

APPENDIX 9-A GREENHOUSE GAS CALCULATION INPUTS

General project inputs

Table 1 General information

LCA timeline	60	years	BS EN 15978
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Table 2 Calculation area schedule for the proposed development

Plot	Unit	Year built						Area
		2025	2026	2027	2028	2029	2030	Total m²
Block A	m²	1,759	1,759	1,316				4,833
Block B	m²	3,017	3,017	2,259				8,292
Block C	m²	5,659	5,659	4,241				15,558
Block D	m²	2,661	2,661	1,993				7,314
Block E	m²	2,661	2,661	1,993				7,314
Block F	m²			2,188	2,188	2,188	1,645	8,208
Block G	m²			1,396	1,396	1,396	1,051	5,238
Block H	m²			1,765	1,765	1,765	1,328	6,622
Block I	m²			1,396	1,396	1,396	1,051	5,238
Block J	m²			970	970	970	732	3,641
Block K	m²	848	848	633				2,328
Block L	m²			1,211	1,211	1,211	913	4,545
Block M	m²			1,609	1,609	1,609	1,211	6,037
Block N	m²			1,584	1,584	1,584	1,192	5,943
Block O	m²			1,211	1,211	1,211	913	4,545
Block P	m²			2,149	2,149	2,149	1,616	8,062
Ancillary	m²		900	900	900	900	900	4,500

Embodied carbon (construction GHG emission) inputs

Table 3 Material embodied carbon benchmarks and low, med, high assumptions

Schedule typologies	Embodied carbon benchmarks (RICS, 2014)	Low	Medium	High	Unit
		Buro Happold’s past project experience (15% reduction)	RICS (2014) and WRAP (2017) benchmarks		
Block A-P	Medium Rise Apartment/Condo (6-10 storey building)	731	860	989	kgCO ₂ e/m ²
Ancillary	Mixed / University Campus	353.6	416	478.4	kgCO ₂ e/m ²

Table 4 Transport, construction, use and demolition embodied carbon benchmarks.

	Year	Low	Medium	High	Unit	Reference
Total on-site energy use	0	13,000	14,000	15,000	kgCO ₂ /£m	BRE SMART Waste KPI from RICS 2017 draft professional statement
Total site transport and delivery	0	2,441	2,910	3,379	kgCO ₂ /£m	BH past project monitored data

	Year	Low	Medium	High	Unit	Reference
Use	15 onwards	80%	90%	100%	% of raw material embodied carbon	BH past project monitored data
Demolition	0 & end of life	3	3.5	4	kgCO2/£m	RICS 2017 draft professional statement

Operational GHG emission calculation inputs

15.1.1 It is assumed that the operational energy use of the proposed development will be 35kwh/m²/year for both regulated and un-regulated energy, based on targets set by the client.

Table 5 BEIS (2022) and SAP (2016) emissions factors.

	kgCO ₂ /kWh	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050+
BEIS	Grid Domestic- BEIS projections (BEIS Measuring and reporting environmental impacts: guidance for businesses, 2021)	0.146	0.151	0.131	0.098	0.073	0.063	0.054	0.049	0.042	0.033	0.026	0.021	0.020	0.020	0.018	0.018	0.017	0.016	0.015	0.015	0.009	0.008	0.008	0.008	0.005	0.005	0.003	0.003
BEIS	Grid Commercial / Public sector- BEIS projections (BEIS Measuring and reporting environmental impacts: guidance for businesses, 2021)	0.143	0.149	0.129	0.096	0.072	0.062	0.053	0.049	0.041	0.032	0.025	0.020	0.020	0.019	0.018	0.018	0.017	0.016	0.015	0.014	0.009	0.008	0.008	0.008	0.005	0.005	0.003	0.002
BEIS	Grid Industrial- BEIS projections (BEIS Measuring and reporting environmental impacts: guidance for businesses, 2019)	0.140	0.146	0.127	0.095	0.070	0.061	0.052	0.048	0.040	0.032	0.025	0.020	0.019	0.019	0.018	0.017	0.016	0.015	0.015	0.014	0.009	0.008	0.008	0.007	0.005	0.005	0.003	0.002
SAP	Grid SAP 2016 Consultation	0.229	0.229	0.183	0.183	0.183	0.183	0.183	0.183	0.183	0.183	0.183	0.183	0.183	0.183	0.183	0.183	0.183	0.183	0.183	0.183	0.183	0.183	0.183	0.183	0.183	0.183	0.183	0.183
SAP	Gas SAP 2016 Consultation	0.208	0.208	0.208	0.208	0.208	0.208	0.208	0.208	0.208	0.208	0.208	0.208	0.208	0.208	0.208	0.208	0.208	0.208	0.208	0.208	0.208	0.208	0.208	0.208	0.208	0.208	0.208	0.208

Table 6 Benchmarks and conversion factors used for GHG emissions associated with operational water consumption for the proposed development

Schedule typologies	Benchmark name	Benchmark	Source
	Flats	120 litres per person per day	BRISA Rules of Thumb Edition for Building Services (5 th Edition)
ancillary uses	Standing spectator areas and bars	0.33 m² per person	BRISA Rules of Thumb Edition for Building Services (5 th Edition)
	Restaurants	7 litres per person per day	
All schedule typologies	Carbon factor for water supply	0.177 kg CO ₂ per m³ of water supplied	Department for Business, Energy & Industrial Strategy Greenhouse Gas Reporting: Conversion Factors 2022
	Carbon factor for the treatment of foul water	0.201 kg CO ₂ per m³ of water supplied	

Table 7 Assumptions and conversion factors used for GHG emissions associated with operational transport for the proposed development

Assumed mode of transport	Assumed Distance travelled (km)	Source of assumed distance travelled	Annual trips	Number of trips over 60-year lifecycle	Carbon factor (total kgCO ₂ e per km)	GHG emissions (tCO ₂ e)
HGVs, LGVs, MGVs	108	Average commute: Department for Transport data. Available here .	12,410	9744,600	0.87205	70,127.47