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CONSULTING ENGINEERS

Proposed Part 8 Residential Development

Basin View, Dublin 8

DEMOLITION JUSTIFICATION REPORT

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Document History

Version	Issued	Comments
0	14th June 2024	For Review
1	19th June 2024	Updated based on Comments
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Contents

1. INTRODUCTION

This report provides information on the whole life carbon assessment performed for the demolition of the existing five blocks of apartments in Basin view, Dublin 8.

Dublin City Council development plan acknowledges a good quality, higher density developments can make a positive contribution to the evolving urban form and structure of the city and can help to achieve sustainable land use and movement patterns.

The purpose of this report is to review the implications off the whole life carbon of demolition of the existing refurbished blocks against the reuse of the site for a new higher density social housing development.

This report responds to sections of Appendix 3 criteria of the Dublin city development plan 2022 to 2028 specifically the following:

15.7.1 reuse of existing buildings
Where development proposal comprises of existing buildings on the site, applicants are encouraged to reuse and repurpose the buildings for integration within the scheme, where possible in accordance with Policy CA6 and CA7. Where demolition is proposed, the applicant must submit a demolition justification report to set out the rational for the demolition having regard to the 'embodied carbon' of existing structures and demonstrate that all options other than demolition, such as refurbishment, extension or retrofitting are not possible; as well as the additional use of resources and energy arising from new construction relative to the reuse of existing structures. Existing building materials should be incorporated and utilised in the new design proposals where feasible and a clear strategy for the reuse and disposal of the materials should be included where demolition is proposed.

Policy CA6
Retrofitting and Reuse of Existing Buildings
To promote and support the retrofitting and reuse of existing buildings rather than their demolition and reconstruction, where possible. See Section 15.7.1 Re-use of Existing Buildings in Chapter 15 Development Standards

Policy CA7
Energy Efficiency in Existing Buildings
To support high levels of energy conservation, energy efficiency and the use of renewable energy sources in existing buildings, including retro-fitting of appropriate energy efficiency measures in the existing building stock, and to actively retrofit Dublin Council housing stock to a B2 Building Energy Rating (BER) in line with the government's Housing for All Plan retrofit targets for 2030.

1.1. METHOLODY

The assessment Of the whole life-cycle carbon for the proposed development versus the refurbishment of the existing is calculated back to an assessment of carbon per apartment to

give a fair and balanced approach as the two options deliver a different number of units on the site and density of the site.

We would also note that this development is under the PPP socialising bundle 4 which delivers housing through a design, build and maintain for 25 years. Therefore the exact construction methods are not yet known as the PPP Co. provide their proposal as to the means of development as part of their tender bid submission. As part of the criteria set out to the bidders a maximum embodied carbon is set for the new development per square metre in line with RIAI recommendations. Therefore the new build option embodied carbon is calculated based on this kilogramme of CO2 per sq metre rate.

"Embodied Carbon Limit: the embodied carbon shall not be greater than **625kgCO2e/m2** for Product and Construction (Stage A (CIBSE TM65:2021)) for each Social Housing Development when assessed using a Whole Life Carbon Analysis Methodology."

The assessment of the refurb and reuse option is based on an outline specification provided by the project architects of what will be required to each of the existing blocks in order to develop social housing units in line with part L.

1.2. PROPOSED DEVELOPMENT

The development comprises construction of 171 apartments at a site of c. 1.64 ha at Basin Street Flats, Basin View, Dublin 8. The site is bounded by Basin Grove and St. James Primary School to the south; Luas light rail line and St. James' Hospital Campus to the west, Basin Street Lower/Ewington Lane and Mary Aikenhead House Flats to the north and Basin View Street / Brandon Terrace to the east which will consist of the following:

- The demolition of four existing Basin Street Flats residential blocks; Building 1 (nos. 20-43), Building 2 (nos. 44-67), Building 3 (nos. 68-91) and Building 4 (nos. 92-115), ancillary structures, boundary walls and railings and site clearance works and renovation of one existing Basin Street Flats block (Building 5 nos. 116-151);

- Construction of 171 no. apartment units in three apartment blocks (Block A, Block B and Block C) comprising 171 residential units (83 no. 1-bed, 71 no. 2-bed, 13 no. 3-bed and 4 no. 4 beds);

1. Block A ranges from 4- 8 storeys with 48 units (17 no. 1-bed, 28 no. 2-bed, 3 no. 3-bed)
2. Block B ranges from 4 -8 -storeys with 81 units (28 no. 1-bed, 39 no. 2-bed, 10 no. 3-bed, 4 no. 4 bed)
3. Block C is 5 storeys (renovation block) with extension to western gable with 42 units (38 no. 1-bed, 4 no. 2-bed)

- 382 bicycle parking spaces;

- 56 car parking spaces, which includes provision of 52 residential and 4 non-residential car parking spaces (2 creche and 2 community, arts and cultural car parking spaces);

- Provision of a childcare facility of 294 sq.m. at ground floor of Block A;

- Provision of 1114 sq.m community, cultural and arts space comprising 516 sq.m internal space at ground floor of Block B and 598 sq.m external space, which includes a 468 sq.m amphitheatre and 130 sq.m space located externally at Block B;

- Relocation of public open space to new central area of 3767 sq.m (in place of Oisin Kelly Park) and 2748 sq.m of communal open space;

- Two vehicular access points are proposed from Brandon Terrace/ Basin View Street and one from Basin Street Lower/ Ewington Lane;

- Existing bollards and line marking fronting Wee Tots Creche Pre-School and Fountain Youth Project at building 2A Basin Lane along Basin View/ Brandon Terrace to be removed and replaced with paving, extension of kerb and flexible bollards;

- Boundary treatments, public lighting, site drainage works, new internal road layout, new raised table, surfacing and footpath, ESB substation and meter rooms, stores, bin and cycle storage, plant rooms, landscaping; and

- All ancillary site services and development works above and below ground.

2. BACKGROUND & DESCRIPTION OF EXISTING BUILDINGS

2.1. SITE SELECTION

The subject land is in the ownership of Dublin City Council and therefore can be efficiently to meet some of the demand for social housing arising in Dublin City centre. The Dublin 8 area has experienced significant growth in recent years with numerous large scale housing development granted in the Dublin 8 area in recent years, The wider area of the site is undergoing significant regeneration and densification of underutilised sites that should see a corresponding increase in local population that will support local services and facilities. There has been a push at all levels of planning policy to reuse brownfield and infill sites in central locations, so as to promote compact growth. Site selection was restricted to consideration of that land in the ownership of Dublin City Council, and which could be adequately serviced and integrated to provide much needed social housing.

Site selection has taken a plan-led approach to development having regard to the residential zoning provisions in the Dublin City Development Plan 2022-2028 (CDP) and the Strategic Development Regeneration Development Area 15 Liberties and Newmarket Square. The site is zoned Z1 Sustainable Residential Neighbourhood and Z9 Amenity/ Open Space Lands/ Green Network.

The site is located in close proximity to shops and community facilities, Luas line and several bus stops. It is ideally located to meet the principles of the 15-minute City as envisaged in the Dublin City Development Plan 2022-2028.

2.2. PLANNING POLICY - NATIONAL PLANNING FRAMEWORK

The National Planning Framework (NPF) guides national, regional and local planning decisions until 2040 as the high-level strategic plan for shaping the future growth and development.

National Policy Objective (NPO) 3a of the NPF states that it is a national policy objective to "deliver at least 40% of all new homes nationally within the built-up envelope of existing urban settlements".

National Policy Objective 3b seeks to “Deliver at least half (50%) of all new homes that are targeted in the five Cities and suburbs of Dublin, Cork, Limerick, Galway and Waterford, within their existing built-up footprints.’

The proposed development accords with objective (3a and 3b) in the provision of new social homes within an urban context of Dublin City.

National Policy Objective 4 states “ensure the creation of attractive, liveable, well designed, high quality urban places that are home to diverse and integrated communities that enjoy a high quality of life and well-being”.

The proposed development accords with this objective and will provide a defined strong urban frontage on Basin View Street. The proposed development includes 1206 sqm of community, arts and cultural space which will serve both prospective residents and the surrounding community to enable the creation a cohesive community in the development.

National Policy Objective 35 aims to "Increase residential density in settlements, through a range of measures including reductions in vacancy, reuse of existing buildings, infill development schemes, area or self-based regeneration and increased building heights."

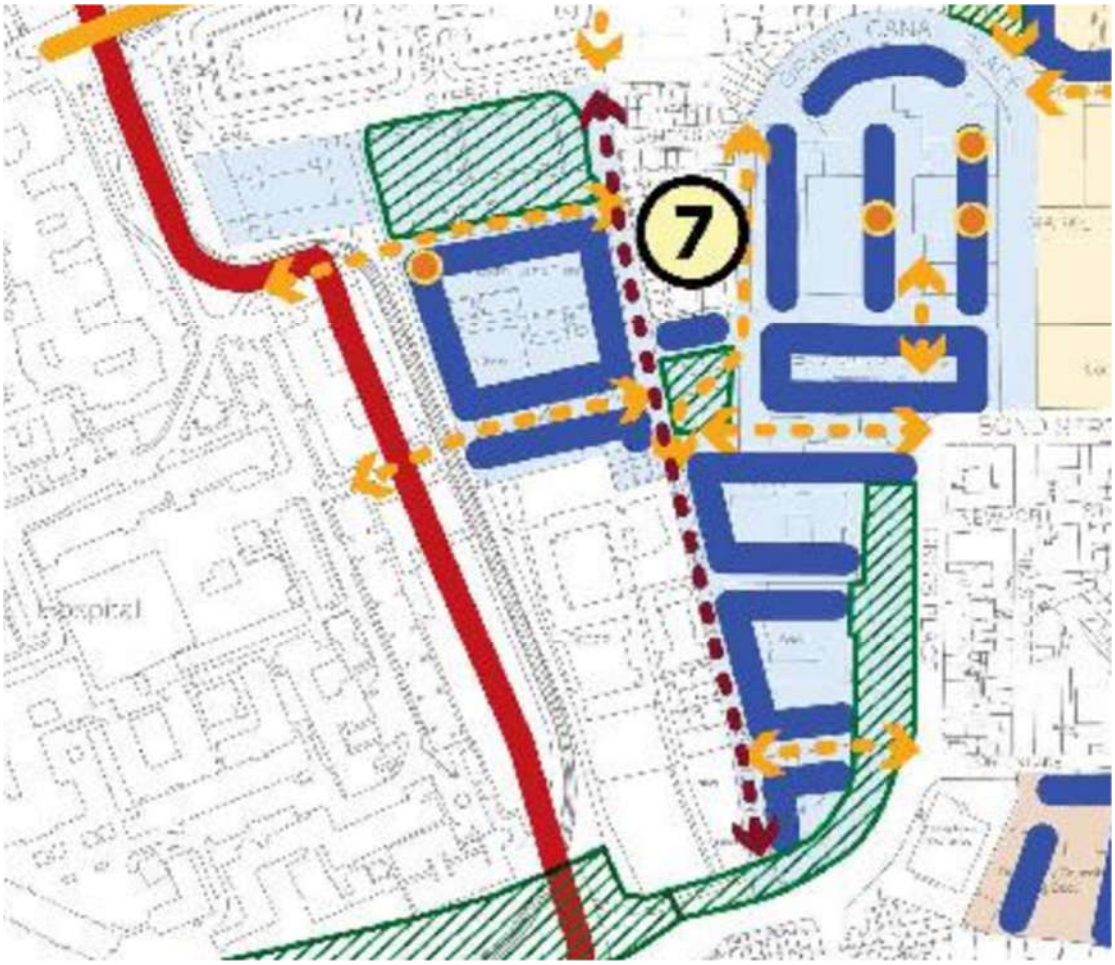
2.3. DUBLIN CITY DEVELOPMENT PLAN 2022-2028

The Dublin City Development Plan (CDP) 2022-2028 is articulated around a number of strategic principles to support a sustainable approach to the development of the city. Under the social/residential principles, the plan seeks to create a more compact city with a network of sustainable neighbourhoods, modelled on the principles of the 15 minute city. This is underpinned by the provision of a range of facilities, choice of tenure and house types to promote social inclusion and integration of all ethnic / minority communities. It also seeks to create a 'connected, legible and liveable city with a distinctive sense of place, based on active streets, quality public spaces and adequate community and civic infrastructure' under the Urban Form Principle. The demolition of the existing blocks will enable a significant community gain to the area through the delivery of a new public open space, in the replacement of Oisin Kelly Park which is underutilised and in a dilapidated condition, 1206 sqm of community, arts and cultural space across Block A and B and the delivery of a creche at the site. While these community facilities are being delivered as part of the subject development, it is also envisaged that the surrounding community can also benefit from these facilities and amenities.

The Core Strategy and Settlement Hierarchy of the Dublin City Development Plan outlined in Table 2-8 of the Development Plan presents the spatial structure and proposed residential yield in the various areas of the City. The site is located in the Liberties & Newmarket Square Strategic Development Regeneration Area 15 where the character and general density applied would be mixed use with a planned residential yield of 2,500 units and an estimated population of 5,000 persons.

The SDRA also sets the spatial principles for the development and regeneration of the Liberties and Newmarket Square.

The relevant extract of the SDRA 15 Guiding Principles is presented in map format below.



Guiding Principles for SDRA 15 (Source: DCC)

The site is annotated as the character area 7 – St James's Harbour

- This area has considerable regeneration potential with both private and public land holdings of considerable scale. Connectivity and green infrastructure initiatives, as identified, are required in order to improve the amenity for existing and future residents and to better integrate the area with its adjoining institutions and neighbourhoods.

- In this area, base heights should be 6-8 storeys, where heritage, built form character and residential amenity considerations allow, while additional heights at the identified locations have potential to reach 12-14 storeys.

The key guiding principles applicable to the site include:

- Permeability interventions east to west between the site and the St James's Hospital Lands
- Proposed/ Improved Public Open Space
- Locally higher building at the north of the site
- Built form includes permitter block and a single block to the south of the site.
- A greening, cycling and pedestrian corridor along Basin View

The proposed development has been earmarked for redevelopment in the Dublin City Development Plan 2022-2028 and through the delivery of the subject proposal will greatly contribute to the regeneration of the area and community and social infrastructure provision in the area which will benefit the wider community.

Policy CA6 Retrofitting and Reuse of Existing Buildings

To promote and support the retrofitting and reuse of existing buildings rather than their demolition and reconstruction where possible.

The proposed development includes the retention refurbishment and renovation of existing buildings. The proposal also includes the demolition of 4 no. existing blocks at the site. These structures are not of architectural or heritage significance and are in poor condition, with substandard units currently in occupation. This report provides a justification in relation to the demolition of existing structures on the site.

Policy CA7 – Energy Efficiency in the Built Environment

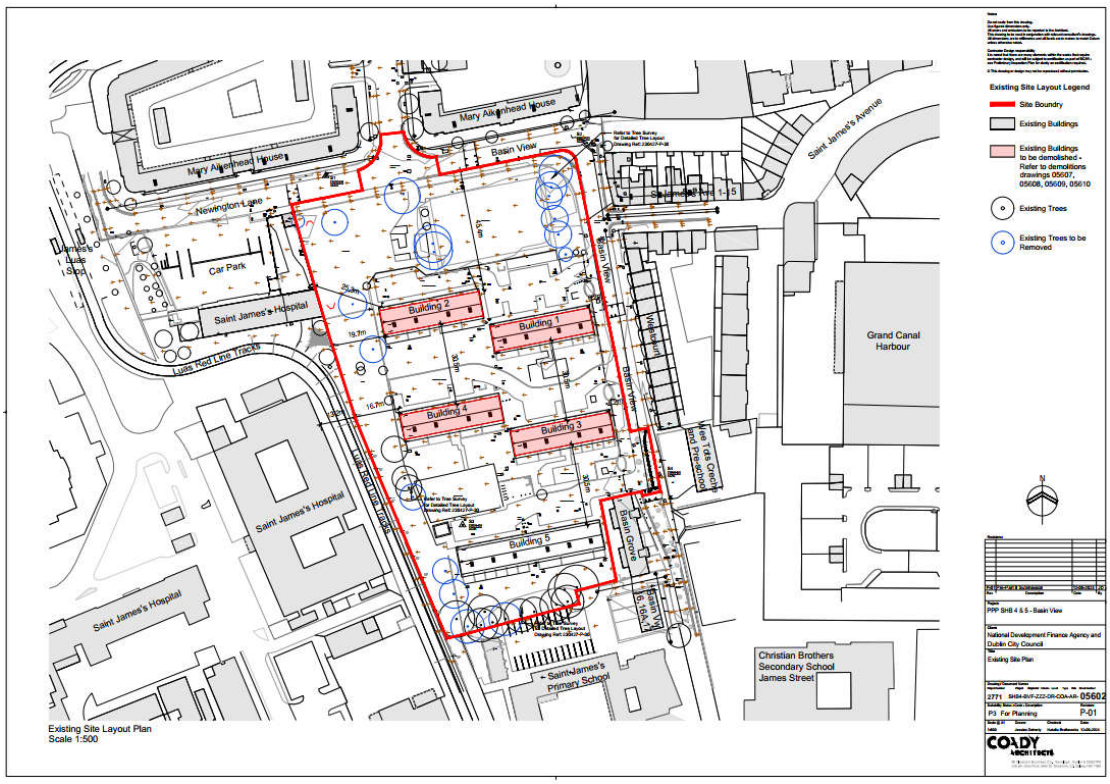
To support high levels of energy conservation, energy efficiency and the use of renewable energy sources in existing buildings, including retrofitting of appropriate energy efficiency measures in the existing building stock, and to actively retrofit Dublin Council housing stock to a B2 Building Energy Rating (BER) in line with the Government's Housing for All Plan retrofit targets for 2030.

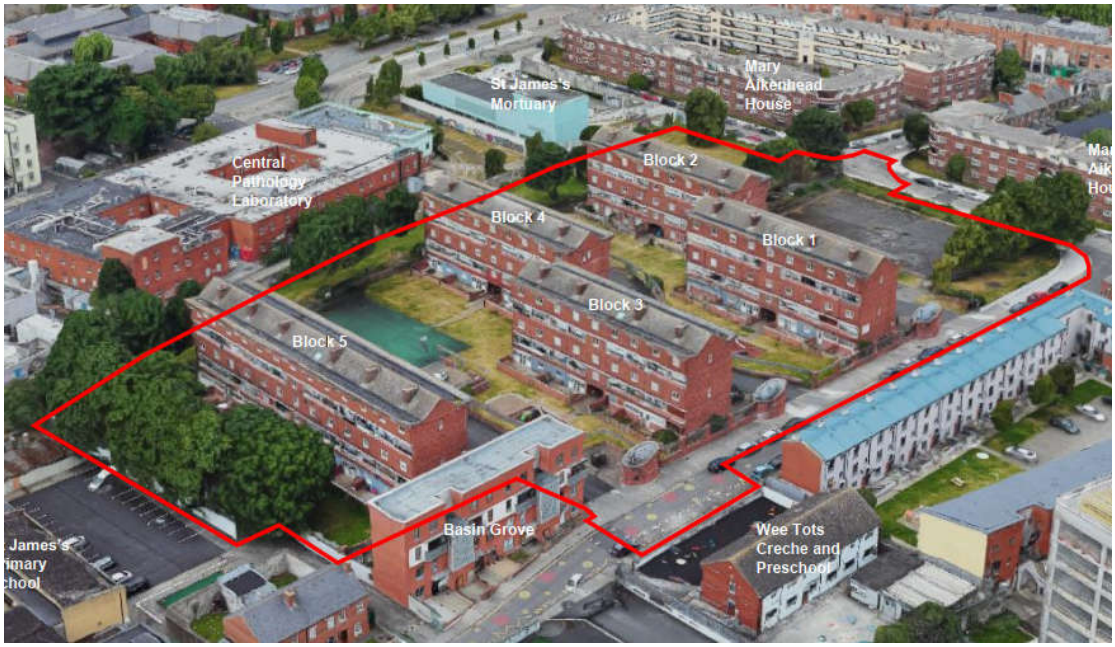
The Climate Action Energy Statement also sets out the energy efficiency and compliance with regard to the proposed development. The report includes energy analysis to demonstrate how low carbon, low energy and heating solutions have been considered and how they are appropriate for this development to achieve compliance to Building Regulations Technical Guidance Document (TGD) Part L 2021 and aligned with Dublin City Climate Action Plan.

Policy CA24 – Waste Management Plans for Construction and Demolition Projects

"To have regard to existing Best Practice Guidance on Waste Management Plans for Construction and Demolition Projects as well as any future updates to these guidelines in order to ensure the consistent application of planning requirements."

We refer to the Resource & Waste Management Plan, which accompanies this application, outlines careful management of waste from the demolition, including segregation at source, will help to ensure maximum recycling, reuse and recovery is achieved in accordance with current local national waste targets. Please refer to section 4 of this report for further details.





Existing Block 01 = 1801.98m2 – Proposed to be demolished

Existing Block 02 = 1812.11m2 – Proposed to be demolished

Existing Block 03 = 1808.08m2 – Proposed to be demolished

Existing Block 04 = 1802.31m2 – Proposed to be demolished

Existing block 05 – Proposed Block C – Proposed to be renovated

Block C new area (retained part and proposed) = 3629m2 - Retained area 2339m2

3. UTILISATION OF THE SITE

An analysis of the existing site, the urban design issues and the site feasibility options are set out in detail in the architectural design statement accompanying this application. A high level summary is provided below to support the demolition justification.

The freestanding pavilion nature of the blocks means there is no sense of physical enclosure within the site and therefore no hierarchy and transition between public, semi-public, communal, and private open space. The open spaces between the blocks are permeable for cars and pedestrians from Brandon Terrace. This lack of security and the mixed nature of their use, including roads and surface parking, bin stores, a basketball court, children's play spaces and grassed areas, means they are not defined as either communal open space or public open space. The parking layout dominates, and the spaces lack a sense of safety and community that comes from enclosed, well-designed landscaped courtyards with good passive supervision.

The grassed landscaped zone along the western boundary is secured on all sides save for a small opening in the wall and railing adjacent to Block 5. This enclosure coupled with the lack any of any passive supervision from the blank gables of Blocks 2 and 4 creates and uninviting and unsuccessful semi-public space.

The footprint of the existing buildings equates to c. 12% site coverage, far below the indicative value of 50-60% in the current development plan. At a height of 5 storeys the buildings are also below the 6-8 storey guiding base height from SDRA 15. These factors lead to the conclusion that this valuable city centre site is underused and could provide a far greater quantum of housing, which is much needed.

Given there are 5 no. existing blocks at the site, a feasibility study with a number of options was prepared by DCC to inform the design approach selected. The feasibility study included several options of new build and reuse of blocks, minimal energy retrofit, deep retrofit and extension, deep retrofit and new build and new build. Each option assessed key consideration such as total number of units, density, car parking allocation and plot ratios to assist in considering the redevelopment potential of the site.

Several options were examined for the renewal of the existing complex:

Option	Description	Units
A	Retention and a minimal energy retrofit of the existing blocks	115
B	Retention, amalgamation of units and a deep energy retrofit of the existing blocks	103
C	Demolition of Blocks 1-4, construction of 2 no. apartment buildings, retention, amalgamation of units and a deep energy retrofit of Block 5	173
D	Demolition of Blocks 1-4, construction of 2 no. apartment buildings, retention, amalgamation of units and a deep energy retrofit of Block 5	174
E	Demolition of all Blocks, construction of 3 no. apartment buildings	173

Key Issues Options:

Option A – Does not delivery housing to current standards and is not acceptable.

Option B – Delivers 68 units less than the preferred option, reduces net density for the site from 149 uph to 90 uph, does not deliver any quality open space. Delivers poor value for money.

Option C – Similar to selected option D

Option E – This is a viable option for utilisation of the site but has a higher demolition and Carbon footprint than the preferred option D.

Option D emerged as the preferred solution to meet the development objectives for the site. This option would:

• Consolidate the housing within higher density blocks providing greater number of homes.

• Open up the routes along the public park to facilitate desirable connections with the surrounding area and provide clear, safe public streets.

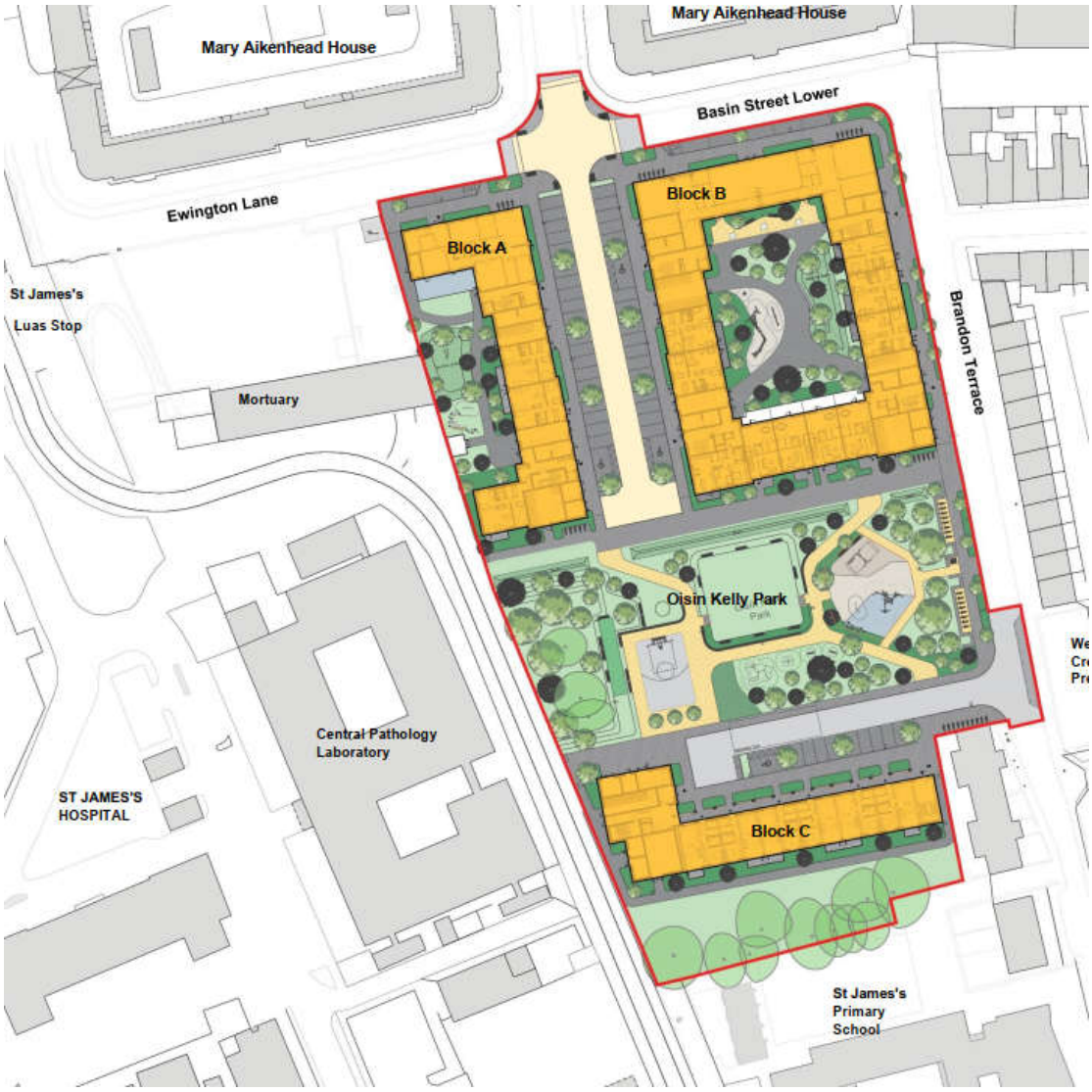
• Provide housing within enclosed urban blocks, making defensible amenity courtyard spaces thus enabling passive supervision of open spaces and prevention of anti-social behaviour.

• Regularise pedestrian access by providing own door entrance to ground floor duplex units.

• Use the redevelopment as an opportunity to improve public realm of public park and surrounding streets to better integrate the scheme with its neighbourhood and support the Council's wider regeneration strategies.

• Clearly define the flow and separation of the spaces between public, semi-public and private areas.

The proposal for this site delivers a good balance between demolition carbon factors and utilisation of the site and addressing the urban design issues with the existing block layouts.



The proposed development has a gross density of 149 uph with heights ranging from 4 to 8 storeys. The proposed height is aligned with recently permitted heights in the area. The proposed development includes the retrofitting of an existing flat complex and the redevelopment of the site following demolition works of 4 no. buildings. The existing blocks at the site are in poor condition, and units are substandard in addition to the external spaces at the site being underutilised and attracting anti-social behaviour. The existing 5 no. residential apartment blocks comprising 115 social housing units with 10 no. unlettable bedsits, 17 no. amalgamated one beds and 88 no. 3 bed duplexes. The proposed development is therefore considered to positively respond to the objective by delivering 171 modern units in blocks with greater levels of insulation, energy efficient heating and an increase in density would be a positive improvement on the existing situation.

In summary, the proposed development is a city centre location with a wide range of amenities and transport options within easy reach. The proposed redevelopment of the Basin Street Flats is aligned with the policies and objectives of the NPF.

4. DEMOLITION MATERIAL WASTE

The full 'Resource Waste Demolition plan' is part of the overall submission for this Part 8 application. Some key elements deal with onsite and offsite disposal of material and waste from the demolition of blocks 1,2,3 and 4. Also submitted is 'Asbestos demolition report' to ascertain any risk of asbestos within the materials and secondly a 'Waste characterization assessment' which outlines any contamination within the waste materials anticipated.

4.1. MATERIALS REUSE ON SITE

The council is dedicated to reusing and recycling deconstructed components elements and materials within the new build provided they meet functionality regulatory and performance standards. This reuse and recycling process must adhere to the pertinent guidelines concerning byproducts, end of waste criteria, under the reporting of waste data.

4.2. MATERIAL REUSE OFFSITE

Specifically for this site it has been determined that numerous materials like bricks, roof slates and timber flooring can be delivered to a salvage yard for re purposing on other projects additionally structural elements such as rubble on concrete can be transported off site and utilised as recycled aggregate.

Despite the aspiration to reuse and recycle waste materials it is anticipated that some of the materials will end up in landfill and must be accounted for within the whole life carbon assessment off the demolitions.

The main Carbon items specifically highlighted on the 'Resource Waste Demolition plan' that will be waste materials that cannot be recycled or recovered for alternative use are as follows:

1. 3000 tonne of soil and stone
2. 10 Tonne Gypsum
3. 10 Tonne Mixed municipal
4. 20 tonne Tarmac
5. 500 tonne Hazordous Soil and stone
6. 3 tonne liquid fuels
7. 3 Tonne Asbestos

5. METHODOLOGY

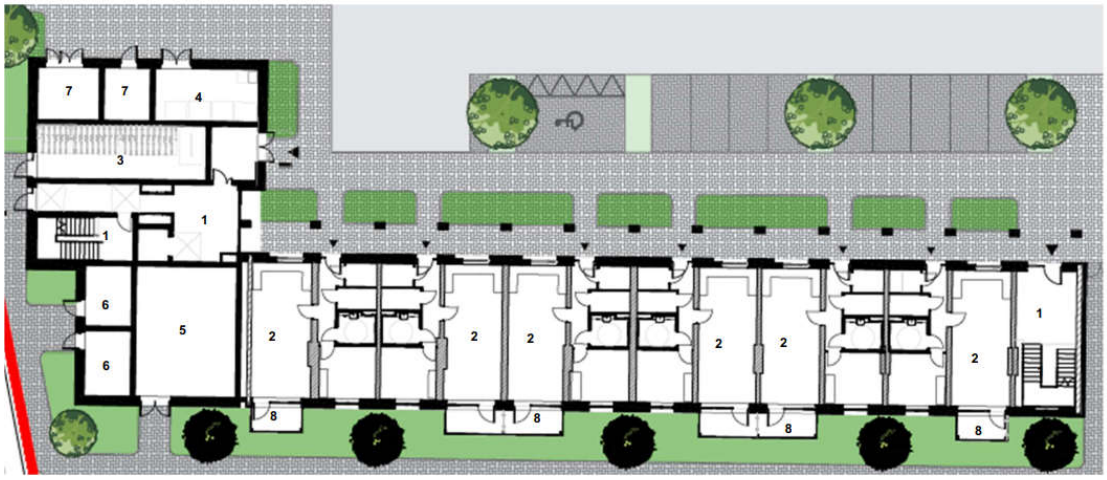
The assessment of the whole life carbon for both the extend and refurbish option and the new build option is to be carried out based on carbon per apartment delivered to provide a fair comparison. The refurbishment option is based on bringing the existing buildings up to our Part L compliant building and therefore the running costs carbon will be the same for both options.

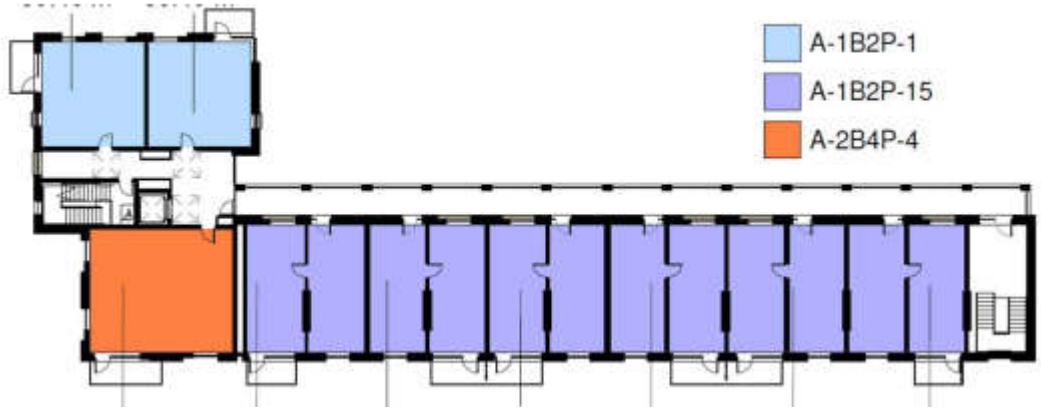
5.1. Inputs and Assumptions

New Build - The construction will include foundations, superstructure, doors, windows, roof, internal walls, internal finishes, building services and external works. This is all part of the **625kgCO2e/m2** embodied carbon assessment. The final construction and a valuation off the carbon will be provided by each of the tenderers along with their proposals on how to deliver this development.

Refurbishment – Although the base of achieving a refurbished block, there is inadequate ancillary space and service space available to complete these blocks, therefore the Block 5 extend and refurbishment is going to be used as a template as if all blocks would be refurbished and extended in the same manner.

Block 5 – Extend and Refurbish proposal





A summary of the proposed works to Block 5 is set out below:

- Eliminate the existing balconies and deck access by bringing them into the weathered building envelope to provide a simple form eliminating cold bridging and the associated risk of internal mould growth, dampness and leaks with a complex building form.
- Upgrade the thermal performance of the envelope in compliance with Building Regulations Part L – Conservation of Fuel and Energy.
- Provide a new deck access approach to the north, sitting outside of the reformed existing envelope with brick clad columns.
- Relocate the existing central stairs to the eastern gable structural bay.
- Existing stair floor opes and all other opes in the existing floor slabs filled in. All new dwellings will be single storey.
- Provide new south facing projecting balconies sitting outside of the reformed existing envelope.
- Construct an extension to west linking a new stair and lift core to the new deck access and relocated stairs.
- New staircore to serve 3 units per floor.
- New build wing to include main entrance lobby, bike store, bin store, ESB substation, switch, and plant rooms.
- Allowance for roof mounted plant on the new building with the potential for a PV array on the existing south facing pitched roof

The detailed design and specification of the upgrade of the building envelope, interiors and services will be the developed as the project stages progress. It is envisaged that the scope of works will include:

- Removal of, at a minimum, the external brick and masonry external leaf. The retention of the internal leaf will be dependent on its condition following opening up works and its structural viability to support the new 5 storey envelope following the interventions required for glazing as described below.
- Existing window opens for bedrooms brought down to floor slab level and widened where required to increase the glazing provision to comply with sunlight/daylight requirements.
- Existing window for living rooms widened and brought down to floor slab level for balcony access and provision of sunlight/daylight.
- A new insulated brick and render external envelope as illustrated in the drawings accompanying this application.
- Retention of the existing pitched profile. Local repair or full replacement of the external finishes as required. A full thermal upgrade of the roof to provide continuity with the walls. This will likely require insulated over cladding of the existing overhanging eaves.

- Removal of the existing ground floor slab and provision of a new insulated slab with a radon membrane to comply with Building Regulations. A full strip out and replacement of all internal finishes and fixtures.
- A full strip out and replacement of all building services.
- Works required for Building Regulations compliance, notably Part B: Fire Safety, Part E: Sound, Part K: Stairways, Ladders, Ramps and Guards and Part M: Access and Use

In essence the only element being retained are the main structural walls and roof structure. Due to the extent of the refurbishment the most accurate assessment is the reduction of the main structure that is being retained.

<u>Refurbishment Carbon assessment</u>

Concrete Walls

Base on the existing floor plans, the structural walls measure 313 metres per floor by 200 mm thick.

313 x 0.2 = 62.6 m3 per floor, 313 m3 wall volume for block 5.

Concrete Walls – 313 x 2.3 Tonne per m3 - 720 Tonnes of Concrete

Concrete Floors

Concrete Floor – 2,339 m2 x 200mm thick – 466 m3

Concrete Floors – 466 m3 x 2.3 Tonne per m3 - 1071 Tonnes of Concrete

Total structural concrete

720+1071 = 1,792 Tonnes of Concrete for Block 5

1,792,000 Kg Concrete x 0.178 kg CO2e/kg = 318,976 Kg C02

2339 sq metres for Block 5 gives a **136 Kg C02e/m2**

This means that the refurbished areas constitute an Embodied Carbon assessment of 489 Kg C02e/m2

The following table of Kg of Embodied Carbon for typical materials was taken from the Institute of Structural Engineers.

TABLE 2: A1–A3 ECFs for typical structural materials

Material	Type	Specification/details	A1–A3 ECF ($kgCO_2e/kg$)	Data source
Concrete	*In situ*: piling, substructure, superstructure	Unreinforced, C30/37, UK average ready-mixed concrete EPD[1] (35% cement replacement)	0.103	MPA, 2018[2]
		Unreinforced, C32/40, 25% GGBS cement replacement[3]	0.120	ICE V3[4]
		Unreinforced, C32/40, 50% GGBS cement replacement	0.089	ICE V3
		Unreinforced, C32/40, 75% GGBS cement replacement	0.063	ICE V3
		Unreinforced, C40/50, 25% GGBS cement replacement	0.138	ICE V3
		Unreinforced, C40/50, 50% GGBS cement replacement	0.102	ICE V3
		Unreinforced, C40/50, 75% GGBS cement replacement	0.072	ICE V3
	Precast	Unreinforced, C40/50 with average UK cement mix	0.178	ICE V3
		Reinforced, 150mm prestressed hollow core slab: British Precast Concrete Federation average EPD	$50.2kgCO_2e/m^2$	BPCF, 2017[5]
Steel	Reinforcement bars	UK: BRC EPD	0.684	BRC, 2019[6]
		Worldwide: Worldsteel LCI study data, 2018, world average	1.99	ICE V3
	PT strands	Assume the same as reinforcement bars		
	Structural sections	UK open sections: British Steel EPD	2.45	BS, 2020[7]
		Europe (excl. UK): Bauforumstahl[8] average EPD	1.13	Bauforumstahl, 2018
		Worldwide: Worldsteel LCI study data, 2018, world average	1.55	ICE V3
	Galvanised profiled sheet (for decking)	UK: TATA Comflor EPD	2.74	TATA, 2018
Blockwork	Precast concrete blocks	Lightweight blocks	0.28	ICE V3
Brick	Single engineering clay brick	Generic, UK	0.213	ICE V3
Timber, excl. carbon sequestration[9], [10]	Manufactured structural timber	CLT, 100% FSC/PEFC	0.437	ICE V3
		Glulam, 100% FSC/PEFC	0.512	ICE V3
	Studwork/framing/flooring	Softwood, 100% FSC/PEFC	0.263	ICE V3
	Formwork	Plywood, 100% FSC/PEFC	0.681	ICE V3
Plasterboard	Partitioning/ceilings	Minimum 60% recycled content	0.39	ICE V2
Intumescent paint	For steelwork	Specific EPD: Amotherm steel WB, Amonn	2.31	AMONN, 2019[11]

Data taken from CEC Table 2, and correct at time of publication. Check data sources to verify that data presented here are valid at time of your calculation.

[1] Covers 93% of production from member companies of the British Ready-Mixed Concrete Association.
[2] MPA, 2018. *UK manufactured generic ready-mixed concrete*. Produced by members of the British Ready-Mixed Concrete Association (BRMCA), part of the Mineral Products Association (MPA). published by Institut Bauen und Umwelt e.V. (IBU). Available online at https://carbon.tips/mpa1 (last accessed 07/04/2020)
[3] Note that the ICE V3 database has a wide range of concrete mixes, including PFA (pulverised fuel ash) cements. Additionally, see CEC §2.2.2.1.3 for more information.
[4] Jones and Hammond, 2019.
[5] British Precast Concrete Federation, 2017. *Environmental Product Declaration (EPD) report of 1m2 of 150mm precast concrete prestressed hollow core flooring slab*. Published by Institut Bauen und Umwelt e.V. (IBU). Available online at: https://carbon.tips/hollow
[6] BRC, 2019. *Environmental product declaration (EPD) report of fabricated steel products produced in the UK by Eco-Reinforcement members*. Gwent, BRC Limited. Available at https://carbon.tips/brcepd (last accessed 23/02/20)
[7] BS, 2020. *Environmental product declaration (EPD) report of Steel Rails and Sections (including semi-finished long products)*. Gwent, BRC Limited. Available online at https://carbon.tips/rails (last accessed 30/04/20)
[8] bauforumstahl e.V., 2018. *Environmental Product Declaration (EPD) report of Structural Steel: Sections and Plates*. Published by Institut Bauen und Umwelt e.V. (IBU). Available online at https://carbon.tips/ed6cd (last accessed 13/05/2020)
[9] The ICE V3 database also includes timber A1–A3 embodied carbon factors including sequestration.
[10] See CEC §2.2.2.1.5.
[11] AMONN, 2019. *Environmental Product Declaration, Intumescent Coating, Amotherm Brick WB - Amotherm Concrete WB - Amotherm Gyps WB Amotherm Steel WB - Amotherm Steel WB HI - Amotherm Wood WB*. Ponte nelle Alpi, J.F. Amonn Srl. Available online at https://carbon.tips/amonn (last accessed 12/06/20)

5.2. Exclusions and constraints

A key constraint of retrofitting and extending existing buildings is the structural floor to floor height. The dimensions in Block 5 are c. 2.7m, far below the 3.15m being provided in new build Blocks A & B. The proposed floor levels in the extension must match with the existing levels as the fire safety strategy relies on linking the staircores together via the new deck access. The new lift must also serve the existing building. At ground level a 2.7m floor to ceiling height cannot be achieved given the existing levels. A 2.4m ceiling height to habitable rooms may be compromised locally to accommodate new building services required to comply with Building Regulations and other relevant technical standards.

6. Demolitions Carbon Calculation

Based on section 5.2 and the demolitions assessment report, the Carbon assessment associated with the proposal for the site is as follows:

1. 3000 tonne of soil and stone – 73 KgCo2e per tonne = 219 Tonne
2. 10 Tonne Gypsum – 140 KgCo2e per tonne – 1.4 Tonne
3. 10 Tonne Mixed municipal - 73 KgCo2e per tonne = 0.73 Tonne
4. 20 tonne Tarmac - 70 KgCo2e per tonne = 1.4 Tonne
5. 500 tonne Hazordous Soil and stone – 73 KgCo2e per tonne – 36.6 Tonne

   Total Demolitions – 260 Tonne

   171 Unit – 1.5 Tonnes Per Unit

7. Embodied Carbon Calculation

7.1. Demolition & New build Carbon Assessment

New Build

Block A = 5249m2 – 48 apartments

Block B = 9276m2 – 81 apartments

Block C = 1290m2 new build (2339 m2 retained)– 48 apartments

Total = 15,815 m2 new build (2339 m2 retained) – 171 apartments

New build Embodied Carbon - 625kgCO2e/m2

Refurbished Embodied Carbon - 489 Kg C02e/m2

New build Embodied Carbon assessment- 15,815 x 625 = 9,884 Tonne CO2e

Refurbished Embodied Carbon assessment- 2339 x 489 = 1,143 Tonne CO2e

Total Demolition and new build with retain Block 5 = 11,027 Tonne CO2e

Delivers 171 units

64.5 Tonne CO2e per unit

7.2. REFURBISHMENT

Existing Block 01 = 1801.98m2

Existing Block 02 = 1812.11m2

Existing Block 03 = 1808.08m2

Existing Block 04 = 1802.31m2

Existing block 05 – 2339 m2

Total Existing – 7,943 m2

Refurbished Embodied Carbon assessment 7,943 x 489 = 3,884 Tonne CO2e

Based on Block C and additional area of Ancillary spaces required for plant, bike storage general storage is 450 sq meters per block

New Build associated – 2,250 sq metres x 625 = 1,406 Tonne CO2e

Total Refurbishment option – 5,290 Tonne CO2e

Delivers 103 units

51.3 Tonne CO2e per unit

8. WHOLE LIFE CARBON ASSESSMENT

As both options are developed to the same U-Values and will be based on the same Part L evaluation and the same strategy for Heating, hot water and electrical energy.

The full Climate Action statement, Sustainability and Part L compliance report is appended with the planning application. Based on Option 1 of a district heating system with an ASHP utilised as the renewable energy source. This is also based on Solar PV delivering electrical energy for the site.

8.1. OPERATIONAL CARBON

For the complete development of 171 units

Heating and Hot Water

Annual Energy -89,057 KwHrs

Carbon Associated – 39,954 KgCO2 per Annum

Electrical Energy

Annual Energy Used – 167,580 Kwhrs

Carbon associated at 254 gCo2/Kwhr – 42,565 KgCO2 per annum

Total annual Carbon – 82.5 Tonne

Carbon Per Unit – 0.48 Tonne Per annum

Carbon Per Unit – 25 year

Option	**Demolition Carbon- Tonne**	**Construction Carbon - Tonne**	**Operational Carbon – 25 years**	**Total – Tonne CO2 – 25 year period per Unit**
Demolition and new build with retention of Block 5	1.5	64.5	12	78 Tonne
Refurbishment Of Existing	0	51.3	12	63.3 Tonne

9. Conclusion

As would be expected the difference in Carbon is largely in the construction on the new build against the refurbishment with a difference largely around the main structural elements of the buildings being retained. The refurbished option is producing 14.7 tonne or 18% less carbon over the life time of the 25 year operation of the building.

This needs to be reviewed against the quality of the units delivered, the quality of the open space delivered and the density of units delivered per hectare of 149 uph for the proposed development against 90 uph of the retention and refurbishment of the existing block which is outside the DCC development plan recommendations. DCC policy has constraints and direction on site density, public open space, SUDs and many others that cannot be met with the option of retention and refurbishment of the existing block.

The public open space is vital for the existing community as well as the future tenants with the provision of a high-quality public realm is a key driver for the renewal of this site. Particular focus has been brought on the delivery of the landscaping and play facilities in the public open space of Oisin Kelly Park, the retention of existing mature trees and local biodiversity enhancements in the SuDs design.

Overall, it is respectfully submitted that in this instance the replacement of the existing buildings, while incurring a carbon increase in the demolition process and the loss of embodied carbon from the original build, and resulting in the creation of further carbon in the new build, would result in a superior building which would have a longer build life and would be constructed to modern standards and efficiencies. The delivery of two new residential blocks, with community, arts and cultural and creche facilities at ground floor of the new blocks and retrofit and renovation of an existing block at the site will deliver a high-quality development and integrate within the established neighbourhood of the Liberties.

On balance the planning proposal not only delivers units to a very high standard and delivers a significantly better development for basin view and its residents.