Life Cycle Report for a Residential Development
Castletreasure, Douglas, Co. Cork
Cairn Homes Properties Ltd.
23.04.2019

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Introduction

The Sustainable Urban Housing; Design Standards for New Apartments – Guidelines for Planning Authorities were published in March 2018 (hereafter referred to as the Apartment Guidelines). The Apartment Guidelines introduced a requirement to include details on the management and maintenance of apartment schemes. This is set out in Section 6.11 to 6.14 - "Operation & Management of Apartment Developments", specifically Section 6.13.

Section 6.13 of the Apartment Guidelines 2018 requires that apartment applications shall:

> *"shall include a building lifecycle report, which in turn includes an assessment of long term running and maintenance costs as they would apply on a per residential unit basis at the time of application"*
>
> *"demonstrate what measures have been specifically considered by the proposer to effectively manage and reduce costs for the benefit of residents."*

This Building Life Cycle Report document sets out to address the requirements of Section 6.13 of the Apartment Guidelines. The report is broken into two sections as follows:

Section 01:

An assessment of long term running and maintenance costs as they would apply on a per residential unit basis at the time of application

Section 02:

Measures specifically considered by the proposer to effectively manage and reduce costs for the benefit of residents.

Proposed Development

The proposed development comprises 472 no. dwelling units, a crèche, and all associated ancillary site development works. These works include the provision of a central spine of parkland which follows the course of the Moneygurney Stream and provides for an extension to the greenway, a number of linked play/amenity areas, and all associated infrastructure and services specifically vehicular access onto the R609 Carrigaline Road/ Carr's Hill and pedestrian and vehicular connections to the existing Vicarage and Temple Grove estates.

The proposed development is located within the South Environs of Cork City, approximately 1.2km south of Douglas Village, off the Carr's Hill Road which connects the village to the N28 Carrigaline road. It lies 3.5km southeast of Cork City. Douglas Golf Club and the Maryborough Woods housing development sit on the opposing hill to the north east. Ballybrack Woods extend along the western boundary between the site and the developed lands at Donnybrook Hill. Lands to the south are in agricultural use.

Access to the site is primarily from the R609 Carrigaline Road / Carr's Hill and the proposed junction and access road will be consistent with that proposed as part of the permitted Primary School planning application 18/5369, currently under appeal to An Bord Pleanála, on lands under the ownership of Cairn but which do not form part of the subject application.

SECTION 01

AN ASSESSMENT OF LONG-TERM RUNNING AND MAINTENANCE COSTS AS THEY WOULD APPLY ON A PER RESIDENTIAL UNIT BASIS AT THE TIME OF APPLICATION.

1.1 Property Management of the Common Areas of the development

A property management company will be engaged at an early stage of the development to ensure that all property management functions are dealt with for the development and that the running and maintenance costs of the common areas of the development are kept within the agreed annual operational budget.

The property management company will enter into a contract directly with the Owners Management Company (OMC) for the ongoing management of the built development. This contract will be for a maximum period of 15 years and in the form prescribed by the PSRA.

The Property Management Company also has the following responsibilities for the apartment development once constructed:

- Timely formation of an Owners Management Company (OMC) – which will be a company limited by guarantee having no share capital. All future purchasers will be obliged to become members of this OMC.
- Preparation of annual service charge budget for the development common areas.
- Fair and equitable apportionment of the Annual operational charges in line with the Multi Units Development Act 2011 (MUD Act).
- Engagement of independent legal representation on behalf of the OMC in keeping with the MUD Act - including completion of Developer OMC Agreement and transfer of common areas.
- Transfer of documentation in line with Schedule 3 of the MUD Act.
- Estate Management.
- Third Party Contractors Procurement and management.
- OMC Reporting.
- Accounting & Corporate Services.
- Insurance Management.
- After Hours Services & Staff Administration.

1.2 Service Charge Budget

The property management company has a number of key responsibilities, primarily the compiling of the service charge budget for the development for agreement with the OMC. The service charge budget covers items such as cleaning, landscaping, refuse management, utility bills, insurance, maintenance of mechanical/electrical, lifts, life safety systems, security, property management fee etc., to the development common areas in accordance with the Multi Unit Developments Act 2011 ("MUD" Act).

This service charge budget also includes an allowance for a Sinking Fund and this allowance is determined following the review of the Building Investment Fund (BIF) report prepared for the OMC. The BIF report once adopted by the OMC, determines an adequate estimated annual cost provision requirement based on the needs of the development over a 30-year cycle period. The BIF report will identify those works which are necessary to maintain, repair, and enhance the premises over the 30-year life cycle period, as required by the Multi Unit Development Act 2011.

In line with the requirements of the MUD Act, the members of the OMC will determine and agree each year at a General Meeting of the members, the contribution to be made to the Sinking Fund, having regard to the BIF report produced.

A sample format of the typical BIF report is set out in Appendix A.

Note: the detail associated with each element heading i.e. specification and estimate of the costs to maintain / repair or replace, can only be determined after detailed design and the procurement/ construction of the development and therefore the figures provided are estimates.

SECTION 02

MEASURES SPECIFICALLY CONSIDERED BY THE PROPOSER TO EFFECTIVELY MANAGE AND REDUCE COSTS FOR THE BENEFIT OF RESIDENTS.

2.1 Energy and Carbon Emissions

The following are an illustration of the energy measures that are planned for the units to assist in reducing costs for the occupants.

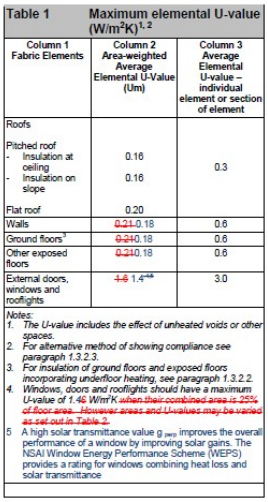
Measure	Description		Benefit
BER Certificates	A Building Energy Rating (BER) certificate will be provided for each dwelling in the proposed development which will provide detail of the energy performance of the dwellings. A BER is calculated through energy use for space and hot water heating, ventilation, and lighting and occupancy. It is proposed to target an A2/A3 rating for the houses & apartments this will equate to the following emissions. A2 – 25-50 kwh/m2/yr with CO2 emissions circa 10kgCO2/m2 year A3 – 50-75 kwh/m2/yr with CO2 emissions circa 12kgCO2/m2 /year		BER ratings reduce energy consumption and running costs.
Fabric Energy Efficiency	The U-values being investigated will be in line with the requirements set out by the current regulatory requirements of the Technical Guidance Documents Part L, titled "Conservation of Fuel and Energy: Dwellings". Thermal bridging at junctions between construction elements and at other locations will be minimised in accordance Section 1.3.3 and Appendix D within the Technical Guidance Document, Part L. See Table 1 of TGD, Part L 2019.		Lower U-values and improved air tightness is being considered to help minimise heat losses through the building fabric, lowering of energy consumption and thus minimising carbon emissions to the environment.
Energy Labelled White Goods	The white good package planned for provision in the apartments will be of a very high standard and have a high energy efficiency rating. It is expected that the below appliance ratings will be provided: • Oven - A plus • Fridge Freezer - A plus • Dishwasher - AAA • Washer/Dryer - B	The provision of high rated appliances in turn reduces the amount of electricity required for occupants.	
External Lighting	The proposed lighting scheme within the development consists of 6m pole mounted fittings as indicated on the lighting plan drawings. The luminaire selected is the 'Cree XSPME' fitting, this fitting was selected for the following reasons; • Low level lighting • Minimal upward light spill • Low voltage LED lamps • Pre-approved by Cork County Council Each light fitting shall be controlled via an individual Photoelectric Control Unit (PECU). The operation of the lighting shall be on a dusk-dawn profile.		The site lighting has been designed to provide a safe environment for pedestrians, cyclists and moving vehicles, to deter anti-social behaviour and to limit the environmental impact of artificial lighting on existing flora and fauna in the area. Having PECU allows for the optimum operation of lighting which minimizes costs.

Table 1 Maximum elemental U-value (W/m^2K)[1, 2]

Column 1 Fabric Elements	Column 2 Area-weighted Average Elemental U-Value (Um)	Column 3 Average Elemental U-value – individual element or section of element
Roofs		
Pitched roof - Insulation at ceiling - Insulation on slope	0.16 0.16	0.3
Flat roof	0.20	
Walls	~~0.21~~0.18	0.6
Ground floors[3]	~~0.21~~0.18	0.6
Other exposed floors	~~0.21~~0.18	0.6
External doors, windows and rooflights	~~1.6~~ 1.4[4,5,6]	3.0

Notes:
1. The U-value includes the effect of unheated voids or other spaces.
2. For alternative method of showing compliance see paragraph 1.3.2.3.
3. For insulation of ground floors and exposed floors incorporating underfloor heating, see paragraph 1.3.2.2.
4. Windows, doors and rooflights should have a maximum U-value of 1.4 W/m²K ~~when their combined area is 25% of floor area. However areas and U-values may be varied as set out in Table 2.~~
5. A high solar transmittance value g_{perp} improves the overall performance of a window by improving solar gains. The NSAI Window Energy Performance Scheme (WEPS) provides a rating for windows combining heat loss and solar transmittance

The following are **low energy technologies** that are being considered for the development and during the design stage of the development the specific combination from the list below will be decided on and then implemented to achieve the A2/A3 BER Rating.

Measure	Description	Benefit
Natural Ventilation	Natural ventilation is being evaluated as a ventilation strategy to minimise energy usage and noise levels.	The main advantages of natural ventilation are: • Low noise impact for occupants and adjacent units. • Completely passive therefore no energy required with associated. • Minimal maintenance required. • Reduced environmental impact as minimal equipment disposal over life cycle. • Full fresh air resulting in healthier indoor environment.
Exhaust air heat pump	It is proposed to utilise an exhaust air heat pump type system for heating, hot water and ventilation of the apartment units.	Heat pumps operate with efficiencies >400%. Exhaust air heat pumps utilise extract air as the air source for the heat pump. This will re-cycle the heat from the dwelling's ventilation system. These machines are ideal for apartments and more compact air-tight low energy or passive homes. Air is drawn through ducts to the heat pump from the bathrooms, utility and kitchen areas. The cold waste air is discharged to outside through another duct, and condensation to a drain. Additional heat generated internally from lighting, people and domestic appliances is also utilised through heat recovery from outgoing exhaust air.
Central extract/ demand-controlled ventilation	Central extract and demand-controlled ventilation will be considered to provide ventilation with low energy usage.	Central extract ventilation provides continuous ventilation with low energy usage. Central extract operates at a low trickle speed constantly and ramp up in response to an increase in humidity from wet areas. Demand control ventilation incorporates automated wall vents which open/close dependent on internal humidity conditions.
PV Solar Panels	PV Solar Panels are being considered which converts the electricity produced by the PV system (which is DC) into AC electricity. The panels are typically placed on the South facing side of the building for maximum heat gain and in some instances, can also be used to assist the heating system.	PV Solar Panels offer the benefit of reducing fossil fuel consumption and carbon emissions to the environment. They also reduce the overall requirement to purchase electricity from the grid.

Measure	Description	Benefit
Combined Heat and Power	Combined Heat and Power, (CHP), is a technology being evaluated. This technology generates electricity and captures the waste heat from the generation unit that can be used within the development.	CHP can achieve energy efficiencies by reusing waste heat from the unit to generate heat required for space heating & domestic hot water services in the apartment developments. As electricity from CHP is both generated & consumed onsite, this also eliminates energy losses from transmission of the electricity.
ECAR Charging Points	Ducting shall be provided from a local landlord distribution board to designated E-car charging car park spaces. This will enable the management company the option to install E-car charging points within the carpark to cater for E-car demand of the residence. This system operates on a single charge point access card. A full re-charge can take from one to eight hours using a standard charge point.	Providing the option of E-car charging points will allow occupants to avail of the ever-improving efficient electric car technologies.

2.2 Materials

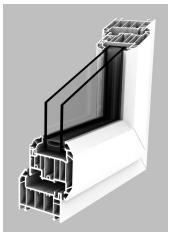
The practical implementation of the Design and Material principles has informed design of building facades, internal layouts and detailing of the proposed apartment buildings, and building facades.

2.2.1 Buildings

The Apartment Buildings are designed in accordance with the Building Regulations, in particular Part D 'Materials and Workmanship', which includes all elements of the construction. The Design Principles and Specification are applied to both the apartment units and the common parts of the building and specific measures taken include:

Measure Description	Benefit
Daylighting to circulation areas.	Avoids the requirement for continuous artificial lighting.
Natural/Passive ventilation system to circulation areas.	Avoids costly mechanical ventilation systems and associated maintenance and future replacement.
Natural ventilation to basement carpark (Blocks C & D only) and other common areas.	Avoids costly mechanical ventilation systems and associated maintenance and future replacement.
External paved and landscaped areas.	All of these require low/minimal maintenance.
Daylighting to circulation areas.	Avoids the requirement for continuous artificial lighting.
Surface carparking areas.	Omits the requirement for a basement which, avoids costly mechanical ventilation systems & associated maintenance.

2.2.2 Material Specification

Measure Description	Benefit
Consideration is given to the requirements of the Building Regulations and includes reference to BS 7543:2015, 'Guide to Durability of Buildings and Building elements, Products and Components', which provides guidance on the durability, design life and predicted service life of buildings and their parts. All common parts of the proposed apartment buildings and, the durability and performance of these are designed and specified in accordance with Figure 4; Phases of the Life Cycle of BS7543; 2015. (Please see Appendix B for this figure). The common parts are designed to incorporate the guidance, best practice principles and mitigations of Annexes of BS 7543: 2015 including: • Annex A Climatic Agents affecting Durability, • Annex B Guidance on materials and durability, • Annex C Examples of UK material or component failures, • Annex D Design Life Data sheets	Ensures that the long-term durability and maintenance of materials is an integral part of the Design and Specification of the proposed development.
Use of brickwork, render and metal sheeting to envelope of buildings.	   Requires no on-going maintenance
Use of factory finished uPVC windows and doors, and powder coated steel balconies.	  Requires no on-going maintenance

2.3 Landscape

Measure	Description	Benefit
Hard Landscape Materials	Sustainable, robust materials, with high slip resistance to be used for paving. Durable and robust finishes to be selected for all fencing, furniture, bin and bicycle storage units.	Materials selected to minimise on-going maintenance inputs.
Soft Landscape Materials	Planting proposals have been formulated to complement the local setting as well as being fit for purpose in respect of private and public realm uses and spatial constraints imposed by garden sizes and the width of planting strips. Native tree species have been selected in significant numbers for planting along boundaries and across open spaces while non-native species have also been selected where spatial constraints are a factor.	Reduction in the frequency of required soft landscape maintenance.
Site Layout and Design	Pedestrian and cyclist friendly hierarchy of streets and open spaces are complemented by generous and high-quality landscape treatments providing long term high quality residential environments.	Safe, high quality residential environments reduce vandalism and antisocial behaviour issues.
Maintenance & Management	Maintenance and management requirements have been considered through the design process. Complex planting arrangements have been omitted thus avoiding onerous maintenance and management requirements.	Estate maintenance costs reduced.
Sustainability & Biodiversity	Sustainability aspects of the proposed development include the retention of trees and hedgerows along site boundaries and within the scheme, and the use of native trees & hedges where possible across the site. Other species have been carefully selected for compatibility with the size of available spaces which is an important factor in long term management of the development. The overall objective is to enhance the biodiversity potential of the site in addition to providing seasonal interest and variety. Judiciously placed flowering shrub and groundcover planting have been included to further promote biodiversity (pollinator species attracting insects and birdlife).	Enhanced sustainability of long-term estate management.

2.4 Waste Management

The following measures illustrate the intentions for the management of waste.

Measure	Description	Benefit
Construction and Operational Waste Management Plan	The application is accompanied by a Construction and Operational Waste Management Plan prepared by J.B. Barry.	The report demonstrates how the scheme has been designed to comply with best practice.
Storage of Non-Recyclable Waste and Recyclable Household Waste	Inclusion of a centralised, covered & locked bin storage building.	Easily accessible by all residents and minimises potential littering of the scheme.
	Domestic waste management strategy: • Grey, Brown and Green bin distinction. • Competitive tender for waste management collection.	Helps reduce potential waste charges.
Composting	Organic waste bins to be provided throughout.	Helps reduce potential waste charges.

2.5 Health & Well Being

The following are illustrations of how the health and well-being of future residents are considered.

Measure	Description	Benefit
Natural / Daylight	The design, separation distances and layout of the apartment blocks have been designed to optimize the ingress of natural daylight/ sunlight to the proposed dwellings to provide good levels of natural light.	Reduces reliance on artificial lighting thereby reducing costs.
Accessibility	All units will comply with the requirements of Part M/K.	Reduces the level of adaptation, and associated costs, potentially necessitated by residents' future circumstances.
Security	The scheme is designed to incorporate passive surveillance with the following security strategies likely to be adopted: • CCTV monitoring details • Secure bicycle stands – covered by CCTV • Routine access fob audits	Help to reduce potential security/ management costs.
Natural Amenity	Large open green spaces proposed throughout the scheme, connecting to the existing green spaces.	Facilitates community interaction, socialising and play – resulting in improved wellbeing.

2.6 Management

Consideration has been given to the future homeowners, ensuring they have a clear understanding of their property.

Measure	Description	Benefit
Home User Guide	Once a purchaser completes their sale, a homeowner box will be provided which will include: **Homeowner manual** – this will provide important information for the purchaser on details of their new property. It typically includes details of the property such as MPRN and GPRN, information in relation to connect with utilities and communication providers, contact details for all relevant suppliers and User Instructions for appliances and devices in the property. **A Residents Pack** prepared by the OMC which will typically provide information on contact details for the Managing Agent, emergency contact information, transport links in the area and a clear set of rules and regulations.	Residents are as informed as possible so that any issues can be addressed in a timely and efficient manner.

2.7 Transport

Measure	Measure Description	Benefit
Access to Public Transport (Bus Services)	Currently, only one bus route (Route 216) is reasonably close/accessible from the proposed site. The nearest bus stop is located on Maryborough Hill within the Maryborough Woods development. It is less than 500m (5-10min walk) from the edge of the proposed development to this bus stop. Bus Eireann provides five services linking the wider Douglas area to Cork City, and the surrounding areas, daily. The routes comprise of: - • Route 206 – Grange to South Mall, • Route 207 – Donnybrook to Glen Heights Park, • Route 216 – Cork University Hospital to Mount, • Route 220 – Ballincollig to Fountainstown, and; • Route 223 – South Mall to Haulbowline. The development will afford an opportunity to consider improvements to the local bus service to improve connectivity and capacity between the proposed site, including surrounding areas, to the city centre. Provision is made in the proposed layout of the primary school site to accommodate a bus parking bay on the R609 close to the proposed entrance to the school/development site.	These bus services provide access to Douglas village and Cork City. The proximity, frequency and additional destinations served by this local bus service enhance the accessibility levels of the proposed residential development in addition to providing a viable and practical sustainable alternative to journeys undertaken by the private motor car.
Permeable Connections	Provision and subsequent maintenance of dedicated pedestrian infrastructure on-site, and their connectivity with the off-site networks, providing connectivity with existing pedestrian & cyclist facilities neighbouring the proposed site. The Ballybrack Valley pedestrian / cycle route provide a safe off-road link through the Mangala Valley from Donnybrook and Maryborough into Douglas Village subsequently providing convenient access to local services including shops, schools, restaurants and doctor's surgeries. To the east, there is a continuous footway on the southern side of the R609 (only) to Douglas Village. As part of the Cork Cycle Network Plan 2017, there is a proposed greenway route linking the existing Ballybrack Greenway and the future inter-urban route on the M28. The greenway is proposed to enter the site from the Ballybrack Greenway via an Irish Water Compound (provided by Cork County Council Part 8) and will travel through the site. Interconnections will be provided to the proposed development as part of the works.	Ensure the long-term attractiveness of walking and cycling to a range of local education, retail and community facilities and services.
Bicycle Storage	The provision of high-quality secure & covered bicycle parking facilities, for both short term and long-term parking requirements.	Accommodates the uptake of cycling and reducing the reliance on the private motor vehicle.

APPENDIX A:

ITEMS INCLUDED IN A TYPICAL BIF

The BIF table below illustrates what would be incorporated for the calculation of a Sinking Fund.

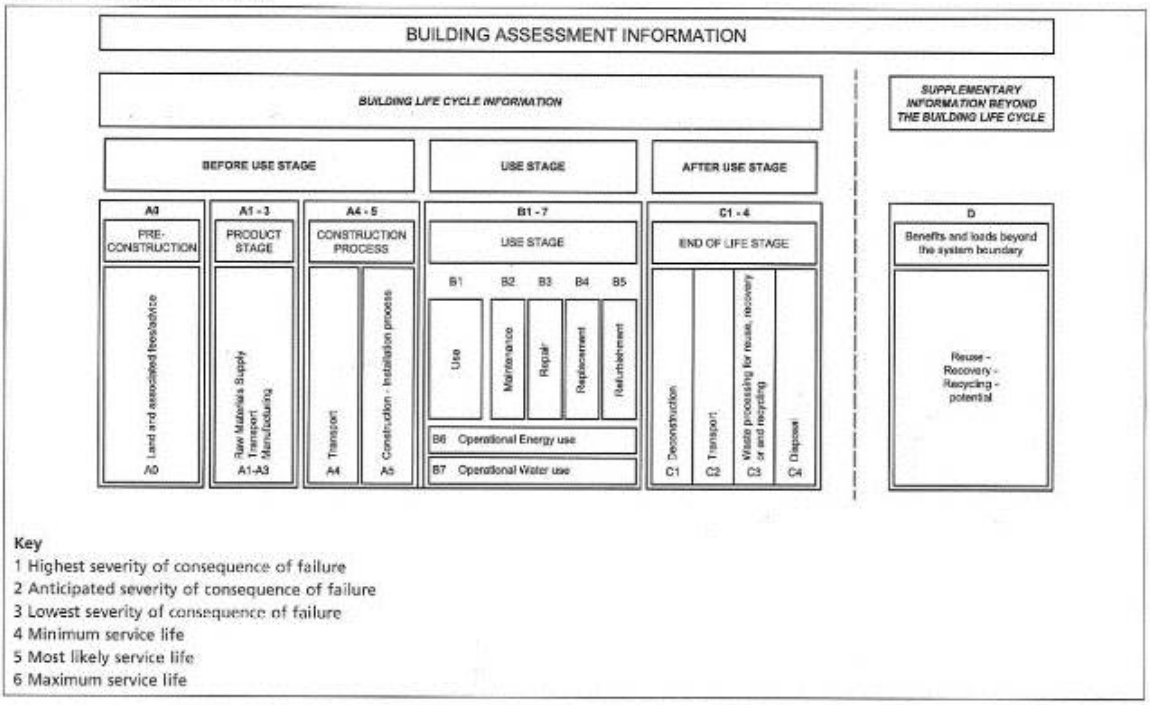
	BUILDING INVESTMENT FUND (SINKING FUND) CALCULATIONS		
Ref	Element	Life Expectancy	Amount
1.00	Roofs		
1.01	Replacement of flat roof covering including insulation to warm roof build ups.	20	
1.02	Replacement parapet details	20	
1.03	Replacement/ repairs to facias	20	
1.04	Replace roof access hatches	25	
1.05	Specialist Roof Systems - Fall arrest	25	
2.00	Elevations		
2.01	Repairs & preparation for decorations of rendered areas	20	
2.02	Replace exit/ entrance doors	25	
2.03	Replace rainwater goods	25	
2.04	Recoat powder coated finishes to balconies & grilles	20	
2.05	Periodic replacement and overhauling of external fixings	5	
2.06	Replace balcony floor finishes	25	
2.07	Recoat metal panels to top floors of all apartments	25	
3.00	Stair cores & lobbies (2No. Cores)		
3.01	Decorate ceilings & walls (stairwells & lobbies)	7	
3.02	Decorate Joinery (stairwells & lobbies)	7	
3.03	Replace fire doors (stairwells & lobbies)	25	
3.04	Replace carpets (stairwells & lobbies)	12	
3.05	Replace entrance mats (stairwells & lobbies)	10	
3.06	Replace nosings (stairwells)	12	
3.07	Replace ceramic floors tiles (stairwells & lobbies)	20	
3.08	Fixed Furniture & Equipment - Provisional Sum	18	

BUILDING INVESTMENT FUND (SINKING FUND) CALCULATIONS			
Ref	Element	Life Expectancy	Amount
4.00	M&E Services		
4.01	General - Internal re-lamping (stairwells & lobbies)	7	
4.02	Replace Internal light fittings (stairwells & lobbies)	18	
4.03	Replace external light fittings (at entrance lobbies)	18	
4.04	Replace smoke detector heads	18	
4.05	Replace manual break glass units/ disabled refuge call points	18	
4.06	Replace fire alarm panel	18	
4.07	Replace lift car and controls	25	
4.08	Replace AOV's	25	
4.08	Replace security access control installation	15	
4.09	Sump pumps replacement	15	
4.10	External mains water connection	20	
4.12	Electrical mains and sub mains distribution	20	
4.13	Emergency lighting	20	
4.14	Overhaul and/or replace waste pipes, stacks & vents	20	
5.00	Exterior		
5.01	External boundary treatments - recoat powder coated finishes to railings	60	
5.02	Replace external signage	18	
5.03	Replace cobble-lock areas	18	
5.04	15-year cutback & thinning of trees & general overhaul of the landscaping	15	
5.05	Replace CCTV provision	12	
5.06	External handrails and balustrade	18	
5.07	Repaint parking spaces & numbering	5	
5.08	Replace bicycle stands	25	

APPENDIX B:

Phases of the Life Cycle of BS7543; 2015

Figure 4 **Phases of the life cycle**



Key
1 Highest severity of consequence of failure
2 Anticipated severity of consequence of failure
3 Lowest severity of consequence of failure
4 Minimum service life
5 Most likely service life
6 Maximum service life