

**EDUCATION AND SKILLS COMMITTEE**

**School infrastructure inquiry**

**Submission from Dundee City Council  
25 May 2017**

Dear Ned,

In response to your update for the School Infrastructure Enquiry, we have taken a recent report to our Policy and Resource Committee that has all the necessary details that I am sure you will require. If you require further information please let me know.

Sincerely,

Paul Clancy

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***Paul Clancy  
Executive Director of Children and Families Service  
Children and Families Service***

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**REPORT TO:** POLICY & RESOURCES COMMITTEE – 24 APRIL 2017

**REPORT ON:** REVIEW OF INDEPENDENT INQUIRY INTO THE CONSTRUCTION OF EDINBURGH SCHOOLS

**REPORT BY:** EXECUTIVE DIRECTOR OF CITY DEVELOPMENT

**REPORT NO:** 158-2017

## **1 PURPOSE OF REPORT**

1.1 The purpose of this report is to summarise the findings of the recently published Independent Inquiry into the Construction of Edinburgh Schools and advise on Dundee City Council's position relating to the issues raised and recommendations made.

## **2 RECOMMENDATION**

2.1 It is recommended that the Committee notes the contents of this report and agrees that Dundee City Council will implement the best practice recommendations of Inquiry.

## **3 FINANCIAL IMPLICATIONS**

3.1 There are no direct financial implications arising from this report.

## **4 BACKGROUND**

In January 2016, part of an external wall at Oxgangs Primary School in Edinburgh collapsed during high winds, in the hours prior to normal school opening times. During the subsequent investigation of this and other PPP schools, construction defects were uncovered which led to the closure of 17 Edinburgh schools for a significant period of time. An independent inquiry was commissioned by the Chief Executive of Edinburgh City Council, remitted to determine the underlying cause of and responsibility for the construction defects as well as providing recommendations for future projects.

### **4.1 Structural Arrangement of Affected Schools and Builderwork Terminology**

The affected PPP schools in Edinburgh were all of similar structural layouts; steel frames with external walls of masonry construction. This form of construction is not unusual or innovative and is widely used and understood in the UK. In this form of construction the structural steel frame carries the weight of the building and the walls cladding the building resist wind loading, transferring these forces back to the structural frame. In order to do so the walls typically require builderwork components installed within their construction. The following are technical terms used within the report:-

Cavity walls are the external cladding to the envelope of the building formed by two leaves of brick or blockwork separated by a gap, or cavity, which provides insulation and a weatherproof barrier between inside and outside faces.

A wall panel is a portion of an elevation, subdivided, bounded by and connected to the beams and columns of the structural frame.

Wall ties provide stability to cavity walls as they connect inner and outer leaves together so that they act as one single structural element. These are typically stainless steel bars installed at a predefined quantity in walls and importantly must be embedded a minimum of 50mm into both inner and outer leaves of the wall.

Wall head restraints are stainless steel ties used to connect the top of the cavity wall back to the structural frame to allow wind loads to be transferred to the principal structure.

Bed joint reinforcement comprises stainless steel wire bedded in masonry joints and is used to improve the stiffness of masonry walls and assist in wind load resistance.

Fire stopping is a system used to seal openings and joints in fire resistant floors or walls, preventing the spread of smoke and fire into other areas of the building.

## **4.2 Conclusions of Edinburgh Inquiry**

The Inquiry determined that the wall at Oxfangs Primary School failed as a result of inadequate wall tie embedment in the original construction. A contributory reason for this was that the inner leaf of the cavity wall was constructed in advance of the outer leaf. Normally, both leafs are constructed together which allows adjustments and tolerance in wall tie installation. Had the wall been built correctly, the structural design was considered adequate to resist the wind loadings and would not have failed.

Inspections at the other Edinburgh Schools highlighted similar construction issues and observed areas of missing head restraint, bed joint reinforcement and under-embedded wall ties. Although the inspection concentrated on the components required for integrity of cavity wall construction, a common thread of deficient fire-stopping was also noted during these inspections.

One of the remits of the Inquiry was to determine if the PPP procurement process had led to the construction shortcomings. In principle, the Inquiry determined that the PPP procurement process in itself was not intrinsically at fault. The defects in construction were ultimately the contractor's responsibility. Conventionally, clerk of works, resident engineers and similar independent representatives are appointed to closely monitor construction quality on site. These appointments were absent from the Edinburgh PPP projects and there was a reliance on the contractor's own self checking of quality. The brief of Independent Certifiers appointed for these PPP projects was misunderstood as the role was more progress focused with ad-hoc visits rather than the closer scrutiny of a clerk of works resident on site. Similarly, the Inquiry concluded that there was a general lack of understanding in the nature and extent of the role that Building Standards provide in site inspections of construction works.

The Inquiry therefore concluded that the level of independent site supervision briefed and provided and misunderstandings on the reassurance provided by this site supervision resulted in gaps in scrutiny that may have allowed the observed quality issues to occur on site otherwise undetected. The inquiry made no comment on whether the quality issues were intentional or otherwise but concluded that the skills shortage in the construction industry may have contributed to these defects and that similar defects had been encountered in other Scottish authorities.

## **4.3 Recommendations of Edinburgh Inquiry**

The Inquiry detailed several recommendations, summarised as follows.

### **4.3.1 Procurement**

Whilst not citing the PPP/PFI process as the cause of the construction defects, it was recommended that public sector bodies maintain or have access to a level of expertise and resources to act as an intelligent customer when procuring public buildings with due diligence in terms of defining a developed brief, setting of quality standards and ensuring compliance with specification.

#### **4.3.2 Independent Inspection/Certification**

Modern forms of procurement have reduced the traditional use of Clerk of Works and resident engineers and the substitution of the Independent Certifier in the construction inspection role does not necessarily have the same level or depth of coverage. The role and level of service provided of those appointed to review construction quality requires to be more defined by clients to reflect the extent and level of construction checking required to ensure compliance.

#### **4.3.3 Client's Relationship With Design Team Members**

In several models of procurement, the client relationship is removed from the design team such that the client should review their procurement arrangements to allow them to benefit from their professional advice and expertise.

The scope of the design team appointment should be appropriately defined, including their proposed role in inspecting works on site and liaison with the client on any safety or functionality matters raised with the contractor.

#### **4.3.4 Information Sharing**

Recommendations on information sharing concentrated on the design team members appropriately conveying their design intent through documentation, specifications and drawings such the importance of wall ties, bed joint reinforcement and wall head restraint should be readily expressed to those constructing the buildings.

Additionally, the accuracy of as-built information and deviations from the designers' details require to more coherently documented and collated into records, prepared and certified by the contractor for retention by the client.

#### **4.3.5 Construction Processes and Industry Training**

The Inquiry recommended the construction industry review the appropriateness of the practice apparent in the Edinburgh Schools of building inner and outer leafs of cavity walls at different times.

The Inquiry recommended that building component manufacturers investigate the design of products that are more buildable and readily aid assessment of correct installation. Due to the difficulty of post-construction inspection, it was also recommended that sign off processes are reviewed and developed by contractors to verify quality and completeness of construction prior to the cavity being closed off.

Inspections in Edinburgh observed other quality issues with construction, principally in fire-stopping. This was sufficiently widespread for the Inquiry to recommend that inspection and certification of installation compliance should be part of the requirements for gaining Completion Certification by Building Standards.

The Inquiry recommended that the construction industry reviews its own training and recruitment schemes to deal with a considered skills shortage in order to develop a highly skilled bricklaying workforce with emphasis on the importance of the role of properly installed builderwork components.

#### **4.3.6 Building Standards**

The Inquiry noted that the typical frequency of site visits and the nature of inspections undertaken by Building Standards Departments could only confirm that buildings are generally built in accordance with approved warrants and not of a detail necessary to

identify the risks to user safety identified in the Inquiry. The Inquiry recommended that consideration be given to extending mandatory inspection and certification of certain building elements by approved certifiers to demonstrate compliance where this cannot be practically undertaken by Building Inspectors themselves. The Inquiry did note that this would require a legislative change.

However, the Inquiry did recommend that site visits undertaken by Building Inspectors are planned to ensure these properly reflect a prioritisation of the identification and inspection of areas of higher risk. Additionally, it was recommended that sanctions are more widely enforced for non-compliance and a more stringent control of temporary occupation certificates out in place to prevent abuse of the system.

#### **4.3.7 Further Investigations**

Finally, the report recommended that other clients with recently constructed buildings of similar structural form should undertake a similar risk-based approach to inspection and investigation of their properties. Information sharing between authorities was also recommended such that emerging issues could be communicated and actioned in a co-ordinated fashion.

#### **4.4 Dundee City Council's Position on Recommendations of Edinburgh Inquiry**

The following details Dundee City Council's response to the Edinburgh Inquiry and its position on the recommendations arising from the Inquiry.

##### **4.4.1 Structural Inspection of Properties**

Following the Edinburgh incident, Dundee's recent estate was inspected to determine if similar issues within cavity walls were present in properties of a similar age and construction.

##### **PPP Schools**

All eight of Dundee's PPP Schools were inspected visually and subsequently intrusively to determine if structural defects were evident and whether wall ties, wall head restraints and bed joint reinforcement, where required by design, were installed correctly. Investigations were co-ordinated by Discovery Education plc and undertaken by the original designer and verified by an independent consulting engineer.

In these schools, cavity masonry construction is primarily limited to games halls and these areas were the prime focus of investigations. These intrusive inspections, in principle, confirmed appropriate build quality throughout the properties including suitable provision and embedment of wall ties and the provision of bed joint reinforcement and wall head restraint. However, at three PPP schools, some deficiencies were encountered.

At Craigowl PS and St Andrews RC PS, isolated wall panels were found to be missing some bed joint reinforcement and/or some wall head restraint ties, both required by design and specified as part of the construction drawings. The reason for these components being omitted at the noted locations is not apparent but their incorporation in other areas of the same buildings does not suggest an inherent construction issue.

The as-installed structural capacity was reviewed by Discovery Education's appointed structural engineers and three wall panels were found to be operating at a factor of safety less than structural design codes require. Remedial works were undertaken during school holidays to restore the affected wall panels back to their original intended design capacity.

At Grove Academy, wall tie embedment was found to be below minimum design requirements at some locations and several wall panels were missing their specified wall head restraint ties. This has been addressed through the provision of retro-fitted wall ties and masonry wall head restraint such that the affected wall panels retain their original intended design capacity.

#### **Non-PPP Properties**

Non-PPP properties were inspected by the City Engineer and these inspections comprised seven schools and six non education sector buildings, concentrating on areas of cavity masonry construction and their interaction with the structural frame. Similar to the PPP properties, these buildings only adopt cavity masonry construction for additional robustness in areas such as games halls, plant rooms and stairwells. In addition to the inspections, reference was made to as-built drawings, calculations and comprehensive record photographs taken by DCC Clerks of Works during construction of these properties. These records allowed sufficient verification of build quality without recourse to disruptive or intrusive investigations. In summary, there were no deficiencies apparent in the cavity wall provision for these properties.

#### **4.4.2 Procurement**

Dundee City Council utilise several procurement methods for construction works, these proportionate to the scope, extent and risk of the projects undertaken. A dedicated Capital Projects team is located within the Design and Property Division which has the appropriate level of technical expertise to act as "intelligent client" for developing briefs, setting of quality standards and ensuring quality compliance. Additionally, commonly used procurement routes such as the SCAPE framework allow early contractor engagement such that good governance is in place from design through to construction.

#### **4.4.3 Independent Certification / Inspection**

The Design and Property Division have a team of 14 Clerk of Works for Capital Projects undertaken within Dundee City Council. As well as providing independent scrutiny on the contractor's work, record photographs and "sign-off" inspection sheets are implemented throughout to manage and assess quality of work, including reporting and correction of non-conformances. These are particularly used in cavity wall construction and fire-stopping areas where future compliance inspections become difficult once the works are sealed up.

#### **4.4.4 Client's Relationship with Design Team Members**

The Design team members are retained during the construction phase of Dundee City Council's capital projects to provide feedback and resolution of technical queries as well as site attendance during the construction. The in-house consultancy services within the Design and Property Division allow for this relationship of on-going dialogue to be more direct than would necessarily be the case with outside parties.

#### **4.4.5 Information Sharing**

Dundee City Council's use of procurement methods such as the SCAPE framework allows early engagement with the contractor such that information can be shared at an early stage in the design process, mitigating against issues with technical details and buildability on site.

A working group is currently defining how Dundee City Council will implement Building Information Modelling (BIM) which will improve the retrieval and ease of understanding of construction information and management of its buildings.

#### **4.4.6 Construction Processes and Industry Training**

This requires the general construction industry to improve its competence and is difficult for Dundee City Council to directly influence. However, Dundee City Council do ensure that robust quality assessments are included in procurement exercises to verify those contractors appointed have the appropriate skills.

#### **4.4.7 Building Standards**

The work of Building Standards has two main elements: checking that building plans comply with regulations when an application is made for a building warrant and undertaking reasonable inquiries to verify that the building work complies with the approved plans and with regulations.

Building standards cannot and are not required to supervise or monitor every activity on a building project nor can they be present at all times. The supervision of building work is the responsibility of the building owner who should appoint a building professional to supervise the work to ensure the standard of workmanship is satisfactory and meets the building regulations.

Currently the building standards service adopts a risk assessed approach, so as to ensure resources are applied where the greatest risk of non-compliance exist. The risk assessment allows for a Construction Compliance & Notification Plan (CCNP) to be created, this is issued along with the building warrant. The CCNP confirms the different stages of the project where the owner or developer should notify Building Standards and provide an opportunity to inspect.

Along with Local Authority Building Standards (LABSS), DCC Building Standards intends to work with the Building Standards Division of the Scottish Government to help develop any proposed changes to the current reasonable inquiry process in light of the Edinburgh Schools Inquiry.

#### **4.4.8 Further Investigations**

Dundee City Council responded as part of the Inquiry by undertaking an investigation of its recently constructed schools and other buildings of similar construction to Edinburgh's Oxbgangs Primary School, both PPP and non-PPP. The findings of these investigations (outlined in this report) have been shared with and feature in the Inquiry.

It should be noted that Dundee City Council undertakes regular, cyclical and structural inspections of its entire estate with targeted maintenance to ensure buildings continue to be safe to use.

Opportunities for information sharing between authorities exists through inter authority working groups such that emerging issues can be communicated and actioned in a co-ordinated fashion.

### **5 CONCLUSION**

5.1 A review of the Independent Inquiry into the construction of Edinburgh schools has been carried out and generally, Dundee City Council currently complies well with the best practice recommendations contained therein.

5.2 All of Dundee City Council's properties of similar build to those of Edinburgh Schools Inquiry were thoroughly investigated at the time and confirmed as safe for occupancy. Relatively minor works were required to address issues in three PPP schools. These

works were carried out at no cost to the Council generally over school holidays with no real impact on the operation of the schools.

## **6 POLICY IMPLICATIONS**

6.1 This Report has been screened for any policy implications in respect of Sustainability, Strategic Environmental Assessment, Anti-Poverty, Equality Impact Assessment and Risk Management. There are no major issues.

## **7 CONSULTATIONS**

7.1 All members of the Council Management Team have been consulted and are in agreement with the contents of this report.

## **8 BACKGROUND PAPERS**

8.1 None.

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FW/NM/MS

6 April 2017

Dundee City Council  
Dundee House  
Dundee