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Newlyn Ice Works – Initial Structural Condition Report

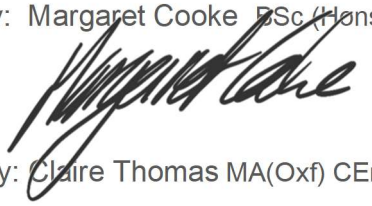
Job number – 1214

Revision

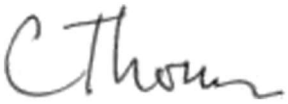
Date	Revision	Comments
14 March 2022	/	First issue
15 February 2024	A	Update following site visit 2/2/2024

Quality Assurance Review

Prepared by: Margaret Cooke BSc (Hons) CEng MIStructE Conservation Accredited Engineer



Reviewed by: Claire Thomas MA(Oxf) CEng MIStructE

Signature 

Date: 14 March 2022

Contents

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1.0 Introduction

Integral were asked by the Newlyn Fish Trust to visit the Grade II listed former Ice Works building in Newlyn and report on its current structural condition.

2.0 Our Brief

The Newlyn Ice Works lie to the west of The Strand in Newlyn opposite the fish markets, TR18 5HW.

Integral were asked by the Newlyn Fish Trust to report on the current structural condition of the building. The report is to be incorporated into a Project Viability Assessment for the Architectural Heritage Fund. Our brief does not extend to commenting on the viability of the proposed uses of the building.

This was a visual inspection only. We have not inspected timber or other parts of the structure which are covered, unexposed or inaccessible and we are therefore unable to report that any such part of the property is free from defect.

3.0 Inspection/investigations

The inspection was carried out by Margaret Cooke, Conservation Accredited structural engineer, on 23 February 2022. The inspection was visual only and time on site was limited. We were unable to access every area of the building (see plans in appendix A).

4.0 Description of buildings

4.1 The Ice Works buildings consist of two distinct halves. The northern half is the original thick walled granite building with timber floors supported on steel or wrought iron beams and a double pitched timber truss roof with timber purlins and rafters. The southern half is a later, thinner-walled, brick building with a steel framework within the brick walls supporting timber rafters and joists at roof level and either timber joists or concrete filler joists at first floor level.

View of Ice Works building from the south

4.2 The original (northern) half of the building is in local granite and at the base incorporates the original quay wall of Gwavas Quay. This building appears on historic maps by 1878 and is thought to have originally been an iron foundry. The foundry had an arched roof, shown in historic photographs. The building was extended upwards in granite to form a first floor level and opened as an Ice Works in 1907. It is possible that the walls of the original building were made thicker at this time to provide the high degree of thermal stability needed to produce ice at scale, though this has not been confirmed. The current building has a pair of pitched roofs with the ridges and valley gutter running east/west. The roof is timber trusses supporting timber purlins and rafters and is thought to have been replaced in the 1970s.

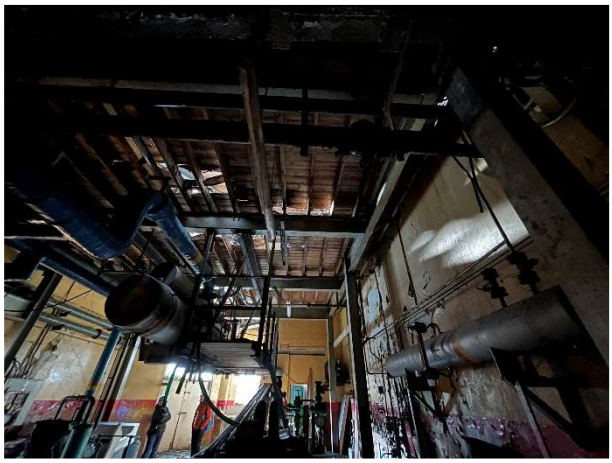
This part of the building was used for ice production, with the roof containing a water tank which filled approximately 1.2m high containers on the 2nd floor which were frozen to create ice blocks. These blocks were released at the 2nd floor level and put through a crusher which sent the ice to a room (not seen during this visit) at 1st floor level. From here the crushed ice was shovelled through a shoot into the ground floor room at the east of the building from where it was taken to the boats. It is assumed that the load capacity of the 1st and 2nd floors must have been high as the load of water and ice would have been considerable.

Second floor level showing roof structure

North east corner of Ice Works

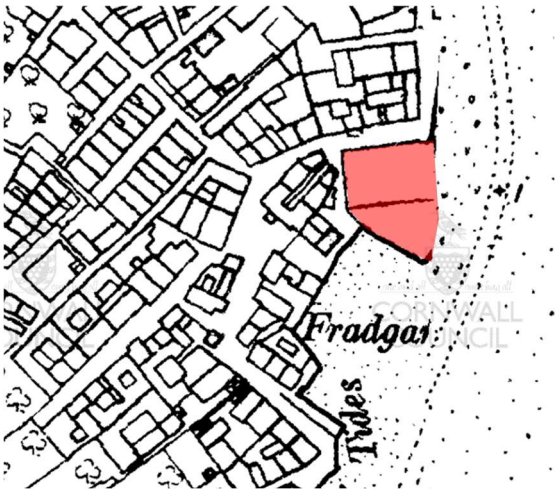
4.3 The brick extensions to the south are thought to date from 1907. The building was adapted further in the 1970s (when ownership changed) and late 1980s (when flake ice machinery was installed). The ground floor of this building houses the machinery used to drive the equipment in the northern building.

First floor level showing roof structure

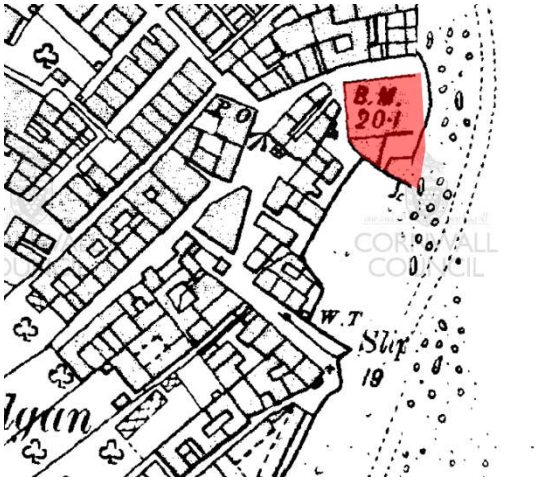


Ground floor level showing first floor structure

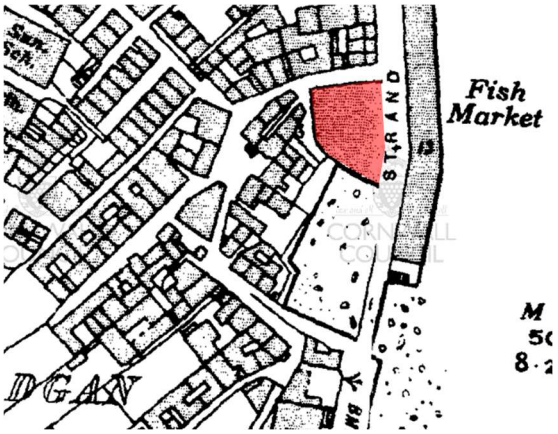
4.4 The inlet to the south was tidal until the early 1980s when it was backfilled to create the pocket park seen today. The works closed in 2006 and the building is yet to find a new use.



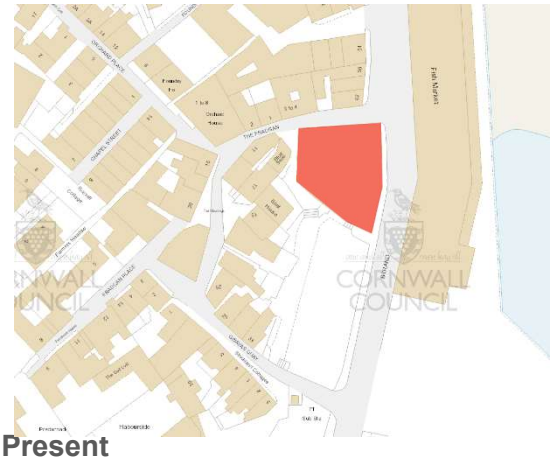
1876



1906



1930s



Present

4.5 The bedrock geology in this area is shown on the British Geological Survey maps as the Mylor Slate Formation - Hornfelsed slate and Hornfelsed siltstone - which is a metamorphic bedrock formed between 382.7 and 358.9 million years ago during the Devonian period. The superficial deposits are not recorded on the BGS map, but it is reasonable to assume that they would be very thin or non-existent as the site lies outside the area of coastal beach deposit (sands and gravels). There are no signs of foundation movement in the building, indicating that it is well founded, probably directly on the underlying bedrock.

5.0 Detailed description and assessment

5.1 A set of rough sketches showing the approximate structural disposition of the building is attached in appendix A. These are based on observations during the short site visit, photographs and the Ordnance Survey map dimensions and will need to be substituted by a proper measured survey in due course. Note that the structure shown is building structure only – there are many other structures in the building carrying industrial equipment.

The condition of each floor of the building is noted on the sketches but broadly:

5.2 **Northern Building**

The roof structures appear generally to be in good condition and we are told that it was rebuilt in the 1970s.

The west end of the second floor structure was not seen during this site visit. While it would have been designed to carry substantial loads, as this level was one of the main production areas for the ice, it was also a very wet environment and it would be reasonable to assume that the second floor could be in rather poor condition.

The east end of the second floor is concrete overlying downstand steel or wrought iron beams. The condition of the floor is not clear: the steelwork has some corrosion but a more intrusive investigation would be necessary to establish whether there is sufficient residual strength in the steel to be acceptable for a new use. However there is no indication that the floor is in real structural distress at present. There is a small cantilevered extension to the southeast corner of the building which should be assumed to be unstable until proven otherwise.

The west end of the first floor is in rather poor condition. It is extremely wet, potentially as a result of the enormous amount of water which remains in the building even though its industrial use ceased over a decade ago. The steel beams which support the timber floor appear to be heavily corroded. The residual section may prove sufficient to support a new use, however this will need to be carefully assessed at the next stage. One column in the space is very heavily corroded and this

may be indicative of corrosion elsewhere. The timber joists are heavily water damaged, though again they may have sufficient residual strength to be reused.

The east end of the first floor appears to be in better condition. Again the structure is steel or wrought iron beams supporting timber joists but the use in this space appears to have been much drier so the steelwork and the joists are not heavily corroded and water stained as they are elsewhere.

The ground floor throughout appears to be a concrete ground bearing slab.

5.3 Southern Building

The roof structure generally appears to be in reasonable condition and is believed to have been renewed, possibly in the late 1980s. There are local holes in the flat roof which have allowed water in. The sloping roof to the southern building shows signs of water damage and would need to be very carefully checked if it is to be kept.

The first floor has some very obvious holes where water has come in through the flat roof. The main steel frame supporting the floor, however, appears to be in good condition so renewal of floor joists locally is all that would be required. Elsewhere the older parts of the first floor appear to be concrete filler joist or concrete spanning between downstand steels. Generally these areas are in much worse condition and their structural integrity would need to be carefully checked at the next stage.

The ground floor houses machinery and appears to be a concrete ground bearing slab in working order. There are manhole covers but none of these were lifted so the condition of the below ground drainage is not known, though there are no signs of structural issues resulting from failure of below ground drainage.

6.0 Discussion

6.1 Generally the external masonry walls of the building appear to be in good condition. There are no signs of foundation movement and the roof structures appear sound, which means that the walls are laterally supported at high level.

6.2 The floor structures are far more prone to issues than the walls and generally these issues appear to be the result of water ingress. Generally also the marine environment can be very corrosive to steel and iron work and this should be taken into account when assessing the structures.

6.3 The southern building and the eastern end of the northern building appear to be in poor but salvageable condition. Water ingress has resulted in deterioration of joists and corrosion of the steelwork. This will need to be assessed in detail at the next stage with intrusive investigation to establish the extent of corrosion and rot and the residual section. The building was designed to carry heavy industrial loads, however, so even fairly extensive loss of section may still provide sufficient capacity for a range of new uses. In a cost plan one should assume fairly extensive local repairs to timber and comprehensive cleaning back and repainting of steelwork.

6.4 The first and second floors at the western end of the northern building are of greater concern. No access was available to the underside of the second floor and the underside of the first floor is in poor condition. This part of the building was used in the production of ice with large quantities of water flooding the space on a daily basis. Given the good condition of the roof the amount of water and corrosion visible on the underside of the first floor indicates that a lot of water may remain in this part of the building, providing perfect conditions for ongoing corrosion and deterioration of the structure. Therefore at this stage it would be prudent to assume that the first and second floor structures may need to be replaced or extensively repaired.

6.5 Currently the buildings appear to be fairly stable, suffering gentle deterioration through holes in the roof. There will, however, come a point when the deterioration rapidly accelerates. This may be precipitated by a catastrophic event, such as extensive storm damage to one of the roofs for example, or may simply be an acceleration of the current situation.

7.0 Conclusions

The primary walls and roofs of the building are in reasonable condition, although holes in the roofs provide the opportunity for rapid deterioration. The floors of the southern building and the east end of the northern building appear to be in poor but salvageable condition, with some repairable water damage to the structure. The floors of the western end of the northern building give greater cause for concern as they were not seen and, where they were seen, are in poor condition with extensive water damage and residual water dripping in the spaces. The assumption should be that considerable repairs will be needed in these areas, potentially even complete replacement of the structure, although this is not yet known and would be an option of last resort in a listed building.

8.0 Update following visit February 2024

On 2 Feb 2024 Margaret Cooke was asked to re-visit site and to comment on the condition of the building two years after the first visit. The hope was to both update the report and also get a sense of the speed of deterioration. The conclusion from the visit is:

Overall the building remains structurally stable, however there is no question that the condition has deteriorated. It did not appear that any maintenance works had been undertaken in the intervening two year, and so deterioration is inevitable.

Southern section

The southern section is starting to more rapidly deteriorate now. The hole in the main roof has enlarged and the timber first floor structure below should not be walked on.

March 2022

Feb 2024

At present the steel frame appears to be in tact still, and there is enough of the timber first floor and roof structure in tact to provide restraint to the external masonry walls. If the deterioration continues, however, eventually the mansard roof will become unstable and start to impact the walls. This also has safety implications for the adjacent public space, so work must be done to at least provide temporary roof repairs within the next 12 months.

The condition of the eastern part of the building, which has flat roofs at first floor level is also deteriorating. The construction here is filler joist (steel or wrought iron joists embedded in mass concrete) and the water is coming through that layer of concrete, indicating that the waterproofing has failed. With a constant water supply the joists can now start to rapidly corrode. The corrosion (and consequent loss of section) is in issue in itself but equally

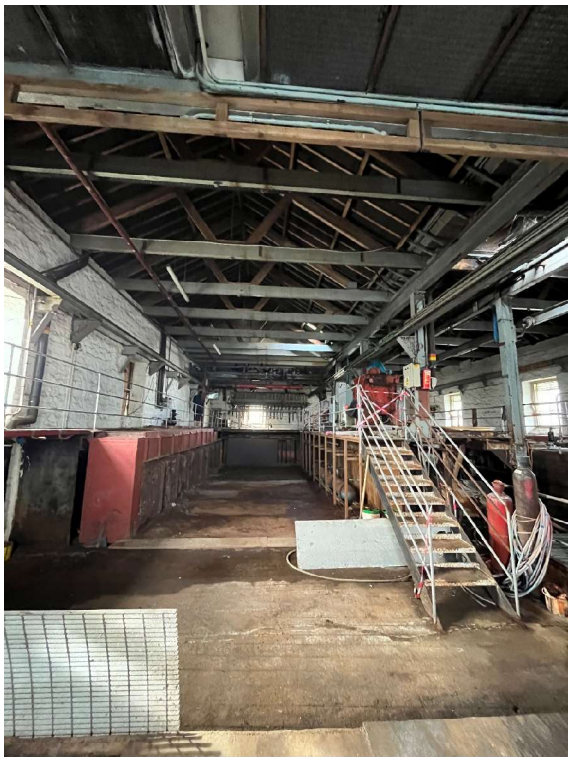
important; rust layers are hugely expansive and will cause spalling of the concrete and potentially lift the brickwork parapet externally into which they are embedded.

Comparing photographs over the two year time frame the deterioration does not yet appear to have reached the point where the deterioration is significantly accelerating.

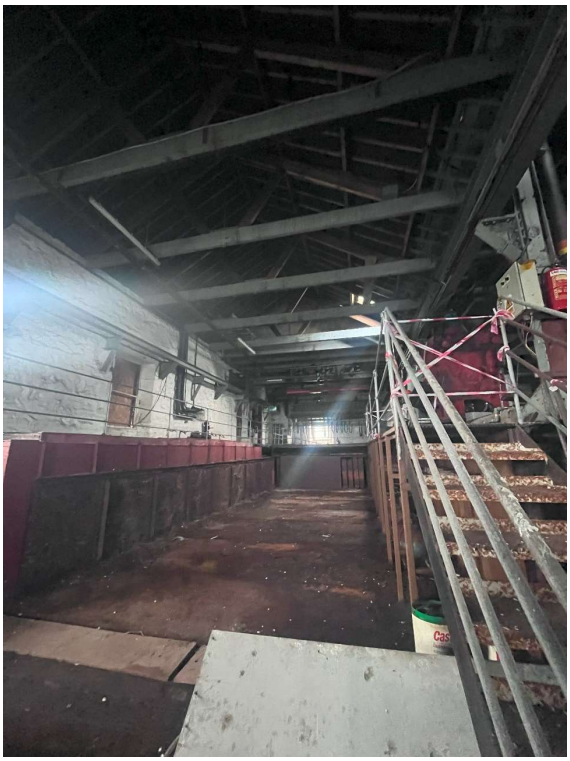
Northern Section

The northern section of the building is inherently significantly more robust that the southern, however it appears to be reaching the point where deterioration will accelerate. There is a significant hole in the valley gutter at the eastern end of the roof and water is pouring through that hole onto the floor structures below.

The major issue with this is a practical one – at present most of the floors in this building are good enough to walk on, which means that people can access the building and repair works could be caried out relatively easily. If repairs are not undertaken soon, however, the building will become unsafe to enter, either because floors cannot be walked on or because the is a danger of falling structure from above. There should, therefore, be a sense of urgency around carrying out repairs to the roof so that the building is allowed to dry out.



March 2022



Feb 2024

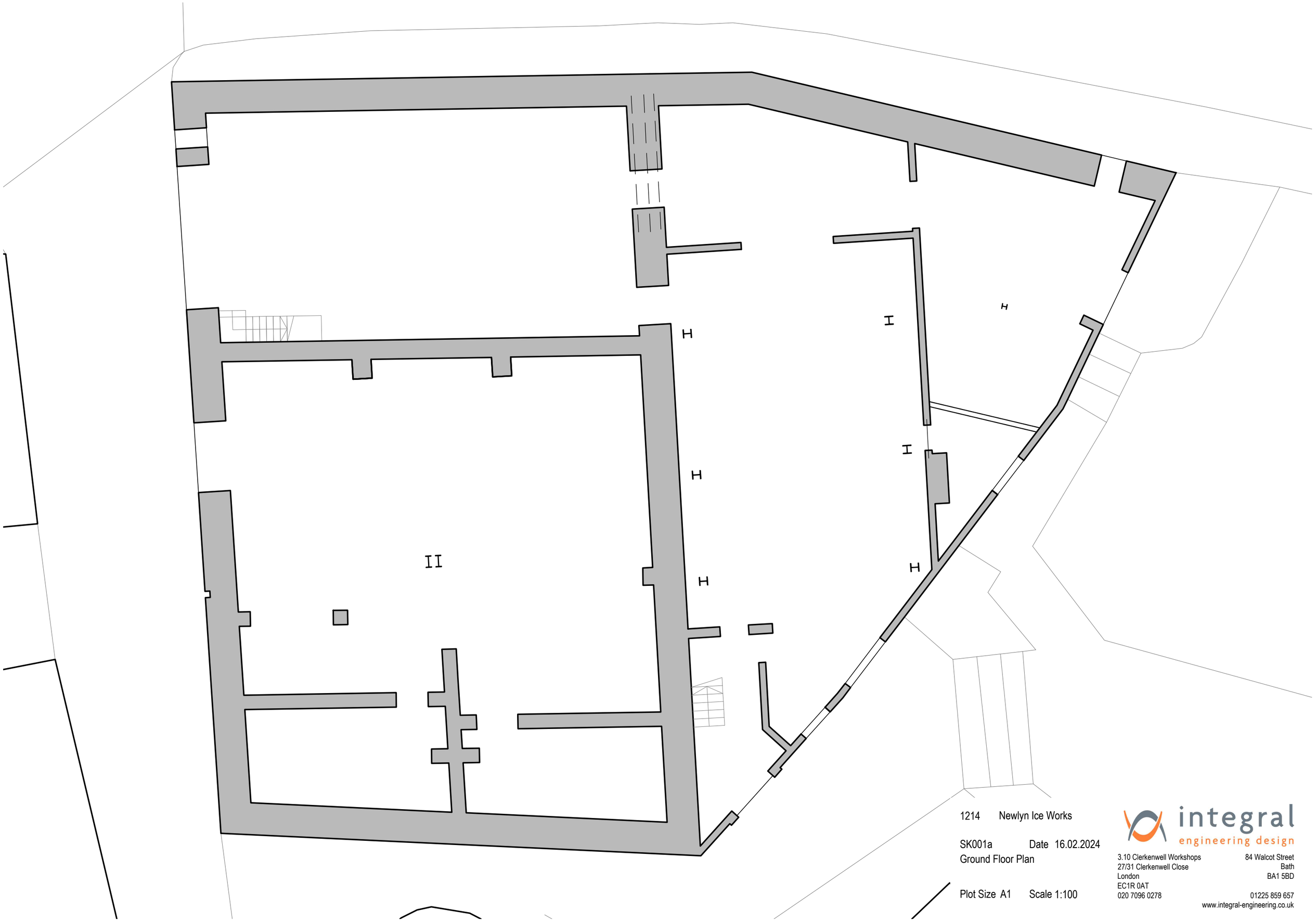
In terms of future use, at present it is still highly likely that the original structure could largely be re-used with brushing back and repainting of steel structures and re-use or replacement of the timbers. Comparing photographs, at present the deterioration is gently increasing, however, if the building is not secured within the next couple of years there is a chance that at least some parts of the structure will be lost and, along with it, the memory of the building use. The floor structures are entirely dictated by the ice making process. If that is lost there

will be no need to replace in the current format and the opportunity to use physical remains to tell the story of the process will be gone.

March 2022

Feb 2024

Appendix A – structural sketches



1214 Newlyn Ice Works

SK001a Date 16.02.2024

Ground Floor Plan

Plot Size A1 Scale 1:100

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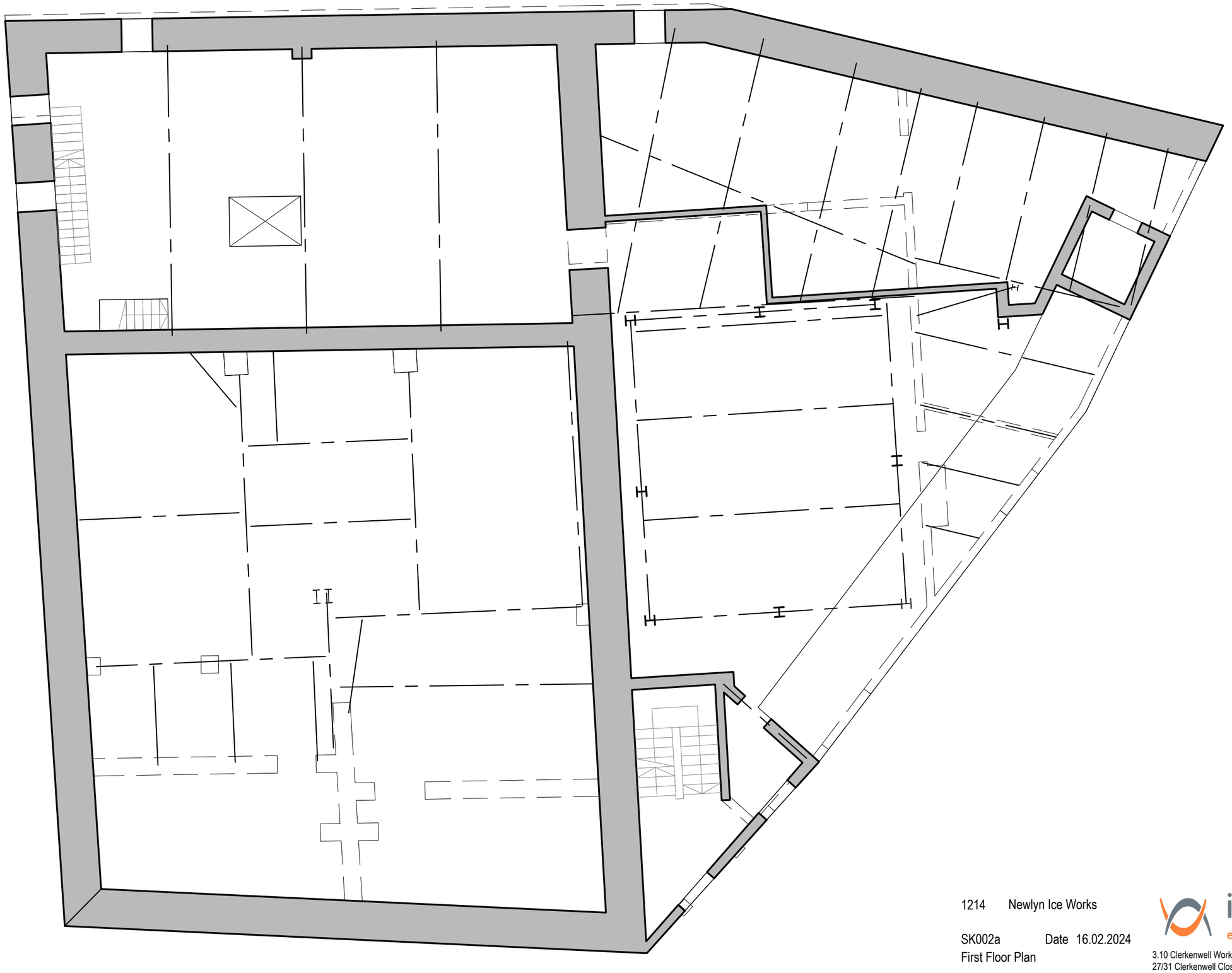

1214 Newlyn Ice Works

SK002a Date 16.02.2024

First Floor Plan

Plot Size A1 Scale 1:100

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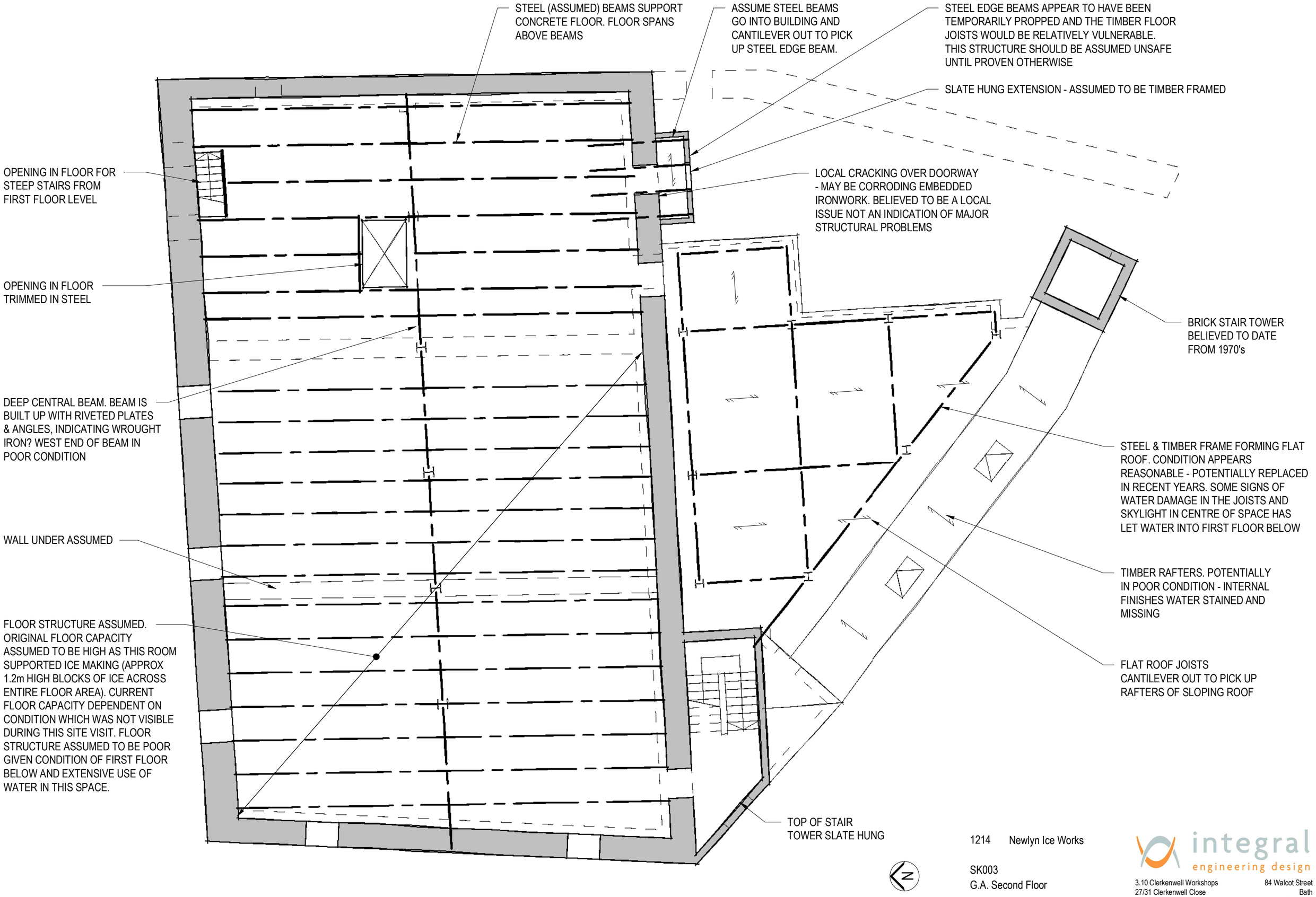

1214 Newlyn Ice Works

SK003
G.A. Second Floor

Plot Size A3 Scale 1 : 100

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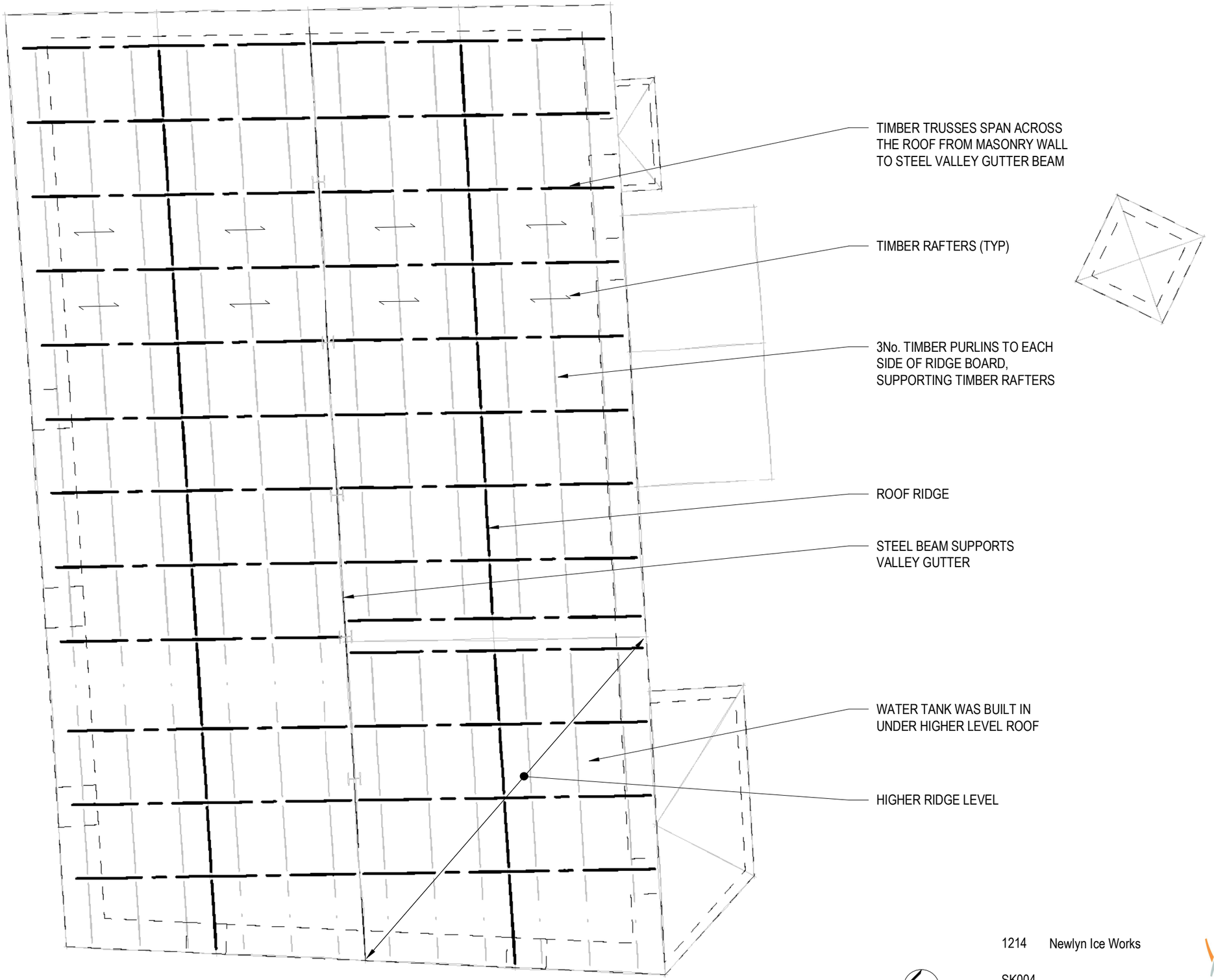

1214 Newlyn Ice Works

SK004
G.A. Roof

Plot Size A3 Scale 1 : 100

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