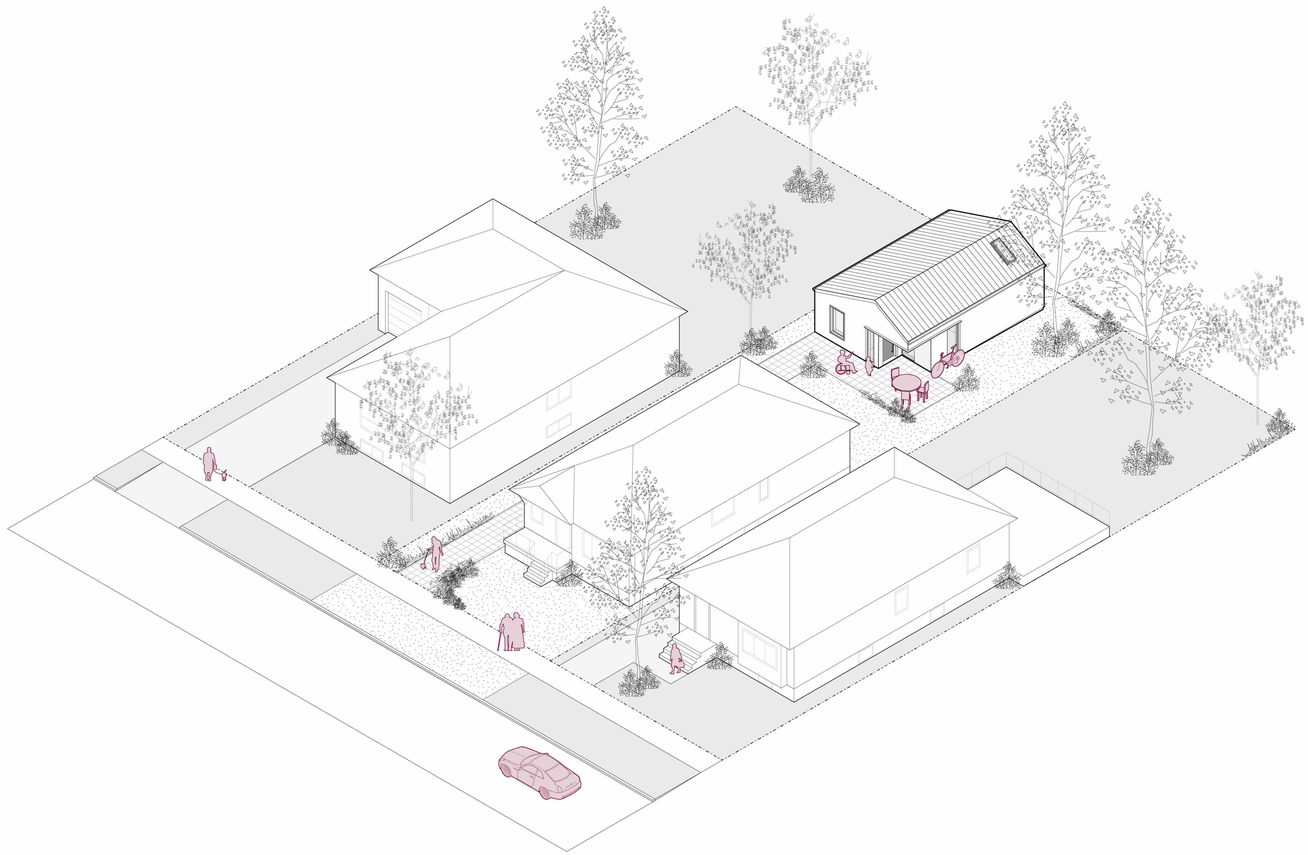
CMHC HOUSING DESIGN CATALOGUE

ON - ACCESSORY DWELLING UNIT 01

Housing, Infrastructure and Communities Canada | Logement, Infrastructures et Collectivités Canada | Canada

CMHC SCHL

CMHC HOUSING DESIGN CATALOGUE
ON - ACCESSORY DWELLING UNIT 01
ARCHITECTURAL DRAWINGS



BUILDING DATA

BUILDING FOOTPRINT	58.9m²/634ft²
BUILDING HEIGHT	4.00m/13'-1 1/2"
STOREYS	1 STOREY
NUMBER OF UNITS	1
UNIT SUMMARY	
UNIT 1	1 BEDROOM, 1 BATHROOM, ACCESSIBLE-READY
UNIT 1 (ALT.)	1 BEDROOM, 1 BATHROOM, ENHANCED ACCESSIBILITY

ARCHITECTURAL SHEET LIST

ABBREVIATIONS

ABBREVIATIONS MAY OR MAY NOT INCLUDE PERIOD PUNCTUATION.
ABBREVIATIONS APPLY TO ARCHITECTURAL DOCUMENTS ONLY.

ARCH	ARCHITECTURAL
BF	BARRIER FREE
C/C	CENTRE TO CENTRE
CL	CENTER LINE
C/V	CIVIL
CSA	CANADIAN STANDARDS ASSOCIATION
C/W	COMES WITH
DIA	DIAMETER
DIM	DIMENSION
DWG	DRAWING
ELEC	ELECTRICAL
ELEV	ELEVATION
EQ	EQUAL
GEOTECH	GEOTECHNICAL
GWB	GYPSUM WALL BOARD
FFE	FINISH FLOOR ELEVATION
FRR	FIRE RESISTANCE RATING
FD	FLOOR DRAIN
HR	HOUR
MAX	MAXIMUM
MECH	MECHANICAL
MIN	MINIMUM
N/A	NOT APPLICABLE
NTS	NOT TO SCALE
OBC	ONTARIO BUILDING CODE
O/C	ON CENTRE
RM	ROOM
R/O	ROUGH OPENING
RWL	RAIN WATER LEADER
SCH	SCHEDULE
SF	SQUARE FEET
SIM	SIMILAR
SM	SQUARE METER
SPEC	SPECIFICATION
STC	SOUND TRANSMISSION CLASS
STRUC	STRUCTURAL
TBD	TO BE DETERMINED
T/O	TOP OF
T&G	TONGUE & GROOVE
TYP	TYPICAL
U/S	UNDERSIDE
W/C	WASHROOM

ANNOTATION LEGEND

ASSEMBLY TAGS

- W# — EXTERIOR WALL TAG
- P# — INTERIOR PARTITION TAG
- R# — ROOF TAG
- F# — FLOOR TAG

(REFER TO ASSEMBLIES SCHEDULES)

TAGS

- D## — DOOR TAG *REFER TO DOOR SCHEDULE*
- W## / ### / ### AFF — WINDOW TAG *REFER TO WINDOW SCHEDULE*
- XYZ-# — MATERIAL TAG
- ## — KEYNOTES *REFER TO SHEET SPECIFIC KEYNOTE SCHEDULE*

DRAWING TAGS

- 1 / A101 (SIM) — DETAIL NUMBER / DRAWING SHEET NUMBER
- 1 / A101 (SIM) — BUILDING SECTION NUMBER / DRAWING SHEET NUMBER
- 1 / 1 A101 1 / 1 — EXTERIOR ELEVATION NUMBER / DRAWING SHEET NUMBER
- 0 — GRID BUBBLE
- SPOT ELEVATION (ABOVE FINISH FLOOR)
- ROOM — ROOM TAG
- CENTRELINE

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NO.	DATE	DESCRIPTION
1	2025/02/14	ISSUED AS PROTOTYPICAL DRAWING

PROJECT:

CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT OR CONSTRUCTION

SHEET TITLE:

COVER SHEET

ON Accessory Dwelling Unit 01

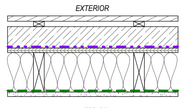
PROJECT NO: 241058

SCALE: As indicated

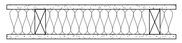
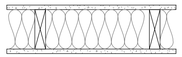
SHEET NO:

A000

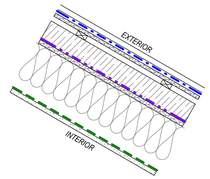
W - EXTERIOR WALL ASSEMBLIES

TYPE	DIAGRAM	DESCRIPTION	PERFORMANCE
W1		**EXTERIOR ENVELOPE WALL** 3/4"/19mm LIGHT-WEIGHT CLADDING PLACE HOLDER 3/4"/19mm 1 1/2"/38mm WIDE WOOD STRAPPING @ 16"/406mm O/C 3"/76mm RIGID INSULATION 1 (R-10.0) VAR AIR BARRIER, VAPOUR PERMEABLE 5/8"/16mm EXTERIOR GRADE PLYWOOD 5 1/2"/140mm WOOD STUD FRAMING, REFER TO STRUCTURAL, C/W 5 1/2"/140mm STUD CAVITY IN-FILL INSULATION (R-24.0) VAR SMART VAPOUR CONTROL BARRIER 5/8"/16mm GYPSUM BOARD	R-VALUE R-10.0 CI + R-24.0 (R-34.0) ASSUMED INSULATION R-VALUES DETERMINED BASED ON MOST RESTRICTIVE VALUES ACROSS ALL COMPLIANCE PACKAGES IN OBC SB-12. TO BE SPECIFIED BY APPLICANT PER SITE LOCATION.

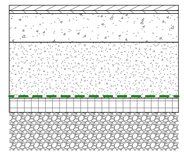
P - INTERIOR PARTITION ASSEMBLIES

TYPE	DIAGRAM	DESCRIPTION	PERFORMANCE
P1		**2x4 INTERIOR PARTITION** 5/8"/16mm GYPSUM BOARD 3 1/2"/89mm WOOD STUD FRAMING @ 16"/406mm O/C 5/8"/16mm GYPSUM BOARD	FRR N/A STC N/A
P1a		**2x4 INTERIOR PARTITION W/ BATTS** 5/8"/16mm GYPSUM BOARD 3 1/2"/89mm WOOD STUD FRAMING @ 16"/406mm O/C C/W 3 1/2"/89mm ACOUSTIC BATT IN-FILL INSULATION 5/8"/16mm GYPSUM BOARD	FRR N/A STC 36
P1b		**2x6 INTERIOR PARTITION W/ BATTS** 5/8"/16mm GYPSUM BOARD 5 1/2"/140mm WOOD STUD FRAMING @ 16"/406mm O/C C/W 5 1/2"/140mm ACOUSTIC BATT IN-FILL INSULATION 5/8"/16mm GYPSUM BOARD	FRR N/A STC 36
P5		**PLUMBING CHASE** 5/8"/16mm GYPSUM BOARD 1/2"/13mm PLYWOOD SHEATHING, REFER TO STRUCTURAL 3 1/2"/89mm WOOD STUD FRAMING @ 16"/406mm O/C	FRR N/A STC N/A

R - ROOF ASSEMBLIES

TYPE	DIAGRAM	DESCRIPTION	PERFORMANCE
R1		**SLOPED ROOF** 5/8"/16mm ROOFING PLACEHOLDER VAR ROOFING MEMBRANE 1/2"/13mm EXTERIOR GRADE PLYWOOD 3/4"/19mm VENTED CAVITY W/ WOOD FURRING 3"/76mm RIGID INSULATION 1 (R-10.0) VAR AIR BARRIER, VAPOUR PERMEABLE 5/8"/16mm EXTERIOR GRADE PLYWOOD VAR WOOD ROOF FRAMING, REFER TO STRUCTURAL 5 1/2"/140mm STUD CAVITY IN-FILL INSULATION (R-24.0) VAR SMART VAPOUR CONTROL BARRIER 5/8"/16mm GYPSUM BOARD	R-VALUE R-10.0 CI + R-24.0 (R-34.0) ASSUMED INSULATION R-VALUES DETERMINED BASED ON MOST RESTRICTIVE VALUES ACROSS ALL COMPLIANCE PACKAGES IN OBC SB-12. TO BE SPECIFIED BY APPLICANT PER SITE LOCATION.

F - FLOOR ASSEMBLIES

TYPE	DIAGRAM	DESCRIPTION	PERFORMANCE
F1		**SLAB ON GRADE** 3/4"/19mm FLOOR FINISH 3/8"/10mm RUBBER UNDERLAY VAR CAST-IN-PLACE CONCRETE SLAB-ON-GRADE, REFER TO STRUCTURAL VAR SAND, REFER TO STRUCTURAL VAR VAPOUR CONTROL BARRIER 2"/51mm RIGID INSULATION 2 (R-10.0) 8"/200mm FREE-DRAINING GRANULAR BASE	R-VALUE R-10.0 ASSUMED INSULATION R-VALUES DETERMINED BASED ON MOST RESTRICTIVE VALUES ACROSS ALL COMPLIANCE PACKAGES IN OBC SB-12. TO BE SPECIFIED BY APPLICANT PER SITE LOCATION.

ASSEMBLIES GENERAL NOTES

1. REFER TO STRUCTURAL DRAWINGS AND DOCUMENTATION FOR STRUCTURAL DESIGN PARAMETERS INCLUDING LOAD-BEARING WALLS, POSTS, STAIRS, CONCRETE ETC.
2. THE DESCRIPTION OF THE ASSEMBLIES NOTED IN THE DRAWINGS ARE NOTED "AS BASIS OF DESIGN" AND MAY NOT REPRESENT THE FULL CRITERIA AS DEFINED BY THE TESTING AUTHORITIES.
3. FOR ALL ASSEMBLIES BASED ON AN ASSEMBLY FOUND IN MMAH SUPPLEMENTARY STANDARD SB-3, FOOTNOTES FOR EACH ASSEMBLY TYPE MUST BE CONSULTED FOR SPECIFIC REQUIREMENTS TO OBTAIN VALUES NOTED.
4. PROVIDE CONTINUOUS ACOUSTICAL SEALANT (BOTH SIDES) AT TOP AND BOTTOM OF ALL INTERIOR STUD AND GYPSUM BOARD PARTITIONS.
5. ISOLATE ALL MECHANICAL PIPES, DUCTS, AND EQUIPMENT FROM INTERIOR PARTITIONS TO AVOID ACOUSTIC NOISE TRANSFER.
6. RECESSED LIGHTING FIXTURES SHALL NOT BE LOCATED IN INSULATED CEILINGS UNLESS THE FIXTURES ARE DESIGNED FOR SUCH INSTALLATIONS AS PER OBC 9.34.1.4
7. COORDINATE ACCESS PANELS LOCATED WITHIN SUSPENDED GYPSUM BOARD CEILING ASSEMBLIES. ACCESS PANELS TO BE PAINTED OUT TO MATCH THE SURROUNDING CEILING FINISH. .
8. PROVIDE ALL PLUMBING CHASES AND MECHANICAL SHAFTS IN ADDITION TO ASSEMBLIES. COORDINATE REQUIRED CRITICAL DIMENSIONS WHEN LAYING OUT WALLS.
9. UNLESS NOTED OTHERWISE, ASSEMBLIES ABOVE OR BELOW DOORS, WINDOWS, EXTERIOR OPENINGS AND INTERIOR SCREENS ARE TO BE THE SAME AS THE TYPE DENOTED ON EITHER SIDE. SEE TYPICAL DETAILS.
10. PROVIDE TILE BACKER IN LIEU OF GYPSUM BOARD AT ALL ASSEMBLIES TO RECEIVE TILE FINISHES, REFER TO PLANS. ENSURE TILE BACKER IS TYPE X GYPSUM AT REQUIRED FIRE RESISTANCE RATED ASSEMBLIES. ALL WATERPROOF WALL FINISHES TO MEET MIN. HEIGHT REQ. AS PER OBC 9.29.2. ALL TILED WALLS AS PER OBC 9.29.10.
11. IN AREAS WITH HIGH VAPOUR CONTENT (INCLUDING BUT NOT LIMITED TO BATHROOMS) PROVIDE MOISTURE AND MOULD-RESISTANT GYPSUM BOARD IN LIEU OF REGULAR GYPSUM BOARD. ENSURE THAT THE MOISTURE AND MOULD-RESISTANT GYPSUM BOARD MEETS ALL THE FIRE AND ACOUSTIC RATINGS REFERENCED IN THE ASSEMBLY SCHEDULE.
12. ENSURE ADEQUATE BLOCKING/STUD WALL REINFORCEMENT FOR FUTURE GRAB BARS AS PER OBC 3.3.4.9 . GRAB BARS SHALL BE CAPABLE OF RESISTING A LOAD OF NO LESS THAN 1.3kN AS PER OBC 9.31.2.3.
13. IF FLOOR DRAINS ARE LOCATED IN A ROOM, COORDINATE SLOPING ENTIRE FLOOR TOWARD THE DRAIN. THERE WILL BE NO FLAT FLOOR SURFACE IN THE ROOM WITH A REQUIRED FLOOR DRAIN WHERE WATER CAN PUDDLE. FLOOR TO SLOPE A MINIMUM OF 2% . REFER TO THE MECHANICAL DOCUMENTS TO DETERMINE WHICH ROOMS HAVE FLOOR DRAINS. REPAIR ANY FLOORS THAT PUDDLE WATER AND/ OR DO NOT DIRECT WATER TO THE PROPER FLOOR DRAIN.
14. FULLY COORDINATE MINIMUM STUD SPACE AND ALL ADDITIONAL SUPPORT REQUIRED FOR SUPPORT AND ANCHORAGE OF MECHANICAL EQUIPMENT OR DUCTS AND ELECTRICAL FIXTURES AS NOTED ON ARCHITECTURAL AND ENGINEERING DRAWINGS.
15. ALL ASSEMBLIES IN CONTACT WITH THE GROUND SHALL BE CONSTRUCTED TO RESIST THE LEAKAGE OF SOIL GAS FROM THE GROUND INTO THE BUILDING IN ACCORDANCE WITH 9.13.4.2. IN AREAS OF THE PROVINCE WHERE RADON GASES ARE KNOWN TO BE A PROBLEM, THE BUILDING SHALL BE DESIGNED AND CONSTRUCTED TO MEET THE RADON LIMITATIONS IN ARTICLE 9.1.1.7. BUILDINGS CONTAINING RESIDENTIAL OCCUPANCIES SHALL BE PROVIDED WITH THE ROUGH IN FOR A RADON EXTRACTION SYSTEM CONFORMING TO ARTICLE 9.13.4.3 (SEE ALSO NOTE A-9.13.4.3)
16. ALL MEMBRANES OR MATERIALS THAT MAKE UP THE AIR BARRIER SYSTEM IN AN ASSEMBLY TO BE CONTINUOUS AT TRANSITIONS AND PENETRATIONS. ALL FLEXIBLE SHEET MATERIAL SHALL BE LAPPED A MIN. OF 100MM AND ALL JOINTS SEALED TO MAINTAIN CONTINUITY AS PER OBC 9.25.3.3.

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MEMBRANE LEGEND

- AIR BARRIER, VAPOUR PERMEABLE
- BUTYL TAPE TRANSITION MEMBRANE
- ROOF MEMBRANE
- VAPOUR CONTROL BARRIER
- FOUNDATION DAMP PROOFING
- PRE-FIN METAL FLASHING

INSULATION LEGEND

- RIGID INSULATION 1, VAPOUR PERMEABLE
- RIGID INSULATION 2, HIGH-DENSITY
- STUD CAVITY IN-FILL INSULATION
- SPRAY FOAM

NO.	DATE	DESCRIPTION
1	2025/02/14	ISSUED AS PROTOTYPICAL DRAWING

PROJECT:

CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT OR CONSTRUCTION

SHEET TITLE:

ASSEMBLIES SCHEDULE

ON Accessory Dwelling Unit 01

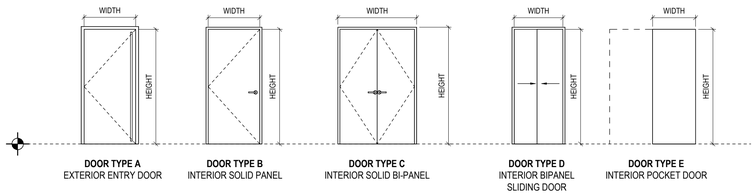
PROJECT NO: 241058

SCALE: As indicated

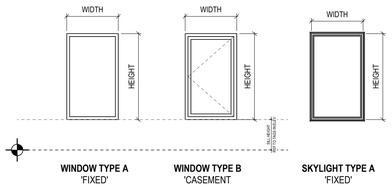
SHEET NO:

A001

DOOR TYPES



WINDOW TYPES



DOOR, WINDOW & SKYLIGHT GENERAL NOTES

1. WINDOWS AND DOORS TO CONFORM TO REQUIREMENTS OF OBC 9.7.3 AND 9.7.4.
2. MAXIMUM U-VALUE FOR WINDOWS AND DOORS TO CONFORM TO OBC TABLE 9.7.3.3 AND MMAH SUPPLEMENTARY STANDARD SB-12, 3.1.1.9 AND 3.1.1.10. WHERE THE U-VALUES DIFFER, THE MOST RESTRICTIVE U-VALUE SHALL APPLY.
3. ALL OPERABLE WINDOWS WITH A SILL HEIGHT OR OPERABLE SECTION LESS THAN 900mm ABOVE FINISHED FLOOR AND 1800mm ABOVE THE FLOOR OR GROUND ON THE OTHER SIDE OF THE WINDOW SHALL BE PROTECTED BY A SWING LIMITER RESTRICTING THE SWING TO NOT MORE THAN 100mm EITHER VERTICALLY OR HORIZONTALLY PER OBC 9.8.8.1.
4. ALL GLASS TO MEET OBC 9.6.1.2. MATERIAL STANDARDS AND STRUCTURAL SUFFICIENCY REQUIREMENTS OF OBC 9.6.1.3.
5. ALL SIDELIGHTS OR GLAZING AT ENTRYS TO DWELLING UNITS TO BE TEMPERED OR LAMINATED PER 9.6.1.4.
6. ALL GLAZING TO MEET A MINIMUM U-VALUE OF 0.21 UNLESS OTHERWISE STATED IN SELECTED SB-12 COMPLIANCE PACKAGE.
7. ALL PRINCIPAL ENTRANCE DOORS, EXIT DOORS OR DOORS TO SUITES INCLUDING EXTERIOR DOORS TO DWELLING UNITS SHALL BE OPENABLE FROM THE INSIDE WITHOUT KEYS AND DOOR RELEASE HARDWARE; SHALL BE GRASPABLE WITH ONE HAND; AND INSTALLED AT 900mm ABOVE FINISHED FLOOR AS PER OBC 9.9.6.7.
8. ALL EXTERIOR DOORS SHALL HAVE A MINIMUM THERMAL RESISTANCE OF RSI 0.7 AND SHALL HAVE AN INSULATED CORE AND BE INSTALLED WITH WEATHERSTRIPPING AS PER SB-12 3.1.1.10.
9. FILL HOLLOW EXTERIOR DOOR FRAMES AND SPACE BETWEEN FRAMES AND ADJACENT MATERIALS WITH SPRAY FOAM INSULATION TO FULLY SEAL AGAINST ALL AIR INFILTRATION. PROVIDE BACKER ROD WHERE REQUIRED AND PROVIDE CONTINUOUS SEALANT AROUND FRAME TO PROVIDE AIR AND WATER TIGHT BARRIER.
10. ALL SKYLIGHTS TO BE SIZED AND INSTALLED PER MANUFACTURES REQUIREMENTS.
11. ALL INTERIOR DOORS TO BE SOLID CORE WOOD DOORS WITH FINISH GRADE TRIM.
12. ALL DOORS WITHOUT GLAZING OR SIDELIGHT SHALL HAVE A DOOR VIEWER AS PER OBC 9.7.2.1.

DOOR SCHEDULE

TAG	TYPE	METRIC SIZE (mm)		IMPERIAL SIZE (FT'-IN")		FIRE RATING	NOTES
		WIDTH	HEIGHT	WIDTH	HEIGHT		
DA01	DOOR TYPE A	915	2032	3'-0"	6'-8"	N/A	
DB01	DOOR TYPE B	915	2032	3'-0"	6'-8"	N/A	
DB02	DOOR TYPE B	813	2032	2'-8"	6'-8"	N/A	
DB03	DOOR TYPE B	610	2032	2'-0"	6'-8"	N/A	
DD01	DOOR TYPE D	1219	2032	4'-0"	6'-8"	N/A	
DE01	DOOR TYPE D	1067	2032	3'-6"	6'-8"	N/A	
DE01	DOOR TYPE E	915	2032	3'-0"	6'-8"	N/A	

WINDOW SCHEDULE

TAG	TYPE	METRIC SIZE (mm)		IMPERIAL SIZE (ft'-in")	
		WIDTH	HEIGHT	WIDTH	HEIGHT
SL01	SKYLIGHT TYPE A	533	1372	1'-9"	4'-6"
WA01	WINDOW TYPE A	914	2083	3'-0"	6'-10"
WA02	WINDOW TYPE A	610	2083	2'-0"	6'-10"
WB01	WINDOW TYPE B	914	2083	3'-0"	6'-10"
WB02	WINDOW TYPE B	914	1524	3'-0"	5'-0"

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NO.	DATE	DESCRIPTION

PROJECT:

CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT OR CONSTRUCTION

SHEET TITLE:

DOOR & WINDOW SCHEDULE

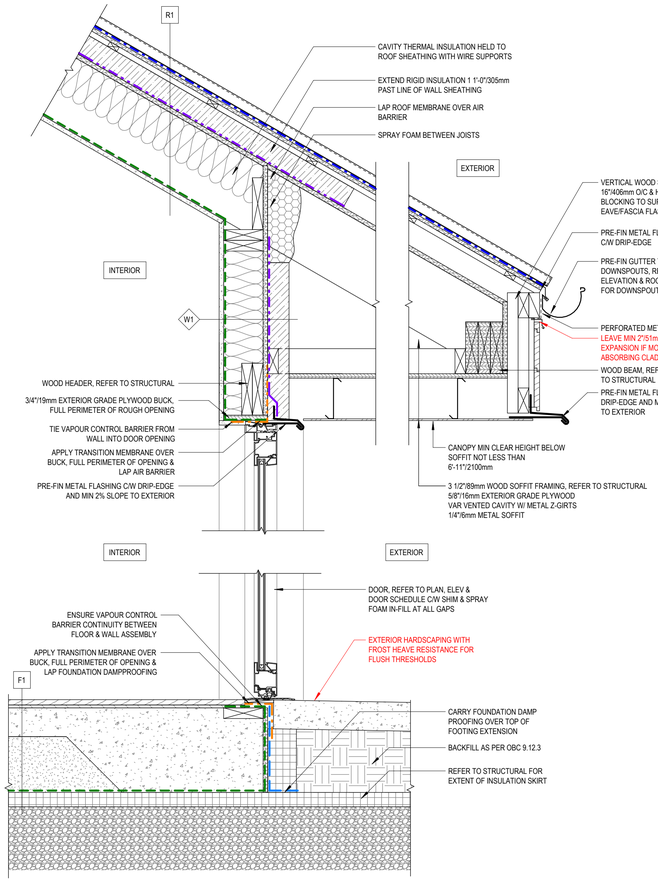
ON Accessory Dwelling Unit 01

PROJECT NO: 241058

SCALE: 1 : 50

SHEET NO:

A002

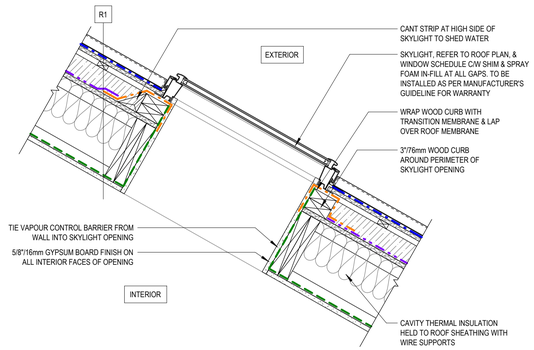


5 A003 SECTION - TYP ENTRY

1 : 10

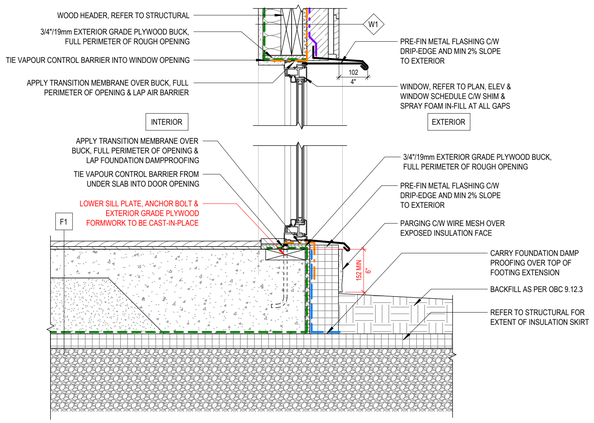
6 A003 SECTION - WINDOW AT GRADE

1 : 10



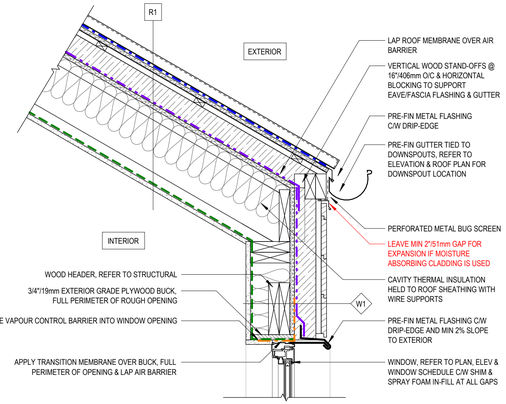
4 A003 SECTION - SKYLIGHT

1 : 10



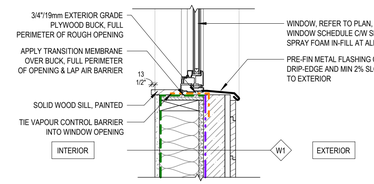
1 A003 SECTION - TYP EAVE & WINDOW HEAD

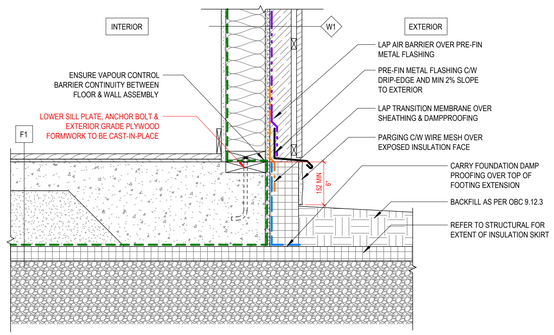
1 : 10



2 A003 SECTION - TYP WINDOW SILL

1 : 10





3 A003 SECTION - TYP BASE

1 : 10

DETAIL GENERAL NOTES

1. MEMBRANE LAPS TO BE MIN 100mm/4" AS PER OBC 9.27.3.3. (2)
2. ALL FLASHIING TO MEET REQUIREMENTS OF OBC 9.27.3.7 & 9.27.3.8
3. WOOD CLADDING REQ'D TO BE 8"/200mm ABOVE GRADE AS PER OBC 9.27.2.4.
4. PROVIDE CONTINUOUS DAMPPROOFING TO FULL DEPTH OF PERIMETER FOOTINGS & FULL PERIMETER OF BUILDING
5. PROVIDE BUG SCREEN AT ALL OPENINGS GREATER THAN 1/4"/5mm IN THE NARROWEST DIRECTION IN ALL EXTERIOR WALL ASSEMBLIES
6. PROVIDE PHYSICAL BARRIER OR SPATIAL SEPARATION BETWEEN DISSIMILAR METALS AS REQUIRED TO PREVENT GALVANIC CORROSION
7. PROVIDE A BOND BREAKING MATERIAL BETWEEN FLOOR SLABS AND FOUNDATION WALLS
8. ENDS OF WOOD MEMBERS FRAMING INTO CONCRETE SHALL BE TREATED TO PREVENT DECAY WHERE THE BOTTOM MEMBER IS AT OR BELOW GROUND LEVEL
9. WOOD FRAMING MEMBERS WITHIN 6" (150mm) OF GRADE, THAT ARE NOT PRESSURE TREATED WITH A WOOD PRESERVATIVE AND THAT ARE SUPPORTED ON CONCRETE IN CONTACT WITH THE GROUND, SHALL BE SEPARATED FROM THE CONCRETE BY NO LESS THAN 0.05mm POLYETHYLENE FILM
10. ALL CLADDING TO BE SECURELY FASTENED TO ALLOW FOR EXPANSION AND CONTRACTION USING CORROSION-RESISTANT FASTENERS AS PER OBC 9.27.5 & REFER TO OBC 9.27.5.4. FOR REQUIRED SPACING OF FASTENERS FOR CLADDING

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MEMBRANE LEGEND

- AIR BARRIER, VAPOUR PERMEABLE
- BUTYL TAPE TRANSITION MEMBRANE
- ROOF MEMBRANE
- VAPOUR CONTROL BARRIER
- FOUNDATION DAMP PROOFING
- PRE-FIN METAL FLASHING

INSULATION LEGEND

- RIGID INSULATION 1, VAPOUR PERMEABLE
- RIGID INSULATION 2, HIGH-DENSITY
- STUD CAVITY IN-FILL INSULATION
- SPRAY FOAM

1	2025/02/14	ISSUED AS PROTOTYPICAL DRAWING

NO.	DATE	DESCRIPTION

PROJECT:

CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT OR CONSTRUCTION

SHEET TITLE:

TYPICAL DETAILS

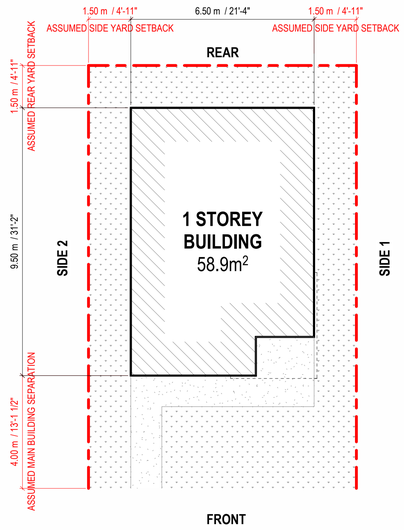
ON Accessory Dwelling Unit 01

PROJECT NO: 241058

SCALE: As indicated

SHEET NO:

A003



1 A010 SITE PLAN

1 : 100

SITE PLAN GENERAL NOTES

1. SITE DESIGN TO CONFORM TO FIREFIGHTING ACCESS REQUIREMENTS AS PER OBC 9.10.20.3.
2. GRADE TO BE SLOPED AWAY FROM BUILDING AS PER OBC 9.14.6.1.
3. DOWNSPOUT TO CONFORM TO OBC 9.26.18.2.
4. SITE DESIGN TO CONFORM TO BARRIER FREE REQUIREMENTS AS PER OBC 3.8.1.1. FOR ACCESS TO BARRIER FREE/ACCESSIBLE-READY UNITS.
5. ENTRANCE TO BARRIER FREE/ACCESSIBLE-READY UNITS TO CONFORM TO OBC 3.8.1.2. AND OBC 3.8.3.3.
6. EXTERIOR WALKS THAT FORM PART OF A BARRIER-FREE PATH OF TRAVEL TO CONFORM FOR OBC 3.8.3.2.
7. SITE DESIGN TO CONFORM TO CSA/ASC B651 FOR ACCESS TO ENHANCED ACCESSIBILITY UNIT.

SITE DATA

ADDRESS	N/A
LOT & PLAN NO.	N/A
ZONING	N/A
LOT AREA	X m^2
BUILDING AREA	58.9 m^2
COVERAGE	X%
LANDSCAPED OPEN SPACE	X m^2
SOFTSCAPE AREA	
HARDSCAPE AREA	
PARKING SPOTS	N/A
DENSITY	
SETBACKS	
FRONT	ASSUMED 4.0m SEPARATION DISTANCE
REAR	ASSUMED 1.5m
SIDE 1	ASSUMED 1.5m
SIDE 2	ASSUMED 1.5m
BUILDING DEPTH	9.5m

SITE LEGEND

- ASSUMED PROPERTY LINE
- CANOPY / PROJECTIONS
- BUILDING
- SOFTSCAPE
- HARDSCAPE

BUILDING CODE DATA MATRIX

PART 9 - HOUSING AND SMALL BUILDINGS

BUILDING CODE VERSION	O.REG. 163/24			LAST AMENDMENT: O.REG. 5/25					**OBC REFERENCE**
PROJECT TYPE	NEW CONSTRUCTION CONSTRUCTION OF NEW ONE STOREY ACCESSORY DWELLING UNIT RESIDENTIAL BUILDING								**[A] 1.1.2.**
MAJOR OCCUPANCY CLASSIFICATION	**GROUP / DIVISION:**	**DESCRIPTION:**		**USE:**					**9.10.2.**
	C	ONE STOREY ONE UNIT BUILDING		RESIDENTIAL					
SUPERIMPOSED MAJOR OCCUPANCIES	NO								**9.10.2.3.**
BUILDING AREA (m^2)	**DESCRIPTION:**			**TOTAL (m^2):**					**[A] 1.4.1.2.**
	NEW CONSTRUCTION			58.9					
GROSS AREA (m^2)	**FLOOR LEVEL:**	**DESCRIPTION:**		**TOTAL (m^2):**					**[A] 1.4.1.2.**
	GROUND FLOOR	1 RESIDENTIAL UNITS		58.9					
	TOTAL (m^2):			58.9					
BUILDING HEIGHT	1	STOREYS ABOVE GRADE		4.00 m ABOVE ASSUMED GRADE					**[A] 1.4.1.2. AND 9.10.4.**
***NUMBER OF STREETS**	TBC								**9.10.20**
SPRINKLER SYSTEM	NOT REQUIRED	PROVIDED: N/A							**9.10.8.2. TO 9.10.8.4.**
FIRE ALARM SYSTEM	NOT REQUIRED	TYPE PROVIDED: N/A							**9.10.18**
***WATER SUPPLY IS ADEQUATE**									
CONSTRUCTION TYPE	**PERMITTED:**	COMBUSTIBLE		**HEAVY TIMBER CONSTRUCTION**	YES/NO				**9.10.6**
	PROPOSED:	COMBUSTIBLE							
POST-DISASTER BUILDING	YES/NO								**[A] 1.1.2.2.(2)**
OCCUPANT LOAD	**FLOOR LEVEL:**	**UNIT #**	**OCCUPANCY TYPE:**	**BASED ON:**	**OCCUPANT LOAD (PERSONS):**				**3.1.17(1)b**
	GROUND FLOOR	UNIT 1	RESIDENTIAL	1 SLEEPING ROOM	2				
	GROUND FLOOR	UNIT 1 (ALT.)	RESIDENTIAL	1 SLEEPING ROOM	2				
BARRIER-FREE DESIGN	REQUIRED								**9.5.2.**
HAZARDOUS SUBSTANCES	NO								**9.10.1.3.**
REQUIRED FIRE RESISTANCE RATINGS	**HORIZONTAL ASSEMBLY:**		**RATING:**	**SUPPORTING ASSEMBLY:**					**9.10.8.**
	FLOORS EXCEPT CRAWLSPACE:		N/A	N/A					
***SPATIAL SEPARATION**	**WALL:**	**EBF AREA (m^2):**	**LD (m):**	**% OPENINGS MAX**	**% PROVIDED**	**RATING:**	**CONSTRUCTION TYPE:**	**CLADDING TYPE:**	**9.10.15.**
	FRONT	21.0	4.0	45%	21.9%	N/A	COMBUSTIBLE	COMBUSTIBLE	
	REAR	21.0	1.5	9%	6.7%	N/A	COMBUSTIBLE	COMBUSTIBLE	
	SIDE 1	21.6	1.5	9%	8.8%	N/A	COMBUSTIBLE	COMBUSTIBLE	
	SIDE 2	24.9	1.5	9%	7.6%	N/A	COMBUSTIBLE	COMBUSTIBLE	
PLUMBING FIXTURE REQUIREMENTS	A KITCHEN SINK, LAVATORY, BATHTUB OR SHOWER, AND WATER CLOSET SHALL BE PROVIDED FOR EVERY DWELLING UNIT								**9.31.4(1) and 3.7.4.5**
NOTES	01 ALL REFERENCES ARE TO DIVISION B OF THE ONTARIO BUILDING CODE UNLESS PRECEDED BY [A] FOR DIVISION A AND [C] FOR DIVISION C. 02 ADDITIONAL NOTES HERE.								

CMHC SCHL

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1	2025/02/14	ISSUED AS PROTOTYPICAL DRAWING

NO.	DATE	DESCRIPTION

PROJECT:

CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT OR CONSTRUCTION

SHEET TITLE:

SITE PLAN & CODE MATRIX

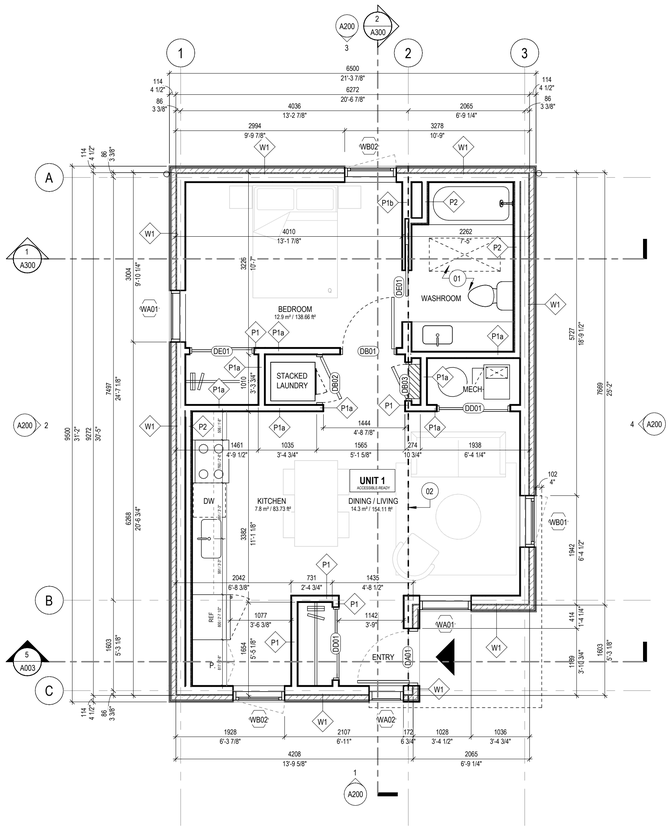
ON Accessory Dwelling Unit 01

PROJECT NO: 241058

SCALE: As indicated

SHEET NO:

A010



1 A100 MAIN FLOOR PLAN

1 : 50

FLOOR PLAN GENERAL NOTES

1. MIN CEILING HEIGHTS AS PER OBC TABLE 9.5.3.1
   - BATHROOMS & HALLWAYS = 2100mm
   - BEDROOM = 2300mm (50%) OR 2100mm (100%)
   - LIVING/DINING/KITCHEN = 2300mm (75%) OR 2100mm(100%)
2. MIN ROOM AREAS AS PER OBC TABLE 9.5.3A
   - LIVING ROOM = 13.5m² (11m² COMBINED WITH KITCHEN & DINING FOR TWO PEOPLE)
   - DINING = 3.25m² (COMBINED ROOM)
   - KITCHEN = 4.2m² (3.7m2 FOR TWO PEOPLE)
   - BEDROOM = 6m² (WITH CLOSET)
   - MASTER BEDROOM = 8.8m² (WITH CLOSET)
3. ALL DROPPED CEILINGS AND BULKHEADS FOR MECHANICAL TO PROVIDE MIN 2100mm CLEAR HEIGHT BELOW
4. UNITS SHOWING ONLY ONE BEDROOM ARE DESIGNED TO ACCOMMODATE NOT MORE THAN TWO PEOPLE

FLOOR PLAN KEYNOTES

01 ALL STUD WALLS TO BE REINFORCED TO PERMIT FUTURE INSTALLATION OF GRAB BARS BEHIND WATER CLOSETS, BATHUBS/SHOWERS AS PER 9.5.2.4. ALL GWB TO BE MOISTURE RESISTANT AND SUBSTITUTED FOR TILE BACKER ON ALL TILED WALL SURFACES.

02 RIDGE BEAM ABOVE, REFER TO STRUCTURAL

FLOOR PLAN LEGEND

	FLOOR MOUNTED TOILET
	PRE-FAB STANDING SHOWER
	PRE-FAB TUB
	KITCHEN SINK
	WASHROOM SINK
W	WASHER
D	DRYER
	DOMESTIC HOT WATER
	AIR HANDLER
	RANGE, TYPICAL
	RANGE, NARROW
REF	REFRIGERATOR
	DISHWASHER
	CLOSET COAT ROD

CMHC SCHL

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NO.	DATE	DESCRIPTION
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PROJECT:

CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT OR CONSTRUCTION

SHEET TITLE:

MAIN FLOOR PLAN - ACCESSIBLE-READY

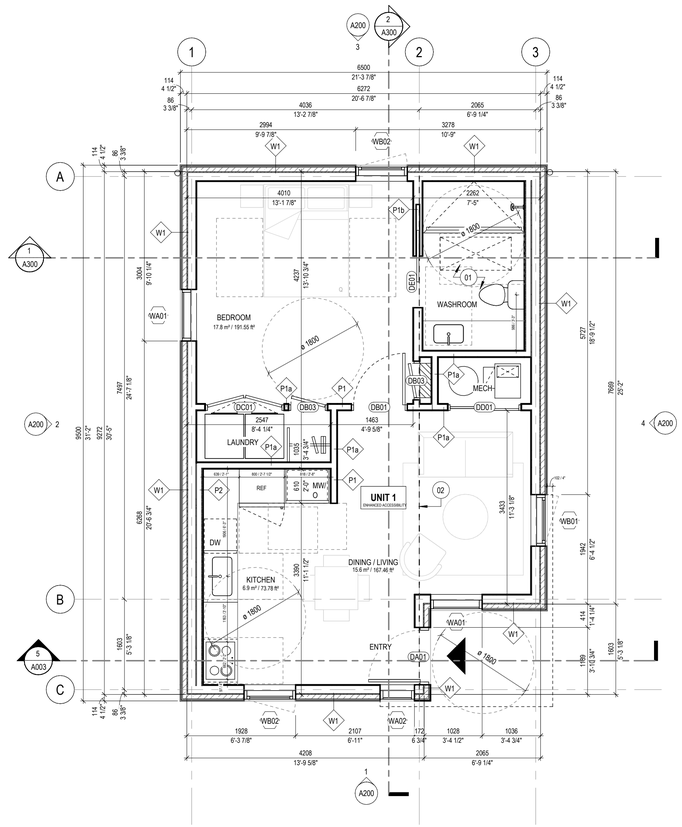
ON Accessory Dwelling Unit 01

PROJECT NO: 241058

SCALE: 1 : 50

SHEET NO:

A100



1 MAIN FLOOR PLAN

1 : 50

FLOOR PLAN GENERAL NOTES

1. MIN CEILING HEIGHTS AS PER OBC TABLE 9.5.3.1
   - BATHROOMS & HALLWAYS = 2100mm
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2. MIN ROOM AREAS AS PER OBC TABLE 9.5.3A
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   - DINING = 3.25m² (COMBINED ROOM)
   - KITCHEN = 4.2m² (3.7m2 FOR TWO PEOPLE)
   - BEDROOM = 6m² (WITH CLOSET)
   - MASTER BEDROOM = 8.8m² (WITH CLOSET)
3. ALL DROPPED CEILINGS AND BULKHEADS FOR MECHANICAL TO PROVIDE MIN 2100mm CLEAR HEIGHT BELOW
4. UNITS SHOWING ONLY ONE BEDROOM ARE DESIGNED TO ACCOMMODATE NOT MORE THAN TWO PEOPLE

FLOOR PLAN KEYNOTES

01 ALL STUD WALLS TO BE REINFORCED TO PERMIT FUTURE INSTALLATION OF GRAB BARS BEHIND WATER CLOSETS, BATHUBS/SHOWERS AS PER 9.5.2.4. ALL GWB TO BE MOISTURE RESISTANT AND SUBSTITUTED FOR TILE BACKER ON ALL TILED WALL SURFACES.

02 RIDGE BEAM ABOVE, REFER TO STRUCTURAL

FLOOR PLAN LEGEND

	FLOOR MOUNTED TOILET
	PRE-FAB STANDING SHOWER
	PRE-FAB TUB
	KITCHEN SINK
	WASHROOM SINK
W	WASHER
D	DRYER
	DOMESTIC HOT WATER
	AIR HANDLER
	RANGE, TYPICAL
	RANGE, NARROW
REF	REFRIGERATOR
	DISHWASHER
	CLOSET COAT ROD

LEGEND

GENERAL NOTE:

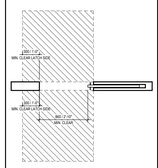
CSA/ASC B652:23 - "ACCESSIBLE DWELLINGS," WAS USED AS A GUIDE FOR SPACE PLANNING PURPOSES WITHIN UNIT(S) LABELED "ENHANCED ACCESSIBILITY - CSA/ASC B652". CONSULT THE STANDARD FOR A COMPLETE SET OF REQUIREMENTS.

DOORS AND DOORWAYS (B652:23 5.7)

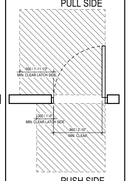
REFER TO B652:23 5.7 DOORS AND DOORWAYS FOR ADDITIONAL REQUIREMENTS:

1. DOOR WIDTH AND CLEARANCE REQUIREMENTS
2. POWER DOOR OPERATOR REQUIREMENTS

SLIDING DOOR



SWINGING DOOR

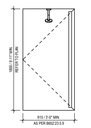


BATHROOMS (B652:23 5.9)

REFER TO B652:23 5.9 BATHROOM(S) FOR ADDITIONAL REQUIREMENTS:

1. WALL REINFORCING BACKING AND GRAB BARS
2. VANITY AND ACCESSORY REQUIREMENTS
3. WASHROOM ILLUMINATION REQUIREMENTS

ROLL-IN SHOWER



WHEN SHOWER IS USED AS PART OF THE TURNING RADIUS, THE SHOWER TO REMAIN UNOBSTRUCTED. HAVE A SLOPE LESS THAN 2% AND BE CONSTRUCTED AS A WET ROOM.

TOILET

TRANSFER SPACE AND CLEAR SPACE AS PER B652:23 5.9

BLOCKING BESIDE TOILET FOR GRAB BAR AS PER B652:23 5.9

GRAB RAILS AS PER B652:23 5.9.11 GRAB BARS

BATHROOM SINK

WASHROOM SINK AS PER B652:23 5.9 BATHROOM(S)

CLEAR SPACE BELOW AS PER B652:23 5.9 BATHROOM(S)

KITCHEN (B652:23 5.10)

REFER TO B652:23 5.10 KITCHENS FOR ADDITIONAL REQUIREMENTS:

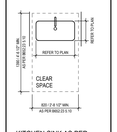
1. MIN. REQ COUNTER SPACE BETWEEN COOKTOP AND SINK NOT LESS THAN 820mm
2. ADDITIONAL KITCHEN FIXTURE AND APPLIANCE REQUIREMENTS
3. ELECTRICAL REQUIREMENTS IN KITCHEN
4. ADDITIONAL CABINETRY AND SPACE PLANNING REQUIREMENTS

REFRIGERATOR

REFRIGERATOR AS PER B652:23 5.10 KITCHENS

CLEAR SPACE IN FRONT AS PER B652:23 5.10 KITCHENS

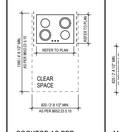
KITCHEN SINK



KITCHEN SINK AS PER B652:23 5.10 KITCHENS

CLEAR SPACE BELOW AS PER B652:23 5.10 KITCHENS

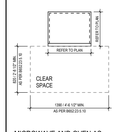
COOKTOP



COOKTOP AS PER B652:23 5.10 KITCHENS

CLEAR SPACE BELOW AS PER B652:23 5.10 KITCHENS

MICROWAVE



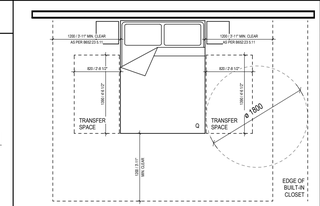
MICROWAVE AND OVEN AS PER B652:23 5.10 KITCHENS

CLEAR SPACE IN FRONT AS PER B652:23 5.10 KITCHENS

BEDROOMS (B652:23 5.11)

REFER TO B652:23 5.11 BEDROOMS FOR ADDITIONAL REQUIREMENTS:

1. CLEAR SPACE AND TRANSFER SPACES AROUND BED
2. ELECTRICAL REQUIREMENTS IN BEDROOMS



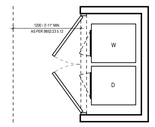
THE BED SHALL HAVE A 1200mm ACCESSIBLE PATH ON THREE SIDES AND PROVIDE A TURNING RADIUS OF 1800mm WHERE A BEDROOM CONTAINS A BUILT-IN CLOSET

LAUNDRY (B652:23 5.12)

REFER TO B652:23 5.12 LAUNDRY FOR ADDITIONAL REQUIREMENTS:

1. APPLIANCE REQUIREMENTS
2. CLOSET DOORS SHALL ALLOW FULL ACCESS TO SIDE-BY-SIDE UNITS
3. STORAGE AND ACCESSORY REQUIREMENTS

WASHER AND DRYER



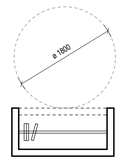
WASHER AND DRYER AS PER B652:23 5.12 KITCHENS

CLEAR SPACE AS PER B652:23 5.12 LAUNDRY

CLOSETS (B652:23 5.13)

REFER TO B652:23 5.13 CLOSETS FOR ADDITIONAL REQUIREMENTS:

1. SHELVES, HANGING ROD HEIGHTS AND STORAGE REQUIREMENTS



1800mm MIN. TURNING RADIUS IN FRONT OF BEDROOM CLOSET AS PER B652:23 5.11 BEDROOMS

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NO.	DATE	DESCRIPTION
1	2025/02/14	ISSUED AS PROTOTYPICAL DRAWING

PROJECT:

CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT OR CONSTRUCTION

SHEET TITLE:

MAIN FLOOR PLAN - ENHANCED ACCESSIBILITY

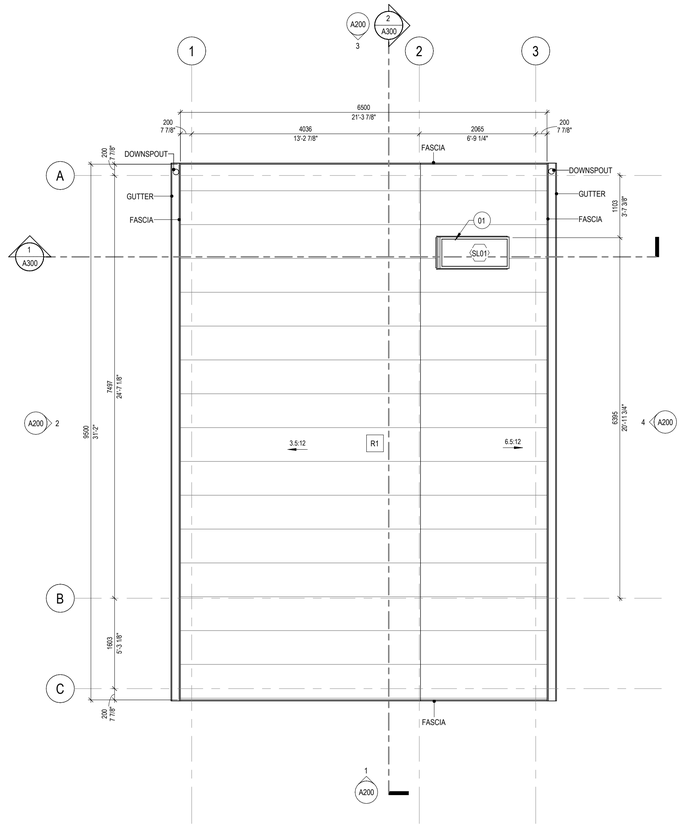
ON Accessory Dwelling Unit 01

PROJECT NO: 241058

SCALE: 1 : 50

SHEET NO:

A100a



1 A101 ROOF PLAN

1 : 50

ROOF PLAN GENERAL NOTES

1. ALL ROOFING TYPES TO COMPLY WITH REQUIRED MINIMUM SLOPES AS PER OBC 9.26.3 AND MANUFACTURER REQUIREMENTS FOR SPECIFIED ROOFING TYPE
2. ALL ROOFS, GUTTERS AND TROUGHS HAVE POSITIVE SLOPE TO DRAIN

ROOF PLAN KEYNOTES

01 FLASH TO DIRECT WATER AWAY FROM ROOF OPENING & SKYLIGHTS

CMHC SCHL

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PROJECT:

CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT OR CONSTRUCTION

SHEET TITLE:

ROOF PLAN

ON Accessory Dwelling Unit 01

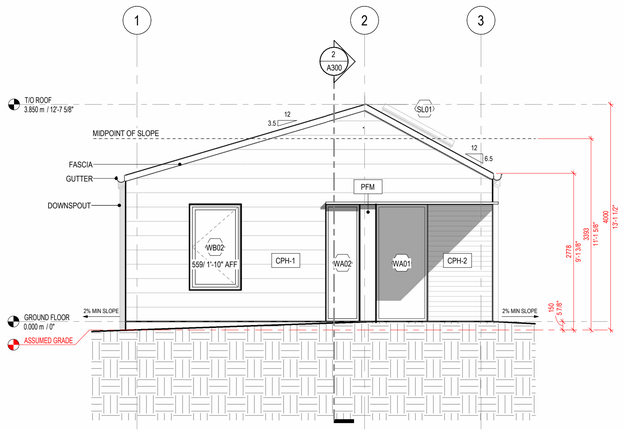
PROJECT NO: 241058

SCALE: 1 : 50

SHEET NO:

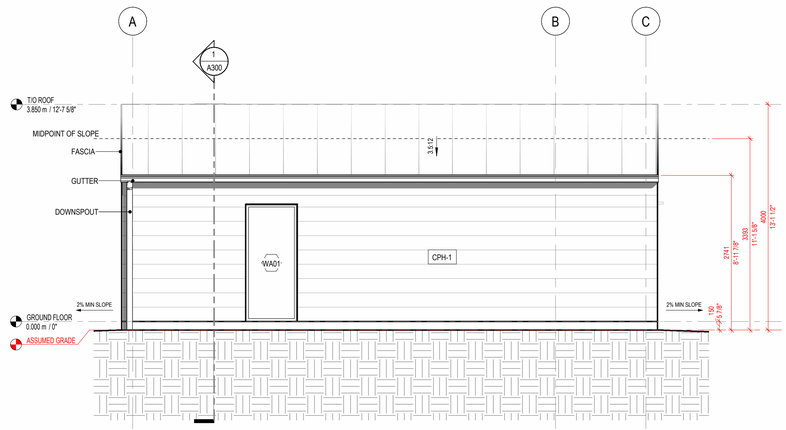
A101

ELEVATION MATERIAL SCHEDULE	
TAG	MATERIAL
CPH-1	CLADDING PLACEHOLDER, TYPE 1
CPH-2	CLADDING PLACEHOLDER, TYPE 2
PFM	PRE-FINISHED METAL FLASHING, REFER TO DETAILS



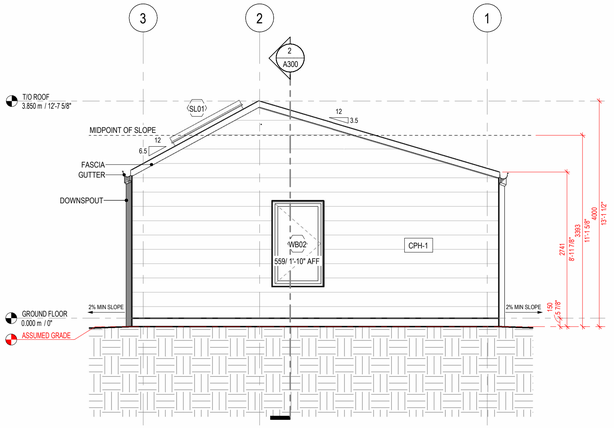
1 A200 BUILDING ELEVATION - FRONT

1 : 50



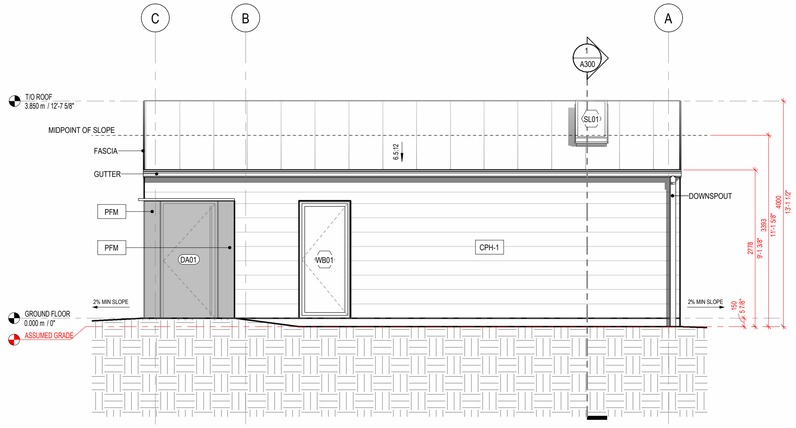
2 A200 BUILDING ELEVATION - SIDE 2

1 : 50



3 A200 BUILDING ELEVATION - REAR

1 : 50



4 A200 BUILDING ELEVATION - SIDE 1

1 : 50

CMHC SCHL

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PROJECT:

CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT OR CONSTRUCTION

SHEET TITLE:

ELEVATIONS

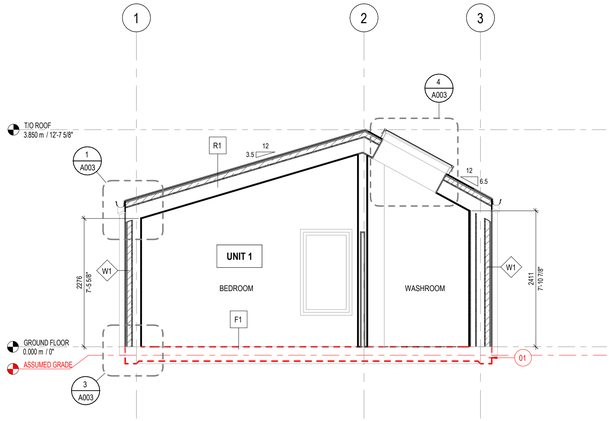
ON Accessory Dwelling Unit 01

PROJECT NO: 241058

SCALE: 1 : 50

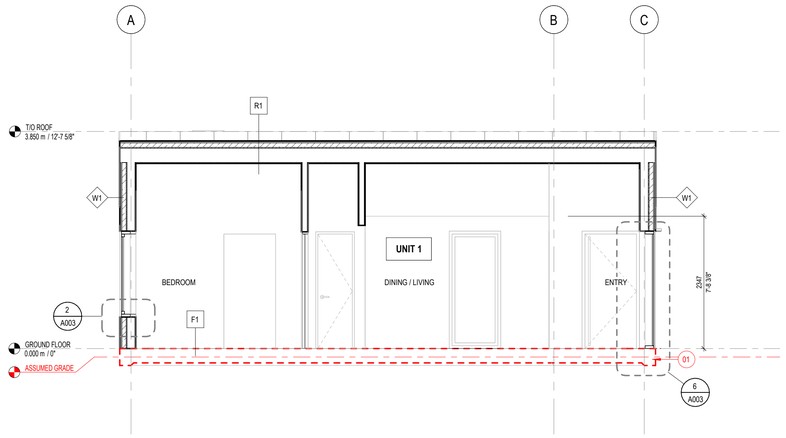
SHEET NO:

A200



1 A300 BUILDING SECTION

1 : 50



2 A300 BUILDING SECTION

1 : 50

SECTION KEYNOTES

01 FOUNDATIONS: ASSUMED, REFER TO STRUCTURAL DRAWINGS

CMHC SCHL

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PROJECT:

CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT
OR CONSTRUCTION

SHEET TITLE:

SECTIONS

ON Accessory Dwelling Unit 01

PROJECT NO: 241058

SCALE: 1 : 50

SHEET NO:

A300

CMHC HOUSING DESIGN CATALOGUE
ON - ACCESSORY DWELLING UNIT 01
STRUCTURAL DRAWINGS

STRUCTURAL DRAWING SHEET	
S001	GENERAL NOTES AND TYPICAL DETAILS
S101	STRUCTURAL PLANS
S401	STRUCTURAL DETAILS

NO.	DATE	DESCRIPTION
01	2025/02/14	ISSUED AS PROTOTYPICAL DRAWING

PROJECT:
CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT
OR CONSTRUCTION

SHEET TITLE:
ON Accessory Dwelling Unit 01

COVER SHEET

PROJECT NO: 240450
SCALE: N.T.S.

SHEET NO:
S000

1. GENERAL

1. GOVERNING CODE: ONTARIO BUILDING CODE 2024 - PART 9 - NORMAL IMPORTANCE*
2. ALL REINFORCED CONCRETE ELEMENTS HAVE BEEN DESIGNED IN ACCORDANCE WITH CSA STANDARD A23.3
3. ALL STRUCTURAL STEEL ELEMENTS HAVE BEEN DESIGNED IN ACCORDANCE WITH CAN/CSA-S16
4. ALL STRUCTURAL TIMBER ELEMENTS HAVE BEEN DESIGNED IN ACCORDANCE WITH CSA STANDARD O86
5. ALL STRUCTURAL MASONRY ELEMENTS HAVE BEEN DESIGNED IN ACCORDANCE WITH CSA STANDARD S304.1

2. DESIGN LOADS - PROTOTYPE MODEL

1. LIVE LOADS:
   SNOW LOADS ON ROOF / BALCONY AREAS:
   S = Cb x Ss + Sr = 0.55 x 3.6 kPa + 0.4 kPa = 2.38 kPa (CHAPLEAU, ON) REFER TO OBC PART 9.4.2.2. AND 9.4.2.3. (SNOW LOAD GOVERNS)
   2.4 kPA USED IN THIS DESIGN*
   FLOOR AREAS:
   1.9 kPa PRIVATE RESIDENTIAL AREAS
   4.8 kPa COMMON / EGRESS STAIRWELL AREAS

2. WIND AND EARTHQUAKE LOADS:
   1. ALL LOCATIONS IN ONTARIO FOR PART 9 BUILDINGS FALL INTO THE LOW TO MODERATE WIND & SEISMIC FORCES CATEGORY PER OBC PART 9.23.13.
      Sa(0.2) VALUES LESS THAN 0.7 (0.599, ALEXANDRIA, ON)
      1/50 YEAR - HOURLY WIND PRESSURE LESS THAN 0.8 kPa (0.49 kPa, PICTON)
   2. THE DESIGN OF BRACING TO RESIST LATERAL LOADS DUE TO WIND AND EARTHQUAKE FORCES HAVE BEEN CARRIED OUT IN ACCORDANCE WITH OBC TABLE 9.23.15.5 - SPACING AND DIMENSIONS OF BRACED WALL BANDS AND BRACED WALL PANELS

3. DEAD LOADS:
   ROOF ASSEMBLY:
   ROOFING: 0.3 kPa
   STRUCTURE: 0.2 kPa
   FINISHES: 0.1 kPa
   SUSPENDED: 0.4 kPa
   TOTAL: 1.0 kPa

   SLAB ON GRADE:
   102mm (4") SLAB: 2.4 kPa
   152mm (6") SLAB: 3.6 kPa

   EXTERIOR WALLS:
   RAINSCREEN: 0.25 kPa (LIGHT WEIGHT)
   SHEATHING: 0.1 kPa
   STUDS: 0.1 kPa
   FINISHES: 0.1 kPa
   SERVICES: 0.2 kPa
   TOTAL: 0.75 kPa

   FOUNDATIONS:
   500 x 300 (20 x 12") SLAB EDGE: 3.53 kN/m
   152mm (6") SLAB: 3.6 kPa

4. DEFLECTIONS:

1. CONFORM TO THE REQUIREMENTS OF OBC TABLE 9.4.3.1 - MAXIMUM DEFLECTIONS

3. MATERIALS

1. CONCRETE

1. CONFORM TO THE REQUIREMENTS OF CSA STANDARD A23.1 (LATEST VERSION) AND THE FOLLOWING FOR STRENGTH, SLUMP, WATER-TO-CEMENTING MATERIALS CONTENT AND AIR CONTENT:
   CONCRETE STRENGTH 25 MPa, INCREASE TO:
   32 MPa FOR GARAGE FLOORS, CARPORT FLOORS AND EXTERIOR FLATWORK
   – AIR CONTENT OF 5%-8% WHERE EXPOSED TO FREEZE-THAW, REDUCE TO 3%-6% FOR FOOTINGS.
   – MAXIMUM SLUMP OF 100 mm, INCREASE TO 150mm FOR CONVENTIONAL FOUNDATIONS.
   – NOMINAL MAXIMUM SIZE OF AGGREGATE SHALL BE 20 mm. USE SMALLER AGGREGATES AS APPROPRIATE IN AREAS OF CONGESTION WITH THE REINFORCING STEEL OR TO IMPROVE WORKABILITY. MODIFY MIX DESIGNS TO SUIT.
2. FOR NOMINALLY UN-REINFORCED CONCRETE, CONFORM TO THE REQUIREMENTS OF CSA STANDARD A438 (LATEST VERSION)

2. MASONRY

1. ALL MASONRY UNITS SHALL COMPLY WITH THE REQUIREMENTS OF CSA STANDARD A371-04, MINIMUM NET AREA COMPRESSIVE STRENGTH, 15 MPa.
2. GROUT FILL - TO BE IN ACCORDANCE WITH THE PROPOTION SPECIFICATION IN CSA A179.
3. MORTAR - CONFORM TO THE REQUIREMENTS OF CSA STANDARD A179-04, TYPE S.

3. STEEL

1. BOLTS, NUTS AND WASHERS - ASTM F3125, GRADE A325
2. ANCHOR RODS - CONFORM TO THE REQUIREMENTS OF CSA G40.21 GRADE 300W UNLESS NOTED OTHERWISE.
3. ALL OTHER - CONFORM TO THE REQUIREMENTS OF CSA G40.21 GRADE 300W
4. NOMINAL GRADE PAINT PROTECTION: IN ACCORDANCE WITH CISC/CPMA 1-73a - A QUICK-DRYING ONE COAT PAINT FOR USE ON STRUCTURAL STEEL.
5. ALL STRUCTURAL STEEL LOCATED OUTSIDE OF THE BUILDING ENVELOPE OR EXPOSED TO HIGH HUMIDITY OR MOISTURE SHALL BE FULLY GALVANIZED IN ACCORDANCE WITH ASTM A123/A123M TO A MINIMUM ZINC COATING AS DICTATED IN TABLE 1 OF A123/A123M. WHERE GALVANIZING IS DAMAGED, THE COATING SHALL BE REPAIRED IN ACCORDANCE WITH ASTM A780/A780M.

4. WOOD

1. ALL WOOD PRODUCTS ARE TO CONFORM TO THE REQUIREMENTS OF CSA - 086-14
   1. SAWN LUMBER: SPRUCE-PINE-FIR (SPF) GRADE No.1/No.2
   2. SHEATHING PANELS: CONFORM TO THE REQUIREMENTS OF CSA O121 AND CSA O151. FLOOR AND ROOF SHEATHING TO BE TONGUE AND GROOVE. GAPS BETWEEN WALL SHEATHING PANELS SHALL BE NO LESS THAN 2mm.
   3. LAMINATED VENEER LUMBER (LVL): E = 2.0E6 PSI AND Fb = 4,805 PSI
   4. WOOD I-JOISTS: CONFORM TO THE REQUIREMENTS OF ASTM D5055-13e1 AND CANADIAN CONSTRUCTION MATERIALS CENTRE (CCMC).
2. SEPARATE ALL STRUCTURAL WOOD COMPONENTS FROM CONTACT WITH CONCRETE OR MASONRY WITH VAPOR BARRIER OR SILL GASKET.

4. FOUNDATIONS

1. FOOTINGS:
   1. FOUND ALL FOOTINGS ON NATURALLY CONSOLIDATED UNDISTURBED SOIL OF ASSUMED ALLOWABLE SOIL BEARING PRESSURE OF 75 kPa (SLS).
   2. QUALIFIED BUILDING OFFICIAL, GEOTECHNICAL ENGINEER OR STRUCTURAL ENGINEER TO RE-SIZE ALL STRIP AND PAD FOOTING WIDTHS AND AREAS IN ACCORDANCE WITH OBC PART 9.15. AND 9.4.4.1 USING TABLE 9.4.4.1 - ALLOWABLE BEARING PRESSURES FOR SOIL OR ROCK BY IDENTIFYING SOIL TYPE AND CORRESPONDING MAXIMUM ALLOWABLE BEARING PRESSURE (MABP) AND APPLYING THE FOLLOWING FORMULAE:
      SPECIFIED FOOTING WIDTH x (75 / MABP) = CORRECTED FOOTING WIDTH.
      SPECIFIED FOOTING AREA x (75 / MABP) = CORRECTED FOOTING AREA.
   3. FOUND FOOTINGS EXPOSED TO FREEZING BELOW THE LEVEL AT WHICH POTENTIAL DAMAGE RESULTING FROM FROST ACTION CAN OCCUR, BUT A MINIMUM OF 1200 mm BELOW FINISHED GRADE IF NOT NOTED TO BE FOUNDED LOWER OR FROST PROTECTED BY RIGID INSULATION.
   4. THE LINE OF SLOPE BETWEEN ADJACENT FOOTINGS OR EXCAVATIONS OR ALONG STEPPED FOOTINGS SHALL NOT EXCEED A RISE OF 7 IN A RUN OF 10. AT STEPS CONSTRUCT LOWER FOOTINGS PRIOR TO CONSTRUCTING HIGHER FOOTINGS.

2. INSULATED SLAB ON GRADE FOUNDATIONS
   1. CONSTRUCT INSULATED SLAB ON GRADE FOUNDATIONS IN ACCORDANCE WITH - INSULATED SLAB ON GRADE FOUNDATIONS: A DESIGN GUIDE FOR RURAL, NORTHERN AND FIRST NATIONS HOUSING BY CMHC/SCHL ONTARIO FIRST NATIONS TECHNICAL SERVICES CORP., FIRST NATIONS (ALBERTA) TECHNICAL SERVICES ADVISORY GROUP, AND BUCHAN, LAWTON, PARENT LTD. CONSULTING ENGINEERS.

5. PROJECT NOTES

1. REFER TO ARCHITECTURAL DRAWINGS FOR DATUM ELEVATIONS.
2. CONTRACTOR TO PROVIDE ADEQUATE SHORING AS REQUIRED DURING ALL PHASES OF CONSTRUCTION.
3. ALL TEMPORARY WORKS, INCLUDING SHORING, IS THE RESPONSIBILITY OF THE CONTRACTOR.
4. FOUND ALL FOOTINGS ON NATIVE UNDISTURBED SOILS WITH THE FOLLOWING BEARING CAPACITIES CONFIRMED ON SITE BY GEOTECHNICAL INVESTIGATION: 75 kPa (SLS)*.
5. FOUND ALL FOOTINGS AT 1200mm BELOW GRADE WHERE EXPOSED TO FROST.
6. 'SDF' DENOTES "STEP DOWN FOOTING."
7. ALL ROOF SHEATHING TO BE 16mm T&G FASTENED DIRECTLY TO ROOF JOISTS.
8. ALL FLOOR SHEATHING TO BE 16mm T&G FASTENED DIRECTLY TO FLOOR JOISTS.
9. ALL WOOD-TO-WOOD CONNECTIONS ARE TO BE MADE WITH APPROPRIATE FACE MOUNT HANGERS CAPABLE OF SUPPORTING REACTION FORCES NOTED ON THE MEMBER SCHEDULES ON PLAN.
10. PROVIDE SOLID BLOCKING IN JOIST SPACE (SQUASH BLOCKS) AND CONTINUE ALL BUILT-UP POSTS DOWN TO T/O FOUNDATION WALLS
11. "PA" DENOTES POST POINT LOAD FROM ABOVE & "CA" DENOTES COLUMN POINT LOAD FROM ABOVE.
12. ARCHITECTURAL DRAWINGS GOVERN REQUIREMENT AND LOCATION OF COMBUSTIBLE AND NON-COMBUSTIBLE WALL TYPES (EX. SW-1 vs SF-1).
13. **DO NOT SCALE STRUCTURAL DRAWINGS.**

LOADS USED IN THE DESIGN:
SNOW: 2.4 kPa* (THIS IS THE ONLY PARAMETER THAT MAY BE MODIFIED FURTHER TO FULL REVIEW BY LICENSED DESIGN PROFESSIONAL PER SECTION 6 BELOW)
LIVE: 1.9 kPa
DEAD: 1.0 kPa (ROOF)
0.75 kPa (EXTERIOR WALLS)

*6. USE OF THESE STRUCTURAL DRAWINGS

STRUCTURAL MEMBERS SHOWN ON THIS SET OF DRAWINGS HAVE BEEN DESIGNED TO RESIST PART 9 ENVIRONMENTAL DESIGN LOADS BASED ON WORST CASE WIND, SNOW AND SEISMIC VALUES FOR ONTARIO LOCATIONS PER OBC 2024 SB-1 TABLE 2 - CLIMATIC DESIGN DATA. MEMBER SIZING HAS BEEN CALCULATED IN ACCORDANCE WITH PART 4 OF THE OBC.

ANY VALUE ENGINEERING TO OPTIMIZE THE STRUCTURAL DESIGN FOR REGIONS WITH LOWER ENVIRONMENTAL LOADS NOTED ON THESE DRAWINGS MUST BE CARRIED OUT BY A STRUCTURAL ENGINEER LICENSED IN THE PROVINCE OF ONTARIO.

FOUNDATION ELEMENTS HAVE BEEN DESIGNED USING A TYPICALLY LOW ALLOWABLE SOIL BEARING VALUE OF 75 kPa. THE OWNER MUST CONFIRM THIS MINIMUM BEARING VALUE BY GEOTECHNICAL INVESTIGATION OR BY MEANS THAT IS IN ACCORDANCE WITH OBC 9.4 AND APPROVED BY LOCAL MUNICIPAL BUILDING OFFICIAL REVIEW.

USE OF HIGHER ALLOWABLE SOIL BEARING VALUES TO OPTIMIZE FOOTING SIZES SHOWN ON THESE DRAWINGS MUST BE BASED ON FINDINGS AND RECOMMENDATIONS MADE BY A GEOTECHNICAL INVESTIGATION AND DESIGN REVISIONS CARRIED OUT BY A STRUCTURAL ENGINEER LICENSED IN THE PROVINCE OF ONTARIO.

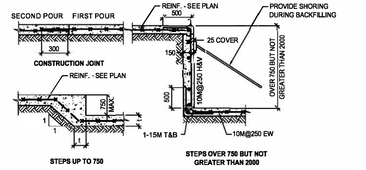
ABBREVIATIONS — TD0001

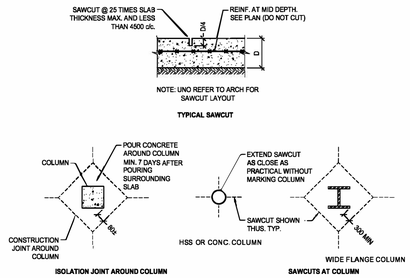
@	= AT	DS	= DRAG STRUT
A.BOLT	= ANCHOR BOLT	DWG (S)	= DRAWING(S)
ADJ	= ADJUSTABLE	DWL(S)	= DOWEL(S)
ALT	= ALTERNATE	EA	= EACH
ARCH	= ARCHITECTURAL	EF	= EACH FACE
ASL	= ACCUMULATED SNOW LOAD	EW	= EACH WAY
B	= BOTTOM	EL	= ELEVATION
BEW	= BOTTOM EACH WAY	ELE C	= ELECTRICAL
BLL	= BOTTOM LOWER LAYER	ELEV	= ELEVATOR
BUL	= BOTTOM UPPER LAYER	E -W	= EAST-WEST
BLDG	= BUILDING	EQ	= EQUAL
BM	= BEAM	EXIST	= EXISTING
BC, BSR	= BASE OR BEARING PLATE	EXP.J	= EXPANSION JOINT
BSMT	= BASEMENT	EXT	= EXTERIOR
c/c, o/c	= CENTRE TO CENTRE	F'c	= f'c
c/w	= COMPLETE WITH	FDN	= FOUNDATION
C	= EPOXY COATED	FIN	= FINISHED
CI, PI, AI	= FACTORED COMPRESSION OR AXIAL FORCE, kN	FL	= FLOOR
CANT	= CANTILEVER	FTG	= F'OOTING
CFW	= COLD-FORMED STUD WALL	FW	= FOUNDATION WALL
CA	= COLUMN ABOVE	f'c	= CONCRETE STRENGTH, MPa
CB	= COLUMN BELOW	GA	= GAUGE
CDL	= COMPRESSION DEVELOPMENT LENGTH, mm	GALV	= GALVANIZED
CIF	= CONFIRM IN FIELD	GEN	= GENERAL
CJ	= CONSTRUCTION JOINT	GL	= GLULAM
CLS	= COMPRESSION LAP SPLICE, mm	H, HOR	= HORIZONTAL
CLT	= CROSS LAMINATED TIMBER	HDG	= HOT DIP GALVANIZED
CLTW	= CROSS LAMINATED TIMBER WALL	HEF, H.EF	= HORIZONTAL EACH FACE
COL	= COLUMN	HEE	= HOOKED EACH END
COMP	= COMPRESSION	HF	= FACTORED HOR FORCE, kN
CONC	= CONCRETE	HSC	= HORIZONTALLY SLOTTED CONNECTION
CONSTR	= CONSTRUCTION	IF	= INSIDE FACE
CONT	= CONTINUOUS	INT	= INTERIOR
CW	= CONCRETE WALL	J	= JOINT
DET	= DETAIL	kN	= KILONEWTON
DEV	= DEVELOPMENT	kg	= KILOGRAM
DIAG	= DIAGONAL	kNm	= KILONEWTON METRES
DIA, Ø	= (BAR) DIAMETER	kNm/m	= kN PER SQUARE METRE
DIM	= DIMENSION	kN/m	= kN PER METRE
DJ	= DOUBLE JOIST	kPa	= KILOPASCAL
DL	= DEAD LOAD		
DLH	= DEVELOPMENT LENGTH FOR STANDARD HOOKS, mm		
DO	= DITTO		

ABBREVIATIONS — TD0002

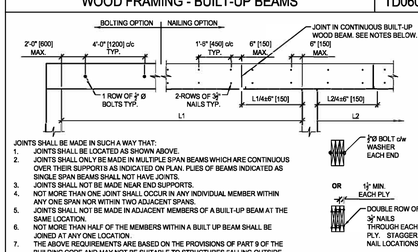
LL	= LIVE LOAD	SIM	= SIMILAR
LG	= LONG	SIP	= STRUCTURALLY INSULATED PANEL
LLV	= LONG LEG VERTICAL	SL	= SNOW LOAD
LLH	= LONG LEG HORIZONTAL	SOG	= SLAB ON GRADE
LW	= LIGHT-WOOD WALL	SPECS	= SPECIFICATIONS
MC, ▶	= MOMENT CONNECTION	SQ	= SQUARE
MECH	= MECHANICAL	STD	= STANDARD
MEW	= MIDDLE EACH WAY	STRUCT	= STRUCTURAL
MEZZ	= MEZZANINE	SW	= SHEAR WALL OR STUD WALL
MID	= MIDDLE	T	= TOP
MISC	= MISCELLANEOUS	TD	= TYPICAL DETAIL
ML	= MIDDLE LAYER	TDL	= TENSION DEVELOPMENT LENGTH, mm
mm	= MILLIMETRE	T/O, TOS	= TOP OF SLAB
MOM	= MOMENT	TEN	= TENSION
m	= METRE, METRIC	TEW	= TOP EACH WAY
MPa	= MEGAPASCAL	TMF	= FACTORED TORSIONAL MOMENT, kNm
MW	= MASONRY WALL	TF	= FACTORED TENSION FORCE, kN
MF	= FACTORED MOMENT	TJ	= TIE JOIST
Mfx, Mfy	= FACTORED MOMENT ABOUT X-AXIS OR Y-AXIS, kNm	TLL	= TOP LOWER LAYER
MFW	= MASONRY FOUNDATION WALL	TUL	= TOP UPPER LAYER
MRW	= MASONRY RETAINING WALL	TEMP	= TEMPERATURE
N	= NETWONS	TLS	= TENSION LAP SPLICE, mm
NF	= NEAR FACE	TYP	= TYPICAL
NIC	= NOT IN CONTRACT	UL	= UPPER LAYER
NLT	= NAIL LAMINATED TIMBER	UN, UNO	= UNLESS NOTED OTHERWISE
N-S	= NORTH-SOUTH	U/S	= UNDERSIDE
NTS	= NOT TO SCALE	Vf	= FACTORED SHEAR OR VERTICAL FORCE, kN
OF	= OUTSIDE FACE	V, VERT	= VERTICAL
OWSJ	= OPEN WEB STEEL JOISTS	VEF, V EF	= VERTICAL EACH FACE
OPEN	= OPENING	VB	= VERTICAL BRACE/BRACING
PL	= PLATE	VSC	= VERTICALLY SLOTTED CONNECTION
PC	= PRECAST	WPL	= WALL PLATE
PROJ	= PROJECTION	WW	= WOOD WALL
R	= REACTION	WWF	= WELDED WIRE FABRIC
RAD	= RADIUS	WWM	= WELDED WIRE MESH
REF	= REFERENCE	W, w/	= WITH
REINF	= REINFORCE, REINFORCEMENT	WO, wt.	= UNIFORMLY DISTRIBUTED LOADS
REQ'D	= REQUIRED		
REV	= REVISION, REVISED		
Rf	= FACTORED REACTION FORCE, kN		
c/w, R/W	= REINFORCED WITH		
RW	= RETAINING WALL		
SECT	= SECTION		
SDF	= STEP DOWN FOOTING		

SLAB ON GRADE - JOINTS, STEPS, SAWCUTS — TD0320



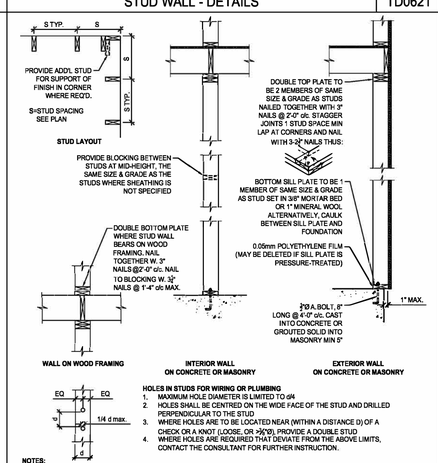


WOOD FRAMING - BUILT-UP BEAMS — TD0604



NOTES:
1. THE PLIES OF 4-PLY AND 5-PLY BEAMS ARE TO BE FASTENED USING BOLTS ONLY. 2-PLY AND 3-PLY BEAMS MAY BE NAILED OR BOLTED.
2. 4-PLY AND 5-PLY BEAMS ARE TO BE TOP LOADED WHENEVER POSSIBLE; THEY MAY BE SIDE LOADED PROVIDED THEY ARE LOADED EQUALLY FROM BOTH SIDES.

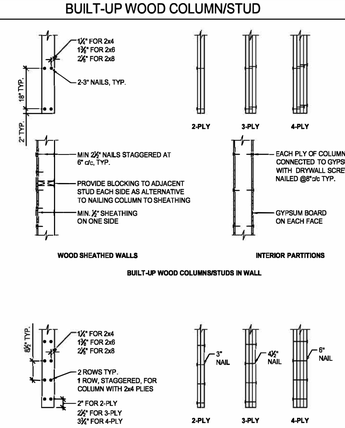
STUD WALL - DETAILS — TD0621



NOTES:
1. SEE PLANS FOR STUD SIZE, SPECIES, LUMBER GRADE AND SPACING. SPACING NOT TO EXCEED 2'-0".
2. ALL STUDS TO BE CONTINUOUS FOR FULL STOREY HEIGHT EXCEPT AT OPENINGS
3. WIDE FACE OF STUD IS TO BE ORIENTED PERPENDICULAR TO THE WALL FACE.
4. NOTES SHOWN FOR THE EXTERIOR WALL CONDITION APPLY TO THE INTERIOR WALL ALSO.

HOLES IN STUDS FOR WIRING OR PLUMBING
1. MAXIMUM HOLE DIAMETER IS LIMITED TO ⌀4
2. HOLES SHALL BE CENTRED ON THE WIDE FACE OF THE STUD AND DRILLED PERPENDICULAR TO THE STUD
3. WHERE HOLES ARE TO BE LOCATED NEAR (WITHIN A DISTANCE D) OF A CHECK OR A KNOT (LOOSE, OR >⅓*D), PROVIDE A DOUBLE STUD
4. WHERE HOLES ARE REQUIRED THAT DEVIATE FROM THE ABOVE LIMITS, CONTACT THE CONSULTANT FOR FURTHER INSTRUCTION.

BUILT-UP WOOD COLUMN/STUD — TD0640



NOTES:
1. NO SPLICES SHALL BE MADE IN ANY BUILTUP WOOD COLUMNS.
2. DETAILS ABOVE ONLY APPLY TO SPF COLUMNS.
3. ALL NAILS TO BE COMMON WIRE NAILS.

CMHC SCHL

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PROJECT:

CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT OR CONSTRUCTION

SHEET TITLE:

ON Accessory Dwelling Unit 01

GENERAL NOTES AND TYPICAL DETAILS

PROJECT NO: 240450

SCALE: N.T.S.

SHEET NO:

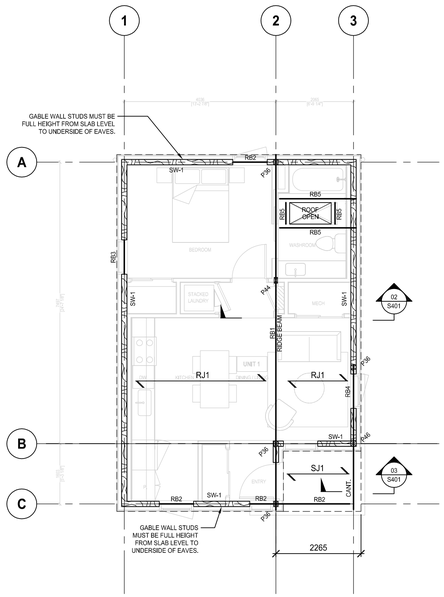
S001

MEMBER SCHEDULE (FACTORED LOADS)				
LABEL	SECTION	REACTIONS (kN, UNO)		COMMENTS
		LEFT	RIGHT	
ROOF FRAMING				
RJ1	38 x 235 SPF @406 oc SLOPED ROOF JOISTS	6	6	USE SLOPE-ABLE FACE MOUNT HANGERS AT RIDGE BEAM SUPPORT
SJ1	38 x 89 SPF @406 oc SOFFIT JOISTS	2	2	USE FACE MOUNT HANGERS
RB1	(3) 44 x 302 LVL RIDGE BEAMS	14 | 56 | 56 | 14		SUPPORT ROOF JOISTS w/ SLOPE-ABLE FACE MOUNT HANGERS
RB2	(2) 38 x 184 SPF LINTEL BEAM	7	7	SUPPORT WITH: CONCEALED FLANGE HANGERS OR (2) JACK + (1) KING POST
RB3	(2) 38 x 184 SPF DROPPED LINTEL BEAM	7	7	SUPPORT WITH: (2) JACK + (1) KING POST
RB4	(3) 44 x 184 LVL CANT. TO SUPPORT ROOF	19	3	SUPPORT WITH: (4) STUDS @ CANT. (3) JACK + (1) KING @ BACK-SPAN
RB5	(2) 38 x 235 SPF AT SKYLIGHT OPENING	8	8	USE SLOPE-ABLE FACE MOUNT HANGERS AT RIDGE BEAM SUPPORT

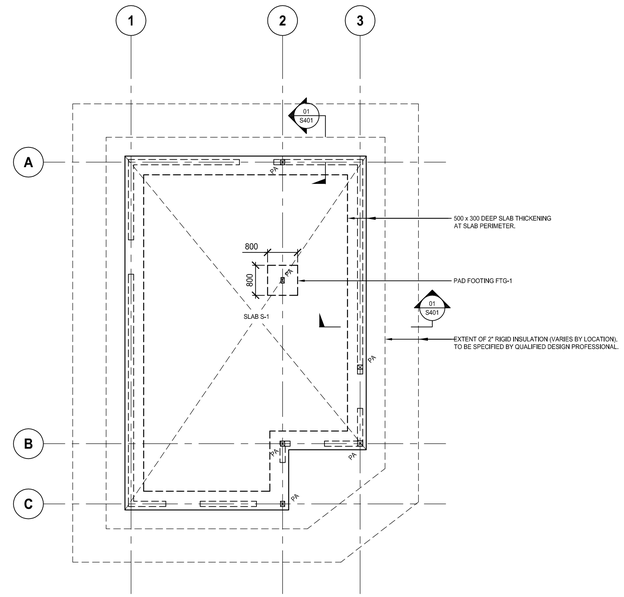
WALL, POSTS, FOUNDATIONS AND SLAB SCHEDULE		
LABEL	ELEMENT	COMMENTS
P#4	(#) 38 x 89 SPF BUILT UP WOOD POST. SEE PLAN FOR NUMBER OF PLIES. EXAMPLE: P34 = (3) 38 x 89	CONTINUE TO FOUNDATION LEVEL OR TRANSFER BEAM BELOW.
P#6	(#) 38 x 140 SPF BUILT UP WOOD POST. SEE PLAN FOR NUMBER OF PLIES. EXAMPLE: P36 = (3) 38 x 140	CONTINUE TO FOUNDATION LEVEL OR TRANSFER BEAM BELOW.
SW-1	38 x 140 SPF @ 406oc STUD WALL WITH DOUBLE TOP PLATES AND BLOCKING AT MID HEIGHT BETWEEN STUDS. PROVIDE 16mm SHEATHING PANELS.	EXTERIOR LOAD BEARING WALLS.
S-1	102mm 25 MPa CONCRETE SLAB ON GRADE r/w WWM 152 x 152 18.7 / 18.7. SAW CUT @2440 EACH WAY. EXTENT OF INSULATION PROJECTION TO BE SPECIFIED BY DESIGN PROFESSIONAL - SEE 4.2.1 / S001.	CAST ON 51mm RIGID INSULATION ON 200mm FREE-DRAINING GRANULAR BASE.
FTG-1	800 x 800 x 300 DEEP SLAB THICKENING CENTRED BELOW POST ABOVE. r/w 15M @10"oc BOTTOM EACH WAY.	

MEMBER SCHEDULE NOTES:

1. LEFT AND RIGHT ENDS OF BEAMS ARE DEFINED BY THE ORIENTATION OF THE BEAM MARK ON PLAN.
2. PROVIDE APPROPRIATE HOLD DOWN STRAPS, TIES AND ANCHORS WHERE UPLIFT FORCES ARE NOTED OR AT BACK SPAN SUPPORT OF CANTILEVERED BEAMS.
3. WHERE REACTION FORCES ARE NOT SHOWN FOR WOOD BEAMS, BEAM CONNECTIONS SHALL BE DESIGNED FOR 70% OF THE SHEAR CAPACITY OF THE BEAM.



02 S101 GROUND FLOOR PLAN SHOWING ROOF LEVEL FRAMING 1:75



01 S101 FOUNDATION PLAN 1:75

CMHC SCHL

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ONTARIO, CANADA

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ON Accessory Dwelling Unit 01

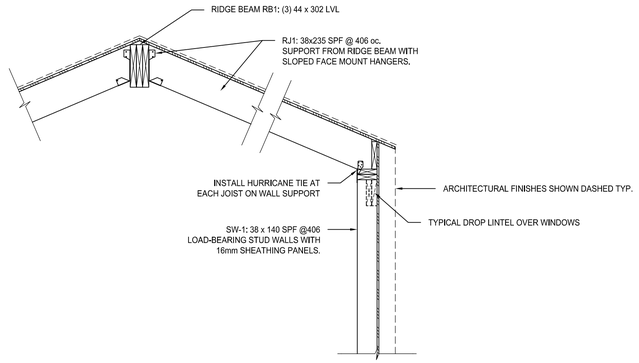
STRUCTURAL PLANS

PROJECT NO: 240450

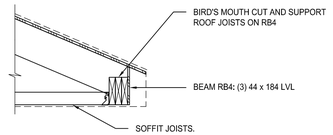
SCALE: 1:75

SHEET NO:

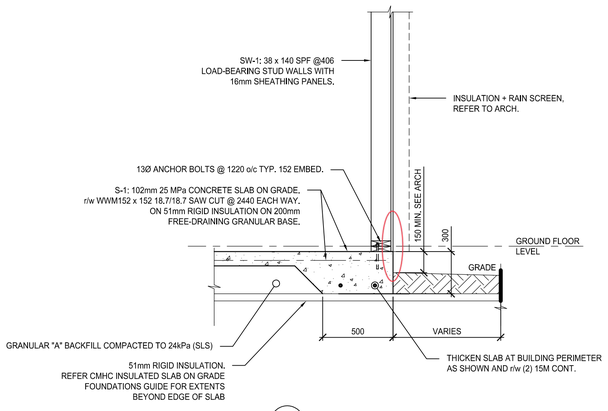
S101



2 / S401 ROOF FRAMING AT RIDGE AND EXTERIOR BEARING WALL
1:20



3 / S401 CANTILEVERED ROOF + SOFFIT AT ENTRY
1:20



1 / S401 EXTERIOR WALL AT FOUNDATION ASSEMBLY
1:20

01	2025/02/14	ISSUED AS PROTOTYPICAL DRAWING

NO.	DATE	DESCRIPTION

PROJECT:

CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT
OR CONSTRUCTION

SHEET TITLE:

ON Accessory Dwelling Unit 01

STRUCTURAL DETAILS

PROJECT NO: 240450

SCALE: 1:20

SHEET NO:

S401

CMHC HOUSING DESIGN CATALOGUE

ACCESSORY DWELLING UNIT 01

MECHANICAL, ELECTRICAL & PLUMBING DRAWINGS

MECHANICAL & ELECTRICAL DRAWING LIST

DRAWING NO.	DRAWING NAME
M000	MECHANICAL, ELECTRICAL & PLUMBING COVER SHEET
M001A	MECHANICAL OUTLINE SPECIFICATIONS - BASE OPTION
M001B	MECHANICAL OUTLINE SPECIFICATIONS - ALTERNATE OPTION 1
M001C	MECHANICAL OUTLINE SPECIFICATIONS - ALTERNATE OPTION 2
M001D	MECHANICAL OUTLINE SPECIFICATIONS - ALTERNATE OPTION 3
M002	ELECTRICAL OUTLINE SPECIFICATIONS
M003A	MECHANICAL & ELECTRICAL DETAILS & SYMBOLS - BASE OPTION
M003B	MECHANICAL & ELECTRICAL DETAILS & SYMBOLS - ALTERNATE OPTION 1
M003C	MECHANICAL & ELECTRICAL DETAILS & SYMBOLS - ALTERNATE OPTION 2
M003D	MECHANICAL & ELECTRICAL DETAILS & SYMBOLS - ALTERNATE OPTION 3
M100	ON ACCESSORY DWELLING UNIT 01 - GROUND FLOOR PLUMBING, ELECTRICAL & HVAC

CMHC SCHL

NO.	DATE	DESCRIPTION
1	2025/02/25	ISSUED AS PROTOTYPICAL DRAWING

PROJECT:

CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT
OR CONSTRUCTION

SHEET TITLE:

MECHANICAL, ELECTRICAL & PLUMBING COVER SHEET

PROJECT NO: 24112

SCALE: NTS

SHEET NO:

M000

MECHANICAL OUTLINE SPECIFICATIONS - BASE OPTION

1. PRIMARY HEAT FROM GAS FIRED FURNACE.
2. COOLING THROUGH SPLIT DX COOLING COIL AND CONDENSING UNIT.
3. NO SUPPLEMENTAL HEAT.
4. ELECTRIC DOMESTIC HOT WATER TANK.

DESIGN CRITERIA AND REQUIREMENTS

1. THE MECHANICAL SYSTEMS SHALL BE DESIGNED IN ACCORDANCE WITH THE ONTARIO BUILDING CODE (OBC), SPECIFIC REQUIREMENTS OF THE LOCAL AUTHORITY HAVING JURISDICTION, DESIGN PRINCIPLES AND STANDARDS OBTAINED FROM THE OWNER AND DESIGN TEAM AS WELL AS STANDARDS OF GOOD ENGINEERING PRACTICES.
2. WORK SHALL BE COMPLETED IN ACCORDANCE WITH STANDARDS PUBLISHED BY THE FOLLOWING PARTIAL LIST OF AUTHORITIES:
   - A. THERMAL ENVIRONMENTAL CONDITIONS FOR HUMAN OCCUPANCY, ANSI/ASHRAE STANDARD 55 (LATEST EDITION);
   - B. VENTILATION REQUIREMENTS TO BE BASED ON MOST CURRENT OBC PART 9 TABLE 9.32.3.3.
   - C. HANDBOOKS PUBLISHED BY AMERICAN SOCIETY OF HEATING, REFRIGERATION AND AIR CONDITIONING ENGINEERS (ASHRAE).
3. HEATING AND COOLING CALCULATIONS TO BE BASED ON MOST CURRENT CLIMATICAL DATA (SB-1) AND ENERGY EFFICIENCY OF HOUSING COMPLIANCE PACKAGES (SB-12) PUBLISHED IN THE ONTARIO BUILDING CODE AND SHALL BE COMPLETED IN ACCORDANCE WITH THE STANDARD CAN/CSA-F280-12 (R2021) TO DETERMINE THE SIZE/CAPACITY OF THE HEATING/AIR CONDITIONING SYSTEMS.
   - A. ALL OCCUPIED AREAS WILL BE AIR CONDITIONED WITH THE FOLLOWING ENVIRONMENTAL CONDITIONS;
     - a. WINTER: 22.0°C ± 1°C AND 20% ± 5% RELATIVE HUMIDITY
     - b. SUMMER: 24.0°C ± 1°C AND 60% ± 5% RELATIVE HUMIDITY
4. ALL UNPROTECTED MECHANICAL PENETRATIONS ON EXPOSING BUILDING FACE MORE THAN 130MM2 SHALL BE COORDINATED WITH DESIGNER AND NOTED ON ARCHITECTURAL DRAWINGS AS PER OBC 9.10.14.6.

SITE SERVICES

1. NATURAL GAS SERVICE:
   - A. ONE (1) UTILITY NATURAL GAS SERVICE WILL BE PROVIDED TO THE BUILDING AND RUN TO INDIVIDUAL GAS METERS PROVIDED FOR EACH RESIDENTIAL UNIT.
   - B. GROUP AND LOCATE GAS METERS ABOVE GRADE ON ONE SIDE OF THE BUILDING AGAINST AN EXTERIOR WALL. RUN INDIVIDUAL GAS LINES FROM GAS METERS TO THE RESPECTIVE RESIDENTIAL UNITS.
   - C. THE NATURAL GAS SYSTEM DESIGN AND INSTALLATION SHALL COMPLY WITH THE LATEST REQUIREMENTS OF CSA B149, NFPA STANDARDS, OBC, AND LOCAL REGULATORY REQUIREMENTS.
   - D. MATERIAL:
     - a. UNDERGROUND PIPING SHALL BE COATED BLACK STEEL "YELLOW JACKET" SCHEDULE 40 MILD BLACK CARBON STEEL; OR, SAFETY YELLOW COLOURED POLYETHYLENE PIPE, FITTINGS, AND JOINTS TO CSA B137.4; OR, COATED TYPE "K" SOFT TEMPER COPPER WITH FACTORY APPLIED EXTERNAL YELLOW LPASTIC COATING, STAMPED WITH DESIGNATION C37700 TO INDICATE FORGED BRASS.
     - b. EXPOSED SCREW PIPING TO BE SCHEDULE 40 MILD BLACK CARBON STEEL, ASTM A53 GRADE B COMPLETE WITH MALLEABLE CAST IRON SCREWED FITTINGS TO ANSI B2.1, AND SCREWED JOINTS.
     - c. EXPOSED WELDED PIPING TO BE SCHEDULE 40 MILD BLACK CARBON STEEL, ASTM A53 GRADE B, MILL OR SITE BEVELLED, COMPLETE WITH FACTORY MADE FORGED STEEL BUTT WELDING FITTINGS AND WELDED JOINTS.
2. WATER SERVICES:
   - A. ONE (1) POTABLE WATER SERVICE WILL BE PROVIDED TO THE BUILDING THEN THE SERVICE WILL SPLIT AND RUN TO INDIVIDUAL UTILITY METER INSIDE EACH RESIDENTIAL UNIT.
3. SANITARY SEWERS:
   - A. ONE (1) SANITARY SERVICE CONNECTION WILL BE PROVIDED TO THE BUILDING COMPLETE WITH SAMPLING PORT IN COORDINATION WITH THE SITE SERVICE ENGINEER. COORDINATE LOCATION AND INVERT OF INCOMING CONNECTION WITH SITE SERVICES CONSULTANT.
   - B. ROOF GUTTERS TO BE PIPED AND ROUTED DOWN THE SIDE OF THE BUILDING TO SPILL ON GRADE.

PLUMBING AND DRAINAGE

1. POTABLE WATER:
   - A. AN INCOMING POTABLE WATER CONNECTION COMPLETED WITH A METER ASSEMBLY WILL SUPPLY WATER TO EACH RESIDENTIAL UNIT. OPTIONAL WATER FILTRATION INCLUDING CARBON ACTIVATED FILTERS, UV AND RO CAN BE PROVIDED IN AREAS WHERE WATER QUALITY IS OF CONCERN.
   - B. POLYETHYLENE PEX PIPING WILL BE PROVIDED TO DISTRIBUTE COLD AND HOT WATER THROUGHOUT THE UNIT.
     - a. TUBE SHALL BE CROSS-LINKED POLYETHYLENE (PEX) MANUFACTURED BY PEX-A OR PEROXIDE METHOD. PEX TUBING SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM F876, ASTM F877 AND CAN/CSA-B137.5. THE TUBE SHALL BE LISTED TO ASTM BY AN INDEPENDENT THIRD PARTY AGENCY.
     - b. FITTINGS SHALL BE MANUFACTURED OF ENGINEERED PLASTIC (EP). FITTINGS SHALL BE PEX-A COLD EXPANSION TYPE CERTIFIED TO ASTM F1960.
       - (1)FITTINGS SHALL BE SUPPLIED BY THE PEX TUBING MANUFACTURER.
       - (2)PEX-A COLD EXPANSION TYPE FITTINGS SHALL BE AN ASSEMBLY CONSISTING OF INSERT AND PEX-A COLD EXPANSION RING.
       - (3)FITTING TYPE: UPONOR ENGINEERED PLASTIC (EP).
2. DRAINAGE:
   - A. ALL SANITARY DRAIN AND MAIN VENT STACKS SHALL BE PLASTIC ABS WITH GLUED CONNECTIONS. WHERE REQUIRED TO MEET FIRE SPREAD AND SMOKE DEVELOPMENT RATINGS METALLIC PIPING OR XFR PIPING IS TO BE PROVIDED BASED ON LOCAL JURISDICTION APPROVAL.
   - B. UNDERGROUND DRAINAGE PIPING SHALL BE PVC DR35 RIGID SEWER PIPING. PIPING 4" AND LARGER TO BE GREEN PVC HUB AND SPIGOT SEWER PIPE AND FITTINGS TO CAN/CSA B182.2. SIZE 3" PIPE TO BE PVC WITH SOLVENT WELD JOINTS CERTIFIED TO CSA B182.1 AND COLOUR CODED AS PER LOCAL CODES.
3. DOMESTIC HOT WATER PRODUCTION:
   - A. AN ELECTRIC DOMESTIC HOT WATER (DHW) TANK WILL BE PROVIDED FOR EACH RESIDENTIAL UNIT.
   - B. DOMESTIC HOT WATER SHALL BE STORED AT A MINIMUM OF 52°C (125°F).
   - C. A MIXING VALVE SHALL BE PROVIDED TO SUPPLY 49°C (120°F) DOMESTIC HOT WATER TO THE FIXTURES.
4. PRESSURE BALANCING TYPE MIXING VALVES SHALL BE PROVIDED FOR ALL SHOWERS.
5. DRAIN WATER HEAT RECOVERY COIL SHALL BE PROVIDED FOR EACH MULTI-STOREY UNIT.
6. PLUMBING FIXTURES SHALL BE LOW FLOW AND OF FIRST QUALITY.
7. SANITARY DRAINS WILL BE COLLECTED AND CONNECTED TO THE MUNICIPAL SANITARY NETWORK UNLESS OTHERWISE NOTED, SLOPE ALL 75 MM (3") DRAINAGE PIPING AT 2% SLOPE AND ALL 100 MM (4") AND LARGER DRAINAGE PIPING AT 1% SLOPE.

HEATING, VENTILATION, AND AIR CONDITIONING (HVAC)

1. HEATING AND COOLING SYSTEMS:
   - A. HEATING AND COOLING WILL BE PRODUCED BY A 96% EFFICIENT GAS FURNACE COMPLETE WITH A SPLIT DIRECT EXPANSION (DX) COOLING COIL.
   - B. THE CAPACITY OF THE GAS FURNACE AND ITS ASSOCIATED DX COOLING COIL SHALL BE SIZED AND SELECTED TO MEET THE FULL HEATING AND COOLING LOAD REQUIREMENTS OF THE RESIDENTIAL UNIT.
   - C. THE GAS FURNACE TO BE COMPLETE WITH MINIMUM MERV 8 FILTRATION.
   - D. THE OUTDOOR CONDENSING UNIT IS TO BE LOCATED WITHIN CLOSE PROXIMITY TO THE INDOOR UNIT AND CONNECTED WITH REFRIGERANT PIPING. THE OUTDOOR CONDENSING UNIT WILL BE ABLE TO OPERATE FROM 5°C (41°F) TO 35°C (95°F).
   - E. PROPANE OR NATURAL GAS SERVICE WITH METER SHALL BE PROVIDED TO SERVE THE FURNACE.
2. VENTILATION AND EXHAUST SYSTEMS:
   - A. VENTILATION AIR WILL BE PROVIDED BY AN ENERGY RECOVERY VENTILATOR (ERV) THAT WILL TRANSFER ENERGY FROM THE PRIMARY BATHROOM EXHAUST TO PRE-CONDITION OUTDOOR AIR THAT WILL BE DUCTED BACK TO THE INDOOR UNIT. SIZE OF ERV TO BE DETERMINED BASED ON OBC PART 9 REQUIREMENT. ERV PERFORMANCE SHALL HAVE A MINIMUM OF 75% EFFECTIVENESS. WHERE REQUIRED, AN ELECTRIC DUCT HEATER SHALL BE PROVIDED. THE ERV SHALL BE CONTROLLED BY A LOCAL TIMER SWITCH.
   - B. SECONDARY WASHROOMS WILL BE PROVIDED WITH DEDICATED CEILING MOUNTED TOILET EXHAUST FANS COMPLETE WITH LOCAL SWITCH.
   - C. CLOTHES DRYERS WILL BE PROVIDED WITH A LINT TRAP AND DRYER BOOSTER FAN CONNECTED TO A CURRENT SENSOR TO AID IN DRYER EXHAUST. LINT TRAPS WILL BE PROVIDED ON THE SUCTION SIDE OF THE FAN WITHIN THE SUITE LAUNDRY ROOM.
   - D. KITCHEN HOOD EXHAUSTS WILL BE SIZED FOR MINIMUM 150 CFM AND DUCTED TO OUTDOORS.
   - E. ALL EXHAUST DUCTWORK WILL BE DISCHARGED TO THE EXTERIOR THROUGH THE EXTERIOR WALLS OF THE UNIT OR THROUGH THE ROOF FOR THE TOP LEVEL.
   - F. EXHAUST DUCTWORK SHALL BE INSULATED FOR THE FIRST 10FT FROM THE EXTERIOR LOUVRE.
3. AIR DISTRIBUTION:
   - A. DUCTWORK SHALL BE GALVANIZED SHEET METAL UNLESS OTHERWISE INDICATED. DUCTS SHALL BE SIZED AT A PRESSURE DROP OF 0.08" (20PA) PER 100' (30.5M) WITH MAXIMUM AIR VELOCITIES OF 1400 FEET (427M) PER MINUTE.
   - B. DUCTWORK TO BE INSULATED TO MEET ASHRAE 90.1 AND THE GOVERNING AUTHORITY REQUIREMENTS.
   - C. PROVIDE ACOUSTIC LINING FOR ALL SUPPLY AND RETURN AIR DUCTWORK SERVING MECHANICAL EQUIPMENT WITH FANS TO A MAXIMUM OF 4.5M (15') FROM THE EQUIPMENT, MEASURED OUTWARD IN ALL DIRECTIONS.
   - D. SUPPLY AIR FROM THE INDOOR UNIT SHALL BE DUCTED TO EACH ROOM VIA 200X100 SIDEWALL GRILLES OR FLOOR REGISTERS.
   - E. EACH ROOM SHALL HAVE A RETURN AIR GRILLE OR AN 1" (25MM) DOOR UNDERCUT FOR AIR TRANSFER.
   - F. PROVIDE BALANCING DAMPERS AT ALL DUCT BRANCHES FOR AIR BALANCING.
   - G. A PROGRAMMABLE THERMOSTAT WITH OCCUPANCY SENSOR SHALL BE PROVIDED TO CONTROL THE SUITE HVAC SYSTEM.
   - H. DUCTWORK PENETRATING CEILING MEMBRANES REQUIRED TO HAVE A FIRE-RESISTANCE RATING SHALL CONFORM TO REQUIREMENTS MENTIONED PER OBC 9.10.5.1. (3).
4. REFRIGERATION:
   - A. DESIGN AND INSTALLATION OF REFRIGERATION SYSTEM SHALL BE IN ACCORDANCE WITH CSA B52 MECHANICAL REFRIGERATION CODE, ONTARIO BUILDING CODE, AHRI, AND EQUIPMENT MANUFACTURERS RECOMMENDATIONS.
   - B. NEW REFRIGERATION PIPING SHALL BE ACR SEAMLESS COPPER TUBING SUITABLE FOR AIR CONDITIONING OR REFRIGERATION SYSTEMS.
   - C. KEEP TUBING RUNS AND NUMBER OF ELBOWS AND FITTINGS TO A MINIMUM.
   - D. ENSURE TUBING IS DEHYDRATED, TESTED, ADEQUATELY CHARGED, AND GAS TIGHT.
   - E. PIPING SHALL BE INSULATED WITH FLEXIBLE ELASTOMERIC, CLOSED CELL, SLEEVE TYPE LONGITUDINALLY SPLIT SELF-SEAL FORMED PLASTIC PIPE INSULATION EQUAL TO ARMACELL AP/ARMAFLEX SS. INSULATION SHALL BE 25 MM (1") THICK.
   - F. COORDINATE AND RUN ALL REFRIGERANT LINES INSIDE DESIGNATED CAVITY. NO EXTERIOR RUNS PERMITTED UNLESS OTHERWISE INSTRUCTED.
5. FIRE STOPPING AND SMOKE SEAL SYSTEMS
   - A. ASBESTOS-FREE, ELASTOMERIC MATERIALS AND INTUMESCENT MATERIALS, TESTED, LISTED AND LABELLED BY ULC IN ACCORDANCE WITH CAN/ULC S115, AND CAN/ULC S101 FOR INSTALLATION IN ULC DESIGNATED FIRESTOPPING, AND SMOKE SEAL SYSTEMS TO PROVIDE A POSITIVE FIRE, WATER AND SMOKE SEAL AND A FIRE RESISTANCE RATING (FLAME, HOSE STREAM AND TEMPERATURE) NO LESS THAN FIRE RATING FOR SURROUNDING CONSTRUCTION.
   - B. FIRESTOPPING AND SMOKE SEAL MATERIAL SYSTEM TO BE SPECIFICALLY ULC CERTIFIED WITH DESIGNATED REFERENCE NUMBER FOR ITS SPECIFIC INSTALLATION.
   - C. SMOKE AND FIRE SEAL MATERIALS AND MANUFACTURERS MUST BE SPECIFICALLY APPROVED FOR EACH APPLICATION OF PENETRATED SURFACES, AS APPROVED BY FM GLOBAL AND LISTED IN FM GLOBAL APPROVAL GUIDE. LISTED COMPANIES HEREIN AND OTHER MANUFACTURERS ARE ONLY ACCEPTABLE IF COMPLIANT WITH THESE REQUIREMENTS.
   - D. MATERIALS ARE TO BE COMPATIBLE WITH ABUTTING DISSIMILAR MATERIALS AND FINISHES AND COMPLETE WITH PRIMERS, DAMMING AND BACK-UP MATERIALS, SUPPORTS, AND ANCHORING DEVICES IN ACCORDANCE WITH FIRESTOPPING MANUFACTURER'S RECOMMENDATIONS AND ULC TESTED ASSEMBLY. COORDINATE MATERIAL REQUIREMENTS WITH TRADES SUPPLYING ABUTTING AREAS OF MATERIALS.
   - E. TYPICALLY, FOR OPENINGS OF UP TO 250 MM (10") IN DIAMETER, PROVIDE PUTTY PAD TYPE FIRESTOP MATERIALS INTUMESCENT, NON-HARDENING, WATER RESISTANT PUTTIES CONTAINING NO SOLVENTS, INORGANIC FIBRES OR SILICONE COMPOUNDS.
   - F. TYPICALLY, FOR OPENINGS OF GREATER THAN 250 MM (10") IN DIAMETER, AND FOR RECTANGULAR OPENINGS, PROVIDE PILLOW TYPE FIRESTOP MATERIALS RE-ENTERABLE, NON-CURING, MINERAL FIBRE CORE ENCAPSULATED ON SIX SIDES WITH INTUMESCENT COATING CONTAINED IN A FLAME RETARDANT POLY BAG.
   - G. SUPPLY PRODUCTS OF A SINGLE MANUFACTURER FOR USE ON WORK OF THIS DIVISION.
   - H. INSTALLER TO BE MANUFACTURER TRAINED AND CERTIFIED ON SPECIFIC PRODUCT.
   - I. INCLUDE FOR MANUFACTURER'S AUTHORIZED REPRESENTATIVE TO INSPECT AND VERIFY EACH INSTALLATION AND APPLICATION.
   - J. ACCEPTABLE CERTIFICATION TO ALSO INCLUDE CERTIFICATION BY UNDERWRITERS LABORATORIES OF NORTHBROOK IL, USING TESTS CONFORMING TO ULC-S115 AND GIVEN CUL LISTING PUBLISHED BY UL IN THEIR "PRODUCTS CERTIFIED FOR CANADA (CUL) DIRECTORY".

MECHANICAL EQUIPMENT - BASE OPTION

GAS FIRED FURNACE

1. GENERAL
   - A. FURNACES AND INSTALLATION OF FURNACES ARE TO BE IN ACCORDANCE WITH REQUIREMENTS OF FOLLOWING:
     - a. APPLICABLE PROVINCIAL CODES AND STANDARDS;
     - b. CAN/CSA B149.1, NATURAL GAS AND PROPANE INSTALLATION CODES.
   - B. FURNACE INSTALLATION TRADESMEN ARE TO BE JOURNEYMAN TRADESMEN LICENSED TO INSTALL GAS FIRED EQUIPMENT.
2. FURNACE
   - A. UNIT SHALL BE 96% AFUE EFFICIENT, CSA OR C-ETL CERTIFIED GAS FIRED WARM AIR FURNACE, FACTORY ASSEMBLED, AND PRE-WIRED.
   - B. INTERNALLY INSULATED CABINET CONSTRUCTED OF STEEL, FINISHED WITH BAKED POWDER EPOXY ENAMEL AND COMPLETE WITH ACCESS PANELS. DOWN-FLOW FURNACES ARE COMPLETE WITH A BASE SECTION AND COMBUSTIBLE FLOOR MOUNTING ADAPTOR.
   - C. TUBULAR DESIGN ALUMINIZED STEEL HEAT EXCHANGER WITH AN EXTENDED 10 YEAR MANUFACTURER'S WARRANTY, EQUIPPED WITH FLUE BOX AND A MOTORIZED COMBUSTION AIR INDUCER TO PRE-PURGE AND POST-PURGE HEAT EXCHANGER AND POSITIVELY VENT COMBUSTION PRODUCTS, AND AN ALUMINIZED STEEL INSHOT BURNER REMOVABLE FROM ASSEMBLY AS A SINGLE COMPONENT.
   - D. DIRECT DRIVE, MULTI-SPEED, STATICALLY AND DYNAMICALLY BALANCED, RESILIENTLY MOUNTED BLOWER WITH PERMANENTLY LUBRICATED OPEN DRIP-PROOF MOTOR CONFORMING TO REQUIREMENTS SPECIFIED IN SECTION ENTITLED BASIC MECHANICAL MATERIALS AND METHODS.
   - E. FACTORY INSTALLED AND PRE-WIRED CONTROLS COMPLETE WITH:
     - a. 24 VOLT REDUNDANT COMBINATION GAS VALVE WITH 100% SAFETY SHUT-OFF, MANUAL MAIN SHUT-OFF VALVE, PRESSURE REGULATOR, AND AUTOMATIC SOLENOID VALVE;
     - b. HOT SURFACE IGNITION AND A SEPARATE ELECTRONIC FLAME SENSOR TO INITIATE 3 ATTEMPTS TO RE-IGNITE AFTER LOSS OF FLAME, THEN LOCKS OUT UNIT OPERATION;
     - c. PRESSURE SWITCH TO PROVE ADEQUATE FLOW THROUGH VENTING;
     - d. HIGH TEMPERATURE LIMIT CONTROLS WITH A FIXED TEMPERATURE SETTING TO PROTECT FROM ABNORMAL OPERATING TEMPERATURES;
     - e. SOLID-STATE, INTEGRATED, COMBINATION IGNITION AND FAN CONTROL BOARD WITH FAN TIMER CONTROL, IGNITION CONTROL LED'S FOR STATUS AND TROUBLESHOOTING;
     - f. 120/24 VOLT CONTROL TRANSFORMER;
     - g. TERMINAL STRIPS FOR POWER AND 24 VOLT CONTROL CONNECTIONS;
     - h. CONTINUOUS LOW SPEED BLOWER CONTROL KIT TO OPERATE BLOWER CONTINUOUSLY ON LOW SPEED AND AUTOMATICALLY SWITCH UP TO RATED SPEED DURING HEATING CYCLE;
     - i. SUMMER-WINTER FAN SWITCH;
   - F. SLIDE-IN FILTER FRAMING WITH A MERV 7 DISPOSABLE FILTER AS WELL AS A SPARE FILTER SUPPLIED LOOSE IN ORIGINAL PACKAGING.
   - G. REMOTE WALL MOUNTING, 24 VOLT, ADJUSTABLE, 7 DAY PROGRAMMABLE, TAMPER-PROOF THERMOSTAT SUPPLIED LOOSE FOR SITE INSTALLATION, COMPLETE WITH THERMOMETER, DIGITAL DISPLAY, TIMED AND CONTINUOUS OVERRIDE, AND BATTERY BACK-UP

SPLIT DX COOLING SYSTEM:

1. FACTORY ASSEMBLED AND TESTED, PACKAGE TYPE SYSTEM CONSISTING OF A DIRECT EXPANSION EVAPORATIVE COIL AND AN EXTERIOR CONDENSING UNIT, CSA OR ETL LISTED AND LABELLED, AHRI RATED AND CERTIFIED AND WITH A MINIMUM SYSTEM EFFICIENCY OF 15 SEER.
2. DIRECT EXPANSION COOLING COIL:
   - A. THE COIL SHALL BE ALL ALUMINUM WITH COPPER CONNECTIONS;
   - B. UNIT COMPLETE WITH FACTORY INSTALLED THERMAL EXPANSION VALVE SUITABLE FOR COOLING APPLICATION;
   - C. COIL PROVIDED WITH AN ANTI-MICROBIAL, RUST RESISTANT DRAIN PAN.
3. AIR COOLED CONDENSING UNIT:
   - A. CABINET SHALL BE CONSTRUCTED OF HEAVY-GAUGE GALVANIZED STEEL C/W BAKED-ON POWDER-PAINT FINISH;
   - B. UNIT COMPLETE WITH HIGH EFFICIENCY TWO-STAGE SCROLL COMPRESSOR, HIGH DENSITY FOAM COMPRESSOR SOUND BLANKET, COPPER TUBE/ALUMINUM FIN COIL, AND QUIET TWO-SPEED ECM OUTDOOR FAN MOTOR;
   - C. UNIT SHALL BE PROVIDED WITH FACTORY INSTALLED FILTER DRIER, AMBIENT TEMPERATURE SENSOR, TRANSFORMER, AND HIGH AND LOW-PRESSURE SWITCHES.

ENERGY RECOVERY VENTILATOR (ERV)

1. UNIT SHALL BE FACTORY ASSEMBLED, WIRED AND TESTED AND SHALL CONFORM TO CSA AND UL STANDARDS.
2. UNIT SHALL BE COMPACT WITH A LOW PROFILE SUITABLE FOR INSTALLATION IN BULKHEADS AND DROPPED CEILINGS.
3. CABINET SHALL BE CONSTRUCTED OF 22-GAUGE PRE-PAINTED GALVANIZED STEEL FOR CORROSION RESISTANCE AND INSULATED TO PREVENT EXTERIOR CONDENSATION. CABINET SHALL BE COMPLETE WITH DRAIN CONNECTIONS, BALANCING PORTS, AND THREADED INSERTS TO ACCEPT S-HOOKS AND HANGING STRAPS SUPPLIED WITH UNIT.
4. ENERGY RECOVERY ASSEMBLY SHALL BE THERMALLY CONDUCTIVE, ALUMINUM CROSS-FLOW ENERGY RECOVERY CORE WITH MINIMUM SRE OF 75%. THE CORE SHALL BE EASILY REMOVABLE FOR CLEANING AND SERVICE.
5. UNIT COMPLETE WITH WASHABLE MERV-6 AIR FILTERS LOCATED IN EXHAUST AND SUPPLY AIR STREAMS.
6. EACH AIRSTREAM HAS AN INDEPENDENT CENTRIFUGAL HIGH EFFICIENCY ECM BLOWER WITH MULTIPLE FAN SPEED OPERATION.
7. DEFROST MODE: SUPPLY AIR SHUTS OFF TO DEFROST CORE WITH WARM EXHAUST AIR AT HIGH SPEED.
8. UNIT COMPLETE WITH WALL MOUNT CONTROLLER WITH SELECTABLE ON/OFF, AND FAN SPEED SETTINGS.

ELECTRIC DOMESTIC HOT WATER TANK

1. CSA CERTIFIED ELECTRIC DOMESTIC HOT WATER TANK AND HEATER WITH MINIMUM EF RATING OF 0.8, AND COMPLETE WITH:
   - A. 1035 KPA (150 PSI) RATED (WORKING PRESSURE) STEEL TANK, GLASS LINED, INSULATED (EXCEPT FOR CONTROL PANEL AREA) WITH INJECTED MINIMUM R-16 FOAM INSULATION, COVERED WITH AN ENAMELLED STEEL JACKET, AND EQUIPPED WITH 40 MM (1-½") DIA. NPS BRASS NIPPLE WATER INLET AND OUTLET CONNECTIONS, A DRAIN VALVE, AND SACRIFICIAL ANODE RODS;
   - B. REMOVABLE MULTIPLE IMMERSION HEATING ELEMENTS, EACH CONSISTING OF A WIRE FILAMENT IN A SEALED STAINLESS STEEL SHEATH;
   - C. ASME RATED TEMPERATURE AND PRESSURE RELIEF VALVE;
   - D. FACTORY PRE-WIRED POWER AND CONTROL PANEL.
2. EQUIP ENAMELLED STEEL VENTILATED CONTROL PANEL WITH REMOVABLE GLASS FIBRE INSULATION TO COVER BARE AREA OF TANK, A HINGED DOOR, MULTIPLE KNOCKOUTS, A GROUND SCREW, AND FOLLOWING:
   - A. TERMINAL BLOCK FOR POWER WIRING CONNECTIONS;
   - B. MAGNETIC CONTACTORS FOR HEATING ELEMENTS;
   - C. ADJUSTABLE IMMERSION THERMOSTAT;
   - D. MANUAL RESET IMMERSED HIGH TEMPERATURE LIMIT CONTROL FOR EACH ELEMENT;
   - E. FUSE BLOCK WITH FUSES;
   - F. ELEMENT DIAGNOSTIC PANEL WITH LED'S FOR EACH ELEMENT TO MONITOR ON-OFF OPERATION OF EACH ELEMENT;

TOILET EXHAUST FANS

1. CEILING EXHAUST FAN SHALL BE HVI CERTIFIED AND IN ACCORDANCE WITH THE FOLLOWING REQUIREMENTS:
2. 26 GAUGE ZINC-ALUMINUM-MAGNESIUM (ZAM) HOUSING C/W INTEGRATED 6" DUCT ADAPTOR, BUILT-IN DAMPER AND BUILT IN METAL FLANGE;
3. FAN C/W POLY PRO MATERIAL AND ATTACHES DIRECTLY TO HOUSING WITH TORSION SPRINGS;
4. MOTOR BE TO TOTALLY ENCLOSED WITH A BRUSHLESS ECM MOTOR TECHNOLOGY RATED FOR CONTINUOUS RUN AND EQUIPPED WITH THERMAL-CUTOFF FUSE. MOTOR TO BE REMOVABLE WITH PERMANENTLY LUBRICATED PLUG-IN MOTOR;
5. FAN VENTILATION RATES SHALL BE MANUALLY ADJUSTABLE;
6. FAN SHALL BE UL AND CUL LISTED FOR TUB/SHOWER ENCLOSURE WHEN GFCI PROTECTED.

DRYER EXHAUST

1. DRYER BOOSTER FAN SHALL BE HVI CERTIFIED AND IN ACCORDANCE WITH THE FOLLOWING REQUIREMENTS:
   - A. 26-GAUGE GALVANISED STEEL HOUSING SUPPLIED WITH VIBRATION ISOLATION TO SUIT MOUNTING;
   - B. ROUND INLET AND DISCHARGE COLLAR;
   - C. FIELD WIRING COMPARTMENT WITH REMOVABLE ACCESS PANEL;
   - D. BACKWARDLY-INCLINED, SELF-CLEANING IMPELLER, FULLY-SEALED IMPELLER ASSEMBLY WITH AUTOMATIC-RESET THERMAL OVERLOAD PROTECTION, AND PERMANENTLY-LUBRICATED MOTOR;
   - E. ACCESSORIES:
     - a. AMP SENSOR (CURRENT-SENSING RELAY SWITCH);
     - b. LINT TRAP;
     - c. WALL BOX.

KITCHEN RANGE HOOD

1. DUCTED RANGE HOODS, CSA CERTIFIED, ROTARY SOLID STATE SPEED CONTROL PROVIDING INFINITE RANGE, ROTARY LIGHT CONTROL SWITCH, BACKDRAFT DAMPER, WITH LIGHT LENS AND PERMANENT, WASHABLE ALUMINUM MESH GREASE FILTER(S).

CMHC SCHL

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NO.	DATE	DESCRIPTION
1	2025/02/25	ISSUED AS PROTOTYPICAL DRAWING

PROJECT:

CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT OR CONSTRUCTION

SHEET TITLE:

MECHANICAL OUTLINE SPECIFICATIONS - BASE OPTION

PROJECT NO: 24112

SCALE: NTS

SHEET NO:

M001A

MECHANICAL OUTLINE SPECIFICATIONS - ALTERNATE OPTION 1

1. PRIMARY HEAT FROM STANDARD AIR SOURCE HEAT PUMP COIL IN GAS FIRED FURNANCE.
2. SUPPLEMENTAL HEAT FROM GAS FURNACE AT COLDER TEMPERATURES.
3. COOLING THROUGH STANDARD AIR SOURCE HEAT PUMP COIL.
4. ELECTRIC DOMESTIC HOT WATER TANK.

DESIGN CRITERIA AND REQUIREMENTS

1. THE MECHANICAL SYSTEMS SHALL BE DESIGNED IN ACCORDANCE WITH THE ONTARIO BUILDING CODE (OBC), SPECIFIC REQUIREMENTS OF THE LOCAL AUTHORITY HAVING JURISDICTION, DESIGN PRINCIPLES AND STANDARDS OBTAINED FROM THE OWNER AND DESIGN TEAM AS WELL AS STANDARDS OF GOOD ENGINEERING PRACTICES.
2. WORK SHALL BE COMPLETED IN ACCORDANCE WITH STANDARDS PUBLISHED BY THE FOLLOWING PARTIAL LIST OF AUTHORITIES:
   - A. THERMAL ENVIRONMENTAL CONDITIONS FOR HUMAN OCCUPANCY, ANSI/ASHRAE STANDARD 55 (LATEST EDITION);
   - B. VENTILATION REQUIREMENTS TO BE BASED ON MOST CURRENT OBC PART 9 TABLE 9.32.3.3.
   - C. HANDBOOKS PUBLISHED BY AMERICAN SOCIETY OF HEATING, REFRIGERATION AND AIR CONDITIONING ENGINEERS (ASHRAE).
3. HEATING AND COOLING CALCULATIONS TO BE BASED ON MOST CURRENT CLIMATICAL DATA (SB-1) AND ENERGY EFFICIENCY OF HOUSING COMPLIANCE PACKAGES (SB-12) PUBLISHED IN THE ONTARIO BUILDING CODE AND SHALL BE COMPLETED IN ACCORDANCE WITH THE STANDARD CAN/CSA-F280-12 (R2021) TO DETERMINE THE SIZE/CAPACITY OF THE HEATING/AIR CONDITIONING SYSTEMS.
   - A. ALL OCCUPIED AREAS WILL BE AIR CONDITIONED WITH THE FOLLOWING ENVIRONMENTAL CONDITIONS;
     - a. WINTER: 22.0°C ± 1°C AND 20% ± 5% RELATIVE HUMIDITY
     - b. SUMMER: 24.0°C ± 1°C AND 60% ± 5% RELATIVE HUMIDITY
4. ALL UNPROTECTED MECHANICAL PENETRATIONS ON EXPOSING BUILDING FACE MORE THAN 130MM2 SHALL BE COORDINATED WITH DESIGNER AND NOTED ON ARCHITECTURAL DRAWINGS AS PER OBC 9.10.14.6.

SITE SERVICES

1. NATURAL GAS SERVICE:
   - A. ONE (1) UTILITY NATURAL GAS SERVICE WILL BE PROVIDED TO THE BUILDING AND RUN TO INDIVIDUAL GAS METERS PROVIDED FOR EACH RESIDENTIAL UNIT.
   - B. GROUP AND LOCATE GAS METERS ABOVE GRADE ON ONE SIDE OF THE BUILDING AGAINST AN EXTERIOR WALL. RUN INDIVIDUAL GAS LINES FROM GAS METERS TO THE RESPECTIVE RESIDENTIAL UNITS.
   - C. THE NATURAL GAS SYSTEM DESIGN AND INSTALLATION SHALL COMPLY WITH THE LATEST REQUIREMENTS OF CSA B149, NFPA STANDARDS, OBC, AND LOCAL REGULATORY REQUIREMENTS.
   - D. MATERIAL:
     - a. UNDERGROUND PIPING SHALL BE COATED BLACK STEEL "YELLOW JACKET" SCHEDULE 40 MILD BLACK CARBON STEEL; OR, SAFETY YELLOW COLOURED POLYETHYLENE PIPE, FITTINGS, AND JOINTS TO CSA B137.4; OR, COATED TYPE "K" SOFT TEMPER COPPER WITH FACTORY APPLIED EXTERNAL YELLOW LPASTIC COATING, STAMPED WITH DESIGNATION C37700 TO INDICATE FORGED BRASS.
     - b. EXPOSED SCREW PIPING TO BE SCHEDULE 40 MILD BLACK CARBON STEEL, ASTM A53 GRADE B COMPLETE WITH MALLEABLE CAST IRON SCREWED FITTINGS TO ANSI B2.1, AND SCREWED JOINTS.
     - c. EXPOSED WELDED PIPING TO BE SCHEDULE 40 MILD BLACK CARBON STEEL, ASTM A53 GRADE B, MILL OR SITE BEVELLED, COMPLETE WITH FACTORY MADE FORGED STEEL BUTT WELDING FITTINGS AND WELDED JOINTS.
2. WATER SERVICES:
   - A. ONE (1) POTABLE WATER SERVICE WILL BE PROVIDED TO THE BUILDING THEN THE SERVICE WILL SPLIT AND RUN TO INDIVIDUAL UTILITY METER INSIDE EACH RESIDENTIAL UNIT.
3. SANITARY SEWERS:
   - A. ONE (1) SANITARY SERVICE CONNECTION WILL BE PROVIDED TO THE BUILDING COMPLETE WITH SAMPLING PORT IN COORDINATION WITH THE SITE SERVICE ENGINEER. COORDINATE LOCATION AND INVERT OF INCOMING CONNECTION WITH SITE SERVICES CONSULTANT.
   - B. ROOF GUTTERS TO BE PIPED AND ROUTED DOWN THE SIDE OF THE BUILDING TO SPILL ON GRADE.

PLUMBING AND DRAINAGE

1. POTABLE WATER:
   - A. AN INCOMING POTABLE WATER CONNECTION COMPLETED WITH A METER ASSEMBLY WILL SUPPLY WATER TO EACH RESIDENTIAL UNIT. OPTIONAL WATER FILTRATION INCLUDING CARBON ACTIVATED FILTERS, UV AND RO CAN BE PROVIDED IN AREAS WHERE WATER QUALITY IS OF CONCERN.
   - B. POLYETHYLENE PEX PIPING WILL BE PROVIDED TO DISTRIBUTE COLD AND HOT WATER THROUGHOUT THE UNIT.
     - a. TUBE SHALL BE CROSS-LINKED POLYETHYLENE (PEX) MANUFACTURED BY PEX-A OR PEROXIDE METHOD. PEX TUBING SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM F876, ASTM F877 AND CAN/CSA-B137.5. THE TUBE SHALL BE LISTED TO ASTM BY AN INDEPENDENT THIRD PARTY AGENCY.
     - b. FITTINGS SHALL BE MANUFACTURED OF ENGINEERED PLASTIC (EP). FITTINGS SHALL BE PEX-A COLD EXPANSION TYPE CERTIFIED TO ASTM F1960.
       - (1)FITTINGS SHALL BE SUPPLIED BY THE PEX TUBING MANUFACTURER.
       - (2)PEX-A COLD EXPANSION TYPE FITTINGS SHALL BE AN ASSEMBLY CONSISTING OF INSERT AND PEX-A COLD EXPANSION RING.
       - (3)FITTING TYPE: UPONOR ENGINEERED PLASTIC (EP).
2. DRAINAGE:
   - A. ALL SANITARY DRAIN AND MAIN VENT STACKS SHALL BE PLASTIC ABS WITH GLUED CONNECTIONS. WHERE REQUIRED TO MEET FIRE SPREAD AND SMOKE DEVELOPMENT RATINGS METALLIC PIPING OR XFR PIPING IS TO BE PROVIDED BASED ON LOCAL JURISDICTION APPROVAL.
   - B. UNDERGROUND DRAINAGE PIPING SHALL BE PVC DR35 RIGID SEWER PIPING. PIPING 4" AND LARGER TO BE GREEN PVC HUB AND SPIGOT SEWER PIPE AND FITTINGS TO CAN/CSA B182.2. SIZE 3" PIPE TO BE PVC WITH SOLVENT WELD JOINTS CERTIFIED TO CSA B182.1 AND COLOUR CODED AS PER LOCAL CODES.
3. DOMESTIC HOT WATER PRODUCTION:
   - A. AN ELECTRIC DOMESTIC HOT WATER (DHW) TANK WILL BE PROVIDED FOR EACH RESIDENTIAL UNIT.
   - B. DOMESTIC HOT WATER SHALL BE STORED AT A MINIMUM OF 52°C (125°F).
   - C. A MIXING VALVE SHALL BE PROVIDED TO SUPPLY 49°C (120°F) DOMESTIC HOT WATER TO THE FIXTURES.
4. PRESSURE BALANCING TYPE MIXING VALVES SHALL BE PROVIDED FOR ALL SHOWERS.
5. DRAIN WATER HEAT RECOVERY COIL SHALL BE PROVIDED FOR EACH MULTI-STOREY UNIT.
6. PLUMBING FIXTURES SHALL BE LOW FLOW AND OF FIRST QUALITY.
7. SANITARY DRAINS WILL BE COLLECTED AND CONNECTED TO THE MUNICIPAL SANITARY NETWORK. UNLESS OTHERWISE NOTED, SLOPE ALL 75 MM (3") DRAINAGE PIPING AT 2% SLOPE AND ALL 100 MM (4") AND LARGER DRAINAGE PIPING AT 1% SLOPE.

HEATING, VENTILATION, AND AIR CONDITIONING (HVAC)

1. HEATING AND COOLING SYSTEMS:
   - A. HEATING AND COOLING WILL BE PRODUCED BY A 96% EFFICIENT GAS FURNACE COMPLETE WITH A STANDARD AIR SOURCE HEAT PUMP COIL. THE HEAT PUMP COIL WILL OPERATE IN HEATING MODE UNTIL -5°C (23°F) WITH THE GAS FURNACE OPERATING AT THE LOWER OUTDOOR TEMPERATURES.
   - B. THE CAPACITY OF THE GAS FURNACE SHALL BE SIZED AND SELECTED TO MEET THE FULL HEATING LOAD REQUIREMENT OF THE RESIDENTIAL UNIT.
   - C. THE CAPACITY OF THE HEAT PUMP COIL SHALL BE SIZED AND SELECTED TO MEET THE HEATING LOAD DOWN TO OUTDOOR AIR TEMPERATURE OF -5°C (23°F) AND THE FULL COOLING LOAD OF THE RESIDENTIAL UNIT.
   - D. THE GAS FURNACE TO BE COMPLETE WITH MINIMUM MERV 8 FILTRATION.
   - E. THE OUTDOOR HEAT PUMP CONDENSER IS TO BE LOCATED WITHIN CLOSE PROXIMITY TO THE INDOOR UNIT AND CONNECTED WITH REFRIGERANT PIPING. THE OUTDOOR HEAT PUMP CONDENSER WILL BE ABLE TO OPERATE FROM -5°C (23°F) TO 35°C (95°F).
   - F. PROPANE OR NATURAL GAS SERVICE WITH METER SHALL BE PROVIDED TO SERVE THE FURNACE.
2. VENTILATION AND EXHAUST SYSTEMS:
   - A. VENTILATION AIR WILL BE PROVIDED BY AN ENERGY RECOVERY VENTILATOR (ERV) THAT WILL TRANSFER ENERGY FROM THE PRIMARY BATHROOM EXHAUST TO PRE-CONDITION OUTDOOR AIR THAT WILL BE DUCTED BACK TO THE INDOOR UNIT. SIZE OF ERV TO BE DETERMINED BASED ON OBC PART 9 REQUIREMENT. ERV PERFORMANCE SHALL HAVE A MINIMUM OF 75% EFFECTIVENESS. WHERE REQUIRED, AN ELECTRIC DUCT HEATER SHALL BE PROVIDED. THE ERV SHALL BE CONTROLLED BY A LOCAL TIMER SWITCH.
   - B. SECONDARY WASHROOMS WILL BE PROVIDED WITH DEDICATED CEILING MOUNTED TOILET EXHAUST FANS COMPLETE WITH LOCAL SWITCH.
   - C. CLOTHES DRYERS WILL BE PROVIDED WITH A LINT TRAP AND DRYER BOOSTER FAN CONNECTED TO A CURRENT SENSOR TO AID IN DRYER EXHAUST. LINT TRAPS WILL BE PROVIDED ON THE SUCTION SIDE OF THE FAN WITHIN THE SUITE LAUNDRY ROOM.
   - D. KITCHEN HOOD EXHAUSTS WILL BE SIZED FOR MINIMUM 150 CFM AND DUCTED TO OUTDOORS.
   - E. ALL EXHAUST DUCTWORK WILL BE DISCHARGED TO THE EXTERIOR THROUGH THE EXTERIOR WALLS OF THE UNIT OR THROUGH THE ROOF FOR THE TOP LEVEL.
   - F. EXHAUST DUCTWORK SHALL BE INSULATED FOR THE FIRST 10FT FROM THE EXTERIOR LOUVRE.
3. AIR DISTRIBUTION:
   - A. DUCTWORK SHALL BE GALVANIZED SHEET METAL UNLESS OTHERWISE INDICATED. DUCTS SHALL BE SIZED AT A PRESSURE DROP OF 0.08" (20PA) PER 100' (30.5M) WITH MAXIMUM AIR VELOCITIES OF 1400 FEET (427M) PER MINUTE.
   - B. DUCTWORK TO BE INSULATED TO MEET ASHRAE 90.1 AND THE GOVERNING AUTHORITY REQUIREMENTS.
   - C. PROVIDE ACOUSTIC LINING FOR ALL SUPPLY AND RETURN AIR DUCTWORK SERVING MECHANICAL EQUIPMENT WITH FANS TO A MAXIMUM OF 4.5M (15') FROM THE EQUIPMENT, MEASURED OUTWARD IN ALL DIRECTIONS.
   - D. SUPPLY AIR FROM THE INDOOR UNIT SHALL BE DUCTED TO EACH ROOM VIA 200X100 SIDEWALL GRILLES OR FLOOR REGISTERS.
   - E. EACH ROOM SHALL HAVE A RETURN AIR GRILLE OR AN 1" (25MM) DOOR UNDERCUT FOR AIR TRANSFER.
   - F. PROVIDE BALANCING DAMPERS AT ALL DUCT BRANCHES FOR AIR BALANCING.
   - G. A PROGRAMMABLE THERMOSTAT WITH OCCUPANCY SENSOR SHALL BE PROVIDED TO CONTROL THE SUITE HVAC SYSTEM.
   - H. DUCTWORK PENETRATING CEILING MEMBRANES REQUIRED TO HAVE A FIRE-RESISTANCE RATING SHALL CONFORM TO REQUIREMENTS MENTIONED PER OBC 9.10.5.1. (3).
4. REFRIGERATION:
   - A. DESIGN AND INSTALLATION OF REFRIGERATION SYSTEM SHALL BE IN ACCORDANCE WITH CSA B52 MECHANICAL REFRIGERATION CODE, ONTARIO BUILDING CODE, AHRI, AND EQUIPMENT MANUFACTURERS RECOMMENDATIONS.
   - B. NEW REFRIGERATION PIPING SHALL BE ACR SEAMLESS COPPER TUBING SUITABLE FOR AIR CONDITIONING OR REFRIGERATION SYSTEMS.
   - C. KEEP TUBING RUNS AND NUMBER OF ELBOWS AND FITTINGS TO A MINIMUM.
   - D. ENSURE TUBING IS DEHYDRATED, TESTED, ADEQUATELY CHARGED, AND GAS TIGHT.
   - E. PIPING SHALL BE INSULATED WITH FLEXIBLE ELASTOMERIC, CLOSED CELL, SLEEVE TYPE LONGITUDINALLY SPLIT SELF-SEAL FORMED PLASTIC PIPE INSULATION EQUAL TO ARMACELL AP/ARMAFLEX SS. INSULATION SHALL BE 25 MM (1") THICK.
   - F. COORDINATE AND RUN ALL REFRIGERANT LINES INSIDE DESIGNATED CAVITY. NO EXTERIOR RUNS PERMITTED UNLESS OTHERWISE INSTRUCTED.
5. FIRE STOPPING AND SMOKE SEAL SYSTEMS
   - A. ASBESTOS-FREE, ELASTOMERIC MATERIALS AND INTUMESCENT MATERIALS, TESTED, LISTED AND LABELLED BY ULC IN ACCORDANCE WITH CAN/ULC S115, AND CAN/ULC S101 FOR INSTALLATION IN ULC DESIGNATED FIRESTOPPING, AND SMOKE SEAL SYSTEMS TO PROVIDE A POSITIVE FIRE, WATER AND SMOKE SEAL AND A FIRE RESISTANCE RATING (FLAME, HOSE STREAM AND TEMPERATURE) NO LESS THAN FIRE RATING FOR SURROUNDING CONSTRUCTION.
   - B. FIRESTOPPING AND SMOKE SEAL MATERIAL SYSTEM TO BE SPECIFICALLY ULC CERTIFIED WITH DESIGNATED REFERENCE NUMBER FOR ITS SPECIFIC INSTALLATION.
   - C. SMOKE AND FIRE SEAL MATERIALS AND MANUFACTURERS MUST BE SPECIFICALLY APPROVED FOR EACH APPLICATION OF PENETRATED SURFACES, AS APPROVED BY FM GLOBAL AND LISTED IN FM GLOBAL APPROVAL GUIDE. LISTED COMPANIES HEREIN AND OTHER MANUFACTURERS ARE ONLY ACCEPTABLE IF COMPLIANT WITH THESE REQUIREMENTS.
   - D. MATERIALS ARE TO BE COMPATIBLE WITH ABUTTING DISSIMILAR MATERIALS AND FINISHES AND COMPLETE WITH PRIMERS, DAMMING AND BACK-UP MATERIALS, SUPPORTS, AND ANCHORING DEVICES IN ACCORDANCE WITH FIRESTOPPING MANUFACTURER'S RECOMMENDATIONS AND ULC TESTED ASSEMBLY. COORDINATE MATERIAL REQUIREMENTS WITH TRADES SUPPLYING ABUTTING AREAS OF MATERIALS.
   - E. TYPICALLY, FOR OPENINGS OF UP TO 250 MM (10") IN DIAMETER, PROVIDE PUTTY PAD TYPE FIRESTOP MATERIALS INTUMESCENT, NON-HARDENING, WATER RESISTANT PUTTIES CONTAINING NO SOLVENTS, INORGANIC FIBRES OR SILICONE COMPOUNDS.
   - F. TYPICALLY, FOR OPENINGS OF GREATER THAN 250 MM (10") IN DIAMETER, AND FOR RECTANGULAR OPENINGS, PROVIDE PILLOW TYPE FIRESTOP MATERIALS RE-ENTERABLE, NON-CURING, MINERAL FIBRE CORE ENCAPSULATED ON SIX SIDES WITH INTUMESCENT COATING CONTAINED IN A FLAME RETARDANT POLY BAG.
   - G. SUPPLY PRODUCTS OF A SINGLE MANUFACTURER FOR USE ON WORK OF THIS DIVISION.
   - H. INSTALLER TO BE MANUFACTURER TRAINED AND CERTIFIED ON SPECIFIC PRODUCT.
   - I. INCLUDE FOR MANUFACTURER'S AUTHORIZED REPRESENTATIVE TO INSPECT AND VERIFY EACH INSTALLATION AND APPLICATION.
   - J. ACCEPTABLE CERTIFICATION TO ALSO INCLUDE CERTIFICATION BY UNDERWRITERS LABORATORIES OF NORTHBROOK IL, USING TESTS CONFORMING TO ULC-S115 AND GIVEN CUL LISTING PUBLISHED BY UL IN THEIR "PRODUCTS CERTIFIED FOR CANADA (CUL) DIRECTORY".

MECHANICAL EQUIPMENT - ALTERNATE OPTION 1

GAS FIRED FURNACE

1. GENERAL
   - A. FURNACES AND INSTALLATION OF FURNACES ARE TO BE IN ACCORDANCE WITH REQUIREMENTS OF FOLLOWING:
     - a. APPLICABLE PROVINCIAL CODES AND STANDARDS;
     - b. CAN/CSA B149.1, NATURAL GAS AND PROPANE INSTALLATION CODES.
   - B. FURNACE INSTALLATION TRADESMEN ARE TO BE JOURNEYMAN TRADESMEN LICENSED TO INSTALL GAS FIRED EQUIPMENT.
2. FURNACE
   - A. UNIT SHALL BE 96% AFUE EFFICIENT, CSA OR C-ETL CERTIFIED GAS FIRED WARM AIR FURNACE, FACTORY ASSEMBLED, PRE-WIRED.
   - B. INTERNALLY INSULATED CABINET CONSTRUCTED OF STEEL, FINISHED WITH BAKED POWDER EPOXY ENAMEL AND COMPLETE WITH ACCESS PANELS. DOWN-FLOW FURNACES ARE COMPLETE WITH A BASE SECTION AND COMBUSTIBLE FLOOR MOUNTING ADAPTOR.
   - C. TUBULAR DESIGN ALUMINIZED STEEL HEAT EXCHANGER WITH AN EXTENDED 10 YEAR MANUFACTURER'S WARRANTY, EQUIPPED WITH FLUE BOX AND A MOTORIZED COMBUSTION AIR INDUCER TO PRE-PURGE AND POST-PURGE HEAT EXCHANGER AND POSITIVELY VENT COMBUSTION PRODUCTS, AND AN ALUMINIZED STEEL INSHOT BURNER REMOVABLE FROM ASSEMBLY AS A SINGLE COMPONENT.
   - D. DIRECT DRIVE, MULTI-SPEED, STATICALLY AND DYNAMICALLY BALANCED, RESILIENTLY MOUNTED BLOWER WITH PERMANENTLY LUBRICATED OPEN DRIP-PROOF MOTOR CONFORMING TO REQUIREMENTS SPECIFIED IN SECTION ENTITLED BASIC MECHANICAL MATERIALS AND METHODS.
   - E. FACTORY INSTALLED AND PRE-WIRED CONTROLS COMPLETE WITH:
     - a. 24 VOLT REDUNDANT COMBINATION GAS VALVE WITH 100% SAFETY SHUT-OFF, MANUAL MAIN SHUT-OFF VALVE, PRESSURE REGULATOR, AND AUTOMATIC SOLENOID VALVE;
     - b. HOT SURFACE IGNITION AND A SEPARATE ELECTRONIC FLAME SENSOR TO INITIATE 3 ATTEMPTS TO RE-IGNITE AFTER LOSS OF FLAME, THEN LOCKS OUT UNIT OPERATION;
     - c. PRESSURE SWITCH TO PROVE ADEQUATE FLOW THROUGH VENTING;
     - d. HIGH TEMPERATURE LIMIT CONTROLS WITH A FIXED TEMPERATURE SETTING TO PROTECT FROM ABNORMAL OPERATING TEMPERATURES;
     - e. SOLID-STATE, INTEGRATED, COMBINATION IGNITION AND FAN CONTROL BOARD WITH FAN TIMER CONTROL, IGNITION CONTROL LED'S FOR STATUS AND TROUBLESHOOTING;
     - f. 120/24 VOLT CONTROL TRANSFORMER;
     - g. TERMINAL STRIPS FOR POWER AND 24 VOLT CONTROL CONNECTIONS;
     - h. CONTINUOUS LOW SPEED BLOWER CONTROL KIT TO OPERATE BLOWER CONTINUOUSLY ON LOW SPEED AND AUTOMATICALLY SWITCH UP TO RATED SPEED DURING HEATING CYCLE;
     - i. SUMMER-WINTER FAN SWITCH;
   - F. SLIDE-IN FILTER FRAMING WITH A MERV 7 DISPOSABLE FILTER AS WELL AS A SPARE FILTER SUPPLIED LOOSE IN ORIGINAL PACKAGING.
   - G. REMOTE WALL MOUNTING, 24 VOLT, ADJUSTABLE, 7 DAY PROGRAMMABLE, TAMPER-PROOF THERMOSTAT SUPPLIED LOOSE FOR SITE INSTALLATION, COMPLETE WITH THERMOMETER, DIGITAL DISPLAY, TIMED AND CONTINUOUS OVERRIDE, AND BATTERY BACK-UP

STANDARD AIR SOURCE HEAT PUMP SYSTEM

1. FACTORY ASSEMBLED AND TESTED, PACKAGE TYPE SYSTEM CONSISTING OF A DIRECT EXPANSION EVAPORATIVE COIL AND AN EXTERIOR CONDENSING UNIT, CSA OR ETL LISTED AND LABELLED, AHRI RATED AND CERTIFIED AND WITH A MINIMUM SYSTEM EFFICIENCY OF 15 SEER AND 7.5 HSPF.
2. DIRECT EXPANSION HEAT PUMP COIL:
   - A. THE COIL SHALL BE ALL ALUMINUM WITH COPPER CONNECTIONS;
   - B. UNIT COMPLETE WITH FACTORY INSTALLED THERMAL EXPANSION VALVE SUITABLE FOR HEAT PUMP APPLICATION;
   - C. COIL PROVIDED WITH AN ANTI-MICROBIAL, RUST RESISTANT DRAIN PAN.
3. HEAT PUMP CONDENSING UNIT:
   - A. CABINET SHALL BE CONSTRUCTED OF HEAVY-GAUGE GALVANIZED STEEL C/W BAKED-ON POWDER-PAINT FINISH;
   - B. UNIT COMPLETE WITH HIGH EFFICIENCY TWO-STAGE SCROLL COMPRESSOR, HIGH DENSITY FOAM COMPRESSOR SOUND BLANKET, COPPER TUBE/ALUMINUM FIN COIL, AND QUIET TWO-SPEED ECM OUTDOOR FAN MOTOR;
   - C. UNIT SHALL BE PROVIDED WITH FACTORY INSTALLED BI-FLOW LIQUID-LINER FILTER DRIER, SUCTION-LINE ACCUMULATOR, COMPRESSOR CRANKCASE HEATER, HIGH-CAPACITY MUFFLER, COIL AND AMBIENT TEMPERATURE SENSORS, TRANSFORMER, AND HIGH AND LOW-PRESSURE SWITCHES;
   - D. UNIT COMPLETE WITH TIME-DELAY TECHNOLOGY WITH SHORT-CYCLE PROTECTION TO ENSURE QUIET, RELIABLE DEFROST.

ENERGY RECOVERY VENTILATOR (ERV)

1. UNIT SHALL BE FACTORY ASSEMBLED, WIRED AND TESTED AND SHALL CONFORM TO CSA AND UL STANDARDS.
2. UNIT SHALL BE COMPACT WITH A LOW PROFILE SUITABLE FOR INSTALLATION IN BULKHEADS AND DROPPED CEILINGS.
3. CABINET SHALL BE CONSTRUCTED OF 22-GAUGE PRE-PAINTED GALVANIZED STEEL FOR CORROSION RESISTANCE AND INSULATED TO PREVENT EXTERIOR CONDENSATION. CABINET SHALL BE COMPLETE WITH DRAIN CONNECTIONS, BALANCING PORTS, AND THREADED INSERTS TO ACCEPT S-HOOKS AND HANGING STRAPS SUPPLIED WITH UNIT.
4. ENERGY RECOVERY ASSEMBLY SHALL BE THERMALLY CONDUCTIVE, ALUMINUM CROSS-FLOW ENERGY RECOVERY CORE WITH MINIMUM SRE OF 75%. THE CORE SHALL BE EASILY REMOVABLE FOR CLEANING AND SERVICE.
5. UNIT COMPLETE WITH WASHABLE MERV-6 AIR FILTERS LOCATED IN EXHAUST AND SUPPLY AIR STREAMS.
6. EACH AIRSTREAM HAS AN INDEPENDENT CENTRIFUGAL HIGH EFFICIENCY ECM BLOWER WITH MULTIPLE FAN SPEED OPERATION.
7. DEFROST MODE: SUPPLY AIR SHUTS OFF TO DEFROST CORE WITH WARM EXHAUST AIR AT HIGH SPEED.
8. UNIT COMPLETE WITH WALL MOUNT CONTROLLER WITH SELECTABLE ON/OFF, AND FAN SPEED SETTINGS.

ELECTRIC DOMESTIC HOT WATER TANK

1. CSA CERTIFIED ELECTRIC DOMESTIC HOT WATER TANK AND HEATER WITH MINIMUM EF RATING OF 0.8, AND COMPLETE WITH:
   - A. 1035 KPA (150 PSI) RATED (WORKING PRESSURE) STEEL TANK, GLASS LINED, INSULATED (EXCEPT FOR CONTROL PANEL AREA) WITH INJECTED MINIMUM R-16 FOAM INSULATION, COVERED WITH AN ENAMELLED STEEL JACKET, AND EQUIPPED WITH 40 MM (1-½") DIA. NPS BRASS NIPPLE WATER INLET AND OUTLET CONNECTIONS, A DRAIN VALVE, AND SACRIFICIAL ANODE RODS;
   - B. REMOVABLE MULTIPLE IMMERSION HEATING ELEMENTS, EACH CONSISTING OF A WIRE FILAMENT IN A SEALED STAINLESS STEEL SHEATH;
   - C. ASME RATED TEMPERATURE AND PRESSURE RELIEF VALVE;
   - D. FACTORY PRE-WIRED POWER AND CONTROL PANEL.
2. EQUIP ENAMELLED STEEL VENTILATED CONTROL PANEL WITH REMOVABLE GLASS FIBRE INSULATION TO COVER BARE AREA OF TANK, A HINGED DOOR, MULTIPLE KNOCKOUTS, A GROUND SCREW, AND FOLLOWING:
   - A. TERMINAL BLOCK FOR POWER WIRING CONNECTIONS;
   - B. MAGNETIC CONTACTORS FOR HEATING ELEMENTS;
   - C. ADJUSTABLE IMMERSION THERMOSTAT;
   - D. MANUAL RESET IMMERSED HIGH TEMPERATURE LIMIT CONTROL FOR EACH ELEMENT;
   - E. FUSE BLOCK WITH FUSES;
   - F. ELEMENT DIAGNOSTIC PANEL WITH LED'S FOR EACH ELEMENT TO MONITOR ON-OFF OPERATION OF EACH ELEMENT;

TOILET EXHAUST FANS

1. CEILING EXHAUST FAN SHALL BE HVI CERTIFIED AND IN ACCORDANCE WITH THE FOLLOWING REQUIREMENTS:
2. 26 GAUGE ZINC-ALUMINUM-MAGNESIUM (ZAM) HOUSING C/W INTEGRATED 6" DUCT ADAPTOR, BUILT-IN DAMPER AND BUILT IN METAL FLANGE;
3. FAN C/W POLY PRO MATERIAL AND ATTACHES DIRECTLY TO HOUSING WITH TORSION SPRINGS;
4. MOTOR BE TO TOTALLY ENCLOSED WITH A BRUSHLESS ECM MOTOR TECHNOLOGY RATED FOR CONTINUOUS RUN AND EQUIPPED WITH THERMAL-CUTOFF FUSE. MOTOR TO BE REMOVABLE WITH PERMANENTLY LUBRICATED PLUG-IN MOTOR;
5. FAN VENTILATION RATES SHALL BE MANUALLY ADJUSTABLE;
6. FAN SHALL BE UL AND CUL LISTED FOR TUB/SHOWER ENCLOSURE WHEN GFCI PROTECTED.

DRYER EXHAUST

1. DRYER BOOSTER FAN SHALL BE HVI CERTIFIED AND IN ACCORDANCE WITH THE FOLLOWING REQUIREMENTS:
   - A. 26-GAUGE GALVANISED STEEL HOUSING SUPPLIED WITH VIBRATION ISOLATION TO SUIT MOUNTING;
   - B. ROUND INLET AND DISCHARGE COLLAR;
   - C. FIELD WIRING COMPARTMENT WITH REMOVABLE ACCESS PANEL;
   - D. BACKWARDLY-INCLINED, SELF-CLEANING IMPELLER, FULLY-SEALED IMPELLER ASSEMBLY WITH AUTOMATIC-RESET THERMAL OVERLOAD PROTECTION, AND PERMANENTLY-LUBRICATED MOTOR;
   - E. ACCESSORIES:
     - a. AMP SENSOR (CURRENT-SENSING RELAY SWITCH);
     - b. LINT TRAP;
     - c. WALL BOX.

KITCHEN RANGE HOOD

1. DUCTED RANGE HOODS, CSA CERTIFIED, ROTARY SOLID STATE SPEED CONTROL PROVIDING INFINITE RANGE, ROTARY LIGHT CONTROL SWITCH, BACKDRAFT DAMPER, WITH LIGHT LENS AND PERMANENT, WASHABLE ALUMINUM MESH GREASE FILTER(S).

CMHC SCHL

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NO.	DATE	DESCRIPTION
1	2025/02/25	ISSUED AS PROTOTYPICAL DRAWING

PROJECT:

CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT OR CONSTRUCTION

SHEET TITLE:

MECHANICAL OUTLINE SPECIFICATIONS - ALTERNATE OPTION 1

PROJECT NO: 24112

SCALE: NTS

SHEET NO:

M001B

MECHANICAL OUTLINE SPECIFICATIONS - ALTERNATE OPTION 2

1. PRIMARY HEAT FROM STANDARD AIR SOURCE HEAT PUMP COIL IN VERTICAL DUCTED FANCOIL UNIT.
2. SUPPLEMENTAL HEAT THROUGH GAS FIRED COMBI BOILER SERVING HYDRONIC HEATING COIL IN FANCOIL UNIT AT COLDER TEMPERATURES.
3. COOLING THROUGH STANDARD AIR SOURCE HEAT PUMP COIL.
4. DOMESTIC HOT WATER PRODUCED BY GAS FIRED COMBI BOILER.

DESIGN CRITERIA AND REQUIREMENTS

1. THE MECHANICAL SYSTEMS SHALL BE DESIGNED IN ACCORDANCE WITH THE ONTARIO BUILDING CODE (OBC), SPECIFIC REQUIREMENTS OF THE LOCAL AUTHORITY HAVING JURISDICTION, DESIGN PRINCIPLES AND STANDARDS OBTAINED FROM THE OWNER AND DESIGN TEAM AS WELL AS STANDARDS OF GOOD ENGINEERING PRACTICES.
2. WORK SHALL BE COMPLETED IN ACCORDANCE WITH STANDARDS PUBLISHED BY THE FOLLOWING PARTIAL LIST OF AUTHORITIES:
   - A. THERMAL ENVIRONMENTAL CONDITIONS FOR HUMAN OCCUPANCY, ANSI/ASHRAE STANDARD 55 (LATEST EDITION);
   - B. VENTILATION REQUIREMENTS TO BE BASED ON MOST CURRENT OBC PART 9 TABLE 9.32.3.3.
   - C. HANDBOOKS PUBLISHED BY AMERICAN SOCIETY OF HEATING, REFRIGERATION AND AIR CONDITIONING ENGINEERS (ASHRAE).
3. HEATING AND COOLING CALCULATIONS TO BE BASED ON MOST CURRENT CLIMATICAL DATA (SB-1) AND ENERGY EFFICIENCY OF HOUSING COMPLIANCE PACKAGES (SB-12) PUBLISHED IN THE ONTARIO BUILDING CODE AND SHALL BE COMPLETED IN ACCORDANCE WITH THE STANDARD CAN/CSA-F280-12 (R2021) TO DETERMINE THE SIZE/CAPACITY OF THE HEATING/AIR CONDITIONING SYSTEMS.
   - A. ALL OCCUPIED AREAS WILL BE AIR CONDITIONED WITH THE FOLLOWING ENVIRONMENTAL CONDITIONS;
     - a. WINTER: 22.0°C ± 1°C AND 20% ± 5% RELATIVE HUMIDITY
     - b. SUMMER: 24.0°C ± 1°C AND 60% ± 5% RELATIVE HUMIDITY
4. ALL UNPROTECTED MECHANICAL PENETRATIONS ON EXPOSING BUILDING FACE MORE THAN 130MM2 SHALL BE COORDINATED WITH DESIGNER AND NOTED ON ARCHITECTURAL DRAWINGS AS PER OBC 9.10.14.6.

SITE SERVICES

1. NATURAL GAS SERVICE:
   - A. ONE (1) UTILITY NATURAL GAS SERVICE WILL BE PROVIDED TO THE BUILDING AND RUN TO INDIVIDUAL GAS METERS PROVIDED FOR EACH RESIDENTIAL UNIT.
   - B. GROUP AND LOCATE GAS METERS ABOVE GRADE ON ONE SIDE OF THE BUILDING AGAINST AN EXTERIOR WALL. RUN INDIVIDUAL GAS LINES FROM GAS METERS TO THE RESPECTIVE RESIDENTIAL UNITS.
   - C. THE NATURAL GAS SYSTEM DESIGN AND INSTALLATION SHALL COMPLY WITH THE LATEST REQUIREMENTS OF CSA B149, NFPA STANDARDS, OBC, AND LOCAL REGULATORY REQUIREMENTS.
   - D. MATERIAL:
     - a. UNDERGROUND PIPING SHALL BE COATED BLACK STEEL "YELLOW JACKET" SCHEDULE 40 MILD BLACK CARBON STEEL; OR, SAFETY YELLOW COLOURED POLYETHYLENE PIPE, FITTINGS, AND JOINTS TO CSA B137.4; OR, COATED TYPE "K" SOFT TEMPER COPPER WITH FACTORY APPLIED EXTERNAL YELLOW LPASTIC COATING, STAMPED WITH DESIGNATION C37700 TO INDICATE FORGED BRASS.
     - b. EXPOSED SCREW PIPING TO BE SCHEDULE 40 MILD BLACK CARBON STEEL, ASTM A53 GRADE B COMPLETE WITH MALLEABLE CAST IRON SCREWED FITTINGS TO ANSI B2.1, AND SCREWED JOINTS.
     - c. EXPOSED WELDED PIPING TO BE SCHEDULE 40 MILD BLACK CARBON STEEL, ASTM A53 GRADE B, MILL OR SITE BEVELLED, COMPLETE WITH FACTORY MADE FORGED STEEL BUTT WELDING FITTINGS AND WELDED JOINTS.
2. WATER SERVICES:
   - A. ONE (1) POTABLE WATER SERVICE WILL BE PROVIDED TO THE BUILDING THEN THE SERVICE WILL SPLIT AND RUN TO INDIVIDUAL UTILITY METER INSIDE EACH RESIDENTIAL UNIT.
3. SANITARY SEWERS:
   - A. ONE (1) SANITARY SERVICE CONNECTION WILL BE PROVIDED TO THE BUILDING COMPLETE WITH SAMPLING PORT IN COORDINATION WITH THE SITE SERVICE ENGINEER. COORDINATE LOCATION AND INVERT OF INCOMING CONNECTION WITH SITE SERVICES CONSULTANT.
   - B. ROOF GUTTERS TO BE PIPED AND ROUTED DOWN THE SIDE OF THE BUILDING TO SPILL ON GRADE.

PLUMBING AND DRAINAGE

1. POTABLE WATER:
   - A. AN INCOMING POTABLE WATER CONNECTION COMPLETED WITH A METER ASSEMBLY WILL SUPPLY WATER TO EACH RESIDENTIAL UNIT. OPTIONAL WATER FILTRATION INCLUDING CARBON ACTIVATED FILTERS, UV AND RO CAN BE PROVIDED IN AREAS WHERE WATER QUALITY IS OF CONCERN.
   - B. POLYETHYLENE PEX PIPING WILL BE PROVIDED TO DISTRIBUTE COLD AND HOT WATER THROUGHOUT THE UNIT.
     - a. TUBE SHALL BE CROSS-LINKED POLYETHYLENE (PEX) MANUFACTURED BY PEX-A OR PEROXIDE METHOD. PEX TUBING SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM F876, ASTM F877 AND CAN/CSA-B137.5. THE TUBE SHALL BE LISTED TO ASTM BY AN INDEPENDENT THIRD PARTY AGENCY.
     - b. FITTINGS SHALL BE MANUFACTURED OF ENGINEERED PLASTIC (EP). FITTINGS SHALL BE PEX-A COLD EXPANSION TYPE CERTIFIED TO ASTM F1960.
       - (1)FITTINGS SHALL BE SUPPLIED BY THE PEX TUBING MANUFACTURER.
       - (2)PEX-A COLD EXPANSION TYPE FITTINGS SHALL BE AN ASSEMBLY CONSISTING OF INSERT AND PEX-A COLD EXPANSION RING.
       - (3)FITTING TYPE: UPONOR ENGINEERED PLASTIC (EP).
2. DRAINAGE:
   - A. ALL SANITARY DRAIN AND MAIN VENT STACKS SHALL BE PLASTIC ABS WITH GLUED CONNECTIONS. WHERE REQUIRED TO MEET FIRE SPREAD AND SMOKE DEVELOPMENT RATINGS METALLIC PIPING OR XFR PIPING IS TO BE PROVIDED BASED ON LOCAL JURISDICTION APPROVAL.
   - B. UNDERGROUND DRAINAGE PIPING SHALL BE PVC DR35 RIGID SEWER PIPING. PIPING 4" AND LARGER TO BE GREEN PVC HUB AND SPIGOT SEWER PIPE AND FITTINGS TO CAN/CSA B182.2. SIZE 3" PIPE TO BE PVC WITH SOLVENT WELD JOINTS CERTIFIED TO CSA B182.1 AND COLOUR CODED AS PER LOCAL CODES.
3. DOMESTIC HOT WATER PRODUCTION:
   - A. DOMESTIC HOT WATER SHALL BE PRODUCED BY THE 97% EFFICIENT GAS FIRED TANKLESS COMBI BOILER THAT ALSO PRODUCES SUPPLEMENTAL HEATING WATER FOR THE ASSOCIATED RESIDENTIAL UNIT.
   - B. A MIXING VALVE SHALL BE PROVIDED TO SUPPLY 49°C (120°F) DOMESTIC HOT WATER TO THE FIXTURES.
   - C. PROPANE OR NATURAL GAS SERVICE WITH METER SHALL BE PROVIDED TO SERVE THE COMBI BOILER.
4. PRESSURE BALANCING TYPE MIXING VALVES SHALL BE PROVIDED FOR ALL SHOWERS.
5. DRAIN WATER HEAT RECOVERY COIL SHALL BE PROVIDED FOR EACH MULTI-STOREY UNIT.
6. PLUMBING FIXTURES SHALL BE LOW FLOW AND OF FIRST QUALITY.
7. SANITARY DRAINS WILL BE COLLECTED AND CONNECTED TO THE MUNICIPAL SANITARY NETWORK. UNLESS OTHERWISE NOTED, SLOPE ALL 75 MM (3") DRAINAGE PIPING AT 2% SLOPE AND ALL 100 MM (4") AND LARGER DRAINAGE PIPING AT 1% SLOPE.

HEATING, VENTILATION, AND AIR CONDITIONING (HVAC)

1. HEATING AND COOLING SYSTEMS:
   - A. HEATING AND COOLING WILL BE PRODUCED BY A STANDARD AIR SOURCE HEAT PUMP SYSTEM WITH A MINIMUM SEER=15 AND HSPF=7.5.
   - B. THE HEAT PUMP SYSTEM IS SIZED FOR THE COOLING LOAD AND NOT THE FULL HEATING LOAD. THE HEATING IS SUPPLEMENTED BY A 97% EFFICIENT GAS FIRED COMBI BOILER WHEN THE OUTDOOR TEMPERATURE IS -5°C (23°F) OR BELOW.
   - C. INDOOR VERTICAL FANCOIL UNIT TO BE COMPLETE WITH A HYDRONIC HEATING COIL SIZED AND SELECTED FOR THE FULL HEATING LOAD REQUIREMENT AND MINIMUM MERV 8 FILTRATION.
   - D. THE COMBI BOILER SHALL ALSO PRODUCE INSTANTANEOUS DOMESTIC HOT WATER FOR THE RESIDENTIAL UNIT THROUGHOUT THE YEAR.
   - E. THE OUTDOOR HEAT PUMP CONDENSER IS TO BE LOCATED WITHIN CLOSE PROXIMITY TO THE INDOOR UNIT AND CONNECTED WITH REFRIGERANT PIPING. THE OUTDOOR HEAT PUMP CONDENSER WILL BE ABLE TO OPERATE FROM -5°C (23°F) TO 35°C (95°F).
   - F. PROPANE OR NATURAL GAS SERVICE WITH METER SHALL BE PROVIDED TO SERVE THE COMBI BOILER.
2. VENTILATION AND EXHAUST SYSTEMS:
   - A. VENTILATION AIR WILL BE PROVIDED BY AN ENERGY RECOVERY VENTILATOR (ERV) THAT WILL TRANSFER ENERGY FROM THE PRIMARY BATHROOM EXHAUST TO PRE-CONDITION OUTDOOR AIR THAT WILL BE DUCTED BACK TO THE INDOOR UNIT. SIZE OF ERV TO BE DETERMINED BASED ON OBC PART 9 REQUIREMENT. ERV PERFORMANCE SHALL HAVE A MINIMUM OF 75% EFFECTIVENESS. WHERE REQUIRED, AN ELECTRIC DUCT HEATER SHALL BE PROVIDED. THE ERV SHALL BE CONTROLLED BY A LOCAL TIMER SWITCH.
   - B. SECONDARY WASHROOMS WILL BE PROVIDED WITH DEDICATED CEILING MOUNTED TOILET EXHAUST FANS COMPLETE WITH LOCAL SWITCH.
   - C. CLOTHES DRYERS WILL BE PROVIDED WITH A LINT TRAP AND DRYER BOOSTER FAN CONNECTED TO A CURRENT SENSOR TO AID IN DRYER EXHAUST. LINT TRAPS WILL BE PROVIDED ON THE SUCTION SIDE OF THE FAN WITHIN THE SUITE LAUNDRY ROOM.
   - D. KITCHEN HOOD EXHAUSTS WILL BE SIZED FOR MINIMUM 150 CFM AND DUCTED TO OUTDOORS.
   - E. ALL EXHAUST DUCTWORK WILL BE DISCHARGED TO THE EXTERIOR THROUGH THE EXTERIOR WALLS OF THE UNIT OR THROUGH THE ROOF FOR THE TOP LEVEL.
   - F. EXHAUST DUCTWORK SHALL BE INSULATED FOR THE FIRST 10FT FROM THE EXTERIOR LOUVRE.
3. AIR DISTRIBUTION:
   - A. DUCTWORK SHALL BE GALVANIZED SHEET METAL UNLESS OTHERWISE INDICATED. DUCTS SHALL BE SIZED AT A PRESSURE DROP OF 0.08" (20PA) PER 100' (30.5M) WITH MAXIMUM AIR VELOCITIES OF 1400 FEET (427M) PER MINUTE.
   - B. DUCTWORK TO BE INSULATED TO MEET ASHRAE 90.1 AND THE GOVERNING AUTHORITY REQUIREMENTS.
   - C. PROVIDE ACOUSTIC LINING FOR ALL SUPPLY AND RETURN AIR DUCTWORK SERVING MECHANICAL EQUIPMENT WITH FANS TO A MAXIMUM OF 4.5M (15') FROM THE EQUIPMENT, MEASURED OUTWARD IN ALL DIRECTIONS.
   - D. SUPPLY AIR FROM THE INDOOR UNIT SHALL BE DUCTED TO EACH ROOM VIA 200X100 SIDEWALL GRILLES OR FLOOR REGISTERS.
   - E. EACH ROOM SHALL HAVE A RETURN AIR GRILLE OR AN 1" (25MM) DOOR UNDERCUT FOR AIR TRANSFER.
   - F. PROVIDE BALANCING DAMPERS AT ALL DUCT BRANCHES FOR AIR BALANCING.
   - G. DUCTWORK PENETRATING CEILING MEMBRANES REQUIRED TO HAVE A FIRE-RESISTANCE RATING SHALL CONFORM TO REQUIREMENTS MENTIONED PER OBC 9.10.5.1. (3).
4. HYDRONIC PIPING:
   - A. ALL HYDRONIC HEATING WATER PIPE, UNLESS OTHERWISE NOTED, SHALL BE MILD BLACK STEEL, SCHEDULE 40. PIPING TO AND INCLUDING 2" (50 MM) DIAMETER SHALL BE SCREWED.
   - B. PROVIDE SHUT OFF VALVES AND CIRCUIT BALANCING VALVES AT ALL PIPE CONNECTIONS TO EQUIPMENT. PROVIDE AUTOMATIC AIR RELIEF VENT IN HIGH POINTS OF THE CLOSED LOOP PIPING SYSTEMS.
   - C. PIPING, FITTINGS, AND VALVES TO BE INSULATED TO MEET ASHRAE 90.1 AND THE GOVERNING AUTHORITY REQUIREMENTS.
5. A PROGRAMMABLE THERMOSTAT WITH OCCUPANCY SENSOR SHALL BE PROVIDED TO CONTROL THE SUITE HVAC SYSTEM.
6. REFRIGERATION:
   - A. DESIGN AND INSTALLATION OF REFRIGERATION SYSTEM SHALL BE IN ACCORDANCE WITH CSA B52 MECHANICAL REFRIGERATION CODE, ONTARIO BUILDING CODE, AHRI, AND EQUIPMENT MANUFACTURERS RECOMMENDATIONS.
   - B. NEW REFRIGERATION PIPING SHALL BE ACR SEAMLESS COPPER TUBING SUITABLE FOR AIR CONDITIONING OR REFRIGERATION SYSTEMS.
   - C. KEEP TUBING RUNS AND NUMBER OF ELBOWS AND FITTINGS TO A MINIMUM.
   - D. ENSURE TUBING IS DEHYDRATED, TESTED, ADEQUATELY CHARGED, AND GAS TIGHT.
   - E. PIPING SHALL BE INSULATED WITH FLEXIBLE ELASTOMERIC, CLOSED CELL, SLEEVE TYPE LONGITUDINALLY SPLIT SELF-SEAL FORMED PLASTIC PIPE INSULATION EQUAL TO ARMACELL AP/ARMAFLEX SS. INSULATION SHALL BE 25 MM (1") THICK.
   - F. COORDINATE AND RUN ALL REFRIGERANT LINES INSIDE DESIGNATED CAVITY. NO EXTERIOR RUNS PERMITTED UNLESS OTHERWISE INSTRUCTED.
7. FIRE STOPPING AND SMOKE SEAL SYSTEMS
   - A. ASBESTOS-FREE, ELASTOMERIC MATERIALS AND INTUMESCENT MATERIALS, TESTED, LISTED AND LABELLED BY ULC IN ACCORDANCE WITH CAN/ULC S115, AND CAN/ULC S101 FOR INSTALLATION IN ULC DESIGNATED FIRESTOPPING, AND SMOKE SEAL SYSTEMS TO PROVIDE A POSITIVE FIRE, WATER AND SMOKE SEAL AND A FIRE RESISTANCE RATING (FLAME, HOSE STREAM AND TEMPERATURE) NO LESS THAN FIRE RATING FOR SURROUNDING CONSTRUCTION.
   - B. FIRESTOPPING AND SMOKE SEAL MATERIAL SYSTEM TO BE SPECIFICALLY ULC CERTIFIED WITH DESIGNATED REFERENCE NUMBER FOR ITS SPECIFIC INSTALLATION.
   - C. SMOKE AND FIRE SEAL MATERIALS AND MANUFACTURERS MUST BE SPECIFICALLY APPROVED FOR EACH APPLICATION OF PENETRATED SURFACES, AS APPROVED BY FM GLOBAL AND LISTED IN FM GLOBAL APPROVAL GUIDE. LISTED COMPANIES HEREIN AND OTHER MANUFACTURERS ARE ONLY ACCEPTABLE IF COMPLIANT WITH THESE REQUIREMENTS.
   - D. MATERIALS ARE TO BE COMPATIBLE WITH ABUTTING DISSIMILAR MATERIALS AND FINISHES AND COMPLETE WITH PRIMERS, DAMMING AND BACK-UP MATERIALS, SUPPORTS, AND ANCHORING DEVICES IN ACCORDANCE WITH FIRESTOPPING MANUFACTURER'S RECOMMENDATIONS AND ULC TESTED ASSEMBLY. COORDINATE MATERIAL REQUIREMENTS WITH TRADES SUPPLYING ABUTTING AREAS OF MATERIALS.
   - E. TYPICALLY, FOR OPENINGS OF UP TO 250 MM (10") IN DIAMETER, PROVIDE PUTTY PAD TYPE FIRESTOP MATERIALS INTUMESCENT, NON-HARDENING, WATER RESISTANT PUTTIES CONTAINING NO SOLVENTS, INORGANIC FIBRES OR SILICONE COMPOUNDS.
   - F. TYPICALLY, FOR OPENINGS OF GREATER THAN 250 MM (10") IN DIAMETER, AND FOR RECTANGULAR OPENINGS, PROVIDE PILLOW TYPE FIRESTOP MATERIALS RE-ENTERABLE, NON-CURING, MINERAL FIBRE CORE ENCAPSULATED ON SIX SIDES WITH INTUMESCENT COATING CONTAINED IN A FLAME RETARDANT POLY BAG.
   - G. SUPPLY PRODUCTS OF A SINGLE MANUFACTURER FOR USE ON WORK OF THIS DIVISION.
   - H. INSTALLER TO BE MANUFACTURER TRAINED AND CERTIFIED ON SPECIFIC PRODUCT.
   - I. INCLUDE FOR MANUFACTURER'S AUTHORIZED REPRESENTATIVE TO INSPECT AND VERIFY EACH INSTALLATION AND APPLICATION.
   - J. ACCEPTABLE CERTIFICATION TO ALSO INCLUDE CERTIFICATION BY UNDERWRITERS LABORATORIES OF NORTHBROOK IL, USING TESTS CONFORMING TO ULC-S115 AND GIVEN CUL LISTING PUBLISHED BY UL IN THEIR "PRODUCTS CERTIFIED FOR CANADA (CUL) DIRECTORY".

MECHANICAL EQUIPMENT - ALTERNATE OPTION 2

STANDARD AIR SOURCE HEAT PUMP SYSTEM

1. FACTORY ASSEMBLED AND TESTED, PACKAGE TYPE SYSTEM CONSISTING OF AN INDOOR VERTICAL AIR HANDLER UNIT AND A DEDICATED EXTERIOR CONDENSING UNIT, CSA OR ETL LISTED AND LABELLED, AHRI RATED AND CERTIFIED AND WITH A MINIMUM SYSTEM EFFICIENCY OF 15 SEER AND 7.5 HSPF.
2. HIGH STATIC, VERTICAL DUCTED INDOOR EVAPORATOR UNIT CONSISTING OF GALVANIZED STEEL PLATE CASING C/W COATED POLYSTYRENE INSULATING MATERIAL ON COLD SURFACES. EVAPORATOR COMPLETE WITH:
   - A. FLANGED SUPPLY AND RETURN AIR OPENING READY FOR FIELD INSTALLED DUCTWORK;
   - B. FACTORY ASSEMBLED, PIPED AND WIRED ELECTRONIC EXPANSION VALVE (EEV) FOR REFRIGERANT CONTROL;
   - C. DIRECT DRIVEN SUPPLY FANS WITH THE FAN MOTOR MOUNTED ON VIBRATION ATTENUATING RUBBER GROMMETS, DIGITALLY CONTROLLED WITH PERMANENTLY LUBRICATED AND SEALED BEARINGS;
   - D. REMOVABLE, WASHABLE RETURN AIR FILTER;
   - E. HEAT PUMP COIL COMPRISED OF ALUMINIUM FINS MECHANICALLY BONDED ON COPPER TUBING C/W FACTORY SUPPLIED CONDENSATE DRAIN PAN BELOW COIL;
   - F. HYDRONIC HEATING COIL CONSISTED OF SEAMLESS COPPER TUBES MECHANICALLY EXPANDED INTO PLATE TYPE ALUMINIUM FINS AND EQUIPPED WITH COPPER PIPE HEADERS, A MANUAL AIR VENT, AND A DRAIN PLUG;
   - G. FACTORY INSTALLED TEMPERATURE THERMISTORS FOR RETURN AIR, REFRIGERANT ENTERING COIL, AND REFRIGERANT LEAVING COIL;
3. HEAT PUMP CONDENSING UNIT:
   - A. CABINET SHALL BE CONSTRUCTED OF HEAVY-GAUGE GALVANIZED STEEL C/W BAKED-ON POWDER-PAINT FINISH;
   - B. UNIT COMPLETE WITH HIGH EFFICIENCY TWO-STAGE SCROLL COMPRESSOR, HIGH DENSITY FOAM COMPRESSOR SOUND BLANKET, COPPER TUBE/ALUMINUM FIN COIL, AND QUIET TWO-SPEED ECM OUTDOOR FAN MOTOR;
   - C. UNIT SHALL BE PROVIDED WITH FACTORY INSTALLED BI-FLOW LIQUID-LINER FILTER DRIER, SUCTION-LINE ACCUMULATOR, COMPRESSOR CRANKCASE HEATER, HIGH-CAPACITY MUFFLER, COIL AND AMBIENT TEMPERATURE SENSORS, TRANSFORMER, AND HIGH AND LOW-PRESSURE SWITCHES;
   - D. UNIT COMPLETE WITH TIME-DELAY TECHNOLOGY WITH SHORT-CYCLE PROTECTION TO ENSURE QUIET, RELIABLE DEFROST.
4. INDOOR WALL MOUNTED REMOTE CONTROLLER SHALL BE CAPABLE OF MONITORING AND CONTROLLING THE SYSTEM IN TERMS OF ON/OFF, MODE OF OPERATION, AIRFLOW DIRECTION, FAN SPEED, SPACE TEMPERATURE, AND SPACE TEMPERATURE SETPOINT BASED ON A 7 DAY PROGRAMMABLE SCHEDULING OF OCCUPIED/UNOCCUPIED SETTINGS. CONTROLLER SHALL HAVE A TOUCH-SCREEN, BACKLIT, LCD DISPLAY.

ENERGY RECOVERY VENTILATOR (ERV)

1. UNIT SHALL BE FACTORY ASSEMBLED, WIRED AND TESTED AND SHALL CONFORM TO CSA AND UL STANDARDS.
2. UNIT SHALL BE COMPACT WITH A LOW PROFILE SUITABLE FOR INSTALLATION IN BULKHEADS AND DROPPED CEILINGS.
3. CABINET SHALL BE CONSTRUCTED OF 22-GAUGE PRE-PAINTED GALVANIZED STEEL FOR CORROSION RESISTANCE AND INSULATED TO PREVENT EXTERIOR CONDENSATION. CABINET SHALL BE COMPLETE WITH DRAIN CONNECTIONS, BALANCING PORTS, AND THREADED INSERTS TO ACCEPT S-HOOKS AND HANGING STRAPS SUPPLIED WITH UNIT.
4. ENERGY RECOVERY ASSEMBLY SHALL BE THERMALLY CONDUCTIVE, ALUMINUM CROSS-FLOW ENERGY RECOVERY CORE WITH MINIMUM SRE OF 75%. THE CORE SHALL BE EASILY REMOVABLE FOR CLEANING AND SERVICE.
5. UNIT COMPLETE WITH WASHABLE MERV-6 AIR FILTERS LOCATED IN EXHAUST AND SUPPLY AIR STREAMS.
6. EACH AIRSTREAM HAS AN INDEPENDENT CENTRIFUGAL HIGH EFFICIENCY ECM BLOWER WITH MULTIPLE FAN SPEED OPERATION.
7. DEFROST MODE: SUPPLY AIR SHUTS OFF TO DEFROST CORE WITH WARM EXHAUST AIR AT HIGH SPEED.
8. UNIT COMPLETE WITH WALL MOUNT CONTROLLER WITH SELECTABLE ON/OFF, AND FAN SPEED SETTINGS.

GAS-FIRED COMBI BOILER

1. CONDENSING GAS FIRED COMBI BOILER, FACTORY FABRICATED, ASSEMBLED AND TESTED, AND COMPLETE WITH THE FOLLOWING:
   - A. UNIT TO BE DESIGN CERTIFIED TO THE ANSI Z21.10.3 STANDARD AND HAVE A THERMAL EFFICIENCY OF 96% AND A UNIFORM ENERGY FACTOR OF 0.93;
   - B. UNIT SHALL PRODUCE NO MORE THAN 20PPM NOX EMISSIONS WHEN TESTED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (SCAQMD);
   - C. UNIT SHALL HAVE MODULATING FIBER MESH BURNERS, SOLID BRASS WATER FLOW CONTROL VALVE, AND SOLID BRASS INLET AND OUTLET WATER CONNECTIONS.
   - D. UNIT SHALL HAVE A STAINLESS-STEEL WATER TUBE CONDENSING HEAT EXCHANGER AND A BUILT-IN DHW STAINLESS STEEL HEAT EXCHANGER.
   - E. UNIT PROVIDED WITH A TEMPERATURE THERMOSTAT WITH AN ADJUSTABLE SET POINT RANGE OF 98°F TO 185°F.
   - F. UNIT SHALL BE MICROPROCESSOR CONTROLLED AND UTILIZE A DIRECT ELECTRONIC IGNITION SYSTEM, FULLY MODULATING GAS CONTROL VALVE, TURBINE FLOW METER, AUTOMATIC ELECTRO-MECHANICAL WATER FLOW CONTROL VALVE, AND WATER TEMPERATURE THERMISTORS TO MAINTAIN OUTLET WATER TEMPERATURE BETWEEN +/- 2°F OF SET POINT TEMPERATURE. MICROPROCESSOR SHALL HAVE PRIORITY/PROPORTIONAL DHW STANDARD AND BUILT IN RECIRCULATION LOGIC TO CONTROL A PUMP'S HEATING CYCLES.
   - G. UNIT SHALL HAVE THE FOLLOWING INTERNAL SAFETY DEVICES:
     - a. FLAME FAILURE LOCKOUT;
     - b. BOILING PROTECTION LOCKOUT;
     - c. THERMAL OVERHEAT PROTECTION;
     - d. INTERNAL FREEZE PROTECTION FOR AMBIENT TEMPERATURES AS LOW AS -22°F;
     - e. LOCKOUT PROTECTION FROM A BLOCKED FLUE.
   - H. UNIT SHALL BE CAPABLE OF STORING AND DISPLAYING A HISTORY OF UP TO 9 DIAGNOSTIC MAINTENANCE CODES VIA DISPLAY ON THE TEMPERATURE THERMOSTAT CONTROLLER.
   - I. UNIT COMPLETED WITH DIRECT VENT SEALED COMBUSTION.
2. UNIT SHALL BE PROVIDED WITH THE FOLLOWING ACCESSORIES:
   - A. INTEGRAL CIRCULATING PUMP;
   - B. PRIMARY-SECONDARY HEATING KIT;
   - C. ROOM AIR SCREEN;
   - D. CONDENSATE NEUTRALIZER;
   - E. SCALE CUTTER;
   - F. ISOLATION VALVE KIT.

TOILET EXHAUST FANS

1. CEILING EXHAUST FAN SHALL BE HVI CERTIFIED AND IN ACCORDANCE WITH THE FOLLOWING REQUIREMENTS:
2. 26 GAUGE ZINC-ALUMINUM-MAGNESIUM (ZAM) HOUSING C/W INTEGRATED 6" DUCT ADAPTOR, BUILT-IN DAMPER AND BUILT IN METAL FLANGE;
3. FAN C/W POLY PRO MATERIAL AND ATTACHES DIRECTLY TO HOUSING WITH TORSION SPRINGS;
4. MOTOR BE TO TOTALLY ENCLOSED WITH A BRUSHLESS ECM MOTOR TECHNOLOGY RATED FOR CONTINUOUS RUN AND EQUIPPED WITH THERMAL-CUTOFF FUSE. MOTOR TO BE REMOVABLE WITH PERMANENTLY LUBRICATED PLUG-IN MOTOR;
5. FAN VENTILATION RATES SHALL BE MANUALLY ADJUSTABLE;
6. FAN SHALL BE UL AND CUL LISTED FOR TUB/SHOWER ENCLOSURE WHEN GFCI PROTECTED.

DRYER EXHAUST

1. DRYER BOOSTER FAN SHALL BE HVI CERTIFIED AND IN ACCORDANCE WITH THE FOLLOWING REQUIREMENTS:
   - A. 26-GAUGE GALVANISED STEEL HOUSING SUPPLIED WITH VIBRATION ISOLATION TO SUIT MOUNTING;
   - B. ROUND INLET AND DISCHARGE COLLAR;
   - C. FIELD WIRING COMPARTMENT WITH REMOVABLE ACCESS PANEL;
   - D. BACKWARDLY-INCLINED, SELF-CLEANING IMPELLER, FULLY-SEALED IMPELLER ASSEMBLY WITH AUTOMATIC-RESET THERMAL OVERLOAD PROTECTION, AND PERMANENTLY-LUBRICATED MOTOR;
   - E. ACCESSORIES:
     - a. AMP SENSOR (CURRENT-SENSING RELAY SWITCH);
     - b. LINT TRAP;
     - c. WALL BOX.

KITCHEN RANGE HOOD

1. DUCTED RANGE HOODS, CSA CERTIFIED, ROTARY SOLID STATE SPEED CONTROL PROVIDING INFINITE RANGE, ROTARY LIGHT CONTROL SWITCH, BACKDRAFT DAMPER, WITH LIGHT LENS AND PERMANENT, WASHABLE ALUMINUM MESH GREASE FILTER(S).

CMHC SCHL

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1	2025/02/25	ISSUED AS PROTOTYPICAL DRAWING

PROJECT:

CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT OR CONSTRUCTION

SHEET TITLE:

MECHANICAL OUTLINE SPECIFICATIONS - ALTERNATE OPTION 2

PROJECT NO: 24112

SCALE: NTS

SHEET NO:

M001C

MECHANICAL OUTLINE SPECIFICATIONS - ALTERNATE OPTION 3

1. PRIMARY HEAT FROM COLD CLIMATE AIR SOURCE HEAT PUMP COIL IN VERTICAL DUCTED FANCOIL UNIT.
2. SUPPLEMENTAL HEAT THROUGH ELECTRIC HEATING COIL IN FANCOIL UNIT IN COLDER TEMPERATURES.
3. COOLING THROUGH AIR SOURCE HEAT PUMP COIL.
4. ELECTRIC DOMESTIC HOT WATER TANK.

DESIGN CRITERIA AND REQUIREMENTS

1. THE MECHANICAL SYSTEMS SHALL BE DESIGNED IN ACCORDANCE WITH THE ONTARIO BUILDING CODE (OBC), SPECIFIC REQUIREMENTS OF THE LOCAL AUTHORITY HAVING JURISDICTION, DESIGN PRINCIPLES AND STANDARDS OBTAINED FROM THE OWNER AND DESIGN TEAM AS WELL AS STANDARDS OF GOOD ENGINEERING PRACTICES.
2. WORK SHALL BE COMPLETED IN ACCORDANCE WITH STANDARDS PUBLISHED BY THE FOLLOWING PARTIAL LIST OF AUTHORITIES:
   A. THERMAL ENVIRONMENTAL CONDITIONS FOR HUMAN OCCUPANCY, ANSI/ASHRAE STANDARD 55 (LATEST EDITION);
   B. VENTILATION REQUIREMENTS TO BE BASED ON MOST CURRENT OBC PART 9 TABLE 9.32.3.3.
   C. HANDBOOKS PUBLISHED BY AMERICAN SOCIETY OF HEATING, REFRIGERATION AND AIR CONDITIONING ENGINEERS (ASHRAE).
3. HEATING AND COOLING CALCULATIONS TO BE BASED ON MOST CURRENT CLIMATICAL DATA (SB-1) AND ENERGY EFFICIENCY OF HOUSING COMPLIANCE PACKAGES (SB-12) PUBLISHED IN THE ONTARIO BUILDING CODE AND SHALL BE COMPLETED IN ACCORDANCE WITH THE STANDARD CAN/CSA-F280-12 (R2021) TO DETERMINE THE SIZE/CAPACITY OF THE HEATING/AIR CONDITIONING SYSTEMS.
   A. ALL OCCUPIED AREAS WILL BE AIR CONDITIONED WITH THE FOLLOWING ENVIRONMENTAL CONDITIONS;
      a. WINTER: 22.0°C ± 1°C AND 20% ± 5% RELATIVE HUMIDITY
      b. SUMMER: 24.0°C ± 1°C AND 60% ± 5% RELATIVE HUMIDITY
4. ALL UNPROTECTED MECHANICAL PENETRATIONS ON EXPOSING BUILDING FACE MORE THAN 130MM2 SHALL BE COORDINATED WITH DESIGNER AND NOTED ON ARCHITECTURAL DRAWINGS AS PER OBC 9.10.14.6.

SITE SERVICES

1. WATER SERVICES:
   A. ONE (1) POTABLE WATER SERVICE WILL BE PROVIDED TO THE BUILDING THEN THE SERVICE WILL SPLIT AND RUN TO INDIVIDUAL UTILITY METER INSIDE EACH RESIDENTIAL UNIT.
2. SANITARY SEWERS:
   A. ONE (1) SANITARY SERVICE CONNECTION WILL BE PROVIDED TO THE BUILDING COMPLETE WITH SAMPLING PORT IN COORDINATION WITH THE SITE SERVICE ENGINEER. COORDINATE LOCATION AND INVERT OF INCOMING CONNECTION WITH SITE SERVICES CONSULTANT.
   B. ROOF GUTTERS TO BE PIPED AND ROUTED DOWN THE SIDE OF THE BUILDING TO SPILL ON GRADE.

PLUMBING AND DRAINAGE

1. POTABLE WATER:
   A. AN INCOMING POTABLE WATER CONNECTION COMPLETED WITH A METER ASSEMBLY WILL SUPPLY WATER TO EACH RESIDENTIAL UNIT. OPTIONAL WATER FILTRATION INCLUDING CARBON ACTIVATED FILTERS, UV AND RO CAN BE PROVIDED IN AREAS WHERE WATER QUALITY IS OF CONCERN.
   B. POLYETHYLENE PEX PIPING WILL BE PROVIDED TO DISTRIBUTE COLD AND HOT WATER THROUGHOUT THE UNIT.
      a. TUBE SHALL BE CROSS-LINKED POLYETHYLENE (PEX) MANUFACTURED BY PEX-A OR PEROXIDE METHOD. PEX TUBING SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM F876, ASTM F877 AND CAN/CSA-B137.5. THE TUBE SHALL BE LISTED TO ASTM BY AN INDEPENDENT THIRD PARTY AGENCY.
      b. FITTINGS SHALL BE MANUFACTURED OF ENGINEERED PLASTIC (EP). FITTINGS SHALL BE PEX-A COLD EXPANSION TYPE CERTIFIED TO ASTM F1960.
         (1)FITTINGS SHALL BE SUPPLIED BY THE PEX TUBING MANUFACTURER.
         (2)PEX-A COLD EXPANSION TYPE FITTINGS SHALL BE AN ASSEMBLY CONSISTING OF INSERT AND PEX-A COLD EXPANSION RING.
         (3)FITTING TYPE: UPONOR ENGINEERED PLASTIC (EP).
2. DRAINAGE:
   A. ALL SANITARY DRAIN AND MAIN VENT STACKS SHALL BE PLASTIC ABS WITH GLUED CONNECTIONS. WHERE REQUIRED TO MEET FIRE SPREAD AND SMOKE DEVELOPMENT RATINGS METALLIC PIPING OR XFR PIPING IS TO BE PROVIDED BASED ON LOCAL JURISDICTION APPROVAL.
   B. UNDERGROUND DRAINAGE PIPING SHALL BE PVC DR35 RIGID SEWER PIPING. PIPING 4" AND LARGER TO BE GREEN PVC HUB AND SPIGOT SEWER PIPE AND FITTINGS TO CAN/CSA B182.2. SIZE 3" PIPE TO BE PVC WITH SOLVENT WELD JOINTS CERTIFIED TO CSA B182.1 AND COLOUR CODED AS PER LOCAL CODES.
3. DOMESTIC HOT WATER PRODUCTION:
   A. AN ELECTRIC DOMESTIC HOT WATER (DHW) TANK WILL BE PROVIDED FOR EACH RESIDENTIAL UNIT.
   B. DOMESTIC HOT WATER SHALL BE STORED AT A MINIMUM OF 52°C (125°F).
   C. A MIXING VALVE SHALL BE PROVIDED TO SUPPLY 49°C (120°F) DOMESTIC HOT WATER TO THE FIXTURES.
4. PRESSURE BALANCING TYPE MIXING VALVES SHALL BE PROVIDED FOR ALL SHOWERS.
5. DRAIN WATER HEAT RECOVERY COIL SHALL BE PROVIDED FOR EACH MULTI-STOREY UNIT.
6. PLUMBING FIXTURES SHALL BE LOW FLOW AND OF FIRST QUALITY.
7. SANITARY DRAINS WILL BE COLLECTED AND CONNECTED TO THE MUNICIPAL SANITARY NETWORK. UNLESS OTHERWISE NOTED, SLOPE ALL 75 MM (3") DRAINAGE PIPING AT 2% SLOPE AND ALL 100 MM (4") AND LARGER DRAINAGE PIPING AT 1% SLOPE.

HEATING, VENTILATION, AND AIR CONDITIONING (HVAC)

1. HEATING AND COOLING SYSTEMS:
   A. HEATING AND COOLING WILL BE PRODUCED BY A COLD CLIMATE AIR SOURCE VARIABLE REFRIGERANT FLOW (VRF) HEAT PUMP SYSTEM. THE HEAT PUMP COIL WILL OPERATE IN HEATING MODE UNTIL -25°C (-13°F) AND BACKED UP BY AN AUXILIARY ELECTRIC HEATING COIL AT THE LOWER OUTDOOR TEMPERATURES.
   B. THE CAPACITY OF THE HEAT PUMP SYSTEM SHALL BE SIZED AND SELECTED TO MEET THE FULL HEATING AND COOLING LOAD REQUIREMENTS OF THE RESIDENTIAL UNIT.
   C. THE INDOOR VERTICAL FANCOIL UNIT (FCU) WILL INCLUDE A 5 KW AUXILIARY ELECTRIC HEATING COIL FOR BACKUP. UNIT TO BE COMPLETE WITH MINIMUM MERV 8 FILTRATION.
   D. THE OUTDOOR HEAT PUMP CONDENSER IS TO BE LOCATED WITHIN CLOSE PROXIMITY TO THE INDOOR UNIT AND CONNECTED WITH REFRIGERANT PIPING. THE OUTDOOR HEAT PUMP CONDENSER WILL BE ABLE TO OPERATE FROM -25°C (-13°F) TO 35°C (95°F).
2. VENTILATION AND EXHAUST SYSTEMS:
   A. VENTILATION AIR WILL BE PROVIDED BY AN ENERGY RECOVERY VENTILATOR (ERV) THAT WILL TRANSFER ENERGY FROM THE PRIMARY BATHROOM EXHAUST TO PRE-CONDITION OUTDOOR AIR THAT WILL BE DUCTED BACK TO THE INDOOR UNIT. SIZE OF ERV TO BE DETERMINED BASED ON OBC PART 9 REQUIREMENT. ERV PERFORMANCE SHALL HAVE A MINIMUM OF 75% EFFECTIVENESS. WHERE REQUIRED, AN ELECTRIC DUCT HEATER SHALL BE PROVIDED. THE ERV SHALL BE CONTROLLED BY A LOCAL TIMER SWITCH.
   B. SECONDARY WASHROOMS WILL BE PROVIDED WITH DEDICATED CEILING MOUNTED TOILET EXHAUST FANS COMPLETE WITH LOCAL SWITCH.
   C. CLOTHES DRYERS WILL BE PROVIDED WITH A LINT TRAP AND DRYER BOOSTER FAN CONNECTED TO A CURRENT SENSOR TO AID IN DRYER EXHAUST. LINT TRAPS WILL BE PROVIDED ON THE SUCTION SIDE OF THE FAN WITHIN THE SUITE LAUNDRY ROOM.
   D. KITCHEN HOOD EXHAUSTS WILL BE SIZED FOR MINIMUM 150 CFM AND DUCTED TO OUTDOORS.
   E. ALL EXHAUST DUCTWORK WILL BE DISCHARGED TO THE EXTERIOR THROUGH THE EXTERIOR WALLS OF THE UNIT OR THROUGH THE ROOF FOR THE TOP LEVEL.
   F. EXHAUST DUCTWORK SHALL BE INSULATED FOR THE FIRST 10FT FROM THE EXTERIOR LOUVRE.
3. AIR DISTRIBUTION:
   A. DUCTWORK SHALL BE GALVANIZED SHEET METAL UNLESS OTHERWISE INDICATED. DUCTS SHALL BE SIZED AT A PRESSURE DROP OF 0.08" (20PA) PER 100' (30.5M) WITH MAXIMUM AIR VELOCITIES OF 1400 FEET (427M) PER MINUTE.
   B. DUCTWORK TO BE INSULATED TO MEET ASHRAE 90.1 AND THE GOVERNING AUTHORITY REQUIREMENTS.
   C. PROVIDE ACOUSTIC LINING FOR ALL SUPPLY AND RETURN AIR DUCTWORK SERVING MECHANICAL EQUIPMENT WITH FANS TO A MAXIMUM OF 4.5M (15') FROM THE EQUIPMENT, MEASURED OUTWARD IN ALL DIRECTIONS.
   D. SUPPLY AIR FROM THE INDOOR UNIT SHALL BE DUCTED TO EACH ROOM VIA 200X100 SIDEWALL GRILLES OR FLOOR REGISTERS.
   E. EACH ROOM SHALL HAVE A RETURN AIR GRILLE OR AN 1" (25MM) DOOR UNDERCUT FOR AIR TRANSFER.
   F. PROVIDE BALANCING DAMPERS AT ALL DUCT BRANCHES FOR AIR BALANCING.
   G. A PROGRAMMABLE THERMOSTAT WITH OCCUPANCY SENSOR SHALL BE PROVIDED TO CONTROL THE SUITE HVAC SYSTEM.
   H. DUCTWORK PENETRATING CEILING MEMBRANES REQUIRED TO HAVE A FIRE-RESISTANCE RATING SHALL CONFORM TO REQUIREMENTS MENTIONED PER OBC 9.10.5.1. (3).
4. REFRIGERATION:
   A. DESIGN AND INSTALLATION OF REFRIGERATION SYSTEM SHALL BE IN ACCORDANCE WITH CSA B52 MECHANICAL REFRIGERATION CODE, ONTARIO BUILDING CODE, AHRI, AND EQUIPMENT MANUFACTURERS RECOMMENDATIONS.
   B. NEW REFRIGERATION PIPING SHALL BE ACR SEAMLESS COPPER TUBING SUITABLE FOR AIR CONDITIONING OR REFRIGERATION SYSTEMS.
   C. KEEP TUBING RUNS AND NUMBER OF ELBOWS AND FITTINGS TO A MINIMUM.
   D. ENSURE TUBING IS DEHYDRATED, TESTED, ADEQUATELY CHARGED, AND GAS TIGHT.
   E. PIPING SHALL BE INSULATED WITH FLEXIBLE ELASTOMERIC, CLOSED CELL, SLEEVE TYPE LONGITUDINALLY SPLIT SELF-SEAL FORMED PLASTIC PIPE INSULATION EQUAL TO ARMACELL AP/ARMAFLEX SS. INSULATION SHALL BE 25 MM (1") THICK.
   F. COORDINATE AND RUN ALL REFRIGERANT LINES INSIDE DESIGNATED CAVITY. NO EXTERIOR RUNS PERMITTED UNLESS OTHERWISE INSTRUCTED.
5. FIRE STOPPING AND SMOKE SEAL SYSTEMS
   A. ASBESTOS-FREE, ELASTOMERIC MATERIALS AND INTUMESCENT MATERIALS, TESTED, LISTED AND LABELLED BY ULC IN ACCORDANCE WITH CAN/ULC S115, AND CAN/ULC S101 FOR INSTALLATION IN ULC DESIGNATED FIRESTOPPING, AND SMOKE SEAL SYSTEMS TO PROVIDE A POSITIVE FIRE, WATER AND SMOKE SEAL AND A FIRE RESISTANCE RATING (FLAME, HOSE STREAM AND TEMPERATURE) NO LESS THAN FIRE RATING FOR SURROUNDING CONSTRUCTION.
   B. FIRESTOPPING AND SMOKE SEAL MATERIAL SYSTEM TO BE SPECIFICALLY ULC CERTIFIED WITH DESIGNATED REFERENCE NUMBER FOR ITS SPECIFIC INSTALLATION.
   C. SMOKE AND FIRE SEAL MATERIALS AND MANUFACTURERS MUST BE SPECIFICALLY APPROVED FOR EACH APPLICATION OF PENETRATED SURFACES, AS APPROVED BY FM GLOBAL AND LISTED IN FM GLOBAL APPROVAL GUIDE. LISTED COMPANIES HEREIN AND OTHER MANUFACTURERS ARE ONLY ACCEPTABLE IF COMPLIANT WITH THESE REQUIREMENTS.
   D. MATERIALS ARE TO BE COMPATIBLE WITH ABUTTING DISSIMILAR MATERIALS AND FINISHES AND COMPLETE WITH PRIMERS, DAMMING AND BACK-UP MATERIALS, SUPPORTS, AND ANCHORING DEVICES IN ACCORDANCE WITH FIRESTOPPING MANUFACTURER'S RECOMMENDATIONS AND ULC TESTED ASSEMBLY. COORDINATE MATERIAL REQUIREMENTS WITH TRADES SUPPLYING ABUTTING AREAS OF MATERIALS.
   E. TYPICALLY, FOR OPENINGS OF UP TO 250 MM (10") IN DIAMETER, PROVIDE PUTTY PAD TYPE FIRESTOP MATERIALS INTUMESCENT, NON-HARDENING, WATER RESISTANT PUTTIES CONTAINING NO SOLVENTS, INORGANIC FIBRES OR SILICONE COMPOUNDS.
   F. TYPICALLY, FOR OPENINGS OF GREATER THAN 250 MM (10") IN DIAMETER, AND FOR RECTANGULAR OPENINGS, PROVIDE PILLOW TYPE FIRESTOP MATERIALS RE-ENTERABLE, NON-CURING, MINERAL FIBRE CORE ENCAPSULATED ON SIX SIDES WITH INTUMESCENT COATING CONTAINED IN A FLAME RETARDANT POLY BAG.
   G. SUPPLY PRODUCTS OF A SINGLE MANUFACTURER FOR USE ON WORK OF THIS DIVISION.
   H. INSTALLER TO BE MANUFACTURER TRAINED AND CERTIFIED ON SPECIFIC PRODUCT.
   I. INCLUDE FOR MANUFACTURER'S AUTHORIZED REPRESENTATIVE TO INSPECT AND VERIFY EACH INSTALLATION AND APPLICATION.
   J. ACCEPTABLE CERTIFICATION TO ALSO INCLUDE CERTIFICATION BY UNDERWRITERS LABORATORIES OF NORTHBROOK IL, USING TESTS CONFORMING TO ULC-S115 AND GIVEN CUL LISTING PUBLISHED BY UL IN THEIR "PRODUCTS CERTIFIED FOR CANADA (CUL) DIRECTORY".

MECHANICAL EQUIPMENT - ALTERNATE OPTION 3

COLD CLIMATE AIR SOURCE VARIABLE REFRIGERANT FLOW (VRF) HEAT PUMP SYSTEM

1. FACTORY ASSEMBLED AND TESTED, PACKAGE TYPE SYSTEM CONSISTING OF AN INDOOR VERTICAL HANDLER UNIT AND A DEDICATED EXTERIOR CONDENSING UNIT, CSA OR ETL LISTED AND LABELLED, AHRI RATED AND CERTIFIED AND WITH A MINIMUM SYSTEM EFFICIENCY OF 17 SEER AND 9.0 HSPF.
2. HIGH STATIC, VERTICAL DUCTED INDOOR EVAPORATOR UNIT CONSISTING OF GALVANIZED STEEL PLATE CASING C/W COATED POLYSTYRENE INSULATING MATERIAL ON COLD SURFACES. EVAPORATOR COMPLETE WITH:
   A. FLANGED SUPPLY AND RETURN AIR OPENING READY FOR FIELD INSTALLED DUCTWORK;
   B. FACTORY ASSEMBLED, PIPED AND WIRED ELECTRONIC EXPANSION VALVE (EEV) FOR REFRIGERANT CONTROL;
   C. DIRECT DRIVEN SUPPLY FANS WITH THE FAN MOTOR MOUNTED ON VIBRATION ATTENUATING RUBBER GROMMETS, DIGITALLY CONTROLLED WITH PERMANENTLY LUBRICATED AND SEALED BEARINGS;
   D. REMOVABLE, WASHABLE RETURN AIR FILTER;
   E. COIL COMPRISED OF ALUMINIUM FINS MECHANICALLY BONDED ON COPPER TUBING C/W FACTORY SUPPLIED CONDENSATE DRAIN PAN BELOW COIL;
   F. FACTORY INSTALLED AND WIRED CONDENSATE PUMP WITH SAFETY SWITCH TO SHUT OFF UNIT IF CONDENSATE RISES TOO HIGH IN DRAIN PAN;
   G. FACTORY INSTALLED TEMPERATURE THERMISTORS FOR RETURN AIR, REFRIGERANT ENTERING COIL, AND REFRIGERANT LEAVING COIL;
   H. BUILT IN MICROPROCESSOR CONTROLLER TO COMMUNICATE WITH THE INDOOR UNIT AND THE OUTDOOR UNIT IN DAISY CHAIN CONFIGURATION. UNITS SHALL ALSO BE CAPABLE OF THE FOLLOWING FUNCTIONS:
      a. SELF-DIAGNOSTIC FUNCTION;
      b. AUTO ADDRESSING;
      c. AUTO RESTART FUNCTION;
      d. AUTO CHANGEOVER FUNCTION;
      e. HEATING/COOLING/FAN ONLY FUNCTION;
      f. AUTO OPERATION FUNCTION;
      g. FORCED OPERATION;
      h. DUAL THERMISTOR CONTROL;
      i. SLEEP MODE;
      j. EXTERNAL STATIC PRESSURE (ESP) CONTROL;
      k. DUAL SETPOINT CONTROL;
      l. MULTIPLE AUXILIARY HEATER APPLICATIONS;
      m. FILTER LIFE AND POWER CONSUMPTION DISPLAY.
3. FACTORY RUN TESTED, WEATHERPROOF CONDENSING UNIT EQUIPPED WITH A FACTORY INSTALLED MICROPROCESSOR CONTROLLER TO INTERFACE WITH INDOOR UNIT AND PERFORM ALL NECESSARY OPERATION FUNCTIONS. PRE-CHARGE UNIT WITH REFRIGERANT FOR A MINIMUM OF 21 M (70') OF REFRIGERANT TUBING. UNIT IS TO BE CAPABLE OF A HEIGHT DIFFERENCE BETWEEN CONDENSING UNIT AND EVAPORATOR OF 30 M (100'). EACH CONDENSING UNIT COMPLETE WITH:
   A. 20-GAUGE GALVANIZED STEEL WITH AN ENAMEL FINISH CABINET C/W HEAVY GAUGE COATED WIRE COIL GUARD WITH FRONT ACCESS PANEL;
   B. REFRIGERANT STRAINER, CHECK VALVES, OIL SEPARATOR, ACCUMULATOR, 4-WAY REVERSING VALVE, ELECTRONIC EXPANSIVE VALVE, HIGH SIDE AND LOW SIDE REFRIGERANT CHARGING PORTS, AND A SERVICE PORT;
   C. INTELLIGENT DEFROST OPERATION TO MELT ACCUMULATED FROST, SNOW AND ICE OFF THE OUTDOOR UNIT HEAT EXCHANGER;
   D. OIL MANAGEMENT SYSTEM TO MAXIMIZE COMPRESSOR EFFICIENCY AND ENSURE CONSISTENT FILM OF OIL ON ALL MOVING COMPRESSOR PARTS AT ALL SPEEDS;
   E. DIRECT DRIVE VARIABLE SPEED PROPELLER FAN(S) WITH PERMANENTLY LUBRICATED BEARINGS, DIGITALLY CONTROLLED INVERTER MOTOR AND A VERTICAL AIR DISCHARGE C/W RAISED FERROUS WIRE METAL GUARD WITH A BANKED ENAMEL FINISH;
   F. OUTDOOR COIL COMPRISED OF ALUMINIUM FINS MECHANICALLY BONDED ON COPPER TUBING WITH FACTORY APPLIED CORROSION RESISTANT MATERIAL;
   G. HERMETICALLY SEALED, DIGITALLY CONTROLLED, INVERTER DRIVEN HIGH SIDE SHELL (HSS) SCROLL COMPRESSOR(S) MOUNTED ON VIBRATION ATTENUATING RUBBER GROMMETS. ALL COMPRESSORS SHALL BE PROTECTED WITH HIGH PRESSURE SWITCH, OVER-CURRENT/UNDER CURRENT PROTECTION, PHASE FAILURE, AND PHASE REVERSAL.
   H. SUCTION TEMPERATURE SENSOR, DISCHARGE TEMPERATURE SENSOR, HIGH PRESSURE SENSOR, LOW PRESSURE SENSOR, OUTDOOR TEMPERATURE SENSOR, AND OUTDOOR HEAT EXCHANGE TEMPERATURE SENSOR.
4. SYSTEM CONTROLS CONSISTING OF A MICROPROCESSOR IN EACH INDOOR AND OUTDOOR UNIT, INDOOR WALL MOUNTED CONTROLLER SITE CONNECTED TO THE ASSOCIATED INDOOR EVAPORATOR UNIT AND A CENTRAL CONTROLLER.
   A. INDOOR WALL MOUNTED REMOTE CONTROLLER SHALL BE CAPABLE OF MONITORING AND CONTROLLING THE INDOOR UNIT IN TERMS OF ON/OFF, MODE OF OPERATION, AIRFLOW DIRECTION, FAN SPEED, SPACE TEMPERATURE, AND SPACE TEMPERATURE SETPOINT BASED ON A 7 DAY PROGRAMMABLE SCHEDULING OF OCCUPIED/UNOCCUPIED SETTINGS. CONTROLLER SHALL HAVE A TOUCH-SCREEN, BACKLIT, LCD DISPLAY.
   B. SYSTEM CENTRAL CONTROLLER SHALL BE CAPABLE OF MONITORING AND CONTROL OF THE INDOOR UNIT AND OUTDOOR UNIT VIA A DAISY-CHAIN CONFIGURATION THROUGH ITS TOUCHSCREEN INTERFACE AND EMBEDDED WEB BROWSER. IT CAN PROVIDE PROGRAMMABLE SCHEDULING OF OCCUPIED/UNOCCUPIED SETTINGS, ON/OFF, MODE OF OPERATION, SETPOINT AND FAN SPEED FOR THE ENTIRE VRF SYSTEM. THE CENTRAL CONTROLLER SHALL BE CAPABLE OF GENERATING OPERATION AND ERROR HISTORY LOG, REMOTE CONTROLLER LOCK (ALL, SETPOINT, MODE, FAN SPEED), ERROR EMAIL NOTIFICATION, AND VISUAL FLOOR NAVIGATION.

ENERGY RECOVERY VENTILATOR (ERV)

1. UNIT SHALL BE FACTORY ASSEMBLED, WIRED AND TESTED AND SHALL CONFORM TO CSA AND UL STANDARDS.
2. UNIT SHALL BE COMPACT WITH A LOW PROFILE SUITABLE FOR INSTALLATION IN BULKHEADS AND DROPPED CEILINGS.
3. CABINET SHALL BE CONSTRUCTED OF 22-GAUGE PRE-PAINTED GALVANIZED STEEL FOR CORROSION RESISTANCE AND INSULATED TO PREVENT EXTERIOR CONDENSATION. CABINET SHALL BE COMPLETE WITH DRAIN CONNECTIONS, BALANCING PORTS, AND THREADED INSERTS TO ACCEPT S-HOOKS AND HANGING STRAPS SUPPLIED WITH UNIT.
4. ENERGY RECOVERY ASSEMBLY SHALL BE THERMALLY CONDUCTIVE, ALUMINUM CROSS-FLOW ENERGY RECOVERY CORE WITH MINIMUM SRE OF 75%. THE CORE SHALL BE EASILY REMOVABLE FOR CLEANING AND SERVICE.
5. UNIT COMPLETE WITH WASHABLE MERV-6 AIR FILTERS LOCATED IN EXHAUST AND SUPPLY AIR STREAMS.
6. EACH AIRSTREAM HAS AN INDEPENDENT CENTRIFUGAL HIGH EFFICIENCY ECM BLOWER WITH MULTIPLE FAN SPEED OPERATION.
7. DEFROST MODE: SUPPLY AIR SHUTS OFF TO DEFROST CORE WITH WARM EXHAUST AIR AT HIGH SPEED.
8. UNIT COMPLETE WITH WALL MOUNT CONTROLLER WITH SELECTABLE ON/OFF, AND FAN SPEED SETTINGS.

ELECTRIC DOMESTIC HOT WATER TANK

1. CSA CERTIFIED ELECTRIC DOMESTIC HOT WATER TANK AND HEATER WITH MINIMUM EF RATING OF 0.8, AND COMPLETE WITH:
   A. 1035 KPA (150 PSI) RATED (WORKING PRESSURE) STEEL TANK, GLASS LINED, INSULATED (EXCEPT FOR CONTROL PANEL AREA) WITH INJECTED MINIMUM R-16 FOAM INSULATION, COVERED WITH AN ENAMELLED STEEL JACKET, AND EQUIPPED WITH 40 MM (1-½") DIA. NPS BRASS NIPPLE WATER INLET AND OUTLET CONNECTIONS, A DRAIN VALVE, AND SACRIFICIAL ANODE RODS;
   B. REMOVABLE MULTIPLE IMMERSION HEATING ELEMENTS, EACH CONSISTING OF A WIRE FILAMENT IN A SEALED STAINLESS STEEL SHEATH;
   C. ASME RATED TEMPERATURE AND PRESSURE RELIEF VALVE;
   D. FACTORY PRE-WIRED POWER AND CONTROL PANEL.
2. EQUIP ENAMELLED STEEL VENTILATED CONTROL PANEL WITH REMOVABLE GLASS FIBRE INSULATION TO COVER BARE AREA OF TANK, A HINGED DOOR, MULTIPLE KNOCKOUTS, A GROUND SCREW, AND FOLLOWING:
   A. TERMINAL BLOCK FOR POWER WIRING CONNECTIONS;
   B. MAGNETIC CONTACTORS FOR HEATING ELEMENTS;
   C. ADJUSTABLE IMMERSION THERMOSTAT;
   D. MANUAL RESET IMMERSED HIGH TEMPERATURE LIMIT CONTROL FOR EACH ELEMENT;
   E. FUSE BLOCK WITH FUSES;
   F. ELEMENT DIAGNOSTIC PANEL WITH LED'S FOR EACH ELEMENT TO MONITOR ON-OFF OPERATION OF EACH ELEMENT;

TOILET EXHAUST FANS

1. CEILING EXHAUST FAN SHALL BE HVI CERTIFIED AND IN ACCORDANCE WITH THE FOLLOWING REQUIREMENTS:
2. 26 GAUGE ZINC-ALUMINUM-MAGNESIUM (ZAM) HOUSING C/W INTEGRATED 6" DUCT ADAPTOR, BUILT-IN DAMPER AND BUILT IN METAL FLANGE;
3. FAN C/W POLY PRO MATERIAL AND ATTACHES DIRECTLY TO HOUSING WITH TORSION SPRINGS;
4. MOTOR BE TO TOTALLY ENCLOSED WITH A BRUSHLESS ECM MOTOR TECHNOLOGY RATED FOR CONTINUOUS RUN AND EQUIPPED WITH THERMAL-CUTOFF FUSE. MOTOR TO BE REMOVABLE WITH PERMANENTLY LUBRICATED PLUG-IN MOTOR;
5. FAN VENTILATION RATES SHALL BE MANUALLY ADJUSTABLE;
6. FAN SHALL BE UL AND CUL LISTED FOR TUB/SHOWER ENCLOSURE WHEN GFCI PROTECTED.

DRYER EXHAUST

1. DRYER BOOSTER FAN SHALL BE HVI CERTIFIED AND IN ACCORDANCE WITH THE FOLLOWING REQUIREMENTS:
   A. 26-GAUGE GALVANISED STEEL HOUSING SUPPLIED WITH VIBRATION ISOLATION TO SUIT MOUNTING;
   B. ROUND INLET AND DISCHARGE COLLAR;
   C. FIELD WIRING COMPARTMENT WITH REMOVABLE ACCESS PANEL;
   D. BACKWARDLY-INCLINED, SELF-CLEANING IMPELLER, FULLY-SEALED IMPELLER ASSEMBLY WITH AUTOMATIC-RESET THERMAL OVERLOAD PROTECTION, AND PERMANENTLY-LUBRICATED MOTOR;
   E. ACCESSORIES:
      a. AMP SENSOR (CURRENT-SENSING RELAY SWITCH);
      b. LINT TRAP;
      c. WALL BOX.

KITCHEN RANGE HOOD

1. DUCTED RANGE HOODS, CSA CERTIFIED, ROTARY SOLID STATE SPEED CONTROL PROVIDING INFINITE RANGE, ROTARY LIGHT CONTROL SWITCH, BACKDRAFT DAMPER, WITH LIGHT LENS AND PERMANENT, WASHABLE ALUMINUM MESH GREASE FILTER(S).

CMHC SCHL

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NO.	DATE	DESCRIPTION
1	2025/02/25	ISSUED AS PROTOTYPICAL DRAWING

PROJECT:

CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT OR CONSTRUCTION

SHEET TITLE:

MECHANICAL OUTLINE SPECIFICATIONS - ALTERNATE OPTION 3

PROJECT NO: 24112

SCALE: NTS

SHEET NO:

M001D

ELECTRICAL OUTLINE SPECIFICATIONS

1. GENERAL

1.1. THE DOCUMENT IS MEANT TO BE VIEWED IN CONJUNCTION WITH AND CROSS REFERENCED TO THE ENCLOSED ELECTRICAL SCHEMATIC DRAWINGS.

2. ELECTRICAL SYSTEMS

2.1. DESIGN AND PERFORMACNE GOALS

2.1.1. THE FOLLOWING INFORMATION IS PROVIDED AS GUIDANCE

2.1.2. THIS OUTLINE SPECIFICATION PROVIDE CHMC REQUIREMENTS FOR THE ELECTRICAL SYSTEM.

2.1.3. THESE REQUIREMENT INTENDS TO OBTAIN FUNCTIONAL ELECTRICAL SYSTEMS, THAT ARE FLEXIBLE AND SUITABLE FOR BOTH ADAPTABLE UNITS AND ACCESSIBILITY UNIT WITH MINIMAL ALTERATION TO THE ELECTRICAL SYSTEM.

2.2. APPLICABLE CODES AND STANDARDS

2.2.1. ELECTRICAL SYSTEMS FOR THE BUILDING SHALL BE DESIGNED IN ACCORDANCE WITH THE FOLLOWING LATEST STANDARDS AND CODES:

2.2.1.1. LATEST EDITION OF THE ONTARIO ELECTRICAL SAFETY CODE (OESC);

2.2.1.2. CAN/ULC-S524

2.2.1.3. CANADIAN STANDARDS ASSOCIATION (CSA-C22.1);

2.2.1.4. LATEST EDITION OF THE ONTARIO BUILDING CODE (OBC).

3. DESIGN CRITERIA AND REQUIREMENTS

3.1. THE FOLLOWING INFORMATION IS PROVIDED AS A REQUIREMENT.

3.1.1. WIRING DEVICES:

3.1.1.1. ALL ELECTRICAL DEVICES AND EQUIPMENT SHALL BE CSA APPROVED.

3.1.1.2. DUPLEX RECEPTACLE SHALL BE MINIMUM RESIDENTIAL GRADE, TAMPER RESISTANT AND ARC FAULT CIRCUIT INTERRUPTER PER ONTARIO ELECTRICAL SAFETY CODE REQUIREMENT.

3.1.1.3. RECEPTACLE WITHIN 1.5 METER TO THE SINK SHALL BE RATED FOR GROUND FAULT INTERRUPTER.

3.1.1.4. RECEPTACLES EXPOSED TO WEATHER SHALL BE PROVIDED WITH WET LOCATION COVER PLATE, AND GROUND FAULT INTERRUPTER.

3.1.1.5. INTERIOR SPACE RECEPTACLE LAYOUT SHALL BE DESIGNED IN CONFORMANCE TO THE ONTARIO ELECTRICAL SAFETY CODE REQUIREMENT.

3.1.2. BASIC MATERIAL

3.1.2.1. ALL POWER WIRING SHALL BE COPPER, NON-METALLIC SHEATH CABLES, RESIDENTIAL RATED, SIMILAR TO ROMEX WITHIN THE UNIT.

3.1.2.2. OUTLET BOX PENETRATE THE MEMBRANE OF AN ASSEMBLY REQUIRE TO HAVE FIRE-RESISTANCE RATING MUST BE SEALED AT THE PENETRATION BY A FIRESTOP THAT HAS AN FT RATING NOT LESS THAN THE FIRE-RESISTANCE RATING OF THE FIRE SEPARATION.

3.1.2.3. PROVIDE EMT CONDUIT COMPLETE WITH SEPARATE INSULATED GROUND WRING FROM HYDRO METER TO SUITE LOAD CENTER.

3.1.2.4. CONDUITS INSTALLED UNDERGROUND SHALL BE RIGID PVC.

3.1.2.5. LOAD CENTER SHALL BE SIZED PER ONTARIO ELECTRICAL SAFETY CODE REQUIREMENT AND SHALL COMPLETE WITH THE FOLLOWING COMPONENTS:

3.1.2.5.1. MAIN BREAKER
3.1.2.5.2. SURFACE MOUNTED AT PLYWOOD BACKBOARD IN ELECTRICAL CLOSET/CABINET.
3.1.2.5.3. QUANTITY OF BRANCH BREAKERS MEETING DESIGN REQUIREMENT.
3.1.2.5.4. TYPE PRINTED PANEL DIRECTORY
3.1.2.5.5. FILLER PLATE FOR ANY OPENING.

3.1.3. SMOKE ALARM

3.1.3.1. PROVIDE A/C POWERED SMOKE ALARMS (COMPLETE WITH STROBE & SOUNDER BASES) IN ACCORDANCE WITH OBC REQUIREMENTS. THESE DETECTORS SHALL BE "NON-ADDRESSABLE" TYPES. A COMBINATION OF SMOKE AND CO ALARMS SHALL BE PROVIDED ADJACENT TO, AND ABOVE AND BELOW THE FLOOR LEVEL OF THE GAS-FIRED EQUIPMENT.

3.1.3.2. SMOKE ALARM/ COMBINATION OF SMOKE & CO ALARM SHALL BE 120V HARD WIRE CONNECTION COMPLETE WITH BATTERY BACKUP.

3.1.3.3. SMOKE ALARM/COMBINATION OF SMOKE & CO ALARM SHALL BE CONNECTED TO A LIGHTING CIRCUIT OR A MIX OF LIGHTING & RECEPTACLE CIRCUIT IN ACCORDANCE WITH ONTARIO ELECTRICAL SAFETY CODE.

3.1.3.4. WHERE MORE THAN ONE SMOKE ALARM IS REQUIRED IN A DWELLING UNIT, THE SMOKE ALARMS SHALL BE WIRED SO THAT THE ACTIVATION OF ONE ALARM WILL CAUSE ALL ALARMS WITHIN THE DWELLING UNIT TO SOUND.

3.1.3.5. SMOKE ALARM/COMBINATION OF SMOKE & CO ALARM SHALL BE EQUIPPED WITH A TESTING/SILENCE BUTTON ON THE FRONT OF THE UNIT.

3.1.3.6. SMOKE ALARM SOUND PATTERN SHALL EMIT A T3 ALARM (THREE INTERMITTENT BEEPS FOLLOWS BY A PERIOD OF SILENCE).

3.1.3.7. CARBON MONOXIDE ALARM SOUND PATTERN SHALL EMIT T4 ALARM (FOUR INTERMITTENT BEEPS FOLLOWED BY A PERIOD OF SILENCE)

3.1.4. LIGHTING

3.1.4.1. PRODUCT SHALL BE CSA APPROVED AND/OR ULC LISTED.

3.1.4.2. ENERGY-EFFICIENT LED LIGHTING FIXTURE SHALL BE PROVIDED.

3.1.4.3. RECESSED LIGHTING SHALL NOT BE LOCATED IN INSULATED CEILINGS UNLESS THE FIXTURES ARE DESIGNED FOR SUCH INSTALLATIONS.

3.1.4.4. RECESSED LIGHTING SHALL NOT BE LOCATED IN FIRE RATED CEILING.

3.1.4.5. LIGHTING SHALL BE CONTROLLED THROUGH A LOCALIZED LIGHT SWITCH IN EACH SPACE.

3.1.4.6. AN EXTERIOR LIGHTING OUTLET WITH FIXTURE CONTROLLED BY A WALL SWITCH LOCATED WITHIN THE BUILDING SHALL BE PROVIDED AT EVERY ENTRANCE.

3.1.4.7. MINIMUM LIGHTING LEVEL TO BE ACHIEVED FOR THE FOLLOWING AREAS:

a.	KITCHEN	300LX
b.	BEDROOM ADULT	100 TO 300LX
c.	BEDROOM (CHILD)	500LX
d.	BATHROOM	300LX
e.	LIVING ROOM/DEN	300LX
f.	FAMILY ROOM	300LX (TV REVIEWING 150LX)
g.	LAUNDRY/UTILITY	200LX
h.	DINING ROOM	200LX
i.	HALL/LANDING/STAIRWAY	100LX TO 500LX
j.	HOME OFFICE	500LX
k.	GARAGE	500LX
l.	WORKSHOP	800LX
m.	EXTERIOR (PATIO, BALCONIES)	50LX

4. ELECTRICAL DESIGN BY UNIT TYPE

4.1. ADU (ONE STORY - ADAPTABLE)

4.1.1. SERVICE

4.1.1.1. PROVIDE ONE (1) 120/240V INCOMING UTILITY SERVICE FOR THE SINGLE RESIDENTIAL UNIT. THE EXACT SIZE SHALL BE DESIGNED PER ONTARIO ELECTRICAL SAFETY CODE REQUIREMENTS. COORDINATE WITH LOCAL HYDRO UTILITY FOR INCOMING SERVICE WORK.

4.1.1.2. PROVIDE ONE (1) RESIDENTIAL GRADE HYDRO METER AND INSTALL ON THE EXTERIOR WALL OF THE RESIDENTIAL UNIT PER LOCAL HYDRO UTILITY REQUIREMENTS. EXACT QUANTITY OF HYDRO METERS

4.1.1.3. PROVIDE ONE (1) 120/240V RATED ELECTRICAL LOAD CENTRE PANEL AT THE ELECTRICAL CLOSET/CABIENT IN THE UNIT FOR POWER DISTRIBUTION.

4.1.1.4. PROVIDE TELECOMMUNICATION SERVICE AND TERMINATE AT THE ELECTRICAL CLOSET/CABINET IN THE UNIT FOR COMMUNICATION SERVICE DISTRIBUTION.

4.1.2. LIGHTING & LIGHTING CONTROL

4.1.2.1. LIGHTING ILLUMINATION REQUIREMENT SHALL REFER TO SECTION 3.1.2 .

4.1.2.2. VANITY (TASK) LIGHTING SHALL BE DIMMABLE AND MOUNTED AT MINIMUM 1000MM TO 1700MM ABOVE FINISH FLOOR.

4.1.2.3. LIGHT SWITCH SHALL BE ILLUMINATED TYPE IN THE BATHROOM

4.1.2.4. LIGHT SWITCH SHALL BE LUMINANCE (COLOR) CONTRASTED WITH THEIR BACKGROUND IN ALL OTHER SPACES.

4.1.2.5. AT THE LEAST ONE (1) LIGHT SWITCH SHALL BE PROVIDED BESIDE THE BED AT A HEIGHT BETWEEN 550MM AND 650MM ABOVE THE FLOOR.

4.1.3. MOUNTING HEIGHT

4.1.3.1.	LIGHT SWITCH:	MAXIMUM HEIGHT OF 1100MM TO THE CENTRE A.F.F.
4.1.3.2.	THERMOSTAT	MAXIMUM HEIGHT OF 1100MM TO THE CENTRE A.F.F.
4.1.3.3.	INTERCOM	MAXIMUM HEIGHT OF 1100MM TO THE CENTRE A.F.F.
4.1.3.4.	DUPLEX RECEPTACLE	MAXIMUM HEIGHT OF 400MM TO THE CENTRE A.F.F.

5. ADAPTABLE UNIT

5.1. THE DESIGN INTENT FOR THE ADAPTABLE UNIT IS SO THAT IT CAN BE ADAPTED INTO AN ACCESSIBLE UNIT, MEETING CSA/ASC B652 WITH MINIMAL EFFORT AND COST.

5.2. IT IS RECOMMENDED TO INSTALL ALL ELECTRICAL DEVICE AT THE HEIGHT SUITABLE FOR BOTH STANDARD UNIT AND ACCESSIBLE UNIT.

5.3. IT IS RECOMMENDED TO INSTALL ALL RECEPTACLE AT THE SPACING PER ACCESSIBLE UNIT REQUIREMENT TO MINIMIZE ELECTRICAL ALTERATION.

5.4. IT IS RECOMMENDED TO PROVIDE QUAD RECEPTACLE NEXT TO THE BED TO MEET ACCESSIBLE UNIT REQUIREMENT.

5.5. KITCHEN COUNTER RECEPTACLE SHALL BE INSTALLED ALONG THE BACK COUNTER SUITABLE FOR BOTH ADAPTABLE AND ACCESSIBLE UNIT.

5.6. OUTLET CONNECTION FOR STACK DRYER & WASHER IN THE ADAPTABLE UNIT SHALL BE INSTALLED SIDE BY SIDE TO SUIT ACCESSIBLE UNIT CONVERSION.

5.7. PROVIDE ROUGH-IN OUTLET BOX COMPLETE WITH PULL STRING FOR FOLLOWING ITEMS:

5.7.1. LIGHT SWITCH BY THE BED SIDE.

5.7.2. ONE OUTLET BELOW BED AND ONE OUTLET IN THE CEILING OF THE BEDROOM COMPLETE WITH PULL STRING FOR FUTURE ADJUSTABLE BED AND LIFT

5.7.3. OUTLET FOR AUTOMATED DOOR OPENER FOR THE ASSIGNED ADAPTABLE WASHROOM, UNIT ENTRANCE.

5.7.4. OUTLET FOR DOOR BELL, INTERCOM AND SECURITY CAMERA.

5.7.5. OUTLET CONNECTION FOR VANITY LIGHTING IN THE BATHROOM.

5.8. ONE (1) BATHROOM SHALL BE ASSIGNED AS THE ADAPTABLE BATHROOM AND SHALL BE DESIGNED IN ACCORDANCE WITH CSA/ASC B652 REQUIREMENT.

5.9. PROVIDE POWER ASSISTED DOOR ROUGH-IN AT ADAPTABLE BATHROOM DOOR AND MAIN ENTRANCE.

5.10. RECEPTACLE

5.10.1. PROVIDE DUPLEX RECEPTACLE AT A MINIMUM DISTANCE OF 600MM FROM THE CORNER OF THE BEDROOM AND A MAXIMUM DISTANCE OF 2080MM BETWEEN EACH OUTLET.

5.10.2. QUAD RECEPTACLE SHALL BE PROVIDED ON BOTH SIDE OF THE BED.

5.10.3. PROVIDE ONE RECEPTACLE IN THE CEILING FOR FUTURE LIFT ABOVE THE BED..

5.10.4. PROVIDE ONE RECEPTACLE BELOW THE BED TO ACCOMMODATE FUTURE ELECTRICALLY ADJUSTABLE BEDS OR LIFTS.

5.10.5. RECEPTACLE IN THE KITCHEN SHALL BE INSTALLED ON FRONT FACE OF COUNTERS. HOWEVER, IT IS ACCEPTABLE TO BE INSTALLED ALONG THE BACK OF COUNTERS FOR ADAPTABLE UNIT. COORDINATE WITH CLIENT TO CONFIRM EXACT REQUIREMENT.

5.10.6. COORDINATE WITH DESIGN PROFESSION TO CONFIRM KITCHEN APPLIANCES - STOVE OR COOK TOP & WALL OVEN. PROVIDE SUITABLE POWER CONNECTION.

NO.	DATE	DESCRIPTION
1	2025/02/25	ISSUED AS PROTOTYPICAL DRAWING

PROJECT:

CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT
OR CONSTRUCTION

SHEET TITLE:

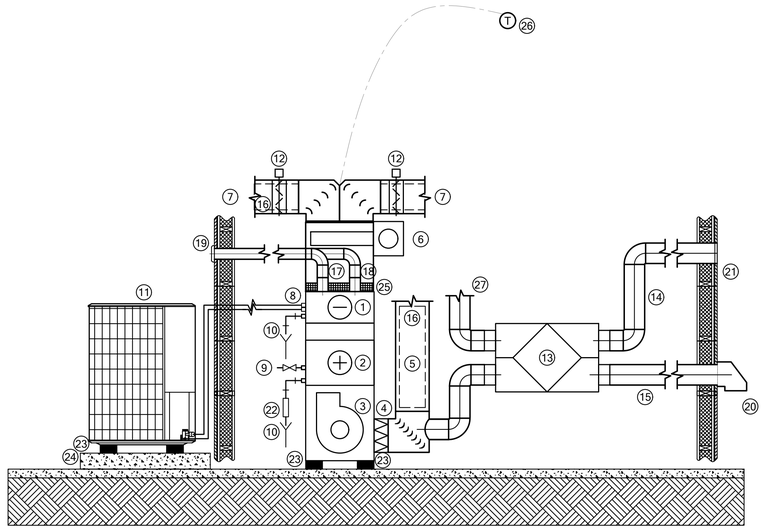
ELECTRICAL OUTLINE SPECIFICATIONS

PROJECT NO: 24112

SCALE: NTS

SHEET NO:

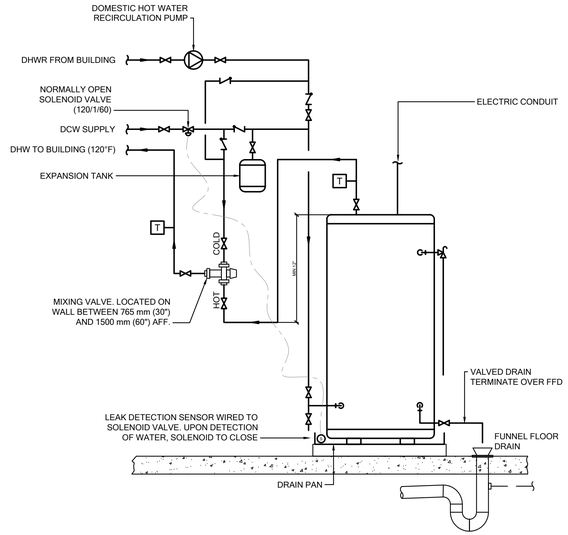
M002



1. COOLING COIL
2. HEATING COIL
3. BLOWER
4. AIR FILTER
5. RETURN AIR DUCT
6. AIR HUMIDIFIER
7. SUPPLY AIR DUCT
8. REFRIGERANT LINES
9. GAS SUPPLY LINE
10. DRAIN LINE WITH TRAP
11. CONDENSER
12. BALANCING DAMPER
13. ENERGY RECOVERY VENTILATOR
14. VENTILATION AIR DUCT
15. EXHAUST AIR DUCT
16. ACOUSTIC LINING (FIRST 8' OF S/A AND R/A DUCTS)
17. FURNACE VENT
18. COMBUSTION AIR INTAKE
19. FLUSH-MOUNT VENT TERMINATION
20. ERV EXAUST MOUNT
21. VENTILATION INTAKE LOUVRE
22. ACID NEUTRALIZER
23. NEOPRENE ISOLATOR
24. CONCRETE PAVER
25. FLEXIBLE DUCT CONNECTION
26. THERMOSTAT
27. EXHAUST AIR DUCT FROM WASHROOM

DETAIL OF FURNACE AND ACESSORIES

SCALE: NTS



DETAIL OF ELECTRIC DHW TANK

SCALE: NTS

ELECTRICAL LEGEND

SYMBOL	DESCRIPTION
SA/CO	120V COMBINATION SMOKE/CARBON MONOXIDE ALARM COMPLETE WITH STROBE, AUDIO ALARM AND BATTERY BACKUP.
	SURFACE OR FLUSH MOUNTED ELECTRICAL PANELS
M	HYDRO METER

ABBREVIATIONS

SYMBOL	DESCRIPTION
S/A	SUPPLY AIR
R/A	RETURN AIR
E/A	EXHAUST AIR
O/A	OUTDOOR AIR

PLUMBING AND DRAINAGE

SYMBOL	DESCRIPTION
	P-TRAP
CO	CLEAN OUT (FLOOR & CEILING)
FD	ROUND FLOOR DRAIN
HD	HUB DRAIN
	DOMESTIC COLD WATER (DCW) PIPING
	DOMESTIC HOT WATER (DHW) PIPING
SAN	SANITARY DRAINAGE (SAN) PIPING
M	WATER METER

MECHANICAL PIPING

SYMBOL	DESCRIPTION
	PIPE DOWN
	PIPE UP
	PIPE UP & DOWN
	VALVE
	BALANCING VALVE
	PIPE CONTINUATION
CD	CONDENSATE DRAINAGE PIPING
	FLOW DIRECTION

DUCTWORK

SYMBOL	DESCRIPTION
	SUPPLY AIR DUCT UP & DOWN
	RETURN / EXHAUST AIR DUCT UP & DOWN
	ROUND DUCT UP & DOWN
	DUCT CONTINUATION (ROUND & RECTANGULAR)
	SUPPLY / RETURN GRILLE
	RETURN / EXHAUST GRILLE
F	TOILET EXHAUST FAN
	FLOOR GRILLE
	CEILING GRILLE
	FLOOR BOOT
T	THERMOSTAT
U/C	DOOR UNDERCUT

CMHC SCHL

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PROJECT:

CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT OR CONSTRUCTION

SHEET TITLE:

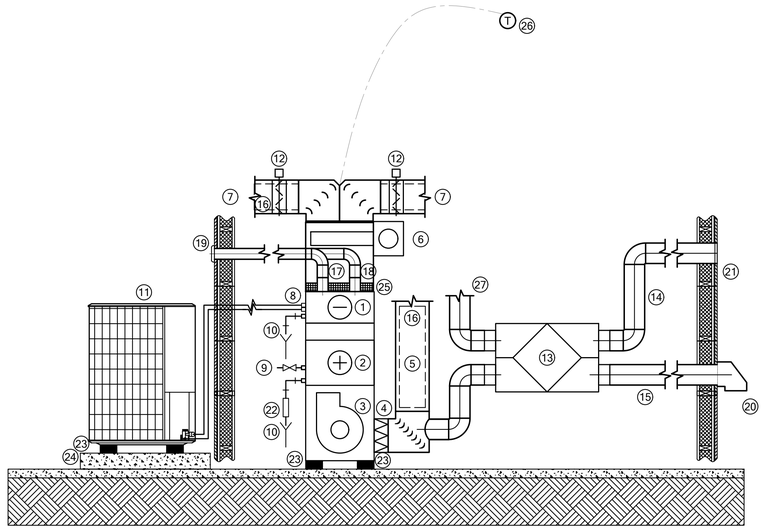
MECHANICAL & ELECTRICAL DETAILS & SYMBOLS - BASE OPTION

PROJECT NO: 24112

SCALE: NTS

SHEET NO:

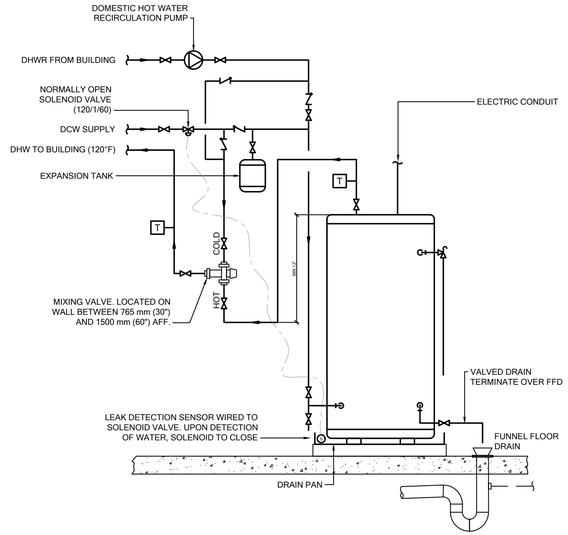
M003A



1. HEAT PUMP COIL
2. GAS HEATING COIL
3. BLOWER
4. AIR FILTER
5. RETURN AIR DUCT
6. AIR HUMIDIFIER
7. SUPPLY AIR DUCT
8. REFRIGERANT LINES
9. GAS SUPPLY LINE
10. DRAIN LINE WITH TRAP
11. HEAT PUMP
12. BALANCING DAMPER
13. ENERGY RECOVERY VENTILATOR
14. VENTILATION AIR DUCT
15. EXHAUST AIR DUCT
16. ACOUSTIC LINING (FIRST 8' OF S/A AND R/A DUCTS)
17. FURNACE VENT
18. COMBUSTION AIR INTAKE
19. FLUSH-MOUNT VENT TERMINATION
20. ERV EXAUST MOUNT
21. VENTILATION INTAKE LOUVRE
22. ACID NEUTRALIZER
23. NEOPRENE ISOLATOR
24. CONCRETE PAVER
25. FLEXIBLE DUCT CONNECTION
26. THERMOSTAT
27. EXHAUST AIR DUCT FROM WASHROOM

DETAIL OF FURNACE AND ACESSORIES

SCALE: NTS



DETAIL OF ELECTRIC DHW TANK

SCALE: NTS

ELECTRICAL LEGEND

SYMBOL	DESCRIPTION
SA/CO	120V COMBINATION SMOKE/CARBON MONOXIDE ALARM COMPLETE WITH STROBE, AUDIO ALARM AND BATTERY BACKUP.
	SURFACE OR FLUSH MOUNTED ELECTRICAL PANELS
M	HYDRO METER

ABBREVIATIONS

SYMBOL	DESCRIPTION
S/A	SUPPLY AIR
R/A	RETURN AIR
E/A	EXHAUST AIR
O/A	OUTDOOR AIR

PLUMBING AND DRAINAGE

SYMBOL	DESCRIPTION
	P-TRAP
CO	CLEAN OUT (FLOOR & CEILING)
FD	ROUND FLOOR DRAIN
HD	HUB DRAIN
	DOMESTIC COLD WATER (DCW) PIPING
	DOMESTIC HOT WATER (DHW) PIPING
SAN	SANITARY DRAINAGE (SAN) PIPING
M	WATER METER

MECHANICAL PIPING

SYMBOL	DESCRIPTION
	PIPE DOWN
	PIPE UP
	PIPE UP & DOWN
	VALVE
	BALANCING VALVE
	PIPE CONTINUATION
CD	CONDENSATE DRAINAGE PIPING
	FLOW DIRECTION

DUCTWORK

SYMBOL	DESCRIPTION
	SUPPLY AIR DUCT UP & DOWN
	RETURN / EXHAUST AIR DUCT UP & DOWN
	ROUND DUCT UP & DOWN
	DUCT CONTINUATION (ROUND & RECTANGULAR)
	SUPPLY / RETURN GRILLE
	RETURN / EXHAUST GRILLE
F	TOILET EXHAUST FAN
	FLOOR GRILLE
	CEILING GRILLE
	FLOOR BOOT
T	THERMOSTAT
U/C	DOOR UNDERCUT

CMHC SCHL

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NO.	DATE	DESCRIPTION
1	2025/02/25	ISSUED AS PROTOTYPICAL DRAWING

PROJECT:

CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT OR CONSTRUCTION

SHEET TITLE:

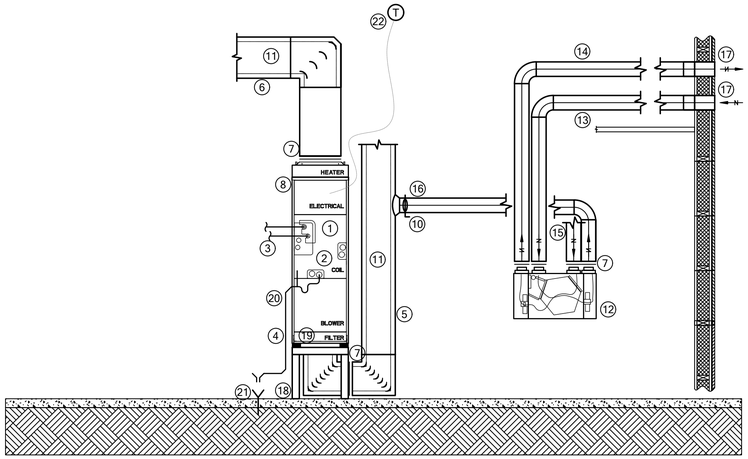
MECHANICAL & ELECTRICAL DETAILS & SYMBOLS - ALTERNATE OPTION 1

PROJECT NO: 24112

SCALE: NTS

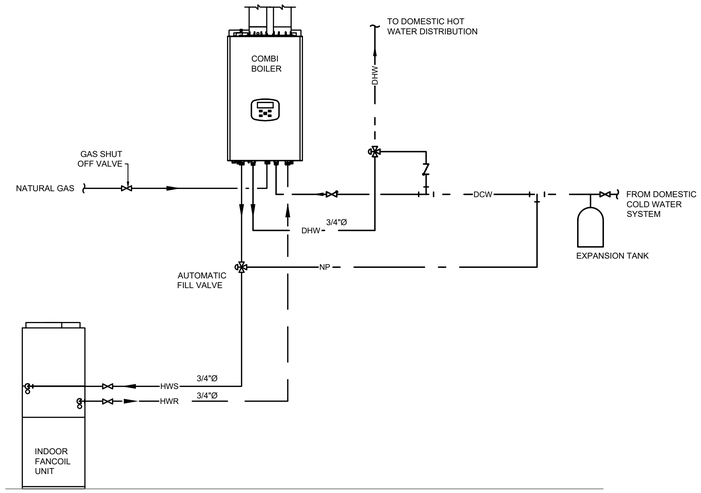
SHEET NO:

M003B



1. VRF AIR HANDLER
2. DX COIL
3. REFRIGERANT PIPING TO VRF OUTDOOR CONDENSING UNIT
4. AIR FILTER
5. RETURN AIR DUCT
6. SUPPLY AIR DUCT
7. FLEXIBLE CONNECTION
8. HOT WATER HEATER COIL
10. BALANCING DAMPER
11. 25mm ACOUSTIC LINING (ALL S/A DUCTWORK AND FIRST 3.0M OF R/A DUCTWORK)
12. ENERGY RECOVERY VENTILATOR
13. INTAKE AIR DUCT INSULATED
14. EXAUST AIR DUCT CW BACKDRAFT DAMPER
15. EXHAUST AIR DUCT FROM WASHROOM
16. FRESH AIR CONNECTION TO R/A DUCT
17. INTAKE AND EXHAUST TERMINATION (LOUVRE BY OTHERS) EXHAUST TERMINATION TO HAVE SPRING LOADED BACKDRAFT DAMPER
18. VRF AIR HANDLER STAND
19. NEOPRENE ISOLATOR
20. DRAIN LINE WITH TRAP AND ANTI SIPHON AIR VENT
21. HUB DRAIN
22. THERMOSTAT

DETAIL OF VERTICAL VRF UNIT
SCALE: NTS



HEATING WATER FLOW DIAGRAM
N.T.S.

ELECTRICAL LEGEND

SYMBOL	DESCRIPTION
SA/C	120V COMBINATION SMOKE/CARBON MONOXIDE ALARM COMPLETE WITH STROBE, AUDIO ALARM AND BATTERY BACKUP.
	SURFACE OR FLUSH MOUNTED ELECTRICAL PANELS
M	HYDRO METER

ABBREVIATIONS

SYMBOL	DESCRIPTION
S/A	SUPPLY AIR
R/A	RETURN AIR
E/A	EXHAUST AIR
O/A	OUTDOOR AIR

PLUMBING AND DRAINAGE

SYMBOL	DESCRIPTION
	P-TRAP
CO	CLEAN OUT (FLOOR & CEILING)
FD	ROUND FLOOR DRAIN
HD	HUB DRAIN
	DOMESTIC COLD WATER (DCW) PIPING
	DOMESTIC HOT WATER (DHW) PIPING
SAN	SANITARY DRAINAGE (SAN) PIPING
M	WATER METER

MECHANICAL PIPING

SYMBOL	DESCRIPTION
	PIPE DOWN
	PIPE UP
	PIPE UP & DOWN
	VALVE
	BALANCING VALVE
	PIPE CONTINUATION
CD	CONDENSATE DRAINAGE PIPING
	FLOW DIRECTION

DUCTWORK

SYMBOL	DESCRIPTION
	SUPPLY AIR DUCT UP & DOWN
	RETURN / EXHAUST AIR DUCT UP & DOWN
	ROUND DUCT UP & DOWN
	DUCT CONTINUATION (ROUND & RECTANGULAR)
	SUPPLY / RETURN GRILLE
	RETURN / EXHAUST GRILLE
F	TOILET EXHAUST FAN
	FLOOR GRILLE
	CEILING GRILLE
	FLOOR BOOT
T	THERMOSTAT
U/C	DOOR UNDERCUT

CMHC SCHL

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PROJECT:

CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT OR CONSTRUCTION

SHEET TITLE:

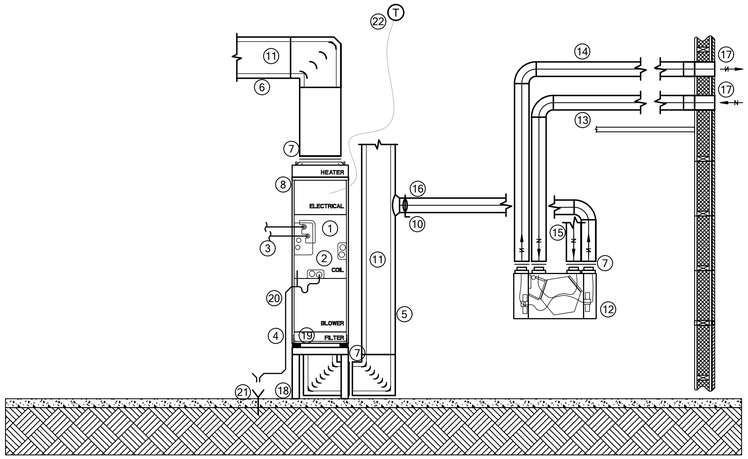
MECHANICAL & ELECTRICAL DETAILS & SYMBOLS - ALTERNATE OPTION 2

PROJECT NO: 24112

SCALE: NTS

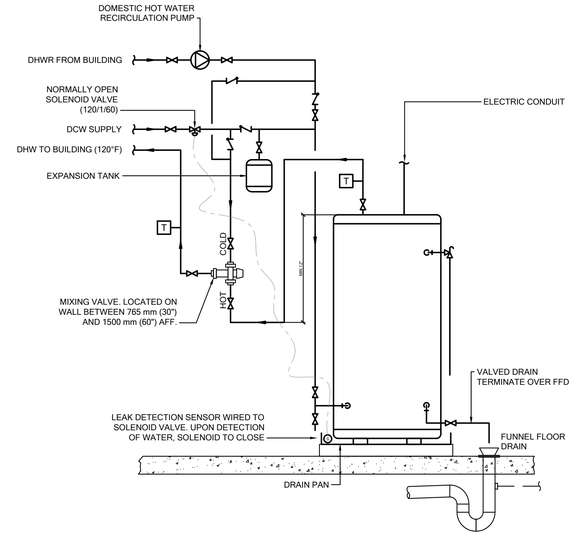
SHEET NO:

M003C



1. VRF AIR HANDLER
2. DX COIL
3. REFRIGERANT PIPING TO VRF OUTDOOR CONDENSING UNIT
4. AIR FILTER
5. RETURN AIR DUCT
6. SUPPLY AIR DUCT
7. FLEXIBLE CONNECTION
8. ELECTRIC HEATING COIL
10. BALANCING DAMPER
11. 25mm ACOUSTIC LINING (ALL S/A DUCTWORK AND FIRST 3.0M OF R/A DUCTWORK)
12. ENERGY RECOVERY VENTILATOR
13. INTAKE AIR DUCT INSULATED
14. EXAUST AIR DUCT CW BACKDRAFT DAMPER
15. EXHAUST AIR DUCT FROM WASHROOM
16. FRESH AIR CONNECTION TO R/A DUCT
17. INTAKE AND EXHAUST TERMINATION (LOUVRE BY OTHERS) EXHAUST TERMINATION TO HAVE SPRING LOADED BACKDRAFT DAMPER
18. VRF AIR HANDLER STAND
19. NEOPRENE ISOLATOR
20. DRAIN LINE WITH TRAP AND ANTI SIPHON AIR VENT
21. HUB DRAIN
22. THERMOSTAT

DETAIL OF VERTICAL VRF UNIT
SCALE: NTS



DETAIL OF ELECTRIC DHW TANK
SCALE: NTS

ELECTRICAL LEGEND

SYMBOL	DESCRIPTION
SA/CO	120V COMBINATION SMOKE/CARBON MONOXIDE ALARM COMPLETE WITH STROBE, AUDIO ALARM AND BATTERY BACKUP.
	SURFACE OR FLUSH MOUNTED ELECTRICAL PANELS
M	HYDRO METER

ABBREVIATIONS

SYMBOL	DESCRIPTION
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SAN	SANITARY DRAINAGE (SAN) PIPING
M	WATER METER

MECHANICAL PIPING

SYMBOL	DESCRIPTION
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	PIPE UP & DOWN
	VALVE
	BALANCING VALVE
	PIPE CONTINUATION
CD	CONDENSATE DRAINAGE PIPING
	FLOW DIRECTION

DUCTWORK

SYMBOL	DESCRIPTION
	SUPPLY AIR DUCT UP & DOWN
	RETURN / EXHAUST AIR DUCT UP & DOWN
	ROUND DUCT UP & DOWN
	DUCT CONTINUATION (ROUND & RECTANGULAR)
	SUPPLY / RETURN GRILLE
	RETURN / EXHAUST GRILLE
F	TOILET EXHAUST FAN
	FLOOR GRILLE
	CEILING GRILLE
	FLOOR BOOT
T	THERMOSTAT
U/C	DOOR UNDERCUT

CMHC SCHL

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NO.	DATE	DESCRIPTION
1	2025/02/25	ISSUED AS PROTOTYPICAL DRAWING

PROJECT:

CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT OR CONSTRUCTION

SHEET TITLE:

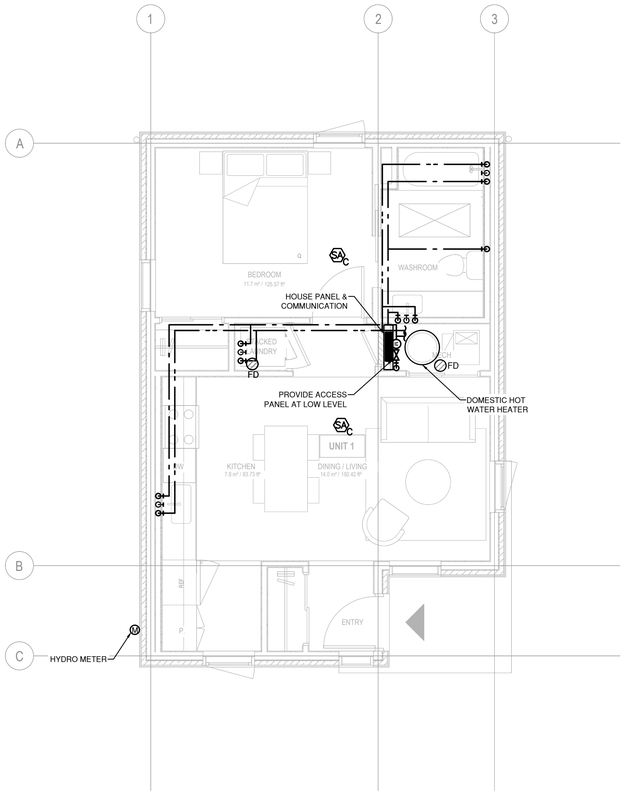
MECHANICAL & ELECTRICAL DETAILS & SYMBOLS - ALTERNATE OPTION 3

PROJECT NO: 24112

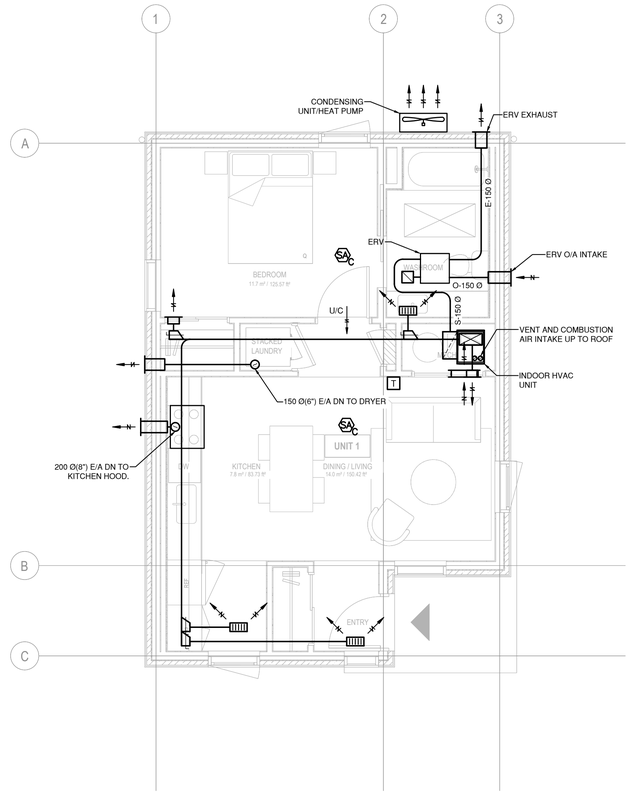
SCALE: NTS

SHEET NO:

M003D



1 M-100 PLUMBING & ELECTRICAL PLAN
Scale: 1:50



2 M-100 HVAC PLAN
Scale: 1:50

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NO.	DATE	DESCRIPTION
1	2025/02/25	ISSUED AS PROTOTYPICAL DRAWING

PROJECT:

CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT OR CONSTRUCTION

SHEET TITLE:

ON ACCESSORY DWELLING UNIT 01 - GROUND FLOOR PLUMBING, ELECTRICAL AND HVAC

PROJECT NO: 24112

SCALE: AS NOTED

SHEET NO:

M100

CMHC HOUSING DESIGN CATALOGUE

ACCESSORY DWELLING UNIT 01 - ENHANCED ACCESSIBILITY

MECHANICAL, ELECTRICAL & PLUMBING DRAWINGS

MECHANICAL & ELECTRICAL DRAWING LIST

DRAWING NO.	DRAWING NAME
M000	MECHANICAL, ELECTRICAL & PLUMBING COVER SHEET
M001A	MECHANICAL OUTLINE SPECIFICATIONS - BASE OPTION
M001B	MECHANICAL OUTLINE SPECIFICATIONS - ALTERNATE OPTION 1
M001C	MECHANICAL OUTLINE SPECIFICATIONS - ALTERNATE OPTION 2
M001D	MECHANICAL OUTLINE SPECIFICATIONS - ALTERNATE OPTION 3
M002	ELECTRICAL OUTLINE SPECIFICATIONS
M003A	MECHANICAL & ELECTRICAL DETAILS & SYMBOLS - BASE OPTION
M003B	MECHANICAL & ELECTRICAL DETAILS & SYMBOLS - ALTERNATE OPTION 1
M003C	MECHANICAL & ELECTRICAL DETAILS & SYMBOLS - ALTERNATE OPTION 2
M003D	MECHANICAL & ELECTRICAL DETAILS & SYMBOLS - ALTERNATE OPTION 3
M100	ENHANCED ACCESSIBILITY UNIT - GROUND FLOOR PLUMBING, ELECTRICAL & HVAC

CMHC SCHL

NO.	DATE	DESCRIPTION
1	2025/02/25	ISSUED AS PROTOTYPICAL DRAWING

PROJECT:

CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT
OR CONSTRUCTION

SHEET TITLE:

ENHANCED ACCESSIBILITY MECHANICAL, ELECTRICAL & PLUMBING COVER SHEET

PROJECT NO: 24112

SCALE: NTS

SHEET NO:

M000

MECHANICAL OUTLINE SPECIFICATIONS - BASE OPTION

1. PRIMARY HEAT FROM GAS FIRED FURNACE.
2. COOLING THROUGH SPLIT DX COOLING COIL AND CONDENSING UNIT.
3. NO SUPPLEMENTAL HEAT.
4. ELECTRIC DOMESTIC HOT WATER TANK.

DESIGN CRITERIA AND REQUIREMENTS

1. THE MECHANICAL SYSTEMS SHALL BE DESIGNED IN ACCORDANCE WITH THE ONTARIO BUILDING CODE (OBC), SPECIFIC REQUIREMENTS OF THE LOCAL AUTHORITY HAVING JURISDICTION, DESIGN PRINCIPLES AND STANDARDS OBTAINED FROM THE OWNER AND DESIGN TEAM AS WELL AS STANDARDS OF GOOD ENGINEERING PRACTICES.
2. WORK SHALL BE COMPLETED IN ACCORDANCE WITH STANDARDS PUBLISHED BY THE FOLLOWING PARTIAL LIST OF AUTHORITIES:
   - A. THERMAL ENVIRONMENTAL CONDITIONS FOR HUMAN OCCUPANCY, ANSI/ASHRAE STANDARD 55 (LATEST EDITION);
   - B. VENTILATION REQUIREMENTS TO BE BASED ON MOST CURRENT OBC PART 9 TABLE 9.32.3.3.
   - C. HANDBOOKS PUBLISHED BY AMERICAN SOCIETY OF HEATING, REFRIGERATION AND AIR CONDITIONING ENGINEERS (ASHRAE).
3. HEATING AND COOLING CALCULATIONS TO BE BASED ON MOST CURRENT CLIMATICAL DATA (SB-1) AND ENERGY EFFICIENCY OF HOUSING COMPLIANCE PACKAGES (SB-12) PUBLISHED IN THE ONTARIO BUILDING CODE AND SHALL BE COMPLETED IN ACCORDANCE WITH THE STANDARD CAN/CSA-F280-12 (R2021) TO DETERMINE THE SIZE/CAPACITY OF THE HEATING/AIR CONDITIONING SYSTEMS.
   - A. ALL OCCUPIED AREAS WILL BE AIR CONDITIONED WITH THE FOLLOWING ENVIRONMENTAL CONDITIONS;
     - a. WINTER: 22.0°C ± 1°C AND 20% ± 5% RELATIVE HUMIDITY
     - b. SUMMER: 24.0°C ± 1°C AND 60% ± 5% RELATIVE HUMIDITY
4. ALL UNPROTECTED MECHANICAL PENETRATIONS ON EXPOSING BUILDING FACE MORE THAN 130MM2 SHALL BE COORDINATED WITH DESIGNER AND NOTED ON ARCHITECTURAL DRAWINGS AS PER OBC 9.10.14.6.

SITE SERVICES

1. NATURAL GAS SERVICE:
   - A. ONE (1) UTILITY NATURAL GAS SERVICE WILL BE PROVIDED TO THE BUILDING AND RUN TO INDIVIDUAL GAS METERS PROVIDED FOR EACH RESIDENTIAL UNIT.
   - B. GROUP AND LOCATE GAS METERS ABOVE GRADE ON ONE SIDE OF THE BUILDING AGAINST AN EXTERIOR WALL. RUN INDIVIDUAL GAS LINES FROM GAS METERS TO THE RESPECTIVE RESIDENTIAL UNITS.
   - C. THE NATURAL GAS SYSTEM DESIGN AND INSTALLATION SHALL COMPLY WITH THE LATEST REQUIREMENTS OF CSA B149, NFPA STANDARDS, OBC, AND LOCAL REGULATORY REQUIREMENTS.
   - D. MATERIAL:
     - a. UNDERGROUND PIPING SHALL BE COATED BLACK STEEL "YELLOW JACKET" SCHEDULE 40 MILD BLACK CARBON STEEL; OR, SAFETY YELLOW COLOURED POLYETHYLENE PIPE, FITTINGS, AND JOINTS TO CSA B137.4; OR, COATED TYPE "K" SOFT TEMPER COPPER WITH FACTORY APPLIED EXTERNAL YELLOW LPASTIC COATING, STAMPED WITH DESIGNATION C37700 TO INDICATE FORGED BRASS.
     - b. EXPOSED SCREW PIPING TO BE SCHEDULE 40 MILD BLACK CARBON STEEL, ASTM A53 GRADE B COMPLETE WITH MALLEABLE CAST IRON SCREWED FITTINGS TO ANSI B2.1, AND SCREWED JOINTS.
     - c. EXPOSED WELDED PIPING TO BE SCHEDULE 40 MILD BLACK CARBON STEEL, ASTM A53 GRADE B, MILL OR SITE BEVELLED, COMPLETE WITH FACTORY MADE FORGED STEEL BUTT WELDING FITTINGS AND WELDED JOINTS.
2. WATER SERVICES:
   - A. ONE (1) POTABLE WATER SERVICE WILL BE PROVIDED TO THE BUILDING THEN THE SERVICE WILL SPLIT AND RUN TO INDIVIDUAL UTILITY METER INSIDE EACH RESIDENTIAL UNIT.
3. SANITARY SEWERS:
   - A. ONE (1) SANITARY SERVICE CONNECTION WILL BE PROVIDED TO THE BUILDING COMPLETE WITH SAMPLING PORT IN COORDINATION WITH THE SITE SERVICE ENGINEER. COORDINATE LOCATION AND INVERT OF INCOMING CONNECTION WITH SITE SERVICES CONSULTANT.
   - B. ROOF GUTTERS TO BE PIPED AND ROUTED DOWN THE SIDE OF THE BUILDING TO SPILL ON GRADE.

PLUMBING AND DRAINAGE

1. POTABLE WATER:
   - A. AN INCOMING POTABLE WATER CONNECTION COMPLETED WITH A METER ASSEMBLY WILL SUPPLY WATER TO EACH RESIDENTIAL UNIT. OPTIONAL WATER FILTRATION INCLUDING CARBON ACTIVATED FILTERS, UV AND RO CAN BE PROVIDED IN AREAS WHERE WATER QUALITY IS OF CONCERN.
   - B. POLYETHYLENE PEX PIPING WILL BE PROVIDED TO DISTRIBUTE COLD AND HOT WATER THROUGHOUT THE UNIT.
     - a. TUBE SHALL BE CROSS-LINKED POLYETHYLENE (PEX) MANUFACTURED BY PEX-A OR PEROXIDE METHOD. PEX TUBING SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM F876, ASTM F877 AND CAN/CSA-B137.5. THE TUBE SHALL BE LISTED TO ASTM BY AN INDEPENDENT THIRD PARTY AGENCY.
     - b. FITTINGS SHALL BE MANUFACTURED OF ENGINEERED PLASTIC (EP). FITTINGS SHALL BE PEX-A COLD EXPANSION TYPE CERTIFIED TO ASTM F1960.
       - (1)FITTINGS SHALL BE SUPPLIED BY THE PEX TUBING MANUFACTURER.
       - (2)PEX-A COLD EXPANSION TYPE FITTINGS SHALL BE AN ASSEMBLY CONSISTING OF INSERT AND PEX-A COLD EXPANSION RING.
       - (3)FITTING TYPE: UPONOR ENGINEERED PLASTIC (EP).
2. DRAINAGE:
   - A. ALL SANITARY DRAIN AND MAIN VENT STACKS SHALL BE PLASTIC ABS WITH GLUED CONNECTIONS. WHERE REQUIRED TO MEET FIRE SPREAD AND SMOKE DEVELOPMENT RATINGS METALLIC PIPING OR XFR PIPING IS TO BE PROVIDED BASED ON LOCAL JURISDICTION APPROVAL.
   - B. UNDERGROUND DRAINAGE PIPING SHALL BE PVC DR35 RIGID SEWER PIPING. PIPING 4" AND LARGER TO BE GREEN PVC HUB AND SPIGOT SEWER PIPE AND FITTINGS TO CAN/CSA B182.2. SIZE 3" PIPE TO BE PVC WITH SOLVENT WELD JOINTS CERTIFIED TO CSA B182.1 AND COLOUR CODED AS PER LOCAL CODES.
3. DOMESTIC HOT WATER PRODUCTION:
   - A. AN ELECTRIC DOMESTIC HOT WATER (DHW) TANK WILL BE PROVIDED FOR EACH RESIDENTIAL UNIT.
   - B. DOMESTIC HOT WATER SHALL BE STORED AT A MINIMUM OF 52°C (125°F).
   - C. A MIXING VALVE SHALL BE PROVIDED TO SUPPLY 49°C (120°F) DOMESTIC HOT WATER TO THE FIXTURES.
4. PRESSURE BALANCING TYPE MIXING VALVES SHALL BE PROVIDED FOR ALL SHOWERS.
5. DRAIN WATER HEAT RECOVERY COIL SHALL BE PROVIDED FOR EACH MULTI-STOREY UNIT.
6. PLUMBING FIXTURES SHALL BE LOW FLOW AND OF FIRST QUALITY.
7. SANITARY DRAINS WILL BE COLLECTED AND CONNECTED TO THE MUNICIPAL SANITARY NETWORK. UNLESS OTHERWISE NOTED, SLOPE ALL 75 MM (3") DRAINAGE PIPING AT 2% SLOPE AND ALL 100 MM (4") AND LARGER DRAINAGE PIPING AT 1% SLOPE.

HEATING, VENTILATION, AND AIR CONDITIONING (HVAC)

1. HEATING AND COOLING SYSTEMS:
   - A. HEATING AND COOLING WILL BE PRODUCED BY A 96% EFFICIENT GAS FURNACE COMPLETE WITH A SPLIT DIRECT EXPANSION (DX) COOLING COIL.
   - B. THE CAPACITY OF THE GAS FURNACE AND ITS ASSOCIATED DX COOLING COIL SHALL BE SIZED AND SELECTED TO MEET THE FULL HEATING AND COOLING LOAD REQUIREMENTS OF THE RESIDENTIAL UNIT.
   - C. THE GAS FURNACE TO BE COMPLETE WITH MINIMUM MERV 8 FILTRATION.
   - D. THE OUTDOOR CONDENSING UNIT IS TO BE LOCATED WITHIN CLOSE PROXIMITY TO THE INDOOR UNIT AND CONNECTED WITH REFRIGERANT PIPING. THE OUTDOOR CONDENSING UNIT WILL BE ABLE TO OPERATE FROM 5°C (41°F) TO 35°C (95°F).
   - E. PROPANE OR NATURAL GAS SERVICE WITH METER SHALL BE PROVIDED TO SERVE THE FURNACE.
2. VENTILATION AND EXHAUST SYSTEMS:
   - A. VENTILATION AIR WILL BE PROVIDED BY AN ENERGY RECOVERY VENTILATOR (ERV) THAT WILL TRANSFER ENERGY FROM THE PRIMARY BATHROOM EXHAUST TO PRE-CONDITION OUTDOOR AIR THAT WILL BE DUCTED BACK TO THE INDOOR UNIT. SIZE OF ERV TO BE DETERMINED BASED ON OBC PART 9 REQUIREMENT. ERV PERFORMANCE SHALL HAVE A MINIMUM OF 75% EFFECTIVENESS. WHERE REQUIRED, AN ELECTRIC DUCT HEATER SHALL BE PROVIDED. THE ERV SHALL BE CONTROLLED BY A LOCAL TIMER SWITCH.
   - B. SECONDARY WASHROOMS WILL BE PROVIDED WITH DEDICATED CEILING MOUNTED TOILET EXHAUST FANS COMPLETE WITH LOCAL SWITCH.
   - C. CLOTHES DRYERS WILL BE PROVIDED WITH A LINT TRAP AND DRYER BOOSTER FAN CONNECTED TO A CURRENT SENSOR TO AID IN DRYER EXHAUST. LINT TRAPS WILL BE PROVIDED ON THE SUCTION SIDE OF THE FAN WITHIN THE SUITE LAUNDRY ROOM.
   - D. KITCHEN HOOD EXHAUSTS WILL BE SIZED FOR MINIMUM 150 CFM AND DUCTED TO OUTDOORS.
   - E. ALL EXHAUST DUCTWORK WILL BE DISCHARGED TO THE EXTERIOR THROUGH THE EXTERIOR WALLS OF THE UNIT OR THROUGH THE ROOF FOR THE TOP LEVEL.
   - F. EXHAUST DUCTWORK SHALL BE INSULATED FOR THE FIRST 10FT FROM THE EXTERIOR LOUVRE.
3. AIR DISTRIBUTION:
   - A. DUCTWORK SHALL BE GALVANIZED SHEET METAL UNLESS OTHERWISE INDICATED. DUCTS SHALL BE SIZED AT A PRESSURE DROP OF 0.08" (20PA) PER 100' (30.5M) WITH MAXIMUM AIR VELOCITIES OF 1400 FEET (427M) PER MINUTE.
   - B. DUCTWORK TO BE INSULATED TO MEET ASHRAE 90.1 AND THE GOVERNING AUTHORITY REQUIREMENTS.
   - C. PROVIDE ACOUSTIC LINING FOR ALL SUPPLY AND RETURN AIR DUCTWORK SERVING MECHANICAL EQUIPMENT WITH FANS TO A MAXIMUM OF 4.5M (15') FROM THE EQUIPMENT, MEASURED OUTWARD IN ALL DIRECTIONS.
   - D. SUPPLY AIR FROM THE INDOOR UNIT SHALL BE DUCTED TO EACH ROOM VIA 200X100 SIDEWALL GRILLES OR FLOOR REGISTERS.
   - E. EACH ROOM SHALL HAVE A RETURN AIR GRILLE OR AN 1" (25MM) DOOR UNDERCUT FOR AIR TRANSFER.
   - F. PROVIDE BALANCING DAMPERS AT ALL DUCT BRANCHES FOR AIR BALANCING.
   - G. A PROGRAMMABLE THERMOSTAT WITH OCCUPANCY SENSOR SHALL BE PROVIDED TO CONTROL THE SUITE HVAC SYSTEM.
   - H. DUCTWORK PENETRATING CEILING MEMBRANES REQUIRED TO HAVE A FIRE-RESISTANCE RATING SHALL CONFORM TO REQUIREMENTS MENTIONED PER OBC 9.10.5.1. (3).
4. REFRIGERATION:
   - A. DESIGN AND INSTALLATION OF REFRIGERATION SYSTEM SHALL BE IN ACCORDANCE WITH CSA B52 MECHANICAL REFRIGERATION CODE, ONTARIO BUILDING CODE, AHRI, AND EQUIPMENT MANUFACTURERS RECOMMENDATIONS.
   - B. NEW REFRIGERATION PIPING SHALL BE ACR SEAMLESS COPPER TUBING SUITABLE FOR AIR CONDITIONING OR REFRIGERATION SYSTEMS.
   - C. KEEP TUBING RUNS AND NUMBER OF ELBOWS AND FITTINGS TO A MINIMUM.
   - D. ENSURE TUBING IS DEHYDRATED, TESTED, ADEQUATELY CHARGED, AND GAS TIGHT.
   - E. PIPING SHALL BE INSULATED WITH FLEXIBLE ELASTOMERIC, CLOSED CELL, SLEEVE TYPE LONGITUDINALLY SPLIT SELF-SEAL FORMED PLASTIC PIPE INSULATION EQUAL TO ARMACELL AP/ARMAFLEX SS. INSULATION SHALL BE 25 MM (1") THICK.
   - F. COORDINATE AND RUN ALL REFRIGERANT LINES INSIDE DESIGNATED CAVITY. NO EXTERIOR RUNS PERMITTED UNLESS OTHERWISE INSTRUCTED.
5. FIRE STOPPING AND SMOKE SEAL SYSTEMS
   - A. ASBESTOS-FREE, ELASTOMERIC MATERIALS AND INTUMESCENT MATERIALS, TESTED, LISTED AND LABELLED BY ULC IN ACCORDANCE WITH CAN/ULC S115, AND CAN/ULC S101 FOR INSTALLATION IN ULC DESIGNATED FIRESTOPPING, AND SMOKE SEAL SYSTEMS TO PROVIDE A POSITIVE FIRE, WATER AND SMOKE SEAL AND A FIRE RESISTANCE RATING (FLAME, HOSE STREAM AND TEMPERATURE) NO LESS THAN FIRE RATING FOR SURROUNDING CONSTRUCTION.
   - B. FIRESTOPPING AND SMOKE SEAL MATERIAL SYSTEM TO BE SPECIFICALLY ULC CERTIFIED WITH DESIGNATED REFERENCE NUMBER FOR ITS SPECIFIC INSTALLATION.
   - C. SMOKE AND FIRE SEAL MATERIALS AND MANUFACTURERS MUST BE SPECIFICALLY APPROVED FOR EACH APPLICATION OF PENETRATED SURFACES, AS APPROVED BY FM GLOBAL AND LISTED IN FM GLOBAL APPROVAL GUIDE. LISTED COMPANIES HEREIN AND OTHER MANUFACTURERS ARE ONLY ACCEPTABLE IF COMPLIANT WITH THESE REQUIREMENTS.
   - D. MATERIALS ARE TO BE COMPATIBLE WITH ABUTTING DISSIMILAR MATERIALS AND FINISHES AND COMPLETE WITH PRIMERS, DAMMING AND BACK-UP MATERIALS, SUPPORTS, AND ANCHORING DEVICES IN ACCORDANCE WITH FIRESTOPPING MANUFACTURER'S RECOMMENDATIONS AND ULC TESTED ASSEMBLY. COORDINATE MATERIAL REQUIREMENTS WITH TRADES SUPPLYING ABUTTING AREAS OF MATERIALS.
   - E. TYPICALLY, FOR OPENINGS OF UP TO 250 MM (10") IN DIAMETER, PROVIDE PUTTY PAD TYPE FIRESTOP MATERIALS INTUMESCENT, NON-HARDENING, WATER RESISTANT PUTTIES CONTAINING NO SOLVENTS, INORGANIC FIBRES OR SILICONE COMPOUNDS.
   - F. TYPICALLY, FOR OPENINGS OF GREATER THAN 250 MM (10") IN DIAMETER, AND FOR RECTANGULAR OPENINGS, PROVIDE PILLOW TYPE FIRESTOP MATERIALS RE-ENTERABLE, NON-CURING, MINERAL FIBRE CORE ENCAPSULATED ON SIX SIDES WITH INTUMESCENT COATING CONTAINED IN A FLAME RETARDANT POLY BAG.
   - G. SUPPLY PRODUCTS OF A SINGLE MANUFACTURER FOR USE ON WORK OF THIS DIVISION.
   - H. INSTALLER TO BE MANUFACTURER TRAINED AND CERTIFIED ON SPECIFIC PRODUCT.
   - I. INCLUDE FOR MANUFACTURER'S AUTHORIZED REPRESENTATIVE TO INSPECT AND VERIFY EACH INSTALLATION AND APPLICATION.
   - J. ACCEPTABLE CERTIFICATION TO ALSO INCLUDE CERTIFICATION BY UNDERWRITERS LABORATORIES OF NORTHBROOK IL, USING TESTS CONFORMING TO ULC-S115 AND GIVEN CUL LISTING PUBLISHED BY UL IN THEIR "PRODUCTS CERTIFIED FOR CANADA (CUL) DIRECTORY".

MECHANICAL EQUIPMENT - BASE OPTION

GAS FIRED FURNACE

1. GENERAL
   - A. FURNACES AND INSTALLATION OF FURNACES ARE TO BE IN ACCORDANCE WITH REQUIREMENTS OF FOLLOWING:
     - a. APPLICABLE PROVINCIAL CODES AND STANDARDS;
     - b. CAN/CSA B149.1, NATURAL GAS AND PROPANE INSTALLATION CODES.
   - B. FURNACE INSTALLATION TRADESMEN ARE TO BE JOURNEYMAN TRADESMEN LICENSED TO INSTALL GAS FIRED EQUIPMENT.
2. FURNACE
   - A. UNIT SHALL BE 96% AFUE EFFICIENT, CSA OR C-ETL CERTIFIED GAS FIRED WARM AIR FURNACE, FACTORY ASSEMBLED, AND PRE-WIRED.
   - B. INTERNALLY INSULATED CABINET CONSTRUCTED OF STEEL, FINISHED WITH BAKED POWDER EPOXY ENAMEL AND COMPLETE WITH ACCESS PANELS. DOWN-FLOW FURNACES ARE COMPLETE WITH A BASE SECTION AND COMBUSTIBLE FLOOR MOUNTING ADAPTOR.
   - C. TUBULAR DESIGN ALUMINIZED STEEL HEAT EXCHANGER WITH AN EXTENDED 10 YEAR MANUFACTURER'S WARRANTY, EQUIPPED WITH FLUE BOX AND A MOTORIZED COMBUSTION AIR INDUCER TO PRE-PURGE AND POST-PURGE HEAT EXCHANGER AND POSITIVELY VENT COMBUSTION PRODUCTS, AND AN ALUMINIZED STEEL INSHOT BURNER REMOVABLE FROM ASSEMBLY AS A SINGLE COMPONENT.
   - D. DIRECT DRIVE, MULTI-SPEED, STATICALLY AND DYNAMICALLY BALANCED, RESILIENTLY MOUNTED BLOWER WITH PERMANENTLY LUBRICATED OPEN DRIP-PROOF MOTOR CONFORMING TO REQUIREMENTS SPECIFIED IN SECTION ENTITLED BASIC MECHANICAL MATERIALS AND METHODS.
   - E. FACTORY INSTALLED AND PRE-WIRED CONTROLS COMPLETE WITH:
     - a. 24 VOLT REDUNDANT COMBINATION GAS VALVE WITH 100% SAFETY SHUT-OFF, MANUAL MAIN SHUT-OFF VALVE, PRESSURE REGULATOR, AND AUTOMATIC SOLENOID VALVE;
     - b. HOT SURFACE IGNITION AND A SEPARATE ELECTRONIC FLAME SENSOR TO INITIATE 3 ATTEMPTS TO RE-IGNITE AFTER LOSS OF FLAME, THEN LOCKS OUT UNIT OPERATION;
     - c. PRESSURE SWITCH TO PROVE ADEQUATE FLOW THROUGH VENTING;
     - d. HIGH TEMPERATURE LIMIT CONTROLS WITH A FIXED TEMPERATURE SETTING TO PROTECT FROM ABNORMAL OPERATING TEMPERATURES;
     - e. SOLID-STATE, INTEGRATED, COMBINATION IGNITION AND FAN CONTROL BOARD WITH FAN TIMER CONTROL, IGNITION CONTROL LED'S FOR STATUS AND TROUBLESHOOTING;
     - f. 120/24 VOLT CONTROL TRANSFORMER;
     - g. TERMINAL STRIPS FOR POWER AND 24 VOLT CONTROL CONNECTIONS;
     - h. CONTINUOUS LOW SPEED BLOWER CONTROL KIT TO OPERATE BLOWER CONTINUOUSLY ON LOW SPEED AND AUTOMATICALLY SWITCH UP TO RATED SPEED DURING HEATING CYCLE;
     - i. SUMMER-WINTER FAN SWITCH;
   - F. SLIDE-IN FILTER FRAMING WITH A MERV 7 DISPOSABLE FILTER AS WELL AS A SPARE FILTER SUPPLIED LOOSE IN ORIGINAL PACKAGING.
   - G. REMOTE WALL MOUNTING, 24 VOLT, ADJUSTABLE, 7 DAY PROGRAMMABLE, TAMPER-PROOF THERMOSTAT SUPPLIED LOOSE FOR SITE INSTALLATION, COMPLETE WITH THERMOMETER, DIGITAL DISPLAY, TIMED AND CONTINUOUS OVERRIDE, AND BATTERY BACK-UP

SPLIT DX COOLING SYSTEM:

1. FACTORY ASSEMBLED AND TESTED, PACKAGE TYPE SYSTEM CONSISTING OF A DIRECT EXPANSION EVAPORATIVE COIL AND AN EXTERIOR CONDENSING UNIT, CSA OR ETL LISTED AND LABELLED, AHRI RATED AND CERTIFIED AND WITH A MINIMUM SYSTEM EFFICIENCY OF 15 SEER.
2. DIRECT EXPANSION COOLING COIL:
   - A. THE COIL SHALL BE ALL ALUMINUM WITH COPPER CONNECTIONS;
   - B. UNIT COMPLETE WITH FACTORY INSTALLED THERMAL EXPANSION VALVE SUITABLE FOR COOLING APPLICATION;
   - C. COIL PROVIDED WITH AN ANTI-MICROBIAL, RUST RESISTANT DRAIN PAN.
3. AIR COOLED CONDENSING UNIT:
   - A. CABINET SHALL BE CONSTRUCTED OF HEAVY-GAUGE GALVANIZED STEEL C/W BAKED-ON POWDER-PAINT FINISH;
   - B. UNIT COMPLETE WITH HIGH EFFICIENCY TWO-STAGE SCROLL COMPRESSOR, HIGH DENSITY FOAM COMPRESSOR SOUND BLANKET, COPPER TUBE/ALUMINUM FIN COIL, AND QUIET TWO-SPEED ECM OUTDOOR FAN MOTOR;
   - C. UNIT SHALL BE PROVIDED WITH FACTORY INSTALLED FILTER DRIER, AMBIENT TEMPERATURE SENSOR, TRANSFORMER, AND HIGH AND LOW-PRESSURE SWITCHES.

ENERGY RECOVERY VENTILATOR (ERV)

1. UNIT SHALL BE FACTORY ASSEMBLED, WIRED AND TESTED AND SHALL CONFORM TO CSA AND UL STANDARDS.
2. UNIT SHALL BE COMPACT WITH A LOW PROFILE SUITABLE FOR INSTALLATION IN BULKHEADS AND DROPPED CEILINGS.
3. CABINET SHALL BE CONSTRUCTED OF 22-GAUGE PRE-PAINTED GALVANIZED STEEL FOR CORROSION RESISTANCE AND INSULATED TO PREVENT EXTERIOR CONDENSATION. CABINET SHALL BE COMPLETE WITH DRAIN CONNECTIONS, BALANCING PORTS, AND THREADED INSERTS TO ACCEPT S-HOOKS AND HANGING STRAPS SUPPLIED WITH UNIT.
4. ENERGY RECOVERY ASSEMBLY SHALL BE THERMALLY CONDUCTIVE, ALUMINUM CROSS-FLOW ENERGY RECOVERY CORE WITH MINIMUM SRE OF 75%. THE CORE SHALL BE EASILY REMOVABLE FOR CLEANING AND SERVICE.
5. UNIT COMPLETE WITH WASHABLE MERV-6 AIR FILTERS LOCATED IN EXHAUST AND SUPPLY AIR STREAMS.
6. EACH AIRSTREAM HAS AN INDEPENDENT CENTRIFUGAL HIGH EFFICIENCY ECM BLOWER WITH MULTIPLE FAN SPEED OPERATION.
7. DEFROST MODE: SUPPLY AIR SHUTS OFF TO DEFROST CORE WITH WARM EXHAUST AIR AT HIGH SPEED.
8. UNIT COMPLETE WITH WALL MOUNT CONTROLLER WITH SELECTABLE ON/OFF, AND FAN SPEED SETTINGS.

ELECTRIC DOMESTIC HOT WATER TANK

1. CSA CERTIFIED ELECTRIC DOMESTIC HOT WATER TANK AND HEATER WITH MINIMUM EF RATING OF 0.8, AND COMPLETE WITH:
   - A. 1035 KPA (150 PSI) RATED (WORKING PRESSURE) STEEL TANK, GLASS LINED, INSULATED (EXCEPT FOR CONTROL PANEL AREA) WITH INJECTED MINIMUM R-16 FOAM INSULATION, COVERED WITH AN ENAMELLED STEEL JACKET, AND EQUIPPED WITH 40 MM (1-½") DIA. NPS BRASS NIPPLE WATER INLET AND OUTLET CONNECTIONS, A DRAIN VALVE, AND SACRIFICIAL ANODE RODS;
   - B. REMOVABLE MULTIPLE IMMERSION HEATING ELEMENTS, EACH CONSISTING OF A WIRE FILAMENT IN A SEALED STAINLESS STEEL SHEATH;
   - C. ASME RATED TEMPERATURE AND PRESSURE RELIEF VALVE;
   - D. FACTORY PRE-WIRED POWER AND CONTROL PANEL.
2. EQUIP ENAMELLED STEEL VENTILATED CONTROL PANEL WITH REMOVABLE GLASS FIBRE INSULATION TO COVER BARE AREA OF TANK, A HINGED DOOR, MULTIPLE KNOCKOUTS, A GROUND SCREW, AND FOLLOWING:
   - A. TERMINAL BLOCK FOR POWER WIRING CONNECTIONS;
   - B. MAGNETIC CONTACTORS FOR HEATING ELEMENTS;
   - C. ADJUSTABLE IMMERSION THERMOSTAT;
   - D. MANUAL RESET IMMERSED HIGH TEMPERATURE LIMIT CONTROL FOR EACH ELEMENT;
   - E. FUSE BLOCK WITH FUSES;
   - F. ELEMENT DIAGNOSTIC PANEL WITH LED'S FOR EACH ELEMENT TO MONITOR ON-OFF OPERATION OF EACH ELEMENT;

TOILET EXHAUST FANS

1. CEILING EXHAUST FAN SHALL BE HVI CERTIFIED AND IN ACCORDANCE WITH THE FOLLOWING REQUIREMENTS:
2. 26 GAUGE ZINC-ALUMINUM-MAGNESIUM (ZAM) HOUSING C/W INTEGRATED 6" DUCT ADAPTOR, BUILT-IN DAMPER AND BUILT IN METAL FLANGE;
3. FAN C/W POLY PRO MATERIAL AND ATTACHES DIRECTLY TO HOUSING WITH TORSION SPRINGS;
4. MOTOR BE TO TOTALLY ENCLOSED WITH A BRUSHLESS ECM MOTOR TECHNOLOGY RATED FOR CONTINUOUS RUN AND EQUIPPED WITH THERMAL-CUTOFF FUSE. MOTOR TO BE REMOVABLE WITH PERMANENTLY LUBRICATED PLUG-IN MOTOR;
5. FAN VENTILATION RATES SHALL BE MANUALLY ADJUSTABLE;
6. FAN SHALL BE UL AND CUL LISTED FOR TUB/SHOWER ENCLOSURE WHEN GFCI PROTECTED.

DRYER EXHAUST

1. DRYER BOOSTER FAN SHALL BE HVI CERTIFIED AND IN ACCORDANCE WITH THE FOLLOWING REQUIREMENTS:
   - A. 26-GAUGE GALVANISED STEEL HOUSING SUPPLIED WITH VIBRATION ISOLATION TO SUIT MOUNTING;
   - B. ROUND INLET AND DISCHARGE COLLAR;
   - C. FIELD WIRING COMPARTMENT WITH REMOVABLE ACCESS PANEL;
   - D. BACKWARDLY-INCLINED, SELF-CLEANING IMPELLER, FULLY-SEALED IMPELLER ASSEMBLY WITH AUTOMATIC-RESET THERMAL OVERLOAD PROTECTION, AND PERMANENTLY-LUBRICATED MOTOR;
   - E. ACCESSORIES:
     - a. AMP SENSOR (CURRENT-SENSING RELAY SWITCH);
     - b. LINT TRAP;
     - c. WALL BOX.

KITCHEN RANGE HOOD

1. DUCTED RANGE HOODS, CSA CERTIFIED, ROTARY SOLID STATE SPEED CONTROL PROVIDING INFINITE RANGE, ROTARY LIGHT CONTROL SWITCH, BACKDRAFT DAMPER, WITH LIGHT LENS AND PERMANENT, WASHABLE ALUMINUM MESH GREASE FILTER(S).

CMHC SCHL

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NO.	DATE	DESCRIPTION
1	2025/02/25	ISSUED AS PROTOTYPICAL DRAWING

PROJECT:

CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT OR CONSTRUCTION

SHEET TITLE:

ENHANCED ACCESSIBILITY MECHANICAL OUTLINE SPECIFICATIONS - BASE OPTION

PROJECT NO: 24112

SCALE: NTS

SHEET NO:

M001A

MECHANICAL OUTLINE SPECIFICATIONS - ALTERNATE OPTION 1

1. PRIMARY HEAT FROM STANDARD AIR SOURCE HEAT PUMP COIL IN GAS FIRED FURNANCE.
2. SUPPLEMENTAL HEAT FROM GAS FURNACE AT COLDER TEMPERATURES.
3. COOLING THROUGH STANDARD AIR SOURCE HEAT PUMP COIL.
4. ELECTRIC DOMESTIC HOT WATER TANK.

DESIGN CRITERIA AND REQUIREMENTS

1. THE MECHANICAL SYSTEMS SHALL BE DESIGNED IN ACCORDANCE WITH THE ONTARIO BUILDING CODE (OBC), SPECIFIC REQUIREMENTS OF THE LOCAL AUTHORITY HAVING JURISDICTION, DESIGN PRINCIPLES AND STANDARDS OBTAINED FROM THE OWNER AND DESIGN TEAM AS WELL AS STANDARDS OF GOOD ENGINEERING PRACTICES.
2. WORK SHALL BE COMPLETED IN ACCORDANCE WITH STANDARDS PUBLISHED BY THE FOLLOWING PARTIAL LIST OF AUTHORITIES:
   A. THERMAL ENVIRONMENTAL CONDITIONS FOR HUMAN OCCUPANCY, ANSI/ASHRAE STANDARD 55 (LATEST EDITION);
   B. VENTILATION REQUIREMENTS TO BE BASED ON MOST CURRENT OBC PART 9 TABLE 9.32.3.3.
   C. HANDBOOKS PUBLISHED BY AMERICAN SOCIETY OF HEATING, REFRIGERATION AND AIR CONDITIONING ENGINEERS (ASHRAE).
3. HEATING AND COOLING CALCULATIONS TO BE BASED ON MOST CURRENT CLIMATICAL DATA (SB-1) AND ENERGY EFFICIENCY OF HOUSING COMPLIANCE PACKAGES (SB-12) PUBLISHED IN THE ONTARIO BUILDING CODE AND SHALL BE COMPLETED IN ACCORDANCE WITH THE STANDARD CAN/CSA-F280-12 (R2021) TO DETERMINE THE SIZE/CAPACITY OF THE HEATING/AIR CONDITIONING SYSTEMS.
   A. ALL OCCUPIED AREAS WILL BE AIR CONDITIONED WITH THE FOLLOWING ENVIRONMENTAL CONDITIONS;
      a. WINTER: 22.0°C ± 1°C AND 20% ± 5% RELATIVE HUMIDITY
      b. SUMMER: 24.0°C ± 1°C AND 60% ± 5% RELATIVE HUMIDITY
4. ALL UNPROTECTED MECHANICAL PENETRATIONS ON EXPOSING BUILDING FACE MORE THAN 130MM2 SHALL BE COORDINATED WITH DESIGNER AND NOTED ON ARCHITECTURAL DRAWINGS AS PER OBC 9.10.14.6.

SITE SERVICES

1. NATURAL GAS SERVICE:
   A. ONE (1) UTILITY NATURAL GAS SERVICE WILL BE PROVIDED TO THE BUILDING AND RUN TO INDIVIDUAL GAS METERS PROVIDED FOR EACH RESIDENTIAL UNIT.
   B. GROUP AND LOCATE GAS METERS ABOVE GRADE ON ONE SIDE OF THE BUILDING AGAINST AN EXTERIOR WALL. RUN INDIVIDUAL GAS LINES FROM GAS METERS TO THE RESPECTIVE RESIDENTIAL UNITS.
   C. THE NATURAL GAS SYSTEM DESIGN AND INSTALLATION SHALL COMPLY WITH THE LATEST REQUIREMENTS OF CSA B149, NFPA STANDARDS, OBC, AND LOCAL REGULATORY REQUIREMENTS.
   D. MATERIAL:
      a. UNDERGROUND PIPING SHALL BE COATED BLACK STEEL "YELLOW JACKET" SCHEDULE 40 MILD BLACK CARBON STEEL; OR, SAFETY YELLOW COLOURED POLYETHYLENE PIPE, FITTINGS, AND JOINTS TO CSA B137.4; OR, COATED TYPE "K" SOFT TEMPER COPPER WITH FACTORY APPLIED EXTERNAL YELLOW LPASTIC COATING, STAMPED WITH DESIGNATION C37700 TO INDICATE FORGED BRASS.
      b. EXPOSED SCREW PIPING TO BE SCHEDULE 40 MILD BLACK CARBON STEEL, ASTM A53 GRADE B COMPLETE WITH MALLEABLE CAST IRON SCREWED FITTINGS TO ANSI B2.1, AND SCREWED JOINTS.
      c. EXPOSED WELDED PIPING TO BE SCHEDULE 40 MILD BLACK CARBON STEEL, ASTM A53 GRADE B, MILL OR SITE BEVELLED, COMPLETE WITH FACTORY MADE FORGED STEEL BUTT WELDING FITTINGS AND WELDED JOINTS.
2. WATER SERVICES:
   A. ONE (1) POTABLE WATER SERVICE WILL BE PROVIDED TO THE BUILDING THEN THE SERVICE WILL SPLIT AND RUN TO INDIVIDUAL UTILITY METER INSIDE EACH RESIDENTIAL UNIT.
3. SANITARY SEWERS:
   A. ONE (1) SANITARY SERVICE CONNECTION WILL BE PROVIDED TO THE BUILDING COMPLETE WITH SAMPLING PORT IN COORDINATION WITH THE SITE SERVICE ENGINEER. COORDINATE LOCATION AND INVERT OF INCOMING CONNECTION WITH SITE SERVICES CONSULTANT.
   B. ROOF GUTTERS TO BE PIPED AND ROUTED DOWN THE SIDE OF THE BUILDING TO SPILL ON GRADE.

PLUMBING AND DRAINAGE

1. POTABLE WATER:
   A. AN INCOMING POTABLE WATER CONNECTION COMPLETED WITH A METER ASSEMBLY WILL SUPPLY WATER TO EACH RESIDENTIAL UNIT. OPTIONAL WATER FILTRATION INCLUDING CARBON ACTIVATED FILTERS, UV AND RO CAN BE PROVIDED IN AREAS WHERE WATER QUALITY IS OF CONCERN.
   B. POLYETHYLENE PEX PIPING WILL BE PROVIDED TO DISTRIBUTE COLD AND HOT WATER THROUGHOUT THE UNIT.
      a. TUBE SHALL BE CROSS-LINKED POLYETHYLENE (PEX) MANUFACTURED BY PEX-A OR PEROXIDE METHOD. PEX TUBING SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM F876, ASTM F877 AND CAN/CSA-B137.5. THE TUBE SHALL BE LISTED TO ASTM BY AN INDEPENDENT THIRD PARTY AGENCY.
      b. FITTINGS SHALL BE MANUFACTURED OF ENGINEERED PLASTIC (EP). FITTINGS SHALL BE PEX-A COLD EXPANSION TYPE CERTIFIED TO ASTM F1960.
      (1)FITTINGS SHALL BE SUPPLIED BY THE PEX TUBING MANUFACTURER.
      (2)PEX-A COLD EXPANSION TYPE FITTINGS SHALL BE AN ASSEMBLY CONSISTING OF INSERT AND PEX-A COLD EXPANSION RING.
      (3)FITTING TYPE: UPONOR ENGINEERED PLASTIC (EP).
2. DRAINAGE:
   A. ALL SANITARY DRAIN AND MAIN VENT STACKS SHALL BE PLASTIC ABS WITH GLUED CONNECTIONS. WHERE REQUIRED TO MEET FIRE SPREAD AND SMOKE DEVELOPMENT RATINGS METALLIC PIPING OR XFR PIPING IS TO BE PROVIDED BASED ON LOCAL JURISDICTION APPROVAL.
   B. UNDERGROUND DRAINAGE PIPING SHALL BE PVC DR35 RIGID SEWER PIPING. PIPING 4" AND LARGER TO BE GREEN PVC HUB AND SPIGOT SEWER PIPE AND FITTINGS TO CAN/CSA B182.2. SIZE 3" PIPE TO BE PVC WITH SOLVENT WELD JOINTS CERTIFIED TO CSA B182.1 AND COLOUR CODED AS PER LOCAL CODES.
3. DOMESTIC HOT WATER PRODUCTION:
   A. AN ELECTRIC DOMESTIC HOT WATER (DHW) TANK WILL BE PROVIDED FOR EACH RESIDENTIAL UNIT.
   B. DOMESTIC HOT WATER SHALL BE STORED AT A MINIMUM OF 52°C (125°F).
   C. A MIXING VALVE SHALL BE PROVIDED TO SUPPLY 49°C (120°F) DOMESTIC HOT WATER TO THE FIXTURES.
4. PRESSURE BALANCING TYPE MIXING VALVES SHALL BE PROVIDED FOR ALL SHOWERS.
5. DRAIN WATER HEAT RECOVERY COIL SHALL BE PROVIDED FOR EACH MULTI-STOREY UNIT.
6. PLUMBING FIXTURES SHALL BE LOW FLOW AND OF FIRST QUALITY.
7. SANITARY DRAINS WILL BE COLLECTED AND CONNECTED TO THE MUNICIPAL SANITARY NETWORK. UNLESS OTHERWISE NOTED, SLOPE ALL 75 MM (3") DRAINAGE PIPING AT 2% SLOPE AND ALL 100 MM (4") AND LARGER DRAINAGE PIPING AT 1% SLOPE.

HEATING, VENTILATION, AND AIR CONDITIONING (HVAC)

1. HEATING AND COOLING SYSTEMS:
   A. HEATING AND COOLING WILL BE PRODUCED BY A 96% EFFICIENT GAS FURNACE COMPLETE WITH A STANDARD AIR SOURCE HEAT PUMP COIL. THE HEAT PUMP COIL WILL OPERATE IN HEATING MODE UNTIL -5°C (23°F) WITH THE GAS FURNACE OPERATING AT THE LOWER OUTDOOR TEMPERATURES.
   B. THE CAPACITY OF THE GAS FURNACE SHALL BE SIZED AND SELECTED TO MEET THE FULL HEATING LOAD REQUIREMENT OF THE RESIDENTIAL UNIT.
   C. THE CAPACITY OF THE HEAT PUMP COIL SHALL BE SIZED AND SELECTED TO MEET THE HEATING LOAD DOWN TO OUTDOOR AIR TEMPERATURE OF -5°C (23°F) AND THE FULL COOLING LOAD OF THE RESIDENTIAL UNIT.
   D. THE GAS FURNACE TO BE COMPLETE WITH MINIMUM MERV 8 FILTRATION.
   E. THE OUTDOOR HEAT PUMP CONDENSER IS TO BE LOCATED WITHIN CLOSE PROXIMITY TO THE INDOOR UNIT AND CONNECTED WITH REFRIGERANT PIPING. THE OUTDOOR HEAT PUMP CONDENSER WILL BE ABLE TO OPERATE FROM -5°C (23°F) TO 35°C (95°F).
   F. PROPANE OR NATURAL GAS SERVICE WITH METER SHALL BE PROVIDED TO SERVE THE FURNACE.
2. VENTILATION AND EXHAUST SYSTEMS:
   A. VENTILATION AIR WILL BE PROVIDED BY AN ENERGY RECOVERY VENTILATOR (ERV) THAT WILL TRANSFER ENERGY FROM THE PRIMARY BATHROOM EXHAUST TO PRE-CONDITION OUTDOOR AIR THAT WILL BE DUCTED BACK TO THE INDOOR UNIT. SIZE OF ERV TO BE DETERMINED BASED ON OBC PART 9 REQUIREMENT. ERV PERFORMANCE SHALL HAVE A MINIMUM OF 75% EFFECTIVENESS. WHERE REQUIRED, AN ELECTRIC DUCT HEATER SHALL BE PROVIDED. THE ERV SHALL BE CONTROLLED BY A LOCAL TIMER SWITCH.
   B. SECONDARY WASHROOMS WILL BE PROVIDED WITH DEDICATED CEILING MOUNTED TOILET EXHAUST FANS COMPLETE WITH LOCAL SWITCH.
   C. CLOTHES DRYERS WILL BE PROVIDED WITH A LINT TRAP AND DRYER BOOSTER FAN CONNECTED TO A CURRENT SENSOR TO AID IN DRYER EXHAUST. LINT TRAPS WILL BE PROVIDED ON THE SUCTION SIDE OF THE FAN WITHIN THE SUITE LAUNDRY ROOM.
   D. KITCHEN HOOD EXHAUSTS WILL BE SIZED FOR MINIMUM 150 CFM AND DUCTED TO OUTDOORS.
   E. ALL EXHAUST DUCTWORK WILL BE DISCHARGED TO THE EXTERIOR THROUGH THE EXTERIOR WALLS OF THE UNIT OR THROUGH THE ROOF FOR THE TOP LEVEL.
   F. EXHAUST DUCTWORK SHALL BE INSULATED FOR THE FIRST 10FT FROM THE EXTERIOR LOUVRE.
3. AIR DISTRIBUTION:
   A. DUCTWORK SHALL BE GALVANIZED SHEET METAL UNLESS OTHERWISE INDICATED. DUCTS SHALL BE SIZED AT A PRESSURE DROP OF 0.08" (20PA) PER 100' (30.5M) WITH MAXIMUM AIR VELOCITIES OF 1400 FEET (427M) PER MINUTE.
   B. DUCTWORK TO BE INSULATED TO MEET ASHRAE 90.1 AND THE GOVERNING AUTHORITY REQUIREMENTS.
   C. PROVIDE ACOUSTIC LINING FOR ALL SUPPLY AND RETURN AIR DUCTWORK SERVING MECHANICAL EQUIPMENT WITH FANS TO A MAXIMUM OF 4.5M (15') FROM THE EQUIPMENT, MEASURED OUTWARD IN ALL DIRECTIONS.
   D. SUPPLY AIR FROM THE INDOOR UNIT SHALL BE DUCTED TO EACH ROOM VIA 200X100 SIDEWALL GRILLES OR FLOOR REGISTERS.
   E. EACH ROOM SHALL HAVE A RETURN AIR GRILLE OR AN 1" (25MM) DOOR UNDERCUT FOR AIR TRANSFER.
   F. PROVIDE BALANCING DAMPERS AT ALL DUCT BRANCHES FOR AIR BALANCING.
   G. A PROGRAMMABLE THERMOSTAT WITH OCCUPANCY SENSOR SHALL BE PROVIDED TO CONTROL THE SUITE HVAC SYSTEM.
   H. DUCTWORK PENETRATING CEILING MEMBRANES REQUIRED TO HAVE A FIRE-RESISTANCE RATING SHALL CONFORM TO REQUIREMENTS MENTIONED PER OBC 9.10.5.1. (3).
4. REFRIGERATION:
   A. DESIGN AND INSTALLATION OF REFRIGERATION SYSTEM SHALL BE IN ACCORDANCE WITH CSA B52 MECHANICAL REFRIGERATION CODE, ONTARIO BUILDING CODE, AHRI, AND EQUIPMENT MANUFACTURERS RECOMMENDATIONS.
   B. NEW REFRIGERATION PIPING SHALL BE ACR SEAMLESS COPPER TUBING SUITABLE FOR AIR CONDITIONING OR REFRIGERATION SYSTEMS.
   C. KEEP TUBING RUNS AND NUMBER OF ELBOWS AND FITTINGS TO A MINIMUM.
   D. ENSURE TUBING IS DEHYDRATED, TESTED, ADEQUATELY CHARGED, AND GAS TIGHT.
   E. PIPING SHALL BE INSULATED WITH FLEXIBLE ELASTOMERIC, CLOSED CELL, SLEEVE TYPE LONGITUDINALLY SPLIT SELF-SEAL FORMED PLASTIC PIPE INSULATION EQUAL TO ARMACELL AP/ARMAFLEX SS. INSULATION SHALL BE 25 MM (1") THICK.
   F. COORDINATE AND RUN ALL REFRIGERANT LINES INSIDE DESIGNATED CAVITY. NO EXTERIOR RUNS PERMITTED UNLESS OTHERWISE INSTRUCTED.
5. FIRE STOPPING AND SMOKE SEAL SYSTEMS
   A. ASBESTOS-FREE, ELASTOMERIC MATERIALS AND INTUMESCENT MATERIALS, TESTED, LISTED AND LABELLED BY ULC IN ACCORDANCE WITH CAN/ULC S115, AND CAN/ULC S101 FOR INSTALLATION IN ULC DESIGNATED FIRESTOPPING, AND SMOKE SEAL SYSTEMS TO PROVIDE A POSITIVE FIRE, WATER AND SMOKE SEAL AND A FIRE RESISTANCE RATING (FLAME, HOSE STREAM AND TEMPERATURE) NO LESS THAN FIRE RATING FOR SURROUNDING CONSTRUCTION.
   B. FIRESTOPPING AND SMOKE SEAL MATERIAL SYSTEM TO BE SPECIFICALLY ULC CERTIFIED WITH DESIGNATED REFERENCE NUMBER FOR ITS SPECIFIC INSTALLATION.
   C. SMOKE AND FIRE SEAL MATERIALS AND MANUFACTURERS MUST BE SPECIFICALLY APPROVED FOR EACH APPLICATION OF PENETRATED SURFACES, AS APPROVED BY FM GLOBAL AND LISTED IN FM GLOBAL APPROVAL GUIDE. LISTED COMPANIES HEREIN AND OTHER MANUFACTURERS ARE ONLY ACCEPTABLE IF COMPLIANT WITH THESE REQUIREMENTS.
   D. MATERIALS ARE TO BE COMPATIBLE WITH ABUTTING DISSIMILAR MATERIALS AND FINISHES AND COMPLETE WITH PRIMERS, DAMMING AND BACK-UP MATERIALS, SUPPORTS, AND ANCHORING DEVICES IN ACCORDANCE WITH FIRESTOPPING MANUFACTURER'S RECOMMENDATIONS AND ULC TESTED ASSEMBLY. COORDINATE MATERIAL REQUIREMENTS WITH TRADES SUPPLYING ABUTTING AREAS OF MATERIALS.
   E. TYPICALLY, FOR OPENINGS OF UP TO 250 MM (10") IN DIAMETER, PROVIDE PUTTY PAD TYPE FIRESTOP MATERIALS INTUMESCENT, NON-HARDENING, WATER RESISTANT PUTTIES CONTAINING NO SOLVENTS, INORGANIC FIBRES OR SILICONE COMPOUNDS.
   F. TYPICALLY, FOR OPENINGS OF GREATER THAN 250 MM (10") IN DIAMETER, AND FOR RECTANGULAR OPENINGS, PROVIDE PILLOW TYPE FIRESTOP MATERIALS RE-ENTERABLE, NON-CURING, MINERAL FIBRE CORE ENCAPSULATED ON SIX SIDES WITH INTUMESCENT COATING CONTAINED IN A FLAME RETARDANT POLY BAG.
   G. SUPPLY PRODUCTS OF A SINGLE MANUFACTURER FOR USE ON WORK OF THIS DIVISION.
   H. INSTALLER TO BE MANUFACTURER TRAINED AND CERTIFIED ON SPECIFIC PRODUCT.
   I. INCLUDE FOR MANUFACTURER'S AUTHORIZED REPRESENTATIVE TO INSPECT AND VERIFY EACH INSTALLATION AND APPLICATION.
   J. ACCEPTABLE CERTIFICATION TO ALSO INCLUDE CERTIFICATION BY UNDERWRITERS LABORATORIES OF NORTHBROOK IL, USING TESTS CONFORMING TO ULC-S115 AND GIVEN CUL LISTING PUBLISHED BY UL IN THEIR "PRODUCTS CERTIFIED FOR CANADA (CUL) DIRECTORY".

MECHANICAL EQUIPMENT - ALTERNATE OPTION 1

GAS FIRED FURNACE

1. GENERAL
   A. FURNACES AND INSTALLATION OF FURNACES ARE TO BE IN ACCORDANCE WITH REQUIREMENTS OF FOLLOWING:
      a. APPLICABLE PROVINCIAL CODES AND STANDARDS;
      b. CAN/CSA B149.1, NATURAL GAS AND PROPANE INSTALLATION CODES.
   B. FURNACE INSTALLATION TRADESMEN ARE TO BE JOURNEYMAN TRADESMEN LICENSED TO INSTALL GAS FIRED EQUIPMENT.
2. FURNACE
   A. UNIT SHALL BE 96% AFUE EFFICIENT, CSA OR C-ETL CERTIFIED GAS FIRED WARM AIR FURNACE, FACTORY ASSEMBLED, PRE-WIRED.
   B. INTERNALLY INSULATED CABINET CONSTRUCTED OF STEEL, FINISHED WITH BAKED POWDER EPOXY ENAMEL AND COMPLETE WITH ACCESS PANELS. DOWN-FLOW FURNACES ARE COMPLETE WITH A BASE SECTION AND COMBUSTIBLE FLOOR MOUNTING ADAPTOR.
   C. TUBULAR DESIGN ALUMINIZED STEEL HEAT EXCHANGER WITH AN EXTENDED 10 YEAR MANUFACTURER'S WARRANTY, EQUIPPED WITH FLUE BOX AND A MOTORIZED COMBUSTION AIR INDUCER TO PRE-PURGE AND POST-PURGE HEAT EXCHANGER AND POSITIVELY VENT COMBUSTION PRODUCTS, AND AN ALUMINIZED STEEL INSHOT BURNER REMOVABLE FROM ASSEMBLY AS A SINGLE COMPONENT.
   D. DIRECT DRIVE, MULTI-SPEED, STATICALLY AND DYNAMICALLY BALANCED, RESILIENTLY MOUNTED BLOWER WITH PERMANENTLY LUBRICATED OPEN DRIP-PROOF MOTOR CONFORMING TO REQUIREMENTS SPECIFIED IN SECTION ENTITLED BASIC MECHANICAL MATERIALS AND METHODS.
   E. FACTORY INSTALLED AND PRE-WIRED CONTROLS COMPLETE WITH:
      a. 24 VOLT REDUNDANT COMBINATION GAS VALVE WITH 100% SAFETY SHUT-OFF, MANUAL MAIN SHUT-OFF VALVE, PRESSURE REGULATOR, AND AUTOMATIC SOLENOID VALVE;
      b. HOT SURFACE IGNITION AND A SEPARATE ELECTRONIC FLAME SENSOR TO INITIATE 3 ATTEMPTS TO RE-IGNITE AFTER LOSS OF FLAME, THEN LOCKS OUT UNIT OPERATION;
      c. PRESSURE SWITCH TO PROVE ADEQUATE FLOW THROUGH VENTING;
      d. HIGH TEMPERATURE LIMIT CONTROLS WITH A FIXED TEMPERATURE SETTING TO PROTECT FROM ABNORMAL OPERATING TEMPERATURES;
      e. SOLID-STATE, INTEGRATED, COMBINATION IGNITION AND FAN CONTROL BOARD WITH FAN TIMER CONTROL, IGNITION CONTROL LED'S FOR STATUS AND TROUBLESHOOTING;
      f. 120/24 VOLT CONTROL TRANSFORMER;
      g. TERMINAL STRIPS FOR POWER AND 24 VOLT CONTROL CONNECTIONS;
      h. CONTINUOUS LOW SPEED BLOWER CONTROL KIT TO OPERATE BLOWER CONTINUOUSLY ON LOW SPEED AND AUTOMATICALLY SWITCH UP TO RATED SPEED DURING HEATING CYCLE;
      i. SUMMER-WINTER FAN SWITCH;
   F. SLIDE-IN FILTER FRAMING WITH A MERV 7 DISPOSABLE FILTER AS WELL AS A SPARE FILTER SUPPLIED LOOSE IN ORIGINAL PACKAGING.
   G. REMOTE WALL MOUNTING, 24 VOLT, ADJUSTABLE, 7 DAY PROGRAMMABLE, TAMPER-PROOF THERMOSTAT SUPPLIED LOOSE FOR SITE INSTALLATION, COMPLETE WITH THERMOMETER, DIGITAL DISPLAY, TIMED AND CONTINUOUS OVERRIDE, AND BATTERY BACK-UP

STANDARD AIR SOURCE HEAT PUMP SYSTEM

1. FACTORY ASSEMBLED AND TESTED, PACKAGE TYPE SYSTEM CONSISTING OF A DIRECT EXPANSION EVAPORATIVE COIL AND AN EXTERIOR CONDENSING UNIT, CSA OR ETL LISTED AND LABELLED, AHRI RATED AND CERTIFIED AND WITH A MINIMUM SYSTEM EFFICIENCY OF 15 SEER AND 7.5 HSPF.
2. DIRECT EXPANSION HEAT PUMP COIL:
   A. THE COIL SHALL BE ALL ALUMINUM WITH COPPER CONNECTIONS;
   B. UNIT COMPLETE WITH FACTORY INSTALLED THERMAL EXPANSION VALVE SUITABLE FOR HEAT PUMP APPLICATION;
   C. COIL PROVIDED WITH AN ANTI-MICROBIAL, RUST RESISTANT DRAIN PAN.
3. HEAT PUMP CONDENSING UNIT:
   A. CABINET SHALL BE CONSTRUCTED OF HEAVY-GAUGE GALVANIZED STEEL C/W BAKED-ON POWDER-PAINT FINISH;
   B. UNIT COMPLETE WITH HIGH EFFICIENCY TWO-STAGE SCROLL COMPRESSOR, HIGH DENSITY FOAM COMPRESSOR SOUND BLANKET, COPPER TUBE/ALUMINUM FIN COIL, AND QUIET TWO-SPEED ECM OUTDOOR FAN MOTOR;
   C. UNIT SHALL BE PROVIDED WITH FACTORY INSTALLED BI-FLOW LIQUID-LINER FILTER DRIER, SUCTION-LINE ACCUMULATOR, COMPRESSOR CRANKCASE HEATER, HIGH-CAPACITY MUFFLER, COIL AND AMBIENT TEMPERATURE SENSORS, TRANSFORMER, AND HIGH AND LOW-PRESSURE SWITCHES;
   D. UNIT COMPLETE WITH TIME-DELAY TECHNOLOGY WITH SHORT-CYCLE PROTECTION TO ENSURE QUIET, RELIABLE DEFROST.

ENERGY RECOVERY VENTILATOR (ERV)

1. UNIT SHALL BE FACTORY ASSEMBLED, WIRED AND TESTED AND SHALL CONFORM TO CSA AND UL STANDARDS.
2. UNIT SHALL BE COMPACT WITH A LOW PROFILE SUITABLE FOR INSTALLATION IN BULKHEADS AND DROPPED CEILINGS.
3. CABINET SHALL BE CONSTRUCTED OF 22-GAUGE PRE-PAINTED GALVANIZED STEEL FOR CORROSION RESISTANCE AND INSULATED TO PREVENT EXTERIOR CONDENSATION. CABINET SHALL BE COMPLETE WITH DRAIN CONNECTIONS, BALANCING PORTS, AND THREADED INSERTS TO ACCEPT S-HOOKS AND HANGING STRAPS SUPPLIED WITH UNIT.
4. ENERGY RECOVERY ASSEMBLY SHALL BE THERMALLY CONDUCTIVE, ALUMINUM CROSS-FLOW ENERGY RECOVERY CORE WITH MINIMUM SRE OF 75%. THE CORE SHALL BE EASILY REMOVABLE FOR CLEANING AND SERVICE.
5. UNIT COMPLETE WITH WASHABLE MERV-6 AIR FILTERS LOCATED IN EXHAUST AND SUPPLY AIR STREAMS.
6. EACH AIRSTREAM HAS AN INDEPENDENT CENTRIFUGAL HIGH EFFICIENCY ECM BLOWER WITH MULTIPLE FAN SPEED OPERATION.
7. DEFROST MODE: SUPPLY AIR SHUTS OFF TO DEFROST CORE WITH WARM EXHAUST AIR AT HIGH SPEED.
8. UNIT COMPLETE WITH WALL MOUNT CONTROLLER WITH SELECTABLE ON/OFF, AND FAN SPEED SETTINGS.

ELECTRIC DOMESTIC HOT WATER TANK

1. CSA CERTIFIED ELECTRIC DOMESTIC HOT WATER TANK AND HEATER WITH MINIMUM EF RATING OF 0.8, AND COMPLETE WITH:
   A. 1035 KPA (150 PSI) RATED (WORKING PRESSURE) STEEL TANK, GLASS LINED, INSULATED (EXCEPT FOR CONTROL PANEL AREA) WITH INJECTED MINIMUM R-16 FOAM INSULATION, COVERED WITH AN ENAMELLED STEEL JACKET, AND EQUIPPED WITH 40 MM (1-½") DIA. NPS BRASS NIPPLE WATER INLET AND OUTLET CONNECTIONS, A DRAIN VALVE, AND SACRIFICIAL ANODE RODS;
   B. REMOVABLE MULTIPLE IMMERSION HEATING ELEMENTS, EACH CONSISTING OF A WIRE FILAMENT IN A SEALED STAINLESS STEEL SHEATH;
   C. ASME RATED TEMPERATURE AND PRESSURE RELIEF VALVE;
   D. FACTORY PRE-WIRED POWER AND CONTROL PANEL.
2. EQUIP ENAMELLED STEEL VENTILATED CONTROL PANEL WITH REMOVABLE GLASS FIBRE INSULATION TO COVER BARE AREA OF TANK, A HINGED DOOR, MULTIPLE KNOCKOUTS, A GROUND SCREW, AND FOLLOWING:
   A. TERMINAL BLOCK FOR POWER WIRING CONNECTIONS;
   B. MAGNETIC CONTACTORS FOR HEATING ELEMENTS;
   C. ADJUSTABLE IMMERSION THERMOSTAT;
   D. MANUAL RESET IMMERSED HIGH TEMPERATURE LIMIT CONTROL FOR EACH ELEMENT;
   E. FUSE BLOCK WITH FUSES;
   F. ELEMENT DIAGNOSTIC PANEL WITH LED'S FOR EACH ELEMENT TO MONITOR ON-OFF OPERATION OF EACH ELEMENT;

TOILET EXHAUST FANS

1. CEILING EXHAUST FAN SHALL BE HVI CERTIFIED AND IN ACCORDANCE WITH THE FOLLOWING REQUIREMENTS:
2. 26 GAUGE ZINC-ALUMINUM-MAGNESIUM (ZAM) HOUSING C/W INTEGRATED 6" DUCT ADAPTOR, BUILT-IN DAMPER AND BUILT IN METAL FLANGE;
3. FAN C/W POLY PRO MATERIAL AND ATTACHES DIRECTLY TO HOUSING WITH TORSION SPRINGS;
4. MOTOR BE TO TOTALLY ENCLOSED WITH A BRUSHLESS ECM MOTOR TECHNOLOGY RATED FOR CONTINUOUS RUN AND EQUIPPED WITH THERMAL-CUTOFF FUSE. MOTOR TO BE REMOVABLE WITH PERMANENTLY LUBRICATED PLUG-IN MOTOR;
5. FAN VENTILATION RATES SHALL BE MANUALLY ADJUSTABLE;
6. FAN SHALL BE UL AND CUL LISTED FOR TUB/SHOWER ENCLOSURE WHEN GFCI PROTECTED.

DRYER EXHAUST

1. DRYER BOOSTER FAN SHALL BE HVI CERTIFIED AND IN ACCORDANCE WITH THE FOLLOWING REQUIREMENTS:
   A. 26-GAUGE GALVANISED STEEL HOUSING SUPPLIED WITH VIBRATION ISOLATION TO SUIT MOUNTING;
   B. ROUND INLET AND DISCHARGE COLLAR;
   C. FIELD WIRING COMPARTMENT WITH REMOVABLE ACCESS PANEL;
   D. BACKWARDLY-INCLINED, SELF-CLEANING IMPELLER, FULLY-SEALED IMPELLER ASSEMBLY WITH AUTOMATIC-RESET THERMAL OVERLOAD PROTECTION, AND PERMANENTLY-LUBRICATED MOTOR;
   E. ACCESSORIES:
      a. AMP SENSOR (CURRENT-SENSING RELAY SWITCH);
      b. LINT TRAP;
      c. WALL BOX.

KITCHEN RANGE HOOD

1. DUCTED RANGE HOODS, CSA CERTIFIED, ROTARY SOLID STATE SPEED CONTROL PROVIDING INFINITE RANGE, ROTARY LIGHT CONTROL SWITCH, BACKDRAFT DAMPER, WITH LIGHT LENS AND PERMANENT, WASHABLE ALUMINUM MESH GREASE FILTER(S).

CMHC SCHL

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NO.	DATE	DESCRIPTION
1	2025/02/25	ISSUED AS PROTOTYPICAL DRAWING

PROJECT:

CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT OR CONSTRUCTION

SHEET TITLE:

ENHANCED ACCESSIBILITY MECHANICAL OUTLINE SPECIFICATIONS - ALTERNATE OPTION 1

PROJECT NO: 24112

SCALE: NTS

SHEET NO:

M001B

MECHANICAL OUTLINE SPECIFICATIONS - ALTERNATE OPTION 2

1. PRIMARY HEAT FROM STANDARD AIR SOURCE HEAT PUMP COIL IN VERTICAL DUCTED FANCOIL UNIT.
2. SUPPLEMENTAL HEAT THROUGH GAS FIRED COMBI BOILER SERVING HYDRONIC HEATING COIL IN FANCOIL UNIT AT COLDER TEMPERATURES.
3. COOLING THROUGH STANDARD AIR SOURCE HEAT PUMP COIL.
4. DOMESTIC HOT WATER PRODUCED BY GAS FIRED COMBI BOILER.

DESIGN CRITERIA AND REQUIREMENTS

1. THE MECHANICAL SYSTEMS SHALL BE DESIGNED IN ACCORDANCE WITH THE ONTARIO BUILDING CODE (OBC), SPECIFIC REQUIREMENTS OF THE LOCAL AUTHORITY HAVING JURISDICTION, DESIGN PRINCIPLES AND STANDARDS OBTAINED FROM THE OWNER AND DESIGN TEAM AS WELL AS STANDARDS OF GOOD ENGINEERING PRACTICES.
2. WORK SHALL BE COMPLETED IN ACCORDANCE WITH STANDARDS PUBLISHED BY THE FOLLOWING PARTIAL LIST OF AUTHORITIES:
   - A. THERMAL ENVIRONMENTAL CONDITIONS FOR HUMAN OCCUPANCY, ANSI/ASHRAE STANDARD 55 (LATEST EDITION);
   - B. VENTILATION REQUIREMENTS TO BE BASED ON MOST CURRENT OBC PART 9 TABLE 9.32.3.3.
   - C. HANDBOOKS PUBLISHED BY AMERICAN SOCIETY OF HEATING, REFRIGERATION AND AIR CONDITIONING ENGINEERS (ASHRAE).
3. HEATING AND COOLING CALCULATIONS TO BE BASED ON MOST CURRENT CLIMATICAL DATA (SB-1) AND ENERGY EFFICIENCY OF HOUSING COMPLIANCE PACKAGES (SB-12) PUBLISHED IN THE ONTARIO BUILDING CODE AND SHALL BE COMPLETED IN ACCORDANCE WITH THE STANDARD CAN/CSA-F280-12 (R2021) TO DETERMINE THE SIZE/CAPACITY OF THE HEATING/AIR CONDITIONING SYSTEMS.
   - A. ALL OCCUPIED AREAS WILL BE AIR CONDITIONED WITH THE FOLLOWING ENVIRONMENTAL CONDITIONS;
     - a. WINTER: 22.0°C ± 1°C AND 20% ± 5% RELATIVE HUMIDITY
     - b. SUMMER: 24.0°C ± 1°C AND 60% ± 5% RELATIVE HUMIDITY
4. ALL UNPROTECTED MECHANICAL PENETRATIONS ON EXPOSING BUILDING FACE MORE THAN 130MM2 SHALL BE COORDINATED WITH DESIGNER AND NOTED ON ARCHITECTURAL DRAWINGS AS PER OBC 9.10.14.6.

SITE SERVICES

1. NATURAL GAS SERVICE:
   - A. ONE (1) UTILITY NATURAL GAS SERVICE WILL BE PROVIDED TO THE BUILDING AND RUN TO INDIVIDUAL GAS METERS PROVIDED FOR EACH RESIDENTIAL UNIT.
   - B. GROUP AND LOCATE GAS METERS ABOVE GRADE ON ONE SIDE OF THE BUILDING AGAINST AN EXTERIOR WALL. RUN INDIVIDUAL GAS LINES FROM GAS METERS TO THE RESPECTIVE RESIDENTIAL UNITS.
   - C. THE NATURAL GAS SYSTEM DESIGN AND INSTALLATION SHALL COMPLY WITH THE LATEST REQUIREMENTS OF CSA B149, NFPA STANDARDS, OBC, AND LOCAL REGULATORY REQUIREMENTS.
   - D. MATERIAL:
     - a. UNDERGROUND PIPING SHALL BE COATED BLACK STEEL "YELLOW JACKET" SCHEDULE 40 MILD BLACK CARBON STEEL; OR, SAFETY YELLOW COLOURED POLYETHYLENE PIPE, FITTINGS, AND JOINTS TO CSA B137.4; OR, COATED TYPE "K" SOFT TEMPER COPPER WITH FACTORY APPLIED EXTERNAL YELLOW LPASTIC COATING, STAMPED WITH DESIGNATION C37700 TO INDICATE FORGED BRASS.
     - b. EXPOSED SCREW PIPING TO BE SCHEDULE 40 MILD BLACK CARBON STEEL, ASTM A53 GRADE B COMPLETE WITH MALLEABLE CAST IRON SCREWED FITTINGS TO ANSI B2.1, AND SCREWED JOINTS.
     - c. EXPOSED WELDED PIPING TO BE SCHEDULE 40 MILD BLACK CARBON STEEL, ASTM A53 GRADE B, MILL OR SITE BEVELLED, COMPLETE WITH FACTORY MADE FORGED STEEL BUTT WELDING FITTINGS AND WELDED JOINTS.
2. WATER SERVICES:
   - A. ONE (1) POTABLE WATER SERVICE WILL BE PROVIDED TO THE BUILDING THEN THE SERVICE WILL SPLIT AND RUN TO INDIVIDUAL UTILITY METER INSIDE EACH RESIDENTIAL UNIT.
3. SANITARY SEWERS:
   - A. ONE (1) SANITARY SERVICE CONNECTION WILL BE PROVIDED TO THE BUILDING COMPLETE WITH SAMPLING PORT IN COORDINATION WITH THE SITE SERVICE ENGINEER. COORDINATE LOCATION AND INVERT OF INCOMING CONNECTION WITH SITE SERVICES CONSULTANT.
   - B. ROOF GUTTERS TO BE PIPED AND ROUTED DOWN THE SIDE OF THE BUILDING TO SPILL ON GRADE.

PLUMBING AND DRAINAGE

1. POTABLE WATER:
   - A. AN INCOMING POTABLE WATER CONNECTION COMPLETED WITH A METER ASSEMBLY WILL SUPPLY WATER TO EACH RESIDENTIAL UNIT. OPTIONAL WATER FILTRATION INCLUDING CARBON ACTIVATED FILTERS, UV AND RO CAN BE PROVIDED IN AREAS WHERE WATER QUALITY IS OF CONCERN.
   - B. POLYETHYLENE PEX PIPING WILL BE PROVIDED TO DISTRIBUTE COLD AND HOT WATER THROUGHOUT THE UNIT.
     - a. TUBE SHALL BE CROSS-LINKED POLYETHYLENE (PEX) MANUFACTURED BY PEX-A OR PEROXIDE METHOD. PEX TUBING SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM F876, ASTM F877 AND CAN/CSA-B137.5. THE TUBE SHALL BE LISTED TO ASTM BY AN INDEPENDENT THIRD PARTY AGENCY.
     - b. FITTINGS SHALL BE MANUFACTURED OF ENGINEERED PLASTIC (EP). FITTINGS SHALL BE PEX-A COLD EXPANSION TYPE CERTIFIED TO ASTM F1960.
       - (1)FITTINGS SHALL BE SUPPLIED BY THE PEX TUBING MANUFACTURER.
       - (2)PEX-A COLD EXPANSION TYPE FITTINGS SHALL BE AN ASSEMBLY CONSISTING OF INSERT AND PEX-A COLD EXPANSION RING.
       - (3)FITTING TYPE: UPONOR ENGINEERED PLASTIC (EP).
2. DRAINAGE:
   - A. ALL SANITARY DRAIN AND MAIN VENT STACKS SHALL BE PLASTIC ABS WITH GLUED CONNECTIONS. WHERE REQUIRED TO MEET FIRE SPREAD AND SMOKE DEVELOPMENT RATINGS METALLIC PIPING OR XFR PIPING IS TO BE PROVIDED BASED ON LOCAL JURISDICTION APPROVAL.
   - B. UNDERGROUND DRAINAGE PIPING SHALL BE PVC DR35 RIGID SEWER PIPING. PIPING 4" AND LARGER TO BE GREEN PVC HUB AND SPIGOT SEWER PIPE AND FITTINGS TO CAN/CSA B182.2. SIZE 3" PIPE TO BE PVC WITH SOLVENT WELD JOINTS CERTIFIED TO CSA B182.1 AND COLOUR CODED AS PER LOCAL CODES.
3. DOMESTIC HOT WATER PRODUCTION:
   - A. DOMESTIC HOT WATER SHALL BE PRODUCED BY THE 97% EFFICIENT GAS FIRED TANKLESS COMBI BOILER THAT ALSO PRODUCES SUPPLEMENTAL HEATING WATER FOR THE ASSOCIATED RESIDENTIAL UNIT.
   - B. A MIXING VALVE SHALL BE PROVIDED TO SUPPLY 49°C (120°F) DOMESTIC HOT WATER TO THE FIXTURES.
   - C. PROPANE OR NATURAL GAS SERVICE WITH METER SHALL BE PROVIDED TO SERVE THE COMBI BOILER.
4. PRESSURE BALANCING TYPE MIXING VALVES SHALL BE PROVIDED FOR ALL SHOWERS.
5. DRAIN WATER HEAT RECOVERY COIL SHALL BE PROVIDED FOR EACH MULTI-STOREY UNIT.
6. PLUMBING FIXTURES SHALL BE LOW FLOW AND OF FIRST QUALITY.
7. SANITARY DRAINS WILL BE COLLECTED AND CONNECTED TO THE MUNICIPAL SANITARY NETWORK. UNLESS OTHERWISE NOTED, SLOPE ALL 75 MM (3") DRAINAGE PIPING AT 2% SLOPE AND ALL 100 MM (4") AND LARGER DRAINAGE PIPING AT 1% SLOPE.

HEATING, VENTILATION, AND AIR CONDITIONING (HVAC)

1. HEATING AND COOLING SYSTEMS:
   - A. HEATING AND COOLING WILL BE PRODUCED BY A STANDARD AIR SOURCE HEAT PUMP SYSTEM WITH A MINIMUM SEER=15 AND HSPF=7.5.
   - B. THE HEAT PUMP SYSTEM IS SIZED FOR THE COOLING LOAD AND NOT THE FULL HEATING LOAD. THE HEATING IS SUPPLEMENTED BY A 97% EFFICIENT GAS FIRED COMBI BOILER WHEN THE OUTDOOR TEMPERATURE IS -5°C (23°F) OR BELOW.
   - C. INDOOR VERTICAL FANCOIL UNIT TO BE COMPLETE WITH A HYDRONIC HEATING COIL SIZED AND SELECTED FOR THE FULL HEATING LOAD REQUIREMENT AND MINIMUM MERV 8 FILTRATION.
   - D. THE COMBI BOILER SHALL ALSO PRODUCE INSTANTANEOUS DOMESTIC HOT WATER FOR THE RESIDENTIAL UNIT THROUGHOUT THE YEAR.
   - E. THE OUTDOOR HEAT PUMP CONDENSER IS TO BE LOCATED WITHIN CLOSE PROXIMITY TO THE INDOOR UNIT AND CONNECTED WITH REFRIGERANT PIPING. THE OUTDOOR HEAT PUMP CONDENSER WILL BE ABLE TO OPERATE FROM -5°C (23°F) TO 35°C (95°F).
   - F. PROPANE OR NATURAL GAS SERVICE WITH METER SHALL BE PROVIDED TO SERVE THE COMBI BOILER.
2. VENTILATION AND EXHAUST SYSTEMS:
   - A. VENTILATION AIR WILL BE PROVIDED BY AN ENERGY RECOVERY VENTILATOR (ERV) THAT WILL TRANSFER ENERGY FROM THE PRIMARY BATHROOM EXHAUST TO PRE-CONDITION OUTDOOR AIR THAT WILL BE DUCTED BACK TO THE INDOOR UNIT. SIZE OF ERV TO BE DETERMINED BASED ON OBC PART 9 REQUIREMENT. ERV PERFORMANCE SHALL HAVE A MINIMUM OF 75% EFFECTIVENESS. WHERE REQUIRED, AN ELECTRIC DUCT HEATER SHALL BE PROVIDED. THE ERV SHALL BE CONTROLLED BY A LOCAL TIMER SWITCH.
   - B. SECONDARY WASHROOMS WILL BE PROVIDED WITH DEDICATED CEILING MOUNTED TOILET EXHAUST FANS COMPLETE WITH LOCAL SWITCH.
   - C. CLOTHES DRYERS WILL BE PROVIDED WITH A LINT TRAP AND DRYER BOOSTER FAN CONNECTED TO A CURRENT SENSOR TO AID IN DRYER EXHAUST. LINT TRAPS WILL BE PROVIDED ON THE SUCTION SIDE OF THE FAN WITHIN THE SUITE LAUNDRY ROOM.
   - D. KITCHEN HOOD EXHAUSTS WILL BE SIZED FOR MINIMUM 150 CFM AND DUCTED TO OUTDOORS.
   - E. ALL EXHAUST DUCTWORK WILL BE DISCHARGED TO THE EXTERIOR THROUGH THE EXTERIOR WALLS OF THE UNIT OR THROUGH THE ROOF FOR THE TOP LEVEL.
   - F. EXHAUST DUCTWORK SHALL BE INSULATED FOR THE FIRST 10FT FROM THE EXTERIOR LOUVRE.
3. AIR DISTRIBUTION:
   - A. DUCTWORK SHALL BE GALVANIZED SHEET METAL UNLESS OTHERWISE INDICATED. DUCTS SHALL BE SIZED AT A PRESSURE DROP OF 0.08" (20PA) PER 100' (30.5M) WITH MAXIMUM AIR VELOCITIES OF 1400 FEET (427M) PER MINUTE.
   - B. DUCTWORK TO BE INSULATED TO MEET ASHRAE 90.1 AND THE GOVERNING AUTHORITY REQUIREMENTS.
   - C. PROVIDE ACOUSTIC LINING FOR ALL SUPPLY AND RETURN AIR DUCTWORK SERVING MECHANICAL EQUIPMENT WITH FANS TO A MAXIMUM OF 4.5M (15') FROM THE EQUIPMENT, MEASURED OUTWARD IN ALL DIRECTIONS.
   - D. SUPPLY AIR FROM THE INDOOR UNIT SHALL BE DUCTED TO EACH ROOM VIA 200X100 SIDEWALL GRILLES OR FLOOR REGISTERS.
   - E. EACH ROOM SHALL HAVE A RETURN AIR GRILLE OR AN 1" (25MM) DOOR UNDERCUT FOR AIR TRANSFER.
   - F. PROVIDE BALANCING DAMPERS AT ALL DUCT BRANCHES FOR AIR BALANCING.
   - G. DUCTWORK PENETRATING CEILING MEMBRANES REQUIRED TO HAVE A FIRE-RESISTANCE RATING SHALL CONFORM TO REQUIREMENTS MENTIONED PER OBC 9.10.5.1. (3).
4. HYDRONIC PIPING:
   - A. ALL HYDRONIC HEATING WATER PIPE, UNLESS OTHERWISE NOTED, SHALL BE MILD BLACK STEEL, SCHEDULE 40. PIPING TO AND INCLUDING 2" (50 MM) DIAMETER SHALL BE SCREWED.
   - B. PROVIDE SHUT OFF VALVES AND CIRCUIT BALANCING VALVES AT ALL PIPE CONNECTIONS TO EQUIPMENT. PROVIDE AUTOMATIC AIR RELIEF VENT IN HIGH POINTS OF THE CLOSED LOOP PIPING SYSTEMS.
   - C. PIPING, FITTINGS, AND VALVES TO BE INSULATED TO MEET ASHRAE 90.1 AND THE GOVERNING AUTHORITY REQUIREMENTS.
5. A PROGRAMMABLE THERMOSTAT WITH OCCUPANCY SENSOR SHALL BE PROVIDED TO CONTROL THE SUITE HVAC SYSTEM.
6. REFRIGERATION:
   - A. DESIGN AND INSTALLATION OF REFRIGERATION SYSTEM SHALL BE IN ACCORDANCE WITH CSA B52 MECHANICAL REFRIGERATION CODE, ONTARIO BUILDING CODE, AHRI, AND EQUIPMENT MANUFACTURERS RECOMMENDATIONS.
   - B. NEW REFRIGERATION PIPING SHALL BE ACR SEAMLESS COPPER TUBING SUITABLE FOR AIR CONDITIONING OR REFRIGERATION SYSTEMS.
   - C. KEEP TUBING RUNS AND NUMBER OF ELBOWS AND FITTINGS TO A MINIMUM.
   - D. ENSURE TUBING IS DEHYDRATED, TESTED, ADEQUATELY CHARGED, AND GAS TIGHT.
   - E. PIPING SHALL BE INSULATED WITH FLEXIBLE ELASTOMERIC, CLOSED CELL, SLEEVE TYPE LONGITUDINALLY SPLIT SELF-SEAL FORMED PLASTIC PIPE INSULATION EQUAL TO ARMACELL AP/ARMAFLEX SS. INSULATION SHALL BE 25 MM (1") THICK.
   - F. COORDINATE AND RUN ALL REFRIGERANT LINES INSIDE DESIGNATED CAVITY. NO EXTERIOR RUNS PERMITTED UNLESS OTHERWISE INSTRUCTED.
7. FIRE STOPPING AND SMOKE SEAL SYSTEMS
   - A. ASBESTOS-FREE, ELASTOMERIC MATERIALS AND INTUMESCENT MATERIALS, TESTED, LISTED AND LABELLED BY ULC IN ACCORDANCE WITH CAN/ULC S115, AND CAN/ULC S101 FOR INSTALLATION IN ULC DESIGNATED FIRESTOPPING, AND SMOKE SEAL SYSTEMS TO PROVIDE A POSITIVE FIRE, WATER AND SMOKE SEAL AND A FIRE RESISTANCE RATING (FLAME, HOSE STREAM AND TEMPERATURE) NO LESS THAN FIRE RATING FOR SURROUNDING CONSTRUCTION.
   - B. FIRESTOPPING AND SMOKE SEAL MATERIAL SYSTEM TO BE SPECIFICALLY ULC CERTIFIED WITH DESIGNATED REFERENCE NUMBER FOR ITS SPECIFIC INSTALLATION.
   - C. SMOKE AND FIRE SEAL MATERIALS AND MANUFACTURERS MUST BE SPECIFICALLY APPROVED FOR EACH APPLICATION OF PENETRATED SURFACES, AS APPROVED BY FM GLOBAL AND LISTED IN FM GLOBAL APPROVAL GUIDE. LISTED COMPANIES HEREIN AND OTHER MANUFACTURERS ARE ONLY ACCEPTABLE IF COMPLIANT WITH THESE REQUIREMENTS.
   - D. MATERIALS ARE TO BE COMPATIBLE WITH ABUTTING DISSIMILAR MATERIALS AND FINISHES AND COMPLETE WITH PRIMERS, DAMMING AND BACK-UP MATERIALS, SUPPORTS, AND ANCHORING DEVICES IN ACCORDANCE WITH FIRESTOPPING MANUFACTURER'S RECOMMENDATIONS AND ULC TESTED ASSEMBLY. COORDINATE MATERIAL REQUIREMENTS WITH TRADES SUPPLYING ABUTTING AREAS OF MATERIALS.
   - E. TYPICALLY, FOR OPENINGS OF UP TO 250 MM (10") IN DIAMETER, PROVIDE PUTTY PAD TYPE FIRESTOP MATERIALS INTUMESCENT, NON-HARDENING, WATER RESISTANT PUTTIES CONTAINING NO SOLVENTS, INORGANIC FIBRES OR SILICONE COMPOUNDS.
   - F. TYPICALLY, FOR OPENINGS OF GREATER THAN 250 MM (10") IN DIAMETER, AND FOR RECTANGULAR OPENINGS, PROVIDE PILLOW TYPE FIRESTOP MATERIALS RE-ENTERABLE, NON-CURING, MINERAL FIBRE CORE ENCAPSULATED ON SIX SIDES WITH INTUMESCENT COATING CONTAINED IN A FLAME RETARDANT POLY BAG.
   - G. SUPPLY PRODUCTS OF A SINGLE MANUFACTURER FOR USE ON WORK OF THIS DIVISION.
   - H. INSTALLER TO BE MANUFACTURER TRAINED AND CERTIFIED ON SPECIFIC PRODUCT.
   - I. INCLUDE FOR MANUFACTURER'S AUTHORIZED REPRESENTATIVE TO INSPECT AND VERIFY EACH INSTALLATION AND APPLICATION.
   - J. ACCEPTABLE CERTIFICATION TO ALSO INCLUDE CERTIFICATION BY UNDERWRITERS LABORATORIES OF NORTHBROOK IL, USING TESTS CONFORMING TO ULC-S115 AND GIVEN CUL LISTING PUBLISHED BY UL IN THEIR "PRODUCTS CERTIFIED FOR CANADA (CUL) DIRECTORY".

MECHANICAL EQUIPMENT - ALTERNATE OPTION 2

STANDARD AIR SOURCE HEAT PUMP SYSTEM

1. FACTORY ASSEMBLED AND TESTED, PACKAGE TYPE SYSTEM CONSISTING OF AN INDOOR VERTICAL AIR HANDLER UNIT AND A DEDICATED EXTERIOR CONDENSING UNIT, CSA OR ETL LISTED AND LABELLED, AHRI RATED AND CERTIFIED AND WITH A MINIMUM SYSTEM EFFICIENCY OF 15 SEER AND 7.5 HSPF.
2. HIGH STATIC, VERTICAL DUCTED INDOOR EVAPORATOR UNIT CONSISTING OF GALVANIZED STEEL PLATE CASING C/W COATED POLYSTYRENE INSULATING MATERIAL ON COLD SURFACES. EVAPORATOR COMPLETE WITH:
   - A. FLANGED SUPPLY AND RETURN AIR OPENING READY FOR FIELD INSTALLED DUCTWORK;
   - B. FACTORY ASSEMBLED, PIPED AND WIRED ELECTRONIC EXPANSION VALVE (EEV) FOR REFRIGERANT CONTROL;
   - C. DIRECT DRIVEN SUPPLY FANS WITH THE FAN MOTOR MOUNTED ON VIBRATION ATTENUATING RUBBER GROMMETS, DIGITALLY CONTROLLED WITH PERMANENTLY LUBRICATED AND SEALED BEARINGS;
   - D. REMOVABLE, WASHABLE RETURN AIR FILTER;
   - E. HEAT PUMP COIL COMPRISED OF ALUMINIUM FINS MECHANICALLY BONDED ON COPPER TUBING C/W FACTORY SUPPLIED CONDENSATE DRAIN PAN BELOW COIL;
   - F. HYDRONIC HEATING COIL CONSISTED OF SEAMLESS COPPER TUBES MECHANICALLY EXPANDED INTO PLATE TYPE ALUMINIUM FINS AND EQUIPPED WITH COPPER PIPE HEADERS, A MANUAL AIR VENT, AND A DRAIN PLUG;
   - G. FACTORY INSTALLED TEMPERATURE THERMISTORS FOR RETURN AIR, REFRIGERANT ENTERING COIL, AND REFRIGERANT LEAVING COIL;
3. HEAT PUMP CONDENSING UNIT:
   - A. CABINET SHALL BE CONSTRUCTED OF HEAVY-GAUGE GALVANIZED STEEL C/W BAKED-ON POWDER-PAINT FINISH;
   - B. UNIT COMPLETE WITH HIGH EFFICIENCY TWO-STAGE SCROLL COMPRESSOR, HIGH DENSITY FOAM COMPRESSOR SOUND BLANKET, COPPER TUBE/ALUMINUM FIN COIL, AND QUIET TWO-SPEED ECM OUTDOOR FAN MOTOR;
   - C. UNIT SHALL BE PROVIDED WITH FACTORY INSTALLED BI-FLOW LIQUID-LINER FILTER DRIER, SUCTION-LINE ACCUMULATOR, COMPRESSOR CRANKCASE HEATER, HIGH-CAPACITY MUFFLER, COIL AND AMBIENT TEMPERATURE SENSORS, TRANSFORMER, AND HIGH AND LOW-PRESSURE SWITCHES;
   - D. UNIT COMPLETE WITH TIME-DELAY TECHNOLOGY WITH SHORT-CYCLE PROTECTION TO ENSURE QUIET, RELIABLE DEFROST.
4. INDOOR WALL MOUNTED REMOTE CONTROLLER SHALL BE CAPABLE OF MONITORING AND CONTROLLING THE SYSTEM IN TERMS OF ON/OFF, MODE OF OPERATION, AIRFLOW DIRECTION, FAN SPEED, SPACE TEMPERATURE, AND SPACE TEMPERATURE SETPOINT BASED ON A 7 DAY PROGRAMMABLE SCHEDULING OF OCCUPIED/UNOCCUPIED SETTINGS. CONTROLLER SHALL HAVE A TOUCH-SCREEN, BACKLIT, LCD DISPLAY.

ENERGY RECOVERY VENTILATOR (ERV)

1. UNIT SHALL BE FACTORY ASSEMBLED, WIRED AND TESTED AND SHALL CONFORM TO CSA AND UL STANDARDS.
2. UNIT SHALL BE COMPACT WITH A LOW PROFILE SUITABLE FOR INSTALLATION IN BULKHEADS AND DROPPED CEILINGS.
3. CABINET SHALL BE CONSTRUCTED OF 22-GAUGE PRE-PAINTED GALVANIZED STEEL FOR CORROSION RESISTANCE AND INSULATED TO PREVENT EXTERIOR CONDENSATION. CABINET SHALL BE COMPLETE WITH DRAIN CONNECTIONS, BALANCING PORTS, AND THREADED INSERTS TO ACCEPT S-HOOKS AND HANGING STRAPS SUPPLIED WITH UNIT.
4. ENERGY RECOVERY ASSEMBLY SHALL BE THERMALLY CONDUCTIVE, ALUMINUM CROSS-FLOW ENERGY RECOVERY CORE WITH MINIMUM SRE OF 75%. THE CORE SHALL BE EASILY REMOVABLE FOR CLEANING AND SERVICE.
5. UNIT COMPLETE WITH WASHABLE MERV-6 AIR FILTERS LOCATED IN EXHAUST AND SUPPLY AIR STREAMS.
6. EACH AIRSTREAM HAS AN INDEPENDENT CENTRIFUGAL HIGH EFFICIENCY ECM BLOWER WITH MULTIPLE FAN SPEED OPERATION.
7. DEFROST MODE: SUPPLY AIR SHUTS OFF TO DEFROST CORE WITH WARM EXHAUST AIR AT HIGH SPEED.
8. UNIT COMPLETE WITH WALL MOUNT CONTROLLER WITH SELECTABLE ON/OFF, AND FAN SPEED SETTINGS.

GAS-FIRED COMBI BOILER

1. CONDENSING GAS FIRED COMBI BOILER, FACTORY FABRICATED, ASSEMBLED AND TESTED, AND COMPLETE WITH THE FOLLOWING:
   - A. UNIT TO BE DESIGN CERTIFIED TO THE ANSI Z21.10.3 STANDARD AND HAVE A THERMAL EFFICIENCY OF 96% AND A UNIFORM ENERGY FACTOR OF 0.93;
   - B. UNIT SHALL PRODUCE NO MORE THAN 20PPM NOX EMISSIONS WHEN TESTED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (SCAQMD);
   - C. UNIT SHALL HAVE MODULATING FIBER MESH BURNERS, SOLID BRASS WATER FLOW CONTROL VALVE, AND SOLID BRASS INLET AND OUTLET WATER CONNECTIONS.
   - D. UNIT SHALL HAVE A STAINLESS-STEEL WATER TUBE CONDENSING HEAT EXCHANGER AND A BUILT-IN DHW STAINLESS STEEL HEAT EXCHANGER.
   - E. UNIT PROVIDED WITH A TEMPERATURE THERMOSTAT WITH AN ADJUSTABLE SET POINT RANGE OF 98°F TO 185°F.
   - F. UNIT SHALL BE MICROPROCESSOR CONTROLLED AND UTILIZE A DIRECT ELECTRONIC IGNITION SYSTEM, FULLY MODULATING GAS CONTROL VALVE, TURBINE FLOW METER, AUTOMATIC ELECTRO-MECHANICAL WATER FLOW CONTROL VALVE, AND WATER TEMPERATURE THERMISTORS TO MAINTAIN OUTLET WATER TEMPERATURE BETWEEN +/- 2°F OF SET POINT TEMPERATURE. MICROPROCESSOR SHALL HAVE PRIORITY/PROPORTIONAL DHW STANDARD AND BUILT IN RECIRCULATION LOGIC TO CONTROL A PUMP'S HEATING CYCLES.
   - G. UNIT SHALL HAVE THE FOLLOWING INTERNAL SAFETY DEVICES:
     - a. FLAME FAILURE LOCKOUT;
     - b. BOILING PROTECTION LOCKOUT;
     - c. THERMAL OVERHEAT PROTECTION;
     - d. INTERNAL FREEZE PROTECTION FOR AMBIENT TEMPERATURES AS LOW AS -22°F;
     - e. LOCKOUT PROTECTION FROM A BLOCKED FLUE.
   - H. UNIT SHALL BE CAPABLE OF STORING AND DISPLAYING A HISTORY OF UP TO 9 DIAGNOSTIC MAINTENANCE CODES VIA DISPLAY ON THE TEMPERATURE THERMOSTAT CONTROLLER.
   - I. UNIT COMPLETED WITH DIRECT VENT SEALED COMBUSTION.
2. UNIT SHALL BE PROVIDED WITH THE FOLLOWING ACCESSORIES:
   - A. INTEGRAL CIRCULATING PUMP;
   - B. PRIMARY-SECONDARY HEATING KIT;
   - C. ROOM AIR SCREEN;
   - D. CONDENSATE NEUTRALIZER;
   - E. SCALE CUTTER;
   - F. ISOLATION VALVE KIT.

TOILET EXHAUST FANS

1. CEILING EXHAUST FAN SHALL BE HVI CERTIFIED AND IN ACCORDANCE WITH THE FOLLOWING REQUIREMENTS:
2. 26 GAUGE ZINC-ALUMINUM-MAGNESIUM (ZAM) HOUSING C/W INTEGRATED 6" DUCT ADAPTOR, BUILT-IN DAMPER AND BUILT IN METAL FLANGE;
3. FAN C/W POLY PRO MATERIAL AND ATTACHES DIRECTLY TO HOUSING WITH TORSION SPRINGS;
4. MOTOR BE TO TOTALLY ENCLOSED WITH A BRUSHLESS ECM MOTOR TECHNOLOGY RATED FOR CONTINUOUS RUN AND EQUIPPED WITH THERMAL-CUTOFF FUSE. MOTOR TO BE REMOVABLE WITH PERMANENTLY LUBRICATED PLUG-IN MOTOR;
5. FAN VENTILATION RATES SHALL BE MANUALLY ADJUSTABLE;
6. FAN SHALL BE UL AND CUL LISTED FOR TUB/SHOWER ENCLOSURE WHEN GFCI PROTECTED.

DRYER EXHAUST

1. DRYER BOOSTER FAN SHALL BE HVI CERTIFIED AND IN ACCORDANCE WITH THE FOLLOWING REQUIREMENTS:
   - A. 26-GAUGE GALVANISED STEEL HOUSING SUPPLIED WITH VIBRATION ISOLATION TO SUIT MOUNTING;
   - B. ROUND INLET AND DISCHARGE COLLAR;
   - C. FIELD WIRING COMPARTMENT WITH REMOVABLE ACCESS PANEL;
   - D. BACKWARDLY-INCLINED, SELF-CLEANING IMPELLER, FULLY-SEALED IMPELLER ASSEMBLY WITH AUTOMATIC-RESET THERMAL OVERLOAD PROTECTION, AND PERMANENTLY-LUBRICATED MOTOR;
   - E. ACCESSORIES:
     - a. AMP SENSOR (CURRENT-SENSING RELAY SWITCH);
     - b. LINT TRAP;
     - c. WALL BOX.

KITCHEN RANGE HOOD

1. DUCTED RANGE HOODS, CSA CERTIFIED, ROTARY SOLID STATE SPEED CONTROL PROVIDING INFINITE RANGE, ROTARY LIGHT CONTROL SWITCH, BACKDRAFT DAMPER, WITH LIGHT LENS AND PERMANENT, WASHABLE ALUMINUM MESH GREASE FILTER(S).

CMHC SCHL

DISCLAIMER

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NO.	DATE	DESCRIPTION
1	2025/02/25	ISSUED AS PROTOTYPICAL DRAWING

PROJECT:

CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT OR CONSTRUCTION

SHEET TITLE:

ENHANCED ACCESSIBILITY MECHANICAL OUTLINE SPECIFICATIONS - ALTERNATE OPTION 2

PROJECT NO: 24112

SCALE: NTS

SHEET NO:

M001C

MECHANICAL OUTLINE SPECIFICATIONS - ALTERNATE OPTION 3

1. PRIMARY HEAT FROM COLD CLIMATE AIR SOURCE HEAT PUMP COIL IN VERTICAL DUCTED FANCOIL UNIT.
2. SUPPLEMENTAL HEAT THROUGH ELECTRIC HEATING COIL IN FANCOIL UNIT IN COLDER TEMPERATURES.
3. COOLING THROUGH AIR SOURCE HEAT PUMP COIL.
4. ELECTRIC DOMESTIC HOT WATER TANK.

DESIGN CRITERIA AND REQUIREMENTS

1. THE MECHANICAL SYSTEMS SHALL BE DESIGNED IN ACCORDANCE WITH THE ONTARIO BUILDING CODE (OBC), SPECIFIC REQUIREMENTS OF THE LOCAL AUTHORITY HAVING JURISDICTION, DESIGN PRINCIPLES AND STANDARDS OBTAINED FROM THE OWNER AND DESIGN TEAM AS WELL AS STANDARDS OF GOOD ENGINEERING PRACTICES.
2. WORK SHALL BE COMPLETED IN ACCORDANCE WITH STANDARDS PUBLISHED BY THE FOLLOWING PARTIAL LIST OF AUTHORITIES:
   A. THERMAL ENVIRONMENTAL CONDITIONS FOR HUMAN OCCUPANCY, ANSI/ASHRAE STANDARD 55 (LATEST EDITION);
   B. VENTILATION REQUIREMENTS TO BE BASED ON MOST CURRENT OBC PART 9 TABLE 9.32.3.3.
   C. HANDBOOKS PUBLISHED BY AMERICAN SOCIETY OF HEATING, REFRIGERATION AND AIR CONDITIONING ENGINEERS (ASHRAE).
3. HEATING AND COOLING CALCULATIONS TO BE BASED ON MOST CURRENT CLIMATICAL DATA (SB-1) AND ENERGY EFFICIENCY OF HOUSING COMPLIANCE PACKAGES (SB-12) PUBLISHED IN THE ONTARIO BUILDING CODE AND SHALL BE COMPLETED IN ACCORDANCE WITH THE STANDARD CAN/CSA-F280-12 (R2021) TO DETERMINE THE SIZE/CAPACITY OF THE HEATING/AIR CONDITIONING SYSTEMS.
   A. ALL OCCUPIED AREAS WILL BE AIR CONDITIONED WITH THE FOLLOWING ENVIRONMENTAL CONDITIONS;
      a. WINTER: 22.0°C ± 1°C AND 20% ± 5% RELATIVE HUMIDITY
      b. SUMMER: 24.0°C ± 1°C AND 60% ± 5% RELATIVE HUMIDITY
4. ALL UNPROTECTED MECHANICAL PENETRATIONS ON EXPOSING BUILDING FACE MORE THAN 130MM2 SHALL BE COORDINATED WITH DESIGNER AND NOTED ON ARCHITECTURAL DRAWINGS AS PER OBC 9.10.14.6.

SITE SERVICES

1. WATER SERVICES:
   A. ONE (1) POTABLE WATER SERVICE WILL BE PROVIDED TO THE BUILDING THEN THE SERVICE WILL SPLIT AND RUN TO INDIVIDUAL UTILITY METER INSIDE EACH RESIDENTIAL UNIT.
2. SANITARY SEWERS:
   A. ONE (1) SANITARY SERVICE CONNECTION WILL BE PROVIDED TO THE BUILDING COMPLETE WITH SAMPLING PORT IN COORDINATION WITH THE SITE SERVICE ENGINEER. COORDINATE LOCATION AND INVERT OF INCOMING CONNECTION WITH SITE SERVICES CONSULTANT.
   B. ROOF GUTTERS TO BE PIPED AND ROUTED DOWN THE SIDE OF THE BUILDING TO SPILL ON GRADE.

PLUMBING AND DRAINAGE

1. POTABLE WATER:
   A. AN INCOMING POTABLE WATER CONNECTION COMPLETED WITH A METER ASSEMBLY WILL SUPPLY WATER TO EACH RESIDENTIAL UNIT. OPTIONAL WATER FILTRATION INCLUDING CARBON ACTIVATED FILTERS, UV AND RO CAN BE PROVIDED IN AREAS WHERE WATER QUALITY IS OF CONCERN.
   B. POLYETHYLENE PEX PIPING WILL BE PROVIDED TO DISTRIBUTE COLD AND HOT WATER THROUGHOUT THE UNIT.
      a. TUBE SHALL BE CROSS-LINKED POLYETHYLENE (PEX) MANUFACTURED BY PEX-A OR PEROXIDE METHOD. PEX TUBING SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM F876, ASTM F877 AND CAN/CSA-B137.5. THE TUBE SHALL BE LISTED TO ASTM BY AN INDEPENDENT THIRD PARTY AGENCY.
      b. FITTINGS SHALL BE MANUFACTURED OF ENGINEERED PLASTIC (EP). FITTINGS SHALL BE PEX-A COLD EXPANSION TYPE CERTIFIED TO ASTM F1960.
         (1)FITTINGS SHALL BE SUPPLIED BY THE PEX TUBING MANUFACTURER.
         (2)PEX-A COLD EXPANSION TYPE FITTINGS SHALL BE AN ASSEMBLY CONSISTING OF INSERT AND PEX-A COLD EXPANSION RING.
         (3)FITTING TYPE: UPONOR ENGINEERED PLASTIC (EP).
2. DRAINAGE:
   A. ALL SANITARY DRAIN AND MAIN VENT STACKS SHALL BE PLASTIC ABS WITH GLUED CONNECTIONS. WHERE REQUIRED TO MEET FIRE SPREAD AND SMOKE DEVELOPMENT RATINGS METALLIC PIPING OR XFR PIPING IS TO BE PROVIDED BASED ON LOCAL JURISDICTION APPROVAL.
   B. UNDERGROUND DRAINAGE PIPING SHALL BE PVC DR35 RIGID SEWER PIPING. PIPING 4" AND LARGER TO BE GREEN PVC HUB AND SPIGOT SEWER PIPE AND FITTINGS TO CAN/CSA B182.2. SIZE 3" PIPE TO BE PVC WITH SOLVENT WELD JOINTS CERTIFIED TO CSA B182.1 AND COLOUR CODED AS PER LOCAL CODES.
3. DOMESTIC HOT WATER PRODUCTION:
   A. AN ELECTRIC DOMESTIC HOT WATER (DHW) TANK WILL BE PROVIDED FOR EACH RESIDENTIAL UNIT.
   B. DOMESTIC HOT WATER SHALL BE STORED AT A MINIMUM OF 52°C (125°F).
   C. A MIXING VALVE SHALL BE PROVIDED TO SUPPLY 49°C (120°F) DOMESTIC HOT WATER TO THE FIXTURES.
4. PRESSURE BALANCING TYPE MIXING VALVES SHALL BE PROVIDED FOR ALL SHOWERS.
5. DRAIN WATER HEAT RECOVERY COIL SHALL BE PROVIDED FOR EACH MULTI-STOREY UNIT.
6. PLUMBING FIXTURES SHALL BE LOW FLOW AND OF FIRST QUALITY.
7. SANITARY DRAINS WILL BE COLLECTED AND CONNECTED TO THE MUNICIPAL SANITARY NETWORK. UNLESS OTHERWISE NOTED, SLOPE ALL 75 MM (3") DRAINAGE PIPING AT 2% SLOPE AND ALL 100 MM (4") AND LARGER DRAINAGE PIPING AT 1% SLOPE.

HEATING, VENTILATION, AND AIR CONDITIONING (HVAC)

1. HEATING AND COOLING SYSTEMS:
   A. HEATING AND COOLING WILL BE PRODUCED BY A COLD CLIMATE AIR SOURCE VARIABLE REFRIGERANT FLOW (VRF) HEAT PUMP SYSTEM. THE HEAT PUMP COIL WILL OPERATE IN HEATING MODE UNTIL -25°C (-13°F) AND BACKED UP BY AN AUXILIARY ELECTRIC HEATING COIL AT THE LOWER OUTDOOR TEMPERATURES.
   B. THE CAPACITY OF THE HEAT PUMP SYSTEM SHALL BE SIZED AND SELECTED TO MEET THE FULL HEATING AND COOLING LOAD REQUIREMENTS OF THE RESIDENTIAL UNIT.
   C. THE INDOOR VERTICAL FANCOIL UNIT (FCU) WILL INCLUDE A 5 KW AUXILIARY ELECTRIC HEATING COIL FOR BACKUP. UNIT TO BE COMPLETE WITH MINIMUM MERV 8 FILTRATION.
   D. THE OUTDOOR HEAT PUMP CONDENSER IS TO BE LOCATED WITHIN CLOSE PROXIMITY TO THE INDOOR UNIT AND CONNECTED WITH REFRIGERANT PIPING. THE OUTDOOR HEAT PUMP CONDENSER WILL BE ABLE TO OPERATE FROM -25°C (-13°F) TO 35°C (95°F).
2. VENTILATION AND EXHAUST SYSTEMS:
   A. VENTILATION AIR WILL BE PROVIDED BY AN ENERGY RECOVERY VENTILATOR (ERV) THAT WILL TRANSFER ENERGY FROM THE PRIMARY BATHROOM EXHAUST TO PRE-CONDITION OUTDOOR AIR THAT WILL BE DUCTED BACK TO THE INDOOR UNIT. SIZE OF ERV TO BE DETERMINED BASED ON OBC PART 9 REQUIREMENT. ERV PERFORMANCE SHALL HAVE A MINIMUM OF 75% EFFECTIVENESS. WHERE REQUIRED, AN ELECTRIC DUCT HEATER SHALL BE PROVIDED. THE ERV SHALL BE CONTROLLED BY A LOCAL TIMER SWITCH.
   B. SECONDARY WASHROOMS WILL BE PROVIDED WITH DEDICATED CEILING MOUNTED TOILET EXHAUST FANS COMPLETE WITH LOCAL SWITCH.
   C. CLOTHES DRYERS WILL BE PROVIDED WITH A LINT TRAP AND DRYER BOOSTER FAN CONNECTED TO A CURRENT SENSOR TO AID IN DRYER EXHAUST. LINT TRAPS WILL BE PROVIDED ON THE SUCTION SIDE OF THE FAN WITHIN THE SUITE LAUNDRY ROOM.
   D. KITCHEN HOOD EXHAUSTS WILL BE SIZED FOR MINIMUM 150 CFM AND DUCTED TO OUTDOORS.
   E. ALL EXHAUST DUCTWORK WILL BE DISCHARGED TO THE EXTERIOR THROUGH THE EXTERIOR WALLS OF THE UNIT OR THROUGH THE ROOF FOR THE TOP LEVEL.
   F. EXHAUST DUCTWORK SHALL BE INSULATED FOR THE FIRST 10FT FROM THE EXTERIOR LOUVRE.
3. AIR DISTRIBUTION:
   A. DUCTWORK SHALL BE GALVANIZED SHEET METAL UNLESS OTHERWISE INDICATED. DUCTS SHALL BE SIZED AT A PRESSURE DROP OF 0.08" (20PA) PER 100' (30.5M) WITH MAXIMUM AIR VELOCITIES OF 1400 FEET (427M) PER MINUTE.
   B. DUCTWORK TO BE INSULATED TO MEET ASHRAE 90.1 AND THE GOVERNING AUTHORITY REQUIREMENTS.
   C. PROVIDE ACOUSTIC LINING FOR ALL SUPPLY AND RETURN AIR DUCTWORK SERVING MECHANICAL EQUIPMENT WITH FANS TO A MAXIMUM OF 4.5M (15') FROM THE EQUIPMENT, MEASURED OUTWARD IN ALL DIRECTIONS.
   D. SUPPLY AIR FROM THE INDOOR UNIT SHALL BE DUCTED TO EACH ROOM VIA 200X100 SIDEWALL GRILLES OR FLOOR REGISTERS.
   E. EACH ROOM SHALL HAVE A RETURN AIR GRILLE OR AN 1" (25MM) DOOR UNDERCUT FOR AIR TRANSFER.
   F. PROVIDE BALANCING DAMPERS AT ALL DUCT BRANCHES FOR AIR BALANCING.
   G. A PROGRAMMABLE THERMOSTAT WITH OCCUPANCY SENSOR SHALL BE PROVIDED TO CONTROL THE SUITE HVAC SYSTEM.
   H. DUCTWORK PENETRATING CEILING MEMBRANES REQUIRED TO HAVE A FIRE-RESISTANCE RATING SHALL CONFORM TO REQUIREMENTS MENTIONED PER OBC 9.10.5.1. (3).
4. REFRIGERATION:
   A. DESIGN AND INSTALLATION OF REFRIGERATION SYSTEM SHALL BE IN ACCORDANCE WITH CSA B52 MECHANICAL REFRIGERATION CODE, ONTARIO BUILDING CODE, AHRI, AND EQUIPMENT MANUFACTURERS RECOMMENDATIONS.
   B. NEW REFRIGERATION PIPING SHALL BE ACR SEAMLESS COPPER TUBING SUITABLE FOR AIR CONDITIONING OR REFRIGERATION SYSTEMS.
   C. KEEP TUBING RUNS AND NUMBER OF ELBOWS AND FITTINGS TO A MINIMUM.
   D. ENSURE TUBING IS DEHYDRATED, TESTED, ADEQUATELY CHARGED, AND GAS TIGHT.
   E. PIPING SHALL BE INSULATED WITH FLEXIBLE ELASTOMERIC, CLOSED CELL, SLEEVE TYPE LONGITUDINALLY SPLIT SELF-SEAL FORMED PLASTIC PIPE INSULATION EQUAL TO ARMACELL AP/ARMAFLEX SS. INSULATION SHALL BE 25 MM (1") THICK.
   F. COORDINATE AND RUN ALL REFRIGERANT LINES INSIDE DESIGNATED CAVITY. NO EXTERIOR RUNS PERMITTED UNLESS OTHERWISE INSTRUCTED.
5. FIRE STOPPING AND SMOKE SEAL SYSTEMS
   A. ASBESTOS-FREE, ELASTOMERIC MATERIALS AND INTUMESCENT MATERIALS, TESTED, LISTED AND LABELLED BY ULC IN ACCORDANCE WITH CAN/ULC S115, AND CAN/ULC S101 FOR INSTALLATION IN ULC DESIGNATED FIRESTOPPING, AND SMOKE SEAL SYSTEMS TO PROVIDE A POSITIVE FIRE, WATER AND SMOKE SEAL AND A FIRE RESISTANCE RATING (FLAME, HOSE STREAM AND TEMPERATURE) NO LESS THAN FIRE RATING FOR SURROUNDING CONSTRUCTION.
   B. FIRESTOPPING AND SMOKE SEAL MATERIAL SYSTEM TO BE SPECIFICALLY ULC CERTIFIED WITH DESIGNATED REFERENCE NUMBER FOR ITS SPECIFIC INSTALLATION.
   C. SMOKE AND FIRE SEAL MATERIALS AND MANUFACTURERS MUST BE SPECIFICALLY APPROVED FOR EACH APPLICATION OF PENETRATED SURFACES, AS APPROVED BY FM GLOBAL AND LISTED IN FM GLOBAL APPROVAL GUIDE. LISTED COMPANIES HEREIN AND OTHER MANUFACTURERS ARE ONLY ACCEPTABLE IF COMPLIANT WITH THESE REQUIREMENTS.
   D. MATERIALS ARE TO BE COMPATIBLE WITH ABUTTING DISSIMILAR MATERIALS AND FINISHES AND COMPLETE WITH PRIMERS, DAMMING AND BACK-UP MATERIALS, SUPPORTS, AND ANCHORING DEVICES IN ACCORDANCE WITH FIRESTOPPING MANUFACTURER'S RECOMMENDATIONS AND ULC TESTED ASSEMBLY. COORDINATE MATERIAL REQUIREMENTS WITH TRADES SUPPLYING ABUTTING AREAS OF MATERIALS.
   E. TYPICALLY, FOR OPENINGS OF UP TO 250 MM (10") IN DIAMETER, PROVIDE PUTTY PAD TYPE FIRESTOP MATERIALS INTUMESCENT, NON-HARDENING, WATER RESISTANT PUTTIES CONTAINING NO SOLVENTS, INORGANIC FIBRES OR SILICONE COMPOUNDS.
   F. TYPICALLY, FOR OPENINGS OF GREATER THAN 250 MM (10") IN DIAMETER, AND FOR RECTANGULAR OPENINGS, PROVIDE PILLOW TYPE FIRESTOP MATERIALS RE-ENTERABLE, NON-CURING, MINERAL FIBRE CORE ENCAPSULATED ON SIX SIDES WITH INTUMESCENT COATING CONTAINED IN A FLAME RETARDANT POLY BAG.
   G. SUPPLY PRODUCTS OF A SINGLE MANUFACTURER FOR USE ON WORK OF THIS DIVISION.
   H. INSTALLER TO BE MANUFACTURER TRAINED AND CERTIFIED ON SPECIFIC PRODUCT.
   I. INCLUDE FOR MANUFACTURER'S AUTHORIZED REPRESENTATIVE TO INSPECT AND VERIFY EACH INSTALLATION AND APPLICATION.
   J. ACCEPTABLE CERTIFICATION TO ALSO INCLUDE CERTIFICATION BY UNDERWRITERS LABORATORIES OF NORTHBROOK IL, USING TESTS CONFORMING TO ULC-S115 AND GIVEN CUL LISTING PUBLISHED BY UL IN THEIR "PRODUCTS CERTIFIED FOR CANADA (CUL) DIRECTORY".

MECHANICAL EQUIPMENT - ALTERNATE OPTION 3

COLD CLIMATE AIR SOURCE VARIABLE REFRIGERANT FLOW (VRF) HEAT PUMP SYSTEM

1. FACTORY ASSEMBLED AND TESTED, PACKAGE TYPE SYSTEM CONSISTING OF AN INDOOR VERTICAL HANDLER UNIT AND A DEDICATED EXTERIOR CONDENSING UNIT, CSA OR ETL LISTED AND LABELLED, AHRI RATED AND CERTIFIED AND WITH A MINIMUM SYSTEM EFFICIENCY OF 17 SEER AND 9.0 HSPF.
2. HIGH STATIC, VERTICAL DUCTED INDOOR EVAPORATOR UNIT CONSISTING OF GALVANIZED STEEL PLATE CASING C/W COATED POLYSTYRENE INSULATING MATERIAL ON COLD SURFACES. EVAPORATOR COMPLETE WITH:
   A. FLANGED SUPPLY AND RETURN AIR OPENING READY FOR FIELD INSTALLED DUCTWORK;
   B. FACTORY ASSEMBLED, PIPED AND WIRED ELECTRONIC EXPANSION VALVE (EEV) FOR REFRIGERANT CONTROL;
   C. DIRECT DRIVEN SUPPLY FANS WITH THE FAN MOTOR MOUNTED ON VIBRATION ATTENUATING RUBBER GROMMETS, DIGITALLY CONTROLLED WITH PERMANENTLY LUBRICATED AND SEALED BEARINGS;
   D. REMOVABLE, WASHABLE RETURN AIR FILTER;
   E. COIL COMPRISED OF ALUMINIUM FINS MECHANICALLY BONDED ON COPPER TUBING C/W FACTORY SUPPLIED CONDENSATE DRAIN PAN BELOW COIL;
   F. FACTORY INSTALLED AND WIRED CONDENSATE PUMP WITH SAFETY SWITCH TO SHUT OFF UNIT IF CONDENSATE RISES TOO HIGH IN DRAIN PAN;
   G. FACTORY INSTALLED TEMPERATURE THERMISTORS FOR RETURN AIR, REFRIGERANT ENTERING COIL, AND REFRIGERANT LEAVING COIL;
   H. BUILT IN MICROPROCESSOR CONTROLLER TO COMMUNICATE WITH THE INDOOR UNIT AND THE OUTDOOR UNIT IN DAISY CHAIN CONFIGURATION. UNITS SHALL ALSO BE CAPABLE OF THE FOLLOWING FUNCTIONS:
      a. SELF-DIAGNOSTIC FUNCTION;
      b. AUTO ADDRESSING;
      c. AUTO RESTART FUNCTION;
      d. AUTO CHANGEOVER FUNCTION;
      e. HEATING/COOLING/FAN ONLY FUNCTION;
      f. AUTO OPERATION FUNCTION;
      g. FORCED OPERATION;
      h. DUAL THERMISTOR CONTROL;
      i. SLEEP MODE;
      j. EXTERNAL STATIC PRESSURE (ESP) CONTROL;
      k. DUAL SETPOINT CONTROL;
      l. MULTIPLE AUXILIARY HEATER APPLICATIONS;
      m. FILTER LIFE AND POWER CONSUMPTION DISPLAY.
3. FACTORY RUN TESTED, WEATHERPROOF CONDENSING UNIT EQUIPPED WITH A FACTORY INSTALLED MICROPROCESSOR CONTROLLER TO INTERFACE WITH INDOOR UNIT AND PERFORM ALL NECESSARY OPERATION FUNCTIONS. PRE-CHARGE UNIT WITH REFRIGERANT FOR A MINIMUM OF 21 M (70') OF REFRIGERANT TUBING. UNIT IS TO BE CAPABLE OF A HEIGHT DIFFERENCE BETWEEN CONDENSING UNIT AND EVAPORATOR OF 30 M (100'). EACH CONDENSING UNIT COMPLETE WITH:
   A. 20-GAUGE GALVANIZED STEEL WITH AN ENAMEL FINISH CABINET C/W HEAVY GAUGE COATED WIRE COIL GUARD WITH FRONT ACCESS PANEL;
   B. REFRIGERANT STRAINER, CHECK VALVES, OIL SEPARATOR, ACCUMULATOR, 4-WAY REVERSING VALVE, ELECTRONIC EXPANSIVE VALVE, HIGH SIDE AND LOW SIDE REFRIGERANT CHARGING PORTS, AND A SERVICE PORT;
   C. INTELLIGENT DEFROST OPERATION TO MELT ACCUMULATED FROST, SNOW AND ICE OFF THE OUTDOOR UNIT HEAT EXCHANGER;
   D. OIL MANAGEMENT SYSTEM TO MAXIMIZE COMPRESSOR EFFICIENCY AND ENSURE CONSISTENT FILM OF OIL ON ALL MOVING COMPRESSOR PARTS AT ALL SPEEDS;
   E. DIRECT DRIVE VARIABLE SPEED PROPELLER FAN(S) WITH PERMANENTLY LUBRICATED BEARINGS, DIGITALLY CONTROLLED INVERTER MOTOR AND A VERTICAL AIR DISCHARGE C/W RAISED FERROUS WIRE METAL GUARD WITH A BANKED ENAMEL FINISH;
   F. OUTDOOR COIL COMPRISED OF ALUMINIUM FINS MECHANICALLY BONDED ON COPPER TUBING WITH FACTORY APPLIED CORROSION RESISTANT MATERIAL;
   G. HERMETICALLY SEALED, DIGITALLY CONTROLLED, INVERTER DRIVEN HIGH SIDE SHELL (HSS) SCROLL COMPRESSOR(S) MOUNTED ON VIBRATION ATTENUATING RUBBER GROMMETS. ALL COMPRESSORS SHALL BE PROTECTED WITH HIGH PRESSURE SWITCH, OVER-CURRENT/UNDER CURRENT PROTECTION, PHASE FAILURE, AND PHASE REVERSAL.
   H. SUCTION TEMPERATURE SENSOR, DISCHARGE TEMPERATURE SENSOR, HIGH PRESSURE SENSOR, LOW PRESSURE SENSOR, OUTDOOR TEMPERATURE SENSOR, AND OUTDOOR HEAT EXCHANGE TEMPERATURE SENSOR.
4. SYSTEM CONTROLS CONSISTING OF A MICROPROCESSOR IN EACH INDOOR AND OUTDOOR UNIT, INDOOR WALL MOUNTED CONTROLLER SITE CONNECTED TO THE ASSOCIATED INDOOR EVAPORATOR UNIT AND A CENTRAL CONTROLLER.
   A. INDOOR WALL MOUNTED REMOTE CONTROLLER SHALL BE CAPABLE OF MONITORING AND CONTROLLING THE INDOOR UNIT IN TERMS OF ON/OFF, MODE OF OPERATION, AIRFLOW DIRECTION, FAN SPEED, SPACE TEMPERATURE, AND SPACE TEMPERATURE SETPOINT BASED ON A 7 DAY PROGRAMMABLE SCHEDULING OF OCCUPIED/UNOCCUPIED SETTINGS. CONTROLLER SHALL HAVE A TOUCH-SCREEN, BACKLIT, LCD DISPLAY.
   B. SYSTEM CENTRAL CONTROLLER SHALL BE CAPABLE OF MONITORING AND CONTROL OF THE INDOOR UNIT AND OUTDOOR UNIT VIA A DAISY-CHAIN CONFIGURATION THROUGH ITS TOUCHSCREEN INTERFACE AND EMBEDDED WEB BROWSER. IT CAN PROVIDE PROGRAMMABLE SCHEDULING OF OCCUPIED/UNOCCUPIED SETTINGS, ON/OFF, MODE OF OPERATION, SETPOINT AND FAN SPEED FOR THE ENTIRE VRF SYSTEM. THE CENTRAL CONTROLLER SHALL BE CAPABLE OF GENERATING OPERATION AND ERROR HISTORY LOG, REMOTE CONTROLLER LOCK (ALL, SETPOINT, MODE, FAN SPEED), ERROR EMAIL NOTIFICATION, AND VISUAL FLOOR NAVIGATION.

ENERGY RECOVERY VENTILATOR (ERV)

1. UNIT SHALL BE FACTORY ASSEMBLED, WIRED AND TESTED AND SHALL CONFORM TO CSA AND UL STANDARDS.
2. UNIT SHALL BE COMPACT WITH A LOW PROFILE SUITABLE FOR INSTALLATION IN BULKHEADS AND DROPPED CEILINGS.
3. CABINET SHALL BE CONSTRUCTED OF 22-GAUGE PRE-PAINTED GALVANIZED STEEL FOR CORROSION RESISTANCE AND INSULATED TO PREVENT EXTERIOR CONDENSATION. CABINET SHALL BE COMPLETE WITH DRAIN CONNECTIONS, BALANCING PORTS, AND THREADED INSERTS TO ACCEPT S-HOOKS AND HANGING STRAPS SUPPLIED WITH UNIT.
4. ENERGY RECOVERY ASSEMBLY SHALL BE THERMALLY CONDUCTIVE, ALUMINUM CROSS-FLOW ENERGY RECOVERY CORE WITH MINIMUM SRE OF 75%. THE CORE SHALL BE EASILY REMOVABLE FOR CLEANING AND SERVICE.
5. UNIT COMPLETE WITH WASHABLE MERV-6 AIR FILTERS LOCATED IN EXHAUST AND SUPPLY AIR STREAMS.
6. EACH AIRSTREAM HAS AN INDEPENDENT CENTRIFUGAL HIGH EFFICIENCY ECM BLOWER WITH MULTIPLE FAN SPEED OPERATION.
7. DEFROST MODE: SUPPLY AIR SHUTS OFF TO DEFROST CORE WITH WARM EXHAUST AIR AT HIGH SPEED.
8. UNIT COMPLETE WITH WALL MOUNT CONTROLLER WITH SELECTABLE ON/OFF, AND FAN SPEED SETTINGS.

ELECTRIC DOMESTIC HOT WATER TANK

1. CSA CERTIFIED ELECTRIC DOMESTIC HOT WATER TANK AND HEATER WITH MINIMUM EF RATING OF 0.8, AND COMPLETE WITH:
   A. 1035 KPA (150 PSI) RATED (WORKING PRESSURE) STEEL TANK, GLASS LINED, INSULATED (EXCEPT FOR CONTROL PANEL AREA) WITH INJECTED MINIMUM R-16 FOAM INSULATION, COVERED WITH AN ENAMELLED STEEL JACKET, AND EQUIPPED WITH 40 MM (1-½") DIA. NPS BRASS NIPPLE WATER INLET AND OUTLET CONNECTIONS, A DRAIN VALVE, AND SACRIFICIAL ANODE RODS;
   B. REMOVABLE MULTIPLE IMMERSION HEATING ELEMENTS, EACH CONSISTING OF A WIRE FILAMENT IN A SEALED STAINLESS STEEL SHEATH;
   C. ASME RATED TEMPERATURE AND PRESSURE RELIEF VALVE;
   D. FACTORY PRE-WIRED POWER AND CONTROL PANEL.
2. EQUIP ENAMELLED STEEL VENTILATED CONTROL PANEL WITH REMOVABLE GLASS FIBRE INSULATION TO COVER BARE AREA OF TANK, A HINGED DOOR, MULTIPLE KNOCKOUTS, A GROUND SCREW, AND FOLLOWING:
   A. TERMINAL BLOCK FOR POWER WIRING CONNECTIONS;
   B. MAGNETIC CONTACTORS FOR HEATING ELEMENTS;
   C. ADJUSTABLE IMMERSION THERMOSTAT;
   D. MANUAL RESET IMMERSED HIGH TEMPERATURE LIMIT CONTROL FOR EACH ELEMENT;
   E. FUSE BLOCK WITH FUSES;
   F. ELEMENT DIAGNOSTIC PANEL WITH LED'S FOR EACH ELEMENT TO MONITOR ON-OFF OPERATION OF EACH ELEMENT;

TOILET EXHAUST FANS

1. CEILING EXHAUST FAN SHALL BE HVI CERTIFIED AND IN ACCORDANCE WITH THE FOLLOWING REQUIREMENTS:
2. 26 GAUGE ZINC-ALUMINUM-MAGNESIUM (ZAM) HOUSING C/W INTEGRATED 6" DUCT ADAPTOR, BUILT-IN DAMPER AND BUILT IN METAL FLANGE;
3. FAN C/W POLY PRO MATERIAL AND ATTACHES DIRECTLY TO HOUSING WITH TORSION SPRINGS;
4. MOTOR BE TO TOTALLY ENCLOSED WITH A BRUSHLESS ECM MOTOR TECHNOLOGY RATED FOR CONTINUOUS RUN AND EQUIPPED WITH THERMAL-CUTOFF FUSE. MOTOR TO BE REMOVABLE WITH PERMANENTLY LUBRICATED PLUG-IN MOTOR;
5. FAN VENTILATION RATES SHALL BE MANUALLY ADJUSTABLE;
6. FAN SHALL BE UL AND CUL LISTED FOR TUB/SHOWER ENCLOSURE WHEN GFCI PROTECTED.

DRYER EXHAUST

1. DRYER BOOSTER FAN SHALL BE HVI CERTIFIED AND IN ACCORDANCE WITH THE FOLLOWING REQUIREMENTS:
   A. 26-GAUGE GALVANISED STEEL HOUSING SUPPLIED WITH VIBRATION ISOLATION TO SUIT MOUNTING;
   B. ROUND INLET AND DISCHARGE COLLAR;
   C. FIELD WIRING COMPARTMENT WITH REMOVABLE ACCESS PANEL;
   D. BACKWARDLY-INCLINED, SELF-CLEANING IMPELLER, FULLY-SEALED IMPELLER ASSEMBLY WITH AUTOMATIC-RESET THERMAL OVERLOAD PROTECTION, AND PERMANENTLY-LUBRICATED MOTOR;
   E. ACCESSORIES:
      a. AMP SENSOR (CURRENT-SENSING RELAY SWITCH);
      b. LINT TRAP;
      c. WALL BOX.

KITCHEN RANGE HOOD

1. DUCTED RANGE HOODS, CSA CERTIFIED, ROTARY SOLID STATE SPEED CONTROL PROVIDING INFINITE RANGE, ROTARY LIGHT CONTROL SWITCH, BACKDRAFT DAMPER, WITH LIGHT LENS AND PERMANENT, WASHABLE ALUMINUM MESH GREASE FILTER(S).

CMHC SCHL

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PROJECT:

CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT OR CONSTRUCTION

SHEET TITLE:

ENHANCED ACCESSIBILITY MECHANICAL OUTLINE SPECIFICATIONS - ALTERNATE OPTION 3

PROJECT NO: 24112

SCALE: NTS

SHEET NO:

M001D

ELECTRICAL OUTLINE SPECIFICATIONS

1. GENERAL

1.1. THE DOCUMENT IS MEANT TO BE VIEWED IN CONJUNCTION WITH AND CROSS REFERENCED TO THE ENCLOSED ELECTRICAL SCHEMATIC DRAWINGS.

2. ELECTRICAL SYSTEMS

2.1. DESIGN AND PERFORMACNE GOALS

2.1.1. THE FOLLOWING INFORMATION IS PROVIDED AS GUIDANCE

2.1.2. THIS OUTLINE SPECIFICATION PROVIDE CHMC REQUIREMENTS FOR THE ELECTRICAL SYSTEM.

2.1.3. THESE REQUIREMENT INTENDS TO OBTAIN FUNCTIONAL ELECTRICAL SYSTEMS, THAT ARE FLEXIBLE AND SUITABLE FOR BOTH ADAPTABLE UNITS AND ACCESSIBILITY UNIT WITH MINIMAL ALTERATION TO THE ELECTRICAL SYSTEM.

2.2. APPLICABLE CODES AND STANDARDS

2.2.1. ELECTRICAL SYSTEMS FOR THE BUILDING SHALL BE DESIGNED IN ACCORDANCE WITH THE FOLLOWING LATEST STANDARDS AND CODES:

2.2.1.1. LATEST EDITION OF THE ONTARIO ELECTRICAL SAFETY CODE (OESC);

2.2.1.2. CAN/ULC-S524

2.2.1.3. CANADIAN STANDARDS ASSOCIATION (CSA-C22.1);

2.2.1.4. LATEST EDITION OF THE ONTARIO BUILDING CODE (OBC).

2.2.1.5. CSA B652

3. DESIGN CRITERIA AND REQUIREMENTS

3.1. THE FOLLOWING INFORMATION IS PROVIDED AS A REQUIREMENT.

3.1.1. WIRING DEVICES:

3.1.1.1. ALL ELECTRICAL DEVICES AND EQUIPMENT SHALL BE CSA APPROVED.

3.1.1.2. DUPLEX RECEPTACLE SHALL BE MINIMUM RESIDENTIAL GRADE, TAMPER RESISTANT AND ARC FAULT CIRCUIT INTERRUPTER PER ONTARIO ELECTRICAL SAFETY CODE REQUIREMENT.

3.1.1.3. RECEPTACLE WITHIN 1.5 METER TO THE SINK SHALL BE RATED FOR GROUND FAULT INTERRUPTER.

3.1.1.4. RECEPTACLES EXPOSED TO WEATHER SHALL BE PROVIDED WITH WET LOCATION COVER PLATE, AND GROUND FAULT INTERRUPTER.

3.1.1.5. INTERIOR SPACE RECEPTACLE LAYOUT SHALL BE DESIGNED IN CONFORMANCE TO THE ONTARIO ELECTRICAL SAFETY CODE REQUIREMENT.

3.1.2. BASIC MATERIAL

3.1.2.1. ALL POWER WIRING SHALL BE COPPER, NON-METALLIC SHEATH CABLES, RESIDENTIAL RATED, SIMILAR TO ROMEX WITHIN THE UNIT.

3.1.2.2. OUTLET BOX PENETRATE THE MEMBRANE OF AN ASSEMBLY REQUIRE TO HAVE FIRE-RESISTANCE RATING MUST BE SEALED AT THE PENETRATION BY A FIRESTOP THAT HAS AN FT RATING NOT LESS THAN THE FIRE-RESISTANCE RATING OF THE FIRE SEPARATION.

3.1.2.3. PROVIDE EMT CONDUIT COMPLETE WITH SEPARATE INSULATED GROUND WRING FROM HYDRO METER TO SUITE LOAD CENTER.

3.1.2.4. CONDUITS INSTALLED UNDERGROUND SHALL BE RIGID PVC.

3.1.2.5. LOAD CENTER SHALL BE SIZED PER ONTARIO ELECTRICAL SAFETY CODE REQUIREMENT AND SHALL COMPLETE WITH THE FOLLOWING COMPONENTS:

3.1.2.5.1. MAIN BREAKER
3.1.2.5.2. SURFACE MOUNTED AT PLYWOOD BACKBOARD IN ELECTRICAL CLOSET/CABINET.
3.1.2.5.3. QUANTITY OF BRANCH BREAKERS MEETING DESIGN REQUIREMENT.
3.1.2.5.4. TYPE PRINTED PANEL DIRECTORY
3.1.2.5.5. FILLER PLATE FOR ANY OPENING.

3.1.3. SMOKE ALARM

3.1.3.1. PROVIDE A/C POWERED SMOKE ALARMS (COMPLETE WITH STROBE & SOUNDER BASES) IN ACCORDANCE WITH OBC REQUIREMENTS. THESE DETECTORS SHALL BE "NON-ADDRESSABLE" TYPES. A COMBINATION OF SMOKE AND CO ALARMS SHALL BE PROVIDED ADJACENT TO, AND ABOVE AND BELOW THE FLOOR LEVEL OF THE GAS-FIRED EQUIPMENT.

3.1.3.2. SMOKE ALARM/ COMBINATION OF SMOKE & CO ALARM SHALL BE 120V HARD WIRE CONNECTION COMPLETE WITH BATTERY BACKUP.

3.1.3.3. SMOKE ALARM/COMBINATION OF SMOKE & CO ALARM SHALL BE CONNECTED TO A LIGHTING CIRCUIT OR A MIX OF LIGHTING & RECEPTACLE CIRCUIT IN ACCORDANCE WITH ONTARIO ELECTRICAL SAFETY CODE.

3.1.3.4. WHERE MORE THAN ONE SMOKE ALARM IS REQUIRED IN A DWELLING UNIT, THE SMOKE ALARMS SHALL BE WIRED SO THAT THE ACTIVATION OF ONE ALARM WILL CAUSE ALL ALARMS WITHIN THE DWELLING UNIT TO SOUND.

3.1.3.5. SMOKE ALARM/COMBINATION OF SMOKE & CO ALARM SHALL BE EQUIPPED WITH A TESTING/SILENCE BUTTON ON THE FRONT OF THE UNIT.

3.1.3.6. SMOKE ALARM SOUND PATTERN SHALL EMIT A T3 ALARM (THREE INTERMITTENT BEEPS FOLLOWS BY A PERIOD OF SILENCE).

3.1.3.7. CARBON MONOXIDE ALARM SOUND PATTERN SHALL EMIT T4 ALARM (FOUR INTERMITTENT BEEPS FOLLOWED BY A PERIOD OF SILENCE)

3.1.4. LIGHTING

3.1.4.1. PRODUCT SHALL BE CSA APPROVED AND/OR ULC LISTED.

3.1.4.2. ENERGY-EFFICIENT LED LIGHTING FIXTURE SHALL BE PROVIDED.

3.1.4.3. RECESSED LIGHTING SHALL NOT BE LOCATED IN FIRE RATED CEILING.

3.1.4.4. RECESSED LIGHTING SHALL NOT BE LOCATED IN INSULATED CEILINGS UNLESS THE FIXTURES ARE DESIGNED FOR SUCH INSTALLATIONS.

3.1.4.5. LIGHTING SHALL BE CONTROLLED THROUGH A LOCALIZED LIGHT SWITCH IN EACH SPACE..

3.1.4.6. AN EXTERIOR LIGHTING OUTLET WITH FIXTURE CONTROLLED BY A WALL SWITCH LOCATED WITHIN THE BUILDING SHALL BE PROVIDED AT EVERY ENTRANCE.

3.1.4.7. MINIMUM LIGHTING LEVEL TO BE ACHIEVED FOR THE FOLLOWING AREAS:

a.	KITCHEN	300LX
b.	BEDROOM ADULT	100 TO 300LX
c.	BEDROOM (CHILD)	500LX
d.	BATHROOM	300LX
e.	LIVING ROOM/DEN	300LX
f.	FAMILY ROOM	300LX (TV REVIEWING 150LX)
g.	LAUNDRY/UTILITY	200LX
h.	DINING ROOM	200LX
i.	HALL/LANDING/STAIRWAY	100LX TO 500LX
j.	HOME OFFICE	500LX
k.	GARAGE	500LX
l.	WORKSHOP	800LX
m.	EXTERIOR (PATIO, BALCONIES)	50LX

4. ELECTRICAL DESIGN BY UNIT TYPE

4.1. ADU (ONE STORY - ACCESSIBLE)

4.1.1. SERVICE

4.1.1.1. PROVIDE ONE (1) 120/240V INCOMING UTILITY SERVICE FOR THE SINGLE RESIDENTIAL UNIT. THE EXACT SIZE SHALL BE DESIGNED PER ONTARIO ELECTRICAL SAFETY CODE REQUIREMENTS. COORDINATE WITH LOCAL HYDRO UTILITY FOR INCOMING SERVICE WORK.

4.1.1.2. PROVIDE ONE (1) RESIDENTIAL GRADE HYDRO METER AND INSTALL ON THE EXTERIOR WALL OF THE RESIDENTIAL UNIT PER LOCAL HYDRO UTILITY REQUIREMENTS. EXACT QUANTITY OF HYDRO METERS

4.1.1.3. PROVIDE ONE (1) 120/240V RATED ELECTRICAL LOAD CENTRE PANEL AT THE ELECTRICAL CLOSET/CABIENT IN THE UNIT FOR POWER DISTRIBUTION.

4.1.1.4. PROVIDE TELECOMMUNICATION SERVICE AND TERMINATE AT THE ELECTRICAL CLOSET/CABINET IN THE UNIT FOR COMMUNICATION SERVICE DISTRIBUTION.

5. ACCESSIBLE DWELLING

5.1. ENSURE THE DESIGN OF ACCESSIBLE DWELLING UNIT IN ACCORDANCE WITH CSA/ASC B652 REQUIREMENT. THE FOLLOWING INFORMATION IS PROVIDED AS A GUIDANCE:

5.1.1. COMMUNICATION SYSTEM

5.1.1.1. DOOR BELL, DOOR CAMERA & INTERCOMS SHALL BE PROVIDED FOR ACCESSIBLE DWELLING.

5.1.1.2. CONNECT ALL DEVICES TO A SECURITY RELEASE DOOR OPENER, AND HAVE A VISUAL AND AUDIBLE SIGNAL AT THE ENTRANCE TO INDICATE A 'GO AHEAD' ACTION AND CONNECTED TO A COMMUNICATION SYSTEM WITHIN THE UNIT.

5.1.2. LIGHTING & LIGHTING CONTROL

5.1.2.1. LIGHTING ILLUMINATION REQUIREMENT SHALL REFER TO SECTION 3.1.2 .

5.1.2.2. VANITY (TASK) LIGHTING SHALL BE DIMMABLE AND MOUNTED AT MINIMUM 1000MM TO 1700MM ABOVE FINISH FLOOR.

5.1.2.3. LIGHT SWITCH SHALL BE ILLUMINATED TYPE IN THE BATHROOM

5.1.2.4. LIGHT SWITCH SHALL BE LUMINANCE (COLOR) CONTRASTED WITH THEIR BACKGROUND IN ALL OTHER SPACES.

5.1.2.5. AT THE LEAST ONE (1) LIGHT SWITCH SHALL BE PROVIDED BESIDE THE BED AT A HEIGHT BETWEEN 550MM AND 650MM ABOVE THE FLOOR.

5.1.3. MOUNTING HEIGHT

5.1.3.1.	LIGHT SWITCH:	MAXIMUM HEIGHT OF 1100MM TO THE CENTRE A.F.F.
5.1.3.2.	THERMOSTAT	MAXIMUM HEIGHT OF 1100MM TO THE CENTRE A.F.F.
5.1.3.3.	INTERCOM	MAXIMUM HEIGHT OF 1100MM TO THE CENTRE A.F.F.
5.1.3.4.	DUPLEX RECEPTACLE	MAXIMUM HEIGHT OF 400MM TO THE CENTRE A.F.F.

5.1.4. RECEPTACLE

5.1.4.1. PROVIDE DUPLEX RECEPTACLE AT A MINIMUM DISTANCE OF 600MM FROM THE CORNER OF THE BEDROOM AND A MAXIMUM DISTANCE OF 2080MM BETWEEN EACH OUTLET.

5.1.4.2. QUAD RECEPTACLE SHALL BE PROVIDED ON BOTH SIDE OF THE BED.

5.1.4.3. PROVIDE ONE RECEPTACLE IN THE CEILING FOR FUTURE LIFT ABOVE THE BED.

5.1.4.4. PROVIDE ONE RECEPTACLE BELOW THE BED TO ACCOMMODATE FUTURE ELECTRICALLY ADJUSTABLE BEDS OR LIFTS.

5.1.4.5. RECEPTACLE IN THE KITCHEN SHALL BE INSTALLED ON FRONT FACE OF COUNTERS. HOWEVER, IT IS ACCEPTABLE TO BE INSTALLED ALONG THE BACK OF COUNTERS. COORDINATE WITH CLIENT TO CONFIRM EXACT REQUIREMENT. PROVIDE SUFFICIENT AMOUNT OF OF 5-15R SPLIT OR 5-20R RECEPTACLE, SO THAT NO POINT ALONG THE WALL LINE IS MORE THAN 900MM FROM A RECEPTACLE MEASURED HORIZONTALLY ALONG THE WALL LINE.

5.1.4.6. COORDINATE WITH DESIGN PROFESSION TO CONFIRM KITCHEN APPLIANCES - STOVE OR COOK TOP & WALL OVEN. PROVIDE SUITABLE POWER CONNECTION.

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NO.	DATE	DESCRIPTION
1	2025/02/25	ISSUED AS PROTOTYPICAL DRAWING

PROJECT:

CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT OR CONSTRUCTION

SHEET TITLE:

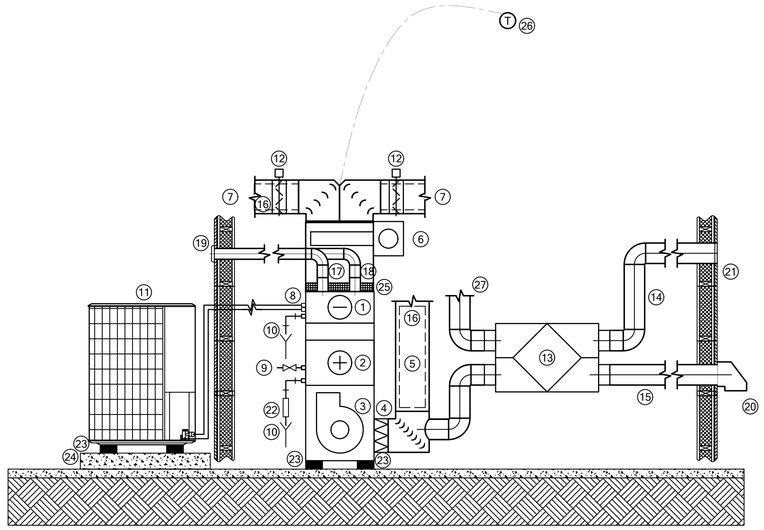
ENHANCED ACCESSIBILITY ELECTRICAL OUTLINE SPECIFICATIONS

PROJECT NO: 24112

SCALE: NTS

SHEET NO:

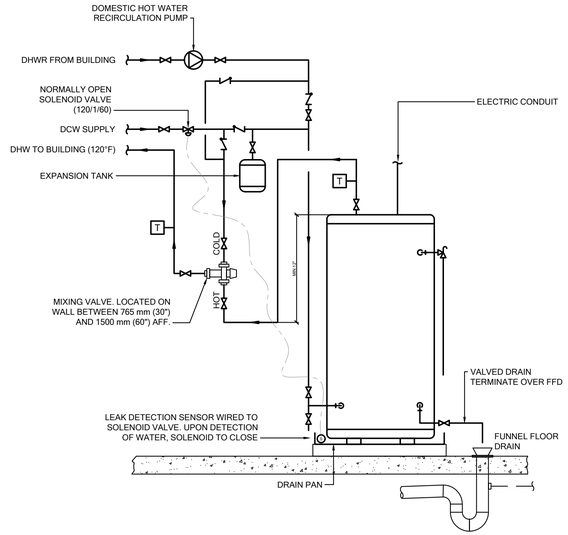
M002



1. COOLING COIL
2. HEATING COIL
3. BLOWER
4. AIR FILTER
5. RETURN AIR DUCT
6. AIR HUMIDIFIER
7. SUPPLY AIR DUCT
8. REFRIGERANT LINES
9. GAS SUPPLY LINE
10. DRAIN LINE WITH TRAP
11. CONDENSER
12. BALANCING DAMPER
13. ENERGY RECOVERY VENTILATOR
14. VENTILATION AIR DUCT
15. EXHAUST AIR DUCT
16. ACOUSTIC LINING (FIRST 8' OF S/A AND R/A DUCTS)
17. FURNACE VENT
18. COMBUSTION AIR INTAKE
19. FLUSH-MOUNT VENT TERMINATION
20. ERV EXAUST MOUNT
21. VENTILATION INTAKE LOUVRE
22. ACID NEUTRALIZER
23. NEOPRENE ISOLATOR
24. CONCRETE PAVER
25. FLEXIBLE DUCT CONNECTION
26. THERMOSTAT
27. EXHAUST AIR DUCT FROM WASHROOM

DETAIL OF FURNACE AND ACESSORIES

SCALE: NTS



DETAIL OF ELECTRIC DHW TANK

SCALE: NTS

ELECTRICAL LEGEND

SYMBOL	DESCRIPTION
SA/C	120V COMBINATION SMOKE/CARBON MONOXIDE ALARM COMPLETE WITH STROBE, AUDIO ALARM AND BATTERY BACKUP.
	SURFACE OR FLUSH MOUNTED ELECTRICAL PANELS
M	HYDRO METER

ABBREVIATIONS

SYMBOL	DESCRIPTION
S/A	SUPPLY AIR
R/A	RETURN AIR
E/A	EXHAUST AIR
O/A	OUTDOOR AIR

PLUMBING AND DRAINAGE

SYMBOL	DESCRIPTION
	P-TRAP
CO	CLEAN OUT (FLOOR & CEILING)
FD	ROUND FLOOR DRAIN
HD	HUB DRAIN
	DOMESTIC COLD WATER (DCW) PIPING
	DOMESTIC HOT WATER (DHW) PIPING
SAN	SANITARY DRAINAGE (SAN) PIPING
M	WATER METER

MECHANICAL PIPING

SYMBOL	DESCRIPTION
	PIPE DOWN
	PIPE UP
	PIPE UP & DOWN
	VALVE
	BALANCING VALVE
	PIPE CONTINUATION
CD	CONDENSATE DRAINAGE PIPING
	FLOW DIRECTION

DUCTWORK

SYMBOL	DESCRIPTION
	SUPPLY AIR DUCT UP & DOWN
	RETURN / EXHAUST AIR DUCT UP & DOWN
	ROUND DUCT UP & DOWN
	DUCT CONTINUATION (ROUND & RECTANGULAR)
	SUPPLY / RETURN GRILLE
	RETURN / EXHAUST GRILLE
F	TOILET EXHAUST FAN
	FLOOR GRILLE
	CEILING GRILLE
	FLOOR BOOT
T	THERMOSTAT
U/C	DOOR UNDERCUT

CMHC SCHL

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NO.	DATE	DESCRIPTION
1	2025/02/25	ISSUED AS PROTOTYPICAL DRAWING

PROJECT:

CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT OR CONSTRUCTION

SHEET TITLE:

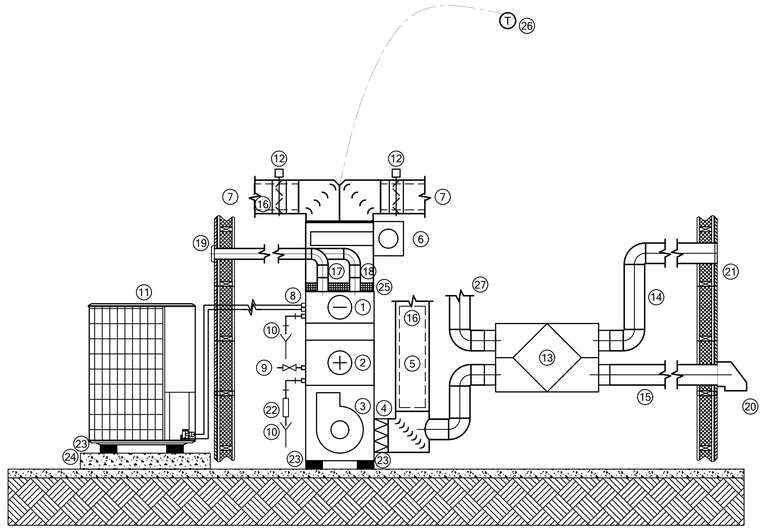
ENHANCED ACCESSIBILITY MECHANICAL & ELECTRICAL DETAILS & SYMBOLS - BASE OPTION

PROJECT NO: 24112

SCALE: NTS

SHEET NO:

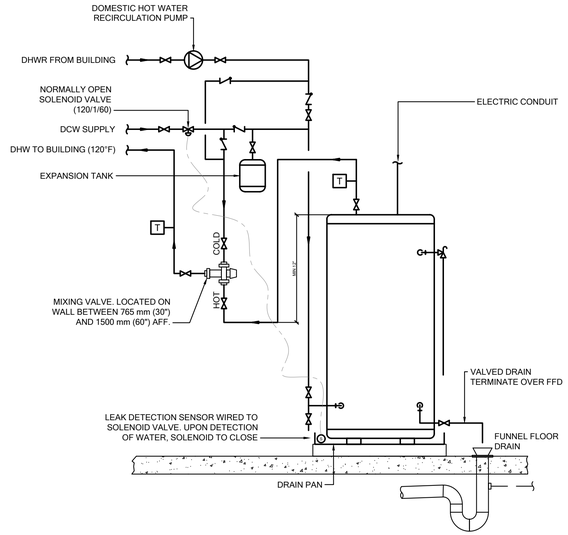
M003A



1. HEAT PUMP COIL
2. GAS HEATING COIL
3. BLOWER
4. AIR FILTER
5. RETURN AIR DUCT
6. AIR HUMIDIFIER
7. SUPPLY AIR DUCT
8. REFRIGERANT LINES
9. GAS SUPPLY LINE
10. DRAIN LINE WITH TRAP
11. HEAT PUMP
12. BALANCING DAMPER
13. ENERGY RECOVERY VENTILATOR
14. VENTILATION AIR DUCT
15. EXHAUST AIR DUCT
16. ACOUSTIC LINING (FIRST 8' OF S/A AND R/A DUCTS)
17. FURNACE VENT
18. COMBUSTION AIR INTAKE
19. FLUSH-MOUNT VENT TERMINATION
20. ERV EXAUST MOUNT
21. VENTILATION INTAKE LOUVRE
22. ACID NEUTRALIZER
23. NEOPRENE ISOLATOR
24. CONCRETE PAVER
25. FLEXIBLE DUCT CONNECTION
26. THERMOSTAT
27. EXHAUST AIR DUCT FROM WASHROOM

DETAIL OF FURNACE AND ACESSORIES

SCALE: NTS



DETAIL OF ELECTRIC DHW TANK

SCALE: NTS

ELECTRICAL LEGEND

SYMBOL	DESCRIPTION
SA	120V COMBINATION SMOKE/CARBON MONOXIDE ALARM COMPLETE WITH STROBE, AUDIO ALARM AND BATTERY BACKUP.
	SURFACE OR FLUSH MOUNTED ELECTRICAL PANELS
M	HYDRO METER

ABBREVIATIONS

SYMBOL	DESCRIPTION
S/A	SUPPLY AIR
R/A	RETURN AIR
E/A	EXHAUST AIR
O/A	OUTDOOR AIR

PLUMBING AND DRAINAGE

SYMBOL	DESCRIPTION
	P-TRAP
CO	CLEAN OUT (FLOOR & CEILING)
FD	ROUND FLOOR DRAIN
HD	HUB DRAIN
	DOMESTIC COLD WATER (DCW) PIPING
	DOMESTIC HOT WATER (DHW) PIPING
SAN	SANITARY DRAINAGE (SAN) PIPING
M	WATER METER

MECHANICAL PIPING

SYMBOL	DESCRIPTION
	PIPE DOWN
	PIPE UP
	PIPE UP & DOWN
	VALVE
	BALANCING VALVE
	PIPE CONTINUATION
CD	CONDENSATE DRAINAGE PIPING
	FLOW DIRECTION

DUCTWORK

SYMBOL	DESCRIPTION
	SUPPLY AIR DUCT UP & DOWN
	RETURN / EXHAUST AIR DUCT UP & DOWN
	ROUND DUCT UP & DOWN
	DUCT CONTINUATION (ROUND & RECTANGULAR)
	SUPPLY / RETURN GRILLE
	RETURN / EXHAUST GRILLE
F	TOILET EXHAUST FAN
	FLOOR GRILLE
	CEILING GRILLE
	FLOOR BOOT
T	THERMOSTAT
U/C	DOOR UNDERCUT

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NO.	DATE	DESCRIPTION
1	2025/02/25	ISSUED AS PROTOTYPICAL DRAWING

PROJECT:

CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT OR CONSTRUCTION

SHEET TITLE:

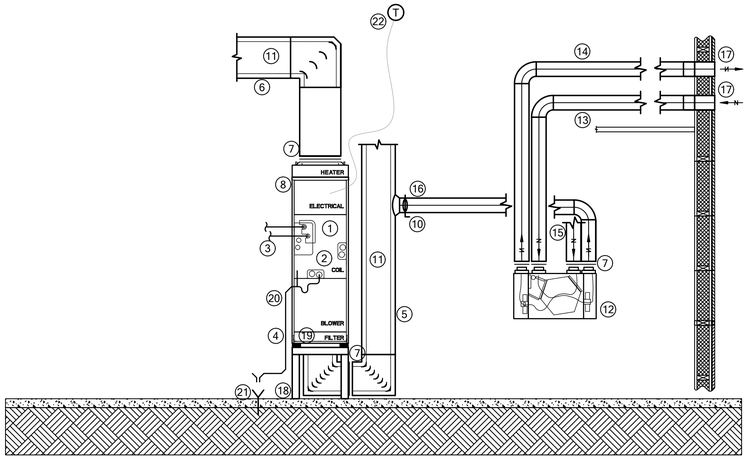
ENHANCED ACCESSIBILITY MECHANICAL & ELECTRICAL DETAILS & SYMBOLS - ALTERNATE OPTION 1

PROJECT NO: 24112

SCALE: NTS

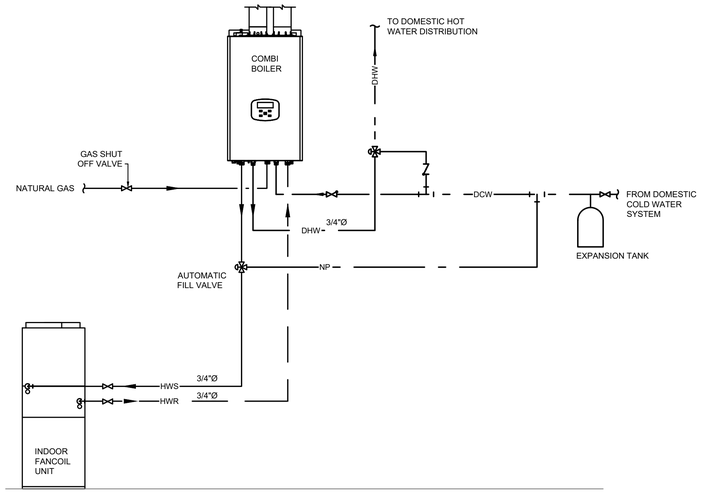
SHEET NO:

M003B



1. VRF AIR HANDLER
2. DX COIL
3. REFRIGERANT PIPING TO VRF OUTDOOR CONDENSING UNIT
4. AIR FILTER
5. RETURN AIR DUCT
6. SUPPLY AIR DUCT
7. FLEXIBLE CONNECTION
8. HOT WATER HEATER COIL
10. BALANCING DAMPER
11. 25mm ACOUSTIC LINING (ALL S/A DUCTWORK AND FIRST 3.0M OF R/A DUCTWORK)
12. ENERGY RECOVERY VENTILATOR
13. INTAKE AIR DUCT INSULATED
14. EXAUST AIR DUCT CW BACKDRAFT DAMPER
15. EXHAUST AIR DUCT FROM WASHROOM
16. FRESH AIR CONNECTION TO R/A DUCT
17. INTAKE AND EXHAUST TERMINATION (LOUVRE BY OTHERS) EXHAUST TERMINATION TO HAVE SPRING LOADED BACKDRAFT DAMPER
18. VRF AIR HANDLER STAND
19. NEOPRENE ISOLATOR
20. DRAIN LINE WITH TRAP AND ANTI SIPHON AIR VENT
21. HUB DRAIN
22. THERMOSTAT

DETAIL OF VERTICAL VRF UNIT
SCALE: NTS



HEATING WATER FLOW DIAGRAM
N.T.S.

ELECTRICAL LEGEND

SYMBOL	DESCRIPTION
SA/CO	120V COMBINATION SMOKE/CARBON MONOXIDE ALARM COMPLETE WITH STROBE, AUDIO ALARM AND BATTERY BACKUP.
	SURFACE OR FLUSH MOUNTED ELECTRICAL PANELS
M	HYDRO METER

ABBREVIATIONS

SYMBOL	DESCRIPTION
S/A	SUPPLY AIR
R/A	RETURN AIR
E/A	EXHAUST AIR
O/A	OUTDOOR AIR

PLUMBING AND DRAINAGE

SYMBOL	DESCRIPTION
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SAN	SANITARY DRAINAGE (SAN) PIPING
M	WATER METER

MECHANICAL PIPING

SYMBOL	DESCRIPTION
	PIPE DOWN
	PIPE UP
	PIPE UP & DOWN
	VALVE
	BALANCING VALVE
	PIPE CONTINUATION
CD	CONDENSATE DRAINAGE PIPING
	FLOW DIRECTION

DUCTWORK

SYMBOL	DESCRIPTION
	SUPPLY AIR DUCT UP & DOWN
	RETURN / EXHAUST AIR DUCT UP & DOWN
	ROUND DUCT UP & DOWN
	DUCT CONTINUATION (ROUND & RECTANGULAR)
	SUPPLY / RETURN GRILLE
	RETURN / EXHAUST GRILLE
F	TOILET EXHAUST FAN
	FLOOR GRILLE
	CEILING GRILLE
	FLOOR BOOT
T	THERMOSTAT
U/C	DOOR UNDERCUT

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NO.	DATE	DESCRIPTION
1	2025/02/25	ISSUED AS PROTOTYPICAL DRAWING

PROJECT:

CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT OR CONSTRUCTION

SHEET TITLE:

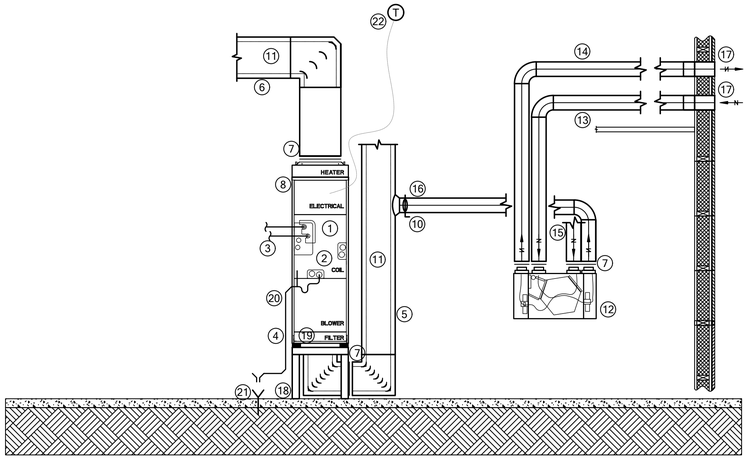
ENHANCED ACCESSIBILITY MECHANICAL & ELECTRICAL DETAILS & SYMBOLS - ALTERNATE OPTION 2

PROJECT NO: 24112

SCALE: NTS

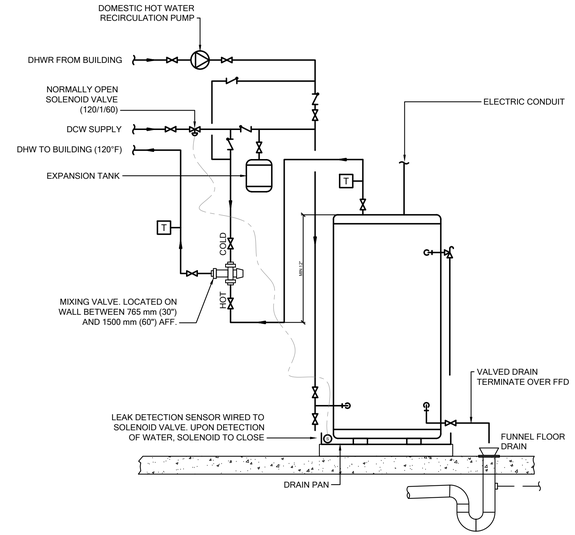
SHEET NO:

M003C



1. VRF AIR HANDLER
2. DX COIL
3. REFRIGERANT PIPING TO VRF OUTDOOR CONDENSING UNIT
4. AIR FILTER
5. RETURN AIR DUCT
6. SUPPLY AIR DUCT
7. FLEXIBLE CONNECTION
8. ELECTRIC HEATING COIL
10. BALANCING DAMPER
11. 25mm ACOUSTIC LINING (ALL S/A DUCTWORK AND FIRST 3.0M OF R/A DUCTWORK)
12. ENERGY RECOVERY VENTILATOR
13. INTAKE AIR DUCT INSULATED
14. EXAUST AIR DUCT CW BACKDRAFT DAMPER
15. EXHAUST AIR DUCT FROM WASHROOM
16. FRESH AIR CONNECTION TO R/A DUCT
17. INTAKE AND EXHAUST TERMINATION (LOUVRE BY OTHERS) EXHAUST TERMINATION TO HAVE SPRING LOADED BACKDRAFT DAMPER
18. VRF AIR HANDLER STAND
19. NEOPRENE ISOLATOR
20. DRAIN LINE WITH TRAP AND ANTI SIPHON AIR VENT
21. HUB DRAIN
22. THERMOSTAT

DETAIL OF VERTICAL VRF UNIT
SCALE: NTS



DETAIL OF ELECTRIC DHW TANK
SCALE: NTS

ELECTRICAL LEGEND

SYMBOL	DESCRIPTION
SA/CO	120V COMBINATION SMOKE/CARBON MONOXIDE ALARM COMPLETE WITH STROBE, AUDIO ALARM AND BATTERY BACKUP.
	SURFACE OR FLUSH MOUNTED ELECTRICAL PANELS
M	HYDRO METER

ABBREVIATIONS

SYMBOL	DESCRIPTION
S/A	SUPPLY AIR
R/A	RETURN AIR
E/A	EXHAUST AIR
O/A	OUTDOOR AIR

PLUMBING AND DRAINAGE

SYMBOL	DESCRIPTION
	P-TRAP
CO	CLEAN OUT (FLOOR & CEILING)
FD	ROUND FLOOR DRAIN
HD	HUB DRAIN
	DOMESTIC COLD WATER (DCW) PIPING
	DOMESTIC HOT WATER (DHW) PIPING
SAN	SANITARY DRAINAGE (SAN) PIPING
M	WATER METER

MECHANICAL PIPING

SYMBOL	DESCRIPTION
	PIPE DOWN
	PIPE UP
	PIPE UP & DOWN
	VALVE
	BALANCING VALVE
	PIPE CONTINUATION
CD	CONDENSATE DRAINAGE PIPING
	FLOW DIRECTION

DUCTWORK

SYMBOL	DESCRIPTION
	SUPPLY AIR DUCT UP & DOWN
	RETURN / EXHAUST AIR DUCT UP & DOWN
	ROUND DUCT UP & DOWN
	DUCT CONTINUATION (ROUND & RECTANGULAR)
	SUPPLY / RETURN GRILLE
	RETURN / EXHAUST GRILLE
F	TOILET EXHAUST FAN
	FLOOR GRILLE
	CEILING GRILLE
	FLOOR BOOT
T	THERMOSTAT
U/C	DOOR UNDERCUT

CMHC SCHL

DISCLAIMER

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NO.	DATE	DESCRIPTION
1	2025/02/25	ISSUED AS PROTOTYPICAL DRAWING

PROJECT:

CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT OR CONSTRUCTION

SHEET TITLE:

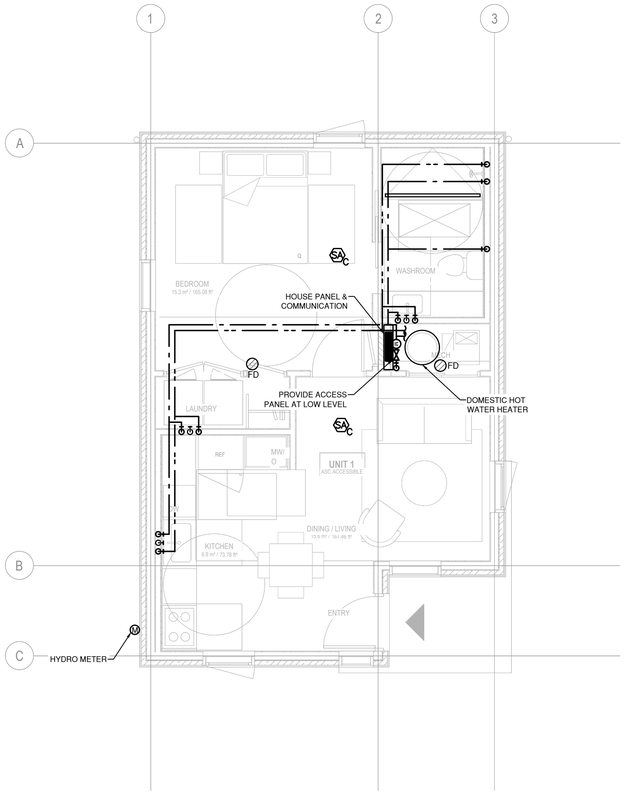
ENHANCED ACCESSIBILITY MECHANICAL & ELECTRICAL DETAILS & SYMBOLS - ALTERNATE OPTION 3

PROJECT NO: 24112

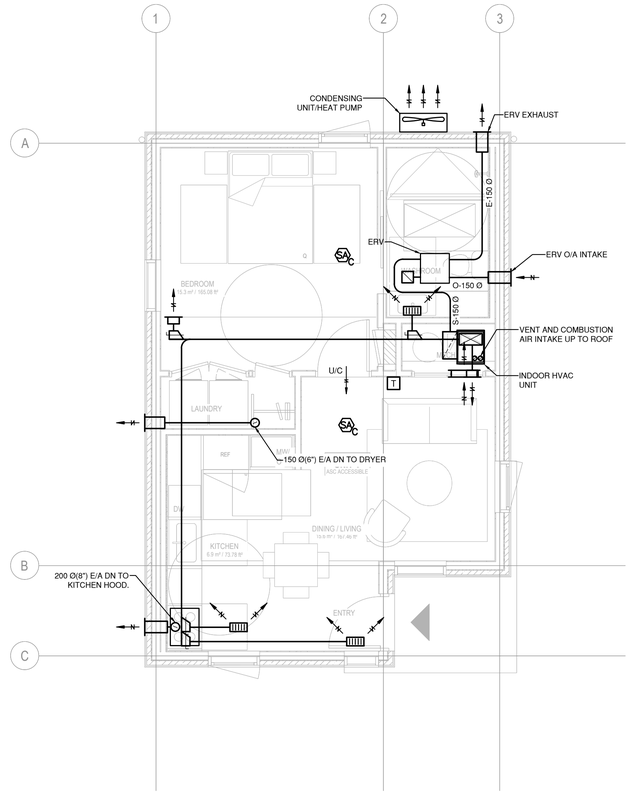
SCALE: NTS

SHEET NO:

M003D



1 M-100 PLUMBING & ELECTRICAL PLAN
Scale: 1:50



2 M-100 HVAC PLAN
Scale: 1:50

CMHC SCHL

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NO.	DATE	DESCRIPTION
1	2025/02/25	ISSUED AS PROTOTYPICAL DRAWING

PROJECT:

CMHC HOUSING DESIGN CATALOGUE

ONTARIO, CANADA

NOT FOR PERMIT OR CONSTRUCTION

SHEET TITLE:

ENHANCED ACCESSIBILITY GROUND FLOOR PLUMBING, ELECTRICAL AND HVAC

PROJECT NO: 24112

SCALE: AS NOTED

SHEET NO:

M100