRFLOW L/S	SUMMER RETURN AIR DB/WB(F)	WINTER RETURN AIR DB/WB(F)	SUMMER OA DB/WB(F)	WINTER OA DB/WB(F)	TOTAL EFFECTIVENESS
22AHU03	3200	1510	75/63	72/55	87/71	-17	72%
22AHU04	N/A	N/A	N/A	N/A	N/A	N/A	N/A
22AHU05	N/A	N/A	N/A	N/A	N/A	N/A	N/A
22AHU06	N/A	N/A	N/A	N/A	N/A	N/A	N/A
22AHU07	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Note:
1 to be provided complete with all required accessories and components to constitute a complete and working installation in accordance with manufacturer's recommendation

VAV BOX / BOOSTER COILS

TAG	TYPE	SERVICE	ROOM#	MAKE	MODEL	STYLE	SIZE (INLET) mm	(IN.)	MAX L/S	MAX (CFM)	MIN L/S	MIN (CFM)	OFF L/S	OFF (CFM)	CAPACITY TYPE	CAPACITY MBTU	EAT °C	EAT (°F)	EWT °C	EWT (°F)	LWT °C	LWT (°F)	FLOW L/S	FLOW (GPM)	WPD KPa	WPD (FT)	NOTES
FLOOR		ZONE																									
VAV 1.1	VAV	FSL OBSERVATION	26	PRICE	SDV		125	5	100	212	50	106	0			60	13	55	82	180	71	160	0.4	6.7			
VAV 1.2	VAV	CORRIDOR	21	PRICE	SDV		175	7	230	487	69	146	0														
VAV 1.3	VAV	VIBRATION LAB	24	PRICE	SDV		150	6	188	398	56	119	0			24	13	55	82	180	71	160	0.2	2.7			
VAV 1.4	VAV	OFFICES	22,31,32	PRICE	SDV		125	5	115	244	35	74	0			7.1	13	55	82	180	71	160	0	0.79			
VAV 1.5	VAV	WORKSHOP	33	PRICE	SDV		150	6	142	301	106	225	0			18	13	55	82	180	71	160	0.1	2			
VAV 1.6	VAV	WORKSHOP	34	PRICE	SDV		150	6	142	301	106	225	0			18	13	55	82	180	71	160	0.1	2			
VAV 1.7	VAV	OFFICES	23,35,36	PRICE	SDV		125	5	115	244	35	74	0			7.1	13	55	82	180	71	160	0	0.79			
VAV 1.8	VAV	CORRIDOR	21	PRICE	SDV		125	5	90	191	27	57				25	13	55	82	180	71	160	0.2	2.8			
VAV 2.1	VAV	CORRIDOR	124	PRICE	SDV		225	9	376	797	113	240	0			51	13	55	82	180	71	160	0.4	5.7			
VAV 2.2	VAV	INTERVIEW	127	PRICE	SDV		150	6	120	254	36	76	0														
VAV 2.3	VAV	WAITING	125	PRICE	SDV		300	12	544	1,153	408	865	0														
VAV 2.4	VAV	ENTRANCE	121,122	PRICE	SDV		125	5	88	186	26	56	0														
VAV 2.5	VAV	SCREENING	129	PRICE	SDV		150	6	136	288	41	86	0														
VAV 2.6	VAV	EXAM	130,131,132	PRICE	SDV		150	6	150	318	52	111	0			6.9	13	55	82	180	71	160	0.04	0.69			
VAV 2.7	VAV	FCL OBSERVATION	138	PRICE	SDV		125	5	50	200	47	100	0														
VAV 2.8	VAV	FLEXIBLE CABIN LAB	139	PRICE	SDV		225	9	376	797	113	239				42	13	55	82	180	71	160	0.3	4.7			

Note: to be provided complete with all required accessories and components to constitute a complete and working installation in accordance with manufacturer's recommendation

SPLIT SYSTEM AC SCHEDULE

TAG	SERVICE	MAKE	EER	EVAPORATOR DIM. (W X L X H) mm	mm	mm	CONDENSER DIM. (W X L X H) mm	mm	mm	TOTAL CAPACITY (KW)	ELECTRICAL MCA	POWER	V/PH	MEDIUM	WEIGHT KG	LBS	NOTE:
22PAS01	OBSERVATION RM	DAIKIN	12	1000	225	300				4.4	15	1.29	208/1	R410a		93	INDOOR UNIT POWERED FROM CONDENSING UNIT. LOW AMBIENT COOLING
22PAS02	OBSERVATION RM	DAIKIN	12	1000	225	300				4.4	15	1.29	208/1	R410a		93	INDOOR UNIT POWERED FROM CONDENSING UNIT. LOW AMBIENT COOLING
22PAS03	ELECTRICAL RM	MITSUBISHI					950	330	1350	7.00	28	2.45	208/1	R410a	120	265.00	INDOOR UNIT POWERED FROM CONDENSING UNIT. LOW AMBIENT COOLING

Note: to be provided complete with all required accessories and components to constitute a complete and working installation in accordance with manufacturer's recommendation

HEAT RECOVERY VENTILATOR SCHEDULE

TAG	SYSTEM	LOCATION	MANUF.	TYPE	MOTOR	ELECT. V/P/C	TAG	FLOW L/S	FLOW CFM	E.S.P. Pa	E.S.P. IN WC	TAG	FLOW L/S	FLOW CFM	E.S.P. Pa	E.S.P. IN WC	WEIGHT KG	WEIGHT LB.	DIMENSIONS L	W	H	REMARKS
22HRV01	REFRIGERANT RM VENTN	BSMT JANITOR RM	VENMAR	HRV700i	2 X 1/6HP	120/1/60	SUPPLY	330	700	50	0.2	EXHAUST	330	700	50	0.2	95	210	660	1372	1168	POLYPROPYLENE CORE

Note: to be provided complete with all required accessories and components to constitute a complete and working installation in accordance with manufacturer's recommendation

CHILLER SCHEDULE

TAG	MAKE	TYPE	LOCATION	MODEL	APPLICATION	CAPACITY KW	CAPACITY TONS	POWER INPUT KW	MCA	EMERGENCY POWER	EVAPORATOR EWT Deg. F	LWT Deg. F	FLOW GPM	PRESS DROP KpA	PRESS DROP Ft WC	WATER CONDENSER EWT Deg. F	LWT Deg. F	FLOW L/S	FLOW GPM	PRESS DROP FT NWC	REFRIGERANT	IPLV COP	HEIGHT Inches	WIDTH Inches	LENGTH Inches	WEIGHT kg	WEIGHT Lb.s	dBA
22CCH04	DAIKIN	Packaged air-cooled chiller	Outdoors on Grade	AGZ030E	BUILDING COOLING	96.6	27.5	32.7	63.9	NO	54	44	78	51	17	N/A	N/A	N/A	N/A	N/A	R410a	15.1	100	88	94	1346	2960	88
22CCH05	AERMEC	Screw - Water Cooled	East Mech Rm	NXW0900Y	LABS COOLING	179.2	51	67.5	22.3	NO	44	34	148	40.7	13.6	85	95	12.4	196	9.43	R410a	19.8	74.2	31.5	95	1265	2789	82
22CCH06	REFPLUS	Screw - Water Cooled	FSL	WCS-250-5L4-8	FUSELAGE COOLING	35.1	10		38.38	NO	-21	-30				85	95	2.52	40	21	R404A		100	50	100	460	1009	85

Note: to be provided complete with all required accessories and components to constitute a complete and working installation in accordance with manufacturer's recommendation

DRY COOLER SCHEDULE

REF. NO.	MAKE	TYPE	MODEL	LOCATION	CAPACITY KW	CAPACITY TONS	FAN HP	FLA	POWER V/PH/HZ	EMERGENCY POWER	WATER EWT Deg. F	LWT Deg. F	FLOW GPM	PRESS DROP Ft WC	AIR EAT(wb) Deg. F	AIR FLOW CFM	HEIGHT Inches	WIDTH Inches	LENGTH Inches	WEIGHT Lb.s	SOUND LEVEL dBA
22DRY01	REFPLUS	FLUID COOLER		GRADE		51	2	2.7	575/3/60	NO	95	85	196	5.8			52	93	237.5	3,412	

to be provided complete with all required accessories and components to constitute a complete and working installation in accordance with manufacturer's recommendation

HEATER SCHEDULE

TAG	SERVICE	MAKE	MODEL	STYLE	VOLTAGE	SIZE (W X H X D) mm	(IN.)	AIR FLOW L/S	(CFM)	FAN SPEED	MOTOR POWER KW	(HP)	EAT °C	(°F)	EWT °C	(°F)	LWT °C	(°F)	FLOW L/S	(GPM)	WPD KPa	(FT)	CAPACITY KW	(MBH)
22UNH11	WEST STAIRWELL	ROSEMEX	F300-A	RW-2	115	1000X750X200	40X30X8		200					70		170		150		2.24				22.4
22UNH12	EAST STAIRWELL	ROSEMEX	F300-A	RW-2	115	1000X750X200	40X30X8		200					70		170		150		2.24				22.4
22UNH13	NORTH ENT. VESTIBULE	ROSEMEX	F300-A	RW-2	115	1000X750X200	40X30X8		200					70		170		150		2.24				22.4
22UNH14	PENTHOUSE MECH	ROSEMEX	HORIZONTAL	H18	115	1000X750X200	40X30X8		460					70		170		155		2.4				18

Note: to be provided complete with all required accessories and components to constitute a complete and working installation in accordance with manufacturer's recommendation

HEAT EXCHANGER SCHEDULE

TAG	SERVICE	MAKE	MODEL	STYLE	CAPACITY (KW)	SIZE (W X H X D) mm	(IN.)	SHELL SIDE PD KPA	FT	MEDIUM	PRESS KPA	PSI	FLOW G/H	LB/HR	TUBE SIDE MEDIUM	EWT °C	(°F)	LWT °C	(°F)	FLOW L/S	(GPM)	WPD KPa	(FT)	NOTES
HX-1	BUILDING HOT WATER			SHELL AND TUBE	180		4.9 X 12.2 X 8.8	1.2		STEAM		50		694	WATER		190		165		49	10		
HX-2	LABS GLYCOL			SHELL AND TUBE	160			1.2		STEAM		50		564	GLYCOL		180		155		50			

Note: to be provided complete with all required accessories and components to constitute a complete and working installation in accordance with manufacturer's recommendation

TANK SCHEDULE

No.	SERVICE	LOCATION	MAKE	MODEL	STORAGE Litre	TYPE	ELEMENTS	VOLTAGE	HEIGHT mm	DIAMETER mm	ORIENT	NOTES
22HWT04	DOMESTIC HOT WATER	JANITOR ROOM	AO SMITH	DRE-80	300	ELECTRIC	3x3000W	600V/3PH	1530	648	VERTICAL	

Note:

FANS SCHEDULE

TAG	SYSTEM	LOCATION	MANUF.	MODEL	TYPE	BHP	MOTOR HP	ELECTRICAL V/P/C	VFD	FLOW L/S	FLOW CFM	E.S.P. Pa	E.S.P. IN WC	SONES
22XAF09	BUILDING SANITARY EXHAUST	UPPER LEVEL W/RM CEILING	GREENHECK	SQ-120	INLINE CABINET DIRECT DRIVE	0.14	0.5	120/1/60	NO	401	850	125	0.5	5.9
22XAF10	FLEX CABIN SAN EXHAUST	FCL CEILING	GREENHECK	SQ-80	INLINE CABINET DIRECT DRIVE	0.06	0.25	120/1/60	NO	94	200	125	0.5	7.6
22RAF06	AIRPORT TERMINAL RETURN	LOWER LEVEL	GREENHECK	BSQ-130HP	INLINE CABINET BELT DRIVE	1	1	575/3/60	YES	472	1,000	560	2.25	16.8
22RAF05	FCL/FSL RETURN	LOWER LEVEL	GREENHECK	BSQ-140	INLINE CABINET BELT DRIVE	1.7	2	575/3/60	YES	944	2000	585	2.35	25
22SAF01	FSL VENTILATION/HEATING	FSL	GREENHECK	BSQ-90	INLINE CABINET BELT DRIVE	0.51	0.5	120/1/60	NO	472	1000	125	0.5	21
22RAF07	VIBRATION LAB RETURN	LOWER LEVEL	GREENHECK	BSQ-140	INLINE CABINET BELT DRIVE	1.7	2	575/3/60	YES	944	2000	585	2.35	25

DUCT HEATING COIL SCHEDULE

TAG	SYSTEM	LOCATION	TYPE	COIL DUTY	AIRFLOW cfm	AIRFLOW L/s	SENSIBLE LOAD btu/hr	SENSIBLE LOAD KW	Power V/PH/HZ	Ent Air Temp DEG C	Ent Air Temp DEG F	Leaving Air Temp DEG C	Leaving Air Temp DEG F	PRESS DROP KPa	PRESS DROP in WC	NOTES
ERH-1	FLEX CABIN	UPPER LEVEL	ELECTRIC	HEATING	2000	944	21600	6.33	600/3/60	35	95	41	105	24.9	0.1	SCR CONTROLLER, AIRFLOW PROVING SWITCH, HIGH LIMIT STAT
ERH-2	FUSELAGE	LOWER LEVEL	ELECTRIC	HEATING	2000	944	21600	6.33	600/3/60	35	95	41	105	24.9	0.1	SCR CONTROLLER, AIRFLOW PROVING SWITCH, HIGH LIMIT STAT
ERH-3	AIRPORT TERMINAL	LOWER LEVEL	ELECTRIC	HEATING	1000	472	10800	3.16	600/3/60	35	95	41	105	24.9	0.1	SCR CONTROLLER, AIRFLOW PROVING SWITCH, HIGH LIMIT STAT
ERH-4	VIBRATION LAB	MAIN MECH RM	ELECTRIC	HEATING	2000	944	21600	6.33	600/3/60	35	95	41	105	24.9	0.1	SCR CONTROLLER, AIRFLOW PROVING SWITCH, HIGH LIMIT STAT
	22SAF01	FSL	GLYCOL	HEATING	2000	944	110160	32.28	N/A	21	70	49	121	57.27	0.23	180F - 160F GLYCOL EWT/LWT
	22AHU04	MAIN MECH RM	STEAM	PREHEAT	2000	944	144720	42.40	N/A	-27	-17	10	50			50 PSI STEAM

Note: to be provided complete all required accessories and components to constitute a complete and working installation

HUMIDIFIER SCHEDULE

(METRIC)

HUM	L/sec	SERVES	ENTERING CONDITIONS ENTERING AIR TEMP / RH	LEAVING CONDITIONS LEAVING AIR TEMP / RH	REQUIRED KG/HR	TYPE	ELECTRICAL POWER INPUT (KW)	V/PH/HZ	AMPS	MOUNTING	
22HUM04	944	AHU-04	40 C / 10%	40 C / 30%	54	ELECTRODE STEAM	42	600/3/60	40	WALL	DRISTEEM XTP-042

Notes
1 c/w: controller, modulating valve (suitable for DDC control), s/s distributor(s), high limit switch, air proving switch, & mounting hardware.
2 to be provided complete with all required accessories and components to constitute a complete and working installation in accordance with manufacturer's recommendation

BASEBOARD HEATER SCHEDULE

TAG	LOCATION	MAKE	MODEL	STYLE	LENGTH (MM) ENCLOSURE	ACTIVE	EAT °C	(°F)	AVGWT °C	(°F)	FLOW L/S	(GPM)	CAPACITY KW	NOTES
22BBH01	WOMEN'S WASHROOM 1	ROSEMEX	RVS 44C3	D	900	800	21	70	77	170	0.03339	0.53	1.5KW/M	PROVIDE END CAP
22BBH02	MEN'S WASHROOM 133	ROSEMEX	RVS 44C3	D	900	800	21	70	77	170	0.03339	0.53	1.5KW/M	PROVIDE END CAP
22BBH03	SINGLE WASHROOM 128	ROSEMEX	RVS 44C3	H	2400	1000	21	70	77	170	0.02268	0.36	1KW/M	APPROXIMATE WALL-TO-WALL LENGTH OF ENCLOSURE LISTED. SITE VERIFY BEFORE ORDERING
22BBH04	JANITOR 136	ROSEMEX	RVS 44C3	H	1440	900	21	70	77	170	0.02016	0.32	1KW/M	APPROXIMATE WALL-TO-WALL LENGTH OF ENCLOSURE LISTED. SITE VERIFY BEFORE ORDERING
22BBH05	AIRPORT TERMINAL 135	ROSEMEX	RVS 44C3	H	5666	2X1500	21	70	77	170	0.06741	1.07	1KW/M	APPROXIMATE WALL-TO-WALL LENGTH OF ENCLOSURE LISTED. SITE VERIFY BEFORE ORDERING

Note: to be provided complete with all required accessories and components to constitute a complete and working installation in accordance with manufacturer's recommendation

EXPANSION TANKS

TAG	SYSTEM	TANK VOLUME (GAL)	ACCEPT VOLUME (GAL)	DIMENSIONS HEIGHT (IN)	DIAMETER (IN)	SYSTEM VOLUME (GAL)	MEDIUM	INITIAL TEMP (F)	MAX DESIGN TEMP (F)	INITIAL PRESSURE (PSI)	MAX DESIGN PRESURE (PSI)	DESIGN BASIS
22PVE02	BUILDING HEATING SYSTEM	11	5	28	14	62.5	50% ETH GLY	80	180	35	65	TACO CBX-42
22PVE03	BUILDING COOLING SYSTEM	4	2.5	15	14	126.3	50% ETH GLY	40	75	35	65	TACO CBX-15
22PVE04	PROCESS COOLING SYSTEM	4	2.5	15	14	133.5	50% ETH GLY	35	75	35	65	TACO CBX-15
22PVE05	DOMESTIC HOT WATER	8	5	25	14	25	POTABLE WATER	40	120	12	65	TACO PAX-30

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GENERAL NOTES

- CONTRACTORS TO CHECK AND VERIFY ALL DIMENSIONS ON SITE PRIOR TO DEMOLITION OR CONSTRUCTION AND REPORT ANY ERRORS OR OMISSIONS TO DEPARTMENTAL REPRESENTATIVE.
- CONTRACTORS MUST VISIT THE SITE & FULLY FAMILIARIZE THEMSELVES WITH THE SCOPE OF THE WORK.
- PREVENT THE SPREAD OF DUST & DEBRIS BEYOND THE WORK AREA AND CLEAN ALL SURFACES AT COMPLETION.
- MAKE GOOD ALL SURFACES AFFECTED BY THIS WORK.
- COORDINATE ALL SHUTDOWNS WITH THE DEPARTMENTAL REPRESENTATIVE.
- PROVIDE ALL LABOUR AND MATERIAL REQUIRED TO FORM A COMPLETE, FUNCTIONAL SYSTEM AS DESCRIBED ON DRAWINGS.

REGISTERED PROFESSIONAL ENGINEER C. C. PAL PROVINCE OF ONTARIO

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KEY PLAN

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0	29 05 2015	ISSUED FOR TENDER	

Date Printed 30 OCT 2014 — Date imprimée

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

A Detail no. / No. du détail
B Location drawing no. / sur dessin no.
C Drawing no. / dessin no.

project / projet: NRC CABIN COMFORT + ENVIRONMENTAL RESEARCH FACILITY

MONTREAL ROAD CAMPUS

drawing / dessin: MECHANICAL SCHEDULES

designed / conçu: KC — date: OCT '14
drawn / dessiné: ALM — scale / échelle: AS SHOWN
checked / vérifié: KC — sheet / feuille: of/de
approved / approuvé — W.O.no. — D.T.no.

dwg.no. / dessin no.: 3788-M08

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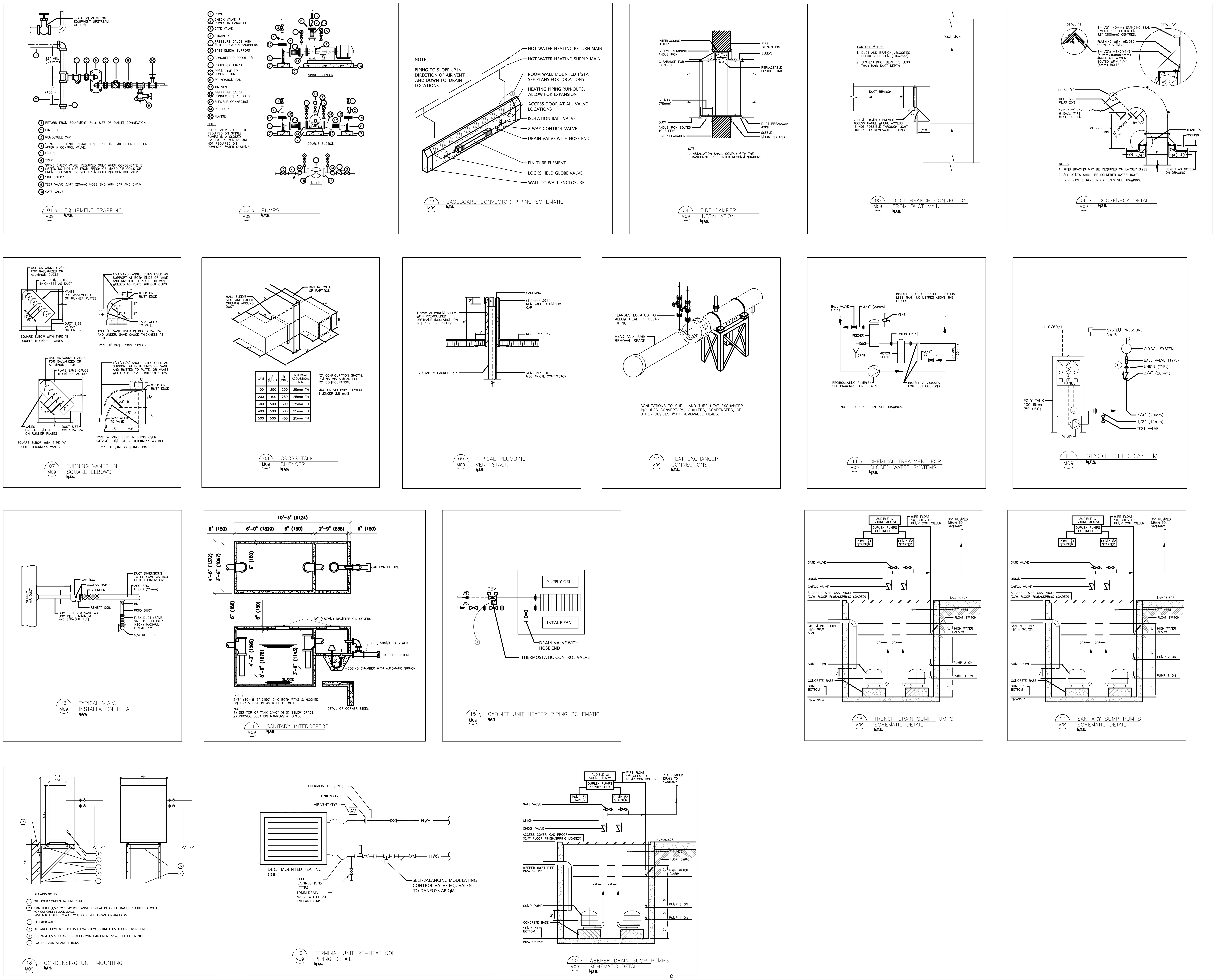

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project / projet: WTA-CCER

MONTREAL ROAD CAMPUS

drawing / dessin: MECHANICAL DETAILS

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approved / approuvé:	W.O.no. / D.T.no.

dwg.no. / dessin no.: 3788-M09

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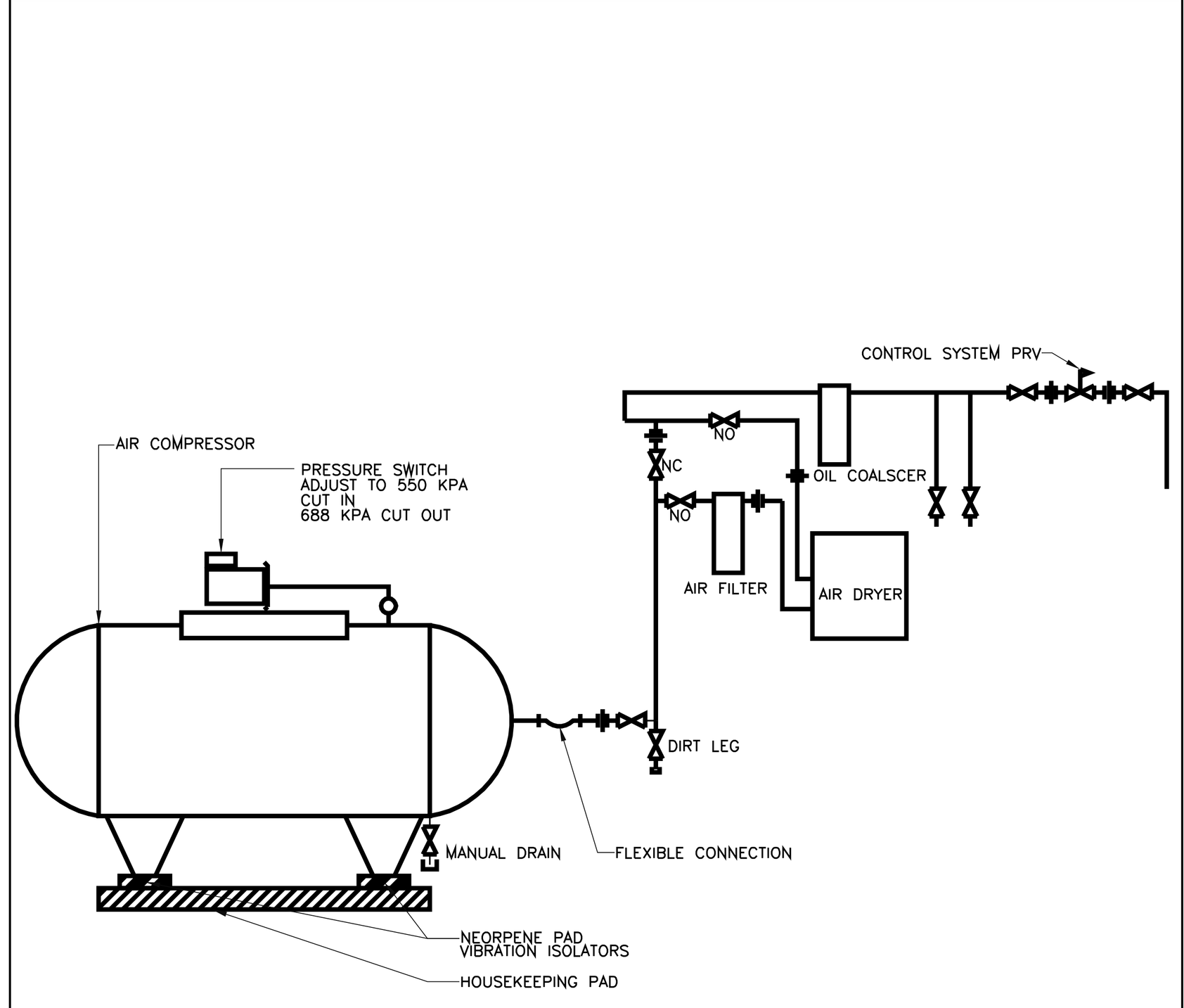
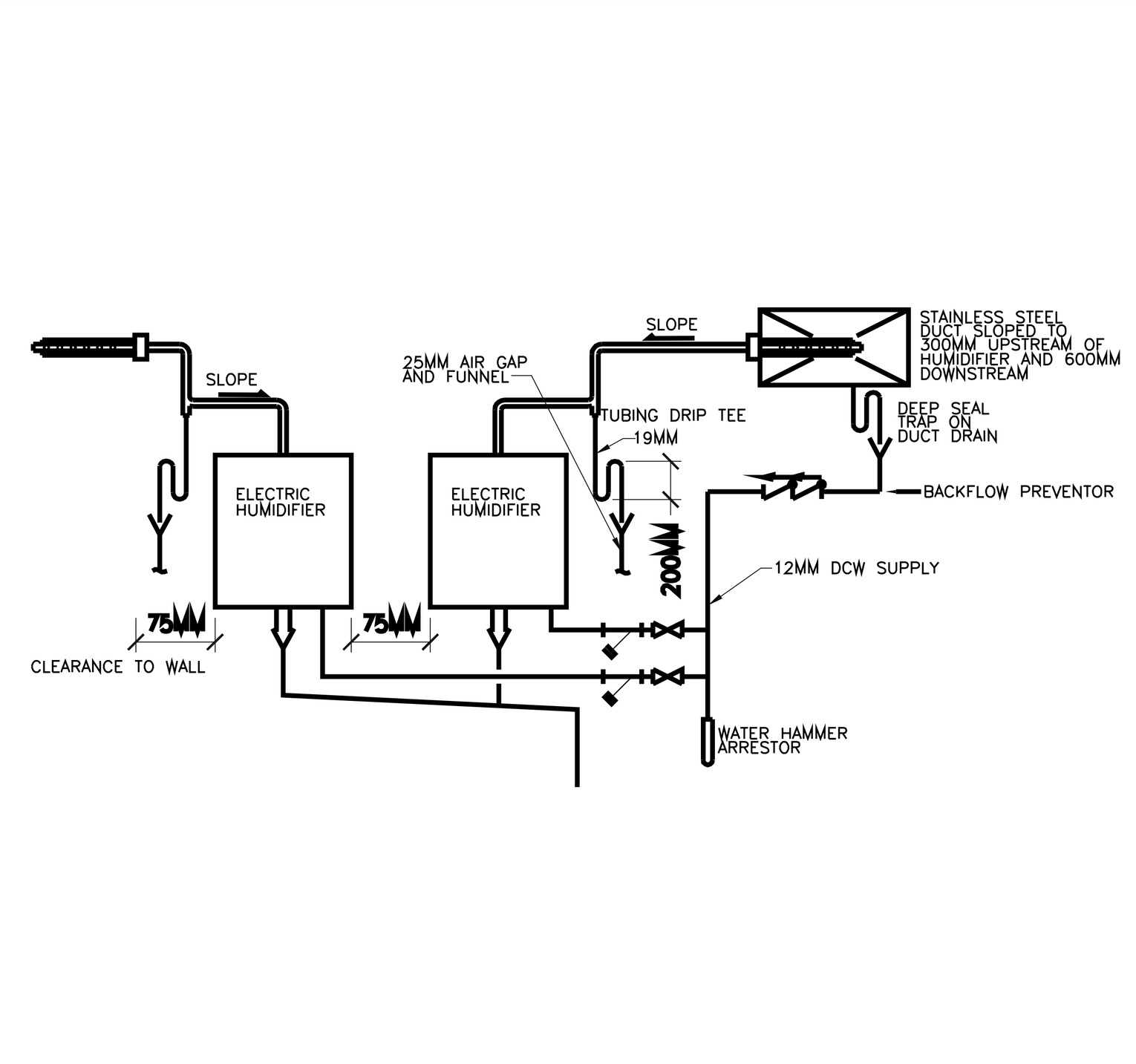
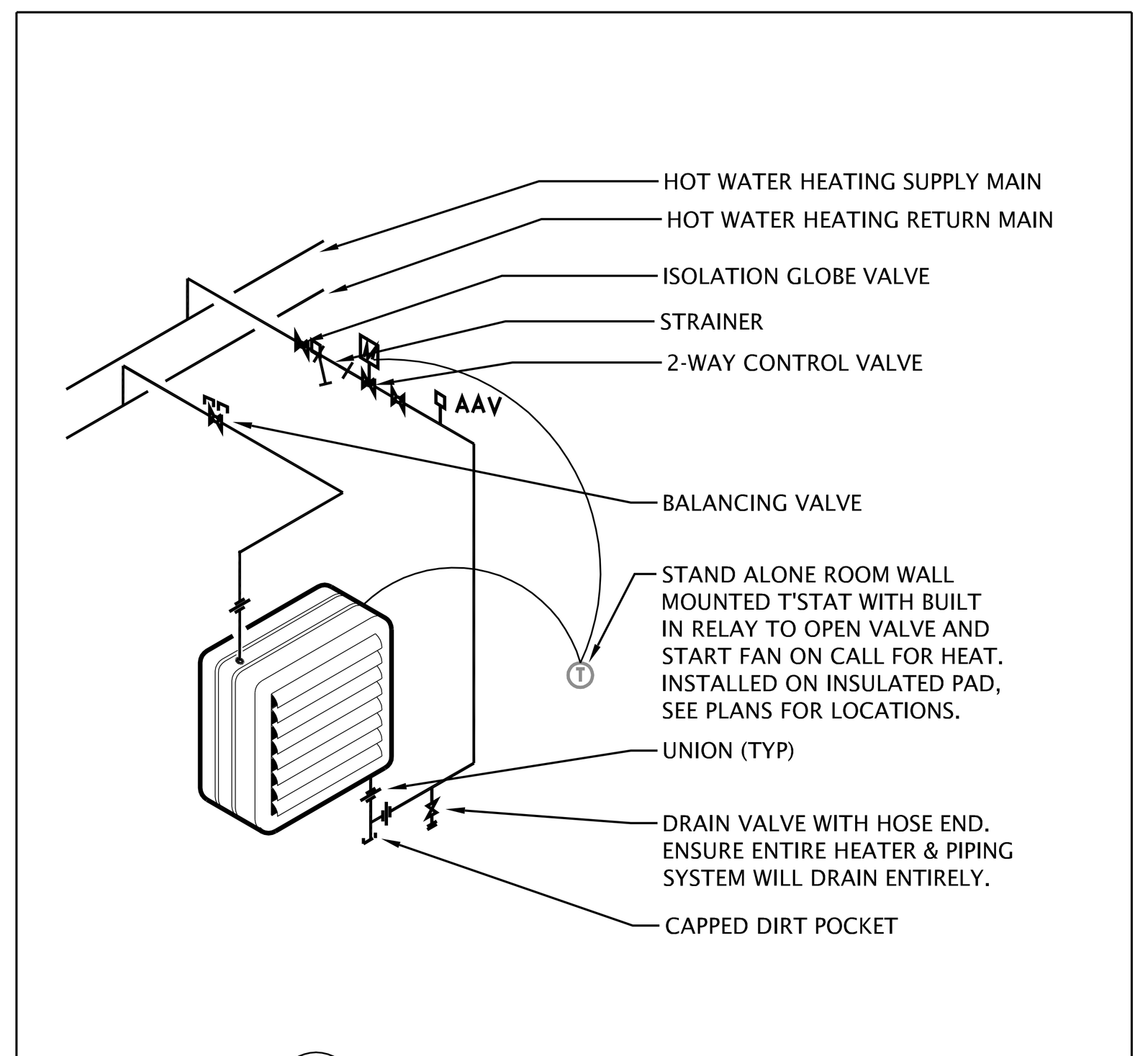


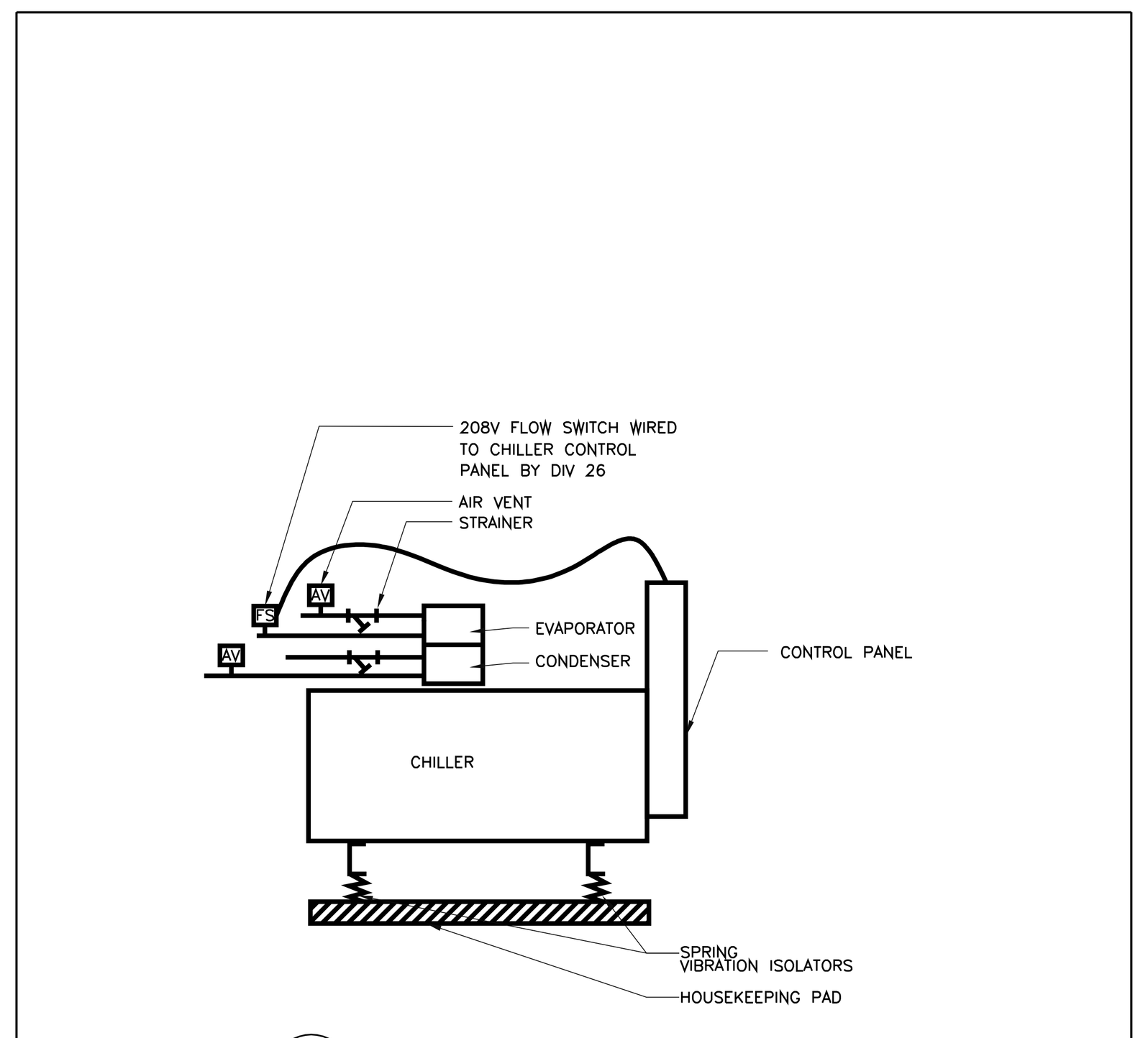
01 COMPRESSED AIR INSTALLATION
M09 N.T.S



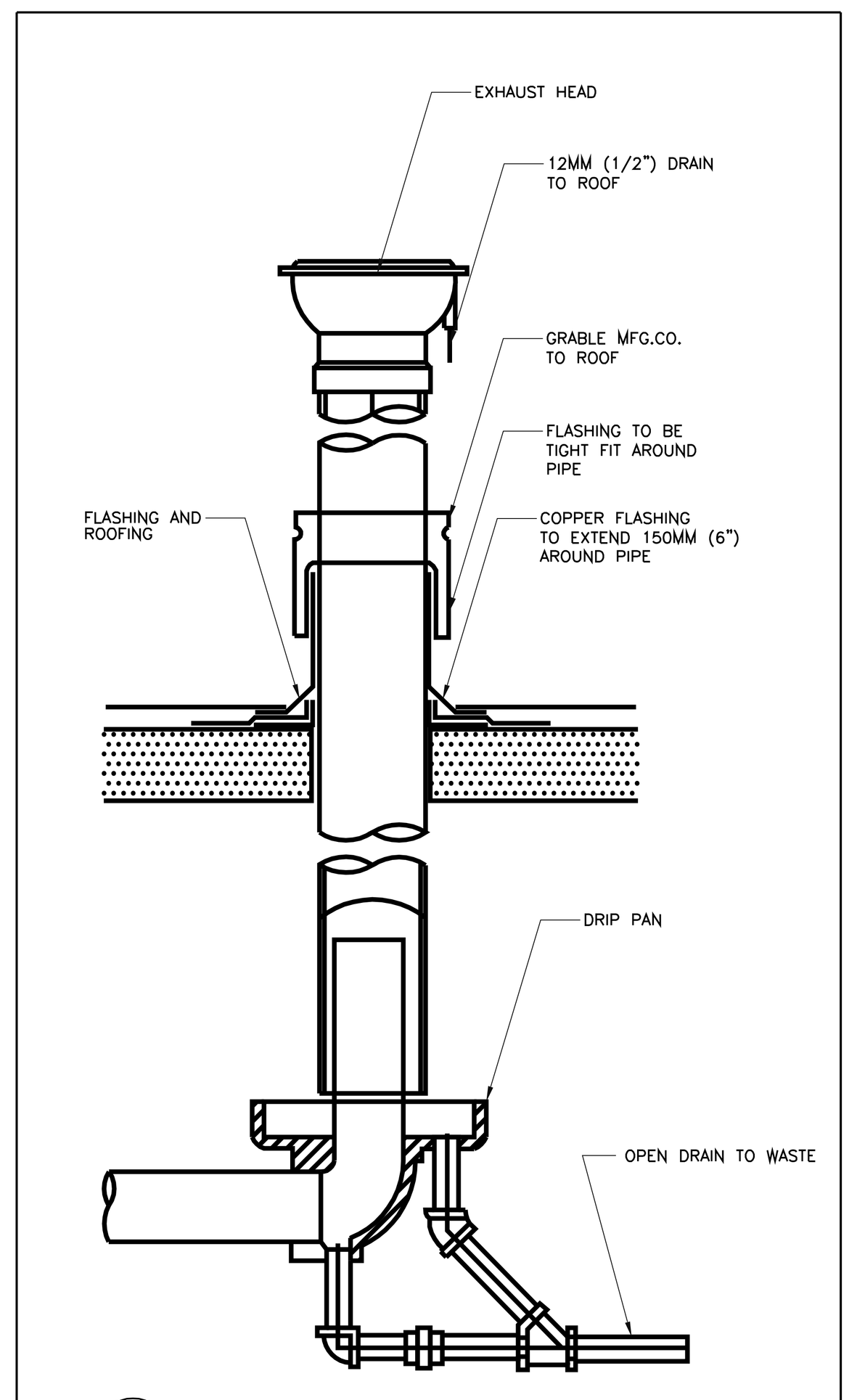
02 HUMIDIFIER INSTALLATION
M10 N.T.S



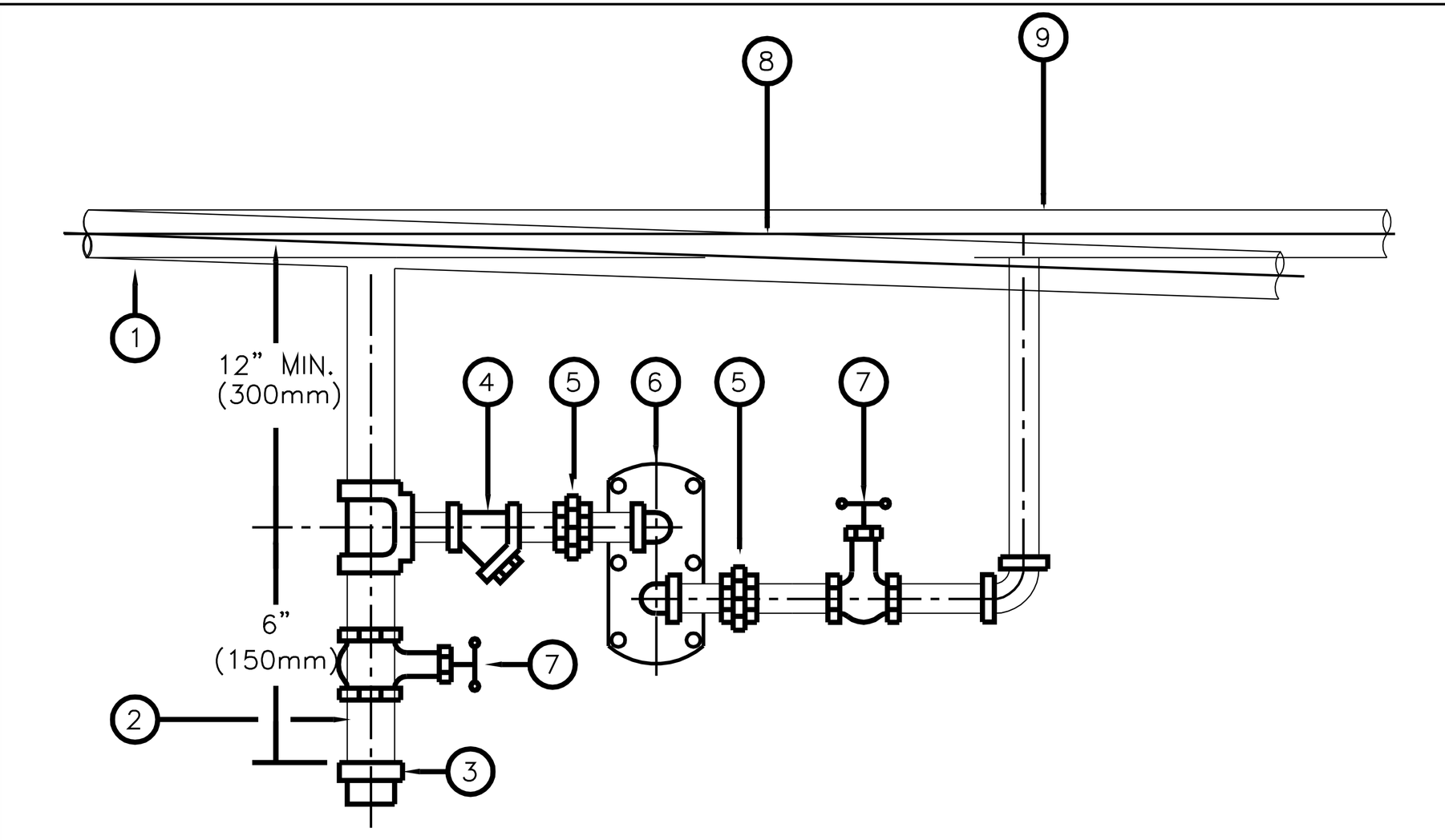
03 UNIT HEATER PIPING SCHEMATIC
M10 N.T.S



04 CHILLER INSTALLATION
M10 N.T.S

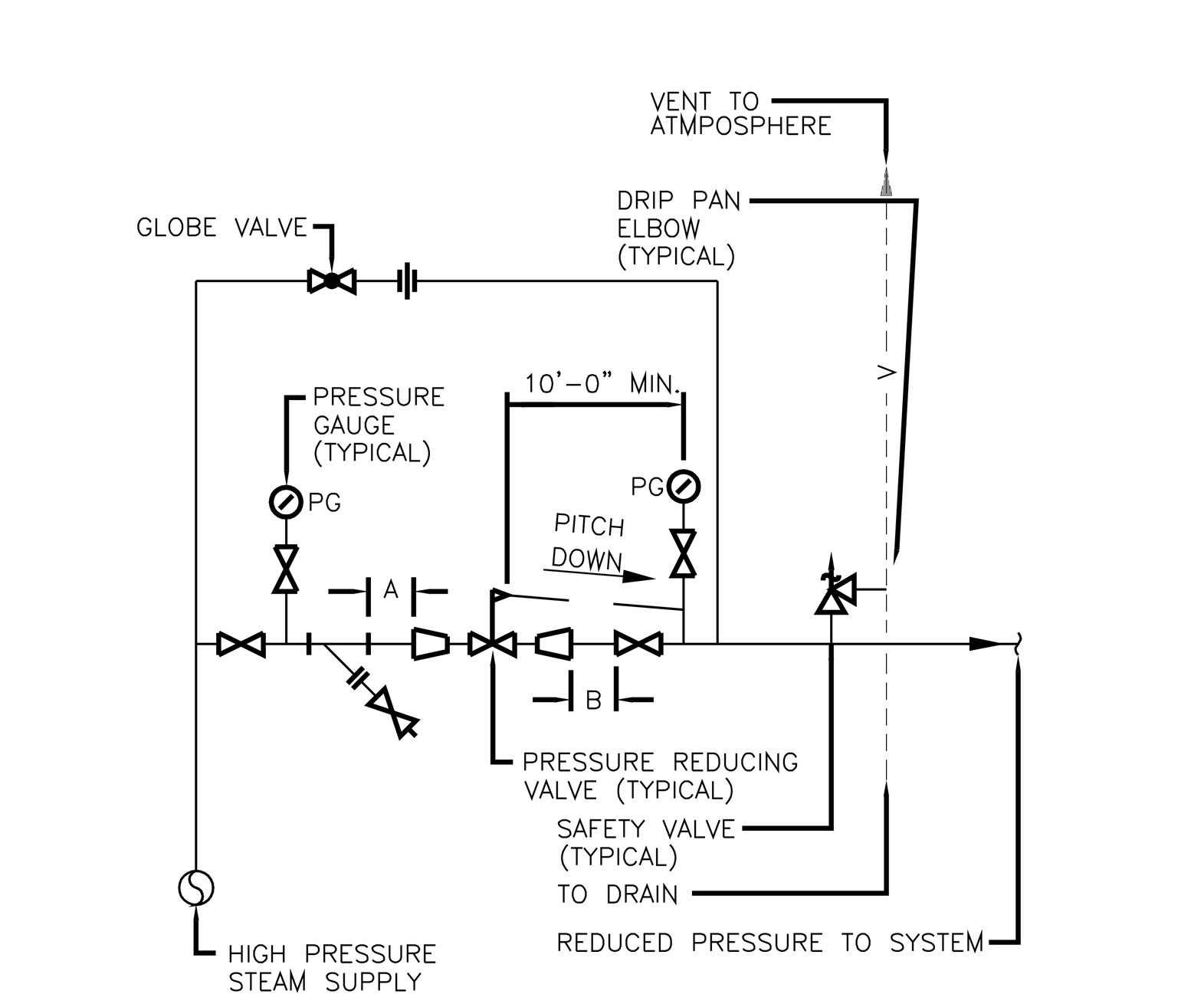


09 DRIP PAN AND EXHAUST FOR PRESSURE RELIEF VALVE
M10



1. RETURN FROM EQUIPMENT. FULL SIZE OF OUTLET CONNECTION.
2. DIRT LEG.
3. REMOVABLE CAP.
4. STRAINER. DO NOT INSTALL ON FRESH AND MIXED AIR COIL OR AFTER A CONTROL VALVE.
5. UNION.
6. TRAP.
7. GATE VALVE.
8. 64MM STEAM MAIN. SLOPE OF STEAM MAIN TO BE 12MM FALL EVERY 3048MM.
9. 38MM CONDENSATE RETURN.

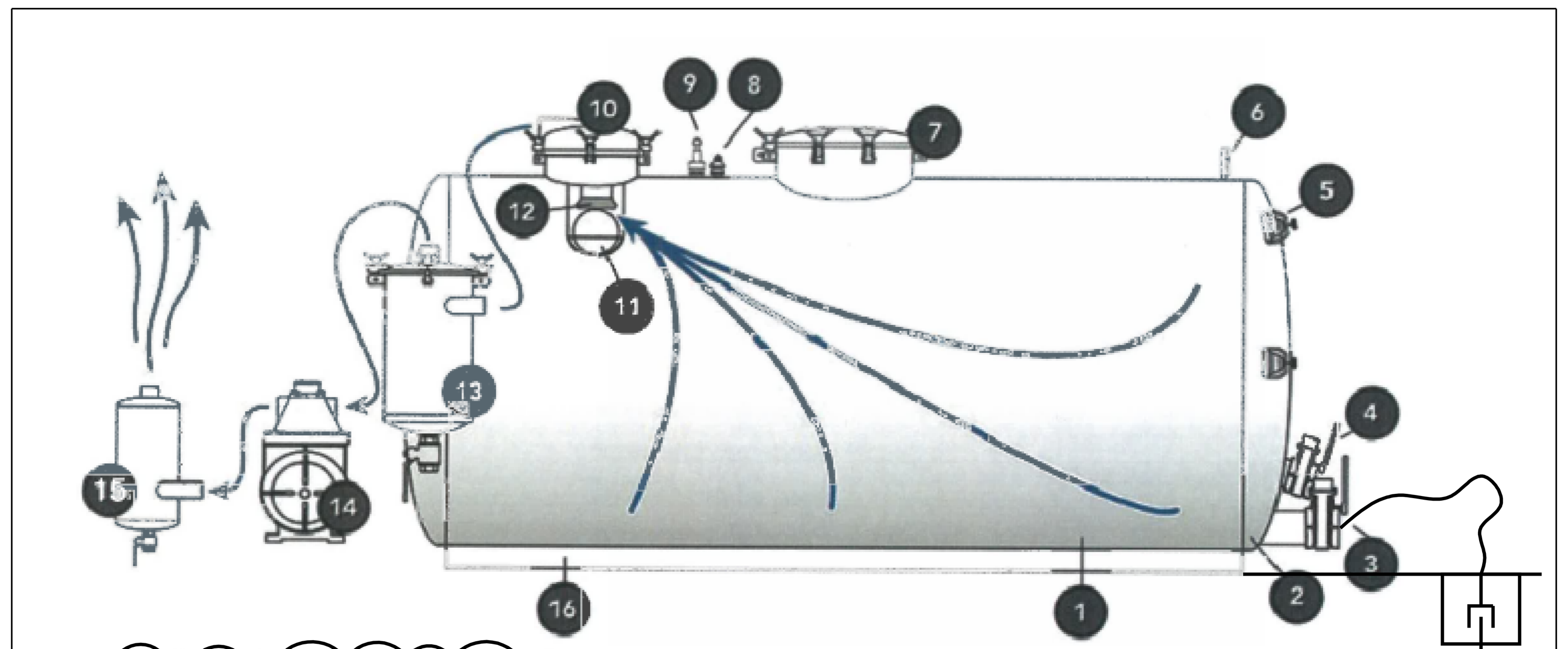
05 STEAM AND CONDENSATE PIPING DIAGRAM OF STEAM TRAP
M10 N.T.S.



NOTES:

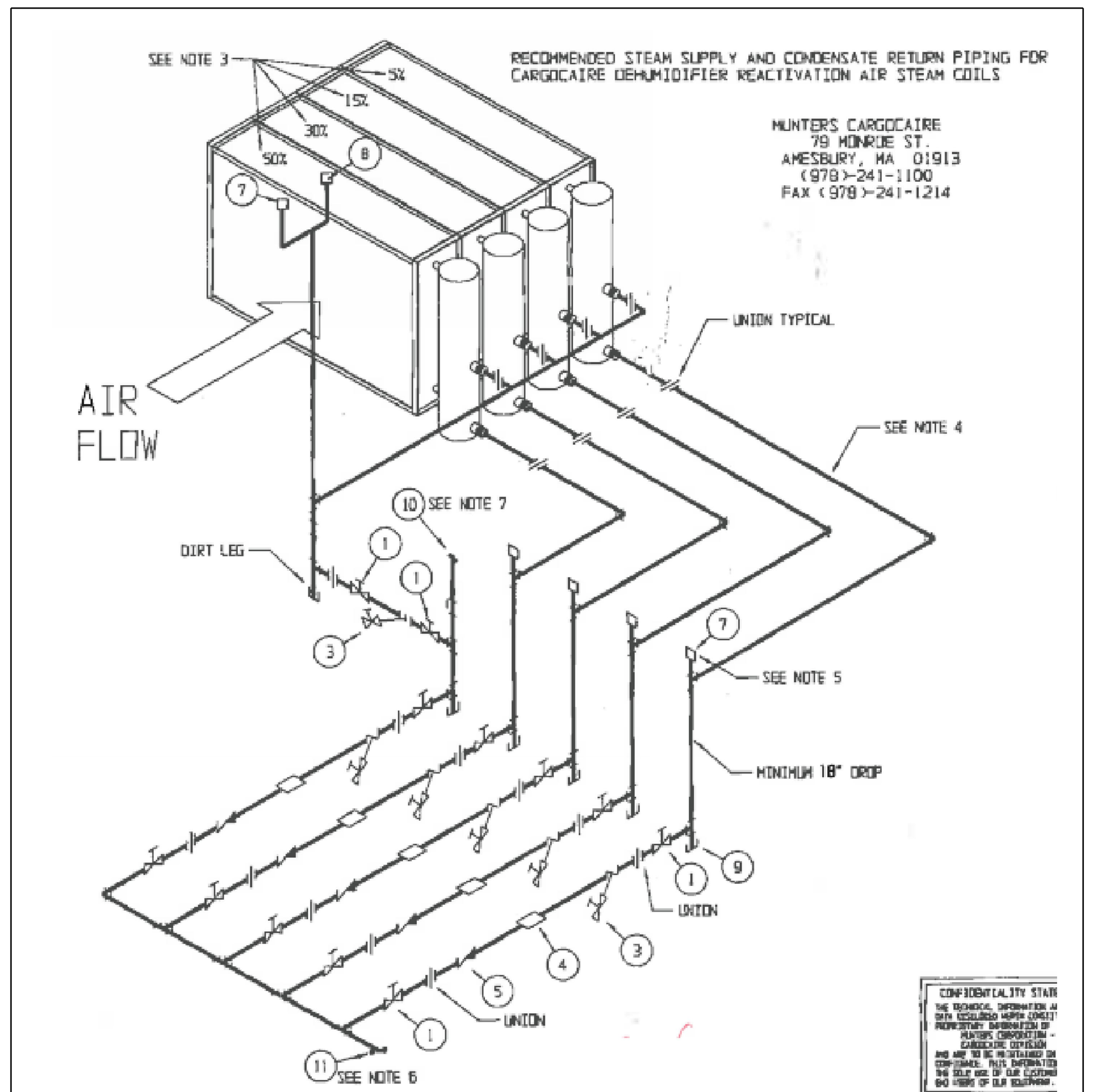
1. LENGTH OF STRAIGHT PIPE SECTION 'A' AND 'B' PER MANUFACTURE REQUIREMENT.
2. RELIEF VALVES ONE OR MORE AS REQUIRED.

06 STEAM PIPING DIAGRAM OF PRESSURE REDUCING VALVE STATION
M10 N.T.S.



1. TANK CAN
2. TANK HEAD
3. DISCHARGE PORT
4. INLET PORT
5. SIGHT EYES
6. VACUUM/PRESSURE GAUGE
7. MANWAY/HATCH/PORTAL
8. VACUUM RELIEF VALVE
9. PRESSURE RELIEF VALVE
10. PRIMARY SHUT OFF
11. FLOAT BALL
12. BALL SEAT
13. SECONDARY SHUT OFF
14. VACUUM PUMP
15. OIL CATCH MUFFLER/OIL SEPERATOR
16. TANK RAILS

07 VACUUM WASTE TANK
M10 N.T.S.

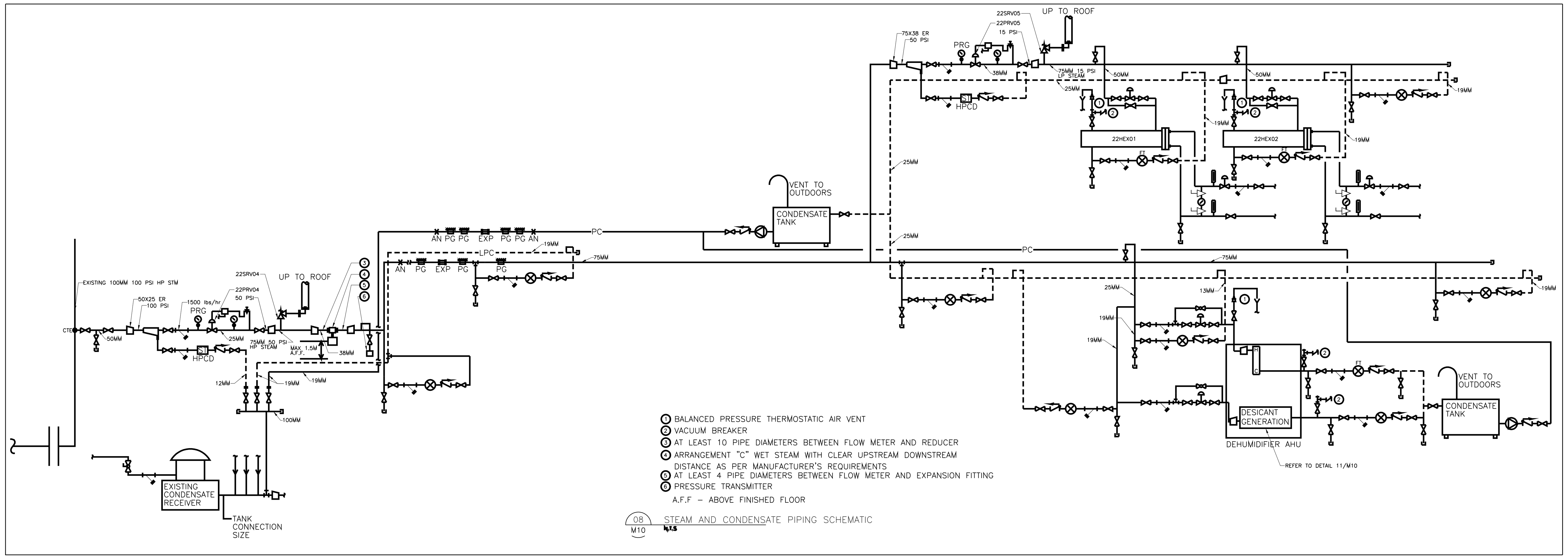


NOTES:

1. QUANTITY OF STEAM COILS REQUIRED IS DETERMINED BY STEAM PRESSURE AVAILABLE, AND REACTIVATION ENERGY REQUIRED.
2. THESE RECOMMENDATIONS ARE FOR GUIDANCE ONLY. IT IS RECOMMENDED THAT THE CUSTOMER CONSULT A STEAM PIPING CONSULTANT FOR SPECIAL REQUIREMENTS.
3. CONDENSATE PIPING AND TRAPS TO BE SIZED PER TRAP MANUFACTURERS SPECIFICATION. COILS TO BE INDIVIDUALLY TRAPPED. THE CONDENSATE LOAD OF EACH COIL IS A PERCENTAGE OF THE TOTAL CONDENSATE LOAD. THE APPROXIMATE PERCENTAGE OF CONDENSATE LOAD FOR EACH COIL IS SHOWN ON SHEET 1. SIZE CONDENSATE TRAPS ACCORDINGLY.
4. CONDENSATE LINES TO BE SAME SIZE AS CONDENSATE CONNECTION ON COIL. REDUCE LINE SIZE AT TRAP USING AN ECCENTRIC REDUCER.
5. AIR VENTS AND VACUUM BREAKERS TO BE HIGHER THAN THE STEAM SUPPLY CONNECTION.
6. CONDENSATE IS TO DRAIN TO A GRAVITY SYSTEM. NO BACK PRESSURE ALLOWED. THERMODYNAMIC TRAPS ARE RECOMMENDED.
7. DO NOT INSTALL MODULATING STEAM VALVE ON COILS. ENERGY MODULATION IS ACHIEVED BY MODULATING AIRFLOW ACROSS COILS. (REFER TO SEQUENCE OF OPERATION). INSTALLATION OF A MODULATING VALVE MAY CAUSE DAMAGE TO STEAM COILS AND MAY VOID WARRANTY.
8. IF SUPPLY VALVE IS USED, IT SHOULD BE SLOW ACTING AND SHOULD BE CLOSED ONLY DURING SYSTEM SHUTDOWN AND WIDE OPEN AT ALL OTHER TIMES.
9. COILS MUST BE INSTALLED LEVEL TO ASSURE PROPER CONDENSATE DRAINAGE.
10. DRAWING SHOWN REPRESENTS HORIZONTAL TUBES FOR VERTICAL TUBE COILS, PIPING REMAINS THE SAME; SUPPLY HEADERS ARE ON TOP OF THE COIL AND CONDENSATE HEATERS ARE ON THE BOTTOM OF THE COIL.
11. SCHEDULE 80 PIPING RECOMMENDED.

(1) GATE VALVE
(2) WYE STRAINER
(3) BLOW DOWN VALVE
(4) STEAM TRAP-SEE NOTE 3
(5) CHECK VALVE
(6)
(7) VACUUM BREAKER
(8) AIR VENT
(9) DIRT LEG
(10) STEAM SUPPLY CONNECTION
(11) CONDENSATE RETURN CONNECTION

11 STEAM PIPING SUPPLY FOR DEHUMIDIFIER
M10



(1) BALANCED PRESSURE THERMOSTATIC AIR VENT
(2) VACUUM BREAKER
(3) AT LEAST 10 PIPE DIAMETERS BETWEEN FLOW METER AND REDUCER
(4) ARRANGEMENT "C" WET STEAM WITH CLEAR UPSTREAM DOWNSTREAM DISTANCE AS PER MANUFACTURER'S REQUIREMENTS
(5) AT LEAST 4 PIPE DIAMETERS BETWEEN FLOW METER AND EXPANSION FITTING
(6) PRESSURE TRANSMITTER
A.F.F - ABOVE FINISHED FLOOR

08 STEAM AND CONDENSATE PIPING SCHEMATIC
M10 N.T.S

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Administrative Services and Property Management Branch / Division des services administratifs et gestion de l'immobilier
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GENERAL NOTES

- CONTRACTORS TO CHECK AND VERIFY ALL DIMENSIONS ON SITE PRIOR TO DEMOLITION OR CONSTRUCTION AND REPORT ANY ERRORS OR OMISSIONS TO DEPARTMENTAL REPRESENTATIVE.
- CONTRACTORS MUST VISIT THE SITE & FULLY FAMILIARIZE THEMSELVES WITH THE SCOPE OF THE WORK.
- PREVENT THE SPREAD OF DUST & DEBRIS BEYOND THE WORK AREA AND CLEAN ALL SURFACES AT COMPLETION.
- MAKE GOOD ALL SURFACES AFFECTED BY THIS WORK.
- COORDINATE ALL SHUTDOWNS WITH THE DEPARTMENTAL REPRESENTATIVE.
- PROVIDE ALL LABOUR AND MATERIAL REQUIRED TO FORM A COMPLETE, FUNCTIONAL SYSTEM AS DESCRIBED ON DRAWINGS.

C. C. PAN

KEY PLAN

No.	Date	Revision	By: Par:
0	29 05 2015	ISSUED FOR TENDER	

Date Printed 30 OCT 2014 Date imprimée

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

A Detail no. / No. du détail
B Location drawing no. / sur dessin no.
C Drawing no. / dessin no.

project / projet: WTA-CCER

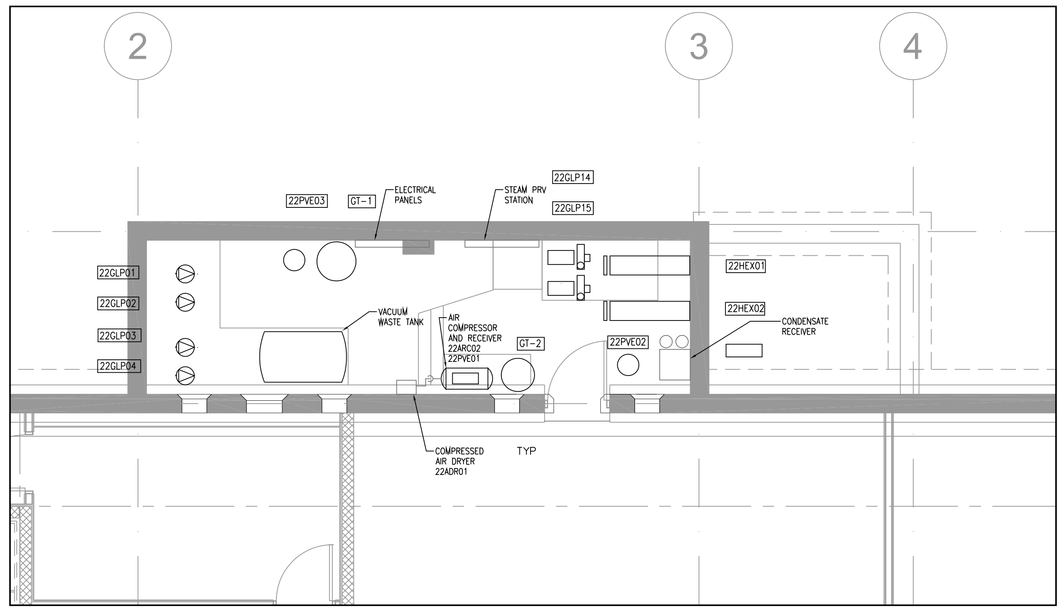
MONTREAL ROAD CAMPUS

drawing / dessin: MECHANICAL DETAILS

designed / conçu	date / date
KC	MAY '15
drawn / dessiné	scale / échelle
ALM	AS SHOWN
checked / vérifié	sheet / feuille
KC	of/de
approved / approuvé	W.O.no. / D.T.no.

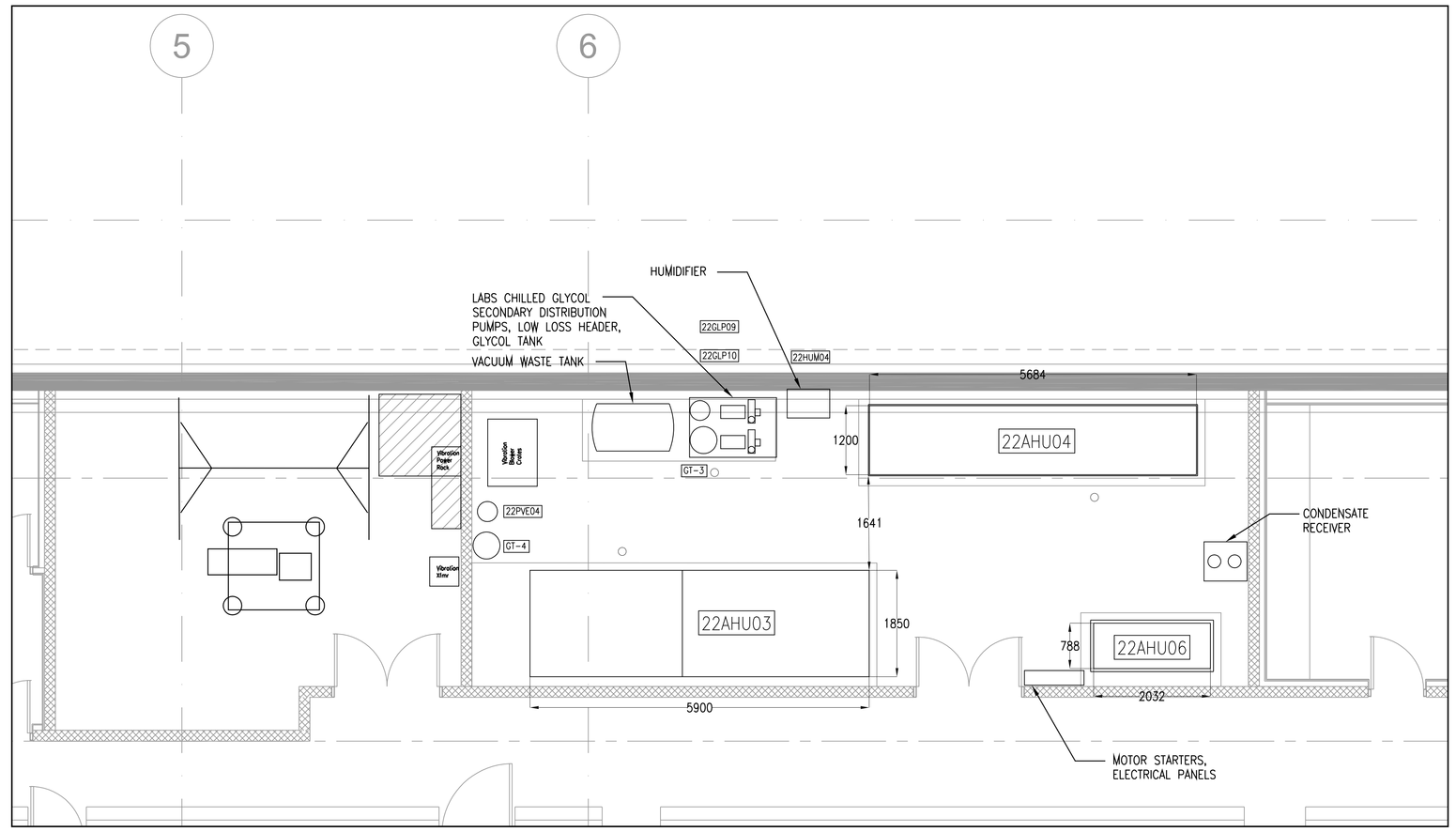
dwg.no. / dessin no.: 3788-M10

ASPM A0 (1189x841)



1 / M11 MECHANICAL ROOM 037 ENLARGED PLAN

SCALE = 1:50



2 / M11 MAIN MECHANICAL ROOM 025 AND VIBRATION LAB EQUIPMENT LAYOUT

SCALE = 1:50

National Research Council Canada | Conseil national de recherches Canada

Administrative Services and Property Management Branch | Division des services administratifs et gestion de l'immobilier

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- PROVIDE ALL LABOUR AND MATERIAL REQUIRED TO FORM A COMPLETE, FUNCTIONAL SYSTEM AS DESCRIBED ON DRAWINGS.

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KEY PLAN

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- Verify all dimensions and site conditions and be responsible for same
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A Detail no., No. du détail
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C Drawing no., dessin no.

project / projet
NRC CABIN COMFORT + ENVIRONMENTAL RESEARCH FACILITY

MONTREAL ROAD CAMPUS

drawing / dessin
ENLARGED MECHANICAL ROOM PLANS

designed / conçu	KC	date / date	MAY '15
drawn / dessiné	ALM	scale / échelle	AS SHOWN
checked / vérifié	KC	sheet / feuille	of/de
approved / approuvé		W.O.no.	D.T.no.

dwg.no. / dessin no.
3788-M11

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C
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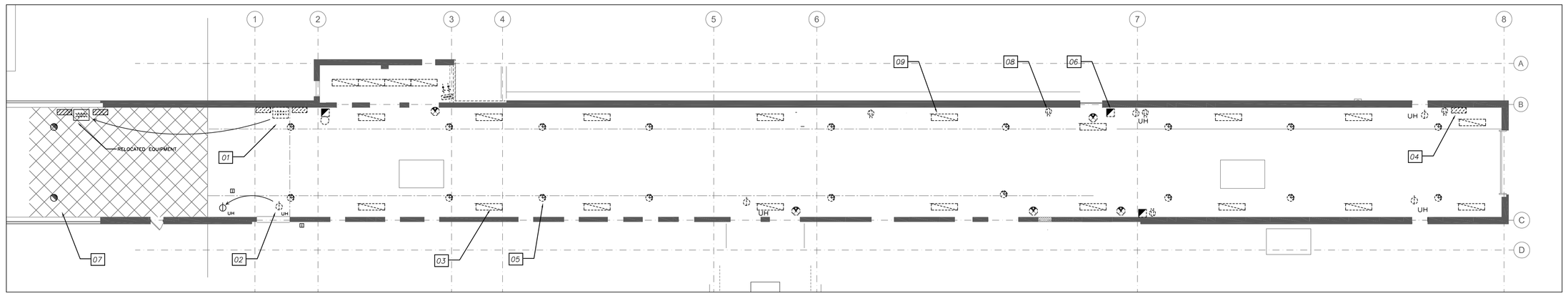
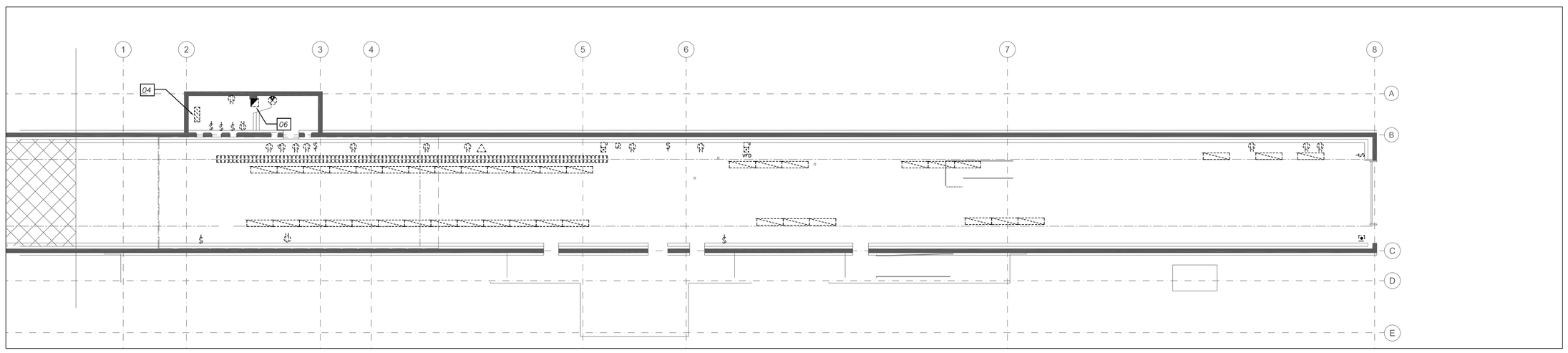


1 / E01 PART SECOND FLOOR PLAN
Scale: 1:200



2 / E01 PART BASEMENT FLOOR PLAN
Scale: 1:200

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	GENERAL		LIGHTING
	EXISTING TO BE REMOVED		WALL LIGHT
	EXISTING EQUIPMENT/DEVICES TO REMAIN		CEILING LIGHT
	NEW EQUIPMENT/DEVICES		CEILING LIGHT ON EMERGENCY
	POWER AND CONTROL		TRACK LIGHT
	DISTRIBUTION PANELBOARD – RECESSED MOUNTED		CEILING OR PENDANT MOUNTED FLUORESCENT LUMINAIRES
000	DRY TYPE TRANSFORMER		CEILING OR PENDANT MOUNTED FLUORESCENT LUMINAIRE ON EMERGENCY CIRCUIT
	STATIC CONVERTER		EMERGENCY BATTERY PACK
$S	HORSEPOWER RATED SPEED SWITCH		EMERGENCY REMOTE LIGHTING HEAD EXIT SIGN – CEILING MOUNTED ARROW DENOTES DIRECTION CHEVRON
	FORCE FLOW HEATING C = CEILING SUSPENDED	$	LOW VOLTAGE LIGHT SWITCH DESIGNATIONS FOR LIGHT SWITCHES 3 – 3-WAY 4 – 4-WAY D – DIMMING L – LOW VOLTAGE P – PILOT LIGHT K – KEY OPERATED LV – LOW VOLTAGE
	DUPLEX RECEPTACLE F = FLOOR MOUNTED GF = GROUND FAULT WP = WEATHERPROOF		
	DUPLEX RECEPTACLE ON SEPARATE CIRCUIT	OS	OCCUPANCY SENSOR
	15/20A DUPLEX RECEPTACLE	LR	LIGHTING CONTROL RELAY
	QUAD RECEPTACLE	DS	DAYLIGHT SENSING RELAY
	SPECIAL RECEPTACLE T = TWIST LOCK		TELEPHONE AND COMMUNICATIONS
	DIRECT CONNECTION	10/1V	TELECOMMUNICATION OUTLET – WALL MOUNTED 10/1V INDICATES QUANTITY OF DATA AND VOICE
	DISCONNECT SWITCH	C	TELECOMMUNICATION OUTLET – CEILING MOUNTED
	COMBINATION MAGNETIC STARTER VFD = VARIABLE FREQUENCY DRIVE	F	TELECOMMUNICATION OUTLET – FLOOR MOUNTED
C	CONTACTOR		CABLE TV OUTLET
T	THERMOSTAT	PA	PUBLIC ADDRESS SPEAKER
	PRIVATE METERING	I	INTERCOM CALL STATION
G	GAS DETECTOR		SECURITY & MISC. SYSTEMS
GD	GAS DETECTION ALARM		PUSHBUTTON
J	JUNCTION BOX	CR	CARD READER
	CABLE TRAY	ML	MAGNETIC DOOR LOCK
	EQUIPMENT IDENTIFICATION	MS	DOOR MONITOR SWITCH
EF-1	MECHANICAL EQUIPMENT IDENTIFICATION	ME	MOTION EGRESS SENSOR
HD	HAND DRYER	DO	DOOR OPERATOR
	FIRE ALARM	DS	ELECTRIC DOOR STRIKE
	FIRE ALARM BELL S = STROBE LIGHT	RTE	REQUEST TO EXIT
	FIRE ALARM PULL STATION	CCTV	CCTV SECURITY CAMERA
	FIRE ALARM HEAT DETECTOR		
	FIRE ALARM SMOKE DETECTOR B = BEAM TYPE		
I	FIRE ALARM ISOLATION MODULE		
LR	LIGHTING CONTROL RELAY		
SYMBOLS AND LEGEND AS APPLICABLE		SYMBOLS AND LEGEND AS APPLICABLE	

General Notes

01 CONTRACTOR MUST VERIFY DIMENSIONS AND CONDITIONS ON SITE BEFORE PROCEEDING WITH ANY PORTION OF THIS WORK

02 DO NOT SCALE FROM DRAWINGS.

03 ALL WORK TO COMPLY WITH THE ONTARIO BUILDING CODE AND MUNICIPAL REGULATIONS.

04 PROVIDE MINIMUM 30 DAY NOTICE FOR SYSTEM INTERRUPTION. ALL POWER AND FIRE ALARM SYSTEM INTERRUPTIONS TO BE COORDINATED WITH NRC DEPARTMENT REPRESENTATIVE.

Electrical Notes

01 RELOCATE EXISTING 600V SQUARE D HCN PANEL, 30 KVA TRANSFORMER AND 42 CIRCUIT PANEL COMPLETE 1x 30A 2P, 2 x 40A 3P, 23 x 15A 1P AND 2 x 20A 2P CIRCUITS. RELOCATE/REPLACE SWITCHING AND MAINTAIN OPERATION OF EXISTING LIGHTING IN EXISTING SPACE TO REMAIN. RELOCATE AND MAINTAIN OPERATION OF EXISTING CIRCUIT TO REMAIN.

02 RELOCATE EXISTING UNIT HEATER AS INDICATED AND REPLACE WIRING AS REQUIRED.

03 TYPICAL;
REMOVE EXISTING LIGHTING COMPLETE WITH ALL REDUNDANT WIRING AND CONDUIT. REWORK EXISTING SWITCHING TO ACCOMMODATE LIGHTING FIXTURES WITHIN UNCHANGED AREAS. MODIFY EXISTING WIRING AND CONDUIT AS REQUIRED.

04 REMOVE EXISTING PANEL COMPLETE WITH SERVICE FEEDER, BRANCH WIRING AND ALL ASSOCIATED CONDUIT BACK TO SOURCE AND MAKE SAFE. EXISTING PANELS ARE FED FROM DISTRIBUTION PANEL INDICATED BETWEEN GRID LINES 1-2/B.

05 TYPICAL;
REMOVE, RELOCATE AND REPLACE FIRE ALARM HEAT DETECTOR TO ALLOW FOR CEILING REMOVAL. ALL DEVICES TO BE REPLACED WITH ADDRESSABLE TYPE AND INSTALLED AT NEW CEILING. PROVIDE NEW LOOP FOR RENOVATION AREA AND VERIFY EXISTING LOOP AFFECTED ONCE WORK IS FINALIZED.

06 TYPICAL;
REMOVE AND REINSTALL FIRE ALARM PULL STATIONS TO ALLOW FOR DEMOLITION WORK. PROVIDE FIRE ALARM VERIFICATION ONCE WORK IS FINALIZED.

07 EXISTING FIRE ALARM DEVICES TO BE RELOCATED AND REPLACED TO ACCOMMODATE CEILING REPLACEMENT. PROVIDE NEW END OF LINE TO ISOLATE EXISTING VACANT SPACE. REFER TO NEW WORK FOR NEW INITIATING, CONTROL AND AUDIBLE LOOPS.

08 TYPICAL;
OUTLET TO RE-FED FROM NEW PANEL, REPLACE WIRING AND DEVICE, REFER TO NEW WORK.

09 TYPICAL;
COORDINATE LIGHTING REMOVAL WITH HAZARDOUS MATERIALS REMOVAL.

National Research Council Canada
Administrative Services and Property Management Branch

Conseil national de recherches Canada
Division des services administratifs et gestion de l'immobilier

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LICENSED PROFESSIONAL ENGINEER
A.O. MIKHAIEL
100071099
May 15, 15
PROVINCE OF ONTARIO
ECoT130061

No.	Date	Revision	By / Par.
0	29 05 2015	ISSUED FOR TENDER	AM

Date Printed / Date imprimée

- Verify all dimensions and site conditions and be responsible for same
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B Location drawing no. / sur dessin no.
C Drawing no. / dessin no.

project / projet
NRC CABIN COMFORT + ENVIRONMENTAL RESEARCH FACILITY

MONTREAL ROAD CAMPUS

drawing / dessin
ELECTRICAL DEMOLITION

designed / conçu	M.T	date / date	May 2015
drawn / dessiné	M.T	scale / échelle	AS INDICATED
checked / vérifié	A.M	sheet / feuille	of/de
approved / approuvé	A.M	W.O.no.	3788-E01
		D.T.no.	

dwg.no. / dessin no.
3788-E01

ASPM A0 (1189x841)

C
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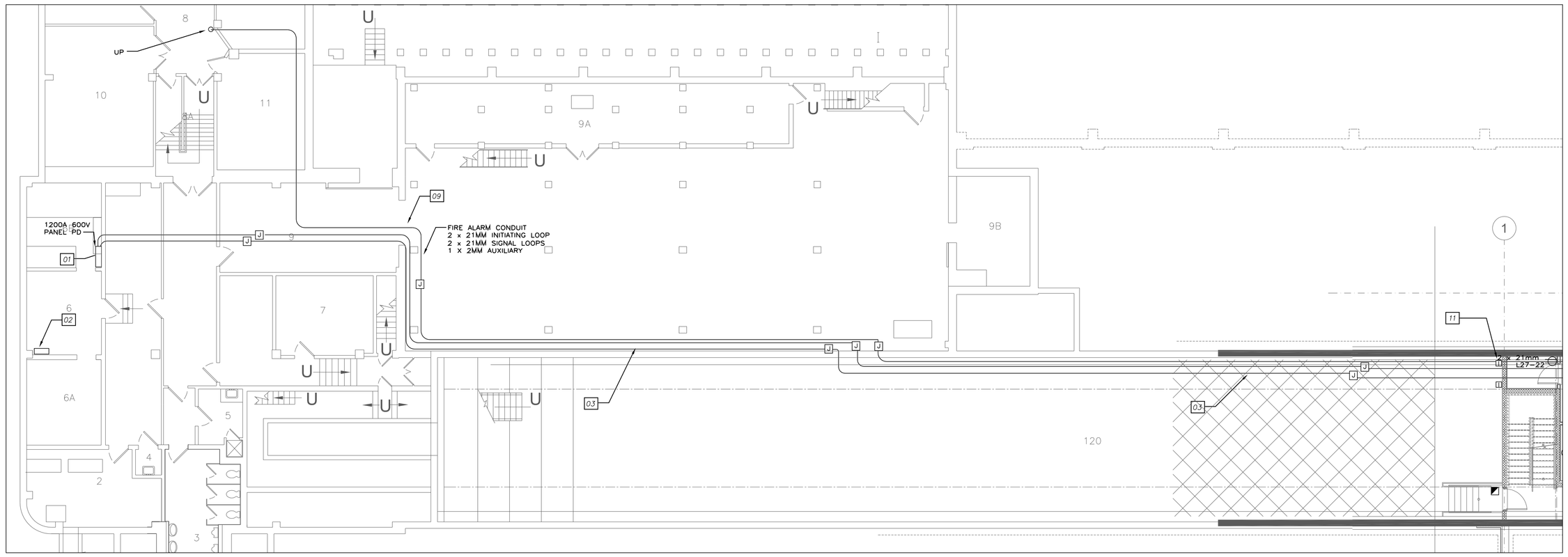
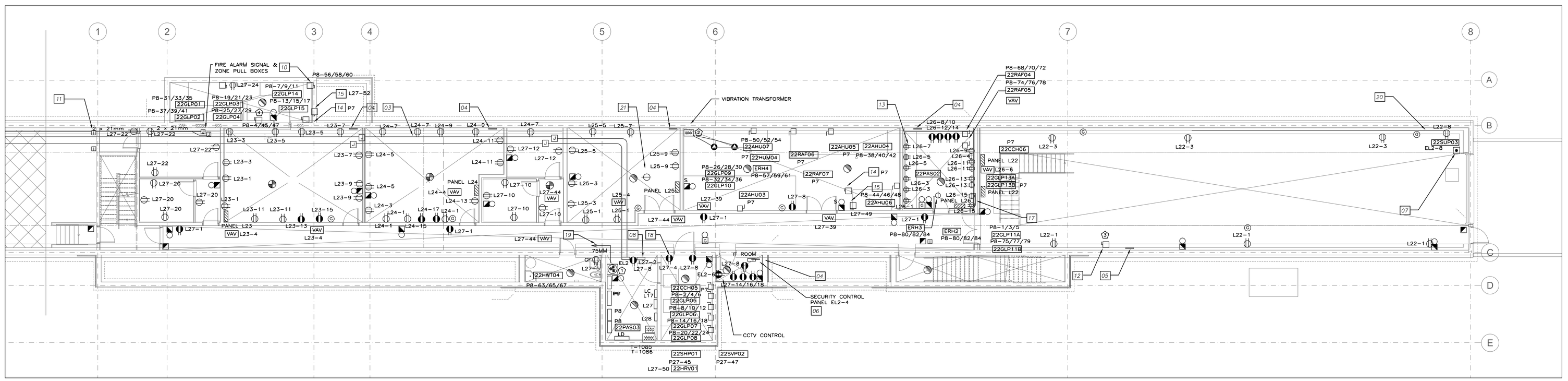


1 / E02 PART BASEMENT FLOOR PLAN

Scale: 1:100



2 / E02 PART BASEMENT FLOOR PLAN

Scale: 1:100

Electrical Notes

01 PROVIDE 2 x 400A 3P 42 KAIC BREAKERS IN EXISTING 1200A 600V MAIN DISTRIBUTION PANEL PD AS INDICATED ON SINGLE LINE. COORDINATE POWER SHUT DOWN WITH NRC DEPARTMENTAL REPRESENTATIVE.

02 PROVIDE NEW BREAKERS ON EXISTING 120/208V EMERGENCY SQUARE D NQO PANEL EL1 AS INDICATED. ANY REQUIRED SHUT DOWNS TO BE COORDINATED WITH NRC DEPARTMENTAL REPRESENTATIVE.

03 EXTEND CONDUITS & INSULATED GROUNDING AT HIGH LEVEL, FOLLOW BUILDING LINES AND PROVIDE ADDITIONAL JUNCTION BOXES AS REQUIRED. EXACT ROUTING TO BE CONFIRMED WITH DEPARTMENT REPRESENTATIVE PRIOR TO INSTALLATION. MAINTAIN 900MM PARALLEL SEPARATION BETWEEN COMMUNICATION AND POWER CONDUITS

04 PROVIDE 600MM x 200MM GROUND BUS WITH INSULATED 3/0 TO ELECTRICAL ROOM. REFER TO GROUNDING RISER ON DRAWING 2/3788-E07 FOR ADDITIONAL INFORMATION.

05 PROVIDE 600MM x 200MM GROUND BUS FOR AIRCRAFT FUSELAGE CONNECTION AND GROUND CREW SHUTDOWN EQUIPMENT.

06 PROVIDE 15A/120V POWER CONNECTION TO SECURITY PANEL. SECURITY PANEL PROVIDED BY OTHERS.

07 REMOVE AND RELOCATE EXISTING OVERHEAD DOOR MOTOR IN COORDINATION WITH DOOR SUPPLIER MODIFICATIONS. PROTECT AND RE-USE CONTROLS AND MAINTAIN POWER FEED FROM RELOCATED PANEL.

08 MAIN GAS CONTROL PANEL TO BE CONNECTED TO BAS MONITORING, COORDINATE WITH MECHANICAL.

09 TYPICAL:
COORDINATE CORING OF CONCRETE WALLS AND FLOORS BY GENERAL CONTRACTOR DURING PRICING.

10 DOCK LEVEL CONNECTION 5 HP 600V 3PH. FEED FROM PANEL P7, REFER TO SINGLE LINE.

11 PROVIDE A FIRE ALARM ISOLATION MODULE WHEN ENTERING A FIRE SEPARATION. REFER TO ELECTRICAL DRAWINGS AND COORDINATE WITH FIRE SEPARATION PLAN ON ARCHITECTURAL DRAWINGS.

12 PROVIDE 200A 600V 3P WEATHERPROOF FUSIBLE DISCONNECT FOR CLIENT SUPPLIED 90 KVA 400HZ CONVERTER AND MAKE FINAL TERMINATIONS IN LIQUID TIGHT FLEX CONDUIT.

13 PROVIDE SINGLE METAL CHANNEL RACEWAY FOR RECEPTACLES IN FSL OBSERVATION ROOM. MAINTAIN 900MM SPACING TO COMMUNICATION SYSTEMS.

14 VACUUM WASTE TANK COMPRESSOR 10 HP 600V. PROVIDE STARTER WITH AUXILIARY CONTROLS AND COORDINATE WITH MECHANICAL.

15 CONDENSATE RECEIVER CONNECTION 1/2HP 120V. CONTROLS INTEGRAL WITH UNIT SUPPLIED BY MECHANICAL.

Electrical Notes

17 PROVIDE N1-362407, 600mm x 900mm MONITORING JUNCTION WALL BOX FOR LIGHTING CIRCUIT OF AIRPORT TERMINAL ROOM 135 ABOVE.

18 COORDINATE BAS OUTLET LOCATION WITH MECHANICAL PRIOR TO ROUGH-IN.

19 PROVIDE 75MM EMT TO UPPER FLOOR FLEX CABIN LAB FOR FUTURE DC SYSTEM WIRING.

20 PROVIDE 20M OF SELF REGULATING PIPE FREEZE PROTECTION HEATING CABLE, COORDINATE WITH MECHANICAL INSULATION INSTALLATION.

21 MAKE ALL CONNECTIONS TO CLIENT SUPPLIED VIBRATION EQUIPMENT AND DEDICATED TRANSFORMER.

General Notes

01 CONTRACTOR MUST VERIFY DIMENSIONS AND CONDITIONS SITE BEFORE PROCEEDING WITH ANY PORTION OF THIS WORK

02 DO NOT SCALE FROM DRAWINGS.

03 ALL WORK TO COMPLY WITH THE ONTARIO BUILDING CODE AND MUNICIPAL REGULATIONS.

04 ALL INSTALLATIONS IN LABS TO BE IN SURFACE EMT CONDUIT AND FS TYPE BOXES. NO FLEXIBLE WIRING WILL BE PERMITTED UNLESS OTHERWISE INDICATED.

05 MAINTAIN CLEARANCES OF POWER WIRING TO COMMUNICATION WIRING. MAINTAIN MINIMUM 900MM CLEARANCE TO PARALLEL INSTALLATIONS.

06 ALL CONDUITS TO BE FACTORY PAINTED, REFER TO SPECIFICATIONS. TO INCLUDE FIRE ALARM, SECURITY, COMMUNICATION, EMERGENCY POWER, BAS AND GAS DETECTION

07 REFER TO GERENAL REQUIREMENTS FOR SEISMIC REQUIREMENTS TO BE INCLUDED IN ELECTRICAL TENDER SUM,

08 ALL BRANCH WIRING TO BE STRANDED, REFER TO SPECIFICATIONS.

09 COORDINATE FASTENINGS IN EXISTING WALLS WITH HAZARDOUS MATERIALS AND GENERAL CONTRACTOR.

0 10 20mm 40 60 80 100 120 140 160 180 200mm

ASPM A0 (1189x841)

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LICENSED PROFESSIONAL ENGINEER
A.O. MIKHAIEL
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PROVINCE OF ONTARIO
EcoT13ee61

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Date Printed / Date imprimée

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C Drawing no. dessin no.

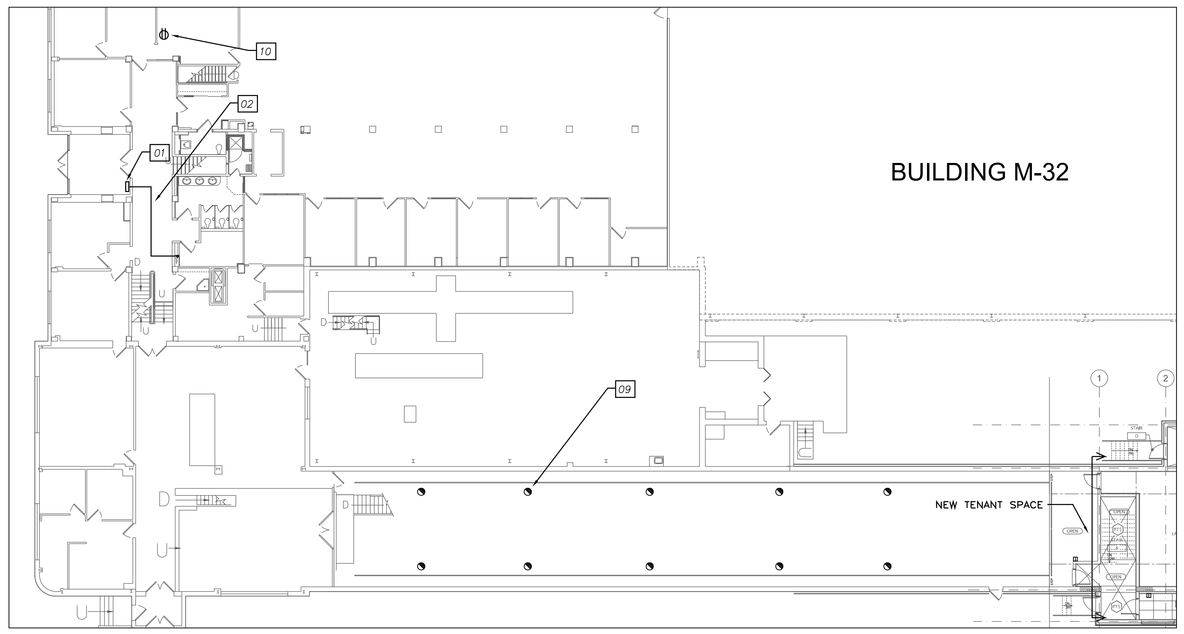
project / projet
NRC CABIN COMFORT + ENVIRONMENTAL RESEARCH FACILITY

MONTREAL ROAD CAMPUS

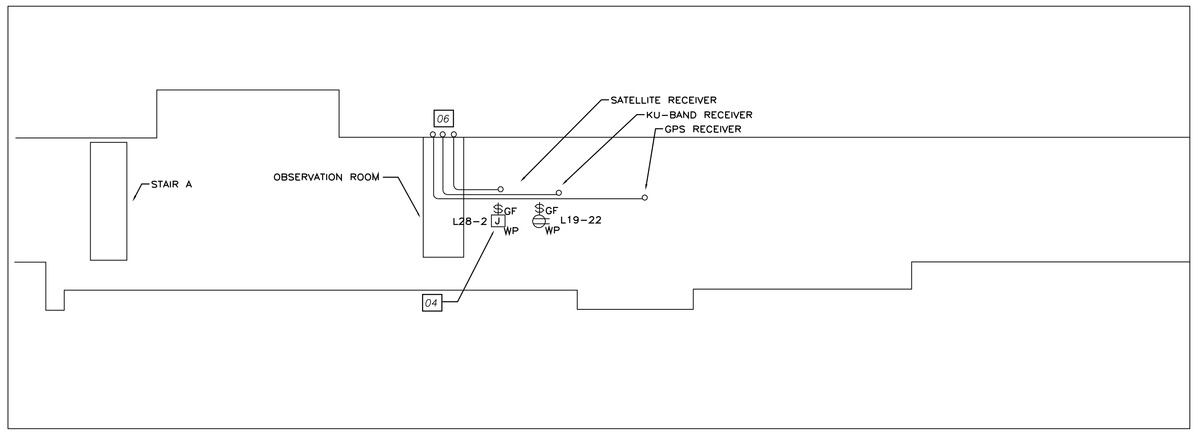
drawing / dessin
POWER, FIRE ALARM & MISC SYSTEMS

designed / conçu	M.T	date / date	May 2015
drawn / dessiné	M.T	scale / échelle	AS INDICATED
checked / vérifié	A.M	sheet / feuille	of/de
approved / approuvé	A.M	W.O.no.	3788-E02
		D.T.no.	

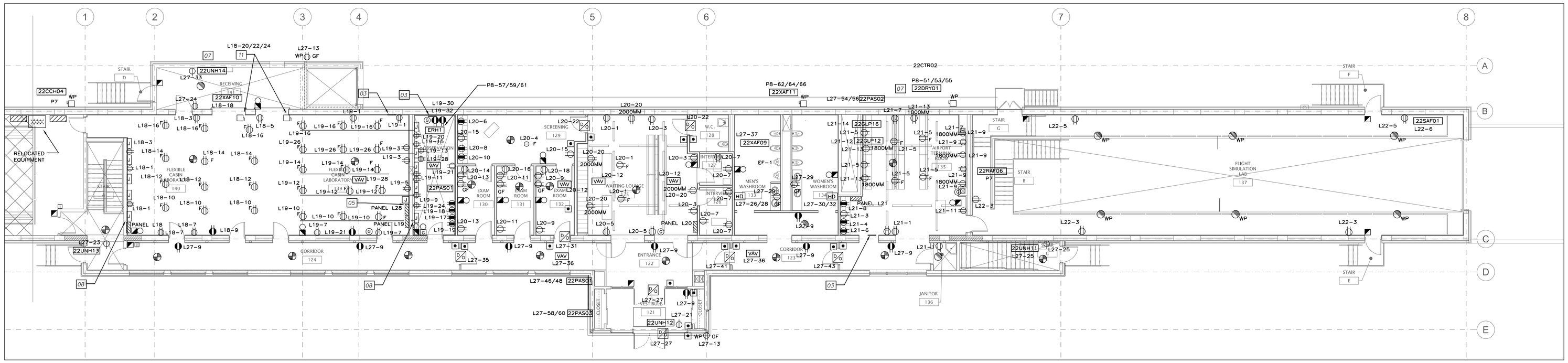
dwg.no. / dessin no. 3788-E02



1 PART GROUND FLOOR PLAN
E03 Scale: 1:200



2 PART ROOF FLOOR PLAN
E03 Scale: 1:200



3 PART SECOND FLOOR PLAN
E03 Scale: 1:100

Schedule of Connections to Owner Supplied Equipment

REF. NUMBER	DESCRIPTION	LOCATION	HP, ℍ or FLA	VOLTS, PHASE Hz	EQUIPMENT ISOLATION	MOTOR OVERLOAD PROTECTION	EQUIPMENT OR CIRCUIT OVERCURRENT PROTECT.	WIRING	CONTROLS / NOTES
(1)	30kVA 3PH 400nZ CONVERTER	FLEXIBLE CABIN 139	30 kVA	600V/3ø	DISC.	N/A	30A PANEL BREAKER	3#10	SUPPLIED BY CLIENT, INSTALLED BY THIS CONTRACTOR PROVIDE SECONDARY PANEL
(2)	VIBRATION TRANSFORMER	REFER TO DRAWINGS	-	600V/1ø	DISC.	N/A	30A PANEL BREAKER	3#10	SUPPLIED BY CLIENT, INSTALLED BY THIS CONTRACTOR
(3)	90kVA 3PH 400nZ CONVERTER	FLIGHT SIMULATOR	90 kVA	600V/3ø	MP DISC.	N/A	125A PANEL BREAKER	3#1/0	SUPPLIED BY CLIENT, PROVDE FUSIBLE DISCONNECT
(4)	COMPRESSOR	MECHANICAL ROOM	5 HP	600V/3ø	DISC.	N/A	15A PANEL BREAKER	3#12	SUPPLIED BY MECHANICAL, INSTALLED BY THIS CONTRACTOR

GENERAL NOTES:
(1) ALL COMPONENTS (STARTERS) NOT INTEGRAL WITH EQUIPMENT OR SPECIFICALLY NOTED AS SUPPLIED BY OTHERS TO BE PROVIDED BY ELECTRICAL
(2) CONTROLS/COMMENTS SHALL BE READ IN CONJUNCTION WITH THE MECHANICAL CONTROLS SCHEMATIC.

Electrical Notes

01 EXISTING EDWARDS EST FIRE ALARM CONTROL PANEL TO REMAIN OPERATIONAL. PROVIDE TWO NEW SIGNAL CIRCUITS C/W STROBE FOR MECHANICAL ROOM AND NEW INITIATING LOOP WITH ADDITIONAL ZONE IDENTIFICATION FOR TWO STAIRS AND TWO FLOORS AS INDICATED. PROVIDE AUXILIARY CONTROLS FOR SECURITY DOOR RELEASE, LIGHTING CONTROLS AND PA MUTE. ALL SYSTEM INTERRUPTIONS AND VERIFICATION TO BE COORDINATED WITH NRC DEPARTMENT REPRESENTATIVE.

02 PROVIDE NEW INITIATING LOOPS IN SEPARATE CONDUITS AND CONCEAL INITIATING, CONTROL AND ALARM CONDUITS IN SUSPENDED CEILINGS AND PARALLEL TO EXISTING CONDUITS WHERE EXPOSED WITH APPROPRIATE SPACING (900min). EXTEND CONDUITS AT HIGH LEVEL AND FOLLOW BUILDING LINES AND PROVIDE ADDITIONAL JUNCTION BOXES AS REQUIRED. EXACT ROUTING TO BE CONFIRMED WITH DEPARTMENT REPRESENTATIVE PRIOR TO INSTALLATION. REFER TO SPECIFICATIONS FOR FACTORY PAINTED CONDUITS.

03 PROVIDE 600MM x 100MM GROUND BUS WITH INSULATED 3/0 TO ELECTRICAL ROOM. INSTALL AT LOW LEVEL.

04 PROVIDE 300 x 300MM PVC WEATHERPROOF HINGED JUNCTION BOX FOR 120V 60Hz POWER WITH TOGGLE SWITCH FOR CONTROL MOUNTED ON ROOF IN, REFER TO NOTE 05

05 PROVIDE NEW 32 CIRCUIT PANEL AND FEED FROM BASEMENT CLIENT SUPPLIED 30 KVA 120V 400nZ CONVERTER. PROVIDE 75MM EMT DOWN TO ELECTRICAL ROOM CONVERTER FOR FUTURE DC SYSTEM.

06 PROVIDE RIGID PVC CONDUIT FOR ROOF EQUIPMENT. REFER TO NOTE 2 ON DRAWING 3788-E04 FOR ADDITIONAL INFORMATION.

07 REFER TO MECHANICAL EQUIPMENT SCHEDULE ON DRAWING 3788-E08 FOR ADDITIONAL INFORMATION.

08 PROVIDE N1-362407 600mm x 900mm MONITORING JUNCTION WALL BOX FOR WIRING FROM PANEL THROUGH WALL MOUNTED BOXES IN FCL OBSERVATION PRIOR TO FEEDING SURFACE MOUNTED FLOOR OUTLETS. COL WIRING WITHIN BOX FOR FUTURE TERMINATIONS. FLOOR MOUNTED RECEPTACLE BOXES TO BE COMPLETE WITH HINGED COVER.

09 TYPICAL:
RELOCATE AND RE-INSTATE HEAT DETECTORS IN COORDINATION WITH CEILING REPLACEMENT.

10 PROVIDE SEPARATE CIRCUIT RECEPTACLE AND FEED FROM CORRIDOR PANEL. COORDINATE EXACT LOCATION WITH MECHANICAL.

11 PROVIDE OVERHEAD DOOR MOTOR CONNECTION IN COORDINATION WITH DOOR SUPPLIER AND PROVIDE ROUGH-IN TO REMOTE OPERATORS.

General Notes

01 CONTRACTOR MUST VERIFY DIMENSIONS AND CONDITIONS SITE BEFORE PROCEEDING WITH ANY PORTION OF THIS WORK

02 DO NOT SCALE FROM DRAWINGS.

03 ALL WORK TO COMPLY WITH THE ONTARIO BUILDING CODE AND MUNICIPAL REGULATIONS.

04 ALL INSTALLATIONS TO BE IN EMT CONDUIT. NO FLEXIBLE WIRING WILL BE PERMITTED UNLESS OTHERWISE INDICATED.

05 ALL CONDUITS TO BE FACTORY PAINTED, REFER TO SPECIFICATIONS. TO INCLUDE FIRE ALARM, SECURITY, COMMUNICATION, EMERGENCY POWER, BAS AND GAS DETECTION

06 REFER TO SECTION 23 05 46 FOR SEISMIC REQUIREMENTS TO BE INCLUDED IN ELECTRICAL TENDER SUM.

07 ALL BRANCH WIRING TO BE STRANDED, REFER TO SPECIFICATIONS.

08 COORDINATE FASTENINGS IN EXISTING WALLS WITH HAZARDOUS MATERIALS AND GENERAL CONTRACTOR.

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NRC CABIN COMFORT + ENVIRONMENTAL RESEARCH FACILITY

MONTREAL ROAD CAMPUS

drawing / dessin
POWER, FIRE ALARM & MISC SYSTEMS

designed / conçu	M.T	date / date	May 15
drawn / dessiné	M.T	scale / échelle	AS INDICATED
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approved / approuvé	A.M	W.O.no.	3788-E03
		D.T.no.	

dwg.no. / dessin no. 3788-E03

ASPM A0 (1189x841)

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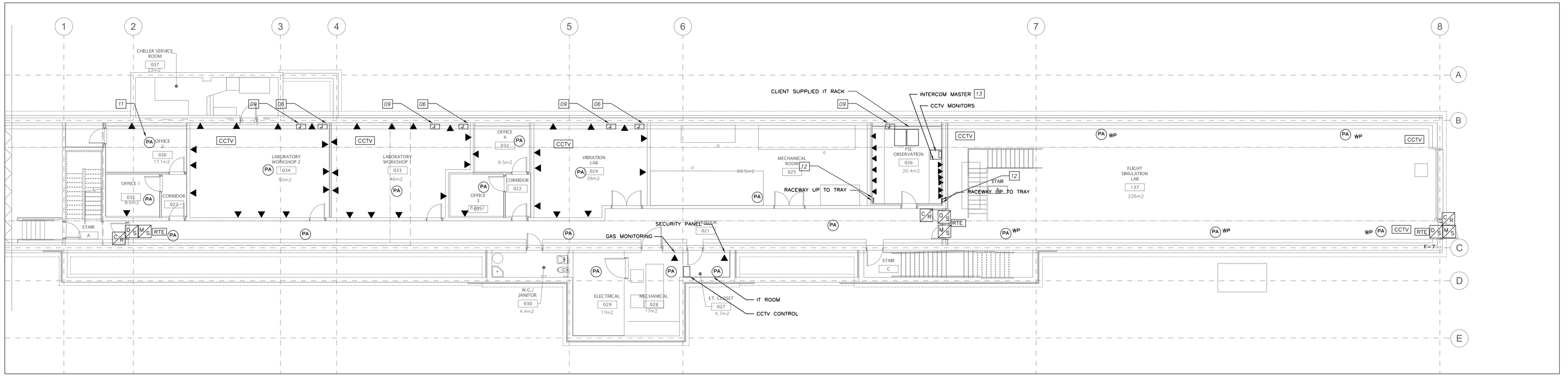
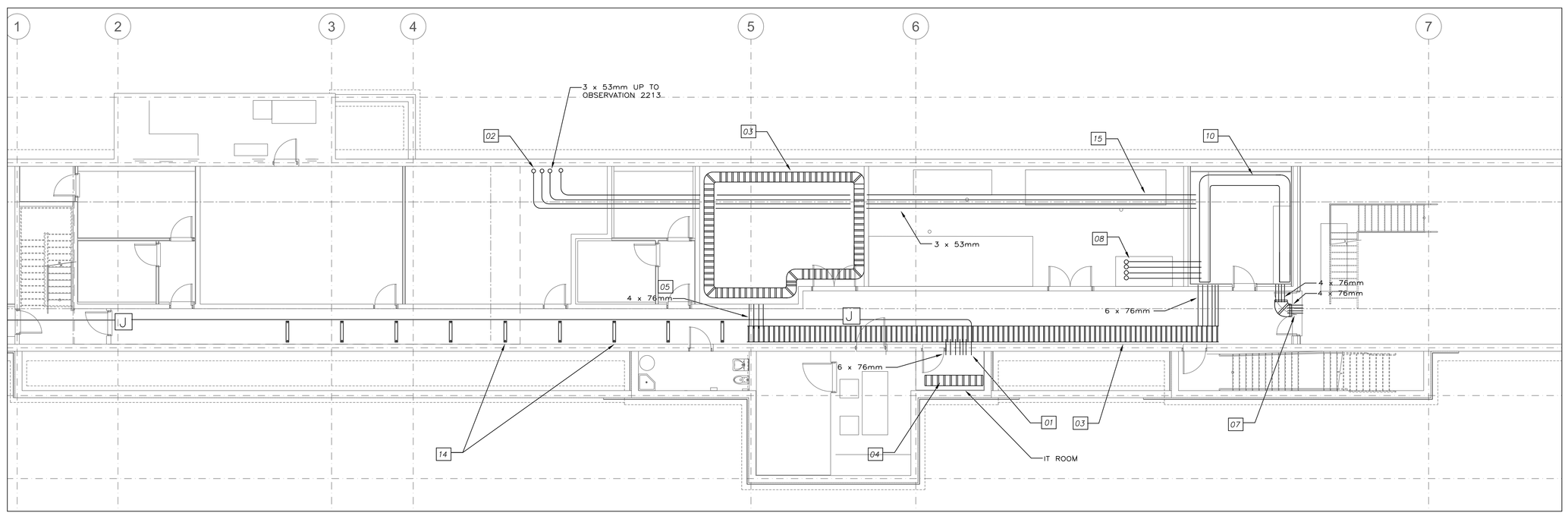
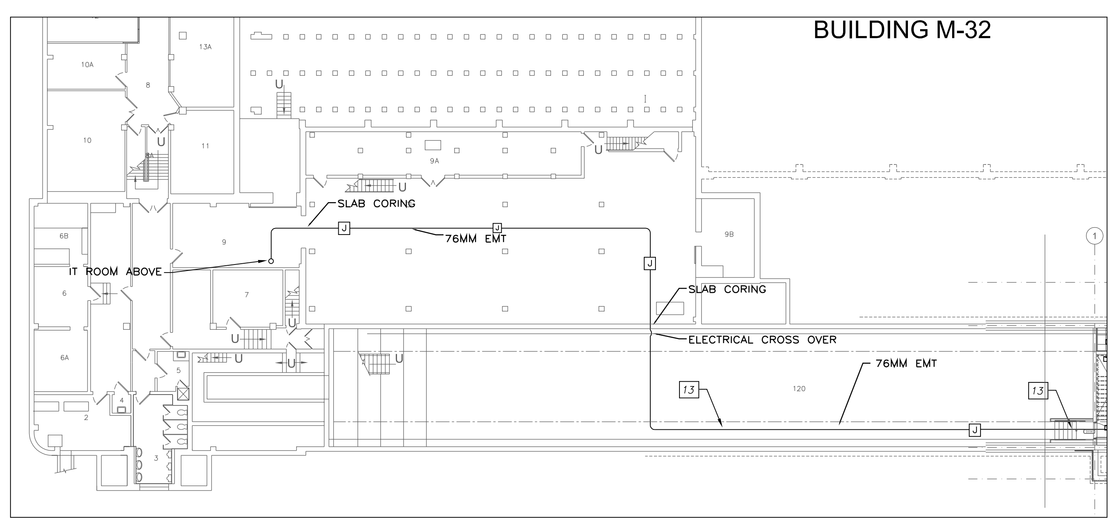


1 / E04 PART BASEMENT FLOOR PLAN – COMMUNICATION & SECURITY
Scale: 1:100



2 / E04 PART BASEMENT FLOOR PLAN – CABLE TRAY & CONDUITS
Scale: 1:100



3 / E04 KEY PLAN
Scale: 1:200

General Notes

01 CONTRACTOR MUST VERIFY DIMENSIONS AND CONDITIONS SITE BEFORE PROCEEDING WITH ANY PORTION OF THIS WORK.

02 DO NOT SCALE FROM DRAWINGS.

03 PROVIDE JUNCTION BOX AT EACH TWO 90 DEG. BENDS

04 ALL INSTALLATIONS TO BE IN EMT CONDUIT. NO FLEXIBLE WIRING WILL BE PERMITTED UNLESS OTHERWISE INDICATED. PROVIDE ALL ROUGH-IN MATERIALS, WIRING AND TERMINATIONS BY NRC.

05 PROVIDE 4 x DROP OUT FITTINGS PER CABLE TRAY SYSTEM OR ROOM.

06 GENERAL TRADES TO PROVIDE 19MM FIRE RATED PLYWOOD ON IT ROOM WALLS.

07 PROVIDE 19MM EMT CONDUIT FROM EACH COMMUNICATION OUTLET TO CABLE TRAY OR TO LAB JUNCTION BOXES AS INDICATED.

08 ALL CONDUITS TO BE FACTORY PAINTED, REFER TO SPECIFICATIONS. TO INCLUDE FIRE ALARM, SECURITY, COMMUNICATION, EMERGENCY POWER, BAS AND GAS DETECTION

09 REFER TO SECTION 23 05 46 FOR SEISMIC REQUIREMENTS TO BE INCLUDED IN ELECTRICAL TENDER SUM,

Electrical Notes

01 PROVIDE 76MM EMT CONDUIT TO MAIN BUILDING IT ROOM. EXTEND CONDUITS AT HIGH LEVEL AND FOLLOW BUILDING LINES AND PROVIDE JUNCTION BOXES AS INDICATED. MAINTAIN 900MM PARALLEL SEPARATION BETWEEN COMMUNICATION AND POWER CONDUITS. EXACT ROUTING TO BE CONFIRMED WITH DEPARTMENT REPRESENTATIVE PRIOR TO INSTALLATION.

02 PROVIDE 3 X 53MM CONDUITS TO OBSERVATION ROOM FOR GPS RECEIVER, KU-BAND RECEIVER AND SATELLITE RECEIVER DISH SYSTEMS. PROVIDE SEPARATE PADS ON THE ROOF COMPLETE WITH MOUNTING POLES. TERMINATE IN 600 x 600mm CEILING JUNCTION BOXES AND EXTEND DOWN TO BASEMENT LAB. AS INDICATED. MAINTAIN 900MM PARALLEL SEPARATION BETWEEN COMMUNICATION AND POWER CONDUITS

03 TYPICAL:
PROVIDE 600 X 150MM BASKET TYPE CABLE TRAY AND INSTALL ON WALL IN LABS WITH L BRACKETS AS DIRECTED ON SITE.

04 TYPICAL:
PROVIDE 600 X 150MM RIGID LADDER TYPE CABLE TRAY AND INSTALL IN COORDINATION WITH RACKS TO MAXIMIZE HEAD SPACE. INSTALL MAIN SYSTEM PULL BOXES AT CEILING.

05 TYPICAL:
STUB EMT CONDUITS INDICATED BETWEEN CABLE TRAYS, ALIGN WITH TRAYS AND TERMINATE WITHIN 100MM.

06 TERMINATE LAB CCTV CONDUITS TO JUNCTION BOX LOCATED WITHIN LAB. PROVIDE ALL CONDUITS AND ROUGH-IN MATERIALS, WIRING AND TERMINATIONS BY OWNER. PROVIDE 100MM x 100MM JUNCTION BOX FOR TERMINATION OF CCTV 21MM CONDUITS WITHIN ROOM. INSTALL AT 1200MM. PROVIDE 21MM TO IT CLOSET 027.

07 TYPICAL:
FIRE CAULK CONDUIT OPENINGS AT FIRE SEPARATIONS, REFER TO ARCHITECTURAL DRAWINGS FOR SEPARATIONS.

08 PROVIDE 4 x 76MM CONDUITS FROM CONTROL ROOM FSL OBSERVATION TO AIRPORT TERMINAL ROOM CABLE TRAYS.

09 TERMINATE LAB COMMUNICATION CONDUITS TO JUNCTION BOX LOCATED WITHIN LAB. PROVIDE ALL CONDUITS AND ROUGH-IN MATERIALS, WIRING AND TERMINATIONS BY OWNER. PROVIDE 600MM x 300MM JUNCTION BOX FOR TERMINATION OF BRANCH 21MM CONDUITS WITHIN ROOM. INSTALL AT 1200MM. PROVIDE 53MM TO IT CLOSET 027, REFER TO DETAIL 9-E09.

10 PROVIDE 600 X 150MM SOLID BOTTOM WITH OPEN TOP TYPE CABLE TRAY AND FASTEN TO WALL, COORDINATE WITH MECHANICAL. PUNCH OUT 21 MM CONDUIT FROM ROOM DATA OUTLETS.

11 TYPICAL:
INSTALL PA SYSTEM WIRING IN EMT CONDUITS, PROVIDE 21MM TO CONTROL PANEL AND SEPARATELY ZONE EACH ROOM.

12 PROVIDE 300MM METAL CHANNEL RACEWAY FOR COMMUNICATION OUTLETS IN FSL OBSERVATION AND EXTEND UP TO CABLE TRAY.

13 PROVIDE PUBLIC ADDRESS SYSTEM COMPLETE WITH CD, TUNER, FIRE ALARM MUTE, WHITE NOISE TONE GENERATOR AND CALL OUT FEATURES, REFER TO SPECIFICATIONS.

14 PROVIDE 900MM LONG SUSPENDED UNISTRUT SUPPORT COMPLETE WITH SEISMIC SUPPORT FOR FUTURE CONDUITS. SPACE AT 2400MM ON CENTER. SUSPEND BELOW MECHANICAL.

15 PROVIDE 53MM EMT CONDUIT FROM UPPER FCL OBSERVATORY CABLE TRAY TO LOWER FSL OBSERVATORY CABLE TRAY.

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MONTREAL ROAD CAMPUS

drawing / dessin
COMMUNICATION & SECURITY SYSTEMS

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ASPM A0 (1189x841)

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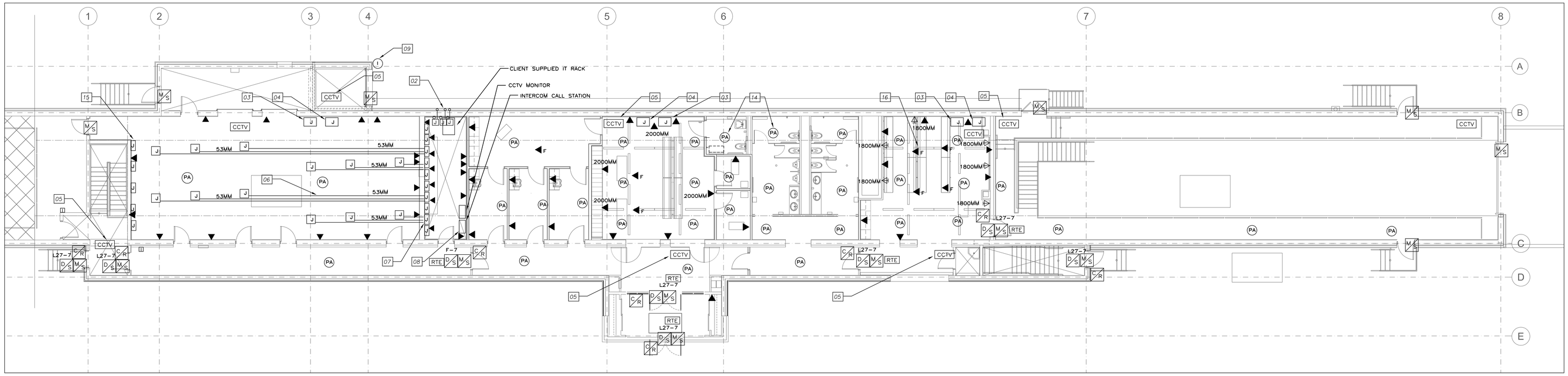
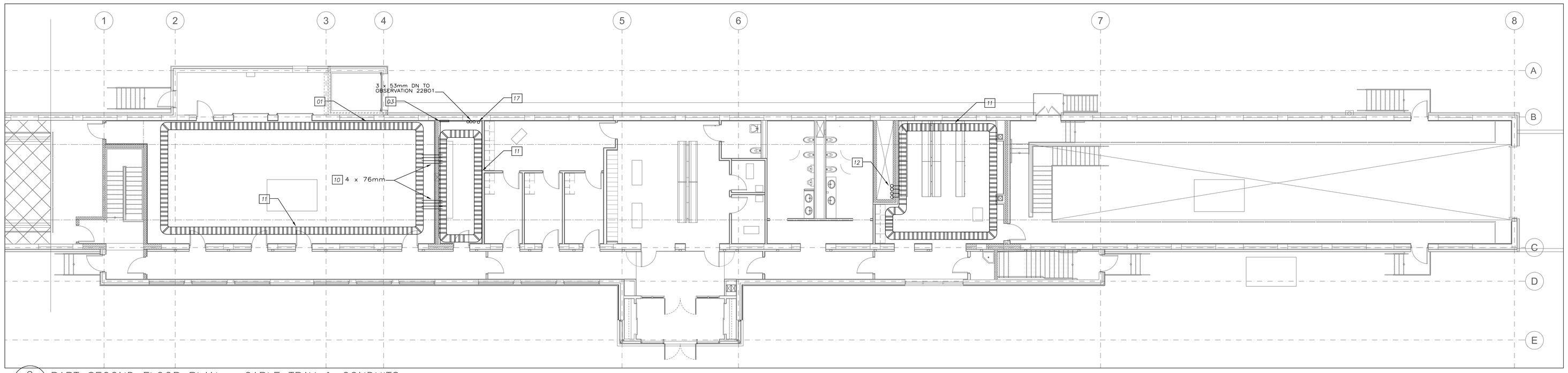
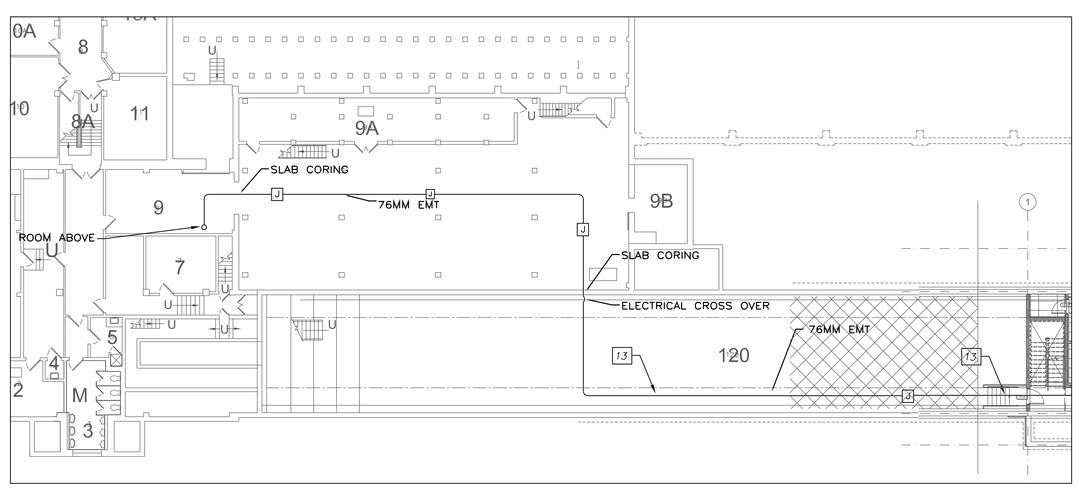


1 E05 PART SECOND FLOOR PLAN – COMMUNICATION & SECURITY
Scale: 1:100



2 E05 PART SECOND FLOOR PLAN – CABLE TRAY & CONDUITS
Scale: 1:100



3 E05 KEY PLAN
Scale: 1:200

General Notes

01 CONTRACTOR MUST VERIFY DIMENSIONS AND CONDITIONS SITE BEFORE PROCEEDING WITH ANY PORTION OF THIS WORK

02 DO NOT SCALE FROM DRAWINGS.

03 PROVIDE JUNCTION BOX AT EACH TWO 90 DEG. BENDS

04 ALL INSTALLATIONS TO BE IN EMT CONDUIT. NO FLEXIBLE WIRING WILL BE PERMITTED UNLESS OTHERWISE INDICATED. PROVIDE ALL ROUGH-IN MATERIALS, WIRING AND TERMINATIONS BY NRC.

05 PROVIDE PLASTIC AND ANTI SHORT BUSHINGS AND ALL CONDUITS.

06 ALL CONDUITS TO BE FACTORY PAINTED, REFER TO SPECIFICATIONS, TO INCLUDE FIRE ALARM, SECURITY, COMMUNICATION, EMERGENCY POWER, BAS AND GAS DETECTION

07 REFER TO SECTION 23 05 46 FOR SEISMIC REQUIREMENTS TO BE INCLUDED IN ELECTRICAL TENDER SUM.

Electrical Notes

01 TYPICAL;
PROVIDE 600 X 150MM BASKET TYPE CABLE TRAY AND INSTALL AS DIRECTED ON SITE.

02 PROVIDE 3 X 53MM CONDUITS TO ROOF FOR GPS RECEIVER, KU-BAND RECEIVER AND SATELLITE RECEIVER DISH SYSTEMS. PROVIDE SEPARATE PADS ON THE ROOF COMPLETE WITH MOUNTING POLES. TERMINATE IN 600 x 600mm CEILING JUNCTION BOXES AND EXTEND DOWN TO BASEMENT LAB. AS INDICATED.

03 TERMINATE LAB CCTV CONDUITS TO JUNCTION BOX LOCATED WITHIN LAB. PROVIDE ALL CONDUITS AND ROUGH-IN MATERIALS, WIRING AND TERMINATIONS BY OWNER. PROVIDE 100MM x 100MM JUNCTION BOX FOR TERMINATION OF CCTV. 21MM CONDUITS WITHIN ROOM. INSTALL AT 1200MM. PROVIDE 21MM TO IT CLOSET 027.

04 TERMINATE LAB COMMUNICATION CONDUITS TO JUNCTION BOX LOCATED WITHIN LAB. PROVIDE ALL CONDUITS AND ROUGH-IN MATERIALS, WIRING AND TERMINATIONS BY OWNER. PROVIDE 600MM x 300MM JUNCTION BOX FOR TERMINATION OF BRANCH 21MM CONDUITS WITHIN ROOM. INSTALL AT 1200MM. PROVIDE 53MM TO IT CLOSET 027, REFER TO DETAIL 9-E09

05 COMMON AREA CCTV CAMERAS TO BE TERMINATED IN BASEMENT MAIN MECHANICAL/IT ROOM. PROVIDE ALL 21MM CONDUITS AND ROUGH-IN MATERIALS, WIRING AND TERMINATIONS BY OWNER.

06 TYPICAL;
PROVIDE 300 x 300 MM FLOOR BOXES COMPLETE WITH 53MM CONDUITS UNDER RAISED FLOOR AND EXTEND TO WALL JUNCTION BOX, COORDINATE WITH FLOOR RECEPTACLES, REFER TO NOTE 07.

07 TYPICAL;
PROVIDE N1-362407 MONITORING 600mm x 900mm WALL MOUNTED JUNCTION BOX COMPLETE WITH 53MM CONDUITS TO N1-241207 RAISED FLOOR BOXES AND TO CABLE TRAY. REFER TO ELEVATION.

08 PROVIDE INTERCOM SYSTEM COMPLETE TELEPHONE TIE IN FEATURE, ZONE ROOMS AND CORRIDORS SEPARATELY.

09 WEATHERPROOF INTERCOM STATION WIRE TO CONTROL ROOM MASTER.

10 TYPICAL;
PROVIDE EMPTY CONDUIT COMPLETE PLASTIC BUSHINGS AND PULL STRINGS FROM CABLE TRAY IN THE CORRIDOR TO CABLE TRAYS IN THE LABS, SIZE AS INDICATED.

11 TYPICAL;
PROVIDE 4 x DROP OUT FITTINGS PER CABLE TRAY SYSTEM OR PER ROOM. EXACT PLACEMENT TO BE COORDINATED ON SITE WITH NRC DEPARTMENT REPRESENTATIVE.

12 PROVIDE 4 x 76MM CONDUITS FROM CONTROL ROOM FSL OBSERVATION TO AIRPORT TERMINAL ROOM CABLE TRAYS. PROVIDE LONG RADIUS BENDS AND COORDINATE ROUTING WITH MECHANICAL.

13 PROVIDE CONDUITS SIZED AS INDICATED AND INSTALL AT CEILING LEVEL, COORDINATE ROUTING ON SITE AND OFFSET AS REQUIRED TO FOLLOW CEILING PROFILE. CORING OF SLABS BY GENERAL TRADES.

14 TYPICAL:
INSTALL PA SYSTEM WIRING IN EMT CONDUITS, PROVIDE 21MM TO CONTROL PANEL AND SEPARATELY ZONE EACH ROOM.

15 OFFSET BOXES WITH POWER TO ACCOMMODATE LIMITED WALL SPACE. PROVIDE 53 MM FROM FLOOR BOXES TO CEILING CABLE TRAY.

16 COORDINATE FLOOR OUTLETS WITH SEATING AND RECEPTACLES. SUBMIT FLOOR DEVICE SPACING SHOP DRAWING TO NRC DEPARTMENTAL REPRESENTATIVE FOR APPROVAL.

17 PROVIDE 5.3MM EMT CONDUIT FROM UPPER FCL OBSERVATORY CABLE TRAY TO LOWER FSL OBSERVATORY CABLE TRAY.

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No.	Date	Revision	By/Par:
0	29 05 2015	ISSUED FOR TENDER	AM

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MONTREAL ROAD CAMPUS

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COMMUNICATION & SECURITY SYSTEMS

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ASPM A0 (1189x841)

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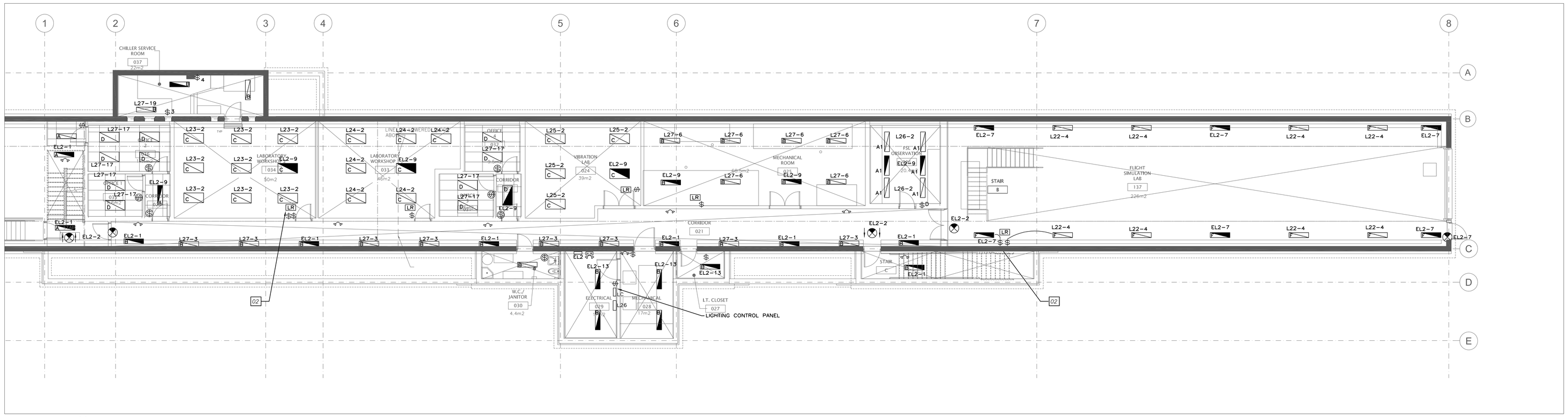

1 / E06 BASEMENT FLOOR PLAN
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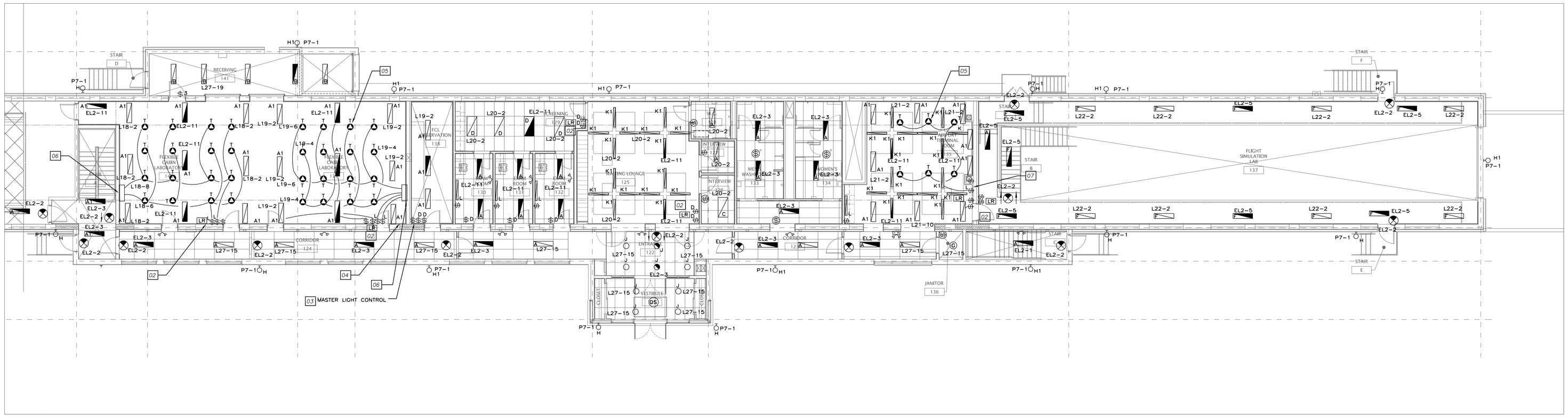

2 / E06 SECOND FLOOR PLAN
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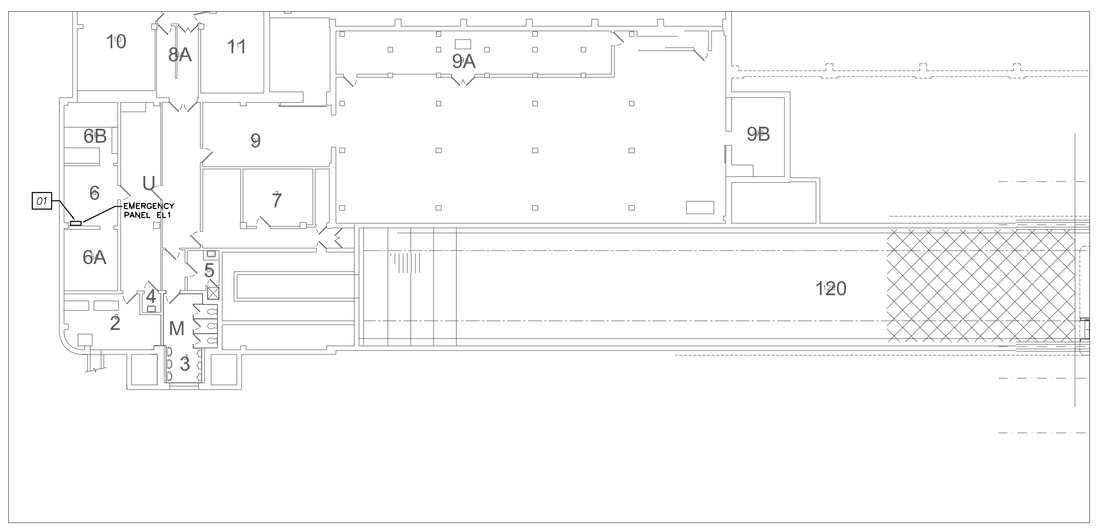

3 / E06 KEY PLAN
Scale: 1:200

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03 ALL WORK TO COMPLY WITH THE ONTARIO BUILDING CODE AND MUNICIPAL REGULATIONS.

04 ALL INSTALLATIONS TO BE IN EMT CONDUIT. FLEXIBLE WIRING WILL BE PERMITTED ONLY AT FINAL LIGHTING TERMINATION.

05 REFER TO SECTION 23 05 46 FOR SEISMIC REQUIREMENTS TO BE INCLUDED IN ELECTRICAL TENDER SUM.

Electrical Notes

01 EXISTING SQUARE D NQO EMERGENCY LIGHTING PANEL EL1 TO REMAIN OPERATIONAL. PROVIDE 30A 3P BREAKER FOR NEW PANEL EL2.

02 TYPICAL:
LIGHTING CONTROL RELAY FOR NORMAL AND EMERGENCY CIRCUIT OVERRIDE. PROVIDE FIRE ALARM AND GENERATOR OVERRIDE OF EMERGENCY LIGHTING FIXTURES.

03 MASTER SWITCH TO CONTROL LIGHTING IN ALL ROOMS EXCEPT FOR EMERGENCY LIGHTING TO REMAIN OPERATIONAL AT ALL TIMES.

04 INSTALL FIXTURES ABOVE DROPPED CEILING AT HIGH LEVEL BETWEEN TRUSSES.

05 TYPICAL:
PROVIDE 15A 120V TWIST LOCK RECEPTACLE AT CEILING LEVEL. INSTALL AT UNDERSIDE OF TRUSSES AND COORDINATE CLEARANCES WITH DUCTS.

06 WIRE RECEPTACLE LIGHT SWITCH THROUGH WALL BOX PRIOR TO FEEDING CEILING OUTLETS, COIL IN BOX. REFER TO POWER DRAWINGS.

07 WIRE RECEPTACLE LIGHT SWITCH THROUGH WALL BOX IN FSL LAB BELOW PRIOR TO FEEDING CEILING OUTLETS, COIL IN BOX. REFER TO POWER DRAWINGS.

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MONTREAL ROAD CAMPUS

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LIGHTING

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dwg.no.	3788-E06	dessin no.	

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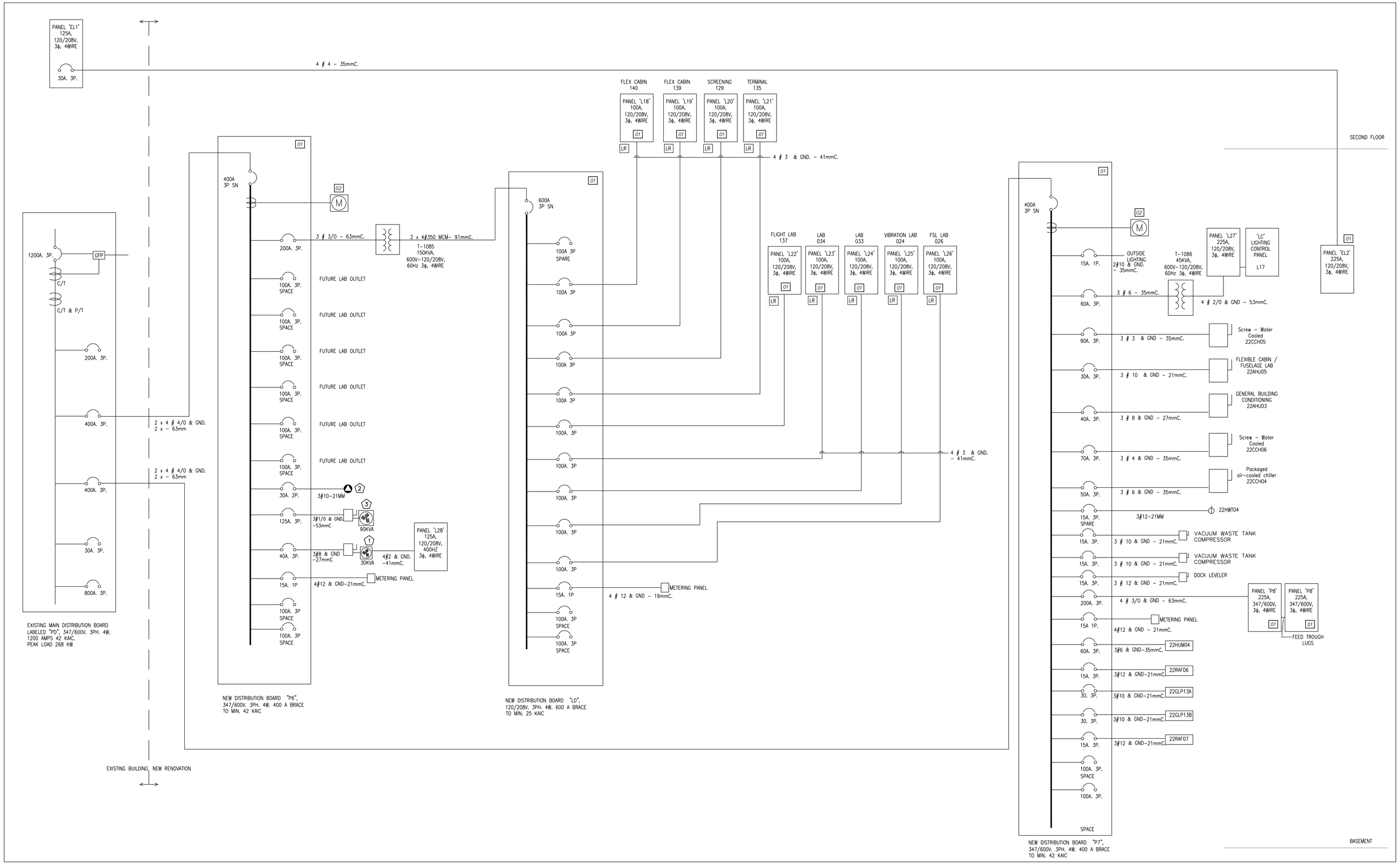
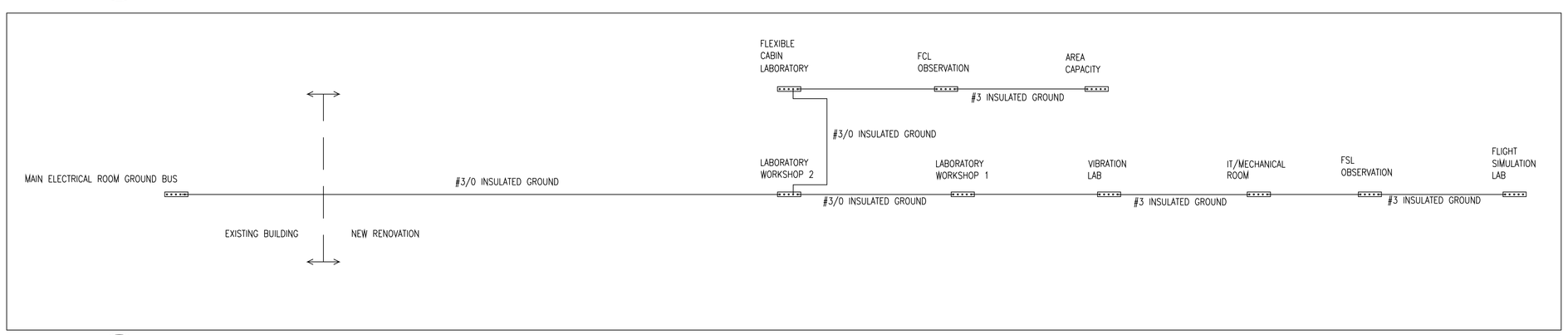


1 SINGLE LINE
E07 Scale: N.T.S.



2 GROUNDING RISER
E07 Scale: N.T.S.

Electrical Notes

01 PROVIDE WIDE TUB PANEL COMPLETE WITH SIDE AUXILIARY GUTTERS FOR PRIVATE METERING.

02 TYPICAL:
PROVIDE NEW PRIVATE METERING TO MATCH EXISTING BUILDING ION 7350 TYPE COMPLETE WITH ETHERNET CARD. PROVIDE 21MM EMT TO DCC PANEL IN MECHANICAL ROOM

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MONTREAL ROAD CAMPUS

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SINGLE LINE

designed / conçu	M.T	date / date	May 15
drawn / dessiné	M.T	scale / échelle	AS INDICATED
checked / vérifié	A.M	sheet / feuille	of/de
approved / approuvé	A.M	W.O.no.	D.T.no. 3788-E07
dwg.no.	3788-E07	dessin no.	

ASPM A0 (1189x841)

C
0 10 20mm 40 60 80 100 120 140 160 180 200mm

PANEL "L18"

PNL. LOCATION: LAB — RATING AMPS: 100A
VOLTAGE: 120/208V — TRIM: SURFACE
PHASE: 3PH. 4W — MAIN BKR: 100A
POLES: 42 — BRANCH BKRS: BOLT-ON

Load	Bkr	Ckt	Ckt	Bkr	Load
RECEPTACLES	15	1	2	15	LIGHTING
RECEPTACLES	15	3	4	15	SPARE
RECEPTACLES	15	5	6	15	CEILING RECEPTACLE LIGHTING
RECEPTACLES	15	7	8	15	CEILING RECEPTACLE LIGHTING
FREEZER	20	9	10	15	FLOOR RECEPTACLES
SPARE	15	11	12	15	FLOOR RECEPTACLES
SPARE	15	13	14	15	FLOOR RECEPTACLES
	15	15	16	15	FLOOR RECEPTACLES
		17	18	15	22XAF10
		19	20	15	OVERHEAD DOOR MOTOR
		21	22	15	
		23	24	15	
		25	26		
		27	28		
		29	30		
		31	32		
		33	34		
		35	36		
		37	38		
		39	40		
		41	42		

PANEL "L19"

PNL. LOCATION: LAB — RATING AMPS: 100A
VOLTAGE: 120/208V — TRIM: SURFACE
PHASE: 3PH. 4W — MAIN BKR: 100A
POLES: 42 — BRANCH BKRS: BOLT-ON

Load	Bkr	Ckt	Ckt	Bkr	Load
RECEPTACLES	15	1	2	15	LIGHTING
RECEPTACLES	15	3	4	15	CEILING RECEPTACLE LIGHTING
RECEPTACLES	15	5	6	15	CEILING RECEPTACLE LIGHTING
RECEPTACLES	15	7	8	15	LIGHTING
CONTROL ROOM RECEPTACLES	15	9	10	15	FLOOR RECEPTACLES
CONTROL ROOM RECEPTACLES	15	11	12	15	FLOOR RECEPTACLES
CONTROL ROOM RECEPTACLES	15	13	14	15	FLOOR RECEPTACLES
CONTROL ROOM RECEPTACLES	15	15	16	15	FLOOR RECEPTACLES
CONTROL ROOM RECEPTACLES	15	17	18	15	INTERCOM
CONTROL ROOM RECEPTACLES/INTERCOM	20	19	20	20	SPARE
FREEZER	20	21	22	15	ROOF RECEPTACLE
SPARE	15	23	24	15	CCTV
SPARE	15	25	26	15	FLOOR RECEPTACLES
SPARE	15	27	28	15	VAV
		29	30	20	IT RACK RECEPTACLE
		31	32	20	IT RACK RECEPTACLE
		33	34		
		35	36		
		37	38		
		39	40		
		41	42		

PANEL "L20"

PNL. LOCATION: LAB — RATING AMPS: 100A
VOLTAGE: 120/208V — TRIM: SURFACE
PHASE: 3PH. 4W — MAIN BKR: 100A
POLES: 42 — BRANCH BKRS: BOLT-ON

Load	Bkr	Ckt	Ckt	Bkr	Load
RECEPTACLES	15	1	2	15	LIGHTING
RECEPTACLES	15	3	4	15	TURNSTILE
RECEPTACLES	15	5	6	15	COUNTER RECEPACLE
PRIVATE OFFICE RECEPTACLES	15	7	8	15	COUNTER RECEPACLE
INTERVIEW ROOM RECEPTACLES	15	9	10	15	COUNTER RECEPACLE
INTERVIEW ROOM RECEPTACLES	15	11	12	15	VAV TRANSFORMER
INTERVIEW ROOM RECEPTACLES	15	13	14	15	HAIR DRYER
SCREENING RECEPTACLES	15	15	16	15	HAIR DRYER
SPARE	15	17	18	15	HAIR DRYER
SPARE	20	19	20	15	WALL TV SCREENS
SPARE	20	21	22	15	DOOR OPRERATOR
		23	24		
		25	26		
		27	28		
		29	30		
		31	32		
		33	34		
		35	36		
		37	38		
		39	40		
		41	42		

PANEL "L21"

PNL. LOCATION: LAB — RATING AMPS: 100A
VOLTAGE: 120/208V — TRIM: SURFACE
PHASE: 3PH. 4W — MAIN BKR: 100A
POLES: 42 — BRANCH BKRS: BOLT-ON

Load	Bkr	Ckt	Ckt	Bkr	Load
RECEPTACLES	15	1	2	15	LIGHTING
RECEPTACLES	15	3	4	15	COUNTER RECEPACLE
RECEPTACLES	15	5	6	15	COUNTER RECEPACLE
RECEPTACLES	15	7	8	15	COUNTER RECEPACLE
RECEPTACLES	15	9	10	15	LIGHTING
RECEPTACLES	15	11	12	15	22GLP12
TV RECEPTACLES	15	13	14	15	22GLP16
SPARE	15	15	16		
SPARE	15	17	18		
		19	20		
		21	22		
		23	24		
		25	26		
		27	28		
		29	30		
		31	32		
		33	34		
		35	36		
		37	38		
		39	40		
		41	42		

PANEL "L22"

PNL. LOCATION: LAB — RATING AMPS: 100A
VOLTAGE: 120/208V — TRIM: SURFACE
PHASE: 3PH. 4W — MAIN BKR: 100A
POLES: 42 — BRANCH BKRS: BOLT-ON

Load	Bkr	Ckt	Ckt	Bkr	Load
RECEPTACLES	15	1	2	15	LIGHTING
RECEPTACLES	15	3	4	15	LIGHTING
RECEPTACLES	15	5	6	20	22SAF01
RECEPTACLES	15	7	8	15	HEAT TRACING CABLE
RECEPTACLES	15	9	10		
RECEPTACLES	15	11	12		
SPARE	15	13	14		
SPARE	15	15	16		
SPARE	15	17	18		
		19	20		
		21	22		
		23	24		
		25	26		
		27	28		
		29	30		
		31	32		
		33	34		
		35	36		
		37	38		
		39	40		
		41	42		

PANEL "L23"

PNL. LOCATION: LAB — RATING AMPS: 100A
VOLTAGE: 120/208V — TRIM: SURFACE
PHASE: 3PH. 4W — MAIN BKR: 100A
POLES: 42 — BRANCH BKRS: BOLT-ON

Load	Bkr	Ckt	Ckt	Bkr	Load
RECEPTACLES	15	1	2	15	LIGHTING
RECEPTACLES	15	3	4	15	VAV TRANSFORMER
RECEPTACLES	15	5	6		
RECEPTACLES	15	7	8		
RECEPTACLES	15	9	10		
RECEPTACLES	15	11	12		
FREEZER	20	13	14		
FREEZER	20	15	16		
SPARE	15	17	18		
SPARE	20	19	20		
SPARE	20	21	22		
SPARE	20	23	24		
		25	26		
		27	28		
		29	30		
		31	32		
		33	34		
		35	36		
		37	38		
		39	40		
		41	42		

PANEL "L24"

PNL. LOCATION: LAB — RATING AMPS: 100A
VOLTAGE: 120/208V — TRIM: SURFACE
PHASE: 3PH. 4W — MAIN BKR: 100A
POLES: 42 — BRANCH BKRS: BOLT-ON

Load	Bkr	Ckt	Ckt	Bkr	Load
RECEPTACLES	15	1	2	15	LIGHTING
RECEPTACLES	15	3	4	15	VAV TRANSFORMER
RECEPTACLES	15	5	6		
RECEPTACLES	15	7	8		
RECEPTACLES	15	9	10		
RECEPTACLES	15	11	12		
RECEPTACLES	15	13	14		
FREEZER	20	15	16		
FREEZER	20	17	18		
SPARE	20	19	20		
SPARE	20	21	22		
SPARE	20	23	24		
SPARE	20	25	26		
		27	28		
		29	30		
		31	32		
		33	34		
		35	36		
		37	38		
		39	40		
		41	42		

PANEL "L25"

PNL. LOCATION: LAB — RATING AMPS: 100A
VOLTAGE: 120/208V — TRIM: SURFACE
PHASE: 3PH. 4W — MAIN BKR: 100A
POLES: 42 — BRANCH BKRS: BOLT-ON

Load	Bkr	Ckt	Ckt	Bkr	Load
RECEPTACLES	15	1	2	15	LIGHTING
RECEPTACLES	15	3	4	15	VAV TRANSFORMER
RECEPTACLES	15	5	6		
RECEPTACLES	15	7	8		
RECEPTACLES	15	9	10		
SPARE	15	11	12		
SPARE	15	13	14		
SPARE	15	15	16		
		17	18		
		19	20		
		21	22		
		23	24		
		25	26		
		27	28		
		29	30		
		31	32		
		33	34		
		35	36		
		37	38		
		39	40		
		41	42		

PANEL "L26"

PNL. LOCATION: LAB — RATING AMPS: 100A
VOLTAGE: 120/208V — TRIM: SURFACE
PHASE: 3PH. 4W — MAIN BKR: 100A
POLES: 42 — BRANCH BKRS: BOLT-ON

Load	Bkr	Ckt	Ckt	Bkr	Load
RECEPTACLES	15	1	2	15	LIGHTING
RECEPTACLES	15	3	4	15	INTERCOM
RECEPTACLES	15	5	6	15	VAV
RECEPTACLES	15	7	8	20	IT RACK RECEPTACLE
RECEPTACLES	15	9	10	20	IT RACK RECEPTACLE
RECEPTACLES	15	11	12	20	IT RACK RECEPTACLE
RECEPTACLES	15	13	14	20	IT RACK RECEPTACLE
RECEPTACLES	15	15	16		
SPARE	15	17	18		
SPARE	20	19	20		
SPARE	20	21	22		
		23	24		
		25	26		
		27	28		
		29	30		
		31	32		
		33	34		
		35	36		
		37	38		
		39	40		
		41	42		

PANEL "L27"

PNL. LOCATION: LAB — RATING AMPS: 225A
VOLTAGE: 120/208V — TRIM: SURFACE
PHASE: 3PH. 4W — MAIN BKR: N/R
POLES: 84 — BRANCH BKRS: BOLT-ON

Load	Bkr	Ckt	Ckt	Bkr	Load
CORRIDOR RECEPTACLES	20	1	2	15	GAS DETECTOR
BASEMENT CORRIDOR LIGHTING	15	3	4	15	BAS CONTROLS
JANITOR/WASHROOM RECEPTACLE	15	5	6	15	MECHANICAL ROOM LIGHTING
DOOR STRIKES	15	7	8	20	MECHANICAL/ELECTRICAL ROOM RECEPTACLES
SECOND FLOOR CORRIDOR RECEPTACLES	15	9	10	15	BASEMENT OFFICE RECEPTACLES
SECOND FLOOR CORRIDOR LIGHTING	15	11	12	15	BASEMENT OFFICE RECEPTACLES
EXTERIOR RECEPTACLE	15	13	14	20	IT ROOM RECEPTACLE ••
UPPER CORRIDOR LIGHTING	15	15	16	20	IT ROOM RECEPTACLE ••
BASEMENT OFFICE LIGHTING	15	17	18	20	IT ROOM RECEPTACLE ••
CHILLER ROOM LIGHTING	15	19	20	15	BASEMENT OFFICE RECEPTACLES
22UNH12	15	21	22	15	BASEMENT OFFICE RECEPTACLES
22UNH13	15	23	24	15	BASEMENT CHILLER ROOM RECEPTACLES
22UNH11	15	25	26		
DOOR OPERATOR	15	27	28	15	HAND DRYER
2ND WASHROOM RECEPTACLES	15	29	30		
DOOR OPERATOR	15	31	32	15	HAND DRYER
22UNH14	15	33	34	15	
DOOR OPERATOR	15	35	36	15	VAV TRANSFORMER
22XAF09	15	37	38	15	TX-1 FOR VAV'S
VAV	15	39	40	15	TX-2 FOR VAV'S
DOOR OPERATOR	15	41	42	15	
DOOR OPERATOR	15	43	44	15	VAV TRANSFORMER
22SHP01	15	45	46	40	22PAS01
22SVP02	15	47	48	2P	
CONDENSATE RECEIVER	15	49	50	15	22HRV01
SPARE	15	51	52	15	CONDENSATE RECEIVER
SPARE	15	53	54	20	22PAS02
		55	56	2P	
		57	58	20	22PAS03
		59	60	2P	
		61	62		
		63	64		
		65	66		

•• ISOLATED GROUND

PANEL "EL2"

PNL. LOCATION: LAB — RATING AMPS: 100A
VOLTAGE: 120/208V — TRIM: SURFACE
PHASE: 3PH. 4W — MAIN BKR: 100A
POLES: 24 — BRANCH BKRS: BOLT-ON

Load	Bkr	Ckt	Ckt	Bkr	Load
BASEMENT CORRIDOR & STAIR LIGHTING	15	1	2	15	EXIT SIGNS •
SECOND CORRIDOR & STAIR LIGHTING	15	3	4	15	SECURITY SYSTEM
UPPER LEVEL FLIGHT LAB LIGHTING	15	5	6	20	CCTV
LOWER LEVEL FLIGHT LAB LIGHTING	15	7	8	15	22SUP03
LOWER LEVEL LAB LIGHTING	15	9	10		
UPPER LEVEL LAB LIGHTING	15	11	12		
UTILITY ROOM LIGHTING	15	13	14		
SPARE	15	15	16		
SPARE	15	17	18		
		19	20		
		21	22		
		23	24		

• PROVIDE LOCK ON DEVICE

PANEL "P8"

PNL. LOCATION: LAB — RATING AMPS: 225A
VOLTAGE: 347/60V — TRIM: SURFACE
PHASE: 3PH. 4W — MAIN BKR: N/R
POLES: 2 X 66 — BRANCH BKRS: BOLT-ON

Circuits 1–96, 15A breakers.

Loads (left side, in order): 22GLP11A 2 HP; 22GLP14 3 HP; 22GLP15 3 HP; 22GLP03 2 HP; 22GLP04 2 HP; 22GLP01 3 HP; 22GLP02 3 HP; COMPRESSOR 5 HP; 22DRY01 2 HP; ERH1, ERH4 9.5KW; 22HWT04 9.5KW; 22GLP16 3 HP; 22GLP11B 2 HP

Loads (right side, in order): 22GLP05 5 HP; 22GLP06 5 HP; 22GLP07 5 HP; 22GLP08 5 HP; 22GLP09 1.5 HP; 22GLP10 1.5 HP; 22AHU04 5 HP; 22AHU06 2.5 HP; 22AHU07 2.5 HP; DOCK LEVELER 5 HP; 22XAF11 1.5 HP; 22RAF04 1 HP; 22RAF05 2 HP; ERH2, ERH3 9.5KW

PANEL "L28"

PNL. LOCATION: LAB — RATING AMPS: 100A
VOLTAGE: 120/208V — TRIM: SURFACE
PHASE: 3PH. 4W — MAIN BKR: 100A
POLES: 32 — BRANCH BKRS: BOLT-ON 400hZ RATED

Load	Bkr	Ckt	Ckt	Bkr	Load
RECEPTACLES	15	1	2	15	ROOF JUNCTION BOX
RECEPTACLES	15	3	4	15	VAV TRANSFORMER
RECEPTACLES	15	5	6	15	
RECEPTACLES	15	7	8		
RECEPTACLES	15	9	10		
SPARE	15	11	12		
SPARE	15	13	14		
SPARE	15	15	16		
		17	18		
		19	20		
		21	22		
		23	24		
		25	26		
		27	28		
		29	30		
		31	32		
		33	34		
		35	36		
		37	38		
		39	40		
		41	42		

Schedule of Connections to Mechanical Equipment

GENERAL NOTES:
(1) ALL COMPONENTS (STARTERS) NOT INTEGRAL WITH EQUIPMENT OR SPECIFICALLY NOTED AS SUPPLIED BY OTHERS TO BE PROVIDED BY ELECTRICAL
(2) CONTROLS/COMMENTS SHALL BE READ IN CONJUNCTION WITH THE MECHANICAL CONTROLS SCHEMATIC.

REF. NUMBER	DESCRIPTION	LOCATION	HP, W or FLA	VOLTS, PHASE Hz	EQUIPMENT ISOLATION	MOTOR OVERLOAD PROTECTION	EQUIPMENT OR CIRCUIT OVERCURRENT PROTECT.	WIRING	CONTROLS / NOTES
22GLP01	BUILDING CHILLER PRIMARY LOOP PUMPS DUTY	BASEMENT MECHANICAL ROOM	3 HP	600V/3ø	W.P. DISC.	VFD	15A PANEL BREAKER	3#12	INSTALL VARIABLE SPEED DRIVE SUPPLIED BY MECHANICAL
22GLP02	BUILDING CHILLER PRIMARY LOOP PUMPS STANDBY	BASEMENT MECHANICAL ROOM	3 HP	600V/3ø	W.P. DISC.	STARTER	15A PANEL BREAKER	3#12	PROVIDE STARTER C/W AUX CONTACTS FOR MECH. BAS CONTROLS, HAND/AUTO/OFF
22GLP03	BUILDING CHILLED WATER SECONDARY DISTRIBUTION DUTY	BASEMENT MECHANICAL ROOM	2 HP	600V/3ø	W.P. DISC.	STARTER	15A PANEL BREAKER	3#12	INSTALL VARIABLE SPEED DRIVE PROVIDED BY MECHANICAL
22GLP04	BUILDING CHILLED WATER SECONDARY DISTRIBUTION STANDBY	BASEMENT MECHANICAL ROOM	2 HP	600V/3ø	W.P. DISC.	STARTER	15A PANEL BREAKER	3#12	INSTALL VARIABLE SPEED DRIVE PROVIDED BY MECHANICAL
22GLP05	LABS CONDENSER WATER PUMPS DUTY	BASEMENT MECHANICAL ROOM	5 HP	600V/3ø	W.P. DISC.	STARTER	15A PANEL BREAKER	3#12	PROVIDE STARTER C/W AUX CONTACTS FOR MECH. BAS CONTROLS, HAND/AUTO/OFF
22GLP06	LABS CONDENSER WATER PUMPS STANDBY	BASEMENT MECHANICAL ROOM	5 HP	600V/3ø	W.P. DISC.	STARTER	15A PANEL BREAKER	3#12	PROVIDE STARTER C/W AUX CONTACTS FOR MECH. BAS CONTROLS, HAND/AUTO/OFF
22GLP07	LABS CHILLER PRIMARY LOOP PUMP DUTY	BASEMENT MECHANICAL ROOM	2 HP	600V/3ø	W.P. DISC.	STARTER	15A PANEL BREAKER	3#12	PROVIDE STARTER C/W AUX CONTACTS FOR MECH. BAS CONTROLS, HAND/AUTO/OFF
22GLP08	LABS CHILLER PRIMARY LOOP PUMP STANDBY	BASEMENT MECHANICAL ROOM	2 HP	600V/3ø	W.P. DISC.	STARTER	15A PANEL BREAKER	3#12	PROVIDE STARTER C/W AUX CONTACTS FOR MECH. BAS CONTROLS, HAND/AUTO/OFF
22GLP09	LABS SECONDARY CHILLED WATER DISTRIBUTION DUTY	BASEMENT MECHANICAL ROOM	1.5 HP	600V/3ø	W.P. DISC.	STARTER	15A PANEL BREAKER	3#12	INSTALL VARIABLE SPEED DRIVE PROVIDED BY MECHANICAL
22GLP10	LABS SECONDARY CHILLED WATER DISTRIBUTION STANDBY	BASEMENT MECHANICAL ROOM	1.5 HP	600V/3ø	W.P. DISC.	STARTER	15A PANEL BREAKER	3#12	INSTALL VARIABLE SPEED DRIVE PROVIDED BY MECHANICAL
22GLP11A	FUSELAGE CONDENSER WATER PUMP	BASEMENT MECHANICAL ROOM	2 HP	600V/3ø	W.P. DISC.	STARTER	15A PANEL BREAKER	3#12	PROVIDE STARTER C/W AUX CONTACTS FOR MECH. BAS CONTROLS, HAND/AUTO/OFF
22GLP11B	FUSELAGE CONDENSER WATER PUMP	BASEMENT MECHANICAL ROOM	2 HP	600V/3ø	W.P. DISC.	STARTER	15A PANEL BREAKER	3#12	PROVIDE STARTER C/W AUX CONTACTS FOR MECH. BAS CONTROLS, HAND/AUTO/OFF
22GLP12	AIRPORT TERMINAL ROOM COOLING	BASEMENT MECHANICAL ROOM	.5 HP	120V/1ø	W.P. DISC.	STARTER	15A PANEL BREAKER	3#12	PROVIDE STARTER C/W AUX CONTACTS FOR MECH. BAS CONTROLS, HAND/AUTO/OFF
22GLP13A	FUSELAGE CHILLED WATER PUMP	BASEMENT MECHANICAL ROOM	10 HP	600V/3ø	W.P. DISC.	STARTER	15A PANEL BREAKER	3#12	PROVIDE STARTER C/W AUX CONTACTS FOR MECH. BAS CONTROLS, HAND/AUTO/OFF
22GLP13B	FUSELAGE CHILLED WATER PUMP	BASEMENT MECHANICAL ROOM	10 HP	600V/3ø	W.P. DISC.	STARTER	15A PANEL BREAKER	3#12	PROVIDE STARTER C/W AUX CONTACTS FOR MECH. BAS CONTROLS, HAND/AUTO/OFF
22GLP14	BUILDING GLYCOL DISTRIBUTION DUTY	BASEMENT MECHANICAL ROOM	3 HP	600V/3ø	W.P. DISC.	STARTER	15A PANEL BREAKER	3#12	INSTALL VARIABLE SPEED DRIVE PROVIDED BY MECHANICAL
22GLP15	BUILDING GLYCOL DISTRIBUTION STANDBY	BASEMENT MECHANICAL ROOM	3 HP	600V/3ø	W.P. DISC.	STARTER	15A PANEL BREAKER	3#12	INSTALL VARIABLE SPEED DRIVE PROVIDED BY MECHANICAL
22GLP16	AIRPORT TERMINAL ROOM HEATING	BASEMENT MECHANICAL ROOM	.5 HP	120V/1ø	DISC.	STARTER	15A PANEL BREAKER	3#12	PROVIDE STARTER C/W AUX CONTACTS FOR MECH. BAS CONTROLS, HAND/AUTO/OFF
22HWP04	AIRPORT TERMINAL ROOM HEATING	BASEMENT MECHANICAL ROOM	.5 HP	120V/1ø	W.P. DISC.	STARTER	15A PANEL BREAKER	3#12	PROVIDE STARTER C/W AUX CONTACTS FOR MECH. BAS CONTROLS, HAND/AUTO/OFF
22SP01	SANITARY SUMP PUMP	BASEMENT MECHANICAL ROOM	.5 HP	120V/1ø	W.P. DISC.	STARTER	15A PANEL BREAKER	3#12	PROVIDE STARTER C/W AUX CONTACTS FOR MECH. BAS CONTROLS, HAND/AUTO/OFF
22SP02	WEEPING TILE SUMP PUMP	BASEMENT MECHANICAL ROOM	.5 HP	120V/1ø	W.P. DISC.	STARTER	15A PANEL BREAKER	3#12	PROVIDE STARTER C/W AUX CONTACTS FOR MECH. BAS CONTROLS, HAND/AUTO/OFF
22SP03	TRENCH DRAIN SUMP PUMP	BASEMENT MECHANICAL ROOM	.5 HP	120V/1ø	W.P. DISC.	STARTER	15A PANEL BREAKER	3#12	PROVIDE STARTER C/W AUX CONTACTS FOR MECH. BAS CONTROLS, HAND/AUTO/OFF
22XAF09	BUILDING SANITARY EXHAUST	UPPER LEVEL W/RM CEILING	.5 HP	120V/1ø	WP DISCONNECT	THERMALLY PROTECTED	15A PANEL BREAKER	3#12	PROVIDE STARTER C/W AUX CONTACTS FOR MECH. BAS CONTROLS, HAND/AUTO/OFF
22XAF10	FLEX CABIN SAN EXHAUST	FCL CEILING	.25 HP	120V/1ø	WP DISCONNECT	THERMALLY PROTECTED	15A PANEL BREAKER	3#12	PROVIDE STARTER C/W AUX CONTACTS FOR MECH. BAS CONTROLS, HAND/AUTO/OFF
22XAF11	BUILDING PRESSURE RELIEF	SIDEWALL	1.5 HP	600V/3ø	WP DISCONNECT	THERMALLY PROTECTED	15A PANEL BREAKER	3#12	PROVIDE STARTER C/W AUX CONTACTS FOR MECH. BAS CONTROLS, HAND/AUTO/OFF
22RAF04	AIRPORT TERMINAL RETURN	LOWER LEVEL	1 HP	600V/3ø	WP DISCONNECT	THERMALLY PROTECTED	15A PANEL BREAKER	3#12	INSTALL VARIABLE SPEED DRIVE PROVIDED BY MECHANICAL
22RAF05	FCL/FSL RETURN	LOWER LEVEL	2 HP	600V/3ø	WP DISCONNECT	THERMALLY PROTECTED	15A PANEL BREAKER	3#12	INSTALL VARIABLE SPEED DRIVE PROVIDED BY MECHANICAL
22RAF06	FCL/FSL RETURN	UPPER LEVEL	1.5 HP	600V/3ø	WP DISCONNECT	THERMALLY PROTECTED	15A PANEL BREAKER	3#12	INSTALL VARIABLE SPEED DRIVE PROVIDED BY MECHANICAL
22RAF07	FCL/FSL RETURN	LOWER LEVEL	2 HP	600V/3ø	WP DISCONNECT	THERMALLY PROTECTED	15A PANEL BREAKER	3#12	INSTALL VARIABLE SPEED DRIVE PROVIDED BY MECHANICAL
22SAF01	FSL VENTILATION/HEATING	FSL	.75 HP	120V/1ø	WP DISCONNECT	THERMALLY PROTECTED	30A PANEL BREAKER	3#10	PROVIDE STARTER C/W AUX CONTACTS FOR MECH. BAS CONTROLS, HAND/AUTO/OFF
22AHU03	GENERAL BUILDING CONDITIONING	MECHANICAL ROOM	15 HP	600V/3ø	W.P. DISC.	STARTER	40A PANEL BREAKER	4#6	INSTALL VARIABLE SPEED DRIVE PROVIDED BY MECHANICAL
22AHU04	LABS PRE-CONDITIONING	MECHANICAL ROOM	5 HP	600V/3ø	W.P. DISC.	STARTER	50A PANEL BREAKER	4#6	MAKE LINE VOLTAGE CONNECTIONS, BAS CONTROLS BY MECHANICAL
22AHU5	FLEXIBLE CABIN / FUSELAGE LAB	MECHANICAL ROOM	8 HP	600V/3ø	W.P. DISC.	STARTER	50A PANEL BREAKER	4#6	MAKE LINE VOLTAGE CONNECTIONS, BAS CONTROLS BY MECHANICAL
22AHU6	AIRPORT TERMINAL LAB	MECHANICAL ROOM	2.5 HP	600V/3ø	W.P. DISC.	STARTER	50A PANEL BREAKER	4#6	MAKE LINE VOLTAGE CONNECTIONS, BAS CONTROLS BY MECHANICAL
22AHU7	VIBRATION LAB	MECHANICAL ROOM	2.5 HP	600V/3ø	W.P. DISC.	STARTER	50A PANEL BREAKER	4#6	MAKE LINE VOLTAGE CONNECTIONS, BAS CONTROLS BY MECHANICAL
22CCH04	Packaged air-cooled chiller	MECHANICAL ROOM	33 KW	600V/3ø	W.P. DISC.	STARTER	50A PANEL BREAKER	4#6	MAKE LINE VOLTAGE CONNECTIONS, BAS CONTROLS BY MECHANICAL
22CCH05	Screw - Water Cooled	MECHANICAL ROOM	68 KW	600V/3ø	W.P. DISC.	STARTER	90A PANEL BREAKER	4#3	MAKE LINE VOLTAGE CONNECTIONS, BAS CONTROLS BY MECHANICAL
22CCH06	Screw - Water Cooled	MECHANICAL ROOM	38 KW	600V/3ø	W.P. DISC.	STARTER	50A PANEL BREAKER	4#6	MAKE LINE VOLTAGE CONNECTIONS, BAS CONTROLS BY MECHANICAL
22DRY01	Fluid Cooler	EXTERIOR	2 HP	600V/3ø	W.P. DISC.	THERMALLY PROTECTED	15A PANEL BREAKER	3#12	MAKE LINE VOLTAGE CONNECTIONS, BAS CONTROLS BY MECHANICAL
ERH1	DUCT HEATER	FCL OBSERVATION	6.3 kW	600V/3ø	–	–	15A PANEL BREAKER	3#12	MAKE LINE VOLTAGE & SCR CONNECTIONS. BAS CONTROLS BY MECHANICAL
ERH2	DUCT HEATER	CORRIDOR	6.3 kW	600V/3ø	–	–	15A PANEL BREAKER	3#12	MAKE LINE VOLTAGE & SCR CONNECTIONS. BAS CONTROLS BY MECHANICAL
ERH3	DUCT HEATER	FCL OBSERVATION	3.5 kW	600V/3ø	–	–	15A PANEL BREAKER	3#12	MAKE LINE VOLTAGE & SCR CONNECTIONS. BAS CONTROLS BY MECHANICAL
ERH4	DUCT HEATER	MECHANICAL ROOM	3.5 kW	600V/3ø	–	–	15A PANEL BREAKER	3#12	MAKE LINE VOLTAGE & SCR CONNECTIONS. BAS CONTROLS BY MECHANICAL
22HWT04	HOT WATER TANK	MECHANICAL ROOM	12 kW	600V/3ø	–	–	15A PANEL BREAKER	3#12	INTEGRAL CONTROLS
22UNH11	HYDRONIC UNIT HEATER	REFER TO DRAWINGS	1/20 HP	120V/1ø	TOGGLE SWITCH	THERMALLY PROTECTED	15A PANEL BREAKER	3#12	PROVIDE REMOTE THERMOSTAT FOR CONTROL WHERE INDICATED
22UNH12	HYDRONIC UNIT HEATER	REFER TO DRAWINGS	1/20 HP	120V/1ø	TOGGLE SWITCH	THERMALLY PROTECTED	15A PANEL BREAKER	3#12	PROVIDE REMOTE THERMOSTAT FOR CONTROL WHERE INDICATED
22UNH13	HYDRONIC UNIT HEATER	REFER TO DRAWINGS	1/20 HP	120V/1ø	TOGGLE SWITCH	THERMALLY PROTECTED	15A PANEL BREAKER	3#12	PROVIDE REMOTE THERMOSTAT FOR CONTROL WHERE INDICATED
22UNH14	HYDRONIC UNIT HEATER	REFER TO DRAWINGS	1/20 HP	120V/1ø	TOGGLE SWITCH	THERMALLY PROTECTED	15A PANEL BREAKER	3#12	PROVIDE REMOTE THERMOSTAT FOR CONTROL WHERE INDICATED
VAV	VARIABLE AIR VOLUME	REFER TO DRAWINGS	50W	120V/1ø	BREAKER	–	15A PANEL BREAKER	3#12	CONNECT LOW VOLTAGE CONTROL TRANSFORMER
22HUM04	HUMIDIFIER	MECHANICAL ROOM	42 kW	600V/3ø	BREAKER	–	60A PANEL BREAKER	3#6	MAKE LINE VOLTAGE CONNECTIONS. BAS CONTROLS BY MECHANICAL
22SHP01	SUMP PUMP	FLIGHT SIMULATION	1/2HP	120V/1ø	RECEPTACLE	–	15A PANEL BREAKER	3#12	INTEGRAL CONTROLS
22SUP02	SUMP PUMP	FLIGHT SIMULATION	1/2HP	120V/1ø	RECEPTACLE	–	15A PANEL BREAKER	3#10	INTEGRAL CONTROLS
22SUP03	SUMP PUMP	FLIGHT SIMULATION	1/2HP	120V/1ø	RECEPTACLE	–	15A PANEL BREAKER	3#10	INTEGRAL CONTROLS
22PAS01	A/C	REFER TO DRAWINGS	14 A	208V/1ø	W.P. DISC.	THERMALLY PROTECTED	20A PANEL BREAKER	3#12	PROVIDE 7 WIRE CONNECTION FROM CONDENSER TO FAN COIL
22SVP02	A/C	REFER TO DRAWINGS	14 A	208V/1ø	W.P. DISC.	THERMALLY PROTECTED	20A PANEL BREAKER	3#12	PROVIDE 7 WIRE CONNECTION FROM CONDENSER TO FAN COIL
22PAS03	A/C	ELECTRICAL ROOM	28 A	208V/1ø	W.P. DISC.	THERMALLY PROTECTED	40A PANEL BREAKER	3#8	PROVIDE 7 WIRE CONNECTION FROM CONDENSER TO FAN COIL
22HRV01	HEAT RECOVERY VENTILATOR	BASEMENT JAN ROOM	1/2HP	120V/1ø	RECEPTACLE	–	15A PANEL BREAKER	3#12	MAKE LINE VOLTAGE CONNECTIONS. BAS CONTROLS BY MECHANICAL

ASPM A0 (1189x841)

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LICENSED PROFESSIONAL ENGINEER A.O. MIKHAIEL 100071099 PROVINCE OF ONTARIO May 15 15
ECOT13006l

No.	Date	Revision	By: Par:
0	29 05 2015	ISSUED FOR TENDER	AM

Date Printed / Date imprimée

- Verify all dimensions and site conditions and be responsible for same
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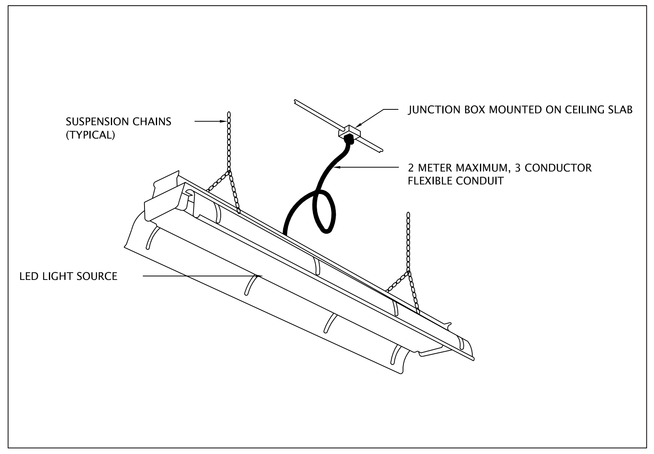
A Detail no. / No. du détail
B Location drawing no. / sur dessin no.
C Drawing no. / dessin no.

project / projet: NRC CABIN COMFORT + ENVIRONMENTAL RESEARCH FACILITY
MONTREAL ROAD CAMPUS
drawing / dessin: PANEL & SCHEDULES
designed / conçu: M.T — date: May 15
drawn / dessiné: M.T — scale / échelle: AS INDICATED
checked / vérifié: A.M — sheet / feuille: of/de
approved / approuvé: A.M — W.O.no. / D.T.no.: 3788-E08
dwg.no. / dessin no.: 3788-E08



1 / E09 TYPICAL CHAIN HUNG FIXTURE
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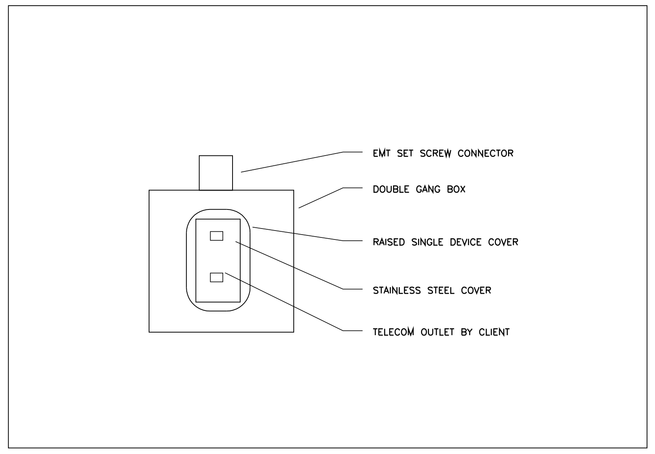

2 / E09 COMMUNICATION OUTLET DETAIL
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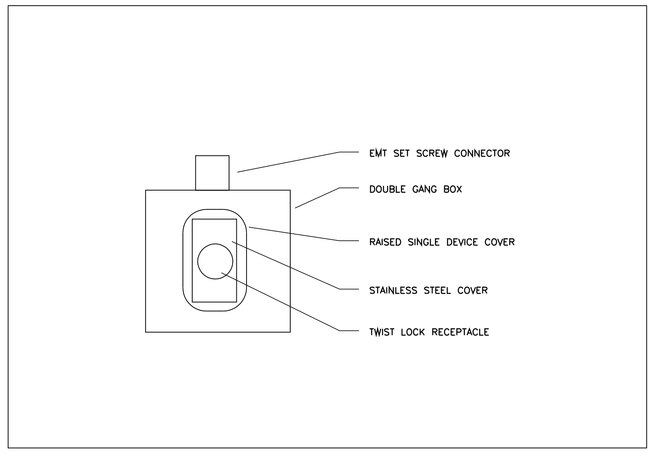

3 / E09 SPECIAL OUTLET DETAIL
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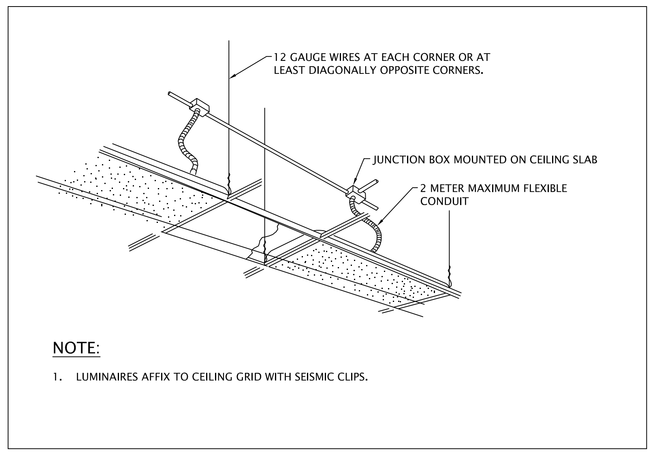

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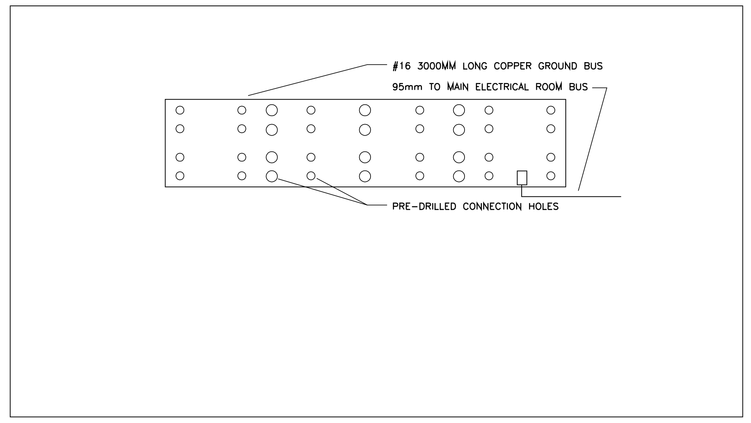

5 / E09 GROUNDING BUS BAR DETAIL
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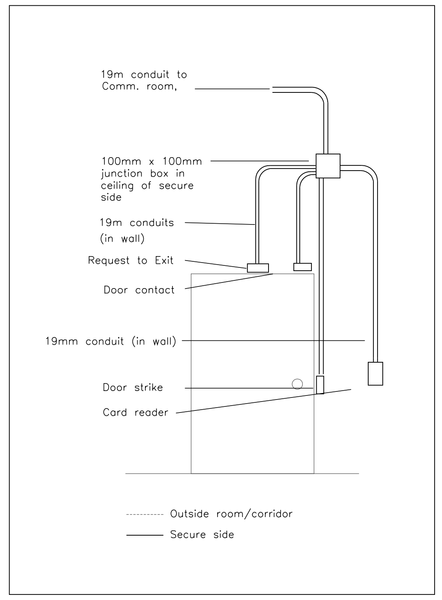

6 / E09 SECURITY DOOR DETAIL
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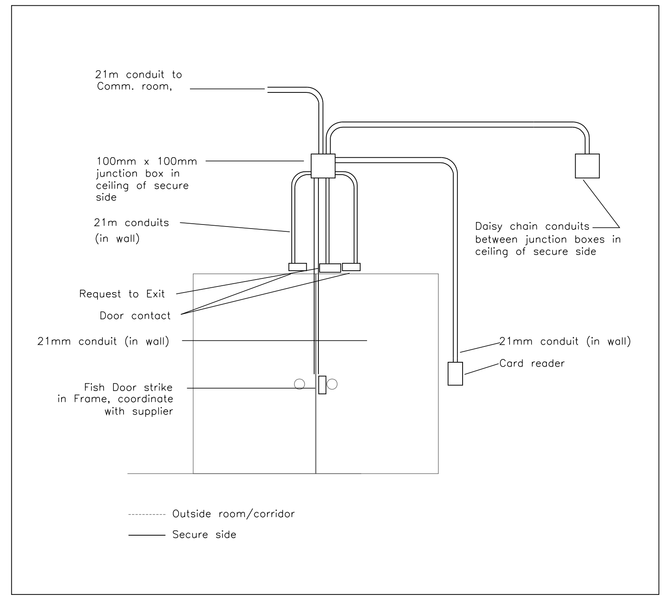

7 / E09 SECURITY DOOR DETAIL
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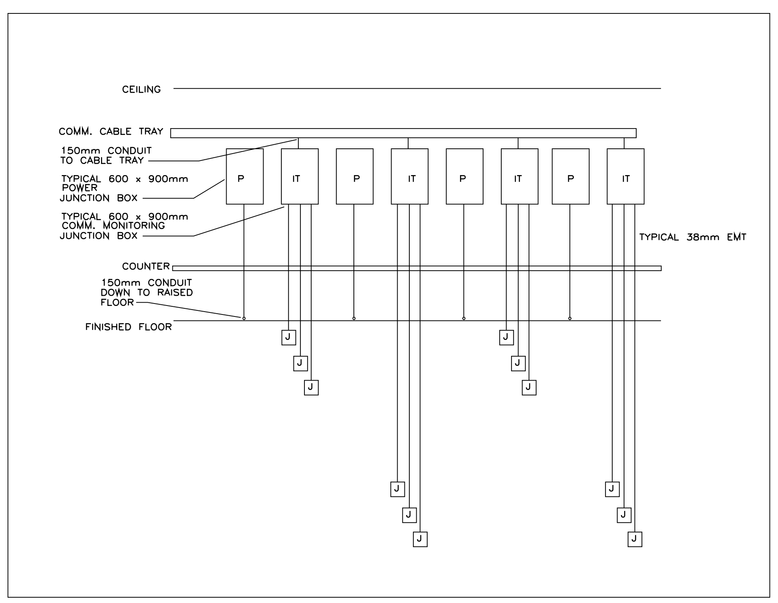
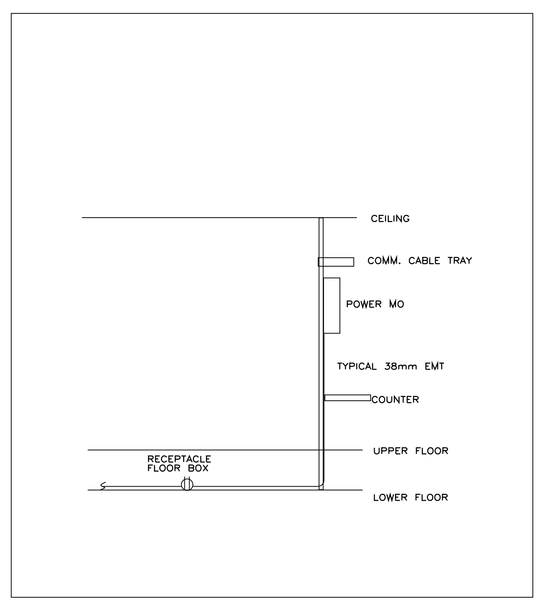


8 / E09 CONTROL ROOM ELEVATION
Scale: 1:50



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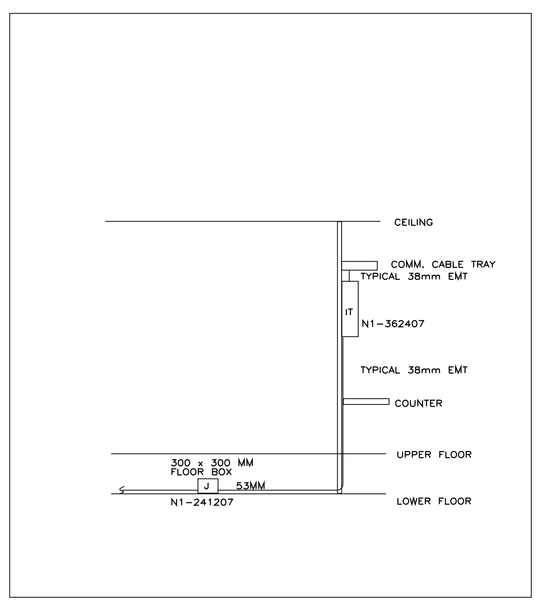
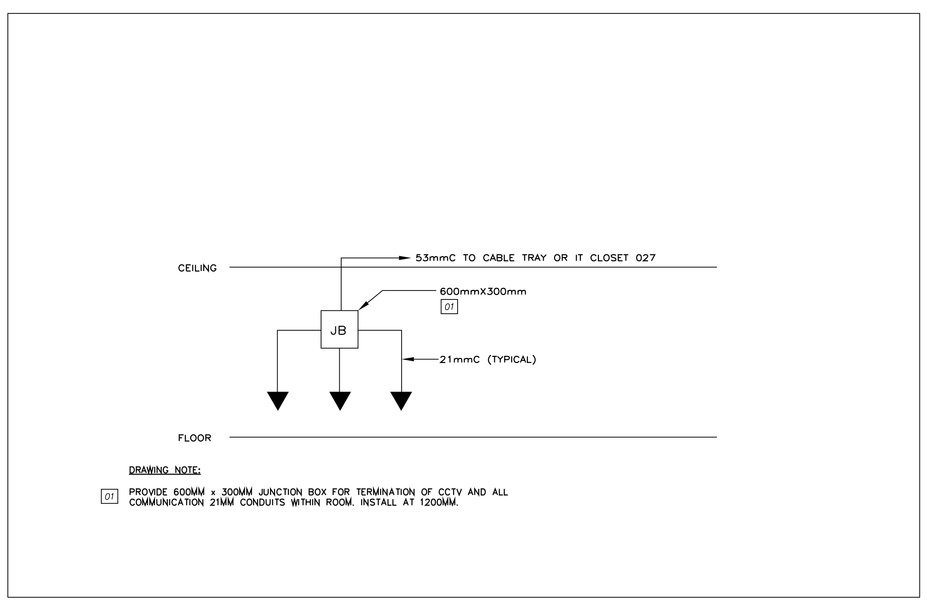


10 / E09 SECTION – COMMUNICATION
Scale: 1:50



11 / E09 TYPICAL LAB COMMUNICATIONS CONDUIT INFRASTRUCTURE
Scale: 1:50

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LICENCED PROFESSIONAL ENGINEER
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May 15, 15
PROVINCE OF ONTARIO
EC07130061

No.	Date	Revision	By/Par
0	29 05 2015	ISSUED FOR TENDER	AM

Date Printed / Date imprimée

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project / projet
NRC CABIN COMFORT + ENVIRONMENTAL RESEARCH FACILITY

MONTREAL ROAD CAMPUS

drawing / dessin
ELECTRICAL DETAILS

designed / conçu	M.T	date	May 15
drawn / dessiné	M.T	scale / échelle	AS INDICATED
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ASPM A0 (1189x841)

C
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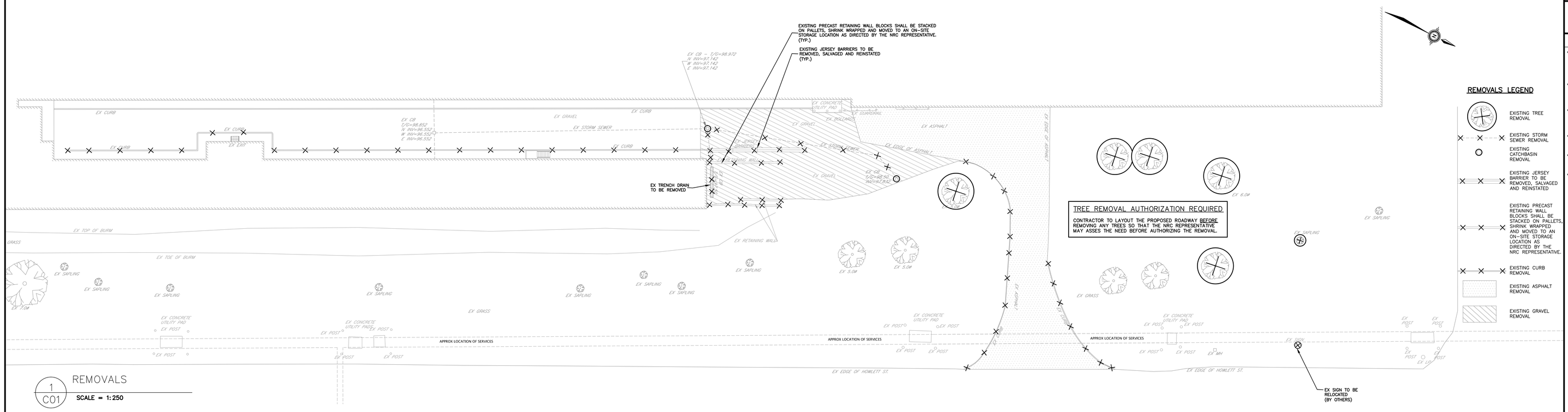


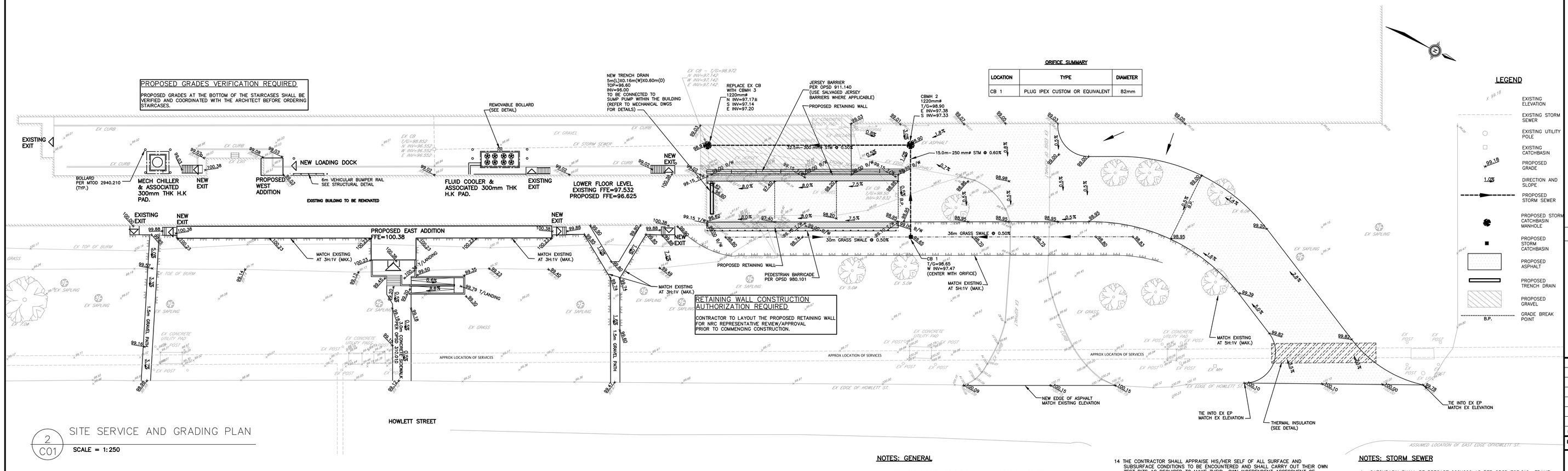
REMOVALS

1 / C01

SCALE = 1:250

REMOVALS LEGEND

- EXISTING TREE REMOVAL
- EXISTING STORM SEWER REMOVAL
- EXISTING CATCHBASIN REMOVAL
- EXISTING JERSEY BARRIER TO BE REMOVED, SALVAGED AND REINSTATED
- EXISTING PRECAST RETAINING WALL BLOCKS SHALL BE STACKED ON PALLETS, SHRINK WRAPPED AND MOVED TO AN ON-SITE STORAGE LOCATION AS DIRECTED BY THE NRC REPRESENTATIVE.
- EXISTING CURB REMOVAL
- EXISTING ASPHALT REMOVAL
- EXISTING GRAVEL REMOVAL



SITE SERVICE AND GRADING PLAN

2 / C01

SCALE = 1:250

ORIFICE SUMMARY

LOCATION	TYPE	DIAMETER
CB 1	PLUG IPEX CUSTOM OR EQUIVALENT	82mm

NOTES: GENERAL

1. CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT FOR CONSTRUCTION
2. ALL ELEVATIONS / DIMENSIONS ARE IN METRIC UNITS.
3. JOB BENCH MARK – CONFIRM WITH NRC PRIOR TO UTILIZATION.
4. ALL GROUND SURFACES SHALL BE EVENLY GRADED WITHOUT PONDING AREAS AND WITHOUT LOW POINTS EXCEPT WHERE APPROVED SWALE OR CATCHBASIN OUTLETS ARE PROVIDED.
5. ALL DISTURBED AREAS SHALL BE REINSTATED TO EQUAL OR BETTER CONDITION TO THE SATISFACTION OF THE NRC REPRESENTATIVE.
6. ALL EDGES OF DISTURBED PAVEMENT SHALL BE SAW CUT TO FORM A NEAT AND STRAIGHT LINE PRIOR TO PLACING NEW PAVEMENT.
7. ALL MATERIAL SUPPLIED AND PLACED FOR PARKING LOT AND ACCESS ROAD CONSTRUCTION SHALL BE TO OPSS STANDARDS AND SPECIFICATIONS UNLESS OTHERWISE NOTED. (CONSTRUCTION OPSS 206, 310 & 314 MATERIALS OPSS 1001, 1003 & 1010).
8. REFER TO ARCHITECT'S SITE PLAN FOR BUILDING DIMENSIONS AND SITE LAYOUT. DIMENSIONS AND LAYOUT INFORMATION SHALL BE CONFIRMED PRIOR TO COMMENCEMENT OF CONSTRUCTION.
9. CONTRACTOR IS RESPONSIBLE FOR ALL DEWATERING, SUPPORT AND PROTECTION OF EXCAVATIONS.
10. DESIGN ELEVATIONS AS GIVEN ON THIS PLAN ARE TO BE ADHERED TO WITH NO CHANGES WITHOUT PRIOR WRITTEN APPROVAL BY THE ENGINEER.
11. U/G CONTRACTOR TO INSTALL AND MAINTAIN A FILTER CLOTH "CATCH" ACROSS ALL MH/CB LIDS TO PREVENT SEDIMENTS AND GRANULARS FROM ENTERING STRUCTURES UNTIL SOD AND PAVING IS COMPLETE. ANY SEDIMENTS/GRANULARS ENTERING STRUCTURES AND SEWERS SHALL BE IMMEDIATELY REMOVED.
12. U/G CONTRACTOR TO CONFIRM LOCATION(S) AND ELEVATION(S) OF EXISTING SERVICES AND STRUCTURES TO BE CONNECTED TO AND EXISTING SERVICES THAT MAY CAUSE CONFLICTS PRIOR TO CONSTRUCTION OF ANY NEW SEWER AND/OR STORM WATER WORKS. THE ENGINEER SHALL BE INFORMED IMMEDIATELY OF ANY ERRORS, DISCREPANCIES, CONFLICTS, OMISSIONS etc THAT ARE FOUND.
13. THE CONTRACTOR SHALL VERIFY ALL SURFACE AND SUBSURFACE CONDITIONS PRIOR TO COMMENCING CONSTRUCTION BY REVIEWING THE GEOTECHNICAL INVESTIGATION REPORT "RAMP MODIFICATION – ADDITION TO BUILDING M22, NRC MONTREAL CAMPUS, OTTAWA" PREPARED BY STANTEC CONSULTING LTD. DATED APRIL 24, 2015.
14. THE CONTRACTOR SHALL APPRAISE HIS/HER SELF OF ALL SURFACE AND SUBSURFACE CONDITIONS TO BE ENCOUNTERED AND SHALL CARRY OUT THEIR OWN TEST PITS AS REQUIRED TO MAKE THEIR OWN INDEPENDENT ASSESSMENT OF GROUND CONDITIONS. THE CONTRACTOR SHALL NOT MAKE ANY CLAIM FOR ANY EXTRA COST DUE TO ANY SUCH GROUND CONDITIONS VARYING FROM THOSE ANTICIPATED BY THE CONTRACTOR.
15. THE CONTRACTOR SHALL COORDINATE AND PAY FOR ALL CONSTRUCTION RELATED PERMITS, FEES, INSPECTIONS AND APPROVALS REQUIRED.
16. IN PREPARATION FOR THE CONSTRUCTION OF THE NEW ASPHALTIC CONCRETE SURFACED ROADWAYS AND PARKING AREAS, ALL TOPSOIL, ORGANIC MATERIAL AND ANY LOOSE/SOFT OR WET SOIL SHOULD BE REMOVED FROM THE PROPOSED SUBGRADE SURFACE AND REPLACED WITH SUITABLE COMPACTED EARTH BORROW OR GRANULAR FILL.
17. PRIOR TO PLACING GRANULAR FILL FOR THE ROADWAYS AND PARKING AREAS, THE EXPOSED SUBGRADE SHOULD BE HEAVILY PROOF ROLLED WITH A LARGE (6 TONNE) VIBRATORY DRUM ROLLER UNDER DRY CONDITIONS. ANY SOFT AREAS EVIDENT FROM THE PROOF ROLLING SHOULD BE SUBEXCAVATED AND REPLACED WITH SUITABLE, COMPACTED EARTH BORROW.
18. THE CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION AND CONSTRUCTION OF ALL SEDIMENT AND EROSION CONTROL MEASURES TO ENSURE THAT SEDIMENT DOES NOT MIGRATE FROM THE CONSTRUCTION SITE. SEDIMENTS SHALL BE CONTAINED AND DISPOSED OF IN AN APPROVED MANNER. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THIS INCLUDES LIMITING THE AMOUNT OF EXPOSED SOIL, USING FILTER CLOTH UNDER THE GRATES OF CATCHBASINS AND MANHOLES AND INSTALLING SILT FENCES (PER OPSD 219.110) AND OTHER EFFECTIVE SEDIMENT TRAPS.
19. ASPHALTIC CONCRETE SHALL NOT BE PLACED UNTIL FINAL CCTV INSPECTION OF THE SEWERS IN ACCORDANCE WITH OPSS 409 HAVE BEEN COMPLETED AND APPROVED BY THE NRC REPRESENTATIVE.
20. THE CONTRACTOR IS RESPONSIBLE FOR ALL RE-CCTV RESULTING FROM DEFICIENCY REPAIRS AS DEEMED NECESSARY BY THE ENGINEER. CCTV INSPECTIONS WILL BE CONDUCTED UNTIL SUCH TIME AS THE RESULTS HAVE BEEN APPROVED BY THE ENGINEER AND/OR NRC REPRESENTATIVE AT NO ADDITIONAL COST TO THE CLIENT.
21. A MUD MAT IS TO BE INSTALLED AT EACH CONSTRUCTION ENTRANCE AND SHALL BE MAINTAINED UNTIL THE PLACEMENT OF THE GRANULAR SUB-BASE. MUD MAT SHALL BE CONSTRUCTED OF 100mm # CLEAR STONE, 400mm THICK. MUD MAT SHALL BE OF SUFFICIENT LENGTH TO ENSURE THAT A MINIMUM AMOUNT OF MATERIALS IS TRUCKED OFF SITE ONTO ADJACENT ROADS.
22. EXISTING SEA CONTAINER BESIDE BUILDING M32 SHALL BE TEMPORARILY RELOCATED AS REQUIRED TO FACILITATE THE ROAD WORK.

NOTES: STORM SEWER

1. CATCHBASIN SHALL BE PRECAST 600X600 AS PER OPSD 705.010 FRAME AND COVER SHALL BE AS PER OPSD 400.020
2. ALL MANHOLES AND CBMH TO BE OPSD 701.010 C/W 300mm SUMP. COVERS TO BE PER OPSD 401.020
3. STORM SEWERS 375mm OR SMALLER SHALL BE PVC SDR 35.
4. STORM SEWER LATERALS SHALL HAVE A MINIMUM OF 1.0m COVER. THERMAL INSULATION IS TO BE INSTALLED WHERE REQUIRED.
5. THE FOUNDATION DRAINS ARE TO BE CONNECTED TO THE STORM SEWER (IF APPLICABLE).
6. PVC PIPE BEDDING SHALL CONSIST OF GRANULAR "A" PLACED IN 150MM LIFTS, UP TO THE OBVERT OF THE PIPE. TO A MINIMUM DEPTH OF 150MM BELOW THE PIPE, COMPACTED TO 95% STANDARD PROCTOR DENSITY.
7. CONTRACTOR IS RESPONSIBLE FOR ALL COSTS AND COORDINATION FOR ALL INSPECTIONS AND TESTING.
8. ALL MANHOLES, CATCHBASINS AND CATCHBASIN MANHOLES TO BE BACKFILLED WITH MIN. 0.3m HORZ. THICKNESS OF GRANULAR "A".

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GENERAL NOTES

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- CONTRACTORS MUST VISIT THE SITE & FULLY FAMILIARIZE THEMSELVES WITH THE SCOPE OF THE WORK.
- PREVENT THE SPREAD OF DUST & DEBRIS BEYOND THE WORK AREA AND CLEAN ALL SURFACES AT COMPLETION.
- MAKE GOOD ALL SURFACES AFFECTED BY THIS WORK.
- COORDINATE ALL SHUTDOWNS WITH THE DEPARTMENTAL REPRESENTATIVE.
- PROVIDE ALL LABOUR AND MATERIAL REQUIRED TO FORM A COMPLETE, FUNCTIONAL SYSTEM AS DESCRIBED ON DRAWNGS.

Professional Engineers Ontario
MAY 29, 2015
Limited Licensee
Name: G. STE-CROIX
Number: 100136659
Category: CIVIL; Sewers/Water Mains
Limitations:
This licence is subject to the limitations as detailed on the certificate.
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KEY PLAN

No.	Date	Revision	By/Par
0	29-05-2015	ISSUED FOR TENDER	GSC

Date Printed / Date imprimée

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A Detail no. No. du détail
B Location drawing no. sur dessin no.
C Drawing no. dessin no.

project / projet
RAMP MODIFICATION - ADDITION TO BUILDING M22

NRC MONTREAL ROAD CAMPUS

drawing / dessin
REMOVALS, SITE SERVICING & GRADING PLAN

designed / conçu	JX	date / date	MAY 2015
drawn / dessiné	MH	scale / échelle	1:250
checked / vérifié	GSC	sheet / feuille	1 of/de 3
approved / approuvé	GSC	W.O.no.	D.T.no.

dwg.no. C01 / dessin no.

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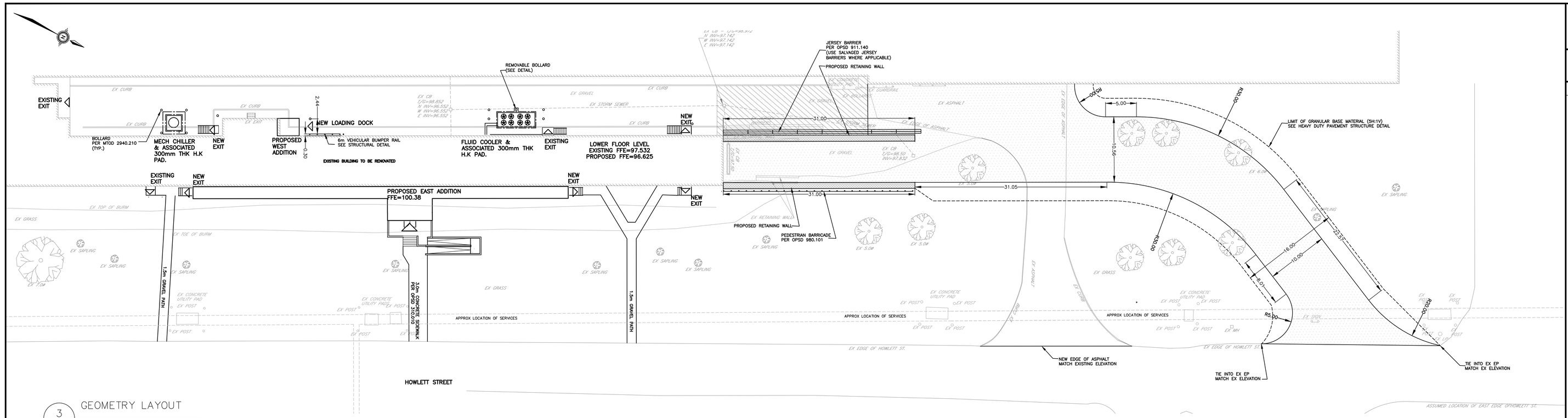
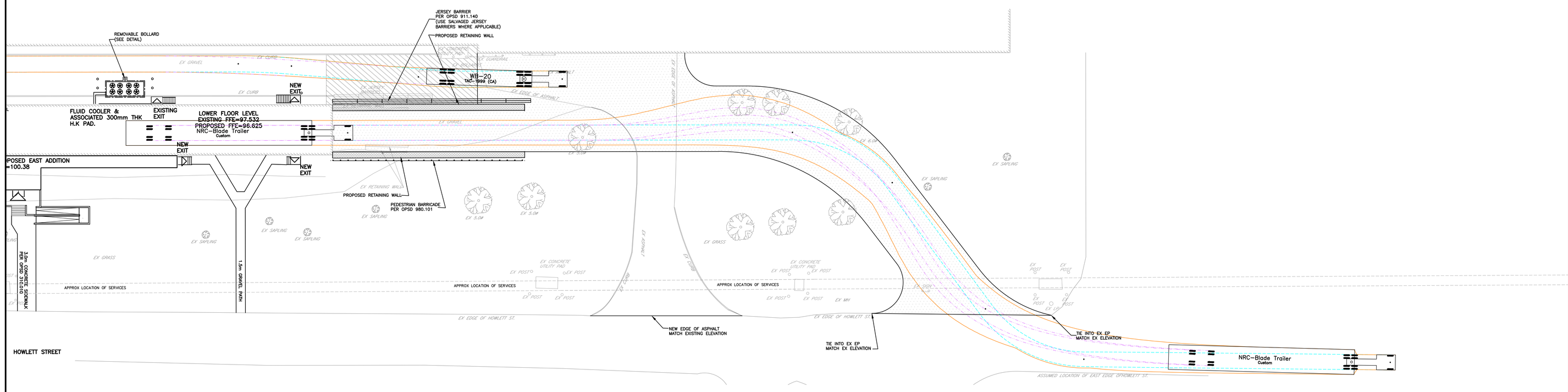


3 C02 GEOMETRY LAYOUT

SCALE = 1:250



4 C02 AUTOTURN

SCALE = 1:250

LEGEND

- BODY OF VEHICLE
- FRONT TIRES
- REAR TIRES

TAC-1999 (CA) WB-20 — TAC-WB 20

30.00 × 4.00 — NRC-Blade Trailer Custom — 6.61 × 2.44 — SPECIALIZED BLADE TRAILER

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A Detail no. No. du détail
B Location drawing no. sur dessin no.
C Drawing no. dessin no.

project / projet
RAMP MODIFICATION - ADDITION TO BUILDING M22

NRC MONTREAL ROAD CAMPUS

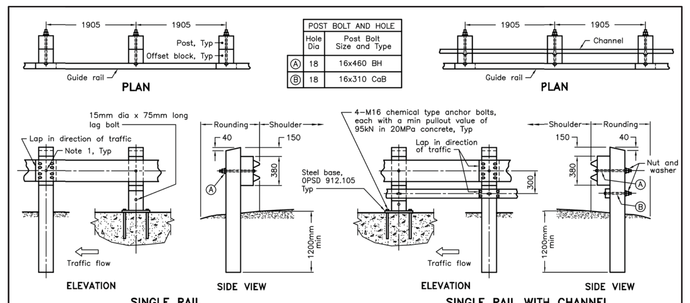
drawing / dessin
GEOMETRY LAYOUT & AUTOTURN PLAN

designed / conçu	JX	date / date	MAY 2015
drawn / dessiné	MH	scale / échelle	1250
checked / vérifié	GSC	sheet / feuille	2 of/de 3
approved / approuvé	GSC	W.O.no.	D.T.no.

dwg.no. / dessin no.
C02

ASPM A0 (1189x841)

0 10 20mm 40 60 80 100 120 140 160 180 200mm



SINGLE RAIL

SINGLE RAIL WITH CHANNEL

POST BOLT AND HOLE		
Hole Dia	Post Bolt Size and Type	
A	18	16x460 BH
B	18	16x310 CaB

NOTES:

1 Washer shall not be installed at front face of rail. One bolt located at centre of steel beam guide rail.

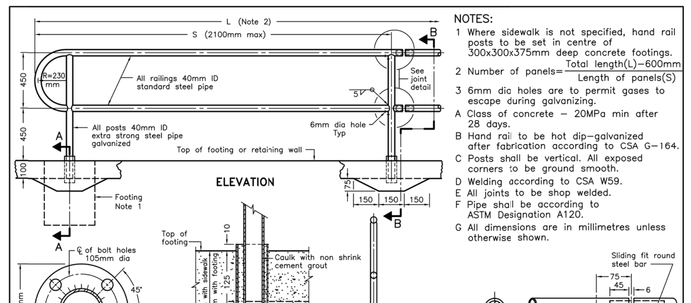
A Wooden posts and offset blocks shall be 190x190mm. Tops to have 25mm chamfer.

B Steel beam guide rail mounting heights shall be as specified.

C This OPSD to be read in conjunction with OPSD 912.101 and 912.102.

D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2010	Rev 2
GUIDE RAIL SYSTEM, STEEL BEAM WOODEN POST ASSEMBLY INSTALLATION – SINGLE RAIL		
	OPSD 912.140	



NOTES:

1 Where sidewalk is not specified, hand rail posts to be set in centre of 300x300x375mm deep concrete footings. Total length(L)–600mm

2 Number of panels = Length of panels(S)

3 6mm dia holes are to permit gases to escape during galvanizing.

A Class of concrete – 20MPa min after 28 days.

B Hand rail to be hot dip–galvanized after fabrication according to CSA G–164.

C Posts shall be vertical. All exposed corners to be ground smooth.

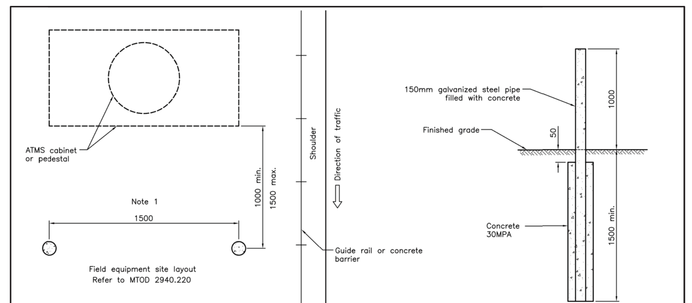
D Welding according to CSA W59.

E All joints to be shop welded.

F Pipe shall be according to ASTM Designation A120.

G All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2001	Rev 0
HAND RAIL, PEDESTRIAN INSTALLATION		
	OPSD – 980.101	

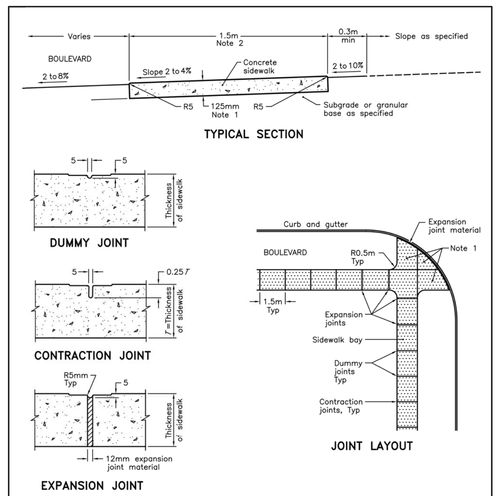


NOTES:

A. All dimensions are in millimetres unless otherwise shown.

1. For location & quantity of bollards, see layout drawings and quantity sheets.

MINISTRY OF TRANSPORTATION ONTARIO DRAWING	Date Sept. 2007	Rev 0
ADVANCED TRAFFIC MANAGEMENT SYSTEM BOLLARDS DETAIL		
	MTOD – 2940.210	



NOTES:

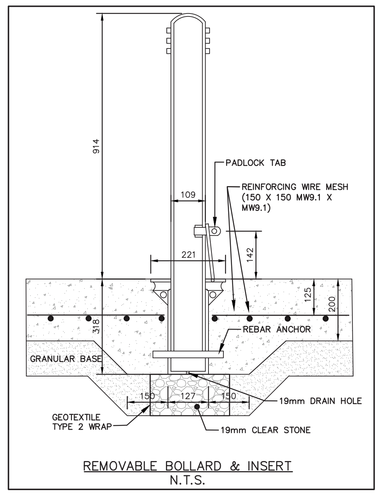
1 Sidewalk thickness at residential driveways and adjacent to curb shall be 150mm. At commercial and industrial driveways, the thickness shall be 200mm.

2 Sidewalk width shall be increased to 2.4m at schools, bus stops, and other high pedestrian areas.

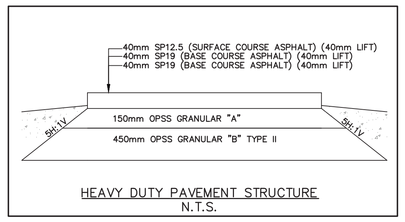
A This OPSD to be read in conjunction with OPSD–310.030.

B All dimensions are in millimetres unless otherwise shown.

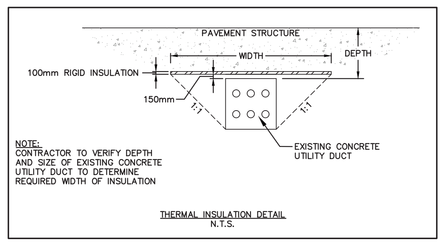
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2005	Rev 1
CONCRETE SIDEWALK		
	OPSD – 310.010	



REMOVABLE BOLLARD & INSERT
N.T.S.



HEAVY DUTY PAVEMENT STRUCTURE
N.T.S.



THERMAL INSULATION DETAIL
N.T.S.

National Research Council Canada | Conseil national de recherches Canada

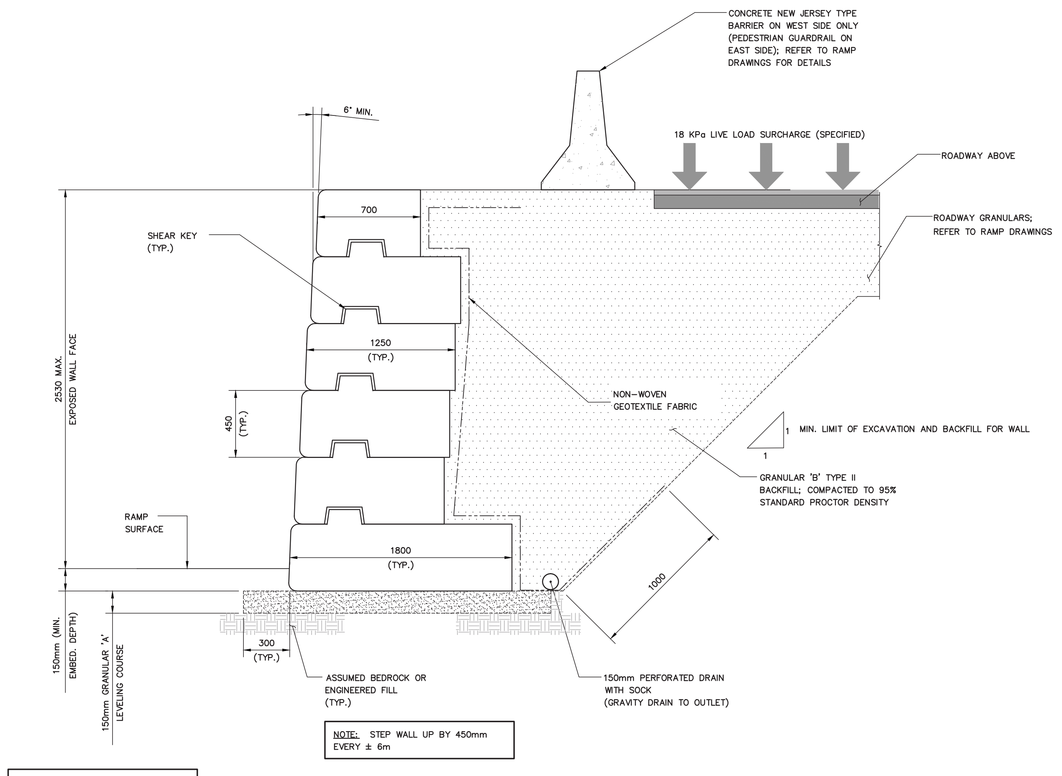
Administrative Services and Property Management Branch | Division des services administratifs et gestion de l'immobilier

NRC · CNRC

GENERAL NOTES

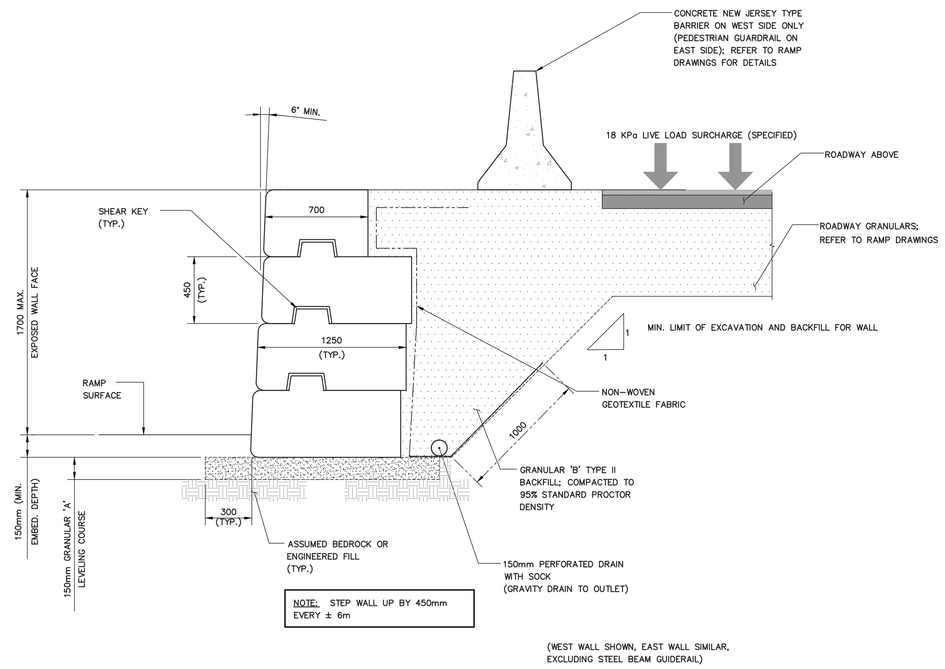
- CONTRACTORS TO CHECK AND VERIFY ALL DIMENSIONS ON SITE PRIOR TO DEMOLITION OR CONSTRUCTION AND REPORT ANY ERRORS OR OMISSIONS TO DEPARTMENTAL REPRESENTATIVE.
- CONTRACTORS MUST VISIT THE SITE & FULLY FAMILIARIZE THEMSELVES WITH THE SCOPE OF THE WORK.
- PREVENT THE SPREAD OF DUST & DEBRIS BEYOND THE WORK AREA AND CLEAN ALL SURFACES AT COMPLETION.
- MAKE GOOD ALL SURFACES AFFECTED BY THIS WORK.
- COORDINATE ALL SHUTDOWNS WITH THE DEPARTMENTAL REPRESENTATIVE.
- PROVIDE ALL LABOUR AND MATERIAL REQUIRED TO FORM A COMPLETE, FUNCTIONAL SYSTEM AS DESCRIBED ON DRAWINGS.

PRECAST CONCRETE UNIT RETAINING WALL



5 C03 TYPICAL RETAINING WALL – SECTION 'A' (WEST WALL SHOWN, EAST WALL SIMILAR)

SCALE = N.T.S.



6 C03 TYPICAL RETAINING WALL – SECTION 'B' (WEST WALL SHOWN, EAST WALL SIMILAR)

SCALE = N.T.S.

NOTES:

1. ALL WALLS TO BE APPROVED BY THE CONTRACT ADMINISTRATOR PRIOR TO CONSTRUCTION.
2. RETAINING WALL TO BE CONSTRUCTED IN LOCATIONS INDICATED ON RAMP DRAWINGS.
3. GEOTEXTILE SHALL CONFORM TO OPSS 1860 AND SHALL BE FREE OF TEARS. ONLY CLASS INON–WOVEN GEOTEXTILE SHALL BE USED.
4. THE CONTRACTOR SHALL SUBMIT RETAINING WALL SHOP DRAWINGS, SHOWING INDIVIDUAL CONCRETE UNIT SIZE AND LAYOUT AS WELL AS OTHER PERTINENT DATA TO THE CONTRACTOR ADMINISTRATOR 2 WEEKS PRIOR TO PROCEEDING WITH THE WORK. THE SOURCE OF CONCRETE WALL UNITS SHALL BE INDICATED ON THE SHOP DRAWINGS.
5. THE CONCRETE UNITS USED IN THE RETAINING WALL SHALL HAVE A STONE TEXTURE ON THE FACE AND SHALL HAVE SHEAR KEYS LINKING EACH UNIT. WALL UNITS SHALL BE FABRICATED WITH A MINIMUM EXPOSURE CLASS OF CONCRETE F–1 TO PROVIDE A USEFUL MINIMUM SERVICE LIFE OF THE WALL OF 50 YEARS. THE WALL FINISH/ SURFACE TEXTURE SHALL BE APPROVED BY THE CONTRACT ADMINISTRATOR PRIOR TO ORDERING THE WALL UNITS. MINIMUM WALL UNIT FACE DIMENSIONS SHALL BE 1000mm WIDE X 450mm HIGH.
6. THE NEW WALL WILL BE FOUNDED ON EITHER 150mm OF COMPACTED GRANULAR 'A' DIRECTLY ON SOUND BEDROCK OR 150mm OF COMPACTED GRANULAR 'A' ON ENGINEERED FILL (GRANULAR 'B' COMPACTED TO 95%%% S.P.D.) ON SOUND BEDROCK.
7. THE TYPICAL WALL CONFIGURATION SHOWN ON THIS DRAWING IS PROVIDED FOR BIDDING PURPOSES. THE CONTRACTOR WILL BE PERMITTED TO PROPOSE MODIFICATIONS PROVIDED THE MINIMUM REQUIREMENTS REQUIRED BY THE CONTRACT DOCUMENTS (DURABILITY, INDIVIDUAL UNIT FACE DIMENSIONS, FINISHES) ARE MET.
8. THE WEST WALL SHALL BE DESIGNED FOR A SPECIFIED LIVE LOAD SURCHARGE OF 18kPa. NO SURCHARGES APPLY FOR THE EAST WALL.

WALL HEIGHT TABLE	
EXPOSED WALL FACE HEIGHT (mm)	SECTION
1700 – 2530	SECTION 'A'
200 – 1700	SECTION 'B'

KEY PLAN

No.	Date	Revision	By/ Par
0	29–05–2015	ISSUED FOR TENDER	GSC

Date Printed | Date imprimée

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

A Detail no. No. du détail
B Location drawing no. sur dessin no.
C Drawing no. dessin no.

project / projet
RAMP MODIFICATION – ADDITION TO BUILDING M22

NRC MONTREAL ROAD CAMPUS

drawing / dessin
DETAILS

designed / conçu	date / date
JX	MAY 2015
drawn / dessiné	scale / échelle
MH	1250
checked / vérifié	sheet / of/de / feuille
GSC	3 of/de 3
approved / approuvé	W.O.no. / D.T.no.
GSC	

dwg.no. / dessin no.
C03

J. J. L. MONETTE 15/05/28 PROVINCE OF ONTARIO

HP ENGINEERING

ASPM A0 (1189x841)

0 10 20mm 40 60 80 100 120 140 160 180 200mm