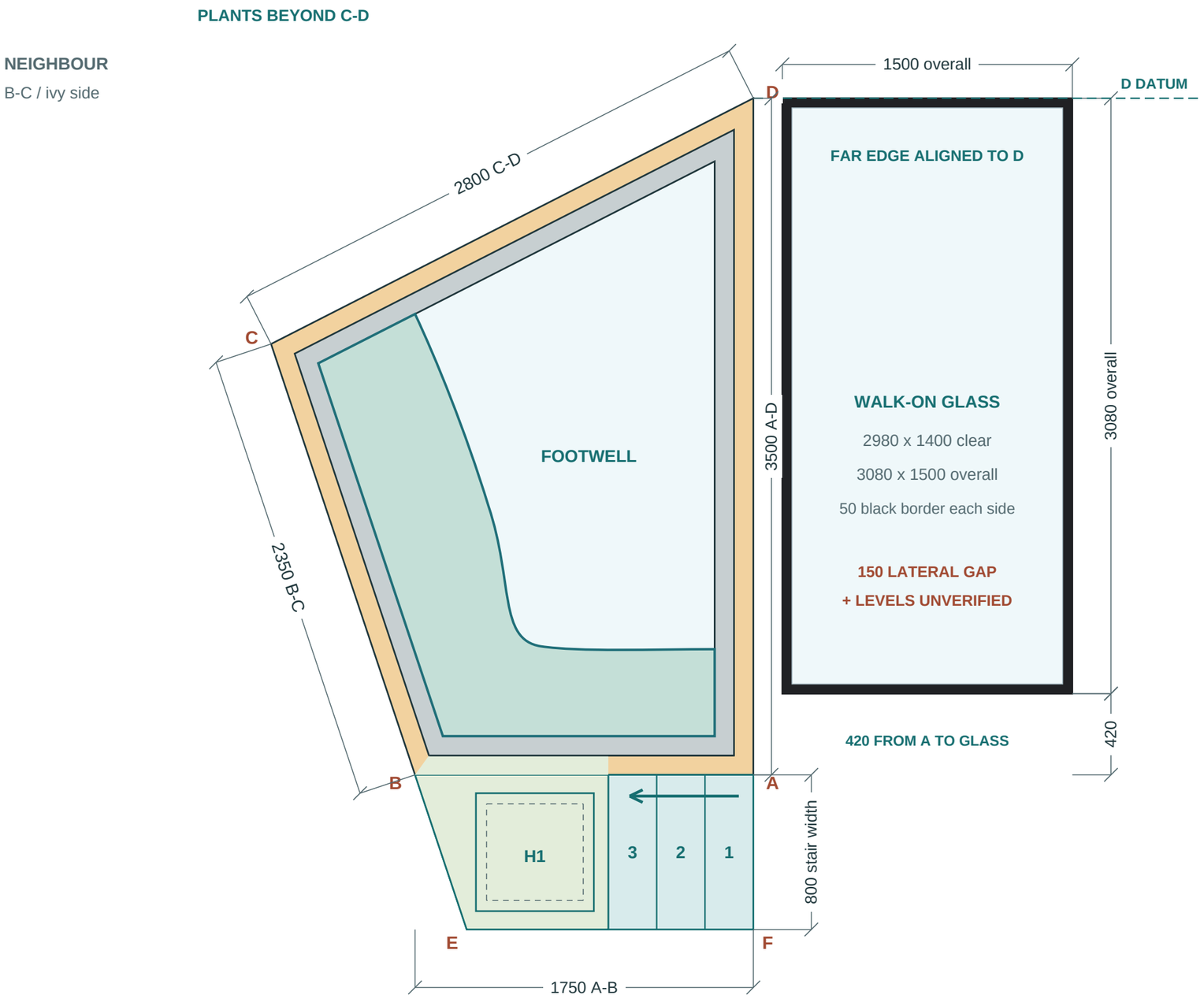
The shape stays. The support needs design.

Retained numerical geometry / Dimensions in mm / Plan 1:25 at A3 when printed at 100%.



Keep the accepted plan

The pool is not rectangular. A-B = 1750, B-C = 2350, C-D = 2800 and A-D = 3500. Corner A = 90 degrees remains an unsurveyed assumption.

Stairs + organic bench

Stairs rise right to left from A to B. Three 250 going zones; 800 width. The tapered landing continues the B-C line. The curved bench stays inside A-B / B-C.

Do not lose the insulation

100 wall insulation outside a nominal 100 RC wall. The local landing contact has no insulation behind it; the RC shell remains continuous. Below the tub is a distinct 100 insulation layer.

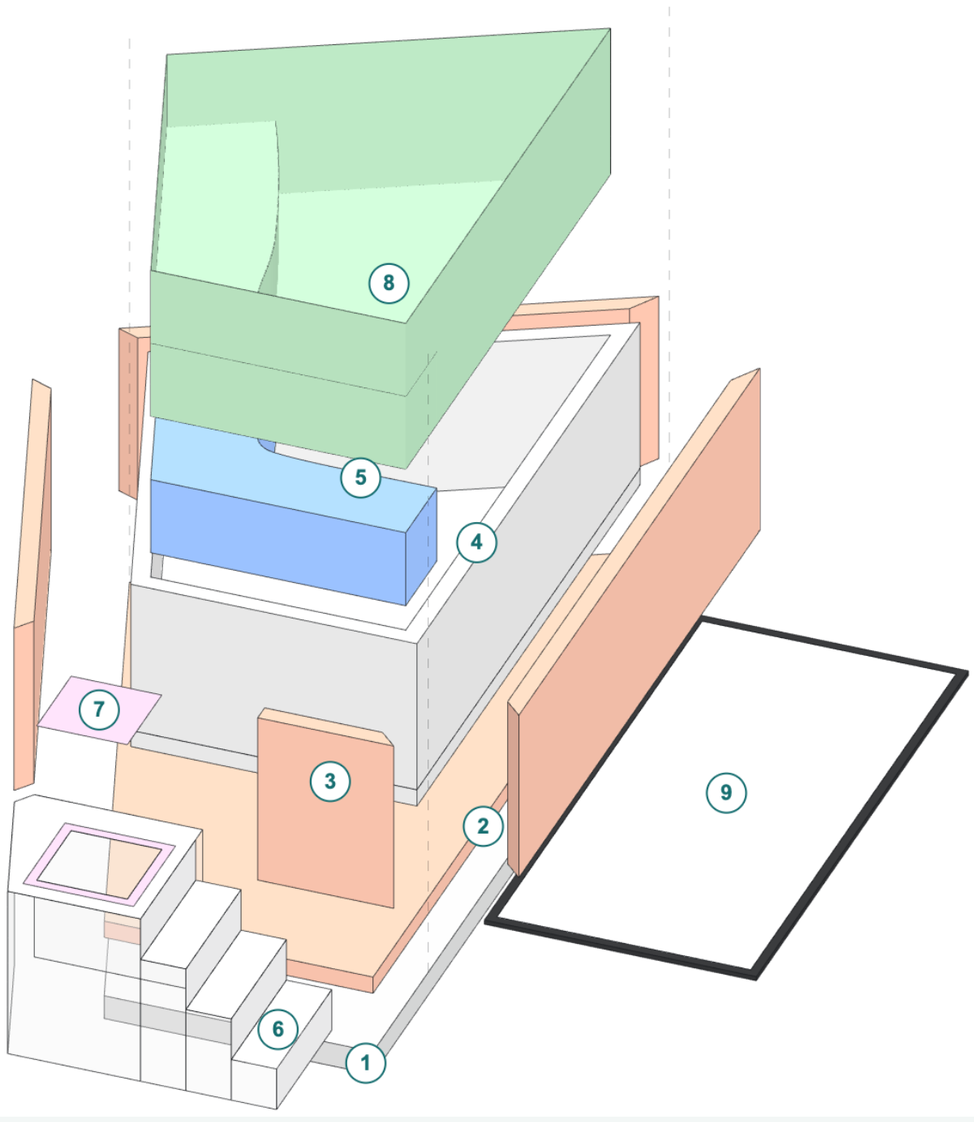
What the hatch means

H1 is a proposed 500 x 500 clear top opening with a 610 x 610 frame envelope. Product, watertightness, support and equipment-removal space are not approved.

GL1: supplier-confirmed glass sizes. D-end alignment is the user's placement instruction; 3500 - 3080 = 420 remains at the A end. The 150 lateral gap, levels and upstand are unverified. Black border is included glass, not an added metal frame.

See each layer. Do not mistake the gaps for joints.

Exploded illustration from the existing numerical model / Display gaps are not construction spacing or a pour sequence.



Interactive rotation and separation are on the website.

1 **Supporting concrete slab / ceiling**

Existing structure: thickness, span, reinforcement and support lines must be surveyed. The model's 140 depth is display-only.

2 **Under-tub insulation: 100**

Still present. A structural-grade bearing system or a designed bypass must be selected; ordinary roof insulation is not assumed suitable.

3 **Wall insulation: 100**

Around the shell, except the agreed landing contact. This is not the same layer as the underfloor insulation.

4 **Continuous concrete basin**

100 walls are the user's nominal concept, not a reinforced-concrete design. The displayed 100 base is also unconfirmed.

5 + 6 **Bench, stairs and landing**

Proposed envelopes, not solid fill or reinforcement specifications. Treads +250 / +500 / +750 and landing +1000 are a steep, unapproved height study.

7 + 8 + 9 **Hatch, finish system and independent glass**

Hatch seals/support are undecided. Mosaic/waterproofing is symbolic. GL1's far glass edge aligns with D; 420 remains at A. The lateral gap, levels and complete support assembly are unverified.

10 tonnes is a scenario - not a verified total.

The question is the complete load path: tub > bearing layer > slab > beams / walls > foundations.

10.0 t

User's assumed total mass

98.1 kN

10,000 kg x 9.81 / 1000

5.318 m2

Model RC-base footprint

18.45 kPa

Mean only; actual bearing unverified

The same 10 tonnes, different assumed contact areas

ASSUMED CONTACT	AREA	MEAN PRESSURE	WHAT IT DOES NOT PROVE
Outer envelope	6.316 m2	15.5 kPa	Not the actual bearing footprint.
RC base envelope	5.318 m2	18.4 kPa	Only if a continuous base distributes load there.
Illustrative supports	1.000 m2	98.1 kPa	No support size or arrangement is being proposed.
Smaller contact total	0.250 m2	392.4 kPa	Shows why local reactions can dominate.

A lower average is not a pass

Ten tonnes alone does not prove the insulation will crush. Local pressures, differential settlement, slab bending, punching and long-term creep are not represented by mass divided by area. No factor of safety or code combination has been applied.

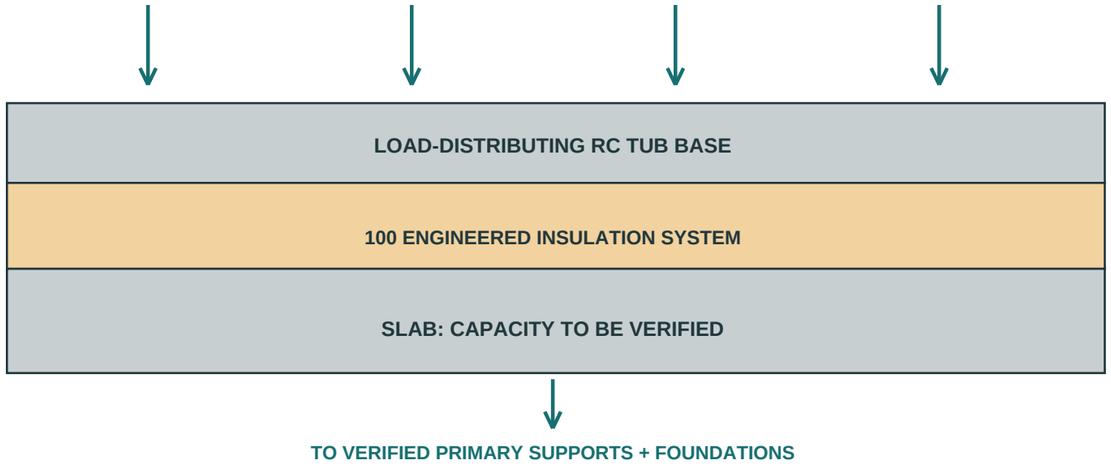
What must be counted

Water at the actual fill level; shell and base; benches; stair enclosure; finishes; equipment; bathers; planter concrete and saturated soil. During the pour, wet concrete, workers and temporary storage also matter.

Two support concepts to investigate. Neither is approved here.

Start with a structural engineer and the actual insulation manufacturer - not a generic foam strength label.

A / Continuous engineered bearing layer



Both diagrams omit the project-specific roof membrane / bedding / protection order.

Why consider it first

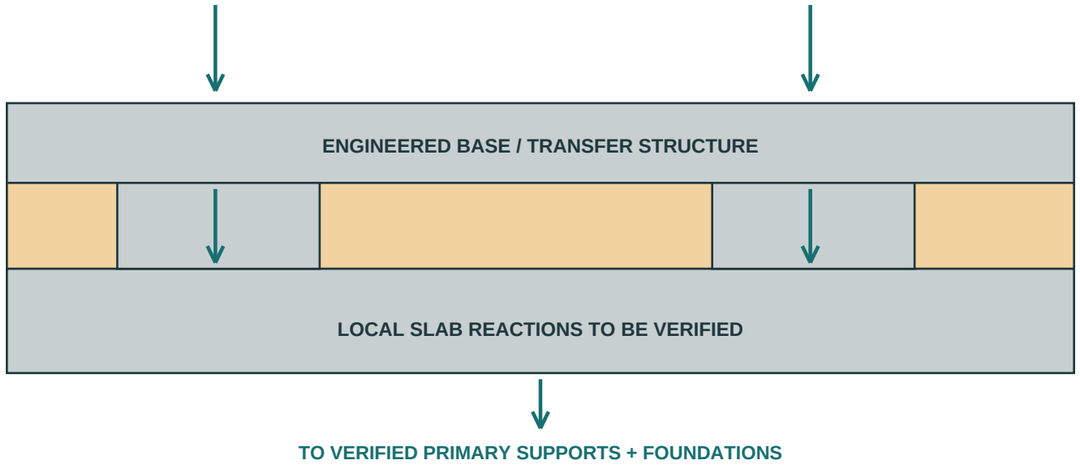
A continuous, suitable bearing insulation system may retain the thermal layer without point loads. Compare product-specific long-term design stresses, creep/deformation limits and installation build-up with the actual reactions.

Candidate families to evaluate

High-load XPS with declared long-term creep performance, or engineered cellular-glass slab systems. Grade, contact layers and environmental suitability must be selected as a complete assembly.

A short-term compressive value at 10% deformation is not an allowable sustained service pressure. Rigid tiled basins may require stricter settlement control than the product test limit.

B / Designed load bypass



Support locations and widths are symbols, not a design.

If insulation cannot carry the design load

A designed base can transfer load through dedicated supports or a structural transfer frame to verified structure below. Supports concentrate loads: the slab and its supports must be checked for those exact reactions.

What the bypass must solve

Thermal bridges, local concrete stress, differential movement and reliable roof waterproofing. Do not use improvised rods or simply drill through insulation and the roof membrane.

No post sizes, number of supports, anchors, rebar or connection detail are specified. If the existing slab cannot carry the load, either route needs structural strengthening or a lighter scheme.

The product grade matters. So does time.

Manufacturer examples for engineering evaluation - not products selected or approved for this roof.

Short-term compression and long-term creep are different declarations.

RAVATHERM XPS X 700 SL

700 kPa at 10% deformation

EN 826 short-duration declaration. On a 100 mm board, 10% corresponds to 10 mm - not an acceptable movement assumed for this basin.

Long-term: CC(2/1.5/50)250. The TDS lists 250 kPa with less than 2% total deformation after 50 years. 100 mm thickness is listed. [1]

FOAMGLAS S3 cellular glass

At least 900 kPa compressive strength

EN 826 Annex A. This is not the same test criterion as XPS at 10% deformation, so the headline numbers are not directly interchangeable.

Long-term: CC(1.5/1/50)350. 350 kPa, 1.5% total reduction / 1% creep at 50 years. 100 mm thickness is listed. [2]

Neither 250 nor 350 kPa is the project allowable pressure

The designer must apply the relevant design method and factors, then check full contact, local peaks, temperature/moisture, tolerances and absolute/differential movement. Two percent of a 100 mm board is 2 mm; that illustrates a limit, not predicted project settlement.

Confirm the actual product supplied in Belgium, its current declaration and the complete roof build-up in writing. Insulation adequacy does not establish the capacity of the concrete ceiling below. [1,2,4]

There is a cast-in-place roof precedent

FOAMGLAS roof system 4.5.1 shows: concrete roof deck > bonded cellular glass > waterproofing > separating/slip layer > in-situ concrete slab. It specifically leaves allowable loads, slab dimensions and joints to the engineer. [3]

This is a useful discussion starting point, not a detail to copy onto this hot tub. Protect insulation and membranes during the pour. Any added protection or spreader concrete also adds weight and changes levels.

Design the pour before ordering the concrete.

Cast-in-place concept sequence / Engineer, concrete contractor, roof-waterproofing installer and spa installer to coordinate.

01 Survey + load path

Confirm slab thickness, span, reinforcement, supporting beams/walls, material condition and existing roof layers. Check the final full tub and every construction stage.

HOLD: structural design accepted before site loading.

02 Bearing + waterproofing detail

Choose Route A or B. Coordinate the 100 insulation layer, level bearing, roof membrane protection, drainage and any designed penetrations. Do not bridge an unknown void.

HOLD: support, insulation and waterproofing junction details accepted.

03 Formwork + reinforcement + services

Install the designed temporary works, reinforcement, cover control and cast-in sleeves. Detail the wall/base sequence, water-retaining joints and penetrations. Keep hatch and equipment access clear.

HOLD: inspect bearing, formwork, reinforcement, joints and services before pour.

04 Controlled concrete placement

Follow the approved placement sequence, delivery rate and consolidation method. Avoid unplanned heaps of wet concrete, pallets or pump-line reactions on the roof. Protect insulation and the membrane.

HOLD: no changes to pour sequence or temporary loading without review.

05 Cure + verify the shell

Use the specified curing regime and formwork-removal criteria. Inspect cracks, joints, surface quality and dimensions before repairs or waterproofing. Do not assume tile adhesive repairs structural cracks.

HOLD: concrete/substrate and remedial work accepted.

06 Waterproof + finish + commission

Apply a compatible system around bench, joints and penetrations, with mosaic and adhesive suited to the actual heated water chemistry. Agree the leak-test and staged-fill procedure; commission drainage and equipment.

HOLD: approve readiness before full filling and occupation.

Fresh concrete has weight but cannot yet act as the finished spanning or load-distributing base. A bypass scheme still needs approved temporary formwork/supports during the pour; ordinary insulation infill is not automatically adequate temporary support. [5,7]

Review worksheet - make the missing decisions explicit.

Fillable PDF fields for your coordination notes / Completing a field does not certify safety or approval.

No construction or full filling until the required design decisions are resolved.

- ☐ **Supporting structure checked**
  Slab survey, final loads, pour-stage loads, load path and deflection limits.
- ☐ **Bearing system chosen**
  Exact product, long-term design stress, settlement/creep limit and installation layers.
- ☐ **Roof + tub waterproofing coordinated**
  Drainage, membrane protection, joints, service penetrations and thermal bridges.
- ☐ **Concrete shell designed**
  Base/wall thickness, reinforcement, water-retaining joint and crack-control design.
- ☐ **Stair / landing / hatch design resolved**
  Safe rises and treads, support, top access, equipment removal and watertight hatch.
- ☐ **Glazing interfaces resolved**
  Final opening/upstand dimensions, fall, finished levels and waterproof junction.

Coordination notes / next decisions

Save a copy after entering notes.

PDF viewers differ in form support. The model controls and load scenario explorer belong to the website; this PDF has links, bookmarks and a fillable worksheet, not embedded interactive 3D.

Source-led decisions, not a construction specification.

Primary references checked for this study / Linked titles open the original manufacturer or authority source.

How the evidence is used

The four pool sides, stairs, bench and insulation arrangement are retained from the project model. A right angle at A is still assumed. Glass sizes are confirmed by supplier correspondence; D alignment is the user's placement instruction. The lateral gap, levels and support assembly remain unverified.

Glass sources are not a support detail

The Walk-on frameless attachment is a generic AGC performance simulation, not a custom dimension drawing. The upstand example is for 1000 x 1000 glass. Neither confirms this opening: ordered upstand 2989 x 1410 differs from earlier 2990 x 1410 advice; the example's +20 opening rule is not adopted.

Research is not product selection

The references explain what to check: sustained stress, creep, structural slab design and installation sequence. They do not certify that an insulation grade or the existing roof is suitable for this hot tub.

The critical distinction

10 tonnes is the user's hypothesis. The calculations are transparent examples using 9.81 m/s2, not a verified material take-off, load combination or structural calculation.

Current construction placeholders

Nominal wall = 100; displayed base = 100; displayed supporting slab = 140. The 100 under-tub insulation is real design intent, but its grade and load-bearing suitability remain unresolved. Do not order structural work from these sizes.

Interactive companion: https://hottub.aa.ag

01 / Ravago / XPS X 700 SL technical data

UK TDS, version 2, 20 May 2022. Separates the 10% compression declaration from long-term creep. Confirm the current locally supplied grade.

02 / FOAMGLAS / S3 product data

International PDS, 8 May 2025. High-load roof uses, EN 826 Annex A strength and EN 1606 creep. Material data, not installed design resistance.

03 / FOAMGLAS / Roof system 4.5.1

1 March 2021. Bonded insulation, roof waterproofing, slip layer and in-situ slab. Engineer to check loads and slab/joint design.

04 / Buildwise / Loaded roof insulation

Belgian technical article 2023/5.7. Distributed/point loads and short-/long-term deformation for loaded roofs. Not a hot-tub approval.

05 / HSE / Temporary works

Planned temporary support and temporary use of permanent structures. Technical safety guidance, not a statement of Belgian law.

06 / European Commission JRC / Eurocode 2

Concrete resistance, serviceability, durability and liquid-retaining rules. Designer must use applicable current standards and Belgian National Annexes.

07 / Sika / Watertight concrete guidance

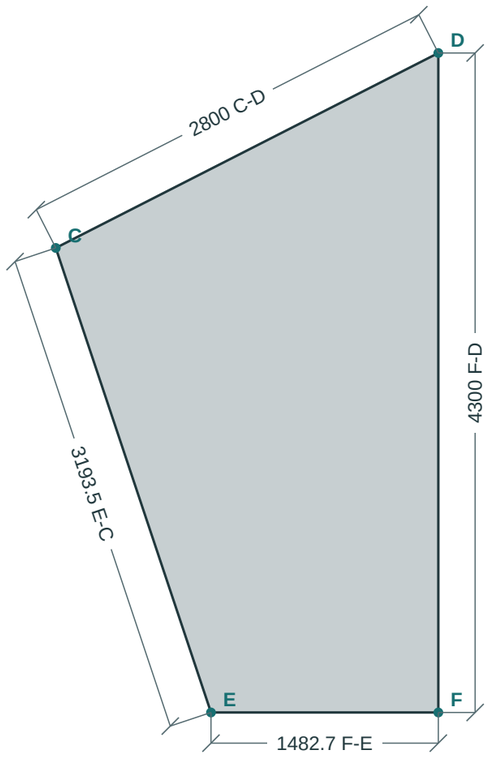
Pour planning, formwork, consolidation, curing, joints and penetrations. An admixture alone does not resolve the complete water-retaining system.

Parts 1-3 / Supporting slab and insulation

Dimensioned model envelopes / Three plans at 1:40 on A3 / All dimensions in mm; computed values rounded to 0.1.

SUPPLIED = stated input / DERIVED = from model coordinates / PROVISIONAL = unapproved geometry / UNKNOWN = not designed

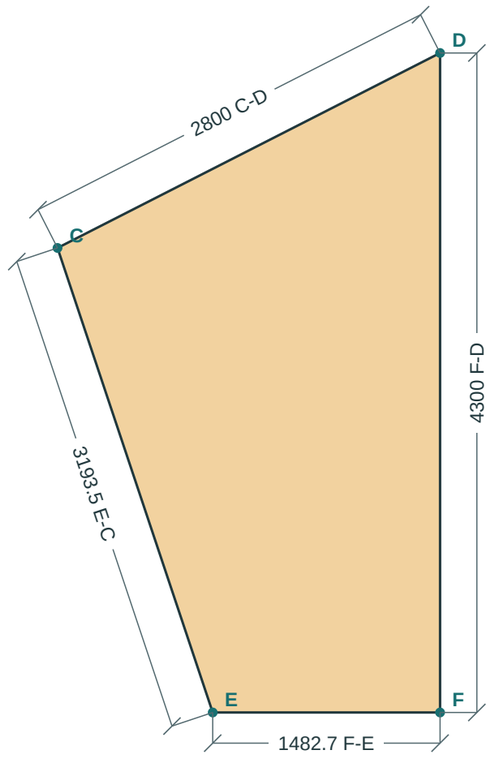
1 / Supporting slab



Displayed thickness	**140**
Displayed bottom / top	**-240 / -100**
Combined footprint area	**7.609 m2**

PROVISIONAL: this is a display slab envelope, not an as-built survey. Actual slab thickness, edge positions, reinforcement and structural supports are UNKNOWN.

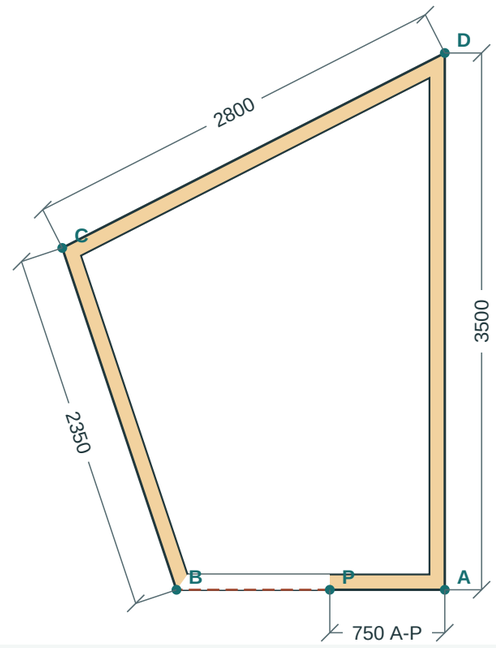
2 / Bottom insulation



Insulation thickness	**100**
Displayed bottom / top	**-100 / 0**
Combined footprint area	**7.609 m2**

SUPPLIED thickness; DERIVED footprint. Continuity beneath the stair enclosure is PROVISIONAL. Product grade, bedding and load-bearing design are UNKNOWN.

3 / Wall insulation



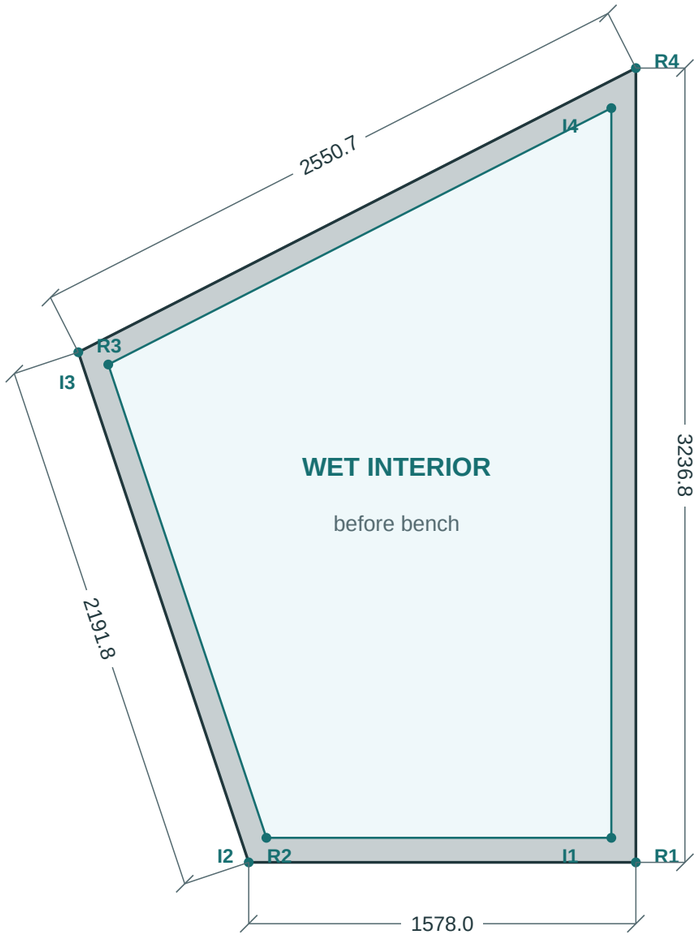
Normal thickness / study height	**100 / 1000**
A-P outer / inner edge	**750 / 650**
B-C outer / inner edge	**2350 / 2191.8**
C-D outer / inner edge	**2800 / 2550.7**
D-A outer / inner edge	**3500 / 3236.8**
P-B omitted contact length	**1000**

100 thickness is SUPPLIED. Height is PROVISIONAL. No wall-insulation panel behind P-B; concrete shell remains.

Part 4 / Continuous concrete basin

Plan at 1:25 on A3 / Vertical section study at 1:20 / No reinforcement, joints or structural thickness is approved.

SUPPLIED = stated input / DERIVED = from model coordinates / PROVISIONAL = unapproved geometry / UNKNOWN = not designed



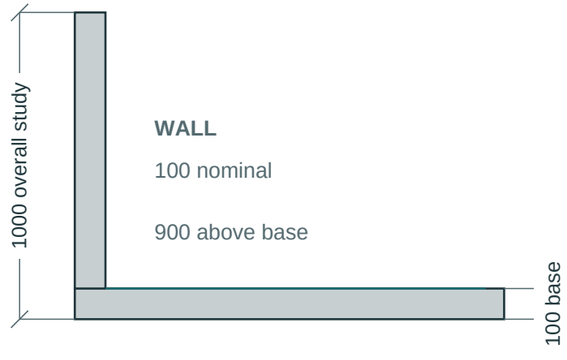
R = outside RC face; I = inside RC face.

Both contours use true 100 mm perpendicular wall offsets. Do not subtract 200 from every side length of this irregular plan.

PLAN LENGTHS / DERIVED

Edge 1: R1-R2 / I1-I2	**1578.0 / 1406.0**
Edge 2: R2-R3 / I2-I3	**2191.8 / 2033.7**
Edge 3: R3-R4 / I3-I4	**2550.7 / 2301.4**
Edge 4: R4-R1 / I4-I1	**3236.8 / 2973.6**

Outside RC base plan area	**5.318 m2**
Inside outline area	**4.405 m2**



LEVEL DATUM

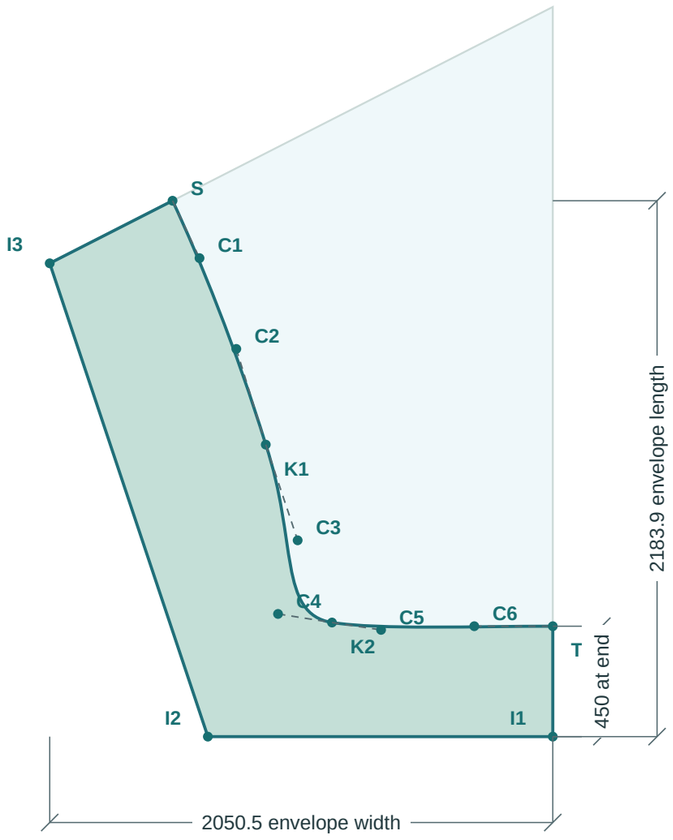
Base underside: 0
Base top: +100
Rim: +1000

All vertical sizes shown are PROVISIONAL. RC mix, reinforcement, crack-control and pour joints are UNKNOWN.

Part 5 / Organic bench / curve coordinates

Plan at 1:25 on A3 / Coordinates from A: +x towards B, +y towards D / Shape is PROVISIONAL.

SUPPLIED = stated input / DERIVED = from model coordinates / PROVISIONAL = unapproved geometry / UNKNOWN = not designed



CUBIC BEZIER SEGMENTS / x, y IN mm

Segment	Start	Control 1	Control 2	End
1	1750, 2383.9	1640, 2150	1490, 1780	1370, 1390
2	1370, 1390	1240, 1000	1320, 700	1100, 665
3	1100, 665	900, 635	520, 650	200, 650

Seat top level / model datum	**+550**
Basin base top	**+100**
Seat height above base	**450**
Seat construction / core	**UNKNOWN**

Straight rear boundary follows I1 > I2 > I3 > S. Curves continue S > K1 > K2 > T; close T > I1. C points are control handles, not points on the finished edge. No constant radius is implied.

Envelope dimensions are not a uniform seating depth.

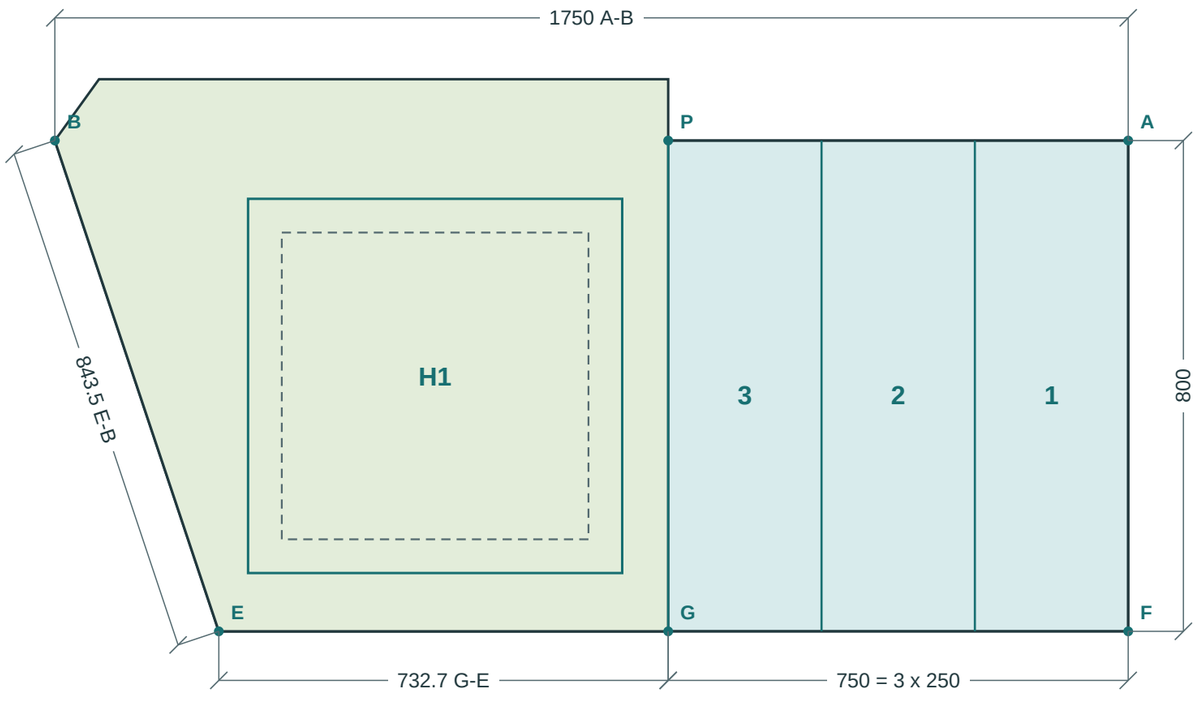
Parts 6-7 / Stairs, tapered landing and top hatch

Plan, profile and hatch detail at 1:10 on A3 / Dimensions in mm / Envelope only; structural build-up is UNKNOWN.

SUPPLIED = stated input / DERIVED = from model coordinates / PROVISIONAL = unapproved geometry / UNKNOWN = not designed

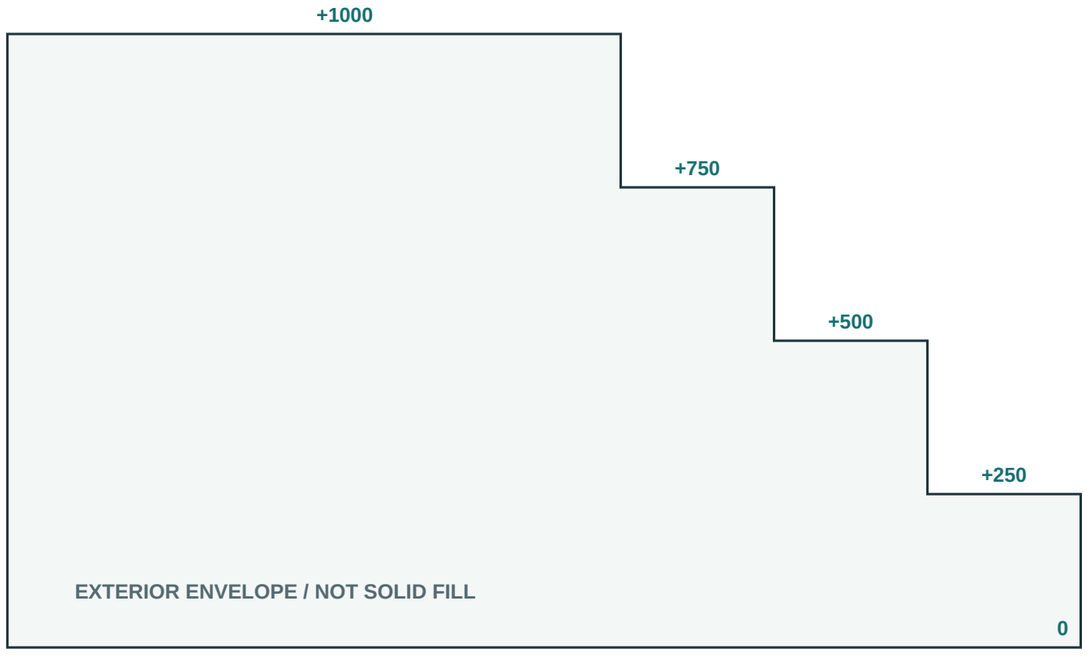
PLAN

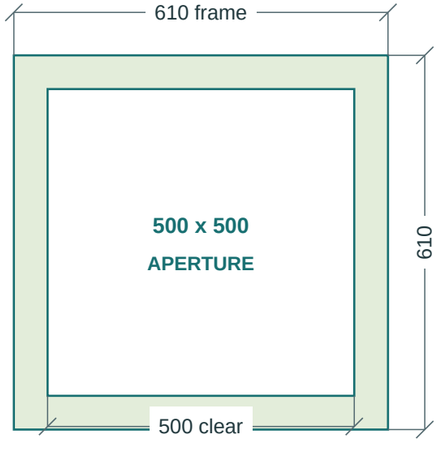
The landing is 1000 along P-B and 732.7 at G-E. The E-B edge continues B-C. Its local inward connection reaches y = +100; the 800 stair width is unchanged.



H1 centre from A: (1130, -400). Frame margins: 75 to step 3;
95 to F-E / A-B; 75.3 normal to E-B. Plan gaps are not bearing approvals.

PROFILE / RIGHT TO LEFT





4 x 250 rise = 1000.
Steep, unapproved study.

HATCH / PROVISIONAL
610 x 610 frame
500 x 500 opening
55 frame band each side

Cover thickness, actual overlap, seals, hinges, supports and equipment-removal clearance: UNKNOWN.

Parts 8-9 / Finish zone and walk-on glazing

Finish plan 1:30; glass plan 1:20 on A3 / Finish is symbolic. Glass sizes are supplied; position follows the user's D datum.

Plan | Exploded model | Load scenario | Support choices | Material evidence | Pour sequence | Review worksheet | Sources | **Part dimensions** | 9 | 10 | 11 | 12 | **13**

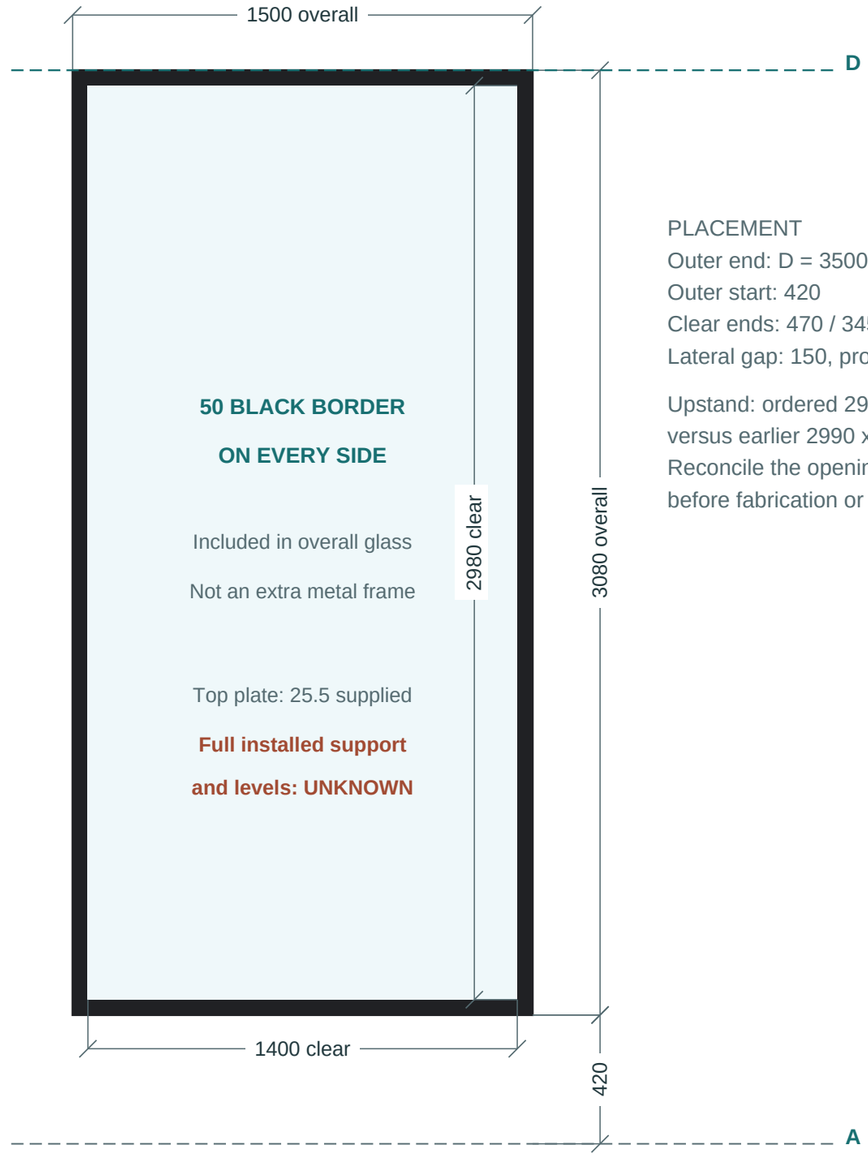
SUPPLIED = stated input / DERIVED = from model coordinates / PROVISIONAL = unapproved geometry / UNKNOWN = not designed

8 / FINISH ZONE

Inside outline area before bench	**4.405 m2**
Wall finish study span	**+100 to +1000**
Bench front study span	**+100 to +550**
Mosaic / adhesive / waterproofing thickness	**UNKNOWN**
Tile module, joints, movement details	**UNKNOWN**

The displayed 2 mm separation is a graphics offset only, NOT a finish build-up. Finish follows the same organic bench. Net finish quantities require the final system and openings.

9 / GL1



PLACEMENT
Outer end: D = 3500
Outer start: 420
Clear ends: 470 / 3450
Lateral gap: 150, provisional

Upstand: ordered 2989 x 1410 versus earlier 2990 x 1410. Reconcile the opening and slope before fabrication or installation.