

Designer Embodied Carbon (EC) Calculation - Civil & Electrical	
Build Table Most Contributing Materials 1%>. Embodied Carbon A1-5	
Project Name:	Withyfold Drive
Project Scope:	T12&T13 Replacement - In Situ

Project Embodied Carbon Breakdown and Totals t(CO2e):		Calculation Date:	01/10/2025
Total A1-5w	181.1199991	Project Code:	50011695
A5a	10.09	Project Completed in Financial Year:	2025
Total A1-5 t(CO2e)	191.21	Estimated Cost of Civil Build(£): (To Estimate A5a)	£1,441,975

Structural timber: in Tonnes, (To Calculate Sequestration Value)

0

Sequestration Value t(CO2e):

0

Note: Total A1-5t(CO2e): Total A1-5w + A5a = Ans

Design Values													Notes/ Comments	
Embodied Carbon t(CO2e)					ECF kg(CO2e/kg)			Embodied Carbon t(CO2e)				Total EC t(CO2e)		
Stage of works	Material	Units values to input in conversion to tonnes cell	Conversion to Tonnes	Quantity(t)	A1-3	A4	A5w	A1-3	A4	A5w	A1-5w	A1-5w		
Foundation Excavation & Backfill	Soil assumed 5% cement content. 1m3 = 1.9 tonnes of clay soil. Ref:	input value in m3 (in 'conversion to tonnes' cell)	224.85	522.1017	0.061	0.005	0.004452	31.848	2.6105	2.3244	36.78310897	Foundation Excavation & Backfill	36.78310897	
Foundation	Asphalt, 8% (Bitumen) binder content (by mass) weight @ 2322kg / m3	input value in m3 (in 'conversion to tonnes' cell)	1.4	3.2508	0.086	0.005	0.005777	0.2796	0.0163	0.0188	0.314602672	Foundation	0.314602672	
	PVC Pipes (Waste water) weight @ 0.72kg / m	input value in meters (in 'conversion to tonnes' cell)	0	0	3.23	0.005	0.172409	0	0	0	0		0	
	Concrete Kerb 26.74 linear meters per m3	input value in m3 (in 'conversion to tonnes' cell)	0	0	0.188	0.005	0.00211	0	0	0	0		0	
	DTP type 1, 2650kg/m3	input value in m3 (in 'conversion to tonnes' cell)	81.8	81.8	0.005	0.005	0.001484	0.409	0.409	0.1214	0.9393912		0.9393912	
	Limestone Aggregate, 2650kg/m3	input value in m3 (in 'conversion to tonnes' cell)	24	63.6	0.005	0.005	0.001484	0.318	0.318	0.0944	0.7303824		0.7303824	
Reinforced Concrete	Ready mix concrete 32/40. 2350kg / m3	input value in m3 (in 'conversion to tonnes' cell)	18.406	43.2541	0.132	0.005	0.008215	5.7095	0.2163	0.3553	6.281144132	Reinforced Concrete	6.281144132	
	Rebar (New) weight @ H10 = 0.62kg / m	input value in kg (in 'conversion to tonnes' cell)	429.3	0.4293	2.77	0.032	0.14946	1.1892	0.0137	0.0642	1.267061778		1.267061778	
	Rebar (New) weight @ H12 = 0.89kg / m	input value in kg (in 'conversion to tonnes' cell)	54.32	0.05432	2.77	0.032	0.14946	0.1505	0.0017	0.0081	0.160323307		0.160323307	
	Rebar (New) weight @ H20 = 2.47kg / m	input value in kg (in 'conversion to tonnes' cell)	0	0	2.77	0.032	0.14946	0	0	0	0		0	
	Weld Mesh A393 weight @ 6.16kg / m2	input value in kg (in 'conversion to tonnes' cell)	172.48	0.17248	2.77	0.032	0.14946	0.4778	0.0055	0.0258	0.509067821		0.509067821	
Steel works	Stainless Steel Windposts Grade 304 weight @ 37.5kg / m	input value in meters (in 'conversion to tonnes' cell)	0	0	6.15	0.032	0.062	0	0	0	0	Steel works	0	13.5941484
	Steel General (New) weight @ 7900kg / m3 (contractor weights for materials on steel is a must)	input value in kg (in 'conversion to tonnes' cell)	4606	4.606	2.89	0.032	0.0294	13.311	0.1474	0.1354	13.5941484		13.5941484	
	Mild Steel Fencing weight @ 25kg per linear meter	input value in meters (in 'conversion to tonnes' cell)	20	0.5	1.53	0.005	0.01553	0.765	0.0025	0.0078	0.775265		0.775265	
Superstructure	Clay Brick (2000kg / m3)	input value in kg (in 'conversion to tonnes' cell)	9400	9.4	0.24	0.005	0.06575	2.256	0.047	0.6181	2.92105	Superstructure	2.92105	
	Louvers RSH5700 edition / weight @ 25kg/m2 (Assumed aluminium frame)	input value in kg (in 'conversion to tonnes' cell)	24.3	0.0243	12.79	0.032	0.1284	0.3108	0.0008	0.0031	0.31469472		0.31469472	
	Mineral wool insulation, Rockwool RW3, weight at 60kg/m3	input value in kg (in 'conversion to tonnes' cell)	0	0	1.28	0.005	0.069059	0	0	0	0		0	
	Autoclaved Aerated Concrete Block 600kg / m3	input value in kg (in 'conversion to tonnes' cell)	0	0	0.375	0.005	0.0995	0	0	0	0		0	
Roof	Timber truss weight @ 3kg / m	input value in kg (in 'conversion to tonnes' cell)	0	0	0.42	0.005	0.12847	0	0	0	0	Roof	0	
	Concrete roof tiles weight @ 3kg / m2	input value in kg (in 'conversion to tonnes' cell)	0	0	0.1	0.005	0.00123	0	0	0	0		0	
	Concrete Roof Columns weight @ 355kg / m	input value in meters (in 'conversion to tonnes' cell)	0	0	0.188	0.005	0.00211	0	0	0	0		0	
	PVC Pipes (weight @ 0.72kg / m)	input value in meters (in 'conversion to tonnes' cell)	0	0	3.23	0.005	0.172409	0	0	0	0		0	
Cable Excavation & Backfill	Soil assumed 5% cement content. 1m3 = 1.9 tonnes of clay soil. Ref: (https://coolconversion.com/volume-mass-construction/~1-cubic-meter-of-clay-soil-to-tonne)	input value in m3 (in 'conversion to tonnes' cell)	10	19	0.061	0.005	0.004452	1.159	0.095	0.0846	1.338588	Cable Excavation & Backfill	1.338588	
	Cable Ducts PVC-3 Phases -ave weight 3.3kg / m	input value in meters (in 'conversion to tonnes' cell)	88	0.2904	3.23	0.005	0.172409	0.938	0.0015	0.0501	0.989511574		0.989511574	
	Single Core Cable 33kV - 3 Phases : ave weight @ 15.6kg/m	input value in meters (in 'conversion to tonnes' cell)	22	0.3432	3.81	0.032	0.0386	1.3076	0.011	0.0132	1.33182192		1.33182192	
	Single Core Cable 6.6 / 11kV - 3 Phases : av weight @ 13.6kg/m	input value in meters (in 'conversion to tonnes' cell)	88	1.1968	3.81	0.032	0.0386	4.5598	0.0383	0.0462	4.64430208		4.64430208	
	Multicore Cable : av weight @ 1.5kg/m	input value in meters (in 'conversion to tonnes' cell)	150	0.225	3.7	0.032	0.0375	0.8325	0.0072	0.0084	0.8481375		0.8481375	
Transformers	Transformer 33kV	input value in Tonnes (in 'conversion to tonnes' cell)	38.73	38.73	2.67	0.032	0.0272	103.41	1.2394	1.0535	105.701916	Transformers	105.701916	
	Transformer 132kV	input value in Tonnes (in 'conversion to tonnes' cell)	0	0		0.16	0.00178	0	0	0	0		0	
	Transformer EAT	input value in Tonnes (in 'conversion to tonnes' cell)	0	0		0.16	0.00178	0	0	0	0		0	
Switch Gear	Protection Panels: ave weight 260kg	input quantity (in 'conversion to tonnes' cell)	2	0.52	3.03	0.16	0.03208	1.5756	0.0832	0.0167	1.6754816	Switch Gear	1.6754816	
	Switch Gear 2	input value in Tonnes (in 'conversion to tonnes' cell)	0	0		0.16	0.00178	0	0	0	0		0	
	Switch Gear 3	input value in Tonnes (in 'conversion to tonnes' cell)	0	0		0.16	0.00178	0	0	0	0		0	
	Switch Gear 4	input value in Tonnes (in 'conversion to tonnes' cell)	0	0		0.16	0.00178	0	0	0	0		0	
	Switch Gear 5	input value in Tonnes (in 'conversion to tonnes' cell)	0	0		0.16	0.00178	0	0	0	0		0	
	Switch Gear 6	input value in Tonnes (in 'conversion to tonnes' cell)	0	0		0.16	0.00178	0	0	0	0		0	

Calculation Notes:	
Weight of structural Timber (Excluding temp works):	tonnes
Weight of Temporary Timber (formworks, Assumed reuse):	tonnes
Foundation -Trench Excavations	At Length[] m x Width[] m x Depth[] m = [] m3
Cables - Trench Excavtions	At Length[] m x Width[] m x Depth[] m = [] m3
Power Cable circuit lengths	[] meter lengths

Important note:

All materials calculated in above sheet, includes only imported materials

Key:	A1-3	Calculation are based on Embodied Carbon Factors (ECF) to Extract & Manufacture the material Calculated as: Tonnes x ECF kg(CO2e/kg) = Embodied Carbon t(CO2e). Sourced IstructE
	A4	Calculation based on kg of CO2e produced by Distance travelled in km, ECF based on: Tonnes x ECF kg(CO2e/kg) = Embodied Carbon t(CO2e). Distances referenced from IStructE: Locally sourced within 50km = 0.005kg(CO2e) / Nationally Sourced within 320km = 0.32kg(COe) / European sourced within 1500km = 0.16kg(CO2e): Sourced IstructE
	A5w	Calculation based on the Waste Factor (WF) of Materials. So brick has a waste factor of 20%, Steel 1% etc...: Material WFx(Material ECF x Distance Travelled x Distance travelled forwaste material taken to landfill (C2) x CO2 used for processing disposal (C3-4) = A5w / Example, assumed waste of concrete is : 0.053 x (A1-3 x x A4 x C2 x C3-4) = A5w : Sourced IStructE
	5a	Typical assumed costat stage A1-5 of build is 50% so: 700kg(CO2e) per £100,000 so: 0.7 x (cost of build + 100,000)= Ans t(CO2e): Soruced IstructE

Key:	Designer to fill in all cells highlighted in light grey					Reference note:	Calculations & Embodied Carbon factors for materials used in the tableare sourced from the Brisa (ICE) & IstructE
	The 'Embodied Carbon t(CO2e)' cells are using a traffic light system to indicate, low-high contributing materials. Below this cell in an example of how the colour format works and what they indicate.						
	Low		Medium		High	Ref for material Embodied Carbon Factors:	A BSRIA guide: Hammond,G et al., 'Embodied Carbon', The inventory of Cabon and Energy,, (ICE).
	0	12.5	25	37.5	50		Embodied Carbon - The Inventory of Carbon and Energy. (ICE) (greenbuildingencyclopedia.uk)
	The notes table to the left can be used to help breakdown and review calculations. The structural timber values in tonnes can be used to calculate the sequestration value, this is used to calculate the amount of carbon storage throughout the builds life cycle Example: 20 tonnes of structural timer x -1.64 kg(CO2e) = -32.8t(CO2e). For more information see notes calculation A1-5 on the tab below.					Ref for calculating Embodied Carbon A1-5& Cell colour formatting:	The Institution of Structural Engineers 'How to calculate embodied carbon'.
							A brief guide to calculating embodied carbon. (Istructe.org)

