

Kidderpore Avenue, Hampstead

Engineering Note: Unreinforced clinker concrete floors to Maynard Wing

1.0 Introduction

- 1.1 This report is in regard to the 'clinker' concrete construction of some corridor floors in Maynard Wing. It was observed during site visits that numerous longitudinal cracks were becoming evident to the underside of the floor. Propping has been put in place as a precautionary temporary support measure. The locations affected are at upper ground and first floor level as indicated on the key plans in the appendix (section 4) of this Engineering Note.
- 1.2 Local opening up of the floor has shown that there is no reinforcement or any other form of steel support to the areas affected. The span of the floor in these locations is approximately 1800mm. It was also observed that the floor appears to be formed of a number of regular square sections. This suggests a form of precast unit that was then grouted in place. This means that the floor has limited overall structural integrity compared to casting the slab fully insitu. The longitudinal crack observed along the centre of the corridor coincides with a joint in the above noted units.

2.0 Discussion

- 2.1 'Clinker' concrete floors are most frequently encountered in a form of construction known as 'filler joist'. In this form steel or wrought iron joists are cast into the floor at varying centres, usually up to a maximum of around 48" (approximately 1200mm) centres. The clinker concrete tends to be unreinforced and relies on arching action to span between the joists. This spacing of 1200mm is considered to be around the maximum span for an unreinforced clinker slab used in this type of floor construction.
- 2.2 The form of construction encountered is very unusual and is not something that we have seen previously from our extensive experience of refurbishment projects. For the slab to work effectively it has to arch across the corridor. The resulting arch is too flat to support the imposed loads safely as localised point loads. The resulting thrust lines will likely be outside the profile of the slab which leads to the type of cracking seen in the soffit. We would therefore be unable to prove that the existing construction can span the corridor with acceptable factors of safety for its ongoing use as residential property.
- 2.3 In view of the above we consider that there are two basic options available regarding making the floor both structurally adequate and safe:
1. Provide a new framing under the existing floor to fully support the existing unreinforced floor.
 2. Remove the existing floor completely and replace with new construction designed to current standards.
- 2.4 While the first option retains the existing structure, the process of installing a steel support frame under the existing slab would be disruptive. It would require many steel beams to be added at regular centres. To avoid compromising headroom and the service void these steels would be need to be shallow. This means the beams would be required at close centres. Installing these would require pockets to be cut into the loadbearing walls each side of the corridor. A steel plate or further longitudinal steels would then be required to properly support the underside of the existing slab. It cannot be guaranteed that this extend of work would not disturb the floor to such an extent that it could compromise the stability of the existing construction further.
- 2.5 The second option requires the existing unreinforced clinker concrete slab to be removed and replaced with a new structure. Options here are either a new reinforced concrete floor or traditional timber joists and boarding. Both will require the wall to be made good where the clinker concrete is removed. The concrete option will be heavier than the current clinker concrete and it will be difficult to place wet concrete in the confines of the existing building, also significant temporary propping would be required to support the wet concrete until it hardens. Timber joisted floors are used elsewhere in the building and

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are considered more sympathetic to the existing structure and to be a safer and more practical option than a reinforced concrete solution.

3.0 Recommendations and Conclusions

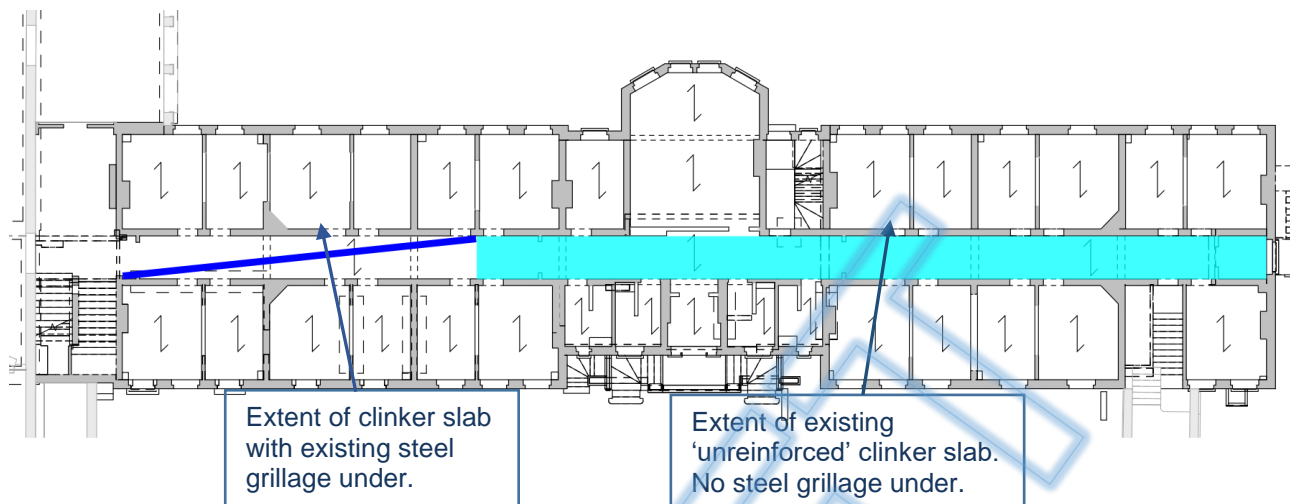
- 3.1 The floor is currently considered unstable and must remain propped until replaced or re-supported.
- 3.2 We consider that the most appropriate remedial action would be to remove the existing clinker concrete and replace with a timber joist construction as used elsewhere in the building.

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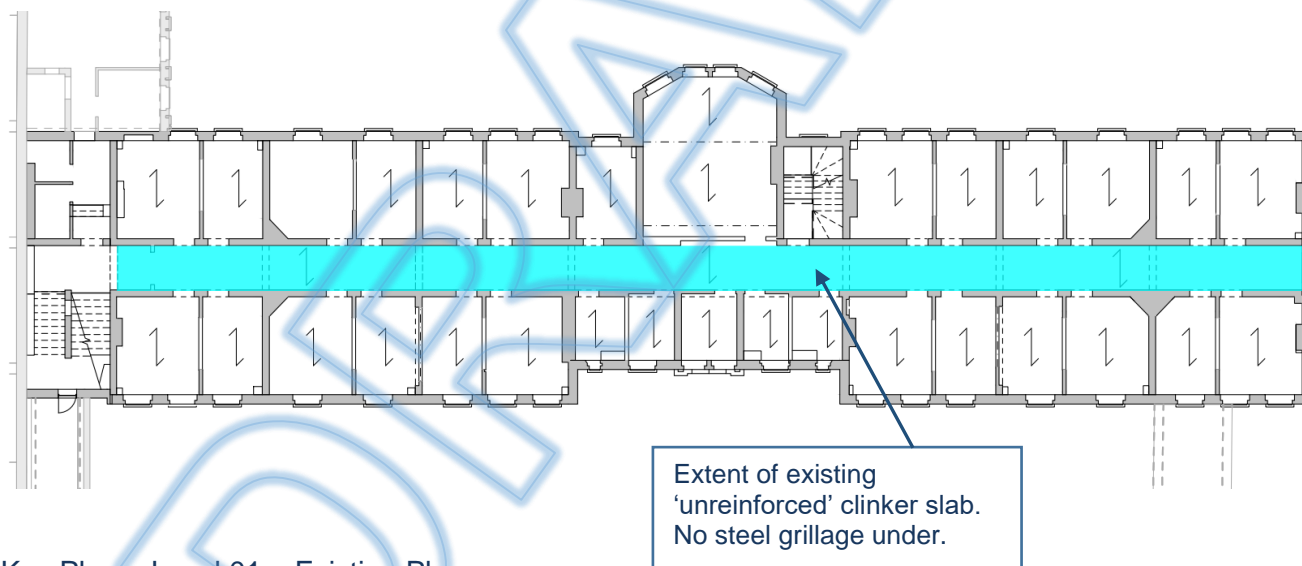


4.0 Appendices:

Appendix A: Key Plans showing extents of unreinforced linker concrete corridor floors



Key Plan – Upper Ground Floor – Existing Plan



Key Plan – Level 01 – Existing Plan