ELECTRICAL

OFFICE / SHOWROOM / WAREHOUSE FIT-OUT AND 600 A SERVICE

CALGARY, ALBERTA · PROJECT AS-24-0247
SAMPLE DRAWING SET · FICTIONAL JOB

SAMPLE · FICTIONAL JOB · NOT FOR CONSTRUCTION
Shows the format of an AI-drafted set. A real set uses your title block and your standards.

DRAWING LIST

SHEET	TITLE	REV
E-001	COVER SHEET, LEGEND AND GENERAL NOTES	1
E-101	LIGHTING PLAN	0
E-102	POWER AND SYSTEMS PLAN	1
E-201	SINGLE-LINE DIAGRAM AND FAULT CURRENT	0
E-301	PANEL SCHEDULES	1
E-302	LOAD CALCULATION AND VOLTAGE DROP	1
E-501	DETAILS	0

PROJECT DATA

ITEM	VALUE
Occupancy	Office / showroom / warehouse, single storey
Gross floor area	1,080 m² (36 m × 30 m)
Service	600 A, 120/208 V, 3-phase, 4-wire, underground
Supply authority	ENMAX Power (transformer, primary, metering)
Calculated load	147.5 kVA = 409 A (CEC Rule 8-210, see E-302)
Fault current at MSB	22.0 kA sym, assumed — confirm with ENMAX
Distribution	MSB 600 A · Panel A 400 A (power) · Panel B 225 A (lighting, receptacles)
EV charging	4 × Level 2 (32 A) now, 2 roughed in (EVEMS needed to connect)
Code	CEC Part I 2024 (CSA C22.1:24), in force in Alberta since April 1, 2025
Permit	City of Calgary electrical permit by the contractor's Master Electrician
Plans examination	Required: service 600 A or greater (City form PL 1219), see E-201

SYMBOL LEGEND

- A LED troffer 600 × 1200, recessed
- B LED downlight 150 mm
- C LED linear pendant 1200 mm
- D LED high-bay
- E LED strip, surface
- T Track with heads
- F Wall pack, exterior
- G Area light on pole
- EM Emergency lighting unit, two heads
- X Exit sign, running-man pictogram
- S Switch (letter = switch leg)
- SD 0-10 V dimmer
- OS Wall-box occupancy sensor
- OS Ceiling occupancy sensor
- LC-1 Lighting control panel LC-1
- Duplex receptacle 15 A, 400 mm AFF
- GFCI GFCI receptacle
- WP GFCI WP GFCI, in-use cover
- Dedicated receptacle 5-20R
- Floor box with duplex
- FF Furniture feed
- Data outlet back box (cabling by others)
- Disconnect switch, non-fused
- M Motor connection
- EV EV charger (dashed: future rough-in)
- Panelboard, surface
- Panelboard, recessed
- Equipment on roof, see roof plan
- B-7 Home run to panel, circuit number
- Branch wiring, same circuit
- 3 Keyed note
- 1 Revision (cloud + delta)
- Ground electrode

ABBREVIATIONS

AFF	Above finished floor	**FLA**	Full-load amperes	**MSB**	Main switchboard
AFG	Above finished grade	**GEC**	Grounding electrode conductor	**NF**	Non-fused
AC90	Armoured cable, 90 °C	**GFCI**	Ground-fault circuit interrupter	**OHD**	Overhead door
BKR	Breaker	**IR**	Interrupting rating	**RTU**	Rooftop unit
CT	Current transformer (utility metering)	**ISC**	Available short-circuit current	**RW90**	Copper conductor, XLPE, 90 °C
EMT	Electrical metallic tubing	**MBJ**	Main bonding jumper	**UNO**	Unless noted otherwise
EVEMS	EV energy management system	**MCA**	Minimum circuit ampacity	**VD**	Voltage drop
EVSE	EV supply equipment (charger)	**MLO**	Main lugs only	**WP**	Weatherproof
FACP	Fire alarm control panel	**MOCP**	Maximum overcurrent protection		

GENERAL NOTES

1. Install to the Canadian Electrical Code, Part I, 2024 (CSA C22.1:24) as adopted in Alberta, Alberta Electrical STANDATA, City of Calgary requirements, NBC (Alberta Edition) 2023 and NECB 2020.
2. Electrical permit by the contractor's Master Electrician (City of Calgary). Service 600 A: submit E-201 information and the PL 1219 checklist before booking the main service inspection.
3. Confirm the available fault current with ENMAX before ordering equipment. Ratings on E-201 assume 22 kA at the service.
4. Copper conductors throughout, RW90 XLPE (1000 V for the underground service). Minimum #12 Cu for branch circuits.
5. AC90 concealed in office areas. EMT exposed in the warehouse, 112 ELECTRICAL and 113 IT ROOM. PVC underground. Liquidtight flex for final connections to equipment.
6. Separate bonding conductor in every raceway, sized to Table 16. Main bonding jumper in the MSB only; neutrals and grounds isolated in Panels A and B (detail 1/E-501).
7. Continuous loads not to exceed 80 % of the overcurrent device rating (Rule 8-104).
8. Typed panel directories. Equipment marking to Rule 2-100; shock and arc flash warning labels to Rule 2-306 (detail 5/E-501).
9. Firestop every penetration of a fire separation with a listed system matching the separation's rating.
10. Mechanical nameplate values shown are design values. Confirm MCA / MOCP from the approved mechanical submittals before setting breakers.
11. Coordinate the underground service route, transformer pad and metering with ENMAX and the general contractor.
12. Test before the final inspection: insulation resistance on feeders, GFCI function, emergency lighting run time, torque log for lugs.

SCOPE OF WORK

1. New 600 A, 120/208 V, 3-phase service, underground from the ENMAX transformer, CT metering, main switchboard (MSB).
2. Panel A (400 A, power) and Panel B (225 A, lighting and receptacles), feeders F1 and F2.
3. Lighting: 31 troffers, 13 downlights, 12 pendants, 17 high-bays, 2 tracks, 12 emergency units, 6 exit signs, 7 wall packs, 2 pole lights; time-clock and occupancy control (NECB 2020).
4. Receptacles, floor boxes, furniture feeds, dedicated circuits; GFCI where required.
5. Mechanical connections: three rooftop units, make-up air unit, two unit heaters, compressor, water heater, exhaust fans, IT split system.
6. EV charging: four Level 2 chargers on Panel A, two more roughed in.
7. Rev 1, change order CO-07: two receptacles in 110 OFFICE on new circuit B-37.
8. Not included: utility work, trenching and bases, fire alarm devices, data cabling, EV charger network subscription (see estimate E-0247).

ABOUT THIS SAMPLE

This is a sample set for a fictional job. The building, the owner, the quantities and the prices are invented.

It shows the format of the drawings and documents Alpha Seed's AI drafts for an electrical contractor: your title block, your standards, your price book.

Nothing here has been reviewed, signed or sealed. On a real job your Master Electrician (and, where required, the engineer) reviews and signs every sheet. Not for construction.

Free to use as a reference or a template. No warranty. Verify every value against the CEC, STANDATA and the City of Calgary for your own job.

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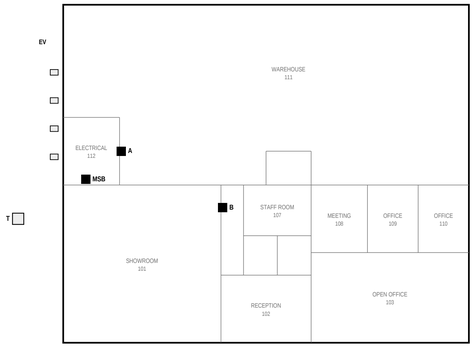
KEY PLAN

SCALE 1:250



CODES, STANDARDS AND AUTHORITIES

CODE OR AUTHORITY	COVERS	NOTE
CEC Part I, 2024 (CSA C22.1:24)	All electrical work	In force in Alberta since April 1, 2025
Alberta Electrical STANDATA	Interpretations and variances to the CEC	Current bulletins at the time of permit
NBC (Alberta Edition) 2023	Emergency lighting, exit signs, fire separations, accessibility	Building permit by others
NECB 2020	Lighting power and automatic lighting controls	Applies to this fit-out (Part 3 building)
CSA C22.2 No. 141	Emergency lighting units	Test before the final inspection
City of Calgary	Electrical permit (Master Electrician); PL 1219 plans examination	Service 600 A or greater
ENMAX Power	Transformer, primary, metering, service connection	Confirm the fault level in writing

SAMPLE

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MASTER ELECTRICIAN SIGNATURE

P.ENG. SEAL (WHERE REQUIRED)

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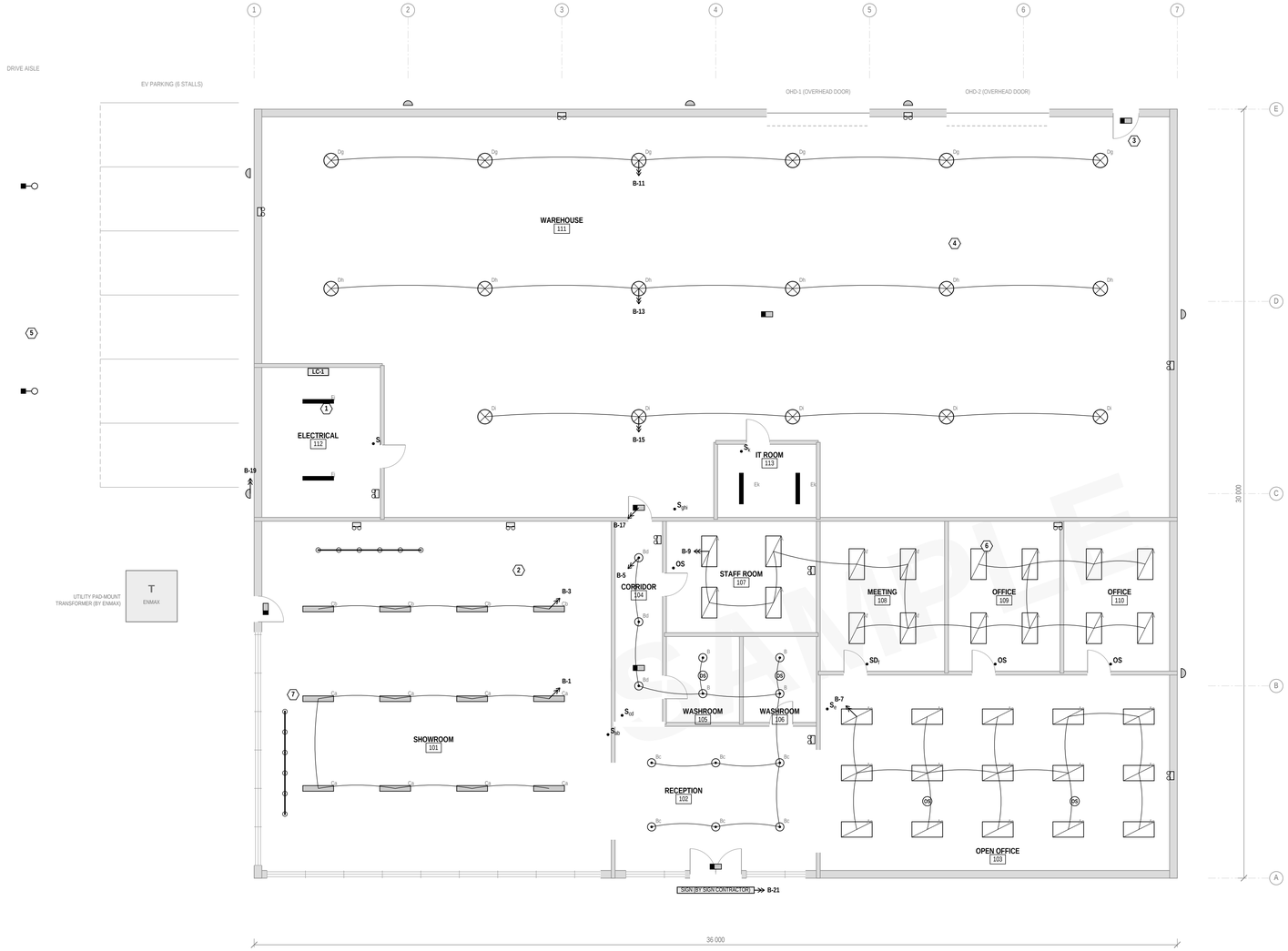
DRAWN	AI DRAFT (ALPHA SEED)
CHECKED	ESTIMATOR / DESIGNER
REVIEWED	MASTER ELECTRICIAN
SCALE	NTS
DATE	2026-10-23

SHEET TITLE
COVER SHEET, LEGEND AND GENERAL NOTES
Drawing list · project data

SHEET
E-001
PROJECT NO. AS-24-0247



1 E-101 **LIGHTING PLAN**

SCALE 1:100

LUMINAIRE SCHEDULE

TYPE	DESCRIPTION	W	MOUNTING	QTY
A	LED troffer 600 x 1200, recessed, 4,800 lm, 4000 K, 0-10 V dimming	40	Recessed T-Bar	31
B	LED downlight 150 mm, recessed, 1,200 lm, 3500 K	15	Recessed	13
C	LED linear pendant 1200 mm, direct/indirect, 7,800 lm, 3500 K	60	Pendant, 3.0 m AFF	12
D	LED high-bay, 20,000 lm, 4000 K, wide distribution	150	Chain, 7.0 m AFF	17
E	LED strip 1200 mm, surface, 3,600 lm, 4000 K	30	Surface / chain	4
F	LED wall pack, full cut-off, 4,500 lm, 4000 K, photocell	40	Wall, 4.0 m AFG	7
G	LED area light on 6 m pole, type III, 12,000 lm	100	Pole, 6.0 m	2
T	Track head on 4.0 m track, 1,600 lm, 3000 K (6 heads per track)	20	Track, ceiling	2 × 6
EM	Emergency lighting unit, 12 V, two heads, self-test	20	Wall, 2.4 m AFF	12
X	Exit sign, green running-man pictogram, LED	3	Wall / ceiling	6

Luminaires: CSA certified, LED, 0-10 V dimmable where shown as A. Final selections by the owner; equivalents accepted on approval.

LIGHTING CONTROLS (NECB 2020, SECTION 4)

1. LC-1 time clock and contactors in 112 ELECTRICAL control the showroom (B-1, B-3), warehouse (B-11, B-13, B-15) and exterior (B-19, B-21). Local switches marked with the leg letter give a 2-hour override.
2. Enclosed rooms (offices, staff room, washrooms) on occupancy sensors, manual-on where shown as OS on the wall.
3. Open office: two ceiling sensors, auto-off after 20 minutes of no occupancy, switch e at the entrance.
4. Meeting room: 0-10 V dimmer SD at the door.
5. Exterior: photocell ON, time clock OFF at 23:00, ON 06:00 to dawn.

KEYED NOTES

1. LC-1 lighting control panel on the north wall of 112 ELECTRICAL, fed from B-17. Contactor coils at 120 V.
2. Emergency lighting units on unswitched circuit B-17. Run time and illumination to NBC (AE) 2023, Subsection 3.2.7; units to CSA C22.2 No. 141. Test before the final inspection.
3. Exit signs: green running-man pictogram, on unswitched circuit B-17, directional arrows as required by the path of travel.
4. High-bays at 7.0 m AFF on chain, clear of the overhead door tracks. Field-verify with the racking layout.
5. Pole lights: 6 m poles on concrete bases by others. B-19 in 27 mm PVC underground, #10 Cu for voltage drop (see E-302).
6. Office lighting on wall-box occupancy sensors (vacancy mode).
7. Track lighting: two 4.0 m tracks, six heads each, aimed on site with the owner.

CIRCUITING

- Home run arrows show the panel circuit. Arcs show fixtures on the same circuit. Lower-case letters are switch legs.
- Branch circuits #12 Cu minimum. AC90 concealed in office areas; EMT exposed in the warehouse, 112 and 113.

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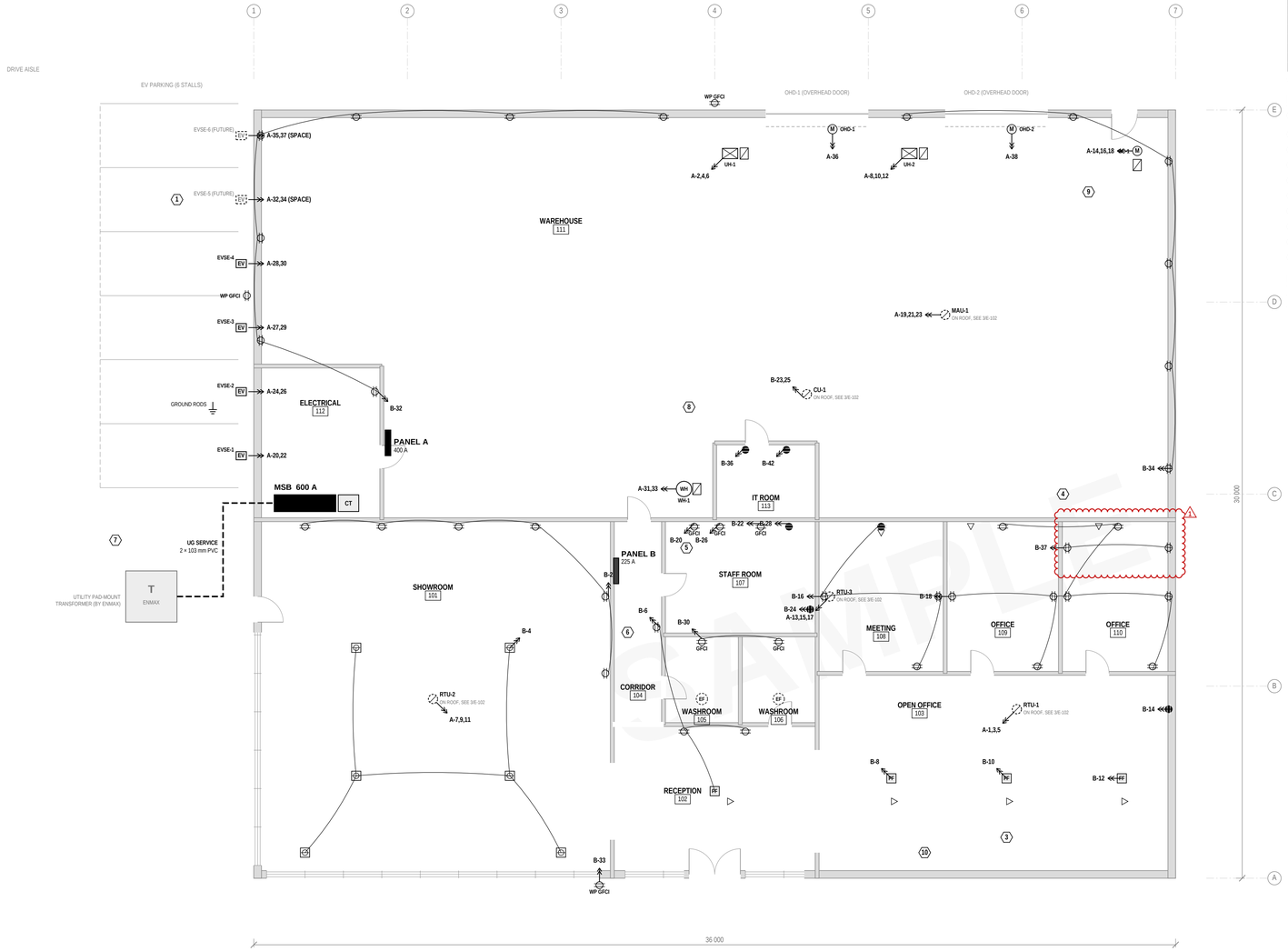
CHECKED	ESTIMATOR / DESIGNER
REVIEWED	MASTER ELECTRICIAN
SCALE	1:100
DATE	2026-10-23

SHEET TITLE
LIGHTING PLAN
Luminaire schedule, lighting controls

SHEET
E-101
PROJECT NO. AS-24-0247

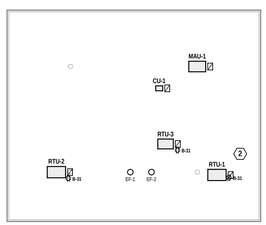
SAMPLE DRAFTED BY ALPHA SEED AI FOR YOUR TEAM TO CHECK · ALPHASEED.CA



2 POWER AND SYSTEMS PLAN

E-102

SCALE 1:100



3 ROOF PLAN

E-102

SCALE 1:400 · ROOFTOP EQUIPMENT, DISCONNECTS, SERVICE RECEPTACLES

EQUIPMENT CONNECTION SCHEDULE

TAG	DESCRIPTION	V/PH	LOAD	BKR	WIRE	DISCONNECT	CIRCUIT
RTU-1	Rooftop unit, 10 t, gas heat	208/3	46.2 A MCA	60 A 3P	#6 Cu	60 A 3P NF, NEMA 3R	A-1,3,5
RTU-2	Rooftop unit, 10 t, gas heat	208/3	46.2 A MCA	60 A 3P	#6 Cu	60 A 3P NF, NEMA 3R	A-7,9,11
RTU-3	Rooftop unit, 7.5 t, gas heat	208/3	36.0 A MCA	50 A 3P	#8 Cu	60 A 3P NF, NEMA 3R	A-13,15,17
MAU-1	Make-up air unit, gas-fired, 3 hp fan	208/3	10.6 A FLA	15 A 3P	#12 Cu	30 A 3P NF, NEMA 3R	A-19,21,23
UH-1	Electric unit heater, 7.5 kW (door heat)	208/3	7.5 kW	30 A 3P	#10 Cu	30 A 3P NF	A-2,4,6
UH-2	Electric unit heater, 7.5 kW (door heat)	208/3	7.5 kW	30 A 3P	#10 Cu	30 A 3P NF	A-8,10,12
AC-1	Air compressor, 7.5 hp	208/3	24.2 A FLA	50 A 3P	#8 Cu	60 A 3P NF	A-14,16,18
EVSE-1	Level 2 EV charger, 32 A continuous	208/1	32.0 A	40 A 2P	#8 Cu	Integral	A-20,22
EVSE-2	Level 2 EV charger, 32 A continuous	208/1	32.0 A	40 A 2P	#8 Cu	Integral	A-24,26
EVSE-3	Level 2 EV charger, 32 A continuous	208/1	32.0 A	40 A 2P	#8 Cu	Integral	A-27,29
EVSE-4	Level 2 EV charger, 32 A continuous	208/1	32.0 A	40 A 2P	#8 Cu	Integral	A-28,30
WH-1	Electric water heater, 6 kW	208/1	6.0 kW	40 A 2P	#8 Cu	30 A 2P NF	A-31,33
OHD-1	Overhead door operator, 1/2 hp	120/1	9.8 A FLA	20 A 1P	#10 Cu	Motor-rated switch	A-36
OHD-2	Overhead door operator, 1/2 hp	120/1	9.8 A FLA	20 A 1P	#10 Cu	Motor-rated switch	A-38
EF-1	Washroom exhaust fan, 1/6 hp	120/1	2.1 A FLA	15 A 1P	#12 Cu	Integral switch	B-30
EF-2	Washroom exhaust fan, 1/6 hp	120/1	2.1 A FLA	15 A 1P	#12 Cu	Integral switch	B-30
CU-1	IT room split system, outdoor unit	208/1	12.0 A MCA	20 A 2P	#12 Cu	30 A 2P NF, NEMA 3R	B-23,25
EVSE-5	Future EV charger: conduit stub only	208/1	-	SPACE	-	-	A-32,34
EVSE-6	Future EV charger: conduit stub only	208/1	-	SPACE	-	-	A-35,37

Values are design values. Confirm every nameplate (MCA / MOCP) with the mechanical submittal before ordering breakers.

KEYED NOTES

1. Four Level 2 EVSE, 32 A continuous on 40 A 2P breakers. EVSE-5 and -6: 27 mm EMT stub with pull string to Panel A. Connecting them later needs an EV energy management system to stay within Panel A's 400 A rating.
2. Rooftop units: 60 A 3P non-fused disconnect, NEMA 3R, within sight of each unit. WP GFCI service receptacle at each unit on B-31.
3. FF-1 to FF-3: furniture feeds hard-wired to the workstation base feed; four duplex outlets each. Data back boxes by this contractor, cabling by others.
4. REV 1 (CO-07): two duplex receptacles added in 110 OFFICE on new circuit B-37 (20 A). See E-301 and the change order.
5. Staff room counter receptacles GFCI (within 1.5 m of the sink). Dishwasher receptacle below the counter, GFCI.
6. Panel B recessed in the 104 CORRIDOR wall; feeder F2 from the MSB, 21 m (see E-201).
7. Utility transformer, primary and metering equipment by ENMAX. Consumer's service: 2 sets 350 kcmil Cu in 2 × 103 mm PVC, underground (see E-201).
8. WH-1: 6 kW, 208 V 1-phase, 2P non-fused disconnect within sight.
9. AC-1: 7.5 hp, 208 V 3-phase, local disconnect; confirm the nameplate before setting the breaker.
10. Data outlets shown for coordination only. Cabling, patch panels and the rack by others.

DEVICE NOTES

- Receptacles 15 A spec grade at 400 mm AFF unless noted; dedicated outlets 5-20R. See detail 4/E-501 for mounting heights.
- Exterior and roof receptacles WP GFCI with in-use covers.

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Calgary, Alberta

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SCALE	1:100
DATE	2026-10-23

SHEET TITLE

POWER AND SYSTEMS PLAN

Equipment connection schedule · Rev 1 (CO-07)

SHEET

E-102

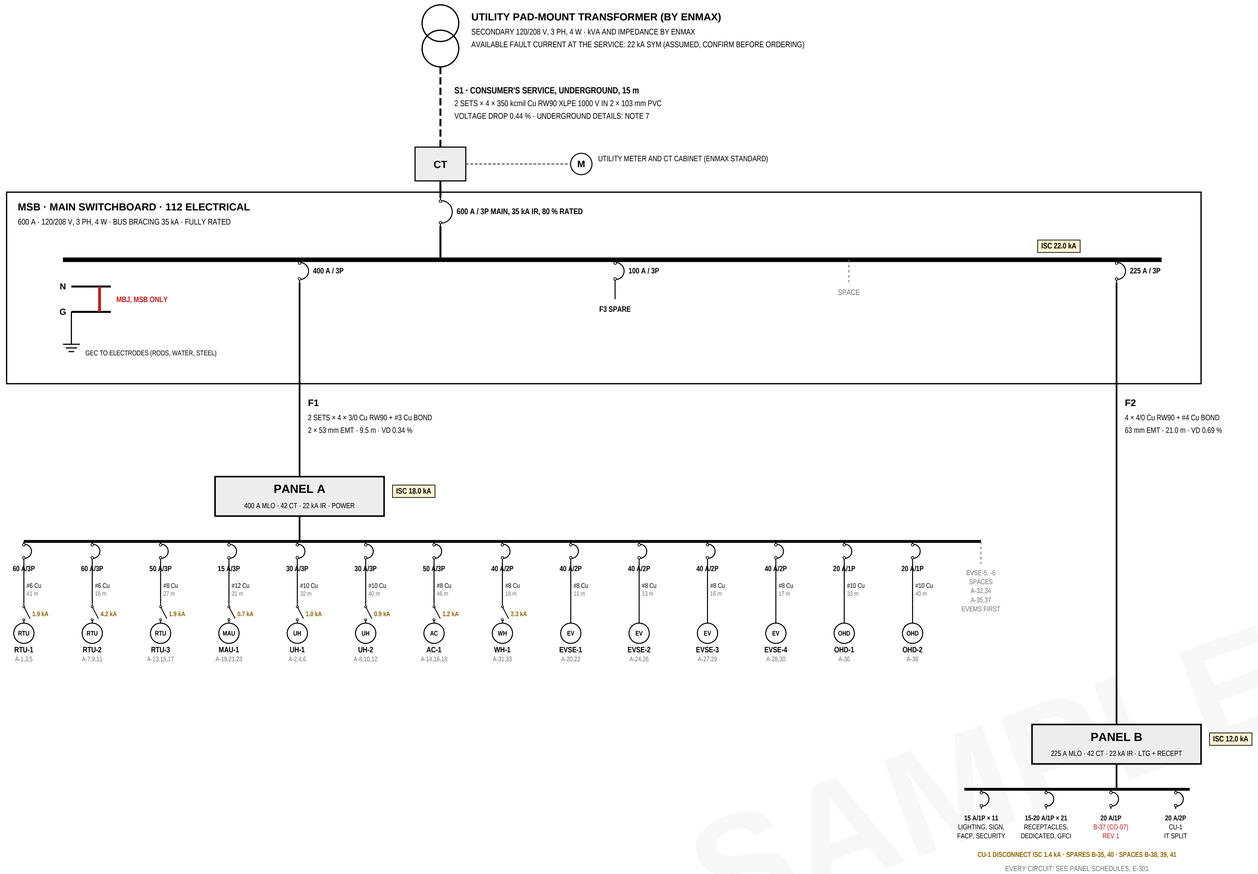
PROJECT NO. AS-24-0247

SAMPLE DRAFTED BY ALPHA SEED AI FOR YOUR TEAM TO CHECK · ALPHASEED.CA

1 / E-201

SINGLE-LINE DIAGRAM

NOT TO SCALE



SLD SYMBOLS

- Circuit breaker (rating / poles)
- Disconnect switch, non-fused
- Load (motor, EV, heater)
- ISC 12.0 kA — Available fault current
- Underground
- Main bonding jumper

FEEDER SCHEDULE

TAG	FROM	TO	OCPD	CONDUCTORS	BOND	RACEWAY	L (m)	VD %	ISC kA
S1	ENMAX	MSB	600 A	2 sets × 4 × 350 kcmil Cu	—	2 × 103 mm PVC	15.0	0.44	22.0
F1	MSB	PANEL A	400 A	2 sets × 4 × 3/0 Cu	#3 Cu	2 × 53 mm EMT	9.5	0.34	18.0
F2	MSB	PANEL B	225 A	4 × 4/0 Cu	#4 Cu	63 mm EMT	21.0	0.69	12.0

AVAILABLE FAULT CURRENT (POINT-TO-POINT METHOD)

LOCATION	FROM / VIA	ISC kA	RATING kA	OK	NOTE
MSB (service)	UTILITY	22.00	35	YES	Utility value, assumed — confirm with ENMAX
PANEL A	F1: 2 × 3/0 Cu, 9.5 m	18.00	22	YES	Fully rated
PANEL B	F2: 4/0 Cu, 21.0 m	11.98	22	YES	Fully rated
RTU-1 disconnect	#6 Cu, 41.4 m	1.92	10	YES	10 kA rated switch
RTU-2 disconnect	#6 Cu, 16.4 m	4.16	10	YES	10 kA rated switch
RTU-3 disconnect	#8 Cu, 27.4 m	1.86	10	YES	10 kA rated switch
MAU-1 disconnect	#12 Cu, 31.4 m	0.69	10	YES	10 kA rated switch
UH-1 disconnect	#10 Cu, 32.5 m	1.04	10	YES	10 kA rated switch
UH-2 disconnect	#10 Cu, 39.5 m	0.87	10	YES	10 kA rated switch
AC-1 disconnect	#8 Cu, 45.9 m	1.16	10	YES	10 kA rated switch
WH-1 disconnect	#8 Cu, 18.4 m	2.29	10	YES	10 kA rated switch
CU-1 disconnect	#12 Cu, 12.0 m	1.41	10	YES	10 kA rated switch

3-phase bolted faults, copper in steel conduit, C values from the Eaton Bussmann point-to-point tables. Single-phase loads as line-to-line faults (0.866 × ISC). The utility value is assumed: replace it with ENMAX's letter before submission.

CITY OF CALGARY PL 1219 (R2025-04) · SERVICE 600 A OR GREATER

#	ITEM	THIS PROJECT
1	Single line diagram	This sheet
2	Manufacturer's shop drawings	MSB, Panel A, Panel B: attach the supplier's submittals
3	Short circuit current at the main service	22.0 kA (assumed, confirm with ENMAX)
4	ISC at downstream panelboards and disconnect switches	Fault current table above
5	Switchgear bracing (rating)	MSB bus bracing 35 kA
6	Series rated?	No
7	Fully rated?	Yes: every device rated at or above its available ISC
8	Overcurrent devices of 1200 A or higher?	None (largest: the 600 A main)
9	Means to reduce arc fault clearing time (Rule 2-306(3))	Not applicable: no device of 1200 A or higher
10	Site in a flood plain area?	To confirm on the City of Calgary flood map
11	Underground conductors 1/0 and larger	Yes, S1: ampacity method stated in note 7

EQUIPMENT RATINGS AGAINST AVAILABLE FAULT CURRENT

EQUIPMENT	SIZE	RATING	AVAILABLE	OK
MSB main breaker	600 A 3P	35 kA	22.0 kA	YES
MSB bus bracing	600 A	35 kA	22.0 kA	YES
Panel A + branch breakers	400 A MLO	22 kA	18.0 kA	YES
Panel B + branch breakers	225 A MLO	22 kA	12.0 kA	YES
Disconnect switches (worst case)	15-60 A	10 kA	4.2 kA	YES
EVSE-1 to -4 (SCCR on the nameplate)	40 A 2P	10 kA	3.5 kA	YES

NOTES

1. Main bonding jumper in the MSB only. Panels A and B: isolated neutral bar, separate bond bar (detail 1/E-501).
2. Every panelboard and disconnect rated at or above the available fault current shown (fully rated system).
3. Continuous loads at 80 % of the breaker rating. Service and feeder calculations on E-302.
4. Label every panel with its name, supply, voltage and available fault current; equipment marking to Rule 2-100 (detail 5/E-501).
5. Shock and arc flash warning labels on the MSB and the panelboards (Rule 2-306).
6. Future EVSE-5 and -6 need an EV energy management system before connection (Panel A capacity, E-302).
7. Underground service S1: ampacity from Rule 4-004 and Appendix D for the installed configuration, burial to the CEC and ENMAX standards. State the table and configuration on the submission.

SAMPLE

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SHEET TITLE

SINGLE-LINE DIAGRAM AND FAULT CURRENT

City of Calgary PL 1219 information

SHEET **E-201**

PROJECT NO. AS-24-0247

PANEL A POWER PANEL

LOCATION	**111 WAREHOUSE (E. WALL OF 112)**	VOLTAGE	**120/208 V, 3 PH, 4 W**	BUS / MAIN	**400 A, MAIN LUGS ONLY**
MOUNTING	**SURFACE**	FED FROM	**MSB, 400 A 3P**	INTERRUPTING	**22 kA, FULLY RATED**
FEEDER	**2 × 4 × 3/0 Cu + #3 Cu bond**	ISC AT PANEL	**18.0 kA**	NEUTRAL / BOND	**Isolated neutral, separate bond bar**

CKT	DESCRIPTION	BKR	WIRE	VA	A	B	C	VA	WIRE	BKR	DESCRIPTION	CKT
1	RTU-1 ROOFTOP UNIT, 10 T, GAS HEAT	60/3	#6	5,548	8,048			2,500	#10	30/3	UH-1 ELECTRIC UNIT HEATER, 7.5 KW (DOOR HEAT)	2
3	(continued)			5,548		8,048		2,500			(continued)	4
5	(continued)			5,548			8,048	2,500			(continued)	6
7	RTU-2 ROOFTOP UNIT, 10 T, GAS HEAT	60/3	#6	5,548	8,048			2,500	#10	30/3	UH-2 ELECTRIC UNIT HEATER, 7.5 KW (DOOR HEAT)	8
9	(continued)			5,548		8,048		2,500			(continued)	10
11	(continued)			5,548			8,048	2,500			(continued)	12
13	RTU-3 ROOFTOP UNIT, 7.5 T, GAS HEAT	50/3	#8	4,323	7,229			2,906	#8	50/3	AC-1 AIR COMPRESSOR, 7.5 HP	14
15	(continued)			4,323		7,229		2,906			(continued)	16
17	(continued)			4,323			7,229	2,906			(continued)	18
19	MAU-1 MAKE-UP AIR UNIT, GAS-FIRED, 3 HP FAN	15/3	#12	1,273	4,601			3,328	#8	40/2	EVSE-1 LEVEL 2 EV CHARGER, 32 A CONTINUOUS	20
21	(continued)			1,273		4,601		3,328			(continued)	22
23	(continued)			1,273			4,601	3,328	#8	40/2	EVSE-2 LEVEL 2 EV CHARGER, 32 A CONTINUOUS	24
25	SPACE	—			3,328			3,328			(continued)	26
27	EVSE-3 LEVEL 2 EV CHARGER, 32 A CONTINUOUS	40/2	#8	3,328		6,656		3,328	#8	40/2	EVSE-4 LEVEL 2 EV CHARGER, 32 A CONTINUOUS	28
29	(continued)			3,328			6,656	3,328			(continued)	30
31	WH-1 ELECTRIC WATER HEATER, 6 KW	40/2	#8	3,000	3,000					—	FUTURE EVSE-5 (EVEMS REQUIRED)	32
33	(continued)			3,000		3,000					(reserved)	34
35	FUTURE EVSE-6 (EVEMS REQUIRED)	—					1,176	1,176	#10	20/1	OHD-1 OVERHEAD DOOR OPERATOR, 1/2 HP	36
37	(reserved)				1,176			1,176	#10	20/1	OHD-2 OVERHEAD DOOR OPERATOR, 1/2 HP	38
39	SPARE	20/1								—	SPACE	40
41	SPACE	—								—	SPACE	42

CONNECTED LOAD PER PHASE A: 35,430 VA (295 A) B: 37,582 VA (313 A) C: 35,758 VA (298 A)
TOTAL CONNECTED 108,771 VA = 302 A balanced · highest phase 313 A ≤ 80 % of 400 A = 320 A

PANEL B LIGHTING AND RECEPTACLE PANEL

LOCATION	**104 CORRIDOR**	VOLTAGE	**120/208 V, 3 PH, 4 W**	BUS / MAIN	**225 A, MAIN LUGS ONLY**
MOUNTING	**RECESSED**	FED FROM	**MSB, 225 A 3P**	INTERRUPTING	**22 kA, FULLY RATED**
FEEDER	**4 × 4/0 Cu + #4 Cu bond**	ISC AT PANEL	**12.0 kA**	NEUTRAL / BOND	**Isolated neutral, separate bond bar**

CKT	DESCRIPTION	BKR	WIRE	VA	A	B	C	VA	WIRE	BKR	DESCRIPTION	CKT
1	LTG SHOWROOM PENDANTS ROWS 1-2	15/1	#12	480	1,560			1,080	#12	20/1	RECEPT SHOWROOM WALLS	2
3	LTG SHOWROOM ROW 3 + TRACKS	15/1	#12	480		1,560		1,080	#12	20/1	RECEPT SHOWROOM FLOOR BOXES	4
5	LTG RECEPTION, CORRIDOR, WASHROOMS	15/1	#12	195			1,095	900	#12	20/1	RECEPT RECEPTION, CORRIDOR	6
7	LTG OPEN OFFICE	15/1	#12	600	2,040			1,440	#12	20/1	FF-1 WORKSTATIONS 1-4	8
9	LTG MEETING, OFFICES, STAFF	15/1	#12	640		2,080		1,440	#12	20/1	FF-2 WORKSTATIONS 5-8	10
11	LTG WAREHOUSE HIGH-BAYS ROW N	15/1	#12	900			2,340	1,440	#12	20/1	FF-3 WORKSTATIONS 9-12	12
13	LTG WAREHOUSE HIGH-BAYS ROW C	15/1	#12	900	2,400			1,500	#12	20/1	COPIER (DEDICATED)	14
15	LTG WAREHOUSE HIGH-BAYS ROW S	15/1	#12	750		2,470		1,720	#12	20/1	RECEPT MEETING + AV	16
17	LTG ELEC/IT, EMERG. UNITS, EXITS (UNSW.)	15/1	#12	378			1,818	1,440	#12	20/1	RECEPT OFFICES 109, 110	18
19	LTG EXTERIOR WALL PACKS + POLES (LC-1)	15/1	#10	480	1,980			1,500	#12	20/1	STAFF COUNTER (GFCI)	20
21	SIGN (LC-1)	15/1	#12	1,200		2,700		1,500	#12	20/1	STAFF COUNTER (GFCI)	22
23	CU-1 IT ROOM SPLIT SYSTEM	20/2	#12	1,248			2,048	800	#12	15/1	REFRIGERATOR (DEDICATED)	24
25	(continued)			1,248	2,448			1,200	#12	15/1	DISHWASHER (GFCI)	26
27	FIRE ALARM CONTROL UNIT (LOCK ON, RED)	15/1	#12	300		1,800		1,500	#12	20/1	MICROWAVE (DEDICATED)	28
29	SECURITY / ACCESS CONTROL	15/1	#12	300			1,160	860	#12	15/1	WASHROOM GFCI + EF-1, EF-2	30
31	ROOF SERVICE RECEPTACLES (WP GFCI)	20/1	#12	360	1,620			1,260	#12	20/1	RECEPT WAREHOUSE WEST + ELEC RM	32
33	EXTERIOR RECEPTACLES (WP GFCI)	20/1	#12	540		1,620		1,080	#12	20/1	RECEPT WAREHOUSE EAST	34
35	SPARE	20/1					1,800	1,800	#12	20/1	IT RACK 1 (DEDICATED)	36
37	RECEPT OFFICE 110 (CO-07)	20/1	#12	360	360					—	SPACE	38
39	SPACE	—								20/1	SPARE	40
41	SPACE	—					1,800	1,800	#12	20/1	IT RACK 2 (DEDICATED)	42

CONNECTED LOAD PER PHASE A: 12,408 VA (103 A) B: 12,230 VA (102 A) C: 12,061 VA (101 A)
TOTAL CONNECTED 36,699 VA = 102 A balanced · highest phase 103 A ≤ 80 % of 225 A = 180 A

MSB MAIN SWITCHBOARD · 112 ELECTRICAL

600 A · 120/208 V, 3 PH, 4 W · BUS BRACING 35 kA · FULLY RATED

POS	DEVICE	FEEDS	CALC. VA	CHECK 80 %
MAIN	600 A 3P · 35 kA	Service S1	147,497	409 A ≤ 480
F1	400 A 3P	PANEL A	108,771	302 A ≤ 320
F2	225 A 3P	PANEL B	58,676	163 A ≤ 180
F3	100 A 3P	SPARE	—	—
F4	—	SPACE	—	—

Calculated loads from E-302: the service by Rule 8-210; feeders taken conservatively (Panel B on the Table 14 basic load of the whole floor).

PANEL A WITH FUTURE EVSE-5, -6

CASE	VA	AMPS	80 % OF 400 A
Panel A today	108,771	302 A	OK
+ EVSE-5, -6 (2 × 32 A)	13,312		
Panel A with both	122,083	339 A	> 320 A

Connecting the future chargers needs an EV energy management system that holds the chargers' total within Panel A's capacity, or a larger panel. Rough-in only in this contract.

PANEL SCHEDULE NOTES

1. Odd circuits left, even right; phases A-B-C by row. Loads in VA; amps per phase at 120 V.
2. Breakers 22 kA IR, bolt-on, fully rated. Spares: breakers OFF, labelled SPARE. Spaces: filler plates.
3. Typed directory inside each door. Panel label with name, supply, voltage and available fault current (detail 5/E-501).
4. Rev 1 (CO-07): B-37, 20 A 1P, two duplex receptacles in 110 OFFICE, AC90 12/2 from Panel B (cloud and delta 1).
5. FACP breaker B-27 lockable in the ON position with red handle marking (Section 32).
6. Mechanical breaker sizes are design values: confirm MOCP against the approved submittals before ordering.

SAMPLE · FICTIONAL JOB · NOT FOR CONSTRUCTION
Shows the format of an AI-drafted set. A real set uses your title block and your standards.

SAMPLE

YOUR LOGO

YOUR COMPANY ELECTRIC LTD.
ELECTRICAL CONTRACTOR
Calgary, Alberta
Your address, phone, email
Master Electrician: your name, No.

REVIEW AND SIGNATURE

MASTER ELECTRICIAN SIGNATURE

P.ENG. SEAL (WHERE REQUIRED)

SAMPLE: NOT REVIEWED, NOT SIGNED, NOT SEALED

PROJECT
OFFICE / SHOWROOM / WAREHOUSE FIT-OUT AND 600 A SERVICE
CALGARY, ALBERTA · FICTIONAL SITE. NO REAL ADDRESS.
OWNER: EXAMPLE OWNER LTD. (FICTIONAL)
PROJECT NO. AS-24-0247

REVISIONS

NO.	DATE	DESCRIPTION
0	2026-09-04	ISSUED FOR PERMIT
1	2026-10-23	CO-07: TWO RECEPTACLES ADDED IN OFFICE 110, NEW CIRCUIT B-37

DRAWN	AI DRAFT (ALPHA SEED)
CHECKED	ESTIMATOR / DESIGNER
REVIEWED	MASTER ELECTRICIAN
SCALE	NTS
DATE	2026-10-23

SHEET TITLE
PANEL SCHEDULES
MSB, Panel A, Panel B · Rev 1 (CO-07: B-37)

SHEET
E-301
PROJECT NO. AS-24-0247

SERVICE LOAD CALCULATION

CEC PART I 2024, RULE 8-210 (OTHER OCCUPANCIES) · 120/208 V, 3 PH, 4 W

LOAD	RULE / BASIS	QUANTITY	CONNECTED W	DEMAND	CALCULATED W
Basic load: lighting and receptacles	Rule 8-210(a), Table 14 (office), whole floor area	1,080 m² × 50 W/m²	54,000	70 %	37,800
RTU-1 (10 t)	Rule 8-210(b); nameplate MCA		16,644	100 %	16,644
RTU-2 (10 t)	Rule 8-210(b); nameplate MCA		16,644	100 %	16,644
RTU-3 (7.5 t)	Rule 8-210(b); nameplate MCA		12,970	100 %	12,970
MAU-1 fan	Rule 8-210(b); FLA		3,819	100 %	3,819
AC-1 compressor (7.5 hp)	Rule 8-210(b); FLA		8,718	100 %	8,718
EVSE-1 to EVSE-4 (4 × 32 A)	Rule 8-210(b); no EVEMS, 100 %		26,624	100 %	26,624
WH-1 water heater	Rule 8-210(b)		6,000	100 %	6,000
OHD-1, OHD-2 operators	Rule 8-210(b)		2,352	100 %	2,352
CU-1 IT split system	Rule 8-210(b)		2,496	100 %	2,496
EF-1, EF-2 exhaust fans	Rule 8-210(b)		500	100 %	500
Exterior lighting and sign	Rule 8-210(b); outside the floor area	480 W + 1,200 W	1,680	100 %	1,680
UH-1, UH-2 electric unit heaters	Section 62, 75 % (not interlocked with cooling: Rule 8-106(3) not applied)	2 × 7,500 W	15,000	75 %	11,250
TOTAL					**147,497**

Calculated load 147,497 W ÷ (√3 × 208 V) = 409.4 A

Service 600 A, 80 % rated: 600 × 0.8 = 480 A ≥ 409.4 A OK

Service conductors 2 × 350 kcmil Cu RW90 per phase: 2 × 310 A = 620 A at 75 °C (Table 2) ≥ 600 A OK

Spare capacity at 80 %: 71 A, about 15 % of the continuous rating

FEEDER CALCULATIONS

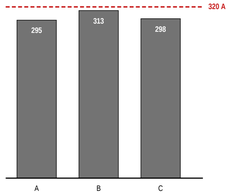
TAG	TO	BASIS	W	AMPS	OCPD	80 %	CONDUCTORS	AMPACITY	BOND	
F1	PANEL A	Connected load of every circuit at 100 % (feeder demand factors not applied)	108,771	301.9	400 A	320 A	2 × 3/0 Cu RW90	400 A	#3 Cu	OK
F2	PANEL B	Table 14 basic load at 100 % + CU-1 + exhaust fans + exterior lighting and sign	58,676	162.9	225 A	180 A	1 × 4/0 Cu RW90	230 A	#4 Cu	OK

Feeder demand factors from Table 14 are not applied: Panel A carries every connected load at 100 %, and Panel B carries the Table 14 basic load of the whole floor at 100 %, which is more than its connected receptacle and lighting load (36.7 kVA). Conductor ampacities from Table 2 at 75 °C; bonding conductors from Table 16.

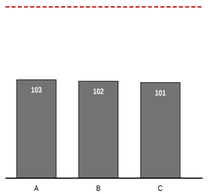
ASSUMPTIONS FOR THE MASTER ELECTRICIAN TO CONFIRM

1. Whole floor area (1,080 m²) taken as office occupancy in Table 14: 50 W/m², 70 % demand for the service. The warehouse would justify less; this errs high.
2. Rooftop units at nameplate MCA (already includes 125 % of the largest motor); gas heat, so the cooling load governs.
3. UH-1 and UH-2 are not interlocked with the rooftop units' cooling, so both heating and cooling are included (Rule 8-106(3) not used).
4. EV chargers at 100 % of their 32 A rating, no energy management system. EVSE-5 and -6 excluded (rough-in only).
5. Utility fault level 22 kA at the service is an assumption until ENMAX confirms it in writing.

PHASE LOADING AGAINST 80 % OF THE BUS



PANEL A (400 A)



PANEL B (225 A)

Amps per phase at 120 V from the connected loads on E-301. Dashed line: 80 % of the bus rating.

VOLTAGE DROP

RULE 8-102: NOT MORE THAN 3 % IN A FEEDER OR BRANCH CIRCUIT, 5 % FROM THE SERVICE TO THE LOAD

RUN	AMPS	LENGTH m	COPPER	VOLTS	THIS RUN %	TO SERVICE %	
Service S1 (2 × 350 kcmil)	409.4	15.0	2 × 350	0.92	0.44	0.44	OK
Feeder F1 to Panel A	301.9	9.5	2 × 3/0	0.72	0.34	0.79	OK
Feeder F2 to Panel B	162.9	21.0	4/0	1.44	0.69	1.14	OK
Branch RTU-1	46.2	41.4	#6	4.78	2.30	3.09	OK
Branch AC-1	24.2	45.9	#8	4.36	2.09	2.88	OK
Branch UH-2	20.8	39.5	#10	5.14	2.47	3.26	OK
Branch EVSE-4	32.0	17.2	#8	2.50	1.20	1.99	OK
Branch OHD-2	9.8	40.5	#10	2.86	2.38	3.17	OK
Branch B-15 warehouse lighting	6.2	38.0	#12	2.65	2.21	3.34	OK
Branch B-19 exterior poles	4.0	45.0	#10	1.30	1.08	2.22	OK

Method: VD = k × I × L × Z, with k = √3 for 3-phase and 2 for single-phase runs, and Z the effective impedance of copper in steel conduit at 0.85 power factor. Lengths are routed lengths including drops. Longest runs only; every other circuit is shorter or lighter.

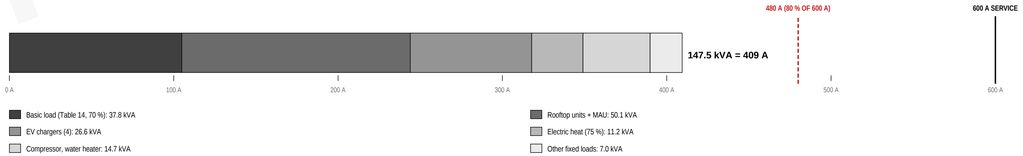
WHAT CHANGED THE DESIGN

OHD-1, OHD-2	On #12 Cu the 40 m run drops 3.7 %, over the 3 % branch limit. Upsized to #10 Cu: 2.4 %.
B-19 exterior	Pole lights 45 m from Panel B: #10 Cu keeps the drop at 1.1 %.
Panel A phases	EV chargers and the water heater moved between phases so no phase exceeds 80 % of 400 A (highest 313 A).
Panel B phases	Microwave, dishwasher and IT rack 2 swapped between phases: 103 / 102 / 101 A.
Future chargers	EVSE-5 and -6 would push Panel A to 339 A, over 320 A: rough-in only, EVEMS required.

REFERENCES

- CEC Part I 2024 (CSA C22.1:24): Rules 8-102, 8-104, 8-106, 8-210; Tables 2, 14, 16. In force in Alberta since April 1, 2025.
- City of Calgary: Electrical permits for contractors; PL 1219 plans examination checklist (R2025-04).
- Fault current: point-to-point method, Eaton Bussmann Selecting Protective Devices (C values, copper, steel conduit).

CALCULATED LOAD AGAINST THE SERVICE



SAMPLE

SAMPLE · FICTIONAL JOB · NOT FOR CONSTRUCTION

Shows the format of an AI-drafted set. A real set uses your title block and your standards.

YOUR LOGO

YOUR COMPANY ELECTRIC LTD.

ELECTRICAL CONTRACTOR

Calgary, Alberta

Your address, phone, email

Master Electrician: your name, No.

REVIEW AND SIGNATURE

MASTER ELECTRICIAN SIGNATURE

P.ENG. SEAL (WHERE REQUIRED)

SAMPLE: NOT REVIEWED, NOT SIGNED, NOT SEALED

PROJECT

OFFICE / SHOWROOM / WAREHOUSE FIT-OUT AND 600 A SERVICE

CALGARY, ALBERTA · FICTIONAL SITE. NO REAL ADDRESS.

OWNER: EXAMPLE OWNER LTD. (FICTIONAL)

PROJECT NO. AS-24-0247

REVISIONS

NO.	DATE	DESCRIPTION
0	2026-09-04	ISSUED FOR PERMIT
1	2026-10-23	CO-07: TWO RECEPTACLES ADDED IN OFFICE 110, NEW CIRCUIT B-37

DRAWN	AI DRAFT (ALPHA SEED)
CHECKED	ESTIMATOR / DESIGNER
REVIEWED	MASTER ELECTRICIAN
SCALE	NTS
DATE	2026-10-23

SHEET TITLE

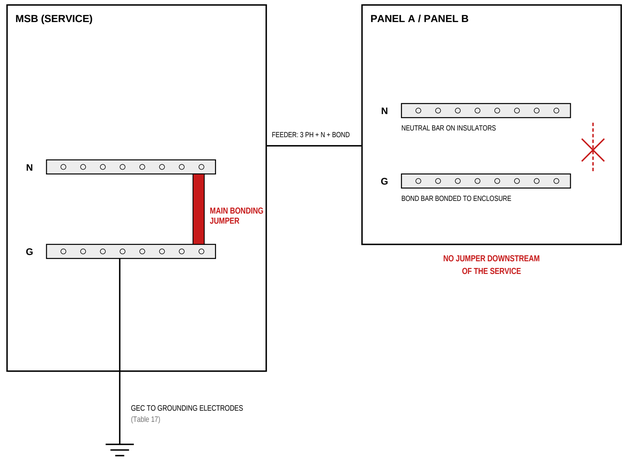
LOAD CALCULATION AND VOLTAGE DROP

CEC Rule 8-210 · feeders · Rule 8-102

SHEET

E-302

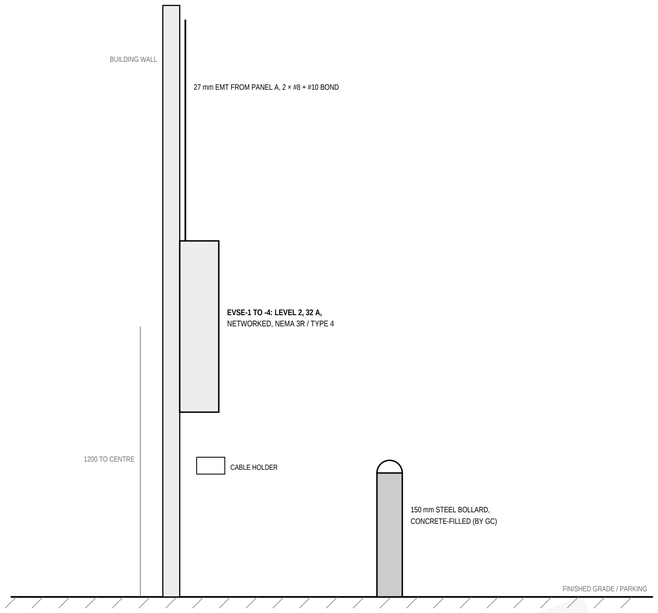
PROJECT NO. AS-24-0247



Neutral and ground are bonded in one place only: the main bonding jumper in the MSB. In Panels A and B the neutral bar stays isolated and the bond conductor lands on the bond bar. The pre-inspection photo check looks for exactly this (checklist items 1 and 8).

1 / E-501 — SERVICE BONDING, ISOLATED NEUTRALS

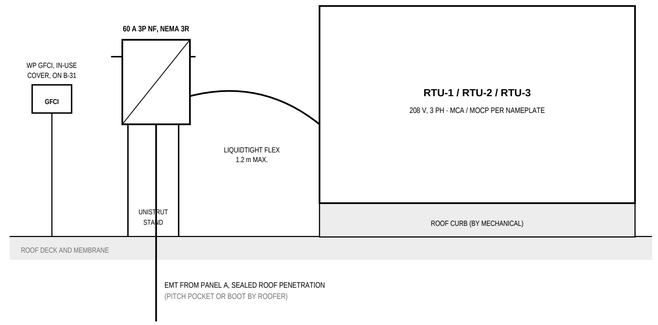
NTS



Mount to the manufacturer's instructions; keep the cable off the ground. Breaker 40 A 2P on Panel A. Label each charger with its panel and circuit. EVSE-5 and -6: 27 mm EMT stub, pull string, capped and labelled FUTURE EVSE.

2 / E-501 — EV CHARGER, WALL MOUNTED

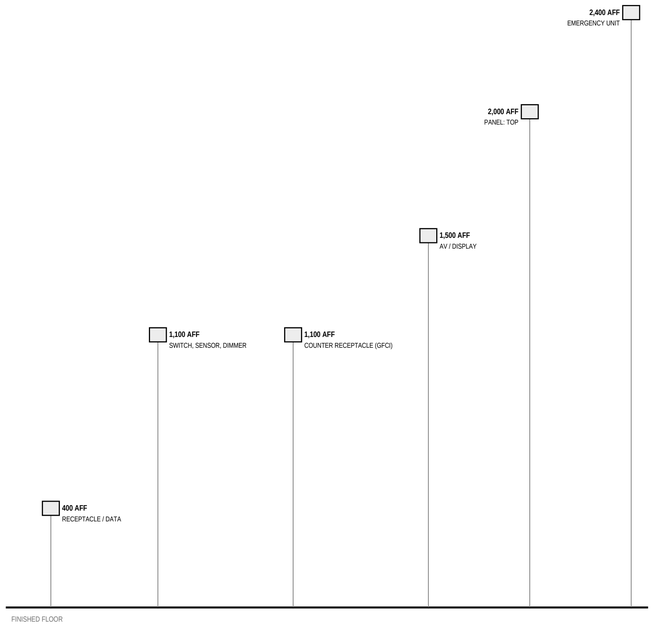
1:25



Disconnect within sight of the unit and readily accessible. Service receptacle within reach of the unit for maintenance. Seal every penetration to the roofer's detail.

3 / E-501 — ROOFTOP UNIT CONNECTION

NTS



Heights to the centre of the box unless noted; panel to the top of the enclosure. Check the architectural elevations and accessibility requirements (NBC (AE) 2023, Section 3.8) before rough-in.

4 / E-501 — TYPICAL MOUNTING HEIGHTS

1:25

PANEL B

120/208 V · 3 PH · 4 W · 225 A BUS · 22 kA IR

FED FROM: MSB, BREAKER F2 (225 A)

AVAILABLE FAULT CURRENT: 12.0 kA · CALCULATED 2026-10-23

LOCATION: 104 CORRIDOR

Engraved phenolic, white on black, riveted. Same format for MSB and Panel A. Marking to Rule 2-100.

WARNING

SHOCK AND ARC FLASH HAZARD

Appropriate PPE required. De-energize before servicing.

Nominal 208 V · Available fault current 12.0 kA

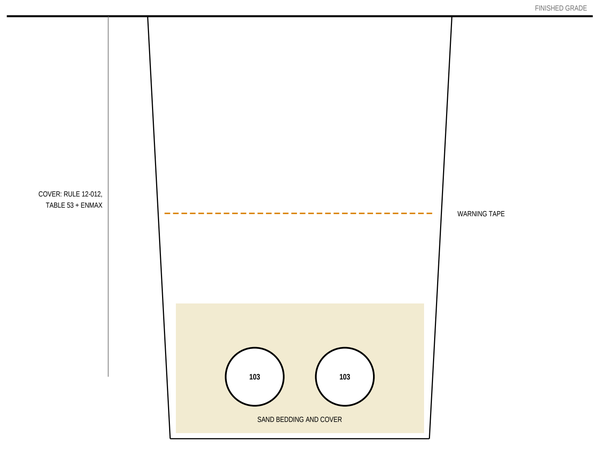
Equipment: PANEL B · Date: (field)

Field-applied warning on the MSB and each panelboard (Rule 2-306). Fill in values from the arc flash assessment where one is done.

Directories typed and placed inside each panel door, listing every circuit in the words used on E-301, including B-37 added by CO-07.

5 / E-501 — PANEL LABELS AND WARNING MARKING

NTS



2 × 103 mm PVC, EACH 4 × 350 kcmil Cu RW90 XLPE 1000 V

Trench, bedding and backfill by the general contractor. Supply-side work, transformer pad and metering to ENMAX standards. State the Appendix D ampacity table and configuration on the PL 1219 submission.

6 / E-501 — UNDERGROUND SERVICE TRENCH

1:20

YOUR LOGO

YOUR COMPANY ELECTRIC LTD.

ELECTRICAL CONTRACTOR

Calgary, Alberta

Your address, phone, email

Master Electrician: your name, No.

REVIEW AND SIGNATURE

MASTER ELECTRICIAN SIGNATURE

P.ENG. SEAL (WHERE REQUIRED)

SAMPLE: NOT REVIEWED, NOT SIGNED, NOT SEALED

PROJECT

OFFICE / SHOWROOM / WAREHOUSE FIT-OUT AND 600 A SERVICE

CALGARY, ALBERTA · FICTIONAL SITE. NO REAL ADDRESS.

OWNER: EXAMPLE OWNER LTD. (FICTIONAL)

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CHECKED	ESTIMATOR / DESIGNER
REVIEWED	MASTER ELECTRICIAN
SCALE	NTS
DATE	2026-10-23

SHEET TITLE

DETAILS

Bonding, EV charger, rooftop unit, mounting heights, labels, trench

SHEET

E-501

PROJECT NO. AS-24-0247

SAMPLE

SAMPLE DRAFTED BY ALPHA SEED AI FOR YOUR TEAM TO CHECK · ALPHASEED.CA