3.0 The Case for Re-use

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3.1 AHMM Approach

Introduction

AHMM has a strong track record of reutilising existing buildings. A zero-carbon future means reengaging with necessity: optimising and re-using resources, excluding excess in design, construction and in use; being responsive to building users; and finding ways of doing more with less.

Undertaking much work on existing structures, reinventing under-utilised buildings to create modern, attractive, far more efficient, future-proofed spaces to work through smart re-use and intelligent additions, while massively improving energy performance and retaining very significant amounts of embodied carbon and existing materials.

The Angel Building in Islington re-uses the existing concrete frame of a 1980's office building that was facing demolition, saving 7400 tons of C02, and creating a 21st Century Office Building.

Angel Building, AHMM

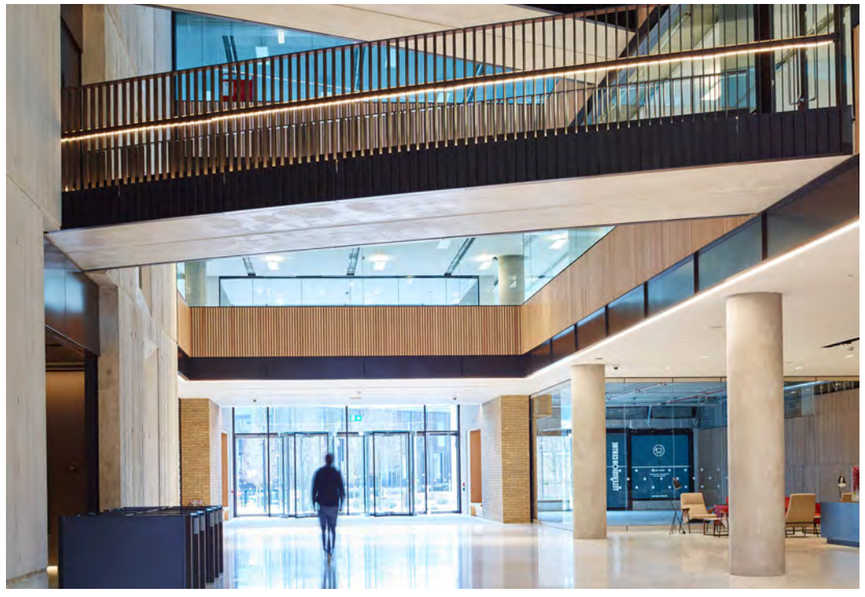
Tea Building, AHMM

The Tea Building in Hackney an existing warehouse on Shoreditch High Street, with nearly 20 years' worth of ongoing iterative design and construction, focusing on light touch and low carbon design solutions to support an ever evolving Hackney landmark.

The Post Building in Camden transforms a Royal Mail sorting office on New Oxford Street in central London, bringing back into use a prominent site which has been derelict for over 20 years. The existing basement, raft foundation and lower half of the existing, generously-scaled frame is retained and a new core and a series of intermediate mezzanine levels inserted into the centre of its plan. The building's top half is replaced, volumetrically configured to create a focal corner befitting the location at the intersection of five key London roads.

The Television Centre in Hammersmith and Fulham preserves and celebrates the original features of the listed office building and repurposes it for residential use.

The Post Building, AHMM



Television Centre, AHMM

3.2 Policy Context

This section should be read in conjunction with Carbon Plan's information, which includes the most up-to-date figures.

LBC Policy Summary

LBC have an holistic policy context to support assessment of re-use viability as contained in CPG Energy and Efficiency 2021.

We have used the processes and criteria setout in this document to review options for re-use of the existing building at Saffron Hill, as summarised in this chapter.

In order to understand the re-use potential of the existing carpark, the below criteria have been considered, as part of condition and feasibility studies that have been undertaken, and have been a recurring element of pre-application discussions with LBC Officers.

Existing Building Uses
- Existing building is a car park
- Small quantity of office uses on two upper floors, incompatible with the requirements of modern office floorspace

Servicing
- Existing building is effectively external, uninsulated façade, no windows, unconditioned space, minimal electrical installation
- To change use from carpark will require full facade upgrade, full plant installation

Technical
- Refer to later pages of this chapter for full technical assessment against the hierarchy of development options contained in the CPG, and summarised below.

Planning Policy
- Retention as carpark not aligned with LBC car free policy. (Policy T2)
- The site would benefit from a commercial building, befitting a Central Activities Zone location and proximity to Farringdon Station. Policies E1 and E2 support the new office development within this area and support the provision of affordable workspace within this area with Policy E2.

Hierarchy of Options

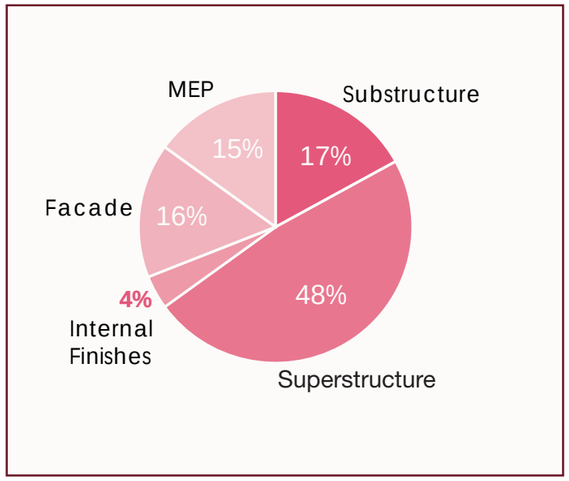
The following hierarchy of Development Options have been considered for the site, in accordance with the requirements of the CPG.
- Refit
- Refurbish
- Substantial refurb and extension
- Reclaim and recycle

Embodied Carbon Targets

In a typical office building Structure accounts for approximately 55-65% of the embodied carbon (48% for Superstructure, and 17% for Substructure).

The RIBA 2030 target is for < 750 $kgCO_2e/m^2$.
The LETI target is for < 600 $kgCO_2e/m^2$.

Any proposals should therefore target less than 288 $kgCO_2e/m^2$ for the superstructure.



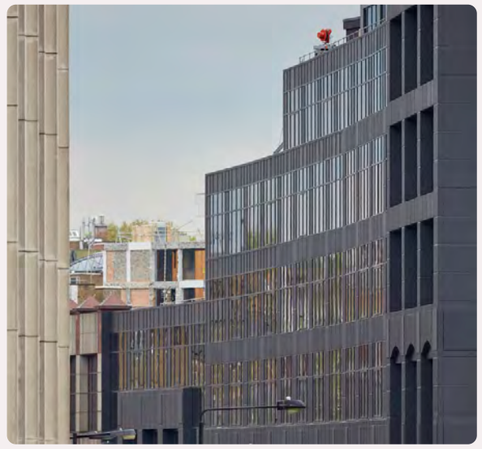
Embodied Carbon Breakdown per Element
Extract from LETI Embodied Carbon Primer

Benchmarking for Embodied Carbon Emissions

3.3 Re-Use Hierarchy

Summary of Development Options

A detailed assessment has been carried out to consider each step on the re-use hierarchy as identified in the CPG.
A summary has been included here of the outcome of these assessments, along with extracts of the response received from LBC officers. The detailed assessments has reviewed with officers have been included in the appendix of this report for reference.
Refer to appendix for Embodied Carbon Assessments used to inform development strategy agreed with LBC.



1. Refit

Option not applicable.

The building would need a significant amount of interventions to be made compliant with current building regulations.

Therefore, a 'minor works' refit approach is not applicable due to the existing building condition.

2. Refurbish

Option not commercially viable as the existing structure is not appropriate for re-use other than parking.

The retention of the frame would limit 'the opportunity to retrofit the building to reduce carbon emissions and include sustainable adaptation measures.'

3. Substantial Refurbishment & Extension

Even with significant intervention, the resulting building would remain compromised and offers little scope for future flexibility.

Embodied Carbon of Building Frame
(GF-L08, excl. foundations):
c. 196 kgC02e/m2

Max. 32% of the building structure retained. Percentage likely to be reduced once foundations are considered.

4. Reclaim & Recycle

The proposed new-build structure offers a better quality space with greater potential for future change.

Due to the use of lightweight structure including CLT slabs, Embodied Carbon of Building Frame
(GF-L08, excl. foundations):
c. 210 kgC02e/m2

The operational energy is expected to be lower compared to that of the substantial refurbishment.

Detailed whole life carbon analysis included as part of this submission

3.0 The Case for Re-use

3.4 LBC Response

Summary Extract of LBC officers response to the case for re-use, dated 08/09/23, supporting the principle of the proposed development, subject to WLCA that has been prepared as part of this submission.

Following meetings, supporting documents have been submitted, which show different parts of the site in relation to the list. The documents outlined the condition of the building, the existing uses, information around servicing and the technical information. It was clear that the existing building levels are uninsulated and unheated. The facades are a mix of light-weight metal mesh and sheet materials meaning that is not secure or air tight. Moreover, the ceiling heights within the car park structure are typically c. 2.25m which are very low with the car park frame is split in three independent sections. A concrete car ramp wraps around the floor plan and connects the central portion of floor slab, which is half a floor higher than the flanking car park levels. The existing building demonstrated that the floor slabs were not flat and had inclinations. Furthermore the existing column grid is typically 4.3x4.9m and 6.5x4.9m which remains very small and provides limited opportunity to develop.

The existing offices are occupied by the car park operator, NCP. The premises are of poor quality when assessed against contemporary standards for office building but more importantly, they present low refit opportunity and future flexibility as demonstrated by the points below:

- Current fire escape arrangements do not conform to modern fire regulations.
- Poor quality facade and windows. These do not comply with modern U-values and overheating Part L requirements.
- Current plant provision results in an inefficient building in terms of energy use. This means a high rate of operational carbon per m2 per year continues to be emitted.
- Existing WC provision does not meet modern office expectations.
- Existing lifts need to be investigated to determine whether they comply with Part M / accessibility requirements.

Overall the condition of the building, commercially, is poor and the upgrades/alterations needed to make this just a functioning office building would be very significant. Following on from this it was accepted that the Council could look into the development options above.

Refit

As with the information above, simply refitting the building would not be enough to cover the fundamental works required for this building to be a commercial building.

Retrofit

The definition of retrofit is outlined below:

> *Refurbishment should seek to significantly improve the service life of the existing building. This option provides an opportunity to retrofit the building to reduce carbon emissions and include sustainable adaptation measures.*

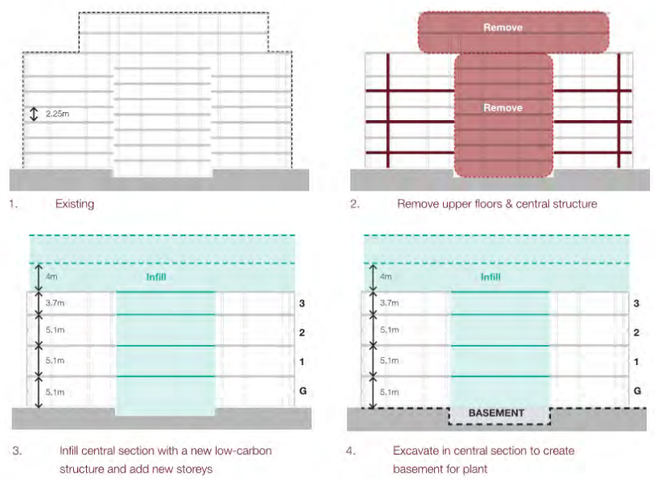
With this option there were still numerous problems and the result would be a scheme that would fail to meet the standards of modern commercial/office space, and would be characterized by inadequate daylight and a poor performance in carbon and energy terms.

With this level of 'refurbishment', the resulting building would still remain compromised and would offer limited scope for future flexibility and reuse.

Substantial refurbishment and extension

The definition of this option is similar to the above, but takes into consideration the need to optimise site capacity and alter the existing structure to meet future needs. This may involve significant changes to the façade (façade replacement) but should seek to retain as much of the existing building as possible reducing the need to use new materials and reduce the loss of embodied carbon in the existing structure.

As the building is split into three sections the refurb and extension naturally proposed to take out the middle core and replace with an extension, aligning the floor plans and adding a couple of floors above. The diagram below from the document demonstrates this.



1. Existing
2. Remove upper floors & central structure
3. Infill central section with a new low-carbon structure and add new storeys
4. Excavate in central section to create basement for plant

With this option columns would be taken out and replaced with beams to improve support and part of the ramps would be reused for servicing and core-type uses the middle section would be 'stitched' to the floors around it.

The issue with substantial refurbishment is that the small grid, awkward ceiling height meaning that additions are difficult for the building. Furthermore the intervention would involve carbon intensive structural alterations that would remain compromised for future flexibility.

Reclaim and Recycle

The definition of this is listed below:

> '*Where it is demonstrated to the Councils satisfaction, that the above options are not feasible the development proposal should include a pre-demolition audit identifying all materials within the building and documenting how they will be managed. The preference should be for re-use on site, then re-use off site, re-manufacture or recycling. (Providing time in the project plan for selective deconstruction techniques and materials storage to maximise reuse). New London Plan policy SI7 expects 95% of construction and demolition waste to be diverted from landfill (reuse, recycle, recovery), and 95% of excavation waste to be put to beneficial use.*'

With this option the potential for a flexible and optimized grid is obviously higher and the building floor plate becomes a lot more rationalised. What is important to mention is that for demolition compared with substantial refurbishment the predicted operational energy is lower than substantial refurbishment. Overall the justification for demolition has been established and now a detailed Whole Life Carbon Assessment will need to support any application. It is recommended that the analysis should run alongside the pre-application process to ensure that the embodied and operational carbon are in line with LETI guidance.

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3.5 Refit

Refit. Not Applicable.

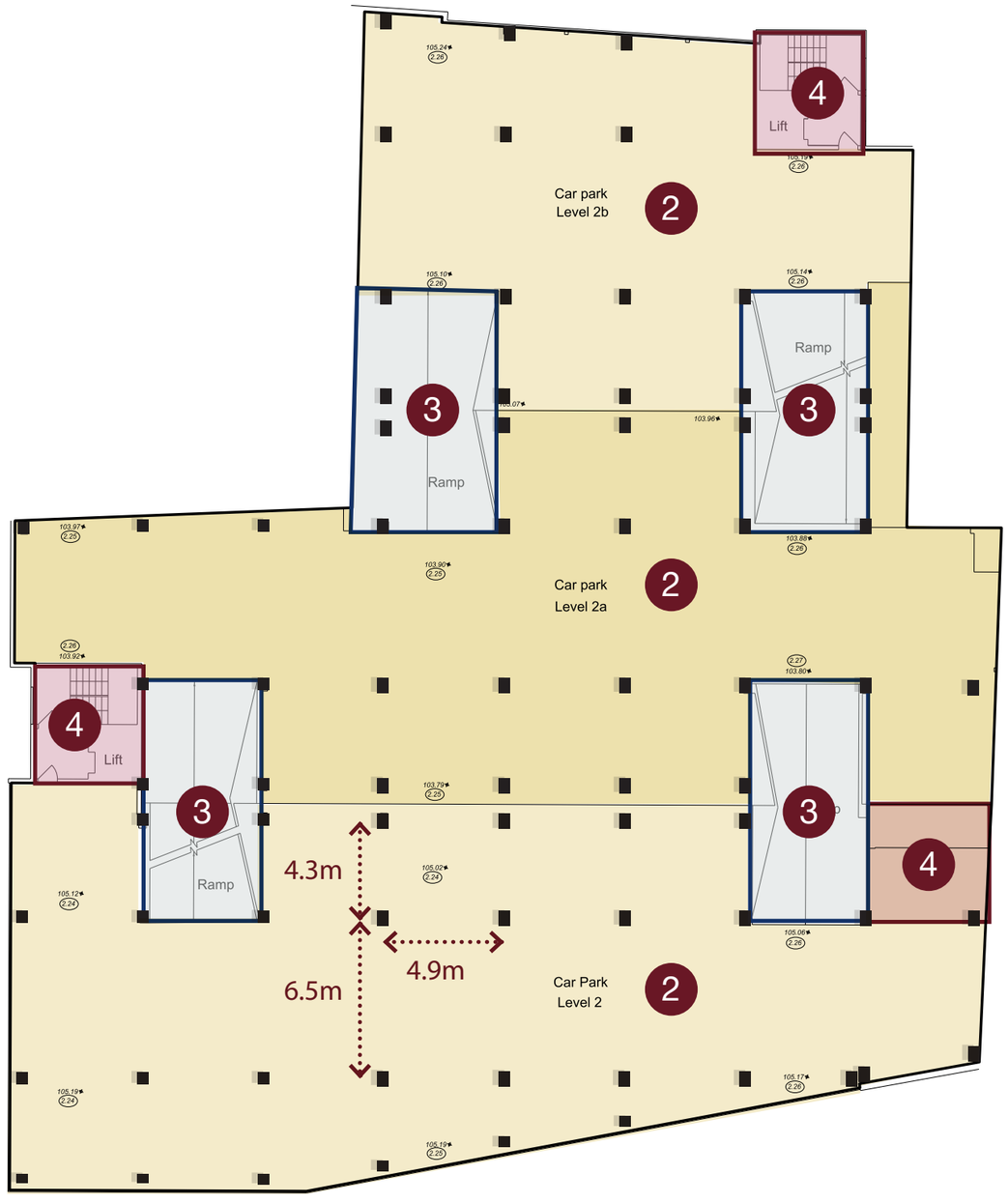
LBC Definition:

‘This option retains the existing structure as is, includes minor works, and the replacement of building services such as heating and insulation, to continue occupation of the building.’

A ‘minor works’ refit approach is not applicable due to the existing building condition and the incompatibility of the existing and proposed uses.

Constraints:

1. Uninsulated and open façade not suitable for refit
2. Inclined floor slab not practical for commercial uses
3. Ramps incline too steep for DDA regulations
4. Existing cores not suitable for commercial use and require upgrade (1 additional passenger per core, and addition of goods lift)
5. Detailed embodied carbon assessment not carried due to significant compromises to all aspects of the design



Existing Plan

Key:

Car Ramps

Vertical Cores

3.6 Refurbish

Refurbish

LBC Definition:

‘Refurbishment should seek to significantly improve the service life of the existing building. This option provides an opportunity to retrofit the building to reduce carbon emissions and include sustainable adaptation measures.’

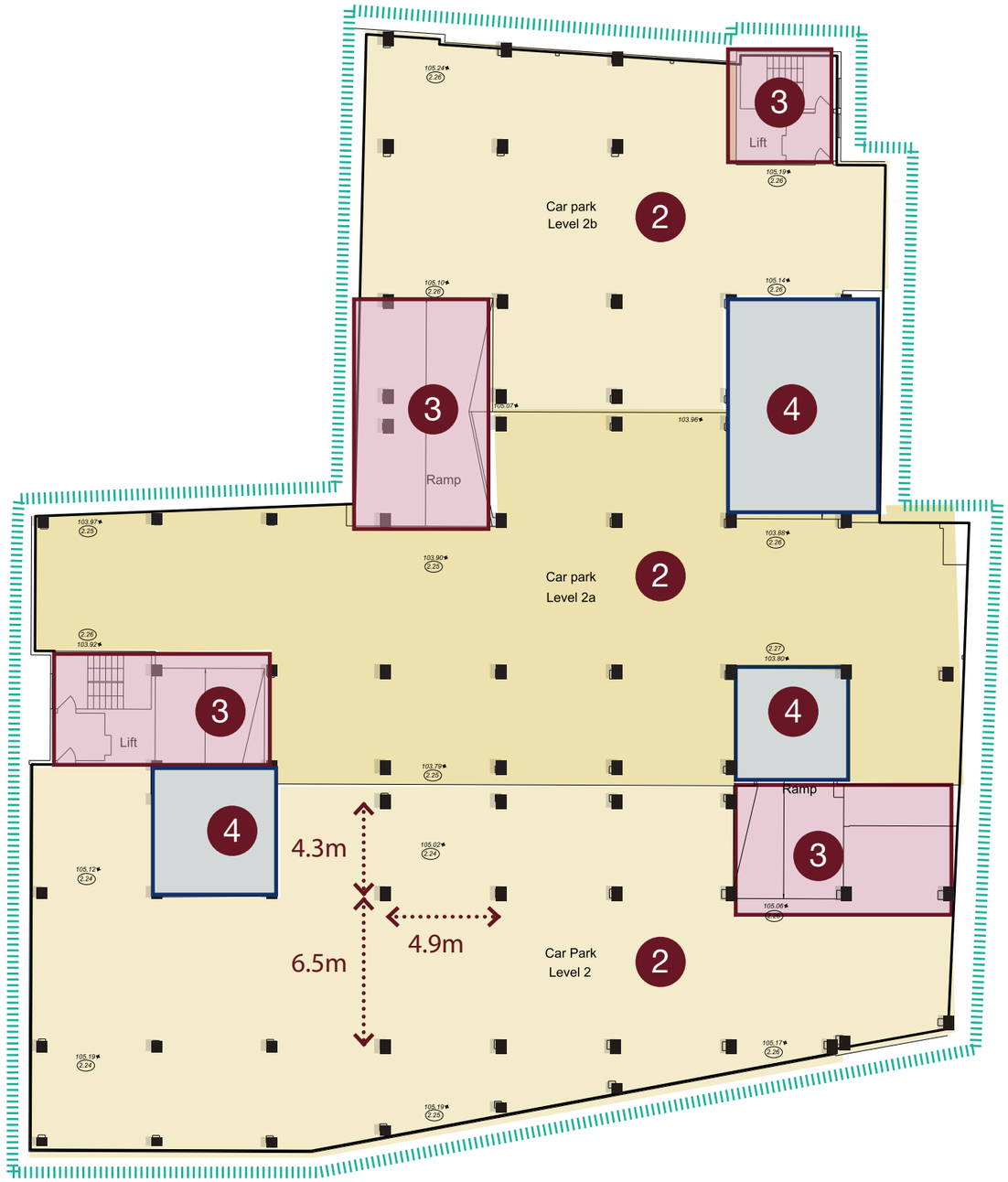
Proposed Alterations:

1. Facade to be reclad and made airtight
2. Floor slab inclinations to be made level
3. Car ramps to be removed to accommodate upgraded cores (ie. 1 lift per core minimum, WC, risers and plant)
4. Voids in the centre of the plan

Design Commentary:

Refurbishment is not considered a viable option due to the following reasons:

- Headroom unsuitable for re-use, refurbishment would not deliver useable space with long term viability and adaptability. Addition of services zone would result in even more reduced headheights, below 2m.
- Column grid unsuitable for commercial uses, refurbishment would not deliver useable space with long term viability and adaptability.
- Core locations would limit tenancy and sub-divisibility, limiting long term flexibility
- Stepped slab would limit flexibility of space and limit accessibility.
- Detailed embodied carbon assessment not carried out as design not viable from a use perspective due to significantly compromised floor to ceiling heights.



Proposed Plan

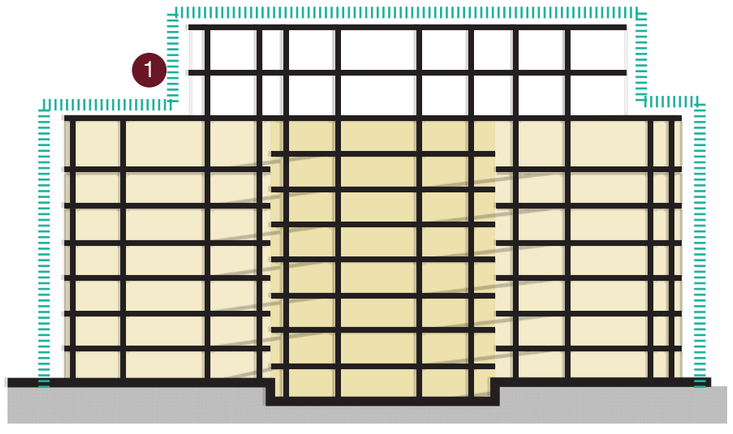
Key:

Car Ramps

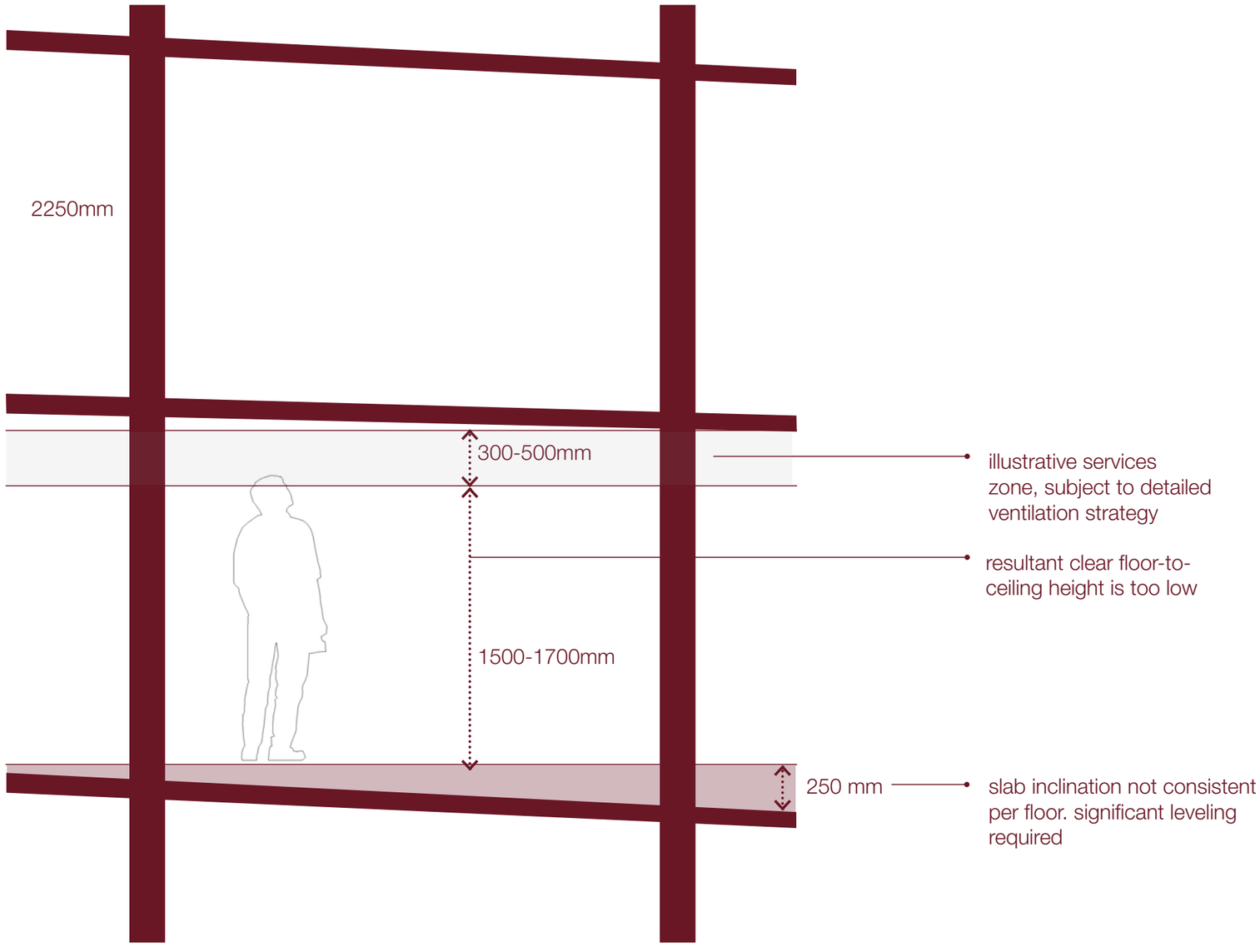
Vertical Cores

3.6 Refurbish

Refurbish



Schematic building section



Schematic section of existing car park structure, demonstrating enhancement required to make it usable as office space

3.7 Substantial Refurbishment

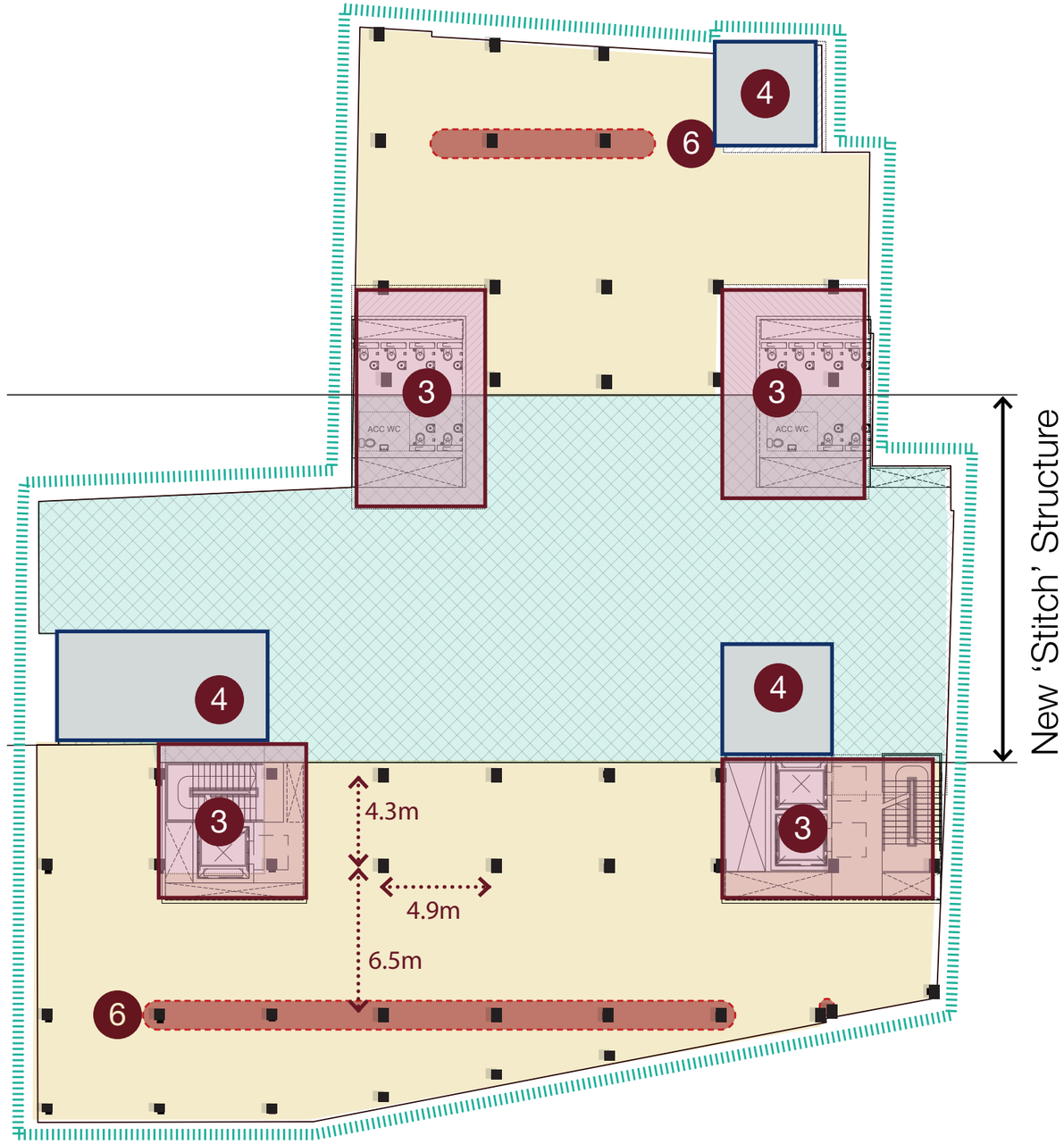
Substantial Refurbishment

LBC Definition:

‘This option is similar to the above, but takes into consideration the need to optimise site capacity and alter the existing structure to meet future needs. This may involve significant changes to the façade (façade replacement) but should seek to retain as much of the existing building as possible reducing the need to use new materials and reduce the loss of embodied carbon in the existing structure. If this option includes partial reclaim and recycle the development proposal should include a pre-demolition audit[...].’

Proposed Alterations:

1. Facade to be reclad and made airtight.
2. Demolish central section of frame and insert new ‘stitch’ structure to create continuous floorplates. Floor slab inclinations to be made level.
3. Car ramps to be removed to accommodate upgraded cores (ie. 1 lift per core minimum, WC, risers and plant) Existing slabs require small areas of new cut-out / infill to achieve this.
4. Lightwells in the centre of the plan.
5. Demolish slabs to create viable headroom and daylight.
6. Optimise grid layout with localised transfer structure.
7. New build roof structure to provide suitable headroom and coordinate with lower floor core locations. Strengthening/Reinforcement of existing ground floor slab and foundations is anticipated.
8. New basement required for plant to prioritize an active ground floor.



Proposed Plan

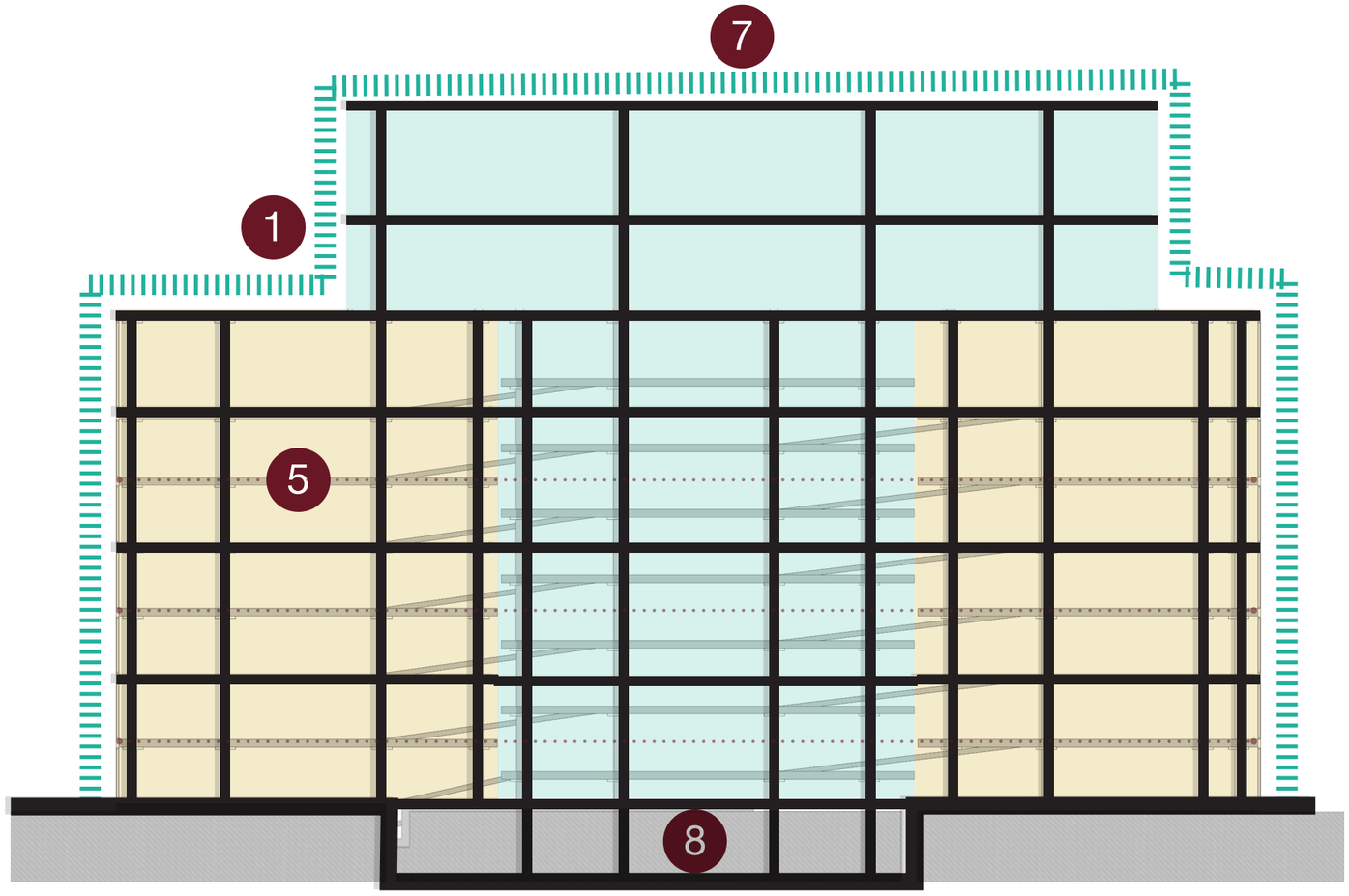
3.0 The Case for Re-use

3.7 Substantial Refurbishment

Substantial Refurbishment

Design Commentary:

- Column grid unsuitable for commercial uses, refurbishment would not deliver useable space with long term viability and adaptability.
- Core locations would limit tenancy and sub-divisibility, limiting long term flexibility.
- Substantial demolition of intermediate floors significantly reduces area and impacts overall project viability.
- Strengthening works required to lower floors due to unrestrained columns and intermediate levels and additional load from new roof structure.
- Initial assessment suggests embodied carbon of 196kg/co2/m2 for A1-A5, structure only.



Schematic section of refurbished carpark structure

3.8 Reclaim & Recycle

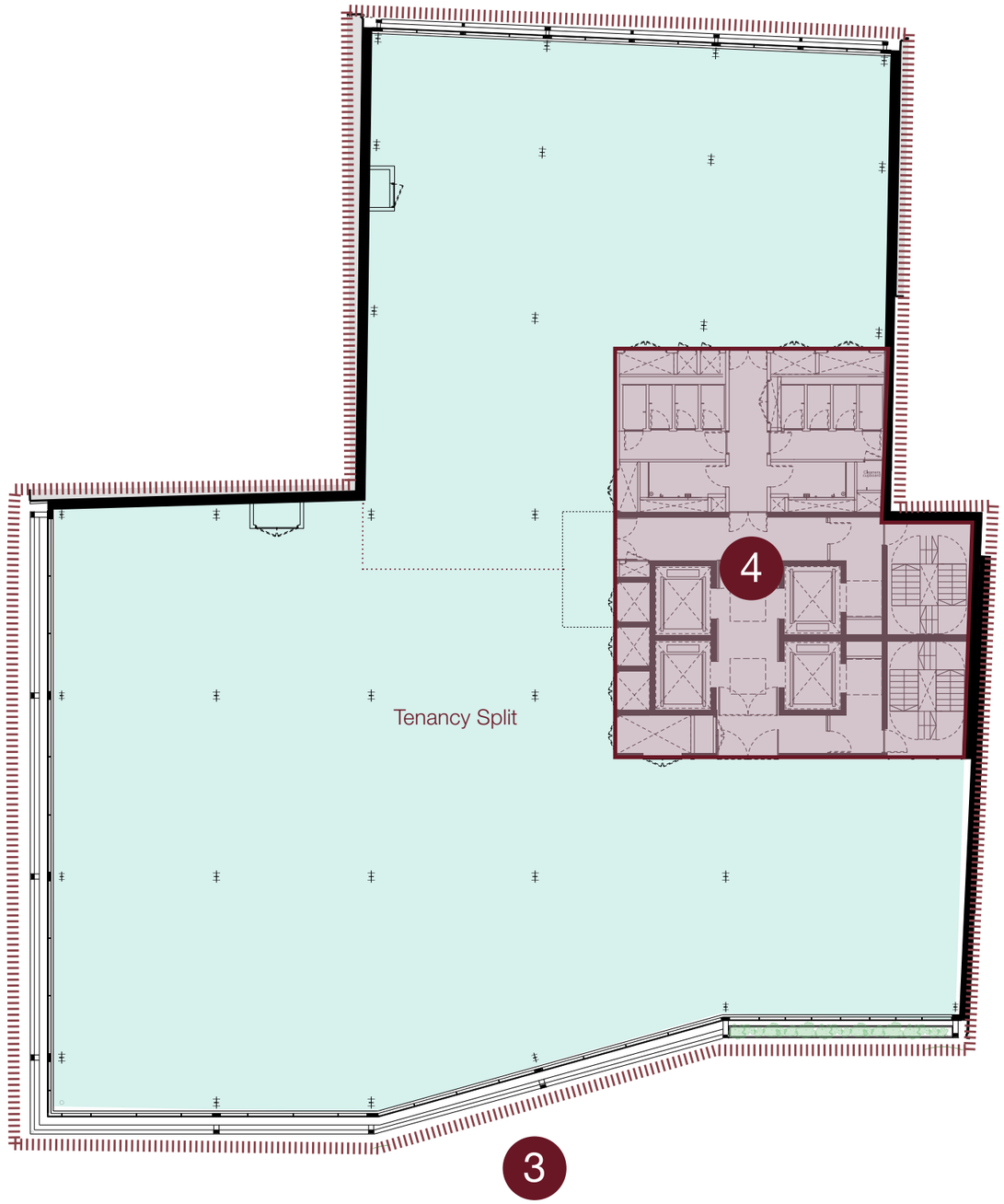
Reclaim & Recycle

LBC Definition:

‘Where it is demonstrated to the Councils satisfaction, that the above options are not feasible the development proposal should include a pre-demolition audit identifying all materials within the building and documenting how they will be managed. The preference should be for re-use on site, then re-use off site, re-manufacture or recycling. (Providing time in the project plan for selective deconstruction techniques and materials storage to maximise reuse). New London Plan policy SI7 expects 95% of construction and demolition waste to be diverted from landfill (reuse, recycle, recovery), and 95% of excavation waste to be put to beneficial use.’

Proposals:

1. New structural grid with lightweight structure (steel and CLT)
2. Optimised floor to ceiling heights for commercial uses (3m clear)
3. New high performance facade
4. New build core
5. Setback upper floors
6. New basement required for plant to prioritize an active ground floor
7. Re-used existing foundations.



Proposed Plan

3.0 The Case for Re-use

3.8 Reclaim & Recycle

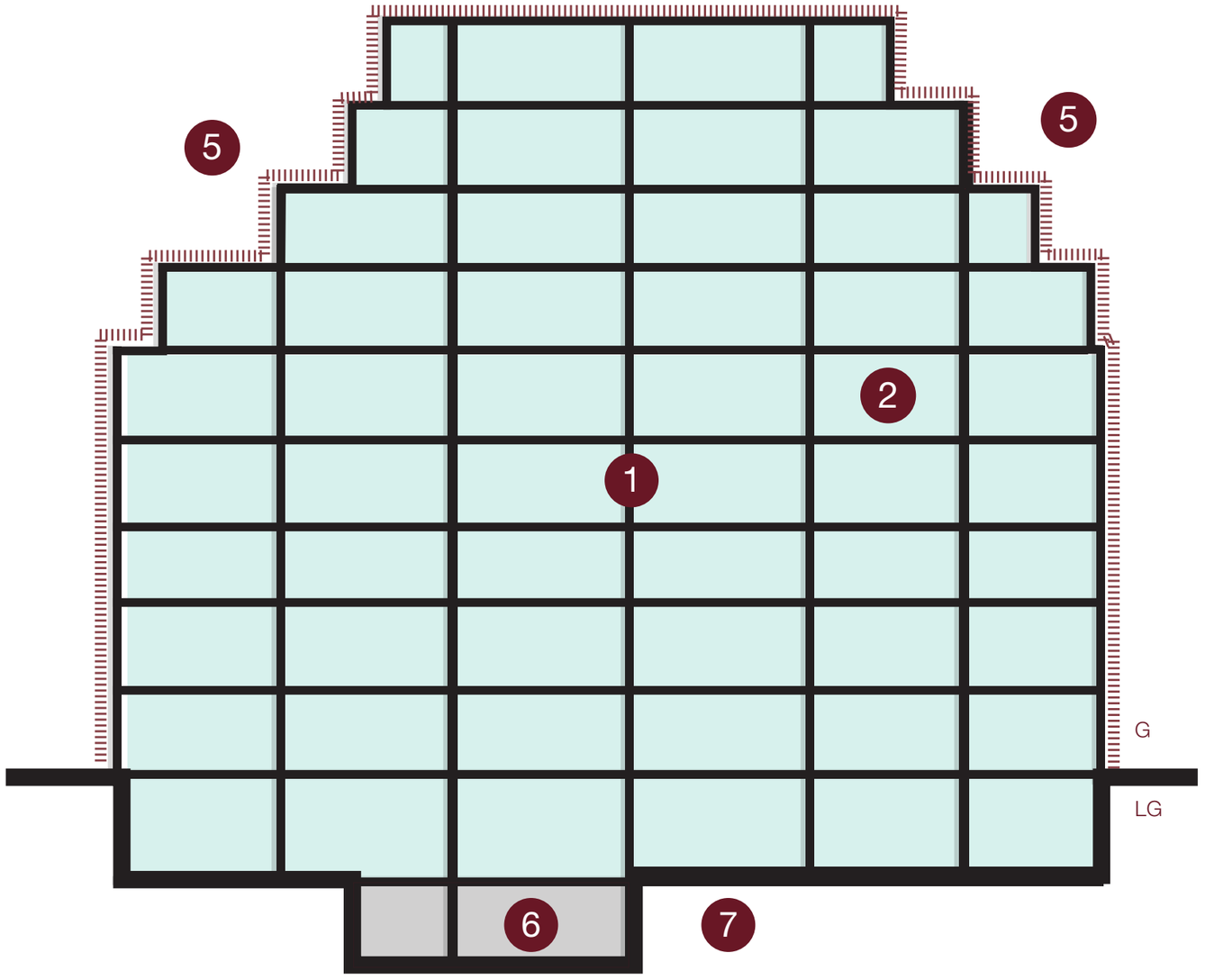
Reclaim & Recycle

Design Commentary:

- New build core provides adaptable and flexible commercial space
- Grid provides flexible space for a range of commercial uses
- Lightweight construction to replace high density concrete car park structure, and re-use of existing foundations
- Maximized daylight across floor plate
- Natural ventilation
- Initial assessment suggests embodied carbon of 210kg/co2/m2 for A1-A5, structure only.
- When comparing the embodied carbon of the superstructure for a “reclaim & recycle” versus “substantial refurbishment,” the results from the second pre-application meeting are as follows:

  RIBA 2030 target: < 350 kgCO2e/m2
  LETI target: < 288 kgCO2e/m2

  Both methods significantly outperform RIBA and LETI benchmarks. The Circular Economy statement sets a minimum 20% recycled material target based upon the outcomes of the pre-demolition audit. A whole-life carbon analysis (WLCA), detailed in the Carbon Plan’s report, demonstrates excellent embodied carbon performance relative to industry benchmarks. Opting for a new-build, low-carbon structure offers higher-quality space, adaptability, and lower operational energy consumption compared to substantial refurbishment. Note that these figures only apply to the superstructure and exclude foundations, facade, substructure, internal finishes, and MEP systems. For the full WLCA analysis please refer to Carbon Plan’s report.



Schematic section of new-build structure, with retained foundations

3.0 The Case for Re-use

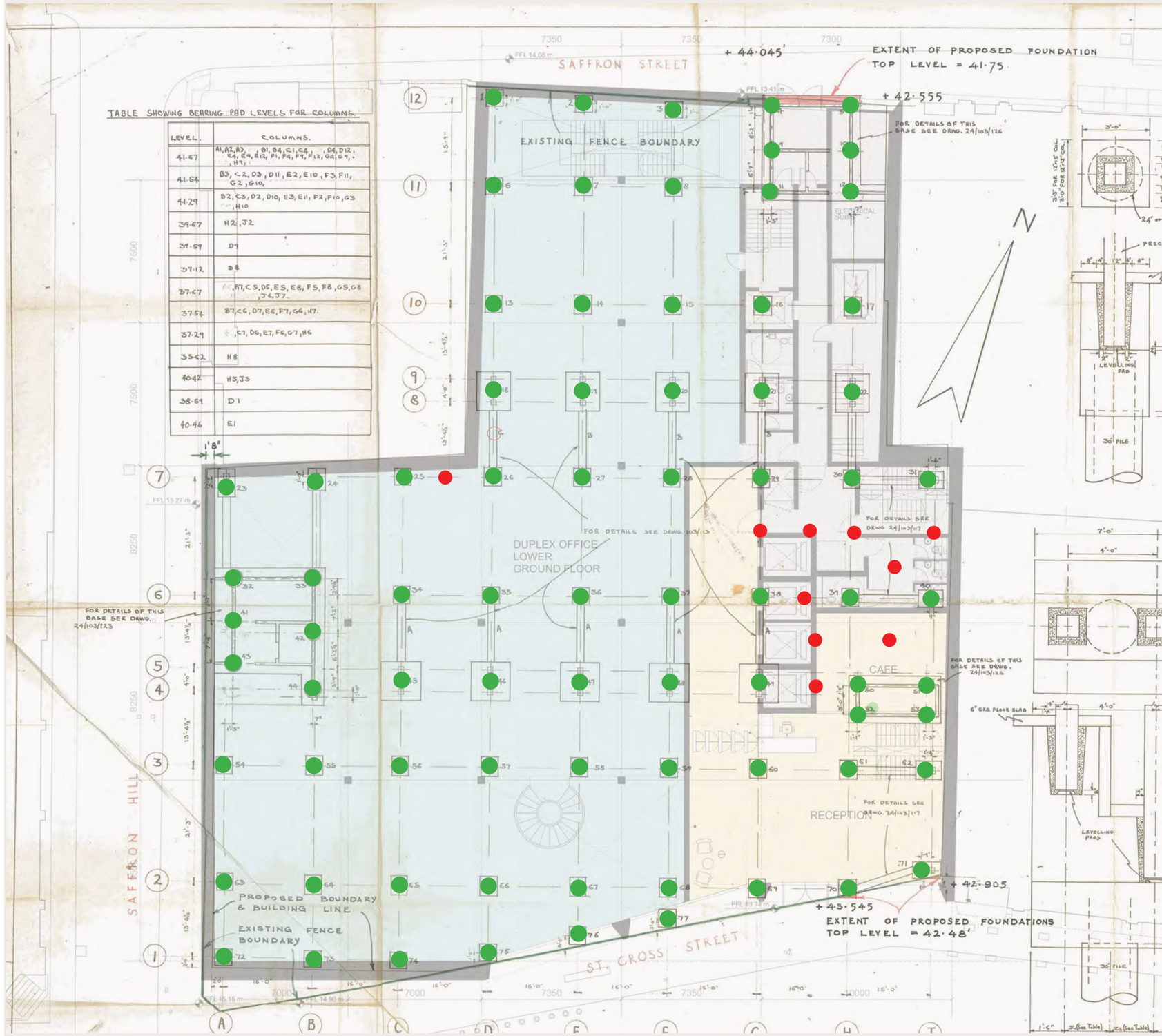
3.8 Reclaim & Recycle

Reuse of existing foundations

Foundation pile drawings of the building suggest that the existing piles could be reused in their current positions in conjunction with a new raft foundation to transfer the loads of the proposed new development.

Embodied carbon savings in the retained structure are estimated to add up to ~272 Tonnes CO2e.

- Estimated locations for new piles subject to SI investigations and on-site testing
- Reuse of existing piles subject to SI investigations and on-site testing



Proposed LGF layout overlaid on existing foundation plan

3.0 The Case for Re-use

3.8 Reclaim & Recycle

Comparison

Following the analysis, there were two viable options:
- Substantial Refurbishment
- Reclaim & Recycle

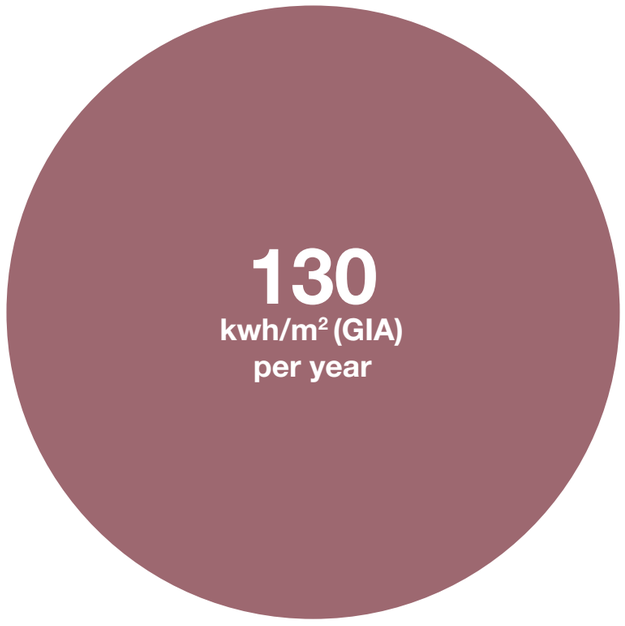
Owing to structural interventions, and temporary works the Embodied Carbon figures for the two options were broadly similar.

From an Operational Carbon perspective, ie, how much carbon is emitted through the running of the building, the Reclaim & Recycle option performed better. Notably, only the Reclaim & Recycle is within the ‘Paris Proof’ Target set out within the UKGBC’s net zero carbon guidance.

In considering the Substantial Refurbishment option there are some issues around operational energy that should be considered. The removal of the intermediate floors leaves a floor to floor height of around 5m which would leave a floor to ceiling height of around 4m. As a result, thermal stratification within the spaces can cause the heating and cooling systems to work harder to maintain a consistent internal temperature and which in turn leads to increased energy consumption. Furthermore, this additional 33% of volume would also require the supply of additional heating, cooling and fresh air on a per m^2 basis when compared to the proposed floor to ceiling heights of 3m. Therefore, the plant size and energy demands would be similar to that of the proposed building in total, but with a much reduced useable floor area and so the overall kWh/m^2 would be significantly higher.

In addition junctions to perimeters from the existing slabs are assumed to be more complicated to deal with from a linear thermal bridge point of view.

Finally, the Reclaim & Recycle also offers a wider array of benefits including increased column spacing, soft spots at every bay, a streamlined core to accommodate dual tenancies, greater future felxibility and a longer building lifespan.

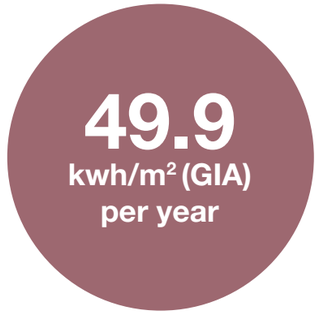


Substantial Refurbishment

Based on UKGBC Whole Building 2020-2025 benchmark for Refurbished buildings

Paris Proof Benchmark

UKGBC “Net zero carbon: energy performance targets for offices”



Reclaim & Recycle

As per Saffron Hill Whole Life Carbon Assesment

3.0 The Case for Re-use

3.8 Reclaim & Recycle

Conclusion

While options for reuse of the superstructure were considered in detail, the analysis concluded that a reclaim & recycle scheme would offer greater flexibility for the future, and opportunities to minimize embodied and operation carbon emissions.

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