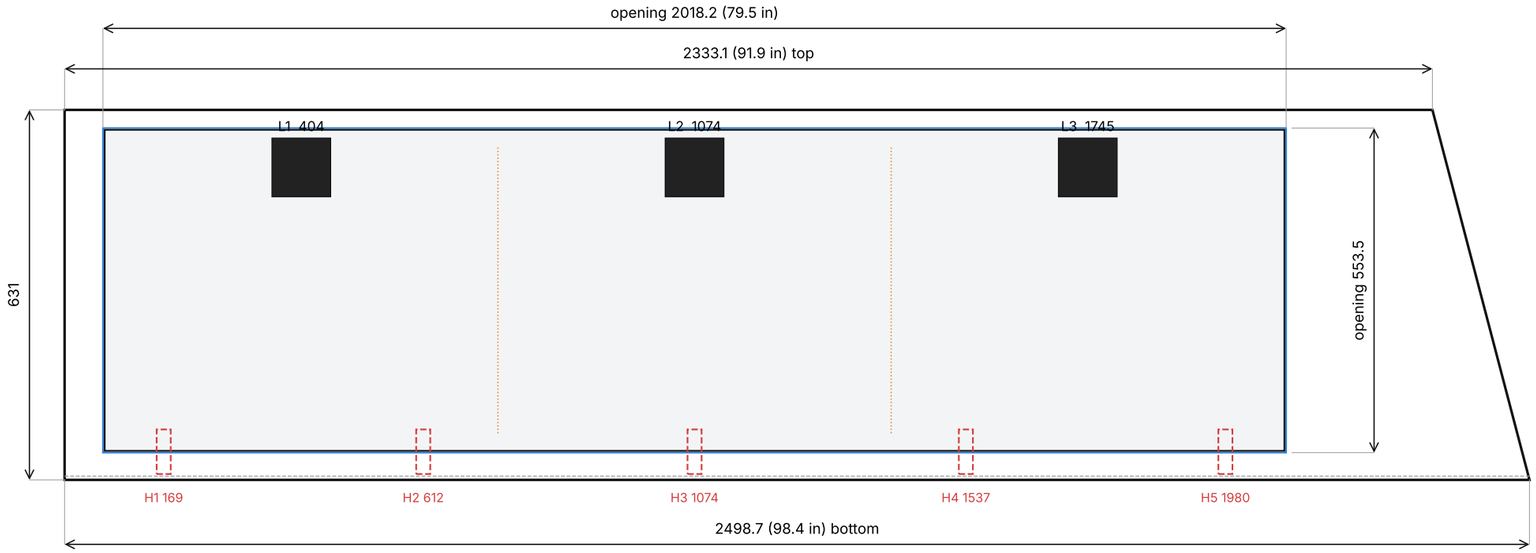
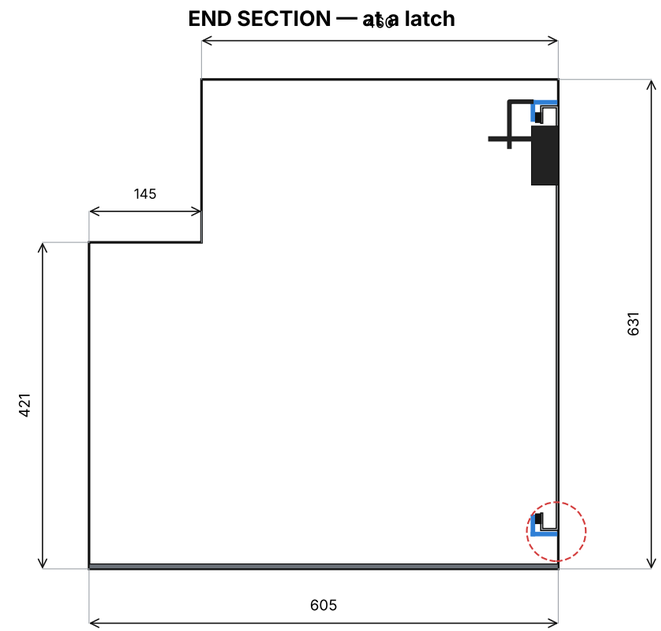
OUTER FACE — door shut



Opening starts 65.4 from the front end and 46.5 above the bottom; it stops 249.5 short of the top of the slope (camper flap).
Door 2012.2 × 547.5, 3 mm gap all round, flush with the face. ■ latches (3) ☒ hinges inside (5, red dashed) ┆ door uprights

END SECTION — at a latch



Grip, door face to back of lip: 34.3
Latch pawl hooks 24.6 behind the top lip
Hinge seam 48 above the bottom
R6 body 76 dia × 38.5 deep (red)
Seal: EPDM push-on on the lip edge, bulb 11 squeezed to 6 by the door's return lips

Box (W × H × L)	605 × 631 × 2498.7 mm; rear end on the camper fin angle, 14.7° from vertical
Shell	0.100 in aluminium tread plate, pattern out: 5052-H32 preferred, 3003-H22 accepted. Never 6061 (cracks on the bend)
Floor	1/4 in aluminium plate (re-used from the flatbed). Walls stand on it: it is the jig. Mounts bolt through it
Opening frame	1-1/4 × 1 × 1/8 in 6061 angle, 4 straight pieces welded inside the opening: stiffens the face, carries the seal
Door	0.100 in tread pan, 20 mm flanges each with a 20 mm return lip (8 bends); 1 × 1/2 × 1/8 in tube stiffeners; opens 90° and 180°
Seal	McMaster 1120A221 EPDM foam push-on seal on the frame lip, 4 × 4784N11 moulded corners; leave the lip uncoated
Latches	3 × Southco N2-2-301-01-20, stainless, key locking, dust shutter on the key (modelled from Southco's STEP); pawl N2-21-101-24
Hinges	5 × Southco R6-20-23 concealed 180° hinge, stainless — nothing shows outside when shut
Finish	Line-X outside. Latch handle and cup Cerakote black (strip the latch first)
Built by	Morena Welding, Inc., San Diego — morenawelding.com

OPENOVERLAND · EXPEDITION BOX V9 — DIAMOND PLATE

Sheet 1 — general arrangement: outer face and end section

mm unless marked · DRAFT 23 Nov 2026 — not strength-checked · sheet 1 of 8

BUILD SEQUENCE

A SUPPLIER — CUT (laser or waterjet), all holes and the door opening while the plate is FLAT
P1, P2, E1, E2 and D1 from 0.100 in tread plate (5052-H32, or 3003-H22). F1 from 1/4 in plate.
Pattern faces OUT on every piece. Flats on sheets 3, 4 and 6 are approximate: develop with your own tooling.

B SUPPLIER — BEND (press brake, 90°, inside radius about 1t)
P1 2 bends that go opposite ways (a Z): ledge / upper-wall bend first, then wall / ledge.
P2 1 bend: top / face. Check the opening stays square after the bend.
D1 box-and-pan (finger) brake: the 4 return lips first, then the 4 flanges.

C MORENA WELDING — BOX
1 Floor F1 flat on the table. It is the jig: everything stands on it.
2 Stand P1 and P2 on the floor; clamp. Check 605 wide top and bottom, and both diagonals.
3 Tack E1 and E2 (E2 leans 14.7° on the fin angle). Re-check square.
4 Weld the 3 long seams (wall / floor, upper wall / top, face / floor) and the end plates.
Stitch-weld, alternate sides, to keep the long seams straight.
5 Opening frame inside the face (sheet 5): top and both ends full length; the bottom in 6 pieces,
leaving a 32 mm gap at each hinge. 1-1/4 in leg square to the face, 1 in leg is the seal lip.

D MORENA WELDING — DOOR
6 Weld the 4 corners of D1. Stitch-weld the stiffeners D2 and the 3 latch plates D3 inside (sheet 7).
7 TEST FIT before any coating: hinges, latches, 3 mm gap all round, door flush with the face.

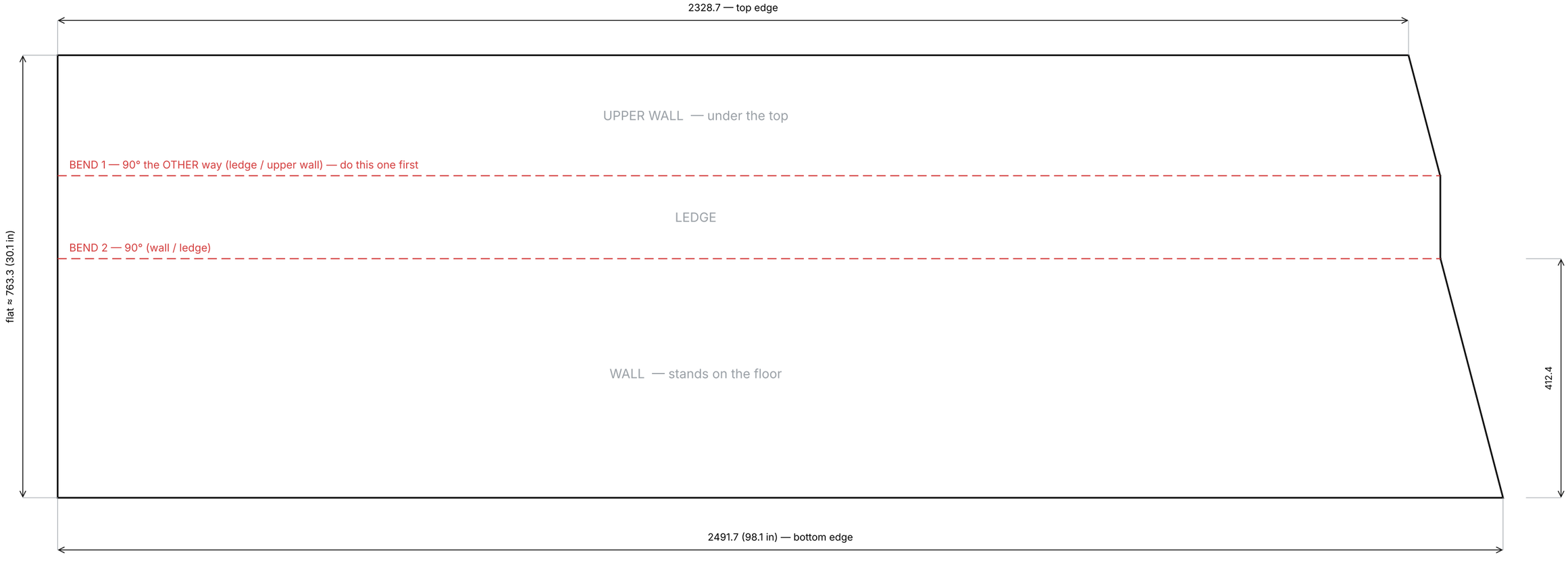
E FINISH AND HARDWARE
8 Line-X the outside. Mask: the lip edge (seal), hinge leaf pads, latch cut-outs and the inside of the door.
9 Hinges (5 x R6-20-23, M5 with nylon isolators — never weld stainless to aluminium),
latches (3 x N2 + pawls), stay cables, then push the seal onto the lip and fit the 4 corners.
10 Adjust the pawls so the door pulls in and squeezes the seal to about 6 mm.

CHECKS

- ☐ Box 605 × 631, diagonals equal within 3 mm
- ☐ Long seams straight within 2 mm over 2.5 m
- ☐ Opening 2018 × 553.5, square
- ☐ Frame lip 31.75 behind the outer face
- ☐ Door gap 3 mm all round, face flush
- ☐ Latch grip (door face to back of lip) 34 mm
- ☐ Door opens to 90° on the stays and to 180°
- ☐ Hose test: no water inside

SHEETS

1 General arrangement
2 Build sequence (this sheet)
3 P1 inboard wall — flat
4 P2 top and outer face — flat
5 F1 floor, E1 / E2 end plates, opening frame
6 D1 door pan — flat
7 Door stiffeners, latch plates, hardware positions
8 Cut list and bought parts



Front edge square. Rear edge on the camper fin angle (14.7°) on the wall and the upper wall; square on the ledge.
Formed legs, outside: wall 414.6 · ledge 147.5 · upper wall 210.0. Bends go opposite ways — the finished section is a Z (see sheet 1, end section).

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Sheet 3 — P1 inboard wall, ledge and upper wall — flat, 0.100 tread, 2 bends

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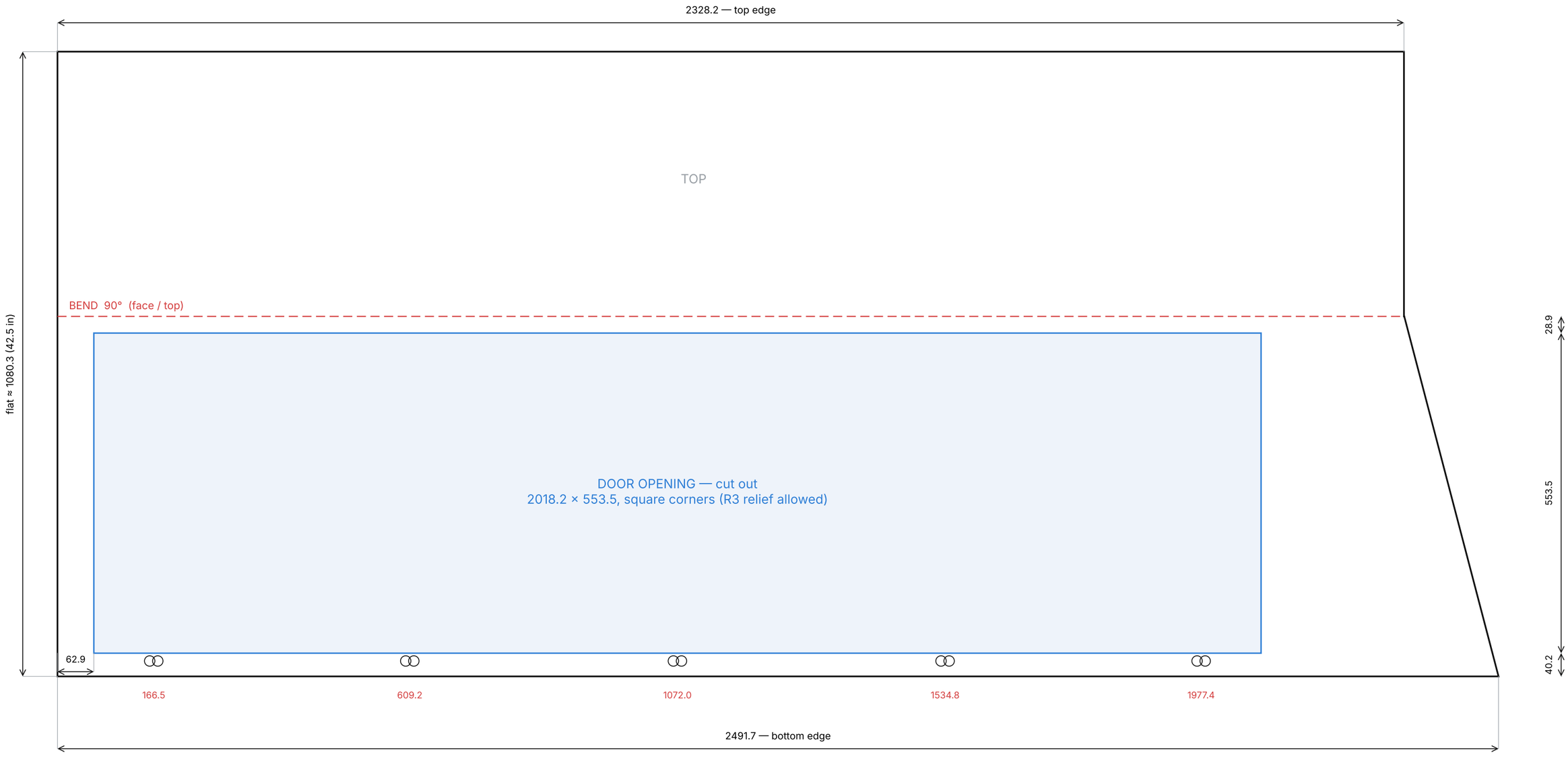

10 holes Ø5.4 for the hinge frame leaves (M5): pairs 14 apart, centred on the hinge positions in red (measured from the front edge), 26.65 above the bottom edge. Drawn oversize for clarity.

Formed legs, outside: face 624.7 · top 460. Front edge square; the face's rear edge runs on the fin angle; the top's rear edge is square.

OPENOVERLAND · EXPEDITION BOX V9 — DIAMOND PLATE

Sheet 4 — P2 top and outer face — flat, 0.100 tread, 1 bend, door opening cut flat

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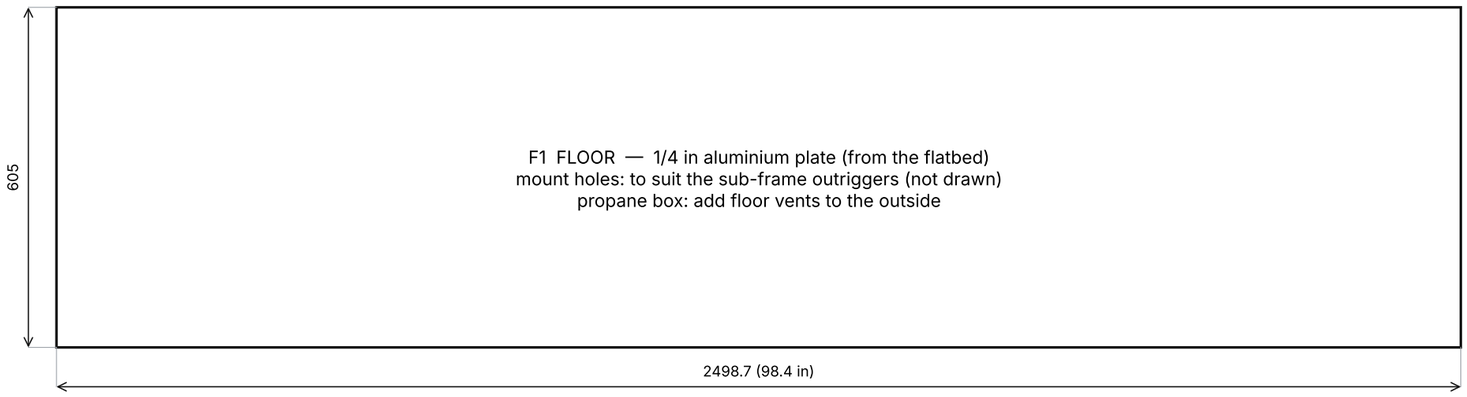
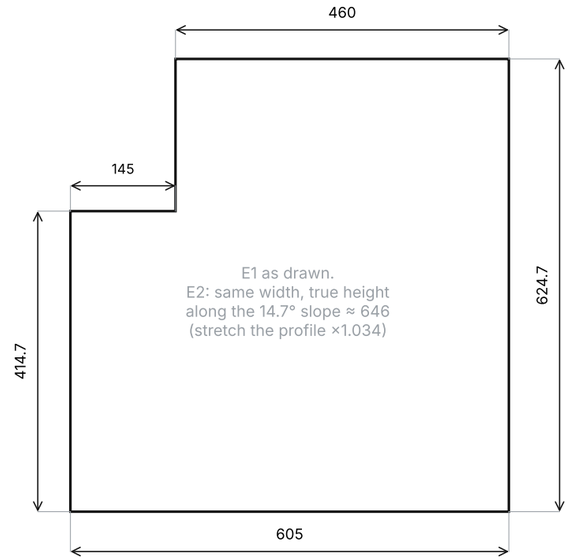


E1 FRONT and E2 REAR — 0.100 tread, flat



A1–A4 OPENING FRAME — 6061 angle 1-1/4 × 1 × 1/8 in, welded inside the face

A2 top	1	2024.6	full length; 1-1/4 leg square to the face, welded along the top of the opening; 1 in leg hangs down = seal lip
A3 front, A4 rear	1 + 1	553.5	vertical, between the top and bottom angles; same orientation (lip points into the opening)
A1 bottom	6	90.8 · 410.7 · 430.8 · 430.8 · 410.7 · 90.8	in line, with a 32 gap at each of the 5 hinges (gaps centred at 106.8, 549.5, 1012.3, 1475.1, 1917.7 from the front end of A2)
Position			the 1 in lip's front face is 31.75 behind the outer face of the box; the 1-1/4 legs line up with the edges of the opening
Lip			leave bare — no Line-X or powder coat: the push-on seal needs a clean 1/8 in edge

OPENOVERLAND · EXPEDITION BOX V9 — DIAMOND PLATE

Sheet 5 — F1 floor, E1 / E2 end plates, A1–A4 opening frame

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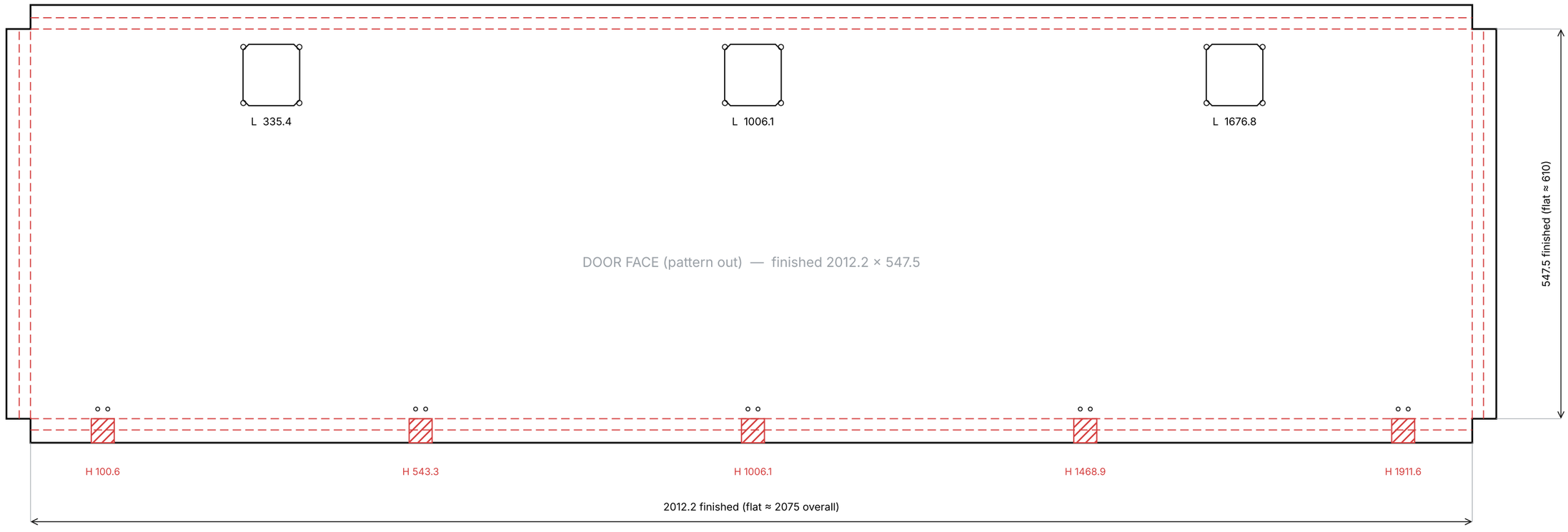


Edges: flange 20.1 deep (bend 1, 90° in), then a 20 return lip (bend 2, 90° in, parallel to the face). Return lips first, then flanges. Corners relieved, welded after folding.

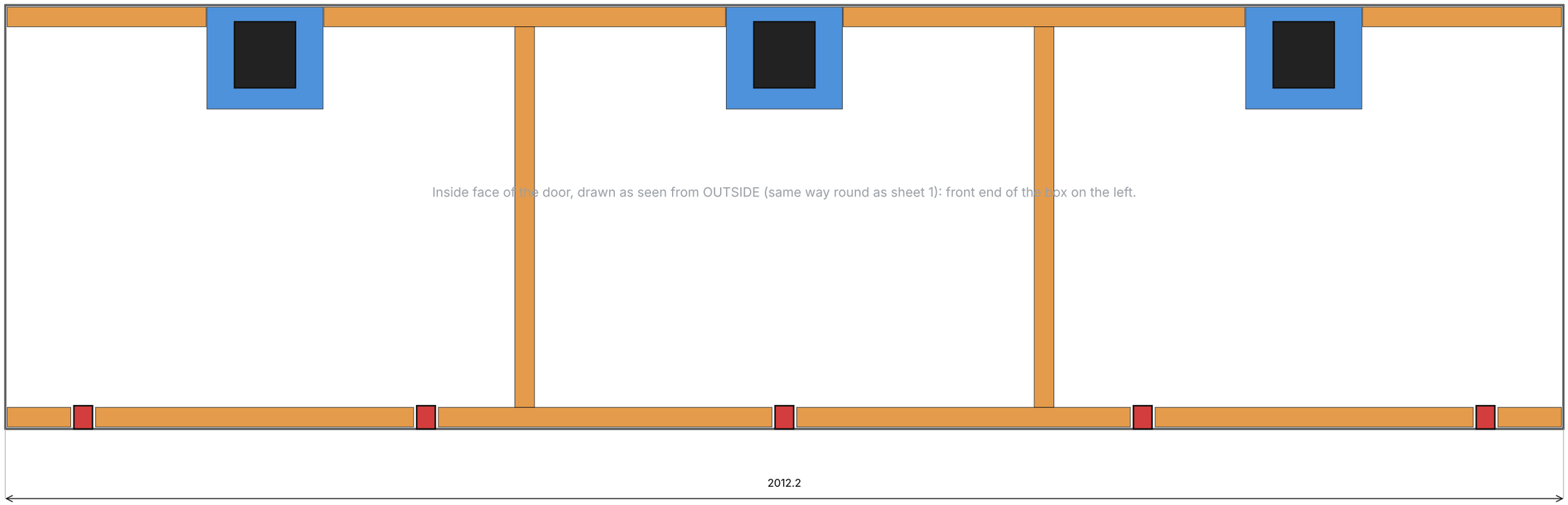
Latches (3 × Southco N2-2-301-01-20): cut-out 78.8 wide × 85.3 tall to the cup outline in Southco's STEP (check against Southco panel prep) + 4 × Ø7.2 on a 78 square; centres 64.1 below the top edge at 335.4, 1006.1, 1676.8 from the front edge. Shaft is 21.5 above the centre.

Hinges (5): notch the bottom flange and return lip 32 wide (hatched); 2 × Ø5.4 per hinge in the face, 14 apart, 13.5 above the bottom edge.

OPENOVERLAND · EXPEDITION BOX V9 — DIAMOND PLATE

Sheet 6 — D1 door pan — flat, 0.100 tread, 8 bends (4 flanges + 4 return lips)

mm unless marked · DRAFT 23 Nov 2026 — not strength-checked · sheet 6 of 8



D2 STIFFENERS — 6061 rect tube 1 × 1/2 × 1/8 in, flat against the inside of the skin (1 in wide face on the skin), stitch-welded:

top row, 4 pieces: 256.9 · 518.7 · 518.7 · 256.9 (gaps at the latches)

bottom row, 6 pieces: 82.1 · 410.7 · 430.8 · 430.8 · 410.7 · 82.1 (gaps at the hinges)

2 uprights 491.6, centred 670.7 and 1341.5 from the front edge of the door

D3 LATCH PLATES — 3/16 in smooth aluminium, 150 × 131.6, same cut-out and 4 holes as the skin; welded to the skin, the top flange and the tube ends (blue).

LATCHES (black) at 335.4, 1006.1, 1676.8. HINGES (red) at 100.6, 543.3, 1006.1, 1468.9, 1911.6 — all from the front edge of the door.

STAY CABLES: from the two top corners of the door to the top corners of the opening frame, about 1.66 m each, set so the door stops at 90°.

OPENOVERLAND · EXPEDITION BOX V9 — DIAMOND PLATE

Sheet 7 — door inside: D2 stiffeners, D3 latch plates, latch and hinge positions

Supplier cuts and bends (90° bends, inside radius 1t, bend deduction about 4.4 mm)

Ref	Piece	Stock	Flat blank (approx.)	Bends	Notes
F1	Floor	1/4 in plate	605 × 2498.7	—	Rear edge on the fin angle
P1	Inboard wall + ledge + upper wall	0.100 tread	763 (30.1 in) × 2492	2	Legs 414.6 / 147.5 / 210; rear end cut on the fin angle
P2	Top + outer face	0.100 tread	1080 (42.5 in) × 2492	1	Legs 460 / 624.7. Cut the opening 2018.2 × 553.5 FLAT, 65.4 from the front end, 40.2 up from the blank edge
E1	Front end plate	0.100 tread	605 × 624.7 less the 145 × 210 notch	—	Sits on the floor
E2	Rear end plate	0.100 tread	the same profile, on the 14.7° slope	—	
D1	Door pan	0.100 tread	about 2092 × 627	8	Outside 2012.2 × 547.5; flanges 20.1 deep, each with a 20 return lip facing in; weld the corners; 3 latch cut-outs (78.8 × 85.3 to Southco's STEP, 4 × Ø7.2 on a 78 square); notch the bottom flange and lip 32 at each hinge

Morena Welding makes (6061 stock) and assembles

Ref	Piece	Stock	Length	Qty	Notes
A1–A4	Opening frame	angle 1-1/4 × 1 × 1/8 in	2 × 2024.6, 2 × 553.5	4	1-1/4 leg square to the face, welded along the opening edge; 1 in leg is the lip. Notch the bottom one 32 mm at each hinge
D2	Door stiffeners	rect tube 1 × 1/2 × 1/8 in	2 × about 2007, 2 × about 492	4	Flat against the inside of the skin: top, bottom, uprights at 1/3 and 2/3. Cut round the latches and hinges
D3	Latch doublers	3/16 in smooth plate	150 × 131.6	3	Behind each latch, same cut-out; welded to skin, top flange and stiffener ends
—	Assembly				Tack on the floor, check square, weld the 3 long seams and the end plates, then the frame, then the door

Bought parts (one box)

Part	Supplier / part number	Qty	Notes
Lift & turn compression latch, stainless, key locking	Southco N2-2-301-01-20	3	Keyed alike CH751 as standard — ask for another code for real security
Pawl, deep offset, stainless, grip 28–43	Southco N2-21-101-24	3	Sold separately; grip here 34.3
Concealed 180° hinge, stainless	Southco R6-20-23	5	505 N max static radial each. 2 × M5 per leaf
M5 × 12 stainless screw, nylon shoulder washer, lock nut	McMaster / local	20 sets	Hinges. Isolate stainless from aluminium; do not weld the hinges
Seal, EPDM foam push-on, bulb on side, 1/8 in edge	McMaster 1120A221	25 ft	On the free edge of the frame lip; about 12 ft used per box
Seal corner, EPDM foam, bulb on side	McMaster 4784N11	4	The four inside corners of the lip
Stay cable, 316 wire rope, quick-release ends	to choose	2 × about 1.66 m	Carry the bench load at 90°; unclip to hang at 180°
Floor vents to outside	to choose	—	Required in the box that carries the propane tank