RIDGE

LPS OPTIONS STUDY
BRIGHTON & HOVE CITY COUNCIL
April 2025

LPS OPTIONS STUDY

BRIGHTON & HOVE CITY COUNCIL
April 2025

Prepared for

Brighton & Hove city council
Housing Centre Unit 1
Fairway Trading Estate
Eastergate Road Brighton
Post Code
BN2 4QL

Prepared by

Ridge and Partners LLP
1 Royal Court
Kings Worthy
Winchester
Hampshire
S023 7TW

Tel: 01962 834400

Contact

Rob Leland
BEng MSc CEng MICE
Senior Associate, Structural Engineering
RLeland@ridge.co.uk
07500 097333

VERSION CONTROL

PROJECT NAME: LPS Options Study
PROJECT NUMBER: 5025201
DOCUMENT REFERENCE: 5025201-RDG-XX-XX-RP-S-2001

REV	DATE	DESCRIPTION	AUTHOR	CHECKER	APPROVER
P01	30/04/2025	Initial Issue	Rob Leland BEng MSc CEng MICE	James McCulloch BEng MSc CEng MICE	Steve Cross MRICS
P02	12/06/2025	Addition on ECE Architecture Option 2 report.	Rob Leland BEng MSc CEng MICE	James McCulloch BEng MSc CEng MICE	Steve Cross MRICS

CONTENTS

1. INTRODUCTION 6
1.1. Structural Engineering Brief 6
1.2. Report Contents 6
1.3. Associated Reports 6
1.4. Statement 6
2. UNDERSTANDING THE PROJECT 7
2.1. The Sites 7
3. STRUCTURAL STRENGTHENING 10
3.1. Bird Blocks 10
3.2. St James House 10
3.3. Nettleton Court & Dudeney Lodge 10
3.4. FRP Strengthening 12
3.5. Consequential Works 13
4. FIRE UPGRADES 13
4.1. Immediate (0-6 month) 13
4.2. Short Term (6 months-2 years) 13
4.3. Longer Term (3-5 years) 14
5. M&E UPGRADES 14
6. DECANT 14
6.1. Bird Blocks & St James House 14
6.2. Nettleton Court & Dudeney Lodge 14
7. PROGRAMME 14
8. COSTS 15
9. APPROACH 17
9.1. Discovery and Understanding of the Buildings 17
10. ANTICIPATED SCOPE OF WORKS AND CLIENT BRIEF 18
10.1. Structural and Compliance Works 18
10.2. Compliance with Building Regs & Building Safety Act 18
10.3. Improving Thermal Comfort 18
10.4. Other Energy Efficiency Upgrades 19
10.5. Additional Consequential Works 19
11. DECANT 19
12. PROGRAMME 19
13. COSTS 20
14. EXISTING BUILDING UPGRADES 20
14.1. Bird Blocks: 20

14.2. Nettleton Court & Dudeney Lodge 21
14.3. St James House: 21
14.4. Lifts 22
15. REFURBISHMENT OPPORTUNITIES 22
16. DEMOLITION APPROACH 24
16.1. Demolition Risk Mitigation 24
16.2. Discovery and Understanding the Buildings 26
16.3. Key Surveys 26
16.4. Other Key Actions Required 26
16.5. Demolition Programme 28
16.6. Demolition Costs 28
17. REGENERATION APPROACH 29
17.1. Regeneration Programme 30
17.2. Regeneration Costs 30
18. REGENERATION OPPORTUNITIES 30
18.1. St James House 30
18.2. Dudeney & Nettleton 31
18.3. Bird Blocks 32
19. SUSTAINABLE DRAINAGE 34
19.1. SuDS Hierarchy 34
19.2. Green Roofs 36
19.3. Blue Roofs 37
19.4. Suds Hierarchy Considered Within the Design 38
20. SUBSTRUCTURE PHILOSOPHY 39
20.1. Outline Substructure Philosophy 39
20.2. Pile Re-Use 39
21. SUPERSTRUCTURE PHILOSOPHY 40
21.1. Flat Slab Concrete Frame 40
21.2. Alternative Solution Above 7 Storeys, Post Tensioned Flat Slab 41
21.3. Slim Floor System with Steel Braced Frame 42
Advantages 44
22. SUSTAINABILITY / ENERGY STRATEGY 44
23. CONCLUSIONS 46
23.1. Next Steps 46

1. INTRODUCTION

1.1. Structural Engineering Brief

Ridge and Partners LLP (Ridge) were appointed by Brighton and Hove City Council (BHCC) to provide a report looking at the next step options for the eight LPS blocks within the BHCC stock. The client would like the report to cover the following scenarios:

- Option 1 – Essential building safety works including completing strengthening works and essential fire safety works in isolation and understanding the impact on tenants, programme, finance, etc.
- Option 2 – Strengthening works and full refurbishment of the blocks, improving fire safety, improving thermal comfort, energy efficiency and ensuring the refurbishment complies with new building regs, Building Safety Act.
- Option 3 – Demolition of existing buildings and new build from scratch.

1.2. Report Contents

The report covers eight existing LPS buildings within the BHCC stock. These are split across three sites, as follows:

- Bird Blocks – Whitehawk Estate:
  - Heron Court
  - Kingfisher Court
  - Swallow Court
  - Kestrel Court
  - Falcon Court
- St James House – Chapel Street
- Nettleton Court & Dudeney Lodge – Upper Hollingdean Road

1.3. Associated Reports

This report should be read in conjunction with the following documents:

- 5025201-RDG-XX-XX-RP-S-2001 – LPS Further Advice Report – Ridge and Partners – April 2025
- Ridge structural strengthening drawings and reports for all blocks.
- ECE Reports:
  - 7567_DO01_rev A – Hollingdean Interim Ideas Presentation
  - 7567_DO02_rev A – North Whitehawk Interim Ideas Presentation
  - 7567_DO03_rev A – St James House, Kempton Interim Ideas Presentation

1.4. Statement

The report is for the sole benefit and may only be relied upon by the addressee, to whom we will owe a duty of care. This report or any part of it is confidential to the addressee and should not be disclosed to any third party for any purpose, without our prior written consent of Ridge and Partners LLP as to the form and context of such disclosure. The granting of such consent shall not entitle the third party to place reliance on the Report, nor shall it confer any third-party rights pursuant to the Contracts (Rights of Third Parties) Act. This report may not be assigned to any third party.

2. UNDERSTANDING THE PROJECT

2.1. The Sites

Figure 1 – Site locations within the city of Brighton

2.1.1. St James House

Figure 2 – Aerial view of St James House

2.1.2. Nettleton Court & Dudeney Lodge

Figure 3 – Aerial view of Dudeney Lodge and Nettleton Court

2.1.3. Bird Blocks at Whitehawk Estate

Figure 4 – Aerial view of the Bird blocks

507

OPTION 1

Essential Building Safety Works

The various assessments of the blocks recommended that as a minimum the blocks should be strengthened, to suit the requirements of the LPS Assessment, and sprinklers should be added throughout to control the fire spread in the buildings. This option looks at the requirements within the blocks for these works and the consequential works that will be required to accommodate them.

At this stage this option does not include for works required to bring the building up to current building regs standards. The regulations state that if the total value of the consequential works is less than 10% of the cost of the main works then it is not required to upgrade the building in line with Part L of the building regulations. It is assumed that this will not be the case.

3. STRUCTURAL STRENGTHENING

Initial strengthening designs and drawings have been produced for each of the block archetypes. The basis of the design is to provide sufficient ties between vertical and horizontal concrete panels and to provide additional capacity to the panels, where required.

Please refer to 5025201-RDG-XX-XX-RP-S-2001 – LPS Further Advice Report – Ridge and Partners – April 2025 for a summary of the general principles of the strengthening design.

3.1. Bird Blocks

Strengthening is required to the internal floor slabs and walls within the Bird Blocks. This includes:

- Strapping to the slab soffits to strengthen the slabs
- Steel angles at wall and floor junctions to tie the horizontal and vertical elements
- Steel frame to flank and cross walls to provide additional strengthening to wall panels

3.2. St James House

Strengthening is required to the internal floor slabs and walls within the St James House. This includes:

- Strapping to the slab soffits to strengthen the slabs
- Steel angles at wall and floor junctions to tie the horizontal and vertical elements
- External steel frame fixed through to angles to provide additional strengthening to flank wall panels

3.3. Nettleton Court & Dudeney Lodge

Strengthening is required to the internal floor slabs and walls within Dudeney and Nettleton. This includes:

- Strapping to the slab soffits to strengthen the slabs
- Steel angles at wall and floor junctions to tie the horizontal and vertical elements
- Steel frame to flank and cross walls to provide additional strengthening to wall panels

3.3.1. Typical Strengthening Details

The following details demonstrate the typical strengthening details for each of the blocks. Further information on the strengthening design is detailed within the Ridge structural strengthening design drawings.

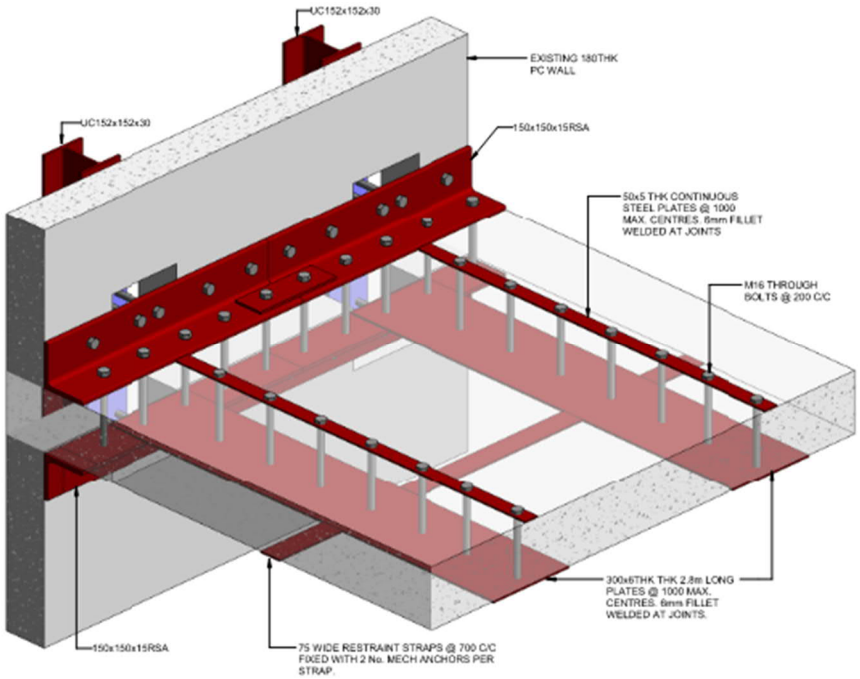


Figure 5 – Typical flank wall strengthening detail with external columns – St James House

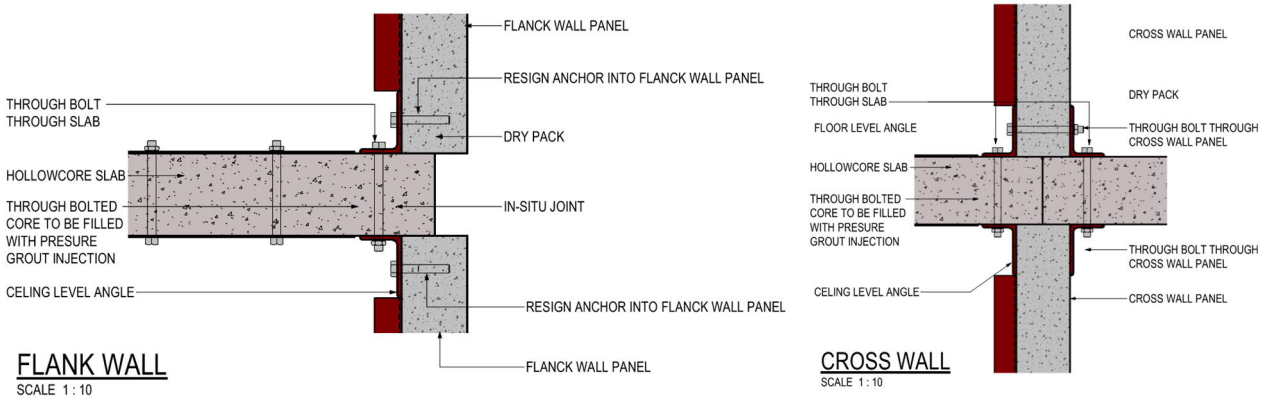


Figure 6 – Typical flank and cross wall / slab junction strengthening detail – Bird Block, Nettleton & Dudeney

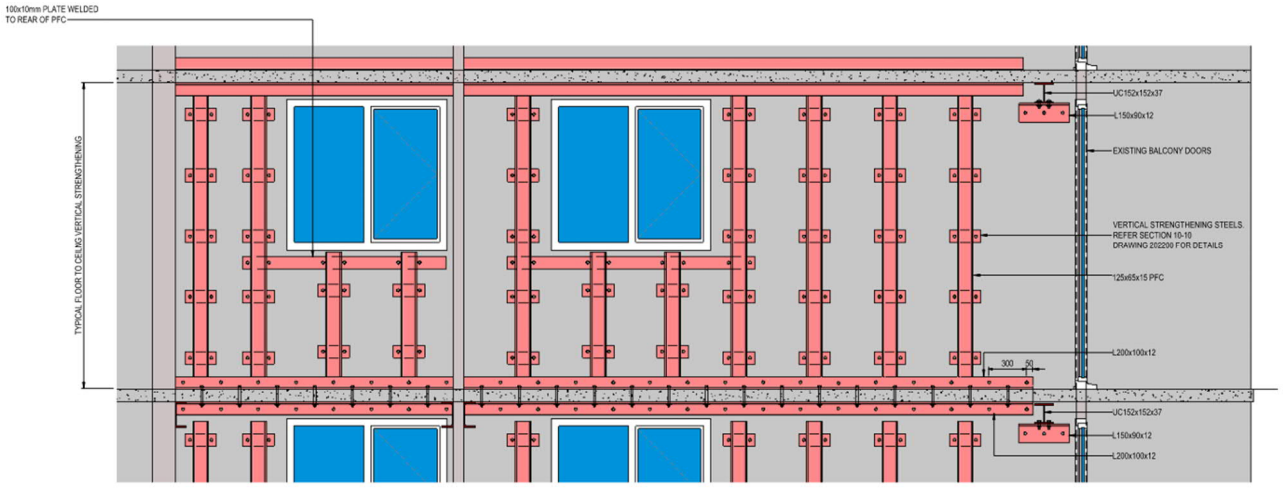


Figure 7 – Typical flank and cross wall strengthening detail – Bird Block, Nettleton & Dudeney

3.4. FRP Strengthening

Although initially proposed as a fully steel solution, an alternative option which may be considered is for the slabs soffits to be strengthened using FRP (Fibre Reinforced Polymer) instead. The solution would remove the requirement for the slab strengthening shown in Figure 5 and Figure 6.

The benefits of this solution are as follows:

- Speed of construction:
  - The FRP is essentially stuck to the slab office meaning the requirement for numerous through bolts and the top washer plate will be removed.
  - The process of installing the FRP is quick and curing times are short.
  - Reduces the time that residents will be required to be decanted from their homes.
- Impact of material on the space:
  - Carbon fibre strengthening will be approximately 5-10mm in thickness with no additional thickness due to bolt heads and nuts.
  - Can be finished and painted with standard paints.
  - Requires additional fire protection.
  - Lightweight material resulting in no major increase in load on the building.
- Cost:
  - On a recent similar project, the costings for the steel strapping on the soffit of the slabs was c.£115/m^2. The equivalent cost of the FRP strengthening was c. £120/m^2.
  - Although the FRP costs are higher, there is significant savings through programme reduction and decant costs.

Figure 8 – Typical example of FRP strengthening

3.5. Consequential Works

Given the extent of the strengthening works required, it is likely that at St James House and the Bird Blocks the flats will require a full strip of internal floor and wall finishes. This will include bathroom and kitchen fixtures and fittings. This would be in addition to the programme stated above by 1-2 weeks subject to the extent of works in each flat. Advanced survey and design would be required to ensure these works are coordinated and properly planned in advance.

It is likely that existing bathrooms and kitchens can be retained at Nettleton and Dudeney due to the reduced extent of strengthening required.

The extent of further consequential works (decorations, flooring, M&E works etc.) would need to be determined as part of a detailed survey of the blocks to inform the scope of works.

Consultation would also be required with Building Control to further understand the implications of the essential works, and any associated compliance upgrades required as a result.

4. FIRE UPGRADES

The following recommendations were made following the completion of the fire assessments for the building.

4.1. Immediate (0-6 month)

- Establish interim measures as detailed in the 'Guidance to support a temporary change to a simultaneous evacuation strategy in purpose-built blocks of flats', to prepare for a change of evacuation strategy. This is to instigate a full simultaneous evacuation of the building in response to the structural deficiencies identified as part of the structural assessments.
- Ensure maintenance works carried out on existing fire safety precautions do not compromise the systems.
- Ensure all maintenance work that has been incorrectly applied to such systems is rectified immediately.
- Prohibit storage within common areas of any significant fire load, particularly electric scooters, and mobility devices.

4.2. Short Term (6 months-2 years)

- Provide a category L5 common fire alarm and detection system in accordance with BS5839-1, where the sound pressure level of the fire alarm signal within flats provides 85dB(A) at the open doorway of every bedroom in each flat to support the change of evacuation strategy.
- Develop a training programme to support the maintenance team in their undertaking of repairs to fire safety systems, namely replacement of permanent vents and fire -resisting glazing.
- Contractors must not compromise the fire safety of buildings when undertaking building works. Establish a contractor permit to work system where the fire strategy is shared with the contractor and the fire risk assessment revisited to ensure that any issues are adequately addressed, and the fire safety of the building isn't compromised.
- Residents should be made aware of the fire strategy of the building and the importance of the hallway in reducing the potential of fire and smoke spread into the lobbies.
- Flat entrance and communal fire doors should be replaced where required to maintain the fire strategy. Residents need to be made aware of the importance on flat entrance door and self-closer on the fire strategy of the building.
- Due to the deficiencies identified in fire stopping and compartmentation, as and when properties become vacant, an intrusive assessment is undertaken of the fire stopping and compartmentation (flat entrance

doors and windows, where services breach floors and shared services and ventilation systems), to ensure they are appropriately fire stopped and upgrading works completed where necessary.

4.3. Longer Term (3-5 years)

- Removal of combustible materials as detailed in the FRAEW.
- Retrospective fitting of a sprinkler system throughout the building. We would recommend a Category 4 residential sprinkler system in accordance with BS 9251:2021 with duplicate pumps and secondary power supplies, for resilience.
- Provide AOV's in the dispersal lobby or provide a dedicated smoke shaft.
- In the course of future building work, the common ventilation system should be removed and replaced with fire-stopping, and wet rooms should be locally ventilated within the flat, via the external wall (which requires adequate protection to support any such proposal). The means by which the new horizontal routes will require detailed design to satisfy the requirements of Gateway Two.

5. M&E UPGRADES

It is understood that the existing incoming power to the Bird Blocks is currently insufficient for the power draw on the blocks. As a part of the essential works a new substation will likely be required to serve the Bird Blocks to resolve this issue and provide the additional supply required to power the proposed sprinkler system.

Further surveys will be required at St James House and Nettleton and Dudeney to determine whether additional measures at required at these blocks to make the installation of a new sprinkler system feasible.

6. DECANT

The decant requirements to enable the construction of the strengthening is as follows:

6.1. Bird Blocks & St James House

Due to the extent of works strengthening works required at the Bird Blocks and St James House, it is likely that a full decant of the flats is required undertake the works for circa six weeks per flat, refer to section 7 for a further breakdown of the programme.

Due to the nature of the works, it is recommended that the flat above and below are decanted simultaneously to provide efficiencies in the installation of the strengthening, and to ensure the safety and comfort of adjacent residents.

6.2. Nettleton Court & Dudeney Lodge

At Nettleton Court and Dudeney Lodge the strengthening is not as extensive as the other blocks, it is likely that although a full decant of the flats will be required, the duration may be reduced.

7. PROGRAMME

Based on our previous experience strengthening LPS buildings and our current understanding of the LPS blocks, we estimate that a single flat would take circa 6-weeks. Note that this is an estimate and would be firmed up following full design / contractor input.

The 6-week period for undertaking works within a single flat is based on the below sequencing:

- Week 1: ACM clearance and removal of finishes (advanced surveys will be required)

- Week 2-5: Strengthening works and sprinkler installation (L-brackets to corners of flat, carbon fibre strap to soffit and steel PFC to internal walls, finally fixed together once in place)
- Week 6: Making good and redecorating

Looking at the typical floor plate for the blocks, we believe there would be benefit in phasing the works so that 6 flats would be undertaken at a single time.

Advanced assessment of any other specific features and constraints within the flats would be required to further inform the works and the specific timescales. There may also be an opportunity to address other associated quality improvements alongside these works, to ensure efficiency and to reduce impacts on tenants.

As part of a coordinated programme of works across the affected blocks, there would be a need properly plan the access and be agile in being able to adjust the programme to suit changing needs.
Once fully designed and procured, it would be for the Contractor to confirm how many teams would be working at once, thus determining the overall programme.

Also note that the 6-week per flat timescale would likely be bettered as the Contractor will have a clear run of all flats, allowing the asbestos / finishes removal to progress ahead.

Assuming the Contractor would provide three teams working at once, a conservative figure of 3-years to complete all strengthening / finishing works to the building.

8. COSTS

A breakdown of associated costs for the strengthening works has been compiled for the blocks. These costs do not currently include for the sprinklers or associated M&E upgrades. Please refer to the Ridge pricing documentation for further details.

The extent of essential works and any associated consequential works will need to be determined to allow costs to be accurately assessed, as would the approach to decant, phasing, resourcing and programme.

OPTION 2
Refurbishment

9. APPROACH

The following sets out the likely approach to a potential strengthening and refurbishment project.

9.1. Discovery and Understanding of the Buildings

1. Information Review and Gap Analysis
    a. This stage involves a detailed review of all existing information on the buildings including previous surveys and reports prepared by Ridge and others.
    b. Any essential information noted to be unavailable may require additional surveys or verification to inform the design of the works.

2. Surveys
    a. Structural – for areas identified as requiring refurbishment which may have been outside of the original LPS assessment scope.
    b. M&E – visual inspections of the buildings to understand how the services are configured and distributed. This will help ensure any opening up and consequential improvement works are coordinated.
    c. Building Survey – representative surveys (not room-by-room) to inform any consequential improvement works.
    d. Asbestos – the procurement of the asbestos surveyor (expected to be via existing BHCC supply chain) would be required to carry out R&D surveys which will be required due to the intrusive nature of the refurbishment proposals. This survey will be included in the tender to ensure that the contractor is fully informed presence of asbestos and can price suitably in their tender returns. This also allows them to include professional removal of any identified asbestos as well as the process for identification and removal of any asbestos discovered during the works.
    e. Transport – this will be required to inform the contractor of any local Highways constraints or issues, as well as identifying provisional access and egress routes from the site.
    f. Additional Surveys – additional surveys may be identified as the initial investigations and surveys progress and once the scope for any consequential improvements is better defined. At this point in time, we would suggest the following:
    g. Topographic Survey and Measured Building Survey – to determine the site surroundings and levels as well as detailed building measurements, feeding into the preparation of detailed design proposals

3. Stakeholder Review

4. Development of the Decant Strategy

5. Development of the Refurbishment Design – The Ridge teams will use the information discovered via surveys and stakeholder engagement to prepared detailed refurbishment design documentation including drawings and specifications. The design will form the basis of the tender.

6. Cost Assessment and Contracts – commercial support and input, initial estimates, benchmarking, a Pre-Tender Estimate (PTE) etc. Contract to be prepared in conjunction with the BHCC Procurement and Legal teams.

7. Health and Safety/CDM – the Principal Designer will need to be appointed during the design and planning of the demolition phase and to prepare the Pre-Construction Information (PCI) pack.

8. Planning Application – an application for Planning Approval may be required, including associated reports such as traffic management plan, ecology etc. Subject to feedback from the Planning Dept, further surveys, investigation and reports may be required.

9. Agreement of Procurement approach and appropriate contracts – liaison with BHCC Procurement team to agree how the project will be procured and agree who will be issuing the tender documents.

10. Agreement of Contractual terms

11. Tender and Analysis – The teams will work with the BHCC Procurement Team to review and evaluate the tender returns and produce a recommendation for appointment of the contractor.

12. Construction Phase – The key roles post-contract will include:
    a. CA/EA – the Ridge PM will administer the contract on behalf of BHCC.
    b. Technical Monitoring of works – the professional team will monitor the works from a technical perspective, reviewing and challenging the contractor's method and calculations.
    c. CDM – The Principal Designer will oversee the activity of the Contractor in their role of Principal Contractor and acting in the role of Client-side Health and Safety Advisor.
    d. QS – The QS will perform the role during the refurbishment phase, dealing with valuations, variations, payment recommendations, and agreeing the final account.
    e. MEP Engineer – should there be any M&E consequential works, the MEP Engineers will oversee these.

10. ANTICIPATED SCOPE OF WORKS AND CLIENT BRIEF

10.1. Structural and Compliance Works

Option 2 will include all items identified under Option 1 (section 3) as well as providing the opportunity to consider a wider scope of refurbishment and asset maintenance.

10.2. Compliance with Building Regs & Building Safety Act

A refurbishment of this scale would likely be considered "significant work", therefore upgrades to meet current Building Regulations are likely to be required. This is likely to result in a focus on sustainability and energy efficiency improvements to ensure the building achieves current regulations but could also consider other items such as DDA compliance and other Building Regulations. This could require thermal studies, air tests and building thermal modelling to inform the design proposals required to achieve compliance.

In addition, as the blocks would be classified as High-Risk Buildings (HRBs) under the Building Safety Act, a Building Regulations Principal Designer will be required to ensure compliance of the design and installation with the regulations and ultimate approval of works by the Building Safety Regulator. This will also include a risk-based approach to Fire Safety and require a full review of Fire Strategies and Fire Risk Assessments.

10.3. Improving Thermal Comfort

When considering the extent of the refurbishment scope of works, improvements to thermal comfort may be a consideration, particularly if the blocks are already experiencing condensation and mould issues. This could also be driven by building regulations compliance.

Concrete system builds such as LPS can have high levels of air tightness, therefore any potential upgrades to insulation will also likely require some additional ventilation to avoid compounding condensation and mould growth.

Floor to ceiling heights and room configuration would need to be reviewed as well as any facade penetrations that might be required to enable this. This would also need careful coordination with the building's fire strategy.

10.4. Other Energy Efficiency Upgrades

In addition to building fabric thermal improvements, there may also be a requirement to improve the overall energy efficiency of the block, which could consider the replacement of older high-energy M&E systems with modern low-energy installations. This might include solar PV, LED lighting, low water use sanitaryware, alternative heating systems including MVHR. During the discovery phase, a review of any statutory and stakeholder requirements would be required to determine the level of upgrades required in the detailed design proposals.

10.5. Additional Consequential Works

Due to the intrusive nature of the structural and refurbishment proposals, there will likely be some consequential improvement works. The extent of these can be reviewed and agreed with BHCC and other stakeholders, but at this stage we anticipate the following will be considered:

- Making good, including replacement of floor coverings and internal redecoration, generally where opening-up has occurred. This could be limited only to areas affected by the works or could include a more extensive refurbishment of entire flats subject to agreement.
- Removal & reinstallation / replacement of kitchen and bathrooms – may be necessary when strengthening works requires their removal for access.
- Firestopping improvements and asbestos removal/remediation - if issues are exposed during the works that were not identified in previous surveys.
- Opportunities to address any other building issues and undertake any forthcoming planned maintenance activities, which might include rectifying any drainage/water leaks, damp, window and door replacements etc., to prolong the life of the building and reduce future disruption to residents.
- Should there be any need to undertake works which would affect the facade of the building (e.g. window/door replacements and potential ventilation installation), a more comprehensive external refurbishment scope might be considered, including facade treatment and external areas (car parking/walkways).

11. DECANT

In addition to the decant identified in the Option 1, the periods would need to be extended to allow the additional works, and subject to the extent of the agreed works, assessed overall to consider whether a full building decant would be required.

12. PROGRAMME

The team would work closely with the BHCC team and stakeholders as well as the selected contractor to develop a detailed programme for the refurbishment, which will be driven by the BSR approval process, the decant strategy, phasing approach, and availability of each dwelling as well as the agreed scope of works and consequential improvements required.

We are aware of significant delays in BSR application approvals at present, currently applications are subject to a 36–40-week approval period. This will need to be considered when preparing the master programme. Furthermore, we would include a robust time allowance to undertake a thorough resident engagement process in the planning and development of the proposed refurbishment proposals.

13. COSTS

As the scope of the refurbishment proposals under this option have not yet been defined it is not possible to include an indicative construction value. However, the following items should be considered when preparing a cost budget for the project:

- Strengthening Works
- Consequential Works
- Compliance Works
- Refurbishment – internal
- Refurbishment - external
- Decant costs, including temporary accommodation
- Professional fees including surveys and design

14. EXISTING BUILDING UPGRADES

At this stage of the projects Ridge have not been involved with the condition mechanical and electrical systems as well as the building fabric of the blocks. Following correspondence with BHCC it is expected that should the essential building safety works be undertaken to extend to the life of the building by c.20 years, the following building upgrades will be required at the following blocks.

The following sections are solely based on Information provided by the client, this isn't based on surveys that either Ridge or ECE Architecture have undertaken, and such there may be further deficiencies in the buildings which have not been identified or alternative approaches which may not have been considered at this stage.

14.1. Bird Blocks:

- Heating:
  - The existing buildings are currently fed by a temporary external plant room containing temporary boilers which supply the buildings heat system. A permanent replacement for this is require in the short term.
  - A strategy for replacement with Air Source Heat Pumps (ASHP) local to each flat has been explored and found not to be viable.
  - There is an opportunity to utilise a centralised system with roof mounted heat pumps in lieu of the local units.
  - Should this found not to be a viable option, the buildings would need to be switched to an all-electric system.
- Electrical System:
  - It is likely that a full rewire of the building will be required regardless of any heating works.
  - An electrical upgrade is also likely to be required to facilitate ASHP or direct electric heating.
  - It is understood the BHCC has be informed that the Bird Blocks site will likely require a new electrical substation to feed the five blocks.
- Ventilation:
  - It is known that there are extensive issues with asbestos within the existing ventilation ductwork.

  - In order to upgrade the building to current regulations a remediation strategy would need to be implemented.
- Water:
  - The cold-water system is understood to not have been renewed within the last 50 years and as such will require upgrading.
- Façade:
  - The existing blocks were reclad 10-15 years ago with a new external wall insulation (EWI) system.
  - A review of the EWI on these blocks is required due to continual leaks through the façade.
  - Should the leaks be repairable, a wholesale replacement of the façade should not be required within the next 20 years.
  - The existing windows are also expected to require replacement.
- Roof:
  - It is likely that a full roof replacement will be required as a part of a refurbishment of the blocks.
- Balconies / Parapets:
  - The existing balconies and roof parapets are original would therefore likely require upgrading as a part of the refurbishment project.
- In addition to the above, a general internal redecoration of communal areas should be included with the building refurbishment.

14.2. Nettleton Court & Dudeney Lodge

- Heating:
  - The existing buildings are currently fed by a centralised gas boiler situated in a plant room between the two buildings. This is believed to have been replaced within the last 5 years and therefore would not likely require further works as a part of the refurbishment.
- Electrical System:
  - An upgrade to the electrical system within the buildings is currently in progress.
- Water:
  - The cold-water system is understood to not have been renewed within the last 50 years and as such will require upgrading.
- Façade:
  - The existing blocks were reclad 10-15 years ago with a new rain screen cladding and as such should not required further works as a part of the refurbishment.
  - The existing windows are also expected to require replacement.
- Roof:
  - It is likely that a full roof replacement will be required as a part of a refurbishment of the blocks.
- Balconies / Parapets:
  - The Fire Risk Assessment at the blocks identified that the spandrel panels forming the front elevation of the existing wintergarden balconies are defective and require replacement.
- In addition to the above, a general internal redecoration of communal areas should be included with the building refurbishment.

14.3. St James House:

- Heating:
  - A strategy to replace the existing heating system with a centralised Air Source Heat Pumps (ASHP) is in the process of being investigated.
  - It is likely that this will utilise either roof mounted plant or a new plant room within the lower ground floor car park.
- Electrical System:

  - A strategy for the renewal of the electrical wiring throughout the building is currently in progress. Common areas are complete with flats to e completed as a when required.
  - It is assumed that this electrical upgrade has accounted for ASHP.
- Fire Alarm:
  - EVAC system being installed
- Water:
  - The cold-water system is understood to not have been renewed within the last 50 years and as such will require upgrading.
- Façade:
  - A full façade replacement is due on the building. This will include replacement of the curtain walling on staircases.
  - The existing windows are also expected to require replacement.
- Roof:
  - It is likely that a full roof replacement will be required as a part of a refurbishment of the blocks.
- Balconies / Parapets:
  - Concrete repairs are required to balcony soffits due to some known concrete defects.
- Below Ground Car Park:
  - The existing below ground car park is currently closed. Electric vehicles are currently prohibited from using the car park due to the risk of fire. BHCC currently cannot restrict access of specific vehicle into the car park and as such the car park remains closed.
  - Provision of an access control system to restrict access to electric vehicles is to be included within the refurbishment.
- In addition to the above, a general internal redecoration of communal areas should be included with the building refurbishment.

14.4. Lifts

- All lifts have been subject to major modernisation/full replacement works over the past 10 years with static equipment having an estimated 40+ year life expectancy. The next phase of modernisation would be to address electrical obsolescence and overhaul of any ‘moving’ components to which we give a 20-year life expectancy.
- It is likely that the existing lifts across all blocks would require further modernisation c.2035 and could therefore be excluded from the refurbishment works.

15. REFURBISHMENT OPPORTUNITIES

Refer to Appendix A for ECE Architectures Option 2 Report.

OPTION 3

Demolition and Regeneration

The third option available is for the demolition and regeneration of the sites, offering the opportunity to not only replace the existing accommodation in a modern, compliant form with improvements to the wider site and community, but also to supplement the quantity and mix of accommodation to enhance the housing stock.

The following sets out the approach and considerations of this option, and the key constraints, opportunities and challenges that will need to be considered.

16. DEMOLITION APPROACH

The demolition of LPS blocks is a specialist process that requires a full understanding of the buildings to help design the methodology of the deconstruction process. The risk of collapse of LPS buildings is at its greatest during the demolition phase, so the agreement of the methodology and the monitoring of its implementation is essential, as is the appointment of competent and experienced consultants and contractors to manage and carry out the works.

The following are the main risks identified in the demolition of the BHCC blocks:

- The major risk when demolishing LPS (large panel system) buildings, specifically buildings with inadequate ties between panels, which is present at the BHCC blocks, is that the buildings are prone to progressive collapse during demolition.
- If the building was to collapse during the demolition phase, any buildings or people within the collapse radius of the edge building, are at risk, St James House (50m), Nettleton & Dudney (48m), Bird Blocks (30m). Should something go wrong during the demolition and the building was to collapse, damage would be caused to the surrounding buildings on the individual sites.
- The debris field cause by a collapse of this magnitude would cover a significantly larger area, affecting local residents.
- The ground vibration caused by the collapse of one of these buildings could potentially affect the stability of other buildings around the site.
- The dismantling of the LPS block will likely require a large number of crane movements, lifting concrete panels down from the blocks near to the other inhabited buildings and public spaces on the estates.
- The demolition of the block will likely generate a significant amount of concrete dust unless adequately controlled.
- A large increase in site traffic throughout the demolition phase.
- A considerable increase in noise pollution during working hours.

16.1. Demolition Risk Mitigation

To best mitigate the above risks, the demolition of the LPS blocks should follow a specific, designed methodology, bespoke for each of the block types. The key considerations to these demolitions are as follows:

- Top-down demolition.
- Removal of overcladding.
- Temporary works.
- Cutting of panels at junctions and craned down to ground.

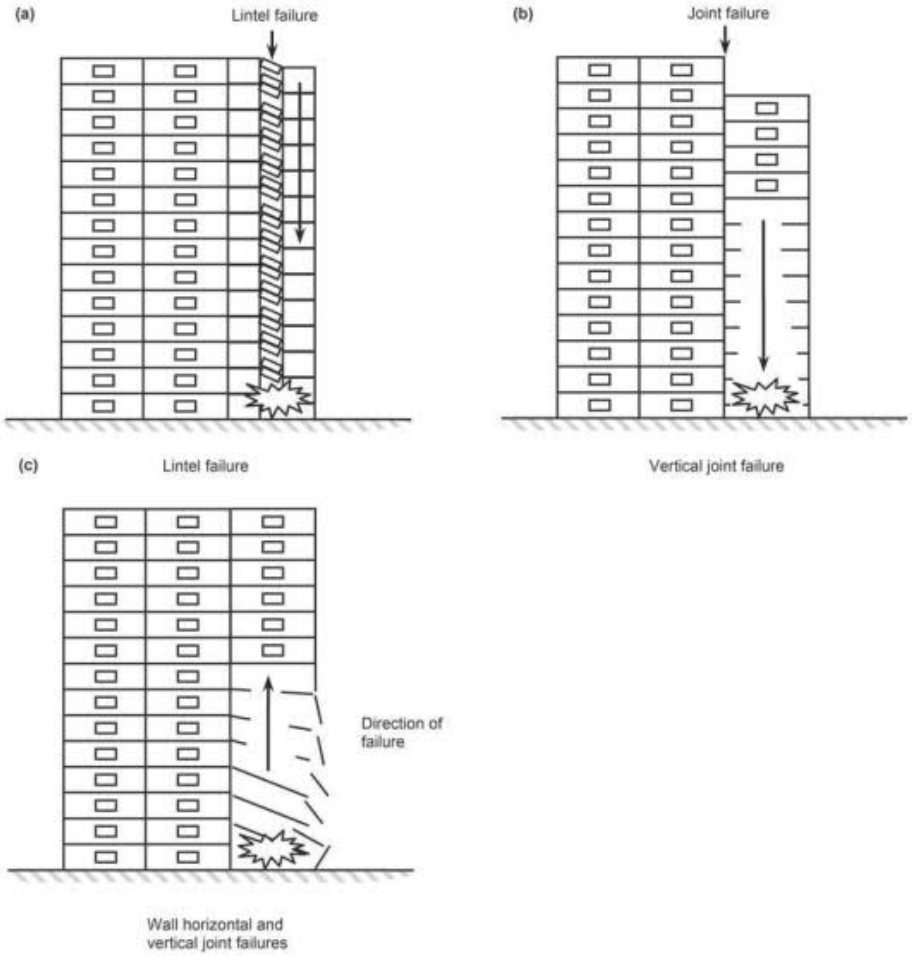


Figure 7: Schematic showing some possible progressive collapse failure modes of the flank wall in a typical LPS dwelling block for a low-level trigger site

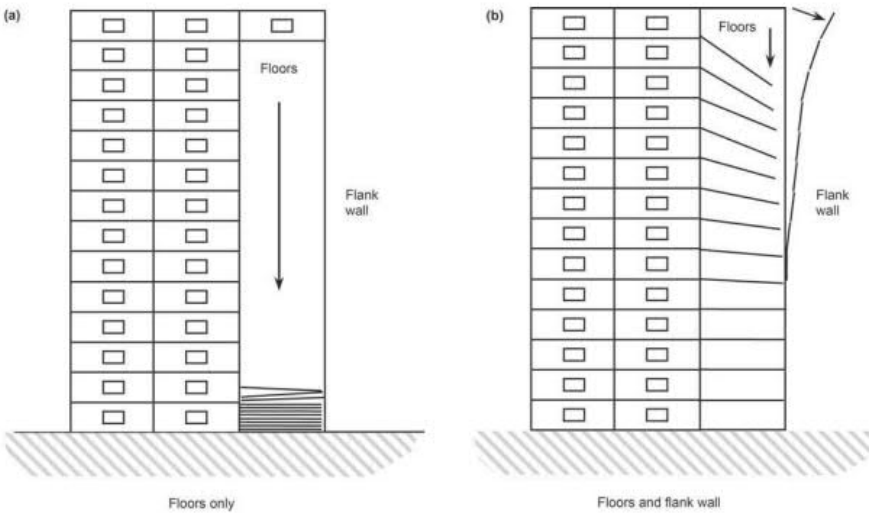


Figure 10: Schematic showing some possible progressive collapse failure modes in a typical LPS dwelling block for a high-level trigger site

Figure 9 – LPS Collapse Mechanisms (BRE, 2012)

16.2. Discovery and Understanding the Buildings

This stage involves a detailed review of all existing information on the buildings including previous surveys and reports prepared by Ridge and others.

Any essential information noted to be unavailable may require additional surveys or verification to inform the design of the demolition.

16.3. Key Surveys

There are several key surveys that will be required to achieve this understanding. These can be supplemented by any building -specific surveys identified as part of the initial review phase.

a. Structural – desktop review of the previous intrusive surveys to fully understand the structure to allow the design of the deconstruction methodology and the provision of the Demolition Methodology Statement required for Planning.
b. M&E – visual inspections of the buildings to understand how the services are configured and distributed. This will help inform the strip-out requirements as well as feed into the Utilities investigations noted below.
c. Utilities – a full review of all incoming services and how and where they are connected to the building. This will inform the demolition tender process, and any terminations or disconnections required. As part of this process, it will be essential to understand capacities and to consider how these capacities might be maintained for use as part of any future development of the residual sites.
d. Building Survey – representative surveys (not room-by-room) to inform strip-out scope within the tender documents, including intrusive investigations of roofs etc to provide the contractor and designers with detailed knowledge of the building construction.
e. Asbestos – Ridge would oversee the procurement of the asbestos surveyor (expected to be via existing BHCC supply chain) and monitor the R&D surveys. This will be included in the tender to ensure that the contractor is fully informed presence of asbestos and can price suitably in their tender returns. This also allows them to include professional removal of any identified asbestos as well as the process for identification and removal of any asbestos discovered during the works. BHCC would make a direct appointment with the Asbestos surveyor.
f. Transport – this will be required to inform the contractor of any local Highways constraints or issues, as well as identifying provisional access and egress routes from the site. This will be provided by the Ridge Transport team, along with the Traffic Management Plan required for Planning.
g. Additional Surveys – additional surveys may be identified as the initial investigations and surveys progress and also as a result of the demolition notice application:
    i. CCTV Drainage surveys
    ii. Topographic Survey – to determine the site surroundings and levels
    iii. Ground Investigation – subject to the initial information review, intrusive investigations may be required to determinefoundations and underground conditions, as well as understanding the ground conditions and bases for the large plant being used during the demolition process. These will further inform the new development.
    iv. GPR - a Ground Penetrating radar survey to identify underground services on the sites.
    v. Ecology and environmental surveys

16.4. Other Key Actions Required

1. Stakeholder Review

2. Development of the Vacant Possession Strategy

3. Development of the Demolition 'Design' – a specific methodology appropriate to the individual buildings, their sites and surroundings. The design will form the basis of the tender, with the contractor expected to provide their proposed methodology design in response, as well as any calculations, temporary works. The structural engineer will review the contractor's design for compliance.

4. Consideration of Regeneration options and how the sites should be left – maximise efficiencies and opportunities between the 2 stages of the process, and mitigating risks

5. Cost Assessment and Contracts – commercial support and input, initial estimates, benchmarking, a Pre-Tender Estimate (PTE) etc. Contract to be prepared in conjunction with the BHCC Procurement and Legal teams.

6. Health and Safety/CDM – the Principal Designer will need to be appointed during the design and planning of the demolition phase and to prepare the Pre-Construction Information (PCI) pack.

7. Planning Application – an application for Prior Approval will be required, including associated reports such as demolition methodology, traffic management plan, ecology etc. Subject to feedback from the Planning Dept, further surveys, investigation and reports may be required.

8. Agreement of Procurement approach and appropriate contracts – liaison with BHCC Procurement team to agree how the project will be procured and agree who will be issuing the tender documents. It is assumed that the contract will be a Single-Stage Design and Build (JCT) Contract.

9. Agreement of Contractual terms

10. Tender and Analysis – to review and evaluate the tender returns and produce a recommendation for appointment of the contractor. The analysis will include the following:

    a. Assessment of competency, capability and proposed team
    b. Assessment of financial returns to seek best value for money
    c. Assessment of technical solutions, methodology and programme
    d. Assessment of any further quality criteria
    e. Assessment of Social Value included

11. Demolition Phase – The key roles post-contract will include:
    a. PM/Employers Agent – administration of the D&B contract on behalf of BHCC.
    b. Technical Monitoring of works – the structural engineering team will monitor the works from a technical perspective, reviewing and challenging the contractor's method and calculations.
    c. CDM – The H&S Advisor will oversee the activity of the Contractor in their role of Principal Contractor and acting in the role of Client-side Health and Safety Advisor and CDM Principal Designer.
    d. QS – The QS will perform the role during the demolition phase, dealing with valuations, variations, payment recommendations, and agreeing the final account.
    e. MEP Engineer – the MEP Engineers will monitor the successful termination of services and Utilities by the contractor.
    f. Achievement of the Completion and Handover expectations is to be reviewed by the team and BHCC.

16.5. Demolition Programme

The key programme drivers need to be identified during the development of the master programme including vacant possession, completion of all relevant surveys, the disconnection of services and receipt of approved demolition notice from BHCC Building Control department.

It will also be important to define the phasing strategy of the 3 sites and how they are coordinated.

Upon appointment, the team would work with BHCC and the stakeholders to develop and agree the vacant possession strategy, assessing current occupancy levels, likely timescales for decanting and tenant engagement. The extent of leaseholders may be a major consideration, both in terms of programme, but also in terms of cost implications.

Subject to the level of occupancy and leaseholders it is likely that vacant possession will take up to 2 years to achieve.

Due to the requirement to seek vacant possession of spaces to enable the R&D Asbestos survey, the programme would need to allow for a phased survey of the buildings. To maintain progress of the programme, an interim update of the R&D survey could be used at tender to provide the bidders with a good understanding of asbestos removal required. Upon full vacant possession, a final survey can be undertaken and all information provided to the contractor as a post-Contract variation, based on an agreed contract rate for asbestos removal.

Based on experience undertaking similar projects, Utilities are a further key programme driver. It is important to identify incoming utilities and future capacity requirements, as well as agreeing strategy for where the risk for service disconnection / diversion will be allocated in the contract. Due to the need for ensuring services and supplies are maintained to the buildings during vacant possession, this usually negates the project's ability to remove services ahead of contractor appointment.

Anticipated periods for completion of key milestones are listed below, noting that they may be an opportunity to overlap activities.

- Project Launch: Day 1
- Surveys and development of design and tender information – within 4-6 months
- Planning Prior Approval Submission: within 4-6 months
- Vacant Possession (VP) achieved – within 18-24 months
- Tender Issue: once VP dates are known
- Tender Period: 8 weeks
- Analysis and appointment of Contractor: 8 weeks
- Start on Site: within 2 months
- Completion of demolition works: within 12-18 months subject to phasing and size of site

16.6. Demolition Costs

The costs for demolition of such high-rise LPS blocks will generally be in the region of £1.5-2.5m/block, but by combining blocks on a site-by-site basis efficiencies can be achieved.

17. REGENERATION APPROACH

The following sets out the typical approach to the regeneration of the sites, noting that the scale and specific features of each site will dictate the specific approach in each case. Assembly of the correct team will be essential to the delivery of a successful project.
Whilst simplified to the next steps for the purposes of this options report, the process would probably follow the RIBA Plan of Work stages, aligned with the BHCC governance process, allowing an ongoing management and control of the process and regular confirmation of the brief, solutions and way forward with BHCC.

1. Discovery Phase (RIBA 0-1)
During this phase the team would effectively be gathering information from the sites, BHCC and other stakeholders to help define a clear brief for onward development as part of the second phase.

We would be looking to understand all aspects of:

a. Findings of survey phase and any implications
b. Understanding the Client vision, options, aspirations, priorities, overall brief, and any wider factors that could impact the solutions (i.e. other local developments)
c. Consideration of options – strengthen and upgrade vs demolition and regen
d. Confirmation of Board report scope
e. Understanding stakeholders
f. Understanding constraints and drivers for the project – policies, statutory, Planning, physical, practical, political, financial, organisational, local sensitivities, sustainability expectations
g. Technical Considerations and constraints
h. Risks and Opportunities
i. Indicative site capacity assessments
j. High level master programme
k. High level cost envelope for options being considered
l. This will take the form of a series of meetings (in person and remote) with BHCC, key stakeholders, site visits, information gathering and review. Subject to the agreed approach and findings, this will dictate the approach to the second phase to suit.

At this stage we see the team requiring the following inputs – PM, QS, Engineers, Planning Consultant, Architect, and Sustainability plus the BHCC teams, stakeholders.

2. Development Phase (RIBA 1-2)
During this phase the team would develop the findings of Phase 1, largely focused on the preferred option/s identified and development of scenarios and options available, refining where possible.

Clearly there are many variables, so we would be seeking to identify and develop the options, the risks, and opportunities available, as well as defining the next steps required to take these options forward.

The key actions and outputs would include the following:

a. A clear client brief (albeit noting that there may be options still contained until further developed)
b. An approach to dealing with constraints, risks, and opportunities
c. Overall update of programme and phasing options at high level, with key milestones – also including considerations in relation to tenants, decanting etc.
d. Confirmation of site capacity studies and development of concept sketch options and massing
e. Consideration of wider technical inputs to inform the development of high-level costs based on the agreed strategy or sketch options

f. Coordination with BHCC on development options available with pros and cons
g. Options for potential funding, delivery arrangements, development or funding partners
h. Viability studies and development of an options appraisal
i. Procurement overview
j. Planning and transport advice and engagement for the sites
k. Site, technical and infrastructure considerations, including implications beyond the site boundary
l. Consideration of any interim measures required to the buildings to maintain the safety of residents whilst they remain in occupation
m. Definition of Next Steps for developing and implementing the solutions agreed by the Board, including:
    i. Surveys required
    ii. Assuming demolition is selected - specialist demolition definition, methodology, approach, and procurement
    iii. Defining BHCC actions required
    iv. Defining with BHCC a delivery and phasing strategy (how residents are relocated, use of other sites and availability of sites, build before demolition, temporary accommodation etc.)
    v. Definition of wider team required to deliver:
    vi. The demolition and site preparation
    vii. The regeneration scheme
    viii. Design and planning actions required

17.1. Regeneration Programme

Greater definition of the brief and indicative solutions will be required to determine the programme for each of the sites.

17.2. Regeneration Costs

Greater definition of the brief and indicative solutions will be required to determine the costs for each of the sites.

18. REGENERATION OPPORTUNITIES

ECE Architects have put together initial ideas presentation documents for the potential regeneration options for the three sites. The ideas presentations provide some site history and details a couple of options for regeneration at each site. This section of the report should be read in conjunction with these reports:

- 7567_DO01_rev A – Hollingdean Interim Ideas Presentation
- 7567_DO02_rev A – North Whitehawk Interim Ideas Presentation
- 7567_DO03_rev A – St James House, Kempton Interim Ideas Presentation

18.1. St James House

The ECE report concludes the following for StJames House:

The emerging concept proposals for St James House show how development has been informed by the vision and Site assessment undertaken to date. Our key vision objectives for St James House, Kemptown are set out below:

1. Creation of a new neighbourhood, defined by a locally distinctive aesthetic, and providing new sustainable homes fit for future living.
2. Recognition and promotion of the sustainable location of the Site, well placed close to local road, rail and bus links, and within walking and cycling distance of the Town Centre.

3. Promotion of a high-quality environment and standard of living, which considers the needs of present and future generations.
4. Delivery of housing to meet local needs, including a mix of housing types and sizes, with potential for affordable housing.
5. Promotion of sustainable modes of transport and enhancing existing foot and cycle routes, promoting healthy living.
6. Provision of safe connections to education, health and community facilities, maintaining existing foot and cycle links.
7. Add extensive green landscaping, providing a multi-function green infrastructure that is easily accessible to all and improves ecological habitats where possible.
8. Provide recreation opportunities throughout the Site, including the provision of onsite natural play spaces, and SuDS to mitigate impacts of the development on the nearby areas.
9. Use best practice urban design principles and placemaking to guide the creation of a safe, legible and vibrant new community.

Figure 10 – St James House regeneration option

18.2. Dudeney & Nettleton

The ECE report concludes the following for Dudeney Lodge and Nettleton Court:

The emerging concept proposals for Dudeney & Nettleton show how development has been informed by this Ideas Presentation and site assessment undertaken to date.

The key objectives for Dudeney & Nettleton are set out below:

1. Creation of a new neighbourhood, defined by a locally distinctive aesthetic, and providing new sustainable homes fit for future living.

2. Recognition and promotion of the sustainable location of the Site, well placed close to local transport bus links and within walking and cycling distance of the Town Centre.
3. Promotion of a high-quality environment and standard of living, which considers the needs of present and future generations.
4. Delivery of housing to meet local needs, including a mix of housing types and sizes, with potential for affordable housing.
5. Promotion of sustainable modes of transport and enhancing existing foot and cycle routes, promoting healthy living.
6. Provision of safe connections to education facilities, maintaining existing foot and cycle links.
7. Creation of a multi-function green infrastructure that is easily accessible to all and improves ecological habitats where possible.
8. Provide recreation opportunities throughout the Site, including the provision of onsite natural play spaces, and SuDS to mitigate impacts of the development on the nearby areas.
9. Use best practice urban design principles to guide the creation of a safe, legible and vibrant new community.

Figure 11 – Nettleton & Dudeney regeneration option

18.3. Bird Blocks

The ECE report concludes the following for Dudeney Lodge and Nettleton Court:

The emerging concept proposals for Whitehawk show how development has been informed by the Ideas and Site assessment undertaken to date.

Our key idea objectives for Whitehawk are set out below:

1. Creation of a new neighbourhood, defined by a locally distinctive aesthetic, and providing new sustainable homes fit for future living.

2. Recognition and promotion of the sustainable location of the Site, well placed close to local road, rail and bus links, and within walking and cycling distance of the Town Centre.
3. Promotion of a high-quality environment and standard of living, which considers the needs of present and future generations.
4. Delivery of housing to meet local needs, including a mix of housing types and sizes.
5. Promotion of sustainable modes of transport and enhancing existing foot and cycle routes, promoting healthy living.
6. Provision of safe connections to education facilities, maintaining existing foot and cycle links.
7. Capitalise on the wealth of existing green capital, providing a multi-function green infrastructure that is easily accessible to all and improves ecological habitats where possible.
8. Provide recreation opportunities throughout the Site, including the provision of onsite natural play spaces, and SuDS to mitigate impacts of the development on the nearby areas.
9. Use best practice urban design principles to guide the creation of a safe, legible and vibrant new community.

Figure 12 – Bird Blocks regeneration option

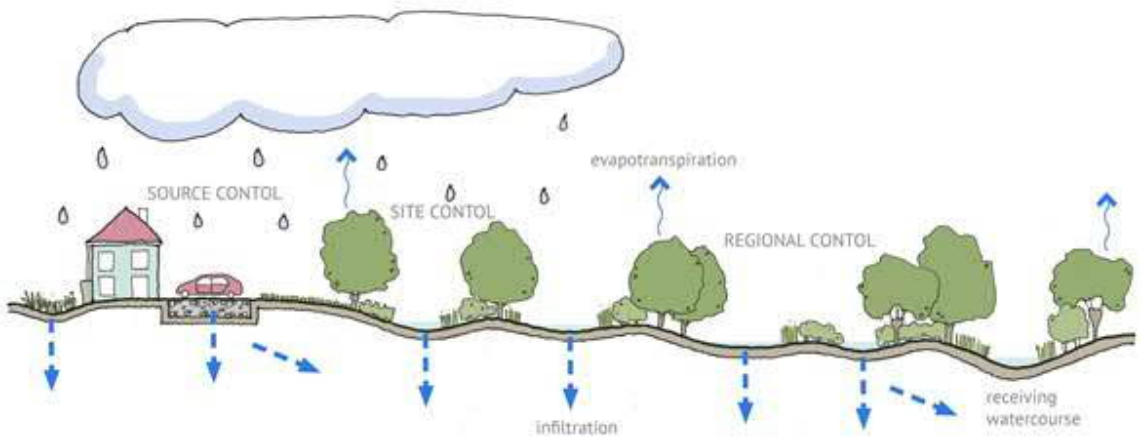
19. SUSTAINABLE DRAINAGE

19.1. SuDS Hierarchy

The SuDS hierarchy, SuDS strategy and drainage strategy will be discussed in more detail within the SuDS strategy and drainage strategy reports, however it is relevant to raise them here as there is direct link with our nitrate mitigation strategy.

A key part of the nitrate mitigation strategy is to retain and detain surface water as close to source longer. The SuDS management train demonstrates this and is a useful concept used in the development of sustainable drainage systems.

Just as in a natural catchment, drainage techniques can be used in series to change the flow and quality characteristics of the runoff in stages.



The management train starts with prevention (preventing runoff by reducing impermeable areas), or good housekeeping measures for reducing pollution; and progresses through local source controls to larger downstream site and regional controls.

Runoff need not pass through all the stages in the management train. It could flow straight to a site control, but as a general principle it is better to deal with runoff locally, returning the water to the natural drainage system as near to the source as possible.

Only if the water cannot be managed on site should it be (slowly) conveyed elsewhere. This may be due to the water requiring additional treatment before disposal or the quantities of runoff generated being greater than the capacity of the natural drainage system at that point. Excess flows would therefore need to be routed off site.

End of pipe solutions where runoff is directly discharged to a wetland or pond should be avoided where possible, as these end of pipe components are likely to larger more expensive and potentially receive faster runoff flows and higher levels of pollution. SuDS design requires a balancing of different options, often depending on the risks associated with each course of action. The risks of an area flooding have to be balanced with the costs of protecting the area from different levels of floods.

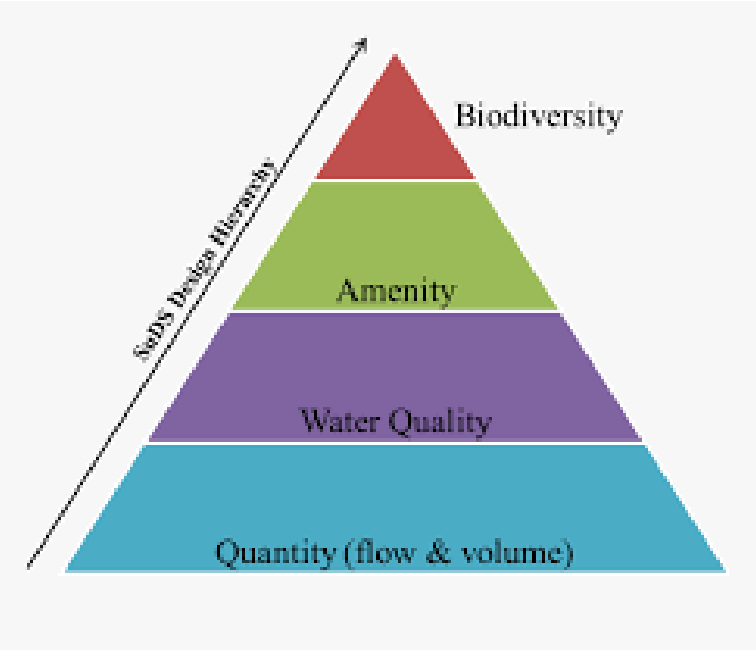
The management train concept promotes division of the area to be drained into sub-catchments with different drainage characteristics and land uses, each with its own drainage strategy. Dealing with the water locally not

only reduces the quantity that has to be managed at any one point, but also reduces the need for conveying the water off the site.

When dividing catchments into small sections it is important to retain a perspective on how this affects the whole catchment management and the hydrological cycle.

The SuDS hierarchy, led by National Planning Guidance, places importance of promoting the use of Sustainable Drainage Systems, by aligning modern drainage systems with natural water processes. The aim of Hierarchy of Drainage is to drain surface water run-off as sustainable, as reasonably practicable.

The increase in infrastructure and the use of traditional drainage networks (pipes and culverts) are resulting in downstream flooding and a deterioration in water quality of controlled waters, due to foul sewer overflow. Therefore, sustainable drainage systems aim to alleviate these problems by storing or re-using surface water at the source. This decreases the flow rates to watercourses and improves water quality.



SuDS designs control surface water run-off (rainfall) by closely resembling that of natural drainage. SuDS features include the use of soakaways, filter strips and swales, filter drains, permeable surfaces, ponds, etc.

As stated in the National Planning Practice Guidance, the aim should be to discharge surface water run-off as high up the drainage hierarchy, as reasonably practicable:

- into the ground (infiltration).
- to a surface water body*.
- to a surface water sewer, highway drain, or another drainage system*.
- to a combined sewer*.

*Local Authorities and water boards generally require proof (BRE Digest 365 Soakaway Tests) that the ground is not suitable infiltration into the ground, before connecting to sewers, drains and other drainage systems.

19.2. Green Roofs

A ‘green roof’ is a roof of a building that is partially or completely covered with vegetation and a growing medium, planted over a waterproofing membrane. It may also include additional layers such as a root barrier and drainage and irrigation systems.

Green roofs serve several purposes for a building, such as absorbing rainwater, providing insulation, creating a habitat for wildlife, increasing benevolence and decreasing stress of the people around the roof by providing a more aesthetically pleasing landscape, and helping to lower urban air temperatures and mitigate the heat island effect. They effectively use the natural functions of plants to filter water and treat air in urban and suburban landscapes.

There are two types of green roof: intensive roofs, which are thicker, with a minimum depth of 12.8 cm and can support a wider variety of plants but are heavier and require more maintenance, and extensive roofs, which are shallow, ranging in depth from 2 cm, lighter than intensive green roofs, and require minimal maintenance.

Green roofs can reduce stormwater runoff. A study presented at the Green Roofs for Healthy Cities Conference in June 2004, cited by the EPA, found water runoff was reduced by over 75% during rainstorms. Water is stored by the roof's substrate and then taken up by the plants, from which it is returned to the atmosphere through transpiration and evaporation.

Green roofs decrease the total amount of runoff and slow the rate of runoff from the roof. It has been found that they can retain up to 75% of rainwater, gradually releasing it back into the atmosphere via condensation and transpiration, while retaining pollutants in their soil. Many green roofs are installed to comply with local regulations and government regulations, often regarding stormwater runoff management. In areas with combined sewer-stormwater systems, heavy storms can overload the wastewater system and cause it to flood, dumping raw sewage into the local waterways.

Often, phosphates and, in the case of the Solant, Nitrates are in this category of environmentally harmful substances even though they are stimulating to the growth of plant life and agriculture. When these substances are added to a system, it can create mass biological activity since they are considered limiting factors of plant growth and by adding more of them to a system, it allows for more plant growth.

19.3. Blue Roofs

A blue roof is a roof of a building that is designed explicitly to provide initial temporary water storage and then gradual release of stored water, typically rainfall. Blue roofs are constructed on flat or low sloped roofs in urban communities where flooding is a risk due to a lack of permeable surfaces for water to infiltrate back into the ground.

Water is stored in blue roof systems until it either evaporates or is released downstream after the storm event has passed. Blue roofs that are used for temporary rooftop storage can be classified as "active" or "passive" depending on the types of control devices used to regulate drainage of water from the roof. Blue roofs can provide a number of benefits depending on design. These benefits include temporary storage of rainfall to mitigate runoff impacts, storage for reuse such as irrigation or cooling water makeup, or recreational opportunities.

Due to the density of urban development, there is a general lack of permeable surfaces in cities. With nowhere for water to infiltrate or be absorbed back into the ground. This leaves cities vulnerable to flooding and overrun storm sewers.

While blue roofs do not remove pollutants from water by temporarily detaining it, they do reduce the load severe rain events place on storm sewers which stops emergency overflow from combined sewer systems from discharging untreated wastewater into rivers, streams, and coastal waters.

Another major benefit of blue roofs are their ability to work alongside other rooftop systems such as solar panels (both solar thermal and photovoltaic panels) and HVAC mechanical equipment.

19.4. Suds Hierarchy Considered Within the Design

The SuDS features considered followed the SuDS hierarchy.

The SuDS Hierarchy

Most Sustainable

Least Sustainable

SUDS Technique	Flood Reduction	Pollution Reduction	Landscape & Wildlife Benefit
Living Roofs	✔	✔	✔
Basins and ponds - Constructed wetlands - Balancing ponds -Detention basins - Retention ponds	✔	✔	✔
Filter Strips and Swales	✔	✔	✔
Infiltration devices - Soakaways - Infiltration trenches and basins	✔	✔	✔
Permeable Surfaces and Filter Drains - Gravelled area - Solid paving blocks - Porous paviors	✔	✔	
Tanked Systems - Over-sized pipes/tanks - Storms cells	✔		

Living Roofs

Living roofs in form of Green Roofs and / or Blue Roofs were offered as the primary solution to reduce the rate of runoff into the below ground drainage network.

Basins and Ponds

An open surface water features in the form of a ‘detention basin’ is proposed to be employed as a method of flood storage during severe storm events, however, will be able to be used as amenity space during dry periods.

Filter Strips and Swales

Some narrow filter strips or swales may be able to be accommodated within the drainage design, however this will be dependent on the final landscaping proposals. Therefore, if possible, they will be utilised to supplement the wider design.

Infiltration Devices

Site Investigation at the proposed site will demonstrate whether infiltration direct to the ground via soakaways or infiltration trenches is feasible.

Permeable Surfaces and Filter Drains

Permeable pavement surfaces will be utilised wherever possible.

Tanked Systems

Proprietary crated tanks and oversized pipes will be utilised to supplement storage for the surface water in order to minimise the storage of the surface water features and maximise the use of the amenity space.

20. SUBSTRUCTURE PHILOSOPHY

20.1. Outline Substructure Philosophy

The ground conditions at the blocks are as follows:

- St James House – Newhaven Chalk Formation (shown in pink on Figure 13Figure 13 below)
- Nettleton & Dudeney – Seaford Chalk Formation (shown in light green on Figure 13Figure 13 below)
- Bird Blocks – Seaford Chalk Formation (shown in light green on Figure 13Figure 13 below)

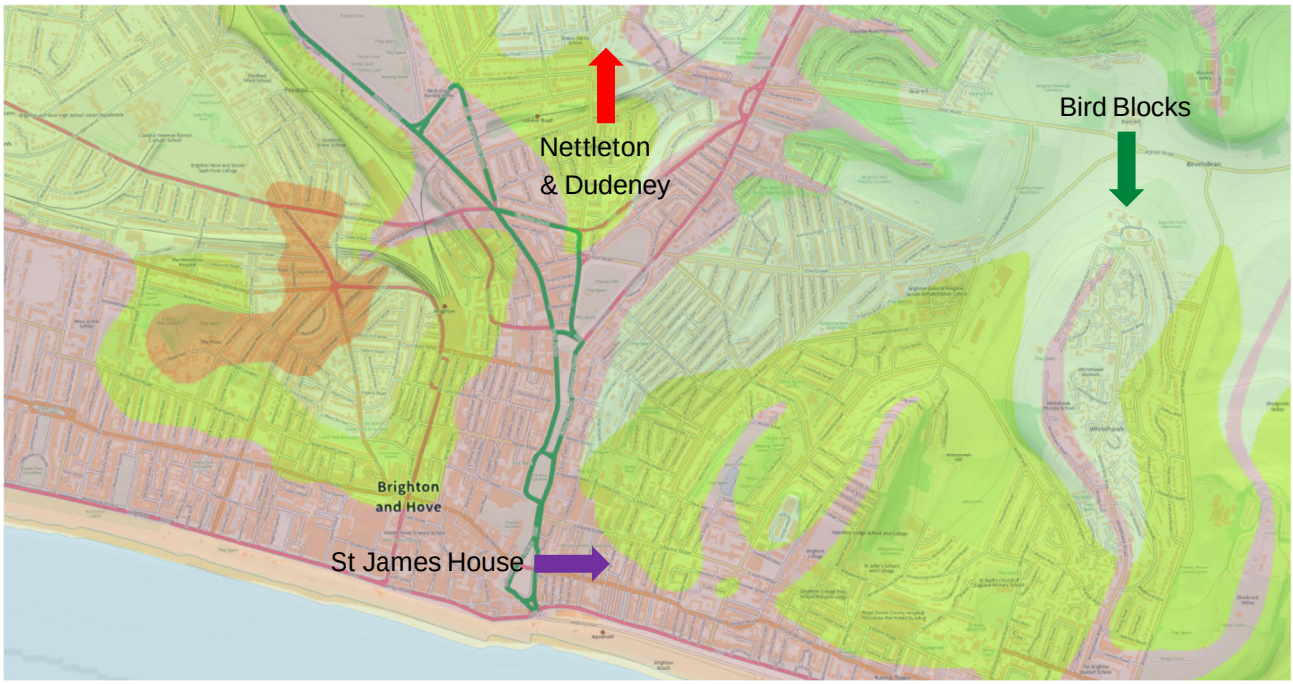


Figure 13 – Geology mapping in Brighton

Based on the current options, it is understood that the building heights may vary from 4 through to 20 storeys in height across the three sites. On the basis of utilising an RC frame option, and the above ground conditions, it is currently proposed to pile the blocks to avoid differential settlement between the blocks. Also much of the foundation strategy will be site dependent with the understanding of the history of BHCC site and their historical developments.

20.2. Pile Re-Use

The regeneration options provided by ECE suggest that the footprint of the proposed buildings broadly align with the existing buildings. It is therefore feasible that the existing piled foundations could be re-used.

Reuse of key structural elements such as foundations can lead to significant savings in cost, programme and materials, together with improved project sustainability credentials.

A successful foundation reuse scheme depends on the relationship between the existing configuration and future needs, particularly:

- Building height/number of storeys and massing.
- Structural grid and core provision requirements, including fire and escape requirements.
- Existing use in relation to proposed use (floor-to-ceiling height and loading).
- Ability of the foundations to support additional or different loading requirements.

The feasibility of reuse fundamentally depends on the load-carrying capacity of the existing foundations; and assurance that foundation movements under the new load are acceptable.
This is a function of:

- The available records on site investigations, foundation design and as-built construction for the existing structure.
- The geotechnical capacity of the foundations based on current design practice, and any load tests carried out.
- The new building loads required in comparison to those experienced by the foundations to date.
- The condition and future durability of the existing foundations.
- The anticipated performance under the new temporary and permanent loads (i.e. Settlement performance).

This approach does however need careful agreement with both warranty providers and insurers such that the new buildings will not be compromised through their design life.

21. SUPERSTRUCTURE PHILOSOPHY

21.1. Flat Slab Concrete Frame

Flat slab construction offers the thinnest possible structural solution minimising cladding costs whilst comfortably meeting acoustic requirements. Although, construction time is slower than the other options discussed herein, extensive experience of construction in the UK and very short lead times can make flat slabs the quickest concrete method of construction. Material availability can be local, reducing transportation costs and environmental impact.

The proposed structural system used for this frame consists of 225mm thick flat slab. By allowing for 150mm zone for services and ceiling as well as 50-75mm of finishes the overall slab thickness is in the range of 425 - 450mm deep. This provides an overall height reduction of 100mm per storey compared to the other options discussed.

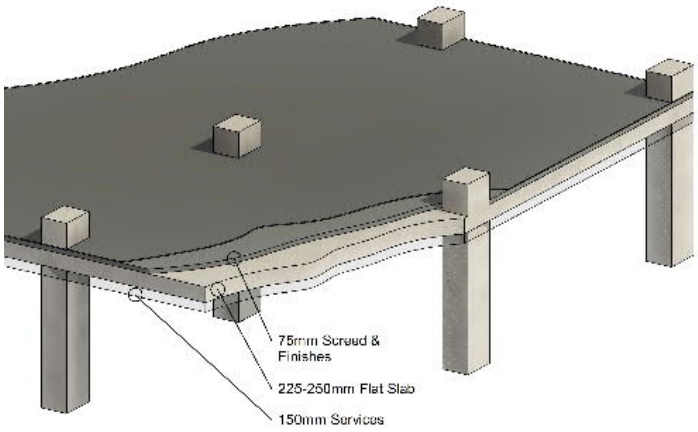


Figure 14 – Flat Slab Construction, Typical Overall depth 425 - 450mm

Embodied Carbon for Flat Slab

The carbon total of this option is equivalent to 193kg CO_2e/m^2. In terms of carbon footprint, this option scores well with a project SCORS rating of B. Although this meets the LETI Residential target (201 $kgCO_2e/m^2$), it does not meet the RIBA domestic target (144 $kgCO_2e/m^2$). This option utilises 'green' concrete with a total cement replacement of 50%. As this option is heavier, there is an increase in the foundations required accounting for approximately a 1/6 of the total embodied carbon. However, both the overall thickness of the

slab as well as the embodied carbon equivalent can be improved further by the adoption of post tensioned flat slab design.

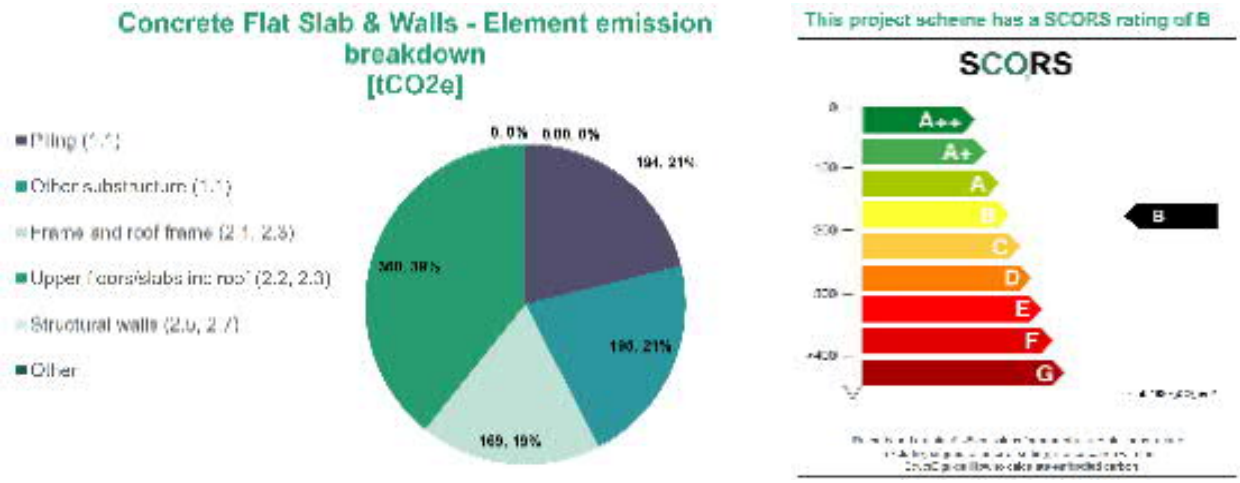


Figure 15 - Carbon Emission Breakdown CO_2e and SCORS Rating for Flat Slab Option

Advantages

- ✓ Overall height reduction of the structure due to thinner slab.
- ✓ Waste materials, such as GGBS and PFA can be incorporated in the mix to create 'green' concrete
- ✓ It requires less formwork than other concrete systems.
- ✓ Fast construction when compared to other concrete options.
- ✓ As this is the most common construction method experienced supply chain can provide very short leading times
- ✓ Social value as workforce can be local to the area.
- ✓ Excellent robustness making it suitable for medium and high-rise buildings
- ✓ Excellent thermal mass properties
- ✓ Inherent fire resistance

Disadvantages

- × Slower construction time compared to other precast/prefabricated options
- × Heavier foundation requirement increasing the embodied carbon
- × More temporary work intensive

21.2. Alternative Solution Above 7 Storeys, Post Tensioned Flat Slab

Above 7 storeys it is possible to adopt a leaner structural solution by using a Post Tensioned (PT) Flat slab system. For typical spans up to 7-8 metres, the slab can be reduced by approximately 25mm to a thickness of 200-225mm thus reducing the overall volume of concrete required for the superstructure and gaining some minor volume reduction on the substructure. The overall slab thickness is in the range of 400 – 425mm deep.

The utilisation of PT slab allows to achieve similar span depths to the flat slab option while at the same time can span greater distances (up to 8.0 metres) allowing for a greater column flexibility and a simpler structural layout.

It is worth noting that for a PT solution, 'green' concrete would not be a viable option for the slab as PT construction relies of quick curing times to allow the slab to be post tensioned. Although, some cement replacement could still be utilised in high strength concrete mixes. Even through there is an overall reduction

in concrete volume, the use of PT slabs raises the total carbon to 210kg CO_2e/m^2 as the 'green' concrete is being replaced with a stronger mix.

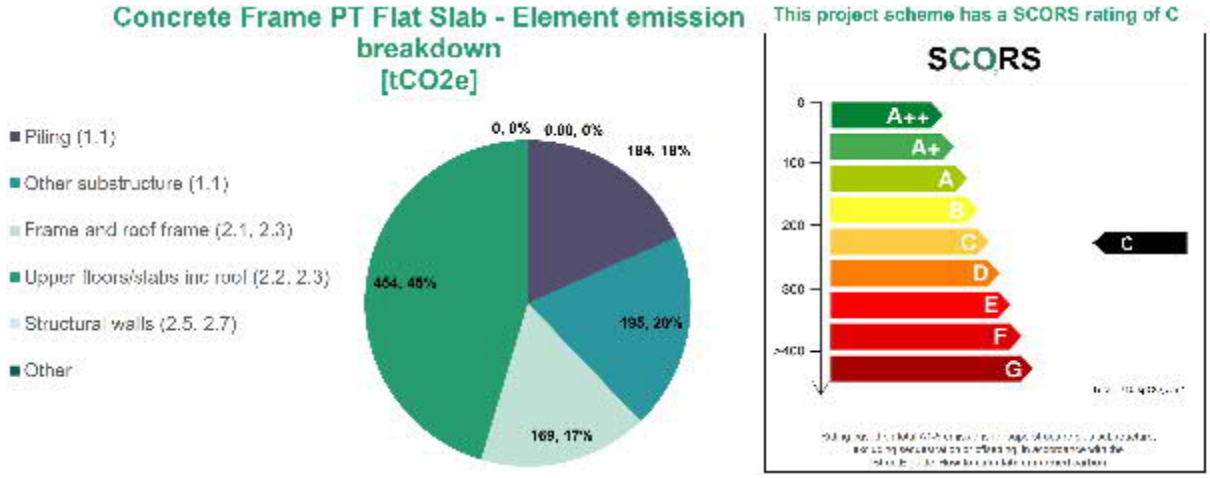


Figure 16 – Carbon Emission Breakdown CO2e and SCORS Rating for PT Flat Slab Option

Advantages

- ✓ Overall height reduction of the structure due to thinner slab than other concrete options.
- ✓ Waste materials, such as GGBS and PFA can be incorporated in the mix to create 'green' concrete
- ✓ It requires less formwork than other concrete systems.
- ✓ Less embodied carbon when compared to other options that provide the same flat soffit.
- ✓ Complex reinforcement layouts on site requiring experienced workforce.
- ✓ Excellent robustness making it suitable for medium and high-rise buildings
- ✓ Excellent thermal mass properties
- ✓ Inherent fire resistance

Disadvantages

- × Slower construction time compared to other precast/prefabricated options
- × Heavier foundation requirement increasing the embodied carbon
- × More temporary work intensive

21.3. Slim Floor System with Steel Braced Frame

Slim floor systems typically consist of precast planks/composite steel decks supported via steel beams embedded within the structural floor depth. It is common practice to utilise standard steel column sections with a 15/20mm thick steel plate welded to the underside to make a Slimflor beam. The plate extends beyond the bottom flange by 100 mm either side, to allow for the installation of the precast planks/composite deck.

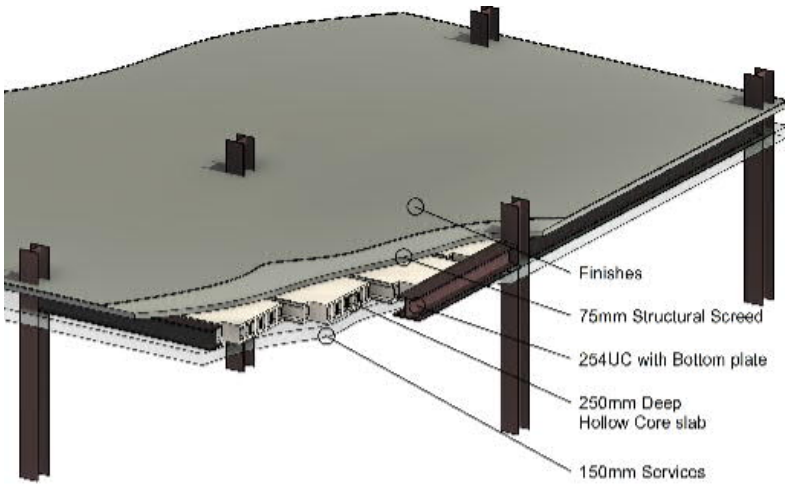


Figure 17 – Slim Floor Construction, Overall Depth 525 - 550mm

The proposed structural system used for this frame consists of 254UC beams supporting 250mm thick hollow core precast units topped with 75mm of structural screed. By allowing for 150mm zone for services and ceiling as well as 50-75mm of finishes the overall slab thickness is in the range of 525 - 550mm deep.

The use of a structural screed with reinforcement is recommended to tie the units together and provide robustness. The thickness of the screed should cover the units by at least 30 mm. If used without a structural screed, reinforcement should be provided through the web of the beam to tie the floor on each side of the beam together. However, neglecting the structural screed topping is not advisable due to the difficulty of ensuring adequate dynamic performance. Lightweight or normal concrete can be used.

Embodied Carbon for Slim Floor construction

The carbon total of this option is 322kgCO2e/m2. In terms of carbon footprint, this option scores poorly with a project SCORS rating of E. This is due to the need for heavy UC sections to be utilised for structural beams in addition to welding steel plates to the underside of each beam. Approximately 50% of the carbon emissions arises from the steelwork frame but this can be further improved by the adoption of composite construction, reducing the steel weight requirements on the beams, or by the adoption of a greener alternative proprietary system called Deltabeam green.

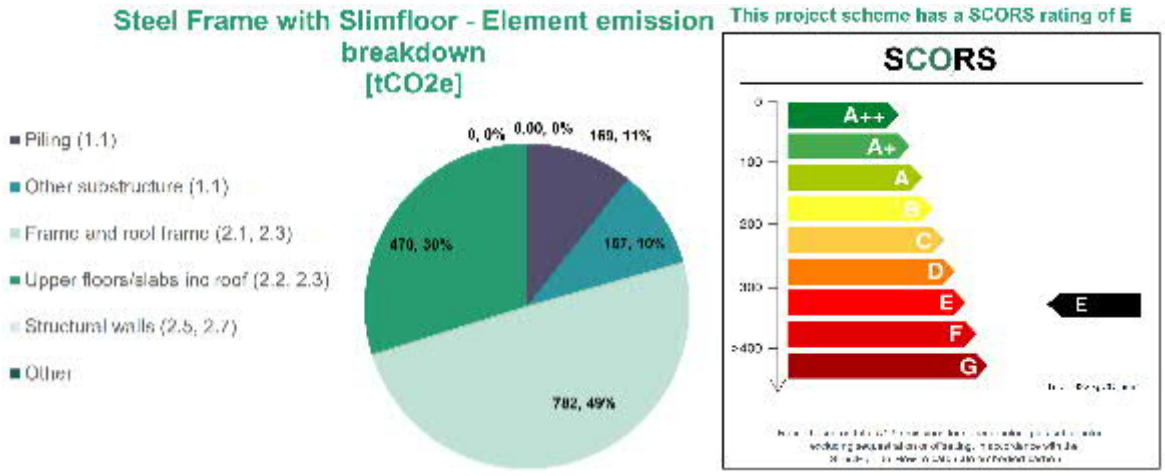


Figure 18 – Carbon Emission Breakdown tCO2e and SCORS Rating for Slim Floor Steel Frame Option

Advantages

- ✓ Quick to erect as the majority of the frame is prefabricated
- ✓ Reduction in overall weight of the structure translates to fewer piles
- ✓ Possibility to reuse existing piles
- ✓ Beams normally require no fire protection for up to 60 minutes fire protection.
- ✓ Shallow floor zone translates in overall reduction in building height and cladding.
- ✓ Virtually flat soffit allows easy service installation and offers flexibility of internal wall positions.

Disadvantages

- × The steel beams are made of heavier UC sections increasing overall structural weight compared to typical steel construction
- × Extra fabrication is involved in welding the plate to the UC.
- × Connections are more expensive and require more detailing as the plate is wider than the column.
- × Precast units involve more individual lifting operations than decking, which is delivered and erected in bundles.
- × The erection sequence requires access for installation of the concrete units.
- × Carbon rating is highest but can be reduced by introducing alternative greener steel sections such as Deltabeam green

22. SUSTAINABILITY / ENERGY STRATEGY

This project presents a fantastic opportunity to embrace sustainability (including embodied carbon and operational carbon) to provide a scheme that delivers for the future residents and the wider city throughout the life of these developments. With early consideration of sustainability as an integral part of the design and consultation process, this project will be able to demonstrate that the inclusion of sustainability does not present a barrier to the creation of affordable, desirable spaces.

The regeneration of the three sites should focus on passive opportunities to limit the energy demands of the buildings.

The ultimate aim of the project is to replace the existing inefficient buildings with a new low carbon, efficient and environmentally considered development. The desire is to provide a template for future developments within the city.

CONCLUSIONS

23. CONCLUSIONS

The document summarises the condition of the blocks and results on recent surveys assessment the robustness and fire resistance capabilities of the blocks. In addition, the report highlights and provides details on three options for the three LPS sites looking at works required to undertake essential safety works, provide opportunities for refurbishments, details constraints around potential demolition and options for regeneration of the sites.

23.1. Next Steps

Ridge are in the process of producing the Building Safety Risk Assessments for each of the LPS sites, which will provide a further assessment of the risks associated with retention of the LPS blocks. This assessment will detail the structural and fire safety risks associated with building, mitigation measures and anticipated consequences of accidental loads scenarios which should paint a further, more detailed picture of the condition and risks associated in retaining the blocks.

Once the decision has been made as to the future of the blocks at each of the three sites, Ridge and Partners can assist with design and management services to provide the necessary detail undertake the works.

Should the blocks be retained, Ridge can undertake the following:

- Detailed design for strengthening solutions.
- Detailed design for necessary building upgrades to provide adequate fire safety features i.e. sprinkler.
- Further surveys on the condition of the non-structural or fire related items within the building i.e. mechanical and electrical systems.

If the blocks are to be demolished and the sites regenerated, Ridge can provide detailed methodologies and management services of the proposed demolition as well as full multidisciplinary services for regeneration schemes.

APPENDIX A

ECE Architecture – Option 2 Report

Brighton and Hove City Council

Large Panel System (LPS) Buildings Study

Option 02 – Strengthening and Refurbishment

Architectural Study

Project Name: BHCC LPS Buildings Study – Option 02 Strengthening and Refurbishment Architectural Study

Location: Bird Blocks, Whitehawk; Dudeney Lodge and Nettleton Court, Hollingdean; St James House, Kemptown

Client: Brighton and Hove City Council

File Reference: 7606

	27.05.25	Rev A	CC	CB	Preliminary Issue
Issue	**Date**	**Revision**	**Author**	**Checker**	**Notes**

Introduction

Large Panel System (LPS) buildings, a type of prefabricated concrete construction method used commonly for high-rise social housing projects from the 1950s to the 1980s, are known to have a legacy of structural issues. These concerns stem from both design flaws and aging materials, and they have led to significant safety concerns.

Brighton and Hove City Council have identified 8 council-owned large panel system (LPS) high-rise blocks in the city and as part of their responsibilities under the Building Safety Act 2022 and Social Housing (Regulation) Act 2023, commissioned detailed structural surveys on the buildings in 2024.

Independent consultants, Ridge and Partners LLP, carried out observational and intrusive surveying. The surveys found that the buildings do not meet the current safety standards in relation to their ability to resist a disproportionate collapse in the case of an explosion or large fire.

Acknowledgement

This report should be read in conjunction with the studies undertaken by Ridge and Partners LLP:

- St James House Structural Robustness Preliminary Executive Summary Report - BHCC Aug '24
- Dudney Lodge Structural Robustness Preliminary Executive Summary Report - BHCC Aug '24
- Nettleton Court Structural Robustness Preliminary Executive Summary Report - BHCC Jun '24
- Falcon Court Structural Robustness Preliminary Executive Summary Report - BHCC Jun '24
- Heron Court Structural Robustness Preliminary Executive Summary Report - BHCC Jun '24
- Kestrel Court Structural Robustness Preliminary Executive Summary Report - BHCC Jun '24
- Kingfisher Court Structural Robustness Preliminary Executive Summary Report - BHCC Jun '24
- Swallow Court Structural Robustness Preliminary Executive Summary Report - BHCC Jun '24
- LPS Options Study – BHCC Apr '25

Scope

The LPS buildings within the BHCC stock under consideration are distributed across three sites in Whitehawk, Hollingdean and Kemptown. They are comprised of the Bird Blocks, Whitehawk – Heron Court, Kingfisher Court, Swallow Court, Kestrel Court and Falcon Court, Nettleton Court, and Dudeney Lodge on Hollingdean Road and St. James House, Chapel Street, Kemptown.

Fig 01 – Location plan (Not to scale)

The report by Ridge and Partners LLP looked at 3 No options to cover the scenarios:

Option 1 – Essential building safety works including completing strengthening works and essential fire safety works in isolation and understanding the impact on tenants, programme, finance, etc.

Option 2 – Strengthening works and full refurbishment of the blocks, improving fire safety, improving thermal comfort, energy efficiency and ensuring the refurbishment complies with new building regs, Building Safety Act.

Option 3 – Demolition of existing buildings and new build from scratch.

This report is concerned exclusively with Option 2 – strengthening and refurbishing works, focusing upon the architectural considerations of implementing this option. The study is based primarily on the work undertaken by Ridge and Partners LLP and has not benefited from extensive site surveys or interventions to explore existing construction and junctions.

Architectural considerations

It is clear from the proposals outline by Ridge for the strengthening options that this building work constitutes a material alteration to the building under Regulation 3 of Building Regulations 2010.

All the work undertaken will, on completion, need to comply with the Schedule 1 of the Building Regulations 2010 (i.e. the Approved Documents).

Strengthening improvements to the building fabric will ensure compliance with AD Part A (Structure).
Work to address the requirements of the Building Safety Act 2022 e.g. re-cladding the façade, adapting the Fire detection/alarm system will need to comply with AD Part B.

The thermal strategy (AD Part L – Conservation of fuel and power; AD Part F – Ventilation) may need to be reviewed if the external cladding/windows are being replaced or indeed if heating/ventilation systems are proposed to upgrade existing. We note that this may be scheduled upgrade or maintenance work, timed to coincide with strengthening works to minimise the disruption to the occupants.

It may be the case that mandatory upgrades to the heating/ventilation system are required because of fabric improvements (or vice-versa), deemed consequential improvements by the Regulating Authority.
Depending upon the significance of the structural alterations, it may result in replanning or adjustment to the accommodation layouts, which may impact AD Part M e.g. level thresholds bathroom layouts.

Other, notifiable work that may be affected because of the structural works include:

- Part C – Site preparation and resistance to contaminants and moisture
- Part G – Sanitation, hot water safety and water efficiency
- Part H – Drainage and waste disposal
- Part J – Combustion appliances and fuel storage systems
- Part K – Protection from falling, collision, and impact
- Part P – Electrical safety (in dwellings)
- Part O - Overheating

Bird Blocks

Fig 02 – Bird Blocks (Kestrel Court foreground: Heron Court background) from Swanborough Drive, Whitehawk.

Structural Strengthening

The Engineer's report states that strengthening is required to the internal floor slabs and walls to all Bird Block buildings, Whitehawk. This includes:

- Strapping to the slab soffits to strengthen the slabs
- Steel angles at wall and floor junctions to tie the horizontal and vertical elements
- Steel frame to flank and cross walls to provide additional strengthening to wall panels

The Ridge report details options to achieve the strengthening:

- Steelwork - steel sections and plates bolted though the floor and to flank walls
- FRB – soffit reinforcement utilising Fibre Reinforced Polymer (FRB

It is evident that both these options will require significant intrusive works to expose the existing structure and that the existing wall/floor/ceiling finishes will have to be removed to facilitate this work. In addition to the finishes strip-out, small power and lighting circuitry and fittings will be affected; radiators may need to be removed or relocated, and pipework re-routed. Existing doors will need to be modified to suit the revised finishes level.

Should the strengthening works occur in kitchen or bathroom areas, the room layouts will require detailed study to ensure that subsequent fitout of fixtures and fittings meet ergonomic practicalities and the requirements of AD Part M. A revised layout or replacement fittings will require compliance with AD Part H – alterations to, or new connections to, a drainage stack, AD Part G - installation of hot water and wholesome water to the sink and AD Part P – for electrical circuits especially in the proximity of sanitary fittings.

The assumption is that existing services penetrations in the party walls and floors will be re-used wherever practicable. New services penetrations will require fire-stopping in accordance with AD Part B and the pipework insulated to prevent the passage of sound (AD Part E).

Fire

An assessment of the Bird Block buildings has been undertaken to determine the Fire Risk including assessment of façade materials, compartmentation, evacuation strategy and access and facilities for the fire service.

Focussing on the internal layout of each apartments, the recommendation is to improve the early warning and detection system by providing a category L5 common fire alarm and detection system in accordance with BS5839-1, where the sound pressure level of the fire alarm signal within flats provides 85dB(A) at the open doorway of every bedroom in each flat to support the change in evacuation strategy. The assumption is that this L5 system, which could support a stay-in-place evacuation strategy, would be used in conjunction with an interlinked fire detection system in all flats and common areas (L1 system). With the structural soffit exposed for strengthening, it would be opportune to run the containment for the fire alarm and detection system.

Likewise, there is recommendation to fit a Category 4 residential sprinkler system throughout the building in accordance with BS 9251:2021. Leaving aside the logistical constraints of where the sprinkler tanks, duplicate pumps and secondary power supplies would be located, the pipework for the sprinklers and the sprinkler heads could fix directly to the structural soffit. If the sprinkler outlets are co-ordinated with other the ceiling mount services to avoid crossovers, the overall depth of the ceiling service void can be kept to a minimum.

The escape distance within the flats is limited to 9m, larger escape distances require a 30min protected corridor within the apartments. Refurbishment works should confirm that the partition construction meets the AD Part B requirement, including the requisite fire stopping at junctions with party walls and floor. All doors on this corridor are to be certified FD30s, any services penetrating the partition will require dampers or fire-stopping to ensure integrity.

The flat entrance doors open onto protected escape routes that should be 60 minutes fire-resisting construction. These doors should be replaced if they are not certified 30-minute fire rated construction with smoke seals. They should also have an affective opening width of 775mm to be compliant with AD Part M. Where modification have been made to structural walls it will be necessary to reinstate any breached compartmentation. Any anomalies or deficiencies in the existing fire-stopping or cavity barrier placement can be rectified when these areas are opened-up; newly formed penetrations will require compliant fire collars, wraps, and mastic where required.

The strip out of existing finishes will remove any combustible legacy finishes (e.g., polystyrene tiles), and should be replaced with wall/ceiling finishes that achieve a minimum Class B-s3, d2 rating. The reinstated finishes should also address any acoustic deficiencies.

The Bird Blocks are clad in external wall insulation (EWI), which was probably installed 10-15 years ago. Although it is noted that the façade is suffering leaks, once repaired it should not require wholesale replacement for the next 20 years. The recommendation from Ridge is to undertake a FRAEW assessment, (Fire Risk Assessment of External Walls) to determine if the cladding system is compliant with BRE 135 (BS 8414) and that the components /materials are non-combustible (BS EN 13501-1 Class A2-s1, d0 or better)

The Bird Blocks, Whitehawk are residential buildings over 18m with a single stair core. Approved Document B (ADB) 2019 (with 2020 amendments) of the Building Regulations in England does not explicitly mandate a second stair is required to be retrofitted, however the Building Safety Act 2022 does put emphasis on how existing buildings should be improved.

Improvement to the Fire Detection and Alarm system, as well as sprinkler provision has been discussed, but this could also extent to additional smoke clearance strategies such as providing AOV’s in the stair lobbies or providing a dedicated smoke shaft, should these provision not already be in place.

Energy Performance

To make significant improvement to the energy efficiency of the Bird Block buildings it is necessary to examine the whole building – heating strategy, ventilation strategy, thermal envelope and any mitigating renewable or energy strategies that can be utilised.

The Ridge report states that the existing buildings are currently fed by a temporary external plant room containing temporary boilers which supply the buildings heat system and that a strategy for replacement with Air Source Heat Pumps (ASHP) local to each flat has been explored and found not to be viable.
There is an option to utilise a centralised system with roof mounted heat pumps in lieu of the local units, or if this proves unviable, the buildings will need to be switched to an all-electric system. Regardless of the strategy adopted, it is likely that a full rewire of the buildings will be required. It is also likely to require a new electrical sub-station to service the demand.

This sub-station will be a located at ground floor level, more than likely remote from the existing building, and will have prescriptive requirements imposed by the Energy provider regarding the means of access, construction, environmental impact, and safety concerns to consider.

The siting of the sub-station must not impede Fire service access to the buildings or encroach on the minimum boundary distances required between buildings to avoid upgrades to the fire resistance of existing structures.

Should roof mounted heat pumps be installed, the service routes to the individual flats need to be designed and detailed. The Ridge report notes that the existing common ventilation system should be removed so there may be scope to utilise some of these existing service routes. Fire stopping will be required on all redundant penetrations.

The options for ventilation systems to meet AD Part F include:

- System 1: Background ventilators (e.g., trickle vents) and intermittent extract fans
- System 3: MEV (Mechanical Extract Ventilation)
- System 4: MVHR (Mechanical Ventilation with Heat Recovery)

The System options will require penetrations being made to the external façade, these will require fire-stopping and cavity barrier to comply with AD Part B. Given the thermal bridging and poor insulation common in LPS buildings, MVHR may only be viable if a deep retrofit is proposed.

If roof mounted ASHP's are adopted as the heating strategy for the scheme, consideration must be given to plant access and maintenance, which may lead to upgrades to the existing edge restraint system.

Acoustic

LPS buildings often have Acoustic concerns as a consequence of:-

- Poor airborne sound insulation between units due to rigid, continuous panel junctions.
- Flanking transmission caused by sound traveling along structural
- Impact noise

Transfer of airborne sound of can be addressed by inducing independent wall construction i.e. internal walls and party walls lined with acoustic panels or independent stud walls with insulation and resilient fixings to reduce sound transfer. Airbourne sound is also less likely to propagate through denser constructions, so double boarding of plasterboard systems may be required, and it is essential that all gaps, joints, and penetrations are sealed meticulously—especially where services pass through.

To mitigate the effect of impact sound acoustic floor treatments such as floating floors with resilient layers (rubber, mineral wool, or acoustic mats). Avoid rigid floor finishes directly on concrete.

Flanking Transmission can be alleviated by disrupting the flanking paths by decoupling wall linings from structural elements by using resilient bar systems or isolation mounts and carefully detailing junctions to avoid direct rigid connections.

Replacing the windows to improve the thermal envelope and energy performance of the building may also be advise if environmental noise concerns are an issue, single-glazed windows offer poor noise insulation and should be replaced with high-performance double or triple glazing with acoustic laminates. If background ventilation is required acoustic trickle vents can be specified.

The report by Ridge draws attention to the ventilation ductwork to ensure that it is acoustically treated and not directly connected across units.

Water

The cold-water system is understood to not have been renewed within the last 50 years and as such will require upgrading.

Façade

Refurbishment of the façade can be argued from a fire safety point of view, compliance with AD Part B (Regulation 7), and as intrinsic component to improve the energy performance AD Part L.

It is stated in the Ridge Report that Bird Blocks, were reclad 10-15 years ago with a new external wall insulation (EWI) system, however there are continual leaks through the façade. Should the leaks be repairable, a wholesale replacement of the façade should not be required within the next 20 years.

As part of the façade replacement, existing windows are also expected to require replacement. This will ensure compliance with AD Part L and AD Part F; however, they are exempt AD Part B (Regulation 7).

Balconies

The existing balconies are original would therefore likely require upgrading as a part of the refurbishment project. As these structures are deemed ‘specified attachments’ under Regulation 7(3) of the Building Regulations they will require replacement and components/finishes will need to achieve a minimum European Class A2-s1, d0 or better, unless listed on the schedule of exempt materials.

Roof

To ensure that the waterproofing integrity of the roof is in step with the performance of the building structure afforded by the strengthening works, it is likely that a full roof replacement will be required as a part of a refurbishment of the blocks. In respect to AD Part B, the roof must achieve BROOF(t4) classification.

Thermal performance should also be considered for this building element as part of AD Part L. Adding additional insulation material to the roof build-up my alter the parapet detailing and guarding requirements (AD Part K). It has already been noted that access will be required to any plant or PV panels, these in turn may require modification to the roof build-up for anchor points/upstands etc.

Nettleton Court & Dudeney Lodge

Fig 03 - Nettleton Court and Dudeney Lodge, Hollingdean from Upper Hollingdean Road

Structural Strengthening

The Engineer's report states that strengthening is required to the internal floor slabs and walls to all Nettleton Court and Dudeney Lodge, Hollingdean. This includes:

- Strapping to the slab soffits to strengthen the slabs
- Steel angles at wall and floor junctions to tie the horizontal and vertical elements
- Steel frame to flank and cross walls to provide additional strengthening to wall panels

The Ridge report details options to achieve the strengthening:

- Steelwork - steel sections and plates bolted though the floor and to flank walls
- FRB – soffit reinforcement utilising Fibre Reinforced Polymer (FRB)

The Ridge report (*5025201-RDG-XX-XX-RP-S-2001 - LPS Options Study*) notes that at Nettleton Court and Dudeney Lodge the strengthening is not as extensive as the other blocks. Whilst this is noted, to affect structural alterations even to localised areas of the building, it will entail significant disruption and will still require wall/floor/ceiling finishes to be removed.

There is currently an upgrade in progress to the electrical system, although the scope of this upgrade has not been ascertained. It is unlikely that structural strengthening works would overlap with the electrical upgrades, consequently recently completed works may need to be altered/revisited to accommodate essential building safety works.

The report also notes that the It is likely that existing bathrooms and kitchens can be retained at Nettleton and Dudeney due to the reduced extent of strengthening required.

Fire

An assessment of the Nettleton Court & Dudeney Lodge buildings has been undertaken to determine the Fire Risk including assessment of façade materials, compartmentation, evacuation strategy and access and facilities for the fire service.

The recommendation is to improve the early warning and detection system by providing a category L5 common fire alarm and detection system in accordance with BS5839-1 to affect a stay-in-place evacuation strategy, in conjunction with an interlinked fire detection system in all flats and common areas (L1 system). With the structural soffit exposed for strengthening, it would be opportune to run the containment for the fire alarm and detection system.

The recommendation is to fit a Category 4 residential sprinkler system throughout the building in accordance with BS 9251:2021. The sprinkler tanks, duplicate pumps and secondary power supplies could be located, at basement level, utilising existing plant space or extending the plantroom into the carparking areas where required.

The escape distance within the flats is limited to 9m, larger escape distances require a 30min protected corridor within the apartments. Refurbishment works should confirm that the partition construction meets the AD Part B requirement, including the requisite fire stopping at junctions with party walls and floor. All doors on this corridor are to be certified FD30s, any services penetrating the partition will require dampers or fire-stopping to ensure integrity.

The flat entrance doors open onto protected escape routes that should be 60 minutes fire-resisting construction. These doors should be replaced if they are not certified 30-minute fire rated construction with smoke seals. They should also have an affective opening width of 775mm to be compliant with AD Part M. Where modification have been made to structural walls it will be necessary to reinstate any breached compartmentation. Any anomalies or deficiencies in the existing fire-stopping or cavity barrier placement can be rectified when these areas are opened-up; newly formed penetrations will require compliant fire collars, wraps, and mastic where required.

The strip out of existing finishes will remove any combustible legacy finishes (e.g., polystyrene tiles), and should be replaced with wall/ceiling finishes that achieve a minimum Class B-s3, d2 rating. The reinstated finishes should also address any acoustic deficiencies.

The blocks have a rainscreen cladding system was probably installed 10-15 years ago. The recommendation from Ridge is to undertake a FRAEW assessment, (Fire Risk Assessment of External Walls) to determine if the cladding system is compliant with BRE 135 (BS 8414) and that the components /materials are non-combustible (BS EN 13501-1 Class A2-s1, d0 or better).

Both Nettleton Court & Dudeney Lodge buildings are residential buildings over 18m with a single stair core. Approved Document B (ADB) 2019 (with 2020 amendments) of the Building Regulations in England does not explicitly mandate a second stair is required to be retrofitted, however the Building Safety Act 2022 does put emphasis on how existing buildings should be improved.

Improvement to the fire detection and alarms, as well as sprinkler provision has been discussed, but this could also extent to additional smoke clearance strategies such as providing AOV's in the stair lobbies or providing a dedicated smoke shaft, should these provision not already be in place.

Energy Performance

Nettleton Court & Dudeney Lodge are currently supplied by a centralised gas boiler situated in a plant room between the two buildings. The Ridge report states that this been installed recently (within the last 5 years) and therefore would not likely factor as part of improvements to the energy efficiency of the buildings.

The buildings were reclad 10-15 years ago with a rain screen cladding system. The Ridge report discounts these elements as requiring refurbishment but it should be noted that even although the details of external wall construction are to be determined, it is unlikely they would meet the current thermal requirements – AD Part L states that the U value for refurbished wall elements short reach a minimum 0.18W/m²K..It would also

need to be determined if the external wall construction meets the requirement of AD Part B (Regulation 7) and the limitation of combustible materials in the façade construction.

Replacement windows could improve the performance of the thermal envelope (AD Part L), address concerns with environmental noise (AD Part E), ventilation (AD Part F) and overheating (AD Part O)

Water:

The cold-water system is understood to not have been renewed within the last 50 years and as such will require upgrading. To upgrade the system to be compliant with BS EN 806 & BS 8558, the work would involve (but not limited to) replacing existing pipework with plastic pipework, riser modifications or even creating new routes, storage tank removal to mains-fed system (subject to capacity studies on pressure and flow rates).

The pipework will need to be insulated to prevent freezing and maintain thermal efficiency, with the required fire stopping detailing to ensure the integrity of all fire compartments.

Roof

It is likely that a full roof replacement will be required as a part of a refurbishment of the blocks. In respect to AD Part B, the roof must achieve BROOF(t4) classification.

Thermal performance should also be considered for this building element as part of AD Part L. Adding additional insulation material to the roof build-up my alter the parapet detailing and guarding requirements (AD Part K). Access requirements will need to be considered.

Balconies

The Fire Risk Assessment of the blocks identified that the spandrel panels forming the front elevation of the existing wintergarden balconies are defective and require replacement.

In addition to the above, a general internal redecoration of communal areas should be included with the building refurbishment.

St James House

Fig 04 – St James House, Kemptown from High Street

Structural Strengthening

The Engineer's report states that strengthening is required to the internal floor slabs and walls to St James House, Kemptown. This includes:

- Strapping to the slab soffits to strengthen the slabs
- Steel angles at wall and floor junctions to tie the horizontal and vertical elements
- External steel frame fixed through to angles to provide additional strengthening to flank wall panels

The Ridge report details options to achieve the strengthening:

- Steelwork - steel sections and plates bolted though the floor and to flank walls
- FRB – soffit reinforcement utilising Fibre Reinforced Polymer (FRB)

In addition to the strengthening works above, the Ridge report (*5025201-RDG-XX-XX-RP-S-2001 - LPS Options Study*) also highlights concerns regarding the steel reinforcement within the panels at St James House and the need to remediate the risk of corrosion, as it was observed some of the reinforcement is actively corroding

There is also concern on the effectiveness of the structural panels to provide sufficient fire integrity as the concrete cover to the embedded reinforcement appeared to vary throughout the inspected ceiling areas, in some areas the cover to the reinforcement was noted as <10mm.

Fire

An EVAC fire alarm system is being installed at St James House. This is a type of fire alarm system that uses voice announcements to guide occupants during an emergency evacuation. EVAC systems work in conjunction with standard fire alarm systems, using the same detection devices (smoke detectors, heat detectors, etc.) to trigger the evacuation.

Any deficiencies identified in fire stopping and compartmentation will need to be addressed during the installation of alarm systems or when the strengthening work proceeds.

The recommendation is to fit a Category 4 residential sprinkler system throughout the building in accordance with BS 9251:2021. The sprinkler tanks, duplicate pumps and secondary power supplies could be located, at basement level, utilising existing plant space or extending the plantroom into the carparking areas where required.

The escape distance within the flats is limited to 9m, larger escape distances require a 30min protected corridor within the apartments. Refurbishment works should confirm that the partition construction meets the AD Part B requirement, including the requisite fire stopping at junctions with party walls and floor. All doors on this corridor are to be certified FD30s, any services penetrating the partition will require dampers or fire-stopping to ensure integrity.

The flat entrance doors open onto protected escape routes that should be 60 minutes fire-resisting construction. These doors should be replaced if they are not certified 30-minute fire rated construction with smoke seals. They should also have an affective opening width of 775mm to be compliant with AD Part M. Where modification have been made to structural walls it will be necessary to reinstate any breached compartmentation. Any anomalies or deficiencies in the existing fire-stopping or cavity barrier placement can be rectified when these areas are opened-up; newly formed penetrations will require compliant fire collars, wraps, and mastic where required.

The blocks have a rainscreen cladding system was probably installed 10-15 years ago. The recommendation from Ridge is to undertake a FRAEW assessment, (Fire Risk Assessment of External Walls) to determine if the cladding system is compliant with BRE 135 (BS 8414) and that the components /materials are non-combustible (BS EN 13501-1 Class A2-s1, d0 or better).

St James House is a residential building over 18m that has alternative means of escape i.e. 2 No. stair cores. However, to comply with AD Part B, the distance between the furthermost flat entrance and the stair core should not be greater than 30m. Extended travel distances can be mitigated by sprinkler provision, additional smoke clearance strategies such as providing AOV’s in the stair lobbies or providing a dedicated smoke shaft, should these provision not already be in place.

Energy performance

To make significant improvement to the energy efficiency of the Bird Block buildings it is necessary to examine the whole building – heating strategy, ventilation strategy, thermal envelope and any mitigating renewable or energy strategies that can be utilised.

The viability of replacing the existing heating system with a centralised Air Source Heat Pumps (ASHP) is being investigated. Some of the factors influencing this proposal are the capacity of the existing electrical system, the containment routes for the ductwork - whether existing routes/risers can be utilised of if new penetrations are required in the existing structure. Where the plant is located, potentially at roof top level or at basement/ carpark level, will be determined by structural constraints, servicing routes and access requirements.

The strengthening proposed for St James House provides an opportunity to develop a full façade replacement strategy on the building. Steel members will be required on the external face of the building, to implement this the existing façade covering will need to be removed. Furthermore, the steels will introduce a massive cold-bridging element to the existing building. A thorough appraisal of the cladding options needs to be undertaken to ascertain the optimum wall construction to meet AD Part L in terms of thermal performance, airtightness, and AD Part B.

The external walls should be upgraded to meet the performance criteria described in BRE report BR 135 or satisfy the criteria that any insulation product construction of an external wall should be class A2-s1, d0 or better and that the external wall surface should achieve class A2-s1, d0 or better for surface spread of flame

classification. Cavity barriers should follow compartment sub-divisions and surround all penetrations in the façade. Replacement of the external cladding should include the curtain walling on staircases.

The existing windows are also expected to require replacement which would also improve the performance of the thermal envelope (AD Part L), address concerns with environmental noise (AD Part E), ventilation (AD Part F) and overheating (AD Part O).

Roof:

It is likely that a full roof replacement will be required as a part of a refurbishment of the blocks. In respect to AD Part B, the roof must achieve BROOF(t4) classification.

Thermal performance should also be considered for this building element as part of AD Part L. Adding additional insulation material to the roof build-up my alter the parapet detailing and guarding requirements (AD Part K). Access requirements will need to be considered.

Balconies

It is noted that some repairs are required to balcony soffits due to some known concrete defects. As these structures are deemed 'specified attachments' under Regulation 7(3) of the Building Regulations, replacement components/finishes will need to achieve a minimum European Class A2-s1, d0 or better, unless listed on the schedule of exempt materials.

Below Ground Car Park

The existing below ground car park is currently closed to prohibited Electric vehicles using the car park due to the risk of fire. Provision of an access control system, such as a ANPR (Automatic Number Plate Recognition) cameras linked to barrier control, sprinkler systems and enhanced smoke clearance, if included within the refurbishment, would address safety concerns.

In addition to the above, a general internal redecoration of communal areas should be included with the building refurbishment.

Summary

As noted in the introduction, this is a high-level architectural assessment of refurbishment option 02.
To obtain a detailed break-down of the architectural work to be undertaken further information is required, including;

- Comprehensive structural review required of each building to determine strengthening scope
- Comprehensive MEP review required of each building to determine scope of servicing strategy
- Utilities study to understand service routes and existing capacity.
- Intrusive survey to understand construction build-ups, junction details etc.
- Asbestos survey including removal and disposal of any material discovered.
- Discussion with the regulatory authorities to determine the requirement for consents
- An understanding from BHCC on programme, procurement and costs.
- A detailed understanding of the proposed building decant.

Summary table of refurbishment actions;

	Whitehawk	Hollingdean	Kemptown
Fire			
Fire detection and alarm system upgrade	✓	✓	✓
Sprinkler system to apartments and communal areas	✓	✓	✓
Sprinkler tanks and pumps	✓	✓	✓
Communal and flat entrance fire doors	✓	✓	✓
Fire-stopping to compartment junctions and penetrations	✓	✓	✓
Fire doors to protective corridor within apartments	✓	✓	✓
Internal			
Floor, wall and ceiling finishes	✓	✓	✓
Replacement sanitary ware and fittings to bathrooms	✓	✓	✓
Replacement joinery and fittings to kitchens	✓	✓	✓
Refurbishment and decoration to communal areas	✓	✓	✓
External			
External plantroom	✓		
New electrical sub-station (dependent on capacity study)	✓		
Replacement façade cladding			✓
Replacement roof	✓	✓	✓
Access control to car parking areas			✓
M&E			
New small power and lighting layouts	✓	✓	✓
New cold water plumbing system	✓	✓	✓
Upgrade to existing heating system (new ASHP)	✓		✓

Conclusion

It is evident that significant structural, fire safety, and energy efficiency deficiencies that must be addressed as part of the strengthening and refurbishment works to the BHCC LSP Building stock.

Strengthening works are required to improve the integrity of internal slabs, walls, and external flank panels, with additional measures needed to mitigate corrosion risks in reinforcement and to restore fire compartmentation.

Fire safety upgrades are critical, including the installation of a full sprinkler system, EVAC fire alarm, certified fire doors, and fire stopping measures, along with a FRAEW assessment to verify the compliance of the existing cladding. Escape strategies, fire integrity of structural panels, and protected routes within flats must be aligned with Approved Document B standards.

Whilst undertaking the critical safety improvement to the buildings the opportunity exists to improve the thermal performance and energy efficiency of the building.

RIDGE

www.ridge.co.uk