

Appendix 16A: Greenhouse Gas Calculations

Table 16A.1: Vehicle Emissions

Conversion factors

Cars	0.17
HGVs	3.00

Site	Km Travelled to site	Additional Cars	CO2e for Cars	Additional HGVs	Co2e for HGVs	Total CO2e
XC187 Fantstown	38.80	-	-	-	-	-
XC201 Thomastown	40.20	54.00	361.16	32.00	3,859.20	4,220.36
XC209 Ballyhay	40.10	-	-	-	-	-
XC211 Newtown and XC212 Ballcoskery	41.17	54.00	369.87	34.00	4,199.34	4,569.21
XC215 Shininagh	44.13	52.00	381.78	32.00	4,236.48	4,618.26
XC219 Buttevant	50.73	54.00	455.76	34.00	5,174.46	5,630.22
Totals	255.13	214.00	1,568.56	132.00	17,469.48	19,038.04

Table 16A.2: Materials Emissions

Material	Units	Unit to kg Conversion	kgCO2 per kg Conversion Factor	Quantities										Totals			
				XC 201	Kg CO 2e	XC 211	Kg CO 2e	XC 212	Kg CO 2e	XC 215	Kg CO 2e	XC 219	Kg CO 2e	Units	kgCO2e	MtCO2e	

Material		Units	Unit to kg Conversion	kgCO2 per kg Conversion Factor	Quantities										Totals		
Demolition	Demolition of existing station building	m3				-		-	190.00	-		-		-		-	-
	Demolition of existing station shed	m3				-		-	710.00	-		-		-		-	-
Fencing	Timber post and tension mesh stud fence, 1220mm high in accordance with CC-SCD-00321 (mesh to be Zinc Aluminium Alloy)	m		Not available	1,058.00	-	233.00	-	462.00	-	1,523.00	-	585.00	-	3,861.00	-	-
	Single steel field gate, 4000mm wide and 1225mm high as per TII CC-SCD-00309	No.	298.08	2.13	4.00	2,539.64		-	1.00	634.91	2.00	1,269.82	3.00	1,904.73	10.00	6,349.10	-
Safety Barriers	Safety Barrier, containment level H4a, impact severity level B, working width class W3, designed to be impacted on one side only, straight or curved exceeding 120m radius	m	Materials tbc	tbc	225.00	-		-	237.00	-		-	181.00	-	643.00	-	-
	Safety barrier, containment level N2, impact severity level A, working	m	Materials tbc	tbc	517.00	-		-	166.00	-	2,132.00	-	301.00	-	3,116.00	-	-

Material	Units	Unit to kg Conversion	kgCO2 per kg Conversion Factor	Quantities										Totals			
	width class W3, designed too be impacted on one side only, straight or curved exceeding 120m radius																
	Pedestrian Guard Rail		Materials tbc	tbc		-		-	272.00	-		-	56.00	-	328.00	-	-
	Pedestrian guardrail to road bridge	m	Materials tbc	tbc	49.00	-		-	49.00	-		-	56.00	-	154.00	-	-
Drains and Service Ducts	300mm pipe; PCV; 1-2m deep	m	0.63	4.38	60.00	165.68	11.00	30.37	508.00	1,402.74	80.00	220.90	722.00	1,993.65	1,381.00	3,813.34	0.00
	Gullies	No.	Materials toc	tbc		-		-		-		-	20.00	-	20.00	-	-
	Filter drain	m	Materials toc	tbc	785.00	-	4.00	-	108.00	-	1,830.00	-		-	2,727.00	-	-
	Filter drain; bridges	m	Materials toc	tbc	110.00	-	2.00	-	130.00	-		-	180.00	-	422.00	-	-
	Manhole Type C 1.5m deep, 1.05m dia as per TII standard CC-SCD-00502.	No	N/A	1,086.00	16.00	17,376.00	3.00	3,258.00	16.00	17,376.00	18.00	19,548.00	14.00	15,204.00	67.00	72,762.00	0.07

Material	Units	Unit to kg Conversion	kgCO2 per kg Conversion Factor	Quantities										Totals		
Catchpit		Materials toc	tbc		-		-	10.00	-		-		-	10.00	-	-
Interceptor ditch headwall to 300mm pipe, as per TII standard CC-SCD-00553.	No	Materials toc	tbc	5.00	-		-	3.00	-	8.00	-	2.00	-	18.00	-	-
Imported Fill																
Imported acceptable material	m3	1,700.00	0.02	9,228.00	266,689.20		-	17,812.00	514,766.80	8,964.00	259,059.60	17,403.00	502,946.70	53,407.00	1,543,462.30	1.54
Imported topsoil Class 5B	m3		N/A	2,497.00	-	514.00	-	2,172.00	-	5,036.00	-	2,325.00	-	12,544.00	-	-
Reinforced earthwork	m3		N/A	2,976.00	-		-	8,256.00	-		-	2,369.00	-	13,601.00	-	-
6N/6P material	m3		N/A	137.00	-		-	215.00	-		-	215.00	-	567.00	-	-
Class 1/2 material	m3		N/A	137.00	-		-	215.00	-		-	215.00	-	567.00	-	-
Pavement Carriageways																
Sub base granular material type B Clause 804 sub-base, 150mm depth	m3	1,700.00	0.02	-	-	-	-	-	-	-	-	404.00	11,675.60	404.00	11,675.60	0.01
Base AC 32 HDM bin 40/60 des, asphalt concrete dense base, aggregate size	m2	1,940.00	0.03	-	-	-	-	-	-	-	-	2,693.00	14,314.91	2,693.00	14,314.91	0.01

Material	Units	Unit to kg Conversion	kgCO2 per kg Conversion Factor	Quantities										Totals			
	32mm 40/60 pen bitumen, 100mm thick.																
	Binder course AC 20 HDM bin 40/60 des, asphalt concrete dense binder, aggregate size 20mm 40/60 pen bitumen, 60mm thick.	m2	1,940.00	0.03	-	-	-	-	-	-	-	-	2,693.00	8,588.95	2,693.00	8,588.95	0.01
	Surface course, HRA 35/14 C surf 40/60 des, hot rolled asphalt 35/14 C 40/60 pen bitumen, 40mm thick, PSV 55.	m2	2,300.00	0.35	-	-	-	-	-	-	-	-	2,693.00	86,615.50	2,693.00	86,615.50	0.09
Pavement Local Access Road	Sub base granular material type B Clause 804 sub-base, 150mm depth	m3	1,700.00	0.02	409.00	11,820.10	135.00	3,901.50	920.00	26,580.00	1,220.00	35,258.00	129.00	3,728.10	2,813.00	81,295.70	0.08
	Base AC 32 HDM bin 40/60 des, asphalt concrete dense base, aggregate size 32mm 40/60 pen bitumen, 100mm thick.	m2	1,940.00	0.03	2,729.00	14,627.50	901.00	4,736.00	6,134.00	32,605.90	8,136.00	43,247.20	858.00	4,560.78	18,758.00	99,710.02	0.10

Material		Units	Unit to kg Conversion	kgCO2 per kg Conversion Factor	Quantities									Totals			
	Binder course AC 20 HDM bin 40/60 des, asphalt concrete dense binder, aggregate size 20mm 40/60 pen bitumen, 60mm thick.	m2	1,940.00	0.03	2,729.00	8,703.76	901.00	2,873.61	6,134.00	19,156.33	8,136.00	25,948.63	858.00	2,736.47	18,758.00	59,826.01	0.06
	Surface course, HRA 35/14 C surf 40/60 des, hot rolled asphalt 35/14 C 40/60 pen bitumen, 40mm thick, PSV 55.	m2	2,300.00	0.35	2,729.00	87,773.37	901.00	28,974.04	6,137.00	19,738.56	8,136.00	26,167.80	858.00	27,596.03	18,761.00	603,413.80	0.60
Pavement Local Field Access road	Sub base granular material type B Clause 804 sub-base, 150mm depth	m3	1,700.00	0.02	23.00	664.70	-	-	37.00	1,069.30	71.00	2,051.90	129.00	3,728.10	260.00	7,514.00	0.01
	Surface course, AC 14 close surf 70/100 des, asphalt concrete surface course system, aggregate size 14mm 70/100 pen bitumen, 55mm thick, PSV 55 in field accesses.	m2	2,300.00	0.35	150.00	4,824.48	-	-	244.00	7,847.82	472.00	15,181.03	555.00	17,850.58	1,421.00	45,703.91	0.05

Material		Units	Unit to kg Conversion	kgCO2 per kg Conversion Factor	Quantities										Totals		
Footways and Paved Areas	concrete footway 100mm thick to clause 1106 on 100mm subbase in accordance with CC-SCD-01105.	m2	2,100.00	0.06	-	-	-	-	2,191.00	55,213.20	221.00	5,569.20	-	-	2,412.00	60,782.40	0.06
	Paved areas, tactile paving flagstones, 50mm in thickness, 400mm x 400mm, 5mm corduroy typical depth; buff in colour; surfaces sloping at 10° or less to the horizontal.	m2	2,500.00	0.10	-	-	-	-	10.00	0.21	-	-	-	-	10.00	0.21	0.00
Kerbs, Channels, Edgings, Combined Drainage and Kerb Blocks and Linear Drainage Channel Systems	precast concrete kerb; carriageway	m	2,500.00	0.10	-	-	-	-	-	-	-	-	856.00	22,042.00	856.00	220,420.00	0.22
	precast concrete kerb; local access road	m	2,500.00	0.10	1,168.00	30,076.00	443.00	11,407.50	1,403.00	36,127.50	2,694.00	69,370.00	348.00	89,610.00	6,056.00	1,559,420.00	1.56
	precast concrete kerb; field access road	m	2,500.00	0.10	53.00	13,640.00	-	-	91.00	23,430.00	159.00	40,940.00	232.00	59,740.00	535.00	137,762.50	0.14

Material	Units	Unit to kg Conversion	kgCO2 per kg Conversion Factor	Quantities										Totals				
						7.50						2.50		2.50		0.00		
	precast concrete kerb; concrete footway	m	2,500.00	0.10	-	-		-	1,727.00	44,702.50		-	261.00	67,207.50	1,988.00	511,910.00	0.51	
	Precast concrete drop kerb 25 to 0-6mm	No.	2,500.00	0.10	-	-		-	4.00	1,030.00		-		-	4.00	1,030.00	0.00	
Traffic Signs	Permanent retroreflective traffic sign to Figure RUS027 (Stop sign) of the Traffic Signs Manual as non-Lit sign face exceeding 0.5 square metre but not exceeding 0.75 square metre in area on 1 No.	No.	tbc	tbc	6.00	-	1.00	-	16.00	-	15.00	-	12.00	-	50.00	-	-	

Material	Units	Unit to kg Conversion	kgCO2 per kg Conversion Factor	Quantities										Totals			
3.1m long 76.1mm dia. with 3.0mm wall thickness Tubular steel post on 1 No. 0.433 m3 concrete foundation.																	
Road bridge & Special Structures	Concrete pre-cast beams	No	17,000.00	0.10	14.00	24,514.00	-	-	14.00	24,514.00	-	-	14.00	24,514.00	42.00	73,542.00	0.07
	Piling to bridge	No	2,500.00	0.10	TBC	-	-	-	-	-	-	-	-	-	#VALUE!	-	-
	Box culvert for river; 40,000 x 6,000 x 3,500mm	No	Need thickness of culvert wall			-		-		-		-	1.00	-	1.00	-	-
	Box culvert for ditch /floodwater;	No	Need thickness of			-		-		-		-	1.00	-	1.00	-	-

Material	Units	Unit to kg Conversion	kgCO2 per kg Conversion Factor	Quantities										Totals			
	24,000 x 3,500 x 3,500mm		culvert wall														
	Precast box culvert for access road; 13,500 x 6,000 x 5,500mm	No	Need thickness of culvert wall		-		-		-		-	1.00	-	1.00	-	-	
	Retaining Wall	m2	2,500.00	0.10	-		-	660.00	50,985.00		-	172.00	13,287.00	832.00	64,272.00	0.06	
Lighting	10m nominal height steel road lighting column with planted base, post-top mounted full cut off luminaire incorporating 150w SON/T+ lamp	No	tbc	tbc	-	-	-	21.00	-	-	-	-	-	21.00	-	-	

Material	Units	Unit to kg Conversion	kgCO2 per kg Conversion Factor	Quantities											Totals		
& electronic control gear.																	
1 no. 125mm external diameter red public lighting duct and cable	m	tbc	tbc	-	-	-	-	593.00	-	-	-	-	-	-	593.00	-	-
public lighting cable access chamber, 1.1m x 1.1m external dimensions, blockwork construction.	No.	tbc	tbc	-	-	-	-	13.00	-	-	-	-	-	-	13.00	-	-
Blockwork	Blockwork wall to CC-SCD-02401, 1.6m tall	m2	2,500.00	0.10	-	-	-	60.00	4,635.00	-	-	-	-	-	60.00	4,635.00	0.00
	TOTALS				75	15	1,7	1,4	1,1	5,278,81	5.27	3,9	7,9	85,02	03,68	78,22	9.25

Appendix 16A: Greenhouse Gas Calculations

Material	Units	Unit to kg Conversion	kgCO2 per kg Conversion Factor	Quantities				Totals
				84.71	04.39	5.46	2.10	2.59

Table 16A.3: Combined Emissions

Ireland emissions & Targets	MtCO2e
2018 emissions	60.93
2018 ED Emissions	45.40
2018 ESD Target	39.80
2020 ESD Target	37.60

Site	Vehicle emissions kgCO2e	Materials	Planting	Totals	MtCO2e
XC187 Fantstown	0.00	0.00		0.00	0.00
XC201 Thomastown	4220.36	753984.71		758205.06	0.76
XC209 Ballyhay	0.00	0.00		0.00	0.00
XC211 Newtown	4569.21	157904.39		162473.60	0.16
XC212 Ballcoskery		1785025.46		1785025.46	1.79
XC215 Shininagh	4618.26	1403682.10		1408300.36	1.41
XC219 Buttevant	5630.22	1178222.59		1183852.81	1.18
Totals	19038.04	5278819.25	-2689900.00	2607957.29	2.61