

MA11229 – Princess and Hanover Court

Dec 2021

Review of previous works and summary of structural condition

Further to a meeting with Martin Donnelly (Principal Surveyor) Cambridge City Council, and councillor Mike Todd-Jones, Millward were requested to review the previous works to the Princess and Hanover Court residential blocks, provide a brief summary of the works and consider the structural integrity of the buildings.

As preparation for the proposed Year 3 / Phase 3 works to the buildings Millward have reviewed structural reports produced by MLTS Limited together with drawings, spreadsheets and record photographs from the health and safety files of the previous works.

From the information reviewed we note the following information:-

Building structure

There are no record drawings or design calculations available of either structure however some limited drawing information was available on the Kingsway development which is of the same architectural design. The building is construction is as follows:-

- Load-bearing masonry with cross walls (across the width of the building) at regular centres along the length of the building providing both vertical supports for the floors/roof and lateral support from wind.
- Gable walls consists of 4½" brickwork outer leaf / cavity / 9" brickwork inner leaf.
- Internal cross walls and other load-bearing internal apartment walls are 9" brickwork.
- Main elevations are 4" brickwork outer leaf / cavity / 4" blockwork inner leaf.
- Precast concrete roof and floors spanning between the gable walls, the cross walls and other internal load-bearing brick walls.
- Foundations are believed to be traditional mass concrete footings.

From the limited intrusive investigations undertaken by MLTS Ltd on the car park masonry walls it would appear that the 9" brickwork walls are two skins of stretcher bond brickwork leaves, collar jointed with metal ties but with no mortar between the two skins. There was also some concern regarding concentration of wall ties although the information is not clear from the report. The cross walls within the building are presumed to be the same construction.

Record of recent remedial works to the buildings

From the health and safety files it has been determined that the following remedial works have been undertaken in recent years.

- Year 0 (2014/15) – Masonry repairs and masonry restraints added to multi-storey car park.

- Year 1 (2016/17) – Roof finishes, roof lights and safety handrailing. During these works defects were noted to the concrete aprons at the top of the buildings. The concrete was suffering from carbonation corrosion and a number of steel support shims were corroding/expanding causing spalling of concrete. The concrete aprons were tap tested and loose sections were removed to prevent any hazardous falling objects.
- Year 2 (2018/19) – Repair works were undertaken to the concrete aprons removing the defective concrete and repairing with Sika cementitious products plus a protective anti-carbonation coating. During these works numerous cracks were noted in the external walls.

A full survey of the building was instructed by Cambridge City Council which included the perimeter walls, internal communal walls, lift shafts, bin chutes and concrete balconies. From the survey and subsequent report by MLTS Ltd the following defects and possible causes were noted:-

- The concrete balcony feature panels were suffering from carbonisation corrosion similar to the concrete aprons.
- There were numerous extensive cracks in the external walls which were believed to have been caused predominantly by wind loads onto the structure but also possibly due to settlement of the foundations and/or the effects of thermal expansion/contraction during the changing seasons and weathering of the structure.
- Concentration of masonry cracks over feature openings in the elevations where loads are concentrated onto slender masonry elements such as the external cross walls and stairwell entrances.
- Cracks and possible movement in the slender masonry bin chute towers and link corridors.
- Numerous ferrous metal scaffold wall ties have been left in the external brickwork which have corroded/expanded and caused the brickwork to spall.

The proposed remedial works for these defects were :-

- Sika cementitious concrete repairs to the balcony feature panels similar to the works to the concrete aprons. Note this work was not completed during the Year 2 works and is proposed to be undertaken in the next phase of works.
- Stitch repairs to the masonry cracks with stainless steel Helifix ties bonded within the bed joints.
- Strengthening large masonry lintels with Helifix bed joint reinforcement.
- Strengthening the external cross walls with steel posts hidden within masonry piers all built off existing foundations that were increased in size where necessary.

- Stainless steel Helifix masonry bed joint ties wrapped around the bin chute towers at regular centres from ground level up to the roof.
- Structural steelwork posts installed at regular centres along the link corridors to the bin chutes in order to restrain the masonry parapet walls and stiffen the concrete walkway.
- The old ferrous metal scaffold wall ties were removed, and the brickwork repaired.

During the contract, the extent of the works is understood to have gone beyond what had been financially allowed for and therefore the work were curtailed, addressing the areas that were of the greatest concern.

- Year 3 (2021/22?) – During 2021 as part of Millward's commission we have inspected the building to determine what repairs have been completed, what items are remaining off the original defect lists and where there were any new areas requiring remedial work. All of the previous remedial works that could be viewed from the ground and communal floor areas were in good condition with no signs of movement or distress indicating that the remedial works have been successful.

Following the proposed remedial works identified on Millwards spreadsheets, drawings, and photographic records all of the known defects to the buildings will have been addressed and the building can continue to provide accommodation for the residents for many years subject to the usual inspections and maintenance that would be expected of any property.

Gas Safety – Disproportionate Collapse – It is understood that the building did not have gas supplied to the property when it was originally built but that it had been subsequently installed and that a few of the apartments had gas appliances within the properties. Millward were commissioned to review the structure in light of the gas supply and the requirements of the Building Regulations for disproportionate collapse. The buildings were built just prior to the Ronan Point failure where a gas explosion caused the corner of the 22 storey tower block to collapse killing 4 people and injuring 17 other residents. Following this incident the building regulations were amended and the structures needed to be designed with adequate ties between the walls and floors to prevent a repeat of the disaster. All buildings built prior to the incident were considered to be satisfactory provided they did not have gas supplied to the properties. Millward's design calculations on the known information about the structure proved that the building would not be able to satisfactorily resist a gas explosion and therefore it was recommended that the gas supplies were removed. It is understood that this work has now been completed and the properties are therefore no longer at risk.

Multi-storey car park – it is understood that there is a proposal to demolish the car park, at some point in the future for possible redevelopment. Considering the extent of repairs to the gable elevation and the lift shafts it would be prudent to review the support of the main

building by the car park structure and the potential strengthening requirements, prior to any demolition.

- Survey the main building and car park structures.
- Intrusive investigations of connection details between the two structures.
- Expose foundations locally to the area.
- Calculation checks of wind load to exposed lift shaft, and possible effects.