



Building Surveying, Norwich

## **Report on Roof Condition**

**The Carnegie, Cage Lane, Thetford**

Thetford Town Council  
King's House  
King Street  
Thetford  
IP24 2AT

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## Executive Summary

Hamson Barron Smith on 9<sup>th</sup> June 2020 to undertake a Roof Condition Report on The Carnegie Building to understand the existing condition and ascertain what works are required in order to look into repair options for the roof, being that there is currently a live leak within the offices on the first floor.

The objective of the inspection was to undertake a detailed survey to understand the condition of the roof serving the property and to recommend forward actions for the client.

The survey was carried out on Tuesday 14<sup>th</sup> July by Shaun Farman of Hamson Barron Smith.

The property is likely to have been constructed in the late 1960's, which falls into the post-war era. The property is a two-storey building that is of traditional brickwork construction with a asphalt flat roof.

The inspection raised some immediate concerns with the roof's durability and issues with water ingress, that are only likely to get worse in the future. The roof covering has exceeded its life expectancy. There are some minor repairs that could be undertaken in the short term, but the roof covering and roof lights within the roof structure should be considered for replacement. The report advises the replacement of the roof rather than the proposed repair to a number of the roof lights, and provides the associated cost estimates for this.

## 1.0 Introduction

### 1.1 Client Details

Thetford Town Council  
King's House  
King Street  
Thetford  
IP24 2AT

### 1.2 Address of the Property

The Carnegie  
Cage Lane  
Thetford  
Norfolk  
IP24 2EA

### 1.3 Client Brief

Rosalind Barnett of Thetford Town Council instructed Hamson Barron Smith on 9<sup>th</sup> June 2020 to undertake a Roof Condition Report on The Carnegie Building to understand the existing condition and ascertain what works are required in order to look into repair options for the roof, being that there is currently a live leak within the offices on the first floor.

The objective of the inspection was to undertake a detailed survey to understand the condition of the roof serving the property and to recommend forward actions for the client.

### 1.4 Inspection Details

The inspection of the property was undertaken by Mr. Shaun Farman on behalf of Hamson Barron Smith Ltd.

The survey was carried out on Tuesday 14<sup>th</sup> July 2020 and commenced at approximately 11.30am. The weather during the inspection was warm and generally sunny. A visual inspection of the flat roof areas to the building was made to investigate the condition of the roofs and the cause of intermittent ingress of water into the building.

During the visit it was advised that there was no knowledge of roofs being replaced in the past which suggests, together with the visible condition, that the asphalt roofs are original.

## 2.0 Survey Limitations

This report is not presented as a full building survey of the subject premises or the location identified and is not a full schedule of condition and should not be construed as being an inventory of every single item required.

The report is not in any way to be construed as a Health & Safety Risk Assessment.

The survey undertaken was for the purpose of preparing a report outlining the faults and problems associated with the flat roof areas and the intermittent water ingress during and following rainfall.

No specialist's inspections or tests were undertaken to ascertain the suitability of the existing structure.

No specialist tests or inspections have been undertaken by mechanical, electrical, structural or drainage specialists.

No comment has been made of any areas or services which are currently unexposed, inaccessible or concealed and where any inspection would cause damage to the existing fabric. In these instances, the appropriate assumptions have been made.

This report is presented for the use of Thetford Town Council and their professional advisors only.

Should this report be made available to others, there is no guarantee to the accuracy of the information to meet their requirements and, therefore, they should seek other professional advice and not rely upon the contents of this feasibility report.

Notwithstanding anything to the contrary in this report, as Consultant we are obliged to exercise reasonable skill, care and diligence in the performance of the services required by our agreement and we shall not be liable except that we have failed in this respect and this report shall be read and construed accordingly.

## 3.0 Survey Findings

3.1 The asphalt flat roof above the ground floor caretaker's office and foyer area is thought to be the original covering and therefore is past its expected lifespan. The defects identified supports that assumption of age.

There are numerous defects evident within the asphalt roofing, and also to the roof lights with lead flashing either missing or displaced to the upstands.

There is extensive ponding to the roof area. The rainwater outlets are all slightly raised locally above the roof finish that allows ponding to occur around the outlets. The excessive ponding to this area is also likely due to the lack of gradient and near flat surfaces within the roof areas.

There is also evidence of thermal movement occurring, with a number of creases forming within the surface. Whilst there are no splits apparent, there is a possibility that these creases could lead to splits forming in the near future and allow water ingress within the building. Blistering is also evident with a number of blisters having active moisture within, with the blisters being spongy and water visibly displaced when force is applied. The roof has perimeter upstands where it abuts the building but also where a parapet is formed. The joint sealant is showing signs of failure with cracks forming and the flashing that sits above the roofing felt is in aged and in poor condition.

The roof lights to this area are in a poor condition with the flashings displaced which allow moisture to enter the rooflight/roof structure. The glazing is also in a poor condition with a number of cracks present. The mastic around the glazing and metal frame has also past its expectant life span and is cracking and delaminating. Moss and moisture are gathering beneath the glazing and the upstand which is causing a damp issue at the junction.

3.2 The large asphalt flat roof above the first-floor offices is also thought to be the original covering and again past its expected lifespan. The defects identified supports that assumption of age and confirmation of the requirement to consider replacement.

There are numerous defects evident within the asphalt roofing including ponding, blistering, flashing failure, thermal movement, debris build up and surface staining.

The extensive ponding to the roof area is believed to have been caused due to the rainwater outlets being slightly raised above the roof finish, alongside the issue that the roof area has a lack of gradient. This allows for ponding to occur around the outlets as the water cannot drain off the surface. Where water is allowed to sit on the surface of a felt roof for an extended period its lifespan will be drastically reduced. Debris retention has further affecting the outlets and caused some degree of blockage. The debris is made up from moss/algae growth and also the chippings that have delaminated from the surface. The surface of the roofing felt throughout the roof area is badly worn and indicates it has passed its lifespan.

There is also evidence of thermal movement occurring with a number of creases forming within the surface. Where the surface is not adequately protected from sun exposure by the chippings, creasing will occur and eventually lead to splits. These splits can lead to water ingress. As there is a considerable number of creases and large blisters, some that currently have water within, this is likely to have occurred already showing evidence of the roof failing. The blisters are also likely to be due to the felt bonding failing, which in this case is likely due to the age of the roof.

The joints between the felt are also aged and have minor cracks forming and is a likely additional cause for the moisture ingress to the roof structure.

The perimeter upstands joint sealant and flashing that sits above the roofing felt is in aged and in poor condition also as previously described.

There are numerous service penetrations through this roof area that are sealed and have a protective coating applied around their perimeter. This appears to be in poor condition also with a number of cracks forming and the coating delaminating.

The roof lights to this area are in a poor condition with the flashings below the glazing to be displaced, this can allow moisture to enter the rooflight/roof structure. The glazing is also in a poor condition with a number of cracks present and the protective film coating beginning to separate. The glazing panels are heavily coated in moss/lichen and the mastic around the glazing and metal frame has also passed its expectant life span. This mastic is cracking in areas and in beginning to come loose, thus providing no weather protection. A number of screw heads that are attaching the flashing to the rooflight frame are missing and allows the flashing to lift further increasing the opportunity for water ingress.

3.3 The small asphalt flat roof above the first-floor offices and stairwell and link to adjacent building is also thought to be the original covering also and has again exceeded its lifespan. The defects identified supports that assumption of age and confirmation of the requirement to consider replacement.

There are numerous defects evident within the asphalt roofing including ponding, blistering, flashing failure, thermal movement, debris build up and surface staining.

The condition of the roof and its defects coincide with the defects previously identified within the report, being that the construction and roofing felt is the same. The difference in the construction is that small glazing light tubes are incorporated within the structure. The protective film is coming away and the seals are displacing also, which is damaging the roof structure.

3.4 The largest areas of roofing above the Carnegie room and stage area is also thought to be the original covering and again surpassed its expected lifespan. The defects identified supports that assumption of age and confirmation of the requirement to consider replacement.

The defects previously identified in the report to the asphalt roof areas are also consistent with the roof condition above the main Carnegie room area. The surface of the felt has worn away considerably and collected near the parapet edges, along with moss and other debris. There is a considerable amount of thermal movement creases throughout the surface of the roof area which indicates the roofing felt is well past its life expectancy and has the potential for more splits and blisters to form in the near future. The considerable number of blisters throughout the surface area, particularly underneath some of the joints, indicates that moisture is within the roof make up already and could possibly be the cause of any leaks to the area directly beneath.

3.5 The area of roofing above the first-floor offices that has 15no. rows of rooflights appears to have a rubber bonded coating, which seems to have been applied as a measure of repair being that it differs from the adjacent roof finishes. This appears to have been undertaken as an attempt to rectify the leak issues to this area previously. The rubber roofing membrane has indications that it has surpassed its life expectancy, particularly with the alligating of the membrane causing the cracks in the surface.

In addition to the defects commonly identified earlier with the report, there is a considerable amount of debris within the gaps between the rooflights, which indicates that the fall may not be

the minimum required to allow the water to drain away correctly. There also may be a lack of drainage outlets. The surface coating is in poor condition with the coating delaminating and cracking away in areas. Evidence of patch repair is evident to areas throughout the surface. The upstands of the roof cover that link with the roof lights have cracks around which is a likely source of water ingress within the office area. There is a temporary repair measure of a polythene sheet and timber battens applied about the roof area to help reduce the live leak which is occurring within the office area.

The roof lights themselves are in a poor condition, with the flashings displaced which can allow moisture to enter the rooflight/roof structure. The glazing is also in a poor condition with a number of cracks present and the protective film separating from the glazing. The mastic around the glazing and metal frame has also past its expectant life span and is cracking and delaminating. Evidence of previous mastic repair is clear but is still showing its age and not operating as required. A number of screw heads that are attaching the flashing to the rooflight frame are missing and allows the flashing to lift. A membrane appears to have been applied around the frame and to the screw heads in an attempt to protect the roof light from moisture ingress.

## 4.0 Recommendations and Budget Costs

4.1 It is recommended that the whole of the original existing asphalt felt roof covering to the Carnegie Room is removed and replaced in the immediate future. The recommendation is for this to be replaced with a fiberglass material roof covering as this is more durable, is jointless and will protect the longevity of the building. However, this is more costly than a standard felt roof. A felt roof replacement could also be considered for the roof but will have the potential to lead to the same issues in the future once its lifespan expires. It is recommended that the new waterproofing system is taken up over the parapet upstands to achieve a complete joint free weatherproof seal.

Repair of the roof and roof lights to the area with the live leak could be undertaken as per the quote previously provided to Hamson Barron Smith (Appendix 1), but this will not safeguard against leaks occurring in other areas in the future.

4.2 Although the underside of the roof deck showed signs of water staining, particularly to the office exposed beams, no rot or other defects were detected at the time of inspection. However, due to the water staining and age of the existing roof deck, it is also advised that the deck beneath the roofing layer be replaced as this appears dated and would further strengthen the roof whilst increasing the water tightness of the new roof structure.

4.3 Whilst the roof covering is being replaced, it is recommended that the roof gradients are altered to increase falls and reduce ponding. This can be improved by installing new furring pieces above the joists or by way of a tapered insulation, although this has a cost premium compared to traditional timber furring pieces. The gradient of the roof should direct towards the existing drainage locations.

4.4 It is worth noting that the new roof cover, whatever material is selected, will require additional insulation installed to ensure the new roof covering conforms to the current Building Regulations. This is because the totally area replace is above 25 per cent of the entire roof area.

4.5 It is recommended that the small area of PVC bonded roofing with the 15no. roof lights is removed and replaced soon with the same new roof covering as the replaced asphalt roofing felt as identified above.

4.6 It is also recommended that the entire roof lights to the building are replaced as the glazing and frames are in a poor condition and whilst the faults with the roof are the predominant cause of the leaks to the roof area, the poor condition of the roof lights will also be a contributing factor.

4.7 The estimated cost for replacing the entire roof area, depending on the material selected, of the Carnegie Room is between £90,000 and £120,000.

4.8 The additional cost of the roof lights to the roof area is likely to be between £40,000 and £50,000.



## 5.0 Picture Survey



Photo 1 – Evidence of water leak to offices



Photo 2 – Evidence of water leak to offices



Photo 3 – Evidence of water leak around roof light



Photo 4 – Ponding to the flat roof area above the offices



Photo 5 – Ponding and blistering to the flat roof area above the offices



Photo 6 – Felt staining and delamination to the flat roof area above the offices



Photo 7 – Moss and debris build up to the flat roof area above the offices



Photo 8 – Ponding to the flat roof area above the offices



Photo 9 – Protective cover cracking to service penetration flat roof area above the offices



Photo 10 – Ponding to additional flat roof area above the offices



Photo 11 – Roof light flashing and missing screws to flat roof area above the offices



Photo 12 – Roof light membrane failure and gap to roof light frame to flat roof area above the offices



Photo 13 – Moss building up beneath the roof lights upstand to flat roof area above the offices



Photo 14 - Moss building up beneath the roof lights upstand and flashing loose beneath roof light to flat roof area above the offices



Photo 15 – Condition of roof lights (cracked glazing) to flat roof area above the offices



Photo 16 – Condition of roof lights (cracked glazing) to flat roof area above the offices



Photo 17 – Condition of link area with adjacent building. Protective film to glass panes delaminating and heavy moss build up



Photo 18 – Thermal movement crease to flat roof area above offices and stairwell



Photo 19 – Blistering to corner of parapet upstand to flat roof area above offices and stairwell



Photo 20 – Ponding to flat roof area and lack of drainage to flat roof area above offices and stairwell



Photo 21 – Condition of roof lights to flat PVC roof area above offices/kitchenette



Photo 22 – Debris building up and ponding around roof light perimeter to flat rubber membrane roof area above offices/kitchenette



Photo 23 – Evidence of previous patch repair to flat rubber membrane roof area above offices/kitchenette



Photo 24 – Cracked glazing panels to roof lights to flat rubber membrane roof area above offices/kitchenette

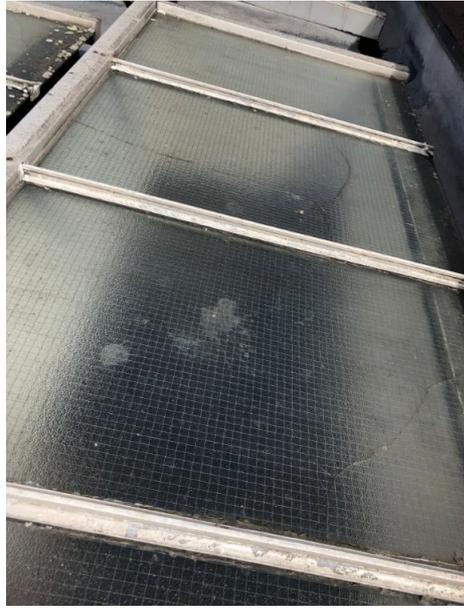


Photo 25 – Further cracked glazing panels to roof lights to flat rubber membrane roof area above offices/kitchenette



Photo 26 – Cracks to mastic and roof light/flat roof abutment to flat rubber membrane roof area above offices/kitchenette



Photo 27 – Moss and moisture build up beneath roof light glazing to the upstand to flat rubber membrane roof area above offices/kitchenette



Photo 28 – Temporary repair to flat rubber membrane roof area above offices/kitchenette



Photo 29 – Roof surface alligating/delamination to flat rubber membrane roof area above offices/kitchenette



Photo 30 – Mastic seal failure to corner of roof light to flat rubber membrane roof area above offices/kitchenette



Photo 31 – Gap between roof upstand and roof light to flat rubber membrane roof area above offices/kitchenette



Photo 32 – Missing screws to roof light capping to flat rubber membrane roof area above offices/kitchenette



Photo 33 – Evidence of previous roof light seal repair to flat rubber membrane roof area above offices/kitchenette



Photo 34 – Further evidence of previous roof light seal repair to flat rubber membrane roof area above offices/kitchenette



Photo 35 – Ponding to flat roof area above the Carnegie room



Photo 36 – Blistering and surface weathering to flat roof area above the Carnegie room



Photo 37 – Thermal movement creases, ponding and surface weathering to flat roof area above the Carnegie room



Photo 38 – Blistering to flat roof area above the Carnegie room



Photo 39 – Blistering to flat roof area above the Carnegie room



Photo 40 – Blistering beneath felt joints to flat roof area above the Carnegie room



Photo 41 – Blistering, ponding and thermal movement creases to flat roof area above the Carnegie room



Photo 42 – Thermal movement creases and surface weathering to flat roof area above the Carnegie room

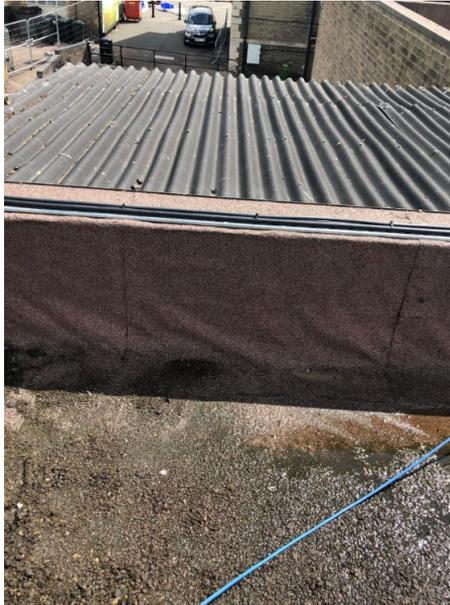


Photo 43 – Thermal movement creases to upstands on flat roof area above the Carnegie room



Photo 44 – Ponding to flat roof area above the stage area



Photo 45 – Ponding and blistering to flat roof area above the stage area



Photo 46 – Roof lights and PVC roofing above the kitchen area (access not available at time of survey)



Photo 47 – Roof lights and PVC roofing with temporary repair above the kitchen area (access not available at time of survey)

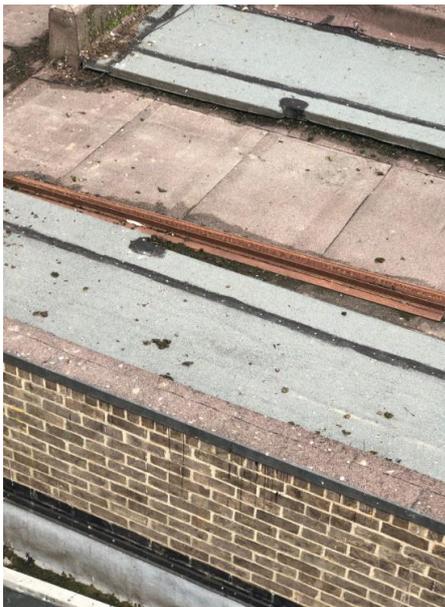


Photo 48 – Flat roof area above dressing room area (access not available at time of survey)



Photo 49 – Roof lights and PVC roofing above toilet corridor (access not available at time of survey)



Photo 50 – Ponding around drainage outlet to flat roof area above caretaker office/foyer area



Photo 51 – Ponding and blistering to flat roof area above caretaker office/foyer area



Photo 52 – Condition of roof lights to flat roof area above caretaker office/foyer area



Photo 53 – Evidence of flash band repair to roof lights to flat roof area above caretaker office/foyer area



Photo 54 – Condition of flashing to roof lights to flat roof area above caretaker office/foyer area



Photo 55 – Condition of roof deck and evidence of water staining within roof structure in office area



Photo 56 – Evidence of water staining and moisture ingress evidence to roof lights in office area