

Designer Embodied Carbon (EC) Calculation - Civil & Electrical	
Build Table Most Contributing Materials 1%>. Embodied Carbon A1-5	
Project Name:	Winifred Road
Project Scope:	T11 & T12 Replacement In Situ with plinth replacement and new enclosure walls

Project Embodied Carbon Breakdown and Totals t(CO2e):			Calculation Date:	31/07/2025
Total A1-5w	355.1658484		Project Code:	50016522
A5a	11.77		Project Completed in Financial Year:	2025
Total A1-5 t(CO2e)	366.94	Note: Total A1-5t(CO2e): Total A1-5w + A5a = Ans	Estimated Cost of Civil Build(£): (To Estimate A5a)	£1,681,697
			Structural timber: in Tonnes, (To Calculate Sequestration Value)	0.99
			Sequestration Value t(CO2e):	-1.6236

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)	196	372.4	0.061	0.005	0.004452	22.716	1.862	1.6579	26.2363248	Foundation Excavation & Backfill	26.2363248	
Foundation	Asphalt, 8% (Bitumen) binder content (by mass) weight @ 2322kg / m3	input value in m3 (in 'conversion to tonnes' cell)	0	0	0.086	0.005	0.005777	0	0	0	0	Foundation	0	
	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	
	Limestone Aggregate, 2650kg/m3	input value in m3 (in 'conversion to tonnes' cell)	132	349.8	0.005	0.005	0.001484	1.749	1.749	0.5191	4.0171032		4.0171032	
Reinforced Concrete	Ready mix concrete 32/40. 2350kg / m3	input value in m3 (in 'conversion to tonnes' cell)	63	148.05	0.132	0.005	0.008215	19.543	0.7403	1.2162	21.49908075	Reinforced Concrete	21.49908075	
	Rebar (New) weight @ H10 = 0.62kg / m	input value in kg (in 'conversion to tonnes' cell)	3617	3.617	2.77	0.032	0.14946	10.019	0.1157	0.5406	10.67543082		10.67543082	
	Rebar (New) weight @ H12 = 0.89kg / m	input value in kg (in 'conversion to tonnes' cell)	1855	1.855	2.77	0.032	0.14946	5.1384	0.0594	0.2772	5.4749583		5.4749583	
	Rebar (New) weight @ H20 = 2.47kg / m	input value in kg (in 'conversion to tonnes' cell)	1068	1.068	2.77	0.032	0.14946	2.9584	0.0342	0.1596	3.15215928		3.15215928	
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	
	Steel General (New) weight @ 7900kg / m3 (contractor weights for materials on steel is a must)	input value in kg (in 'conversion to tonnes' cell)	2156	2.156	2.89	0.032	0.0294	6.2308	0.069	0.0634	6.3632184		6.3632184	
	Mild Steel Fencing weight @ 25kg per linear meter	input value in meters (in 'conversion to tonnes' cell)	0	0	1.53	0.005	0.01553	0	0	0	0		0	
Superstructure	Clay Brick (2000kg / m3)	input value in kg (in 'conversion to tonnes' cell)	165000	165	0.24	0.005	0.06575	39.6	0.825	10.849	51.27375	Superstructure	51.27375	
	Louvers RSH5700 edition / weight @ 25kg/m2 (Assumed aluminium frame)	input value in kg (in 'conversion to tonnes' cell)	0	0	12.79	0.032	0.1284	0	0	0	0		0	
	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)	4620	4.62	0.375	0.005	0.0995	1.7325	0.0231	0.4597	2.21529		2.21529	
Roof	Timber truss weight @ 3kg / m	input value in kg (in 'conversion to tonnes' cell)	990	0.99	0.42	0.005	0.12847	0.4158	0.005	0.1272	0.5479353	Roof	0.5479353	
	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)	14.4	0.010368	3.23	0.005	0.172409	0.0335	5E-05	0.0018	0.035328017		0.035328017	
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)	0	0	0.061	0.005	0.004452	0	0	0	0	Cable Excavation & Backfill	0	
	Cable Ducts PVC weight @ 150mm dia 3.3kg / m	input value in meters (in 'conversion to tonnes' cell)	260	0.858	3.23	0.005	0.172409	2.7713	0.0043	0.1479	2.923556922		2.923556922	
	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)	300	0.45	3.7	0.032	0.0375	1.665	0.0144	0.0169	1.696275		1.696275	
Transformers	Transformer 33kV	input value in Tonnes (in 'conversion to tonnes' cell)	77.46	77.46	2.67	0.032	0.0272	206.82	2.4787	2.1069	211.403832	Transformers	211.403832	
	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 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): Sourced IstructE

Key:	Designer to fill in all cells highlighted in light grey				Reference note:
	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.				Calculations & Embodied Carbon factors for materials used in the tableare sourced from the Brisa (ICE) & IstructE
	Low		Medium		Ref for material Embodied Carbon Factors: A BSRIA guide: Hammond.G etal., 'Embodied Carbon', The inventory of Cabon and Energy., (ICE).
	0	12.5	25	37.5	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)

