Roof Survey **Report**

Darwen Town Hall
Croft Street, DARWEN
BB3 1BG, England

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1 Introduction

Further to our site inspection we have prepared the following survey report based on the current condition of the existing roofs. This survey report is based on our visual inspection of the roofs together with our exploratory core test samples. It should be noted that core test samples are taken to identify the existing roof construction to deck level and to provide an indication of the roof condition. Due to the limited number of core samples that can be practically taken on a roof, Bauder Ltd cannot be held responsible for any changes in roof build-up in areas where core samples have not been taken.

1.1 Description of Building and Weather Conditions

Building use – Public
Height in Storeys: 1

The weather conditions at the time of our survey inspection were dry and sunny
The Roof surface at the time of our survey was dry

1.2 Roof Access

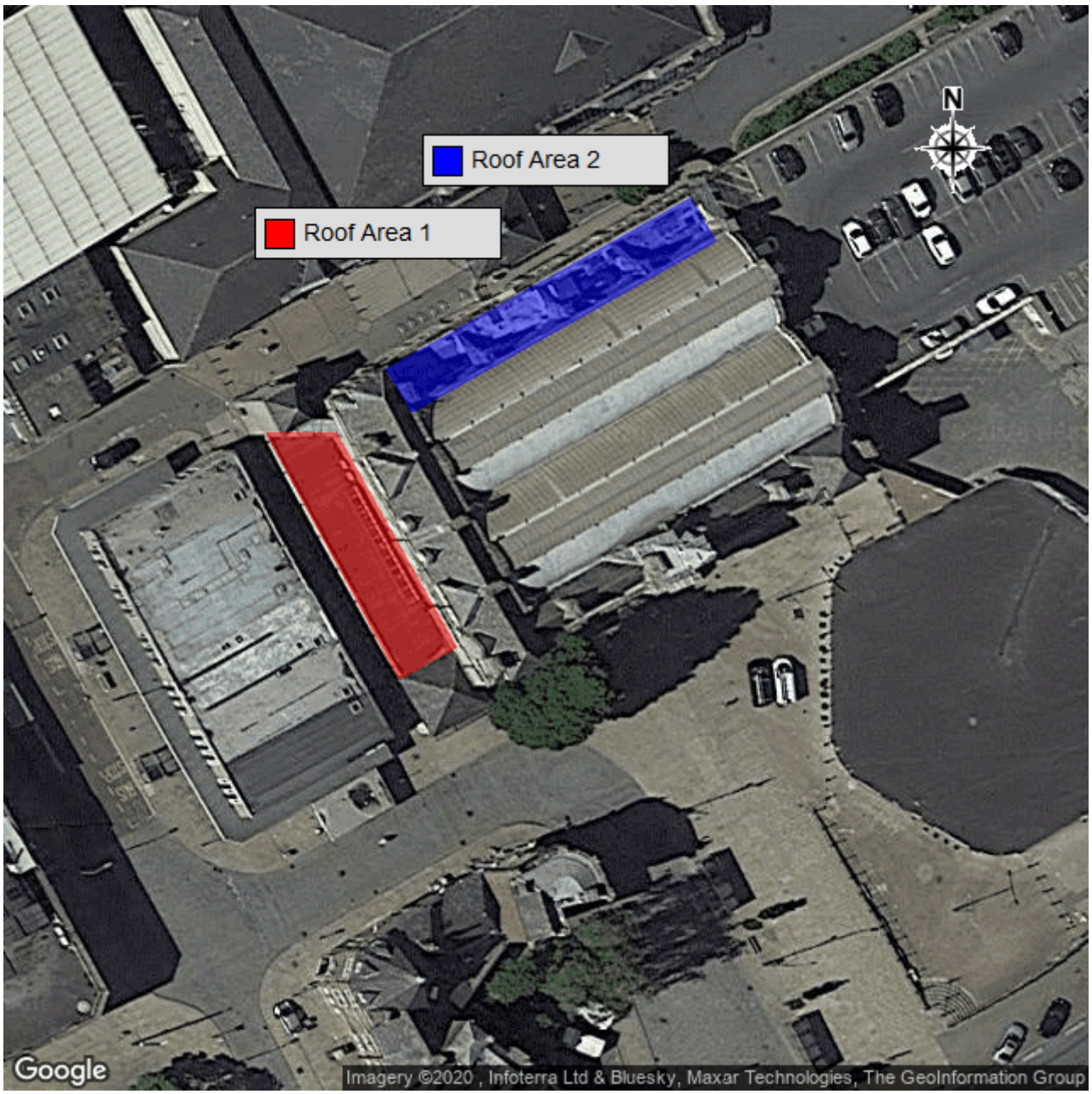
Roof access was gained to roof area 1 externally using a single storey surveyor's ladder. There is internal access onto roof area 2 through a door and down a stairwell.

1.3 Confirmation of Client brief

To carry out an evaluation and produce a condition report for the flat roof areas concerned, together with specification proposals for upgrading the thermal performance (roof 1 only) and renewing the waterproofing system to both areas.

1.4 Roof Plan

1.4.1 Roof Areas 1 and 2



Any measurements displayed on the map above are approximated and are therefore not to be used in tenders.

2 Existing Roof Construction

2.1 Core Sample Analysis

Core samples are taken as a method of confirming the existing deck and waterproofing system construction and provide indicative feedback regarding general condition. Please note that the findings are representative only of the particular location tested and this is used to give general guidance as to the likely overall condition and deck construction.

2.1.1 Roof Area 1

No. of core samples taken:	1
Construction Type:	Cold Roof
Surfacing:	Slate mineral finish
Waterproofing:	BS747 Built-up bituminous membrane system
Roof Deck:	Plywood panels
Internal inspection:	No internal access available at the time of our inspection
Condition of core sample:	The decking was dry but its suitability should be confirmed by a structural engineer to ensure it can take the weight of the new system. If so, the roof can be overlaid.

The waterproofing has been installed directly to the plywood decking with no insulation present. This will need to be upgraded.

View of the two layers of waterproofing which is beginning to fail.

2.1.2 Roof Area 2

No. of core samples taken: 1

Construction Type: Cold Roof

Surfacing: Solar reflective paint
Waterproofing: Mastic Asphalt
Roof Deck: Concrete
Internal inspection: No internal access available at the time of our inspection

Condition of core sample: The roof is aged and the asphalt is cracking and the coating is wearing away. There is no insulation present but this is not required above this area.

The asphalt is 25mm in thickness and is installed onto a concrete deck. This can be overlaid following suitable preparation.

View of the thickness of the asphalt waterproofing.

3 Issues and Considerations

3.1 Roof Areas 1 and 2

3.1.1 Existing Waterproofing

The waterproofing on roof area 1 is provided by a two layer bituminous membrane system. This has had various repairs using liquid and felt products but now needs to be fully refurbished. There is no insulation present within the build-up and this will need to be improved to comply with part L of the building regulations. The asphalt on roof area 2 is showing all the typical defects consistent with a covering of this age including; surface oxidisation, cracks, splits, blows, slumping and signs of repair. This has had a solar reflective paint applied over the top but this is delaminating and wearing away allow UV light degradation.

General view of roof area 1 showing the various repairs.

Example of the waterproofing on roof area 2. The coating is wearing away and the asphalt is slumping.

Numerous repairs have been undertaken on both roofs.

Further evidence of the repairs.

Repairs to the cracks in the asphalt on roof area 1. These will need to be removed and infilled using LiquiPaste.

A new 1m wide walkway is to be formed in a contrasting colour of the liquid system.

The timber window frames on roof area 1 are in a poor condition. Ideally these should be replaced.

The stairwell will need to be raised temporarily on roof 2.

3.1.2 Drainage

We noted that the existing lead chutes on roof area 1 are aged, defective and generally in poor condition. These are considered unfit for reuse and should be replaced as part of the re-waterproofing works. There are 3no internal outlets on roof 2 and the new liquid system is to be extended as far as possible into the downpipe and new leaf guards installed.

There are numerous chutes on roof area 1. A new gutter is to be formed and the chutes opened up and lined with lead.

Example of one of the internal outlets on roof 2. These have no protection from debris and leaf guards are to be installed.

There is a gutter at the back of the structural glazing on roof 1. This is in a good condition and can be left in situ. New 60mm gutters can be formed next to these to take the water to the external chutes.

The chutes are narrow on roof 1 and opening these up will rectify this. This will ensure that they do not get blocked.

3.1.3 Upstands and Details

Requirements for waterproofing at upstands and details

Codes of Practice (BS 8217: 2005) dictate that the minimum height for waterproofing upstand detailing is 150 mm, taken from the finished surface. Perimeter kerbs should be a minimum height of 50 mm above the finished surface and detailed with a welted drip detail or edge trim.

There should be no mechanical penetrations to kerb waterproofing or need for secondary

weathering. Kerbs that are weathered with mechanically fixed metal capping or concrete copings are categorised as 'abutment upstands' and must comply with the minimum height requirement of 150 mm.

This minimum height rule applies equally to upstands to roof lights, pipes, vents and door and window thresholds.

Waterproofed upstand detailing is usually weathered with lead or metal counter-flashings, metal capping and cladding. Termination bars should only be used when fixing to concrete abutments, where no provision exists for other forms of secondary weathering.

Waterproofing height to brickwork upstand requires increasing

To comply with codes of practice the waterproofing should be dressed up the brickwork upstand to a minimum height of 150mm above the new finished roof level. This will impact on the position of any counter-flashings which also need to be raised accordingly.

The existing waterproofing on roof area 1 terminates beneath a flashing into the stonework. This will need to be raised to ensure that a height of 150mm is achieved.

The new liquid system is to be taken onto the upstand on roof 2 and extended 600mm. A new chase is to be cut to allow the liquid to terminate and a new sealant is then to be installed.

Door Threshold

On roof area 2 the door should be temporarily removed to allow the new system to be finished onto the kerb. The door cills can then be reinstated. If required by the client, the door can be replaced.

Gaining access to re-waterproof the abutment behind tiles/ slates

The lower courses of tiles/ slates from the adjacent abutment will need to be removed in order to allow access to re-waterproof the upstand behind and if necessary extend the supporting lay-board.

View of the adjacent pitched roof on roof area 1. The lower courses of slate are to be removed to allow the new system to be terminated. The slates are then to be reinstated.

The abutments are to be infilled to level them off and a new flashing installed. A gutter is to be formed on this elevation as highlighted on the roof plan to maximise the height.

View of the door threshold on roof area 2.

Repairs have been carried out to the lead cladding. Modification may be required to ensure that the height of 150mm can be achieved in these areas.

Defective metal capping - roof 1

The existing metal capping is looking tired and has obvious defects in the form of missing or corroded fasteners and missing seals/caps. These issues will allow water enter the structure below.

Defective coping joints - roof 2

The joints in the existing coping on top of the parapet wall are defective. Water staining below the bed course is highlighting that any DPC that may be present is certainly no longer effective in preventing downward movement of water into the wall structure. Long term saturation will lead to gradual degradation of the structure and make the brickwork susceptible to frost damage.

The metal capping on roof area 1 is in a very poor condition. This will need to be removed, the perimeter raised using timber and a new GRP trim installed.

The waterproofing integrity is reliant on a sealant which has perished.

General view of the perimeter on roof area 1.

The new waterproofing on roof 2 is to terminate beneath the coping stone into a chase. The coping joints should be raked out and re-pointed as part of the works.

Increasing the height of perimeter kerbs

When the waterproofing is refurbished the perimeter check kerbs will not provide a 50mm upstand above the finished roof level. As a consequence the perimeter kerb will require raising.

Modification to the existing soil vent pipes

The existing soil vent pipe penetrates through roof area 1 and will need to be altered. A new weathering cravat is to be installed to protect the new system.

View of the pipe penetration on roof area 1.

3.1.4 Rooflights

Natural light on roof 1 is provided by a large continuous structural rooflight, mounted upon an upstand kerb. This glazing is in a reasonable condition and can be left in situ.

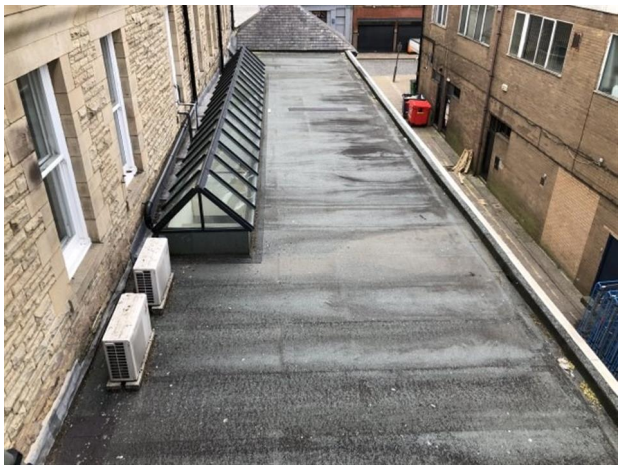
General view of the structural glazing unit on roof 1.

A new flashing is to be installed beneath the overhang of the glazing and the waterproofing extended under this.

3.1.5 Plant

The roof mounted AC units appear to be functional, they are positioned on or very close to the roof. We assume they are to be retained on the roof following any refurbishment of the waterproofing. Unfortunately it will not be possible to refurbish the area of waterproofing beneath the AC units due to their proximity to the waterproofing membranes. They will require temporary disconnection and relocation while the roof is refurbished.

The pipework/cables to the A/C units will need to be temporarily disconnected to allow access for the new system.



Overview of roof 1 showing the location of the A/C units.

4 Proposals

4.1 Roof Area 1 and Roof Area 2

- The existing waterproofing requires localised repairs to remove any damaged, wet or defective areas and be made good prior to overlaying with the new waterproofing system.
- The existing drainage chutes are to be removed and new site fabricated lead replacement items installed.
- The waterproofing upstand is to be raised to achieve the minimum required height of 150mm. Counter-flashings are to be positioned to suit.
- The existing door and frame are to be removed to allow access to raise the upstand kerb in preparation for re-waterproofing. The door and frame are to be either modified or replaced, these works need to be included within the main client specification/ schedule of works.
- The lower courses of tiles from the adjacent abutments will need to be removed to re-waterproof the upstand. This work should include provision for extending the lay-board to accommodate the change in surface level imposed by the new insulation in order to comply with the required minimum upstand height. As a consequence of these works, the lower course of tiles may need adjusting.
- The existing metal capping system to be removed and the upstand suitably prepared so that the new waterproofing system can encapsulate the upstand and top of the parapet wall, terminating with a GRP trim or welted drip detail.
- Provision should be made for extending the existing soil vent pipes in order to accommodate the increase in the finished surface level resulting from the thickness of the new waterproofing system.
- The roof mounted AC units are to be disconnected and temporarily relocated while the roof is re-waterproofed. The AC units are then to be repositioned on suitable surface protection and reconnected.

4.2 Proposed Waterproofing System

Roof Area 1 and Roof Area 2

Bauder Total Roof System (BTRS) - Roof 1

The Bauder Total Roof System (BTRS) includes the most advanced bitumen membranes currently available. The system offers the highest levels of performance supported by the most comprehensive guarantee in the market. For maximum flexibility our membranes are manufactured using highly modified SBS elastomeric bitumen and very high tensile reinforcing layers that means this sophisticated waterproofing system offers the ultimate flat roof solution.

Where required the system will include Bauder PIR insulation with a choice of either glass tissue or aluminium facing offering versatility in installation methods for both the insulation and the membranes. Bauder insulation provides excellent thermal performance and has outstanding dimensional stability and compressive strength, achieving an "A" rating in the BRE Green Guide. BTRS is suited to both new build projects and the refurbishment of existing buildings.

Guarantee Information

This system is supplied with a 20 year guarantee that covers products, workmanship, design, consequential damage and financial loss. Full terms and conditions are available by request.

Key Features

- Insulation and waterproofing products are all manufactured by Bauder resulting in complete system compatibility and single source responsibility.
- Robust and extremely durable waterproofing that minimises the risk of physical damage and is capable of withstanding foot traffic.
- This BBA certified system with FAA fire rating has been extensively used in the UK for over 30 years with proven durability in service. This provides complete peace of mind to specifiers past and present.
- 5mm cap sheet with high tensile strength and choice of 3 colours.
- Bauder site technicians monitor and sign off each installation and provide up-to-date inspection reports directly to our clients via email.
- Bauder provides installation training for our approved company operatives ensuring the highest quality of workmanship is maintained.
- Reliable application in both high and low ambient temperatures – enables all year round installation.
- Reduced rain noise to gain an extra credit under point 5 of section Hea of BREEAM education 2008 for most projects.

Bauder LiquiTEC Roof System - Roof 2

Bauder Cold Applied Liquitec Roof System is based on PMMA (Poly Methyl Methacrylate) resin technology. This technology combines ease of application, exceptionally fast cure, and durability,

to provide a cold liquid applied waterproofing product.

This polyester reinforced system is intended for both new build and refurbishment projects and can be applied to a wide variety of substrates including concrete and timber decks, as well as most existing waterproofing membranes such as asphalt, bitumen membranes, and even synthetic single ply, subject to an adhesion test and the condition of the existing coverings.

Guarantee Information

The Bauder Cold Applied Liquitec Roof System is supplied as standard with a comprehensive 20 year guarantee. Full terms and conditions are available by request.

Key Features

- All elements of the system are totally cold applied, avoiding the risks and insurance costs associated with hot works.
- Works on site can commence immediately, with no waiting time for the heating of materials.
- Due to short "rain proof" times and rapid cure times, installation times on site are more controlled.
- Can be installed all year round at temperatures as low as -5°C.
- The product can be trafficked and/or ready to overcoat within an hour of application.
- 2mm thick with 110g/m² polyester fleece reinforcement.
- The system provides a seamless waterproofing layer that can be dressed around awkward shapes and penetrations.

5 Health & Safety and Construction Design Management

Bauder believes in promoting a strong safety culture at all times. Our Staff will adhere to the appropriate risk assessments and method statements as required under the Health and Safety at Work Act 1974 and Work at Height Regulations 2005. It is the client's duty of care to advise of any specific health and safety issues pertaining to the project as required under the Work at Height Regulations 2005.

As part of our duty of care we would like to draw attention to the following information:

The HSE Guide H&S in Roof Work (HSG33) states that **all** roofs should be treated as fragile unless declared otherwise by a competent person. Please refer to the Work at Height Regulations 2005 provision 9 for information on working with fragile/suspected fragile roof areas. Under the Health and Safety at Work Act 1974 Sections 3 and 4, it is the responsibility of employers and anyone who controls the work of others to ensure so far as it is reasonably practicable that persons are not exposed to risks that impact on their health and safety. Appropriate control measures must be in place before any work or contact with a fragile/suspected fragile roof area commences.

Safe access and egress to a roof is a major risk and requires careful planning. In particular, the following are likely to be fragile:

- Non reinforced fibre cement sheets e.g. asbestos
- Corroded metal decking
- Woodwool slabs
- Rotten chipboard or similar
- Stramit
- Slates or tiles
- Old roof lights
- Glass (including wired)

Specifying non fragile rooflights will help reduce the risk of falls from height. A non-fragility rating is required by the HSE (Health and Safety Executive) in order to comply with CDM (Construction Design and Management) Regulations 2015.

We draw your attention to your duties under the Construction (Design and Management) Regulations 2015. Regulation 4, Client's duties in relation to managing projects states that the client must make suitable arrangements for managing a project, including the allocation of sufficient time and other resources. Regulation 5, Appointment of the Principal Designer and the Principal Contractor states that where more than one contractor will be working on a project at any time, the client must appoint a Principal Designer and a Principal Contractor.

Please note that although Bauder will assist with the roof waterproofing system design, we will

not undertake the role of Principal Designer.

It is always the responsibility of the contractor to carry out a risk assessment on all aspects of the contract. The 'Safe2Torch' checklist is solely for guidance for the safe installation of torch-on reinforced bitumen membranes and use of gas torches in the workplace.