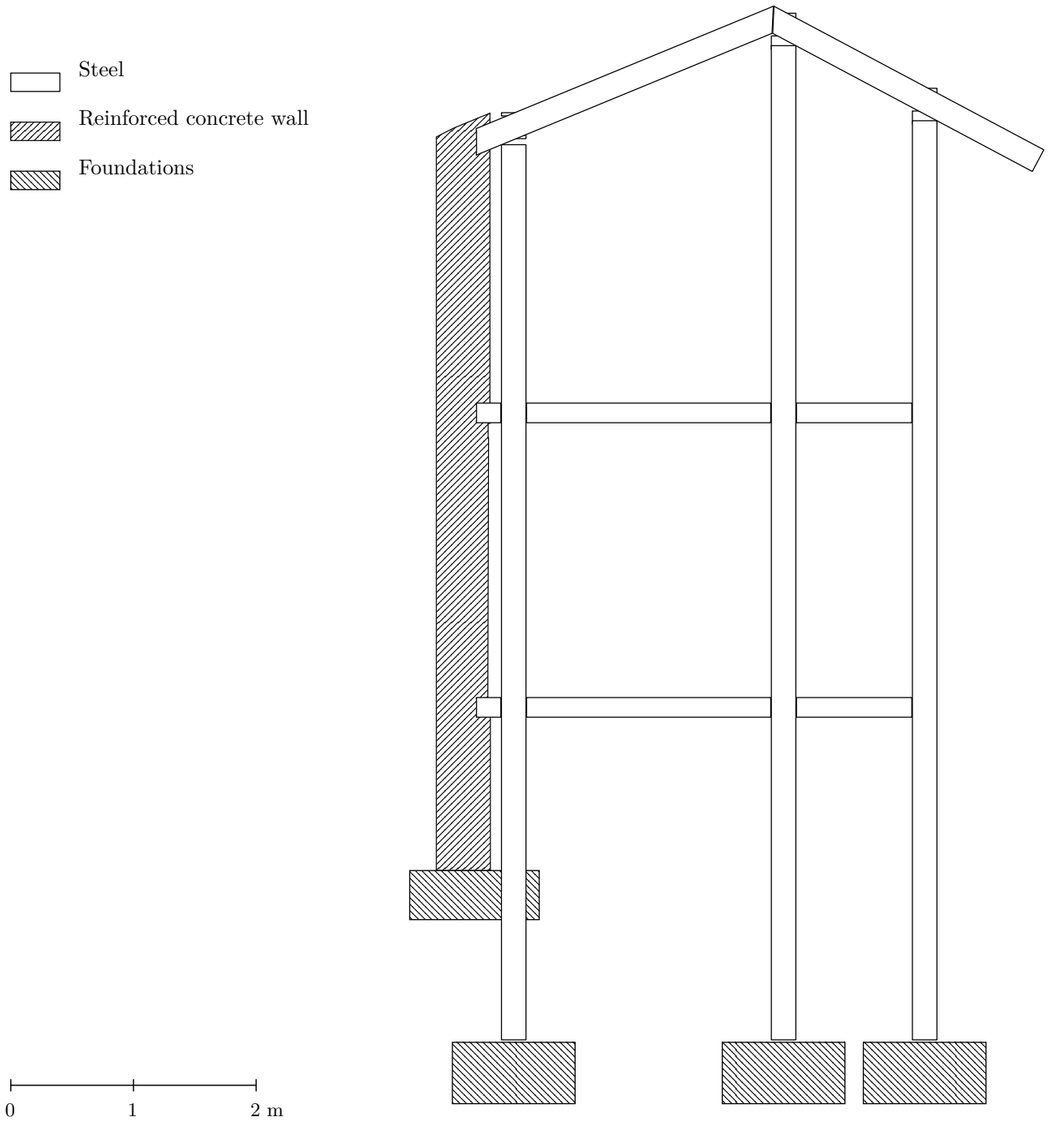
An internal frame for the historic stone wing

The proposed frame runs from the foundations to the roof on the tall elevation facing the garden and stream.

Garden elevation

Orthographic projection of the frame from the 3D model. Scale 1:50.



Three levels within the existing stone walls

The frame sits inside the existing masonry. Three columns along the garden elevation support the floor beams and the new steel roof. The lower brick wing and its existing floor are retained.

How the loads reach the foundations

The beams transfer loads to the front columns and the internal supports. The study includes a new reinforced concrete wall where openings have weakened the existing masonry, three pad footings and one strip footing.

Checks still required

The column positions are provisional. The structural engineer must assess the masonry and ground, check the supports above the voids below and design the connections between materials. Stability during construction also requires verification.

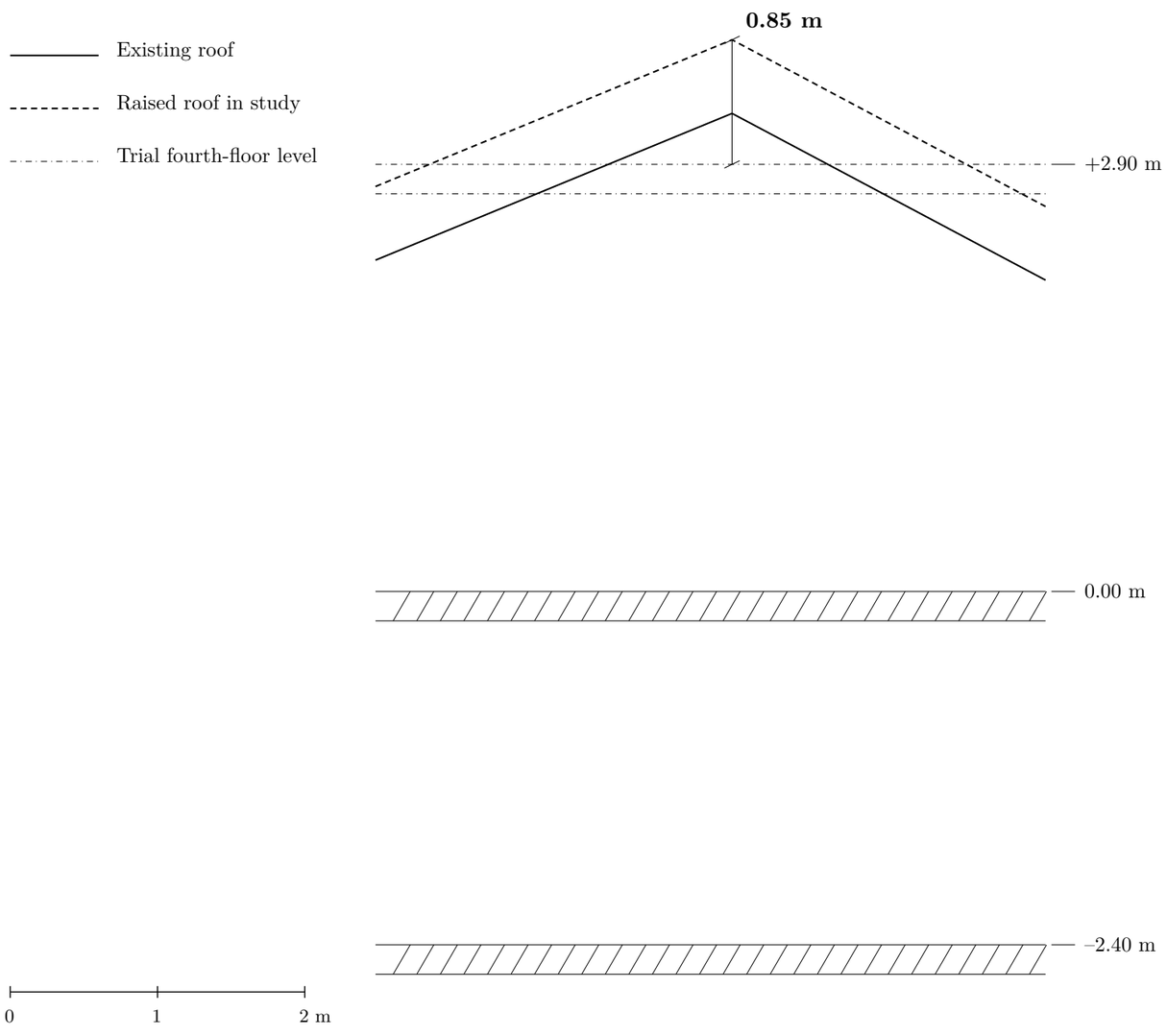
Reading the elevation. Members at different depths overlap in this view. The dimensions and footings shown form part of the preliminary study.

Could a 0.50 m roof rise accommodate a fourth level?

An earlier study tested a vertical rise over the tall wing alone. The current scheme retains three levels and the modelled floor and roof elevations.

Cross-section

Scale 1:40. All levels are relative to the common-room floor at 0.00 m.



Keeping the common-room floor

Allowing 2.70 m of clear height in the common room and 0.20 m for the new floor puts the fourth-floor surface at +2.90 m. Even with the roof raised, headroom below the ridge is 0.85 m in this section. The maximum anywhere over the floor area is 0.87 m.

Redistributing all the floors

Three levels at 2.70 m, a top level averaging 2.30 m and three floor assemblies at 0.20 m require 11.00 m in total. From the lower-level datum to the mean of the highest and lowest points under the raised roof, only 8.39 m is available. The shortfall is 2.61 m.

Outcome of the study

The fourth level would have insufficient headroom. The design proceeds on three levels. Clear heights in individual rooms depend on the beams, floor build-ups and intended use.

Next stages. The structural engineer must sign the structural and seismic calculation report. Building approvals and a cost estimate for the works are still outstanding.