

East Anglia THREE

Appendix 27.7

Construction material quantities and
associated HGV demand (Substation
Single Phase)

Environmental Statement

Volume 3

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Appendix 27.07 Construction material quantities and associated HGV demand Substation (Single Phase)

material quantities and HGV demand derived by construction consultants AECOM

Table 1

	Height to Ridge (m)	Length (m)	Width (m)	Area (m ²)
Substation Building 1	25	85	58	4,930
Substation Building 2	25	85	56	4,760
Control room	10	25	25	625
Spares storage building and MV Interface building	5	10	10	100

Table 2

Building	Item	Description	Unit Weight (kg/m ²)	Total Volume (m ³)	Total Area (m ²)	Density (kg/m ³)	Total Weight (t)	Material	Delivery	HGVs
Main Substation Building (total for 2No.)	pad foundations	5x5x1m deep RC concrete on a 29x8.5m grid plus one on each gable		1,500		2,400	3,600	Concrete	6	250
	concrete slab within building	200mm thick concrete slab	480	1,938		2,400	4,651	Concrete	6	323
		on 150mm thick type 1 sub base	285	1,454		1,900	2,762	Stone	20	138
	extra concrete plinths for equipment in building									
	perimeter ground beam	600mm deep x 400mm wide, 568m long		136		2,400	327	Concrete	6	23
	steel frame	78 kg/m ² includes secondary steel (purlins and cladding rails and door framing, and a 10% allowance for connections. Based on max 29m span and 8m bay centres, 25m ridge height.	78				756	Steel	12.5	60
	cladding	composite cladding panels 150mm thick -	10		23,890		239	Cladding	12.5	19
Total HGVs										813

Table 3

Building	Item	Description	Unit Weight (kg/m ²)	Total Volume (m ³)	Total Area (m ²)	Density (kg/m ³)	Total Weight (t)	Material	Delivery	HGVs
Control Room Building	pad foundations	2.5x2.5x0.75m RC concrete on a 25x8m grid		56		2,400	135	Concrete	6	9
	concrete slab within building	200mm thick concrete slab	480	125		2,400	300	Concrete	6	21
		on 150mm thick type 1 sub base	285	94		1,900	178	Stone	20	9
	perimeter ground beam	600mm deep x 400mm wide, 100m long		24		2,400	58	Concrete	6	4
	steel frame	70 kg/m ² includes secondary steel (purlins and cladding rails and door framing, and a 10% allowance for connections. Based on max 25m span and 8m bay centres, 10m ridge height.	70				44	Steel	12.5	4
		cladding	composite cladding panels 150mm thick -	10		6,875		69	Cladding	12.5
Total HGVs										52

Table 4

Building	Item	Description	Unit Weight (kg/m ²)	Total Volume (m ³)	Total Area (m ²)	Density (kg/m ³)	Total Weight (t)	Material	Delivery	HGVs
Spares storage building and MV Interface building	pad foundations	1.5x1.5x0.6m RC concrete on a 10x5m grid		16		2,400	39	Concrete	6	3
	concrete slab within building	200mm thick concrete slab	480	40		2,400	96	Concrete	6	7
		on 150mm thick type 1 sub base	285	30		1,900	57	Stone	20	3
	perimeter ground beam	600mm deep x 400mm wide, 100m long		10		2,400	46	Concrete	6	2
	steel frame	65 kg/m ² includes secondary steel (purlins and cladding rails and door framing, and a 10% allowance for connections. Based on max 25m span and 8m bay centres, 10m ridge height.	65				13	Steel	12.5	2
	cladding	composite cladding panels 150mm thick -	10		1,200		12	Cladding	12.5	1
									Total HGVs	17

Table 5

Building	Item	Description	Unit Weight (kg/m ²)	Total Volume (m ³)	Total Area (m ²)	Density (kg/m ³)	Total Weight (t)	Material	Delivery	HGVs
External blast walls	9No. Blast walls between transformers	9m high x 11m long x 300mm thick blast walls		30		2,400	71	Concrete	6	5
									Total HGVs	5

Table 6

Building	Item	Description	Unit Weight (kg/m ²)	Total Volume (m ³)	Total Area (m ²)	Density (kg/m ³)	Total Weight (t)	Material	Delivery	HGVs
plinth for external plant	cooler plinths x 2	2no. 28m x 14m x 300mm thick	720	235	784	2,400	564	Concrete	6	39
	AHU plinths	8No. 12m x 4m x 300mm thick	720	115	384	2,400	276	Concrete	6	19
	Generator plinth	6m x 12m	720	22	72	2,400	52	Concrete	6	4
	2No. Plinths either side of control room	2No. 14x6m	720	50	168	2,400	121	Concrete	6	8
	plinth for 3 transformers	45x11m x 300mm thick	720	149	495	2,400	356	Concrete	6	25
	plinth for 4 transformers	62x11m x 300mm thick	720	205	682	2,400	491	Concrete	6	34
	type 1 beneath all plinths	150mm thick	285	388	2,585	1,900	737	Stone	20	37
									Total HGVs	166

Table 7

Building	Item	Description	Unit Weight (kg/m ²)	Total Volume (m ³)	Total Area (m ²)	Density (kg/m ³)	Total Weight (t)	Material	Delivery	HGVs
concrete hardstanding access road	200mm thick concrete		480	1,000	5,000	2,400	2,400	Concrete	6	167
	on 200mm thick type 1 sub base		285		5,000	1,900	1,425	Stone	20	71
									Total HGVs	238

Table 8

Building	Item	Description	Unit Weight (kg/m ²)	Total Volume (m ³)	Total Area (m ²)	Density (kg/m ³)	Total Weight (t)	Material	Delivery	HGVs
car parking	2No. 15x4.8m	block pavers 75mm		11	144	2,000	22		12.5	2
		single size stone subbase 600mm		86		1,500	130	Stone	20	6
									Total HGVs	8

Table 9

Grand total deliveries	1,300
Grand total (two-way movements)	2,599

Exclusions

- kerbing to road/slab edges
- Surfacing to switchgear area or any other areas out with the concrete hardstanding access road. Could be either concrete slab, gravel over type1 sub base, or grass ?
- Domestic electrical and mechanical services in the buildings (fire alarms, lighting, toilet and welfare facilities)
- Roof drainage, surface water drainage should be SuDs scheme with soakaway or controlled discharge to river.
- foul drainage from welfare/ cooling systems - either septic tank or mains sewer connection
- No allowance has been made for soil excavation or removal of arisings from foundation excavations.

Table 10

Electrical Equipment								
QTY	Description	Dimensions / unit	Weight/unit (t)	total weight (t)	Units per HGV	HGV Gross Weight	HGV Deliveries	Abnormal Loads
7	transformers	12m x 5m x 10m	350	2,450	1	350	0	7
2	Auxiliary transformers	5m x 2m x 2m	10	20	1	10	2	
400	Pallets/Crates for shipping Converter valve Modules (assembled on site)	2.5m x 2.5m x 2m	2	800	6	12	67	
200	Valve coolers (condenser / fans) modules	1.5m x 1.5m x 2m	0.50	100	8	4	25	
8	Air handling units	2m x 2m x 1m	1	8	6	6	2	
20	AC Reactors	4m x 3m diam	1	20	6	6	4	
8	DC Smoothing Reactors (air cooled)	10m x 3m diam	1.50	12	4	6	2	
4	DC wall Bushings	8m x 0.4m diam	1	4	4	4	1	
60	DC Insulator assemblies	8m x 0.3m diam	0.50	30	15	7.50	4	
60	AC Insulator assemblies	3m x 0.3m diam	0.25	15	30	7.50	2	
60	steel columns (for insulator assemblies)	2m x 0.3m diam	0.25	15	30	7.50	2	
60	steel columns (for insulator assemblies)	8m x 0.3m diam	0.75	45	15	11.25	4	
10	Switch board assemblies	5m x 0.8m x 2m	2	20	2	4	5	
20	Control panel assemblies	1m x 0.6m x 2m	0.25	5	4	1	5	
24	HPL Compact Breaker + 2 disconnect switch	12m x 0.4m diam	0.75	18	12	9	2	
20	HV horizontal line disconnect switch	12m x 0.4m diam	0.25	5	12	3	2	
20	HV vertical break feeder disconnect switch	12m x 0.4m diam	0.25	5	12	3	2	
12	AC Filters	10m x 5m diam	1	12	2	2	6	
6	Capacitor Banks	10m x 5m diam	1	6	2	2	3	
1	Water Booster set	2m x 2m x 1m	1	1	1	1	1	
1	Emergency Diesel Generator 1MVA	5m x 2m x 2.5m	10	10	1	10	1	
2	Emergency Diesel Fire Pumps 300 hp	1.5m x 2m x 0.5m	16	32	1	16	2	
7	DC Smoothing Reactors (air cooled)	4m x 3m diam	8	56	2	16	4	
24	CT's	4.5m x 0.6m diam	0.50	12	12	6	2	
20	VT's	4.5m x 0.6m diam	0.50	10	10	5	2	
Grand total deliveries							152	7

Appendix 27.7 ends here