

ELEMENTAL LIFE CYCLE COST PLAN



UNITS 14-17 PLOT B, WINDRUSH, WITNEY

CANMOOR

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CONTENTS

INTRODUCTION	3
DEVELOPMENT DESCRIPTION.....	3
BREEAM NC V6 CRITERIA	3
PD 156865: 2008.....	4
ASSESSMENT SCOPE.....	5
COMPETENT PERSON	6
SOURCES OF DATA.....	7
AUTOMATED DATA SOURCES.....	7
OUTLINE ENTIRE ASSET LIFE CYCLE COST PLAN	8
DESIGN OPTIONS APPRAISAL	9
SUPERSTRUCTURE	9
CONCLUSION	16
APPENDIX A	17
ENTIRE ASSET LIFE CYCLE COST INPUTS.....	17
APPENDIX B	19
ENERGY CONSUMPTION CALCULATION	19
APPENDIX C	20
MODEL FILE NAME REFERENCES.....	20

INTRODUCTION

This report provides an elemental life cycle cost plan for Units 14-17 Plot B, Windrush, Witney. The life cycle cost plan has been undertaken by Nick Gorrie at the concept design stage (RIBA Stage 2).

This report has been compiled to demonstrate compliance with the BREEAM New Construction V6 Man 02 Life Cycle Costing criteria.

An outline, entire asset life cycle cost plan has been carried out for Units 14-17 Plot B, Windrush, Witney in alignment with PD 156865:2008.

The purpose of life cycle costing is to quantify the life cycle cost (LCC) to help inform a decision-making or evaluation process. It will typically also include inputs from other evaluations (e.g. environmental assessment).

DEVELOPMENT DESCRIPTION

Building type	Industrial warehouse with office
Location	Windrush Industrial Park, Witney
Building Area (GIA)	5,244m ²
Number of Units	4
Number of Floors	2
Required Service Life	60 years

BREEAM NC V6 CRITERIA

1. A competent person carries out an outline, entire asset LCC plan at Process Stage 2 (equivalent to Concept Design - RIBA Stage 2) together with any design options appraisals in line with 'Standardised method of life cycle costing for construction procurement' PD 156865:2008.
2. The elemental LCC plan:
 - Provides an indication of future replacement costs over a period of analysis as required by the client (e.g. 20, 30, 50 or 60 years);
 - Includes service life, maintenance and operation cost estimates.
 - The study period should ideally be agreed by the client, in line with the design life expectancy of the building. However, where the life expectancy of the building is not yet formally agreed (due to being at very early design stages), the default design life of 60 years should be used for modelling purposes (in line with the UK default).
3. Demonstrate, using appropriate examples provided by the design team, how the elemental LCC plan has been used to influence building and systems design and specification to minimise life cycle costs and maximise critical value.

PD 156865: 2008

PD 156865:2008 defines the scope of costs to be included in a whole life cost plan and a life cycle cost plan, as illustrated in Figure 1.

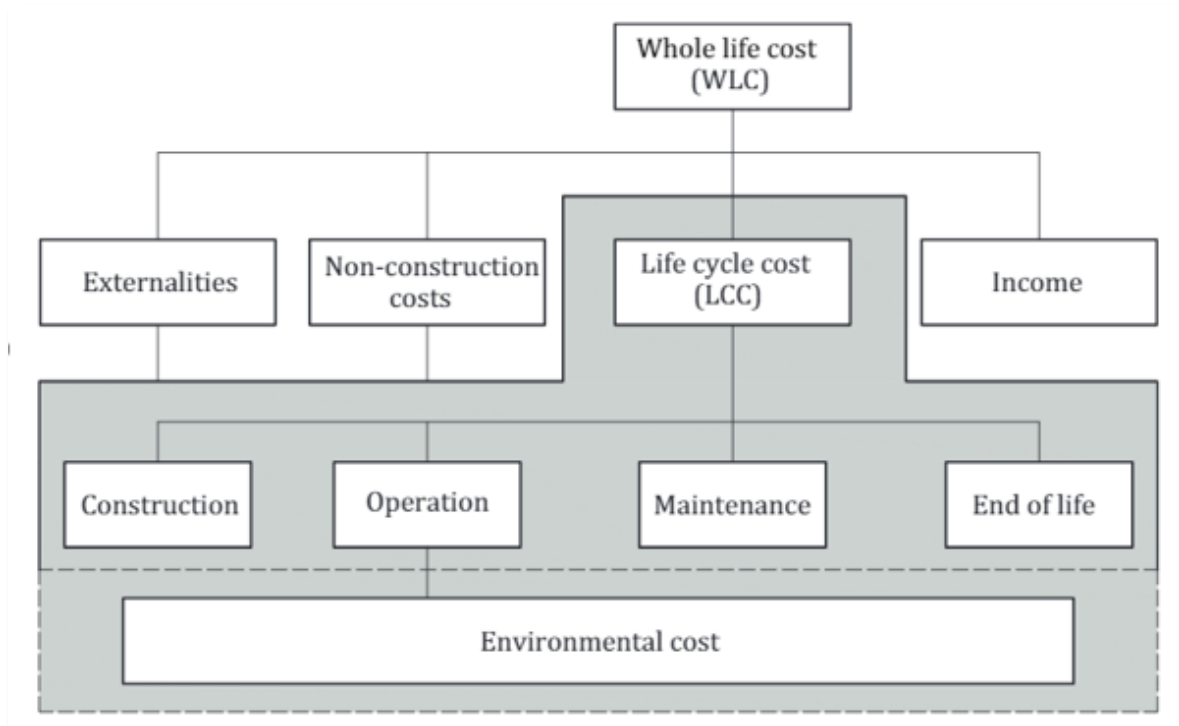


Figure 1: Whole Life Cost and Life Cycle Cost Elements (Source: PD 156865:2008)

ASSESSMENT SCOPE

The assessment scope has been developed in line with PD 156865:2008.

Please refer to Table 1 below:

Cost Category	Cost Heading	Included?
Construction	Professional fees	No
	Temporary works	No
	Construction of asset	Yes
	Initial adaption or refurbishment of asset	N/A
	Taxes	No
Operation	Rent	No
	Insurance	No
	Cyclical regulatory costs	No
	Utilities	Yes
	Taxes	No
Maintenance	Maintenance management	Yes
	Adaptation or refurbishment of asset in use	Yes
	Repairs and replacement of minor components /small areas	Yes
	Replacement of major systems and components	Yes
	Cleaning	No
	Grounds maintenance	No
	Redecoration	No
	Taxes	No
End of Life	Disposal inspections	No
	Disposal and demolition	Yes
	Reinstatement to meet contractual requirements	No
	Taxes	No

Table 1: Scope of Assessment

COMPETENT PERSON

This elemental life cycle cost plan has been undertaken by Nick Gorrie.

The BREEAM definition of a competent person is:

An individual who has acquired substantial expertise or a recognised qualification for undertaking life cycle costing studies and is not professionally connected to a single manufacturer.

Nick Gorrie has acquired substantial expertise through undertaking life cycle costing plans since 2021 and has undertaken training provided by BSRIA, covering the below listed content:

- The concept of life cycle costing
- Setting the scene for the life cycle costing models
- Project timelines. Net Present Values for one-off costs
- Cost categories and sources of information
- Net Present Values for recurring costs
- Component life expectancies
- Dealing with uncertainty with data
- Advanced LCC techniques
- Interpreting the results of LCC calculations
- LCC tools to calculate life cycle costs

Nick Gorrie is not professionally connected to any manufacturers.



SOURCES OF DATA

The life cycle cost model has been built in the OneClick LCA software utilising its associated databases. The model has been developed using information provided by the design team, as follows:

- Various drawings from Hale Architecture
 - 23052 - PL-1003_00 - Proposed Site Plan-A1
 - 23052 - PL-1004_00 - Proposed Hard and Soft Landscape-A1
 - 23052 - PL-1100_00 - Units 14 to 17 Proposed Ground Floor GA Plan-A1
 - 23052 - PL-1101_00 - Units 14 to 17 Proposed First Floor Office GA Plan-A1
- Canmoor Developments Limited Cost Plan 240119 Budget Cost Estimate Nr 2 - Plot B, Windrush Estate, Witney
- Units 14-17 UKNC2018_Mat0102_ResultsSubmissionTool_V2.2
- BREEAM_UK_NC_2018_and_V6_Wat01_Calculator_v2.3

AUTOMATED DATA SOURCES

Construction Cost	As advised by the project manager
Material Costs	OneClick LCA database, based on Neubau baupreise Kompakt; Statistische Baupreise für Positionen mit Kurzttexten (BKI) (2017) and Spon's Architects' and Builders' Price Book (AECOM) (2017) This includes material replacement costs.
Maintenance	£1/m ² as per OneClick LCA £6.50/m ² per CIBSE Guide M for building services
Energy Costs	£0.09kw/h as per OneClick LCA
Energy Consumption	Based on operational energy calculation for offices and warehouse. See Appendix B 384924kWh/annum
Water cost	£1.44/m ³ as per OneClick LCA
Water consumption	As pre the BREEAM Wat 01 calculator. See Appendix C 5.11m ³ /person/day 253 operational days 159 default occupancy
Interest rate	2%
Discount rate	7% as per OneClick LCA
Service Life period	60 years

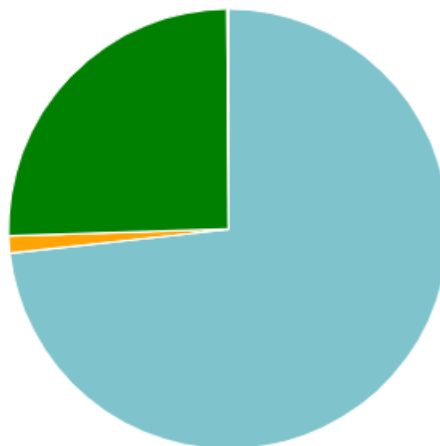
OUTLINE ENTIRE ASSET LIFE CYCLE COST PLAN

The life cycle cost model data inputs, including service life and replacement costs, can be seen in Appendix A.

LCC Baseline - Life-cycle cost (PD 156865:2008)

Result category	Life-cycle cost, discounted with inflation £
Construction costs	4,618,924
Maintenance costs	79,624
Operation costs	1,600,490
Occupancy costs	
End of life costs	6,182
Non-construction costs	
Income	
Externalities	
Total	6,305,221

Life-cycle cost, discounted with inflation £ - Life-cycle stages



- 1.0 Construction costs - 73.3%
- 3.0 Operating cost - 25.4%
- 2.0 Maintenance costs - 1.3%
- 5.0 End of life costs - 0.1%

DESIGN OPTIONS APPRAISAL

SUPERSTRUCTURE

OPTION 1

Baseline	Alternative
<p>Upper Floor</p> <ul style="list-style-type: none"> Structural steel profiles, generic, 20% recycled (columns and beams of for the upper floors only) Assumed 45 kg/m² for upper floor GIA Galvanized profiled steel decking, for composite floor slabs/decks, 0.9 mm sheet thickness Steel mesh reinforcement for concrete Concrete – C32/40, CEM I, 0% recycled binders, 150mm thick Raised access floor 	<p>Upper Floor</p> <ul style="list-style-type: none"> Structural steel profiles, generic, 20% recycled (columns and beams of for the upper floors only) Assumed 25kg/m² for upper floor GIA Hollow core concrete slabs - Assumed 250mm thick, C30/37, 0% recycled binders in cement Flooring screed - 50mm thick, C20/25, CEM I 0% Cement Replacement Assumed NO Raised access floor (as service runs can be allowed for within screed detailing)

Elemental LCC	LCC Discounted with inflation		Nominal LCC Undiscounted with inflation	
	Baseline	Alternative	Baseline	Alternative
Construction Cost	£4,618,924	£4,507,480	£4,618,924	£4,507,480
Maintenance Cost	£79,624	£32,264	£78,386	£238,675
Operational Cost	£1,600,490	£1,600,490	£9,980,164	£9,980,164
End of Life costs	£6,182	£6,033	£388,076	£378,712
Total LCC	£6,305,220	£6,146,267	£15,065,550	£15,105,031
Result (Baseline-Alternative)	£158,953		-£39,481	

Concept Design LCA	Baseline	Alternative
CO ₂ e (tonne)	6,759	6,628
Result (Baseline-Alternative)	131	

Lowest LCC	Alternative material
Lowest CO₂e	Alternative material

OPTION 2

Baseline	Alternative
<p>Upper Floor</p> <ul style="list-style-type: none"> • Structural steel profiles, generic, 20% recycled (columns and beams of for the upper floors only) Assumed 45 kg/m² for upper floor GIA • Galvanized profiled steel decking, for composite floor slabs/decks, 0.9 mm sheet thickness • Steel mesh reinforcement for concrete • Concrete – C32/40, CEM I, 0% recycled binders, 150mm thick • Raised access floor 	<p>Upper Floor</p> <ul style="list-style-type: none"> • Glue laminated timber (Glulam) - Assumed 100 kg/m² for upper floor GIA, NB: FSC certified timber, and a detailed disassembly plan made, to promote reuse at end of building life • 200mm joists - Assumed 1.8m of joists per m² • 22mm chipboard - Assumed 14.57 kg/m² • Soffit lining/fire protection: <ul style="list-style-type: none"> i) 2 x Gypsum plasterboard, fire resistant, 12.5 mm ii) 200mm of Rock wool/mineral wool insulation, Fire resistance class = A • No raised access floor needed

Elemental LCC	LCC Discounted with inflation		Nominal LCC Undiscounted with inflation	
	Baseline	Alternative	Baseline	Alternative
Construction Cost	£4,618,924	£4,657,789	£4,618,924	£4,657,789
Maintenance Cost	£79,624	£33,657	£78,386	£260,681
Operational Cost	£1,600,490	£1,600,490	£9,980,164	£9,980,164
End of Life costs	£6,182	£6,234	£388,076	£391,341
Total LCC	£6,305,220	£6,298,170	£15,065,550	£15,289,975
Result (Baseline-Alternative)	£7,050		-£224,425	

Concept Design LCA	Baseline	Alternative
CO ₂ e (tonne)	6,759	6,584
Result (Baseline-Alternative)	175	

Lowest LCC	Alternative material
Lowest CO₂e	Alternative material

OPTION 3

Baseline	Alternative
<p>Steel Frame</p> <ul style="list-style-type: none"> • Structural steel profiles, generic, 20% recycled (Hot rolled) • Structural hollow steel Generic 20% (Cold rolled) <p>Upper Floor</p> <ul style="list-style-type: none"> • Structural steel profiles, generic, 20% recycled (columns and beams of for the upper floors only) Assumed 45 kg/m² for upper floor GIA • Galvanized profiled steel decking, for composite floor slabs/decks, 0.9 mm sheet thickness • Steel mesh reinforcement for concrete • Concrete – C32/40, CEM I, 0% recycled binders, 150mm thick • Raised access floor 	<p>Timber Frames</p> <ul style="list-style-type: none"> • Glue laminated timber (Glulam) - Assumed 70 kg/m² for ground floor GIA, NB: FSC certified timber, and a detailed disassembly plan made, to promote reuse at end of building life <p>Upper Floor</p> <ul style="list-style-type: none"> • Glue laminated timber (Glulam) - Assumed 100 kg/m² for upper floor GIA • 200mm joists - Assumed 1.8m of joists per m² • 22mm chipboard - Assumed 14.57 kg/m² • Sofit lining/fire protection: <ul style="list-style-type: none"> i) 2 x Gypsum plasterboard, fire resistant, 12.5 mm ii) 200mm of Rock wool/mineral wool insulation, Fire resistance class = A • No raised access floor needed

Elemental LCC	LCC Discounted with inflation		Nominal LCC Undiscounted with inflation	
	Baseline	Alternative	Baseline	Alternative
Construction Cost	£4,618,924	£4,764,326	£4,618,924	£4,764,326
Maintenance Cost	£79,624	£33,657	£78,386	£260,681
Operational Cost	£1,600,490	£1,600,490	£9,980,164	£9,980,164
End of Life costs	£6,182	£6,377	£388,076	£400,292
Total LCC	£6,305,220	£6,404,850	£15,065,550	£15,405,463
Result (Baseline-Alternative)	-£99,630		-£339,913	

Concept Design LCA	Baseline	Alternative
CO ₂ e (tonne)	6,759	6,024
Result (Baseline-Alternative)	735	

Lowest LCC	Baseline material
Lowest CO ₂ e	Alternative material

SUBSTRUCTURE

OPTION 1

Baseline	Alternative
Lowest Floor Construction <ul style="list-style-type: none"> Concrete - Assumptions: C32/40, CEM I, 0% recycled binders 	Lowest Floor Construction <ul style="list-style-type: none"> Concrete - Assumptions: C32/40, CEM I, 0% recycled binders, 15% thinner ground floor slab

Elemental LCC	LCC Discounted with inflation		Nominal LCC Undiscounted with inflation	
	Baseline	Alternative	Baseline	Alternative
Construction Cost	£4,618,924	£4,585,071	£4,618,924	£4,585,071
Maintenance Cost	£79,624	£79,624	£78,386	£783,846
Operational Cost	£1,600,490	£1,600,490	£9,980,164	£9,980,164
End of Life costs	£6,182	£6,137	£388,076	£385,231
Total LCC	£6,305,220	£6,271,322	£15,065,550	£15,734,312
Result (Baseline-Alternative)	£33,898		-£668,762	

Concept Design LCA	Baseline	Alternative
CO ₂ e (tonne)	6,759	6,715
Result (Baseline-Alternative)	44	

Lowest LCC	Alternative material
Lowest CO₂e	Alternative material

OPTION 2

Baseline	Alternative
<p>Standard Foundations</p> <ul style="list-style-type: none"> • Concrete - Assumptions: C32/40, CEM I, 0% recycled binders • Steel reinforcement 	<p>Standard Foundations</p> <ul style="list-style-type: none"> • Concrete - Reduced Foundations Size Due to Structural Timber Lighter Loads (circa 20% saving) • Steel reinforcement

Elemental LCC	LCC Discounted with inflation		Nominal LCC Undiscounted with inflation	
	Baseline	Alternative	Baseline	Alternative
Construction Cost	£4,618,924	£4,607,035	£4,618,924	£4,607,035
Maintenance Cost	£79,624	£79,624	£78,386	£783,486
Operational Cost	£1,600,490	£1,600,490	£9,980,164	£9,980,164
End of Life costs	£6,182	£6,166	£388,076	£387,077
Total LCC	£6,305,220	£6,293,315	£15,065,550	£15,757,762
Result (Baseline-Alternative)	£11,905		-£692,212	

Concept Design LCA	Baseline	Alternative
CO ₂ e (tonne)	6,759.	6,744
Result (Baseline-Alternative)	15	

Lowest LCC	Alternative material
Lowest CO₂e	Alternative material

HARD LANDSCAPING

OPTION 1

Baseline	Alternative
Tarmac 550mm build up of: <ul style="list-style-type: none"> 350mm crushed aggregate sub-base 70mm AC 32 60mm AC20 and <ul style="list-style-type: none"> 40mm surface course 	Paving 550mm build up of: Block Paver <ul style="list-style-type: none"> 350mm crushed aggregate sub-base 60mm AC 20 50mm sand bedding 80mm block paver

Elemental LCC	LCC Discounted with inflation		Nominal LCC Undiscounted with inflation	
	Baseline	Alternative	Baseline	Alternative
Construction Cost	£4,618,924	£4,624,281	£4,618,924	£4,624,281
Maintenance Cost	£79,624	£73,545	£78,386	£739,163
Operational Cost	£1,600,490	£1,600,490	£9,980,164	£9,980,164
End of Life costs	£6,182	£6,189	£388,076	£388,526
Total LCC	£6,305,220	£6,304,505	£15,065,550	£15,732,134
Result (Baseline-Alternative)	£715		-£666,584	

Concept Design LCA	Baseline	Alternative
CO ₂ e (tonne)	6,759	6,745
Result (Baseline-Alternative)	14	

Lowest LCC	Alternative material
Lowest CO₂e	Alternative material

OPTION 2

Baseline	Alternative
<p>Tarmac</p> <p>550mm build up of:</p> <ul style="list-style-type: none"> • 350mm crushed aggregate sub-base • 70mm AC 32 • 60mm AC20 and 40mm surface course 	<p>Paving</p> <p>550mm build up of:</p> <p>Block Paver</p> <ul style="list-style-type: none"> • 330mm crushed aggregate sub-base • 60mm AC20 • 50mm sand bedding <p>100mm open grid paver (with 40% openness)</p>

Elemental LCC	LCC Discounted with inflation		Nominal LCC Undiscounted with inflation	
	Baseline	Alternative	Baseline	Alternative
Construction Cost	£4,618,924	£4,615,936	£4,618,924	£4,615,936
Maintenance Cost	£79,624	£71,869	£78,386	£727,082
Operational Cost	£1,600,490	£1,600,490	£9,980,164	£9,980,164
End of Life costs	£6,182	£6,178	£388,076	£387,825
Total LCC	£6,305,220	£6,294,473	£15,065,550	£15,711,007
Result (Baseline-Alternative)	£10,747		-£645,457	

Concept Design LCA	Baseline	Alternative
CO ₂ e (tonne)	6,759	6,736
Result (Baseline-Alternative)	23.	

Lowest LCC	Alternative material
Lowest CO ₂ e	Alternative material

CONCLUSION

The outline, entire asset life cycle cost plan has been carried out for Units 14-17 Plot B, Windrush, Witney in alignment with PD 156865:2008.

Several design options have been analysed and the following results summarises which materials have the lower life cycle cost:

Building Element	Option	LCC (discounted)		LCC (undiscounted)		LCC Result
		Baseline	Alternative	Baseline	Alternative	
Superstructure	1	£6,305,220	£6,146,267	£15,065,550	£15,105,031	Alternate
	2	£6,305,220	£6,298,170	£15,065,550	£15,289,975	Alternate
	3	£6,305,220	£6,404,850	£15,065,550	£15,405,463	Baseline
Substructure	1	£6,305,220	£6,271,322	£15,065,550	£15,734,312	Alternate
	2	£6,305,220	£6,293,315	£15,065,550	£15,757,762	Alternate
Hard Landscaping	1	£6,305,220	£6,304,505	£15,065,550	£15,732,134	Alternate
	2	£6,305,220	£6,294,473	£15,065,550	£15,711,007	Alternate

The LCA of each of the design options have been analysed and the following alternatives are found to offer a lower embodied carbon:

Building Element	Option	LCA (CO ₂ e (tonne))		LCA Result
		Baseline	Alternative	
Superstructure	1	6,759	6,628	Alternate
	2	6,759	6,584	Alternate
	3	6,759	6,024	Alternate
Substructure	1	6,759	6,715	Alternate
	2	6,759	6,744	Alternate
Hard Landscaping	1	6,759	6,745	Alternate
	2	6,759	6,736	Alternate

The LCA and the LCC of each design option has been compared and analysed to determine if there is a preferred material option:

Building Element	Option	LCC Result	LCA Result	Result Alignment
Superstructure	1	Alternate	Alternate	Alternate
	2	Alternate	Alternate	Alternate
	3	Baseline	Alternate	No Result
Substructure	1	Alternate	Alternate	Alternate
	2	Alternate	Alternate	Alternate
Hard Landscaping	1	Alternate	Alternate	Alternate
	2	Alternate	Alternate	Alternate

APPENDIX A

ENTIRE ASSET LIFE CYCLE COST INPUTS

Main > ESS0416 Plot B Windrush Units 1-4 LCC > LCC Baseline > Life-cycle cost (PD 156865:2008) > Input data : Building materials

LCC Baseline

Building materials Energy consumption, annual Water consumption, annual Calculation period Other capital cost Other operating cost

Material Country Data source Type Upstream CO2e Unit Standard

Fill in the material consumptions by material type. You may fill in all materials lumped together, or on separate rows for example by type of structure. Unless instructed otherwise, use gross amounts (incl. losses). Materials can be added in any section. [Material selection help](#).

1. Foundations and substructure

Materials in the foundations will never be replaced, no matter assessment period length (except for RE2020 and FEC tools). For BREEAM UK Mat 1 IMPACT equivalent provide the data for site excavation fuel use here, choose resource Excavation works.

Foundation, sub-surface, basement and retaining walls [Compare answers](#) [Create a group](#) [Move materials](#) [Add to compare](#)

Start typing or click the arrow

Resource	Quantity	Unit cost	Total cost	Comment	RICS category	Service life	
Ready-mix concrete, normal strength ?	202.5 m3	246.38 £ / m3	49,892 £	Foundations - concrete	1.Substructure	Permanent	change
Reinforcement steel (rebar), generi ?	20250 kg	0.47 £ / kg	9,557 £	Foundations - Steel	1.1.1.Standard	Permanent	change
Ready-mix concrete, normal strength ?	916 m3	246.38 £ / m3	225,684 £	Ground Floor Slab -	1.1.3.Lowest floor	Permanent	change
Reinforcement steel (rebar), generi ?	32060 kg	0.47 £ / kg	15,132 £	Ground Floor Slab - Steel	1.1.3.Lowest floor	Permanent	change

2. Vertical structures and facade

External walls and facade [Compare answers](#) [Create a group](#) [Move materials](#) [Add to compare](#)

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Resource	Quantity	Unit cost	Total cost	Comment	RICS category	Service life	
Sandwich panel with glasswool insul ?	1439 m2	81.37 £ / m2	117,096 £	External wall - Built up	2.5.1.External enclosing	As building	cl
Sandwich panel with stone wool i ?	2268 m2	61.52 £ / m2	139,523 £	External wall - Composite	2.5.1.External enclosing	As building	cl

Columns and load-bearing vertical structures [Compare answers](#) [Create a group](#) [Move materials](#) [Add to compare](#)

Start typing or click the arrow

Resource	Quantity	Unit cost	Total cost	Comment	RICS category	Service life	
Structural steel profiles, generic, ?	206100 kg	0.67 £ / kg	138,207 £	Steel frame - hot rolled	2.1. Frame	As building	change
Structural hollow steel sections (H ?	45800 kg	0.67 £ / kg	30,713 £	Steel frame - cold rolled	2.1.1.Steel frames	As building	change

Internal walls and non-bearing structures [Compare answers](#) [Create a group](#) [Move materials](#) [Add to compare](#)

Start typing or click the arrow

3. Horizontal structures: beams, floors and roofs

Resource	Quantity	Unit cost	Total cost	Comment	RICS category	Service life	
Structural steel profiles, generic, ?	29880 kg	0.67 £ / kg	20,037 £	Upper Floor Structural Steel	2.2.Upper floor	As building	
Profiled steel decking for compo ?	664 m2	6.76 £ / m2	4,488 £	Upper floor - Metal deck	2.2.1.Floors	As building	
Reinforcement steel mesh (rebar), 1 ?	2005.28 kg	0.47 £ / kg	946 £	Upper floor - Reinforcement	2.2.1.Floors	As building	
Ready-mix concrete, normal strength ?	99.6 m3	246.38 £ / m3	24,539 £	Upper floor - Concrete	2.2.Upper floor	As building	
Raised access floor pedestals, for ?	1381.12 kg	0.86 £ / kg	1,189 £	Raised access floor feet	3.2.2.Raised access	As building	
Sandwich panel with glasswool insul ?	4855 m2	81.37 £ / m2	395,066 £	Roof	2.3.Roofs	As building	
Corrugated rooflight GRP sheets, 5. ?	486 m2	50 £ / m2	24,300 £	Rooflights	2.3.5.Rooflights	30	
Raised access flooring panels, chip ?	664 m2	186.47 £ / m2	123,816 £	Raised access floor panels	3.2.2.Raised access	25	

4. Other structures and materials

Other structures and materials [Compare answers](#) [Create a group](#) [Move materials](#) [Add to compare](#)

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Resource	Quantity	Unit cost	Total cost	Comment	RICS category	Service life
Precast concrete staircase, 2 flight	84705.6 kg	0.41 £ / kg	34,614 £	Precast Stair	2.4.Stairs and ramps	As building

Windows and doors [Compare answers](#) [Create a group](#) [Move materials](#) [Add to compare](#)

Start typing or click the arro

Resource	Quantity	Unit cost	Total cost	Comment	RICS category	Service life
Aluminium frame window, double glaz	360 m2	233.4 £ / m2	84,024 £		2.6.Windows and external	As building

Finishes and coverings [Compare answers](#) [Create a group](#) [Move materials](#) [Add to compare](#)

[Click to input data](#)

5. External areas and site elements

Materials and constructions for external areas [Compare answers](#) [Create a group](#) [Move materials](#) [Add to compare](#)

Start typing or click the arro

Resource	Quantity	Unit cost	Total cost	Comment	RICS category	Service life
Asphalt concrete base course	1089 m ²	15.61 £ / m2	16,997 £	Access road - 90mm AC32	8.2.1.Roads, paths and	Data by constituent
Asphalt concrete base course	1089 m ²	10.40 £ / m2	11,331 £	Access road - 60mm AC20	8.2.1.Roads, paths and	Data by constituent
Asphalt concrete base course	776 m ²	10.40 £ / m2	8,074 £	Car Park - 60mm AC20	8.2.1.Roads, paths and	Data by constituent
Asphalt, generic, compacted, 5/95%	1089 m2	6.63 £ / m2	7,225 £	Access road - 40mm	8.2.1.Roads, paths and	30
Aggregate (crushed gravel), generic	1089 m2	5.79 £ / m2	6,305 £	Access road - Sub-base -	8.2.1.Roads, paths and	As building
Ready-mix concrete, normal strength	2434 m2	49.28 £ / m2	119,938 £	Service Yard - Concrete	8.2.1.Roads, paths and	As building
Reinforcement steel (rebar), generi	17038 kg	0.47 £ / kg	8,042 £	Service Yard - Steel	8.2.1.Roads, paths and	As building
Asphalt, generic, compacted, 5/95%	776 m2	6.63 £ / m2	5,148 £	Car park bays - 40mm	8.2.1.Roads, paths and	30
Asphalt concrete base course	776 m ²	12.14 £ / m2	9,420 £	Car park circulation - 70mm	8.2.1.Roads, paths and	Data by constituent
Aggregate (crushed gravel), generic	776 m2	8.11 £ / m2	6,290 £	Car park circulation-	8.2.1.Roads, paths and	As building
Concrete paving blocks, semi dry mi	420 m2	18.39 £ / m2	7,723 £	Footpaths - block paving	8.2.1.Roads, paths and	60
Sand, compacted dry density, 1682 k	420 m2	1.16 £ / m2	486 £	Footpaths - bedding sand	8.2.1.Roads, paths and	As building
Aggregate (crushed gravel), generic	420 m2	3.47 £ / m2	1,459 £	Footpaths - aggregate	8.2.1.Roads, paths and	60

APPENDIX B

ENERGY CONSUMPTION CALCULATION

Units 1-4, Plot B Windrush, Witney
 Calculation for Annual Energy Consumption
 30/01/2024

Building	Office area (m ²)	Warehouse area (m ²)	Total area (m ²)	Total power - Warehouse standard B8 (kVA) - 30w/m ² Warehouse and 80w/m ² Office	Provision of EV charging based on B8 use only. Assumed 10% of parking bays being active.	Maximum Demand KvA	Operating Load KvA	KW	Weekly kWh	Monthly kWh	Annual kWh
1	664.00	4580.00	5244.00	190.52	55.25	245.77	122.89	110.60	6635.81	26543.25	331790.58
Total site	664	4,580	5,244	191	55	246	123	111	6,636	26,543	331,791

APPENDIX C

MODEL FILE NAME REFERENCES

Model name	Model includes material option
LCC Baseline	Baseline option
LCC SuperS Opt1	Superstructure Option 1
LCC SuperS Opt2	Superstructure Option 2
LCC SuperS Opt3	Superstructure Option 3
LCC Sub Opt1	Substructure Option 1
LCC Sub Opt2	Substructure Option 2
LCC HL Opt1	Hard Landscaping Option 2
LCC HL Opt2	Hard Landscaping Option 2

LCC Baseline - Life-cycle cost (PD 156865:2008)

Result category	Life-cycle cost, discounted with inflation £
Construction costs	4,618,924
Maintenance costs	79,624
Operation costs	1,600,490
Occupancy costs	
End of life costs	6,182
Non-construction costs	
Income	
Externalities	
Total	6,305,221

LCC SuperS Opt1 - Life-cycle cost (PD 156865:2008)

Result category	Life-cycle cost, discounted with inflation £
Construction costs	4,507,480
Maintenance costs	32,264
Operation costs	1,600,490
Occupancy costs	
End of life costs	6,033
Non-construction costs	
Income	
Externalities	
Total	6,146,267

LCC SuperS Opt2 - Life-cycle cost (PD 156865:2008)

Result category	Life-cycle cost, discounted with inflation £
Construction costs	4,657,789
Maintenance costs	33,657
Operation costs	1,600,490
Occupancy costs	
End of life costs	6,234
Non-construction costs	
Income	
Externalities	
Total	6,298,170

LCC SuperS Opt3 - Life-cycle cost (PD 156865:2008)

Result category	Life-cycle cost, discounted with inflation £
Construction costs	4,764,326
Maintenance costs	33,657
Operation costs	1,600,490
Occupancy costs	
End of life costs	6,377
Non-construction costs	
Income	
Externalities	
Total	6,404,850

LCC SubS Opt1 - Life-cycle cost (PD 156865:2008)


Result category	Life-cycle cost, discounted with inflation £
Construction costs	4,585,071
Maintenance costs	79,624
Operation costs	1,600,490
Occupancy costs	
End of life costs	6,137
Non-construction costs	
Income	
Externalities	
Total	6,271,322

LCC SubS Opt2 - Life-cycle cost (PD 156865:2008)

Result category	Life-cycle cost, discounted with inflation £
Construction costs	4,607,035
Maintenance costs	79,624
Operation costs	1,600,490
Occupancy costs	
End of life costs	6,166
Non-construction costs	
Income	
Externalities	
Total	6,293,316

LCC HL Opt1 - Life-cycle cost (PD 156865:2008)

Result category	Life-cycle cost, discounted with inflation £
Construction costs	4,624,281
Maintenance costs	73,545
Operation costs	1,600,490
Occupancy costs	
End of life costs	6,189
Non-construction costs	
Income	
Externalities	
Total	6,304,505

 **LCC HL Opt2 - Life-cycle cost (PD 156865:2008)**

Result category	Life-cycle cost, discounted with inflation £
Construction costs	4,615,936
Maintenance costs	71,869
Operation costs	1,600,490
Occupancy costs	
End of life costs	6,178
Non-construction costs	
Income	
Externalities	
Total	6,294,474