

38 Queens Road, Reading

Ventilation strategy. August 2017

This assessment has been carried out to establish the potential impact of the conversion of the existing buildings from offices (Class B1) to residential (Class C3) in particular how the change may affect the moisture levels in the building. This is of particular concern due to the changes in insulation, air permeability and ventilation.

Current situation.

The development site is at 38 Queens Road, Reading, RG1 4AU and consists of two buildings. To the front, north side, is the original late Georgian mid-terrace building which has four floors consisting of a basement and three floors above ground. To the rear, south side, is a single storey building constructed in the early 1980's as office accommodation and connected to the main building by an access corridor built at the same time as the rear building.

The original building was built in 1832-33 in Bath stone and was listed in 1957 with Grade II status (Appendix 1). It is believed the whole terrace was originally used for residential purposes and over the years many of the individual buildings converted for commercial use. In recent years the trend has been to revert the buildings to their original use. Whilst the rear building falls within the curtilage of the Listed building it was clearly not part of the original listing and its construction and subsequent treatment as part of the conversion are considered separately from the main building.

Main building

The construction of the original building is typical of its period with 400mm thick solid external walls faced with Bath stone ashlar and random stone and rubble internally with lime plaster. The basement walls are solid with no apparent means of excluding water or dampness and with solid stone on earth floors. The main building has a slate covered low pitch with internal skellings to the front and rear and a central flat ceiling area and small loft void above.

Internally the original load bearing walls will remain in place and are all of a solid construction. A range of timber and metal studwork partitions have been added over the years as the building has been used for offices most of which will be removed and new metal stud work partitions constructed to form the internal layout of the new dwellings. Existing floors all consist of wooden floorboards or chipboard on timber joists. On some floors the original lathe & plaster ceilings still remain and these will be protected and retained. Below the original ceilings a typical commercial metal ceiling grid with tiles has been installed. The existing windows are all of a sash type, single glazed some of which have secondary glazing.

Rear building

The rear building was constructed as office accommodation in the 1980's and consists of a solid floor, cavity external walls with a brick inner layer and reconstituted stone outer layer. The cavity is unfilled.

The pitched roof has a slate covering with mineral wool insulation at ceiling level. The windows are all timber framed single glazed and the external doors, external grade solid timber.

Heating, ventilation and air permeability.

Currently, both buildings are heated by a domestic mains gas non-condensing boiler with a room sealed fan flue, located in the main building via radiators in all the main rooms and controlled by a programmer and thermostatic radiator valves. Secondary heating is provided by electric panel heaters. Hot water for wash basins and sinks used in 'kitchen' areas is provided from a domestic hot water cylinder heated by the same boiler and located in the main building.

Ventilation is currently only provided by one source – that is to open a window. There are no existing ventilation systems such as extract fans in place and there is no ventilation to the basement at all.

The site has remained unoccupied and unheated for more than six months so any dampness apparent at the present time is most likely to be due to penetration rather than from occupancy. The main building shows no signs of damp penetration to roofs and external walls with the only indications of damp being in the basement. It has not been possible to determine if this is due to penetration from the outside or condensation on the inside of cold surfaces and thought most likely to be a combination of both to some extent.

The rear building shows no signs of damp penetration.

The main building is assumed to have a very high level of air permeability although this has not been tested and not requested by either building control or the Planning Authority/Conservation Officer. It is assumed that the main building would have an air permeability considerably in excess of 15 and the rear building would be approximately 15, the limit first set under Building Regulations when air testing was first introduced (although this was after the rear building was actually built.)

Development Strategy

Planning Consent and Listed Building Consent for the conversion of the site into residential flats was granted in May 2017 (Appendices 2 & 3) with no constraints regarding the ventilation, insulation or heating of the buildings. Building Control have indicated that they only require the conversion to meet the relevant sections of Building regulations Approved Documents F and L with regard to these topics.

In developing a strategy for the fabric, ventilation and heating systems consideration has been taken of the following:

Guide to building services for historic buildings. CIBSE, 2002.

BS7193: Guide to the conservation of historic buildings. BSI, IHBC, 2013.

Building Regulations Approved Document F, Means of ventilation. 2010 edition with 2013 amendments. NBS 2015.

Building Regulations Approved Document L1B, Conservation of fuel and power in existing dwellings, 2010 edition with 2011 and 2013 amendments. NBS 2015.

Domestic Building Services Compliance Guide. NBS 2013.

The principal consideration is for the main building which is the subject of the original Grade II listing. In developing the strategy a balanced approach has been taken to ensure that thermal comfort and energy efficiency of the flats is optimised, adequate ventilation is ensured and the fabric of the building left uncompromised.

Heating

The heating proposal is for each flat to be fitted electrical storage heaters with automatic charge control. Such a method of heating will provide background heating even during the night as the heaters are charged up. This will help ensure the flats do not drop below a critical temperature for condensation to occur. As the flats will be used for residential purposes the pattern of heating will change from that used in a commercial office situation. Rather than a weekday 8am – 6pm pattern of comfort heating with only background heating, if any, overnight and at weekends, the residential comfort heating will extend until much later in the day during the week and be all day at weekends. Whilst there may be a reduction in heating during the middle part of weekdays, this reduction occurs during the warmest part of the day meaning that internal temperatures are less likely to drop to those experienced overnight. As a consequence the overall period of heating in the residential situation will be considerably extended compared with the office situation. As warmer air is capable of holding more moisture the likelihood of internal condensation will be reduced as a result of the conversion.

Fabric insulation

The external walls and floor of the basement of main building will be ‘tanked’ to prevent any penetration of moisture from the outside. The current lack of ventilation in the basement also means there is little opportunity for any drying of the walls to take place internally and the current moisture content of the basement walls and floor is thought to be entirely dependent on the outside ground conditions.

Once the basement has been waterproofed, the basement walls will be internally insulated using PIR insulation between timber battens. This will be covered with a vapour control layer and plasterboard. The insulation will increase the thermal performance of the walls but clearly there is a risk that it could lead to problems of interstitial condensation.

The external walls of the main building will be internally insulated using PIR insulation fixed to the existing walls and covered with a vapour control layer and plasterboard. The risk of interstitial condensation has been

There is only one window in the main building that does not already have secondary glazing (ground floor level to the front) which will have secondary glazing installed.

Ventilation

The current building has no background or extract ventilation and only purge ventilation by means of opening the windows. Therefore, any moisture generated by the occupants can only escape through the fabric of the building. The installation of background and extract ventilation will therefore be a significant improvement and ensure that moisture generated by the occupants is removed from the building in a controlled manner rather than relying on *ad hoc* dissipation through the fabric.

Compliance with Part F Section 3.11 – 3.16 (Historic and traditional buildings) will be met as follows:

3.11 The building meets criterion *a. listed buildings*.

3.12 When undertaking work on or in connection with a building that falls within one of the classes above, the aim should be to provide adequate ventilation as far as is reasonable and practically possible. The work should not prejudice the character of the host building or increase the risk of long-term deterioration of the building fabric or fittings.

The work will not prejudice the character – all ventilation outlets are to the rear of the building either through the external wall or rear roof area. Ducting will be hidden in the behind false ceilings or boxed in. The work will not increase the risk of long-term deterioration of the building fabric or fittings. By installing controlled ventilation the internal humidity levels can be controlled to ensure there is a reduced risk of condensation on the fabric. This is further enhanced by the insulation to external elements which will reduce cold spots and potential for localised condensation. The only negative is that any moisture in the external walls will no longer be able to move internally and dissipate within the building. However it is thought this has never been a particularly important route considering the wall thickness and current condition of the internal surfaces. On balance it is believed the risk to the fabric and fittings will be reduced.

3.13 The guidance given by English Heritage and in BS 7913 Principles of the conservation of historic buildings should be taken into account in determining appropriate ventilation strategies for building work in historic buildings.

Guidance in English Heritage and BS 7913 has been taken into account and has informed the choice of options. This has ensured an holistic non-standard approach has been taken to ensure.

3.14 In general, new extensions to historic or traditional dwellings should comply with the standards of ventilation as set out in this Approved Document. The only exception would be where there is a particular need to match the external appearance or character of the extension to that of the host building.

New extensions – whilst no new extensions are being constructed, the single storey building to the rear which was built in the 1980s will be converted in full compliance with the requirements of AD Part F. New windows will be fitted with trickle vents and wet rooms and the kitchen fitted with intermittent extract fans. Purge ventilation will be provided by the ability to open the windows and new rooflights in Flat 4.

3.15 *Particular issues relating to work in historic buildings that warrant sympathetic treatment and where advice from others could therefore be beneficial include:*

- a. *restoring the historic character of a building that has been subject to previous inappropriate alteration, e.g. replacement windows, doors and rooflights;*
Not applicable
- b. *rebuilding a former historic building (e.g. following a fire or filling a gap site in a terrace);*
Not applicable
- c. *making provision for the fabric of historic buildings to ‘breathe’ to control moisture and potential long-term decay problems.*

Particular attention has been paid to the guidance in sections 3.1 and 3.2 of the CIBSE guide to building services for historic buildings. Prior to conversion the existing external walls would have dried out by exposure to wind and sun externally and by evaporation internally. However, as already indicated heating in an office situation is at a lower level compared to residential and the existing building has no ventilation apart from the ability of occupants to open windows where necessary.

The external walls will not be treated externally in any way and the only change will be the installation of internal insulation, vapour barrier and plasterboard. This has the potential to reduce dissipation of moisture within the walls internally, but the wall thickness (400mm) and the absence of any current internal dampness in the walls, indicate that this is not the primary method of wall drying. It has been determined that interstitial condensation will not occur within the structure of the walls (Appendix 4) and the new ventilation system will ensure any internal moisture is dealt with in a controlled manner.

The flat on the top floor of the building will benefit from the installation of new rooflights which will contain trickle vents for background ventilation and be openable for additional purge ventilation.

3.16 *In determining what is adequate ventilation in the circumstances, it is important that the BCB takes into account the advice of the local authority’s conservation officer. The views of the conservation officer are particularly important where building work requires planning permission and/or listed building consent.*

The Local Authority Conservation Officer has expressed no specific opinion or set and specific requirements regarding the work only to say the work should comply with part F – which is what BCB are working on. A copy of the Listed Building consent is provided in Appendix 3.

Summary

The refurbishment has been designed to meet the requirements of Building Regulations Part F Section 3.11 – 3.16. In doing so it has taken account of the guidance provided by CIBSE, English Heritage and included in BS 7913. The refurbishment also complies with the requirements of the local planning authority Conservation Officer and the Building Control Body.

Appendix 1. Listed Building

QUEEN'S CRESCENT

List Entry Summary

This building is listed under the Planning (Listed Buildings and Conservation Areas) Act 1990 as amended for its special architectural or historic interest.

Name: QUEEN'S CRESCENT

List entry Number: 1113563

Location

QUEEN'S CRESCENT, 24-52, QUEEN'S ROAD

The building may lie within the boundary of more than one authority.

County:

District: Reading

District Type: Unitary Authority

Parish: Non Civil Parish

National Park: Not applicable to this List entry.

Grade: II

Date first listed: 22-Mar-1957

Date of most recent amendment: Not applicable to this List entry.

Legacy System Information

The contents of this record have been generated from a legacy data system.

Legacy System: LBS

UID: 39132

Asset Groupings

This list entry does not comprise part of an Asset Grouping. Asset Groupings are not part of the official record but are added later for information.

List entry Description

Summary of Building

Legacy Record - This information may be included in the List Entry Details.

Reasons for Designation

Legacy Record - This information may be included in the List Entry Details.

History

Legacy Record - This information may be included in the List Entry Details.

Details

QUEEN'S ROAD 1. 5128 Nos 24 to 52 (even) (Queen's Crescent) SU 7173 SE 3/225 SU 7273 7/225 22.3.57. II GV 2. 1832-33. J J Cooper architect (according to Colvin). A very slight crescent with houses on a skew, following the curve of the road. 3 storeys Bath stone ashlar. Channelled ground floor. Band over ground floor. Plain cornice and parapet. 3 ranges of glazing bar sashes each, 1st floor centre of each with pediment. Ground floor windows round headed, one each, No 44 1+3 (formerly 2 houses). Bracketed hoods to 4 panel doors with rectangular overlights and architrave surrounds. Butterfly roofs with brick chimneys. No 40 rendered. No 24 has no door but 3 round headed windows on ground floor.

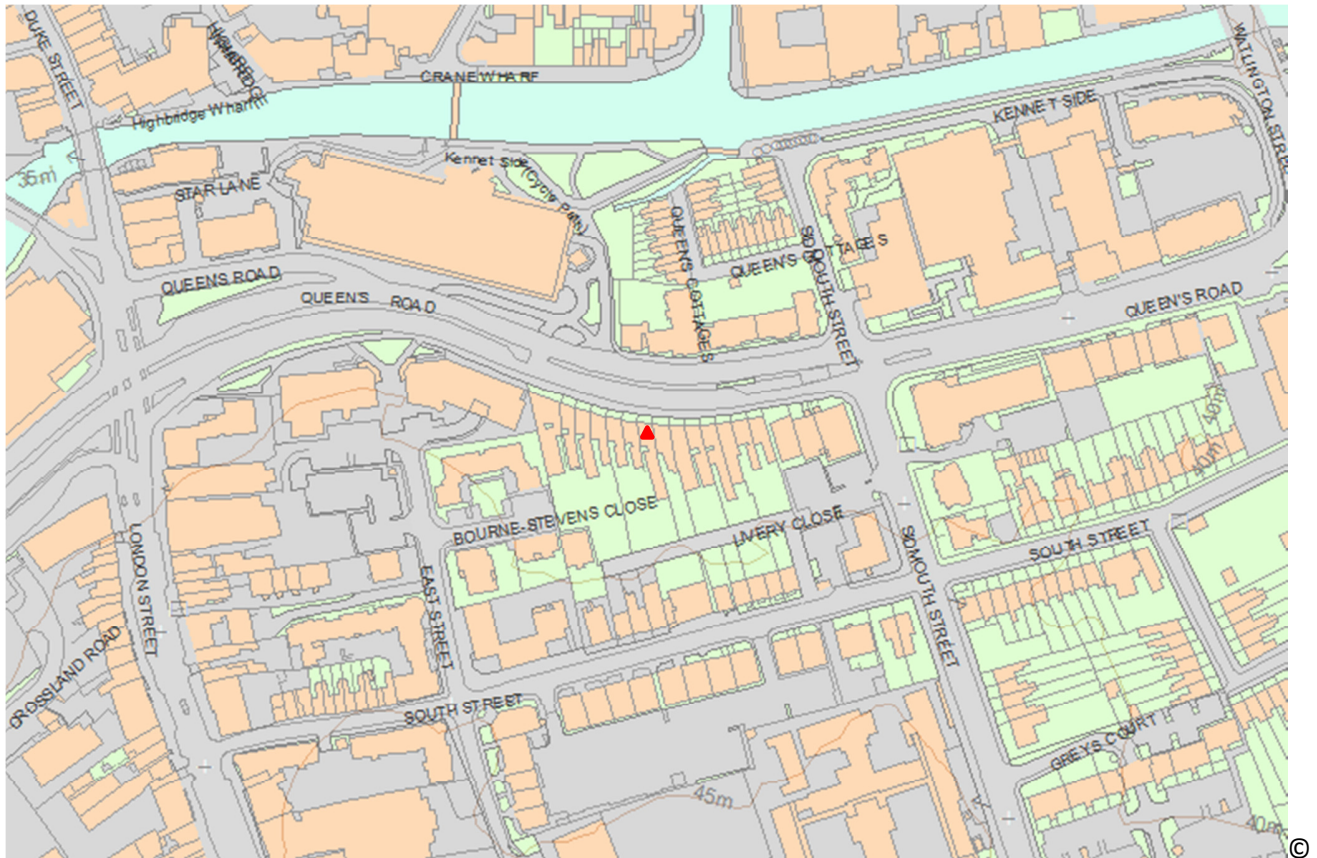
Listing NGR: SU7197873190

Selected Sources

Legacy Record - This information may be included in the List Entry Details

National Grid Reference: SU7197873190

Map



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Appendix 2 – Planning consent

Appendix 3 – Listed Building Consent

Appendix 4 – External wall interstitial condensation calculation