Annex 1 Methodology Used in Calculating GHG Emissions for each activity

Factor and How Calculated	Conversion Factor Used and how calculation accuracy could be improved.
GHG emissions from Electricity Usage at Exmouth Town Hall EPC of Exmouth Town Hall 2019 gives 59 kWh oer m2 of electricity per year. ETC provided figures of 186m^2 occupied by ETC. The two multiplied by conversion factor give 2710kgCo2e. Errors in this figure will be around sharing out emissions from shared facilities (eg toilets, council chamber) and differences in energy for different floor space use.	DEFRA GHG Conversion Factors 2019 Mains Electricity 0.2556 kgCO2e/kWh for mains electricity Figure could be improved by: Better sub-metering of electricity use. Conversion factor that represents GHG emissions for the electricity purchased by the supplier.
GHG emissions from gas usage for heating and DHW at Exmouth Town Hall. EPC of Exmouth Town Hall 2019 gives 93 kWh oer m2 of gas per year. ETC provided figures of 186m^2 occupied by ETC. The two multiplied by conversion factor give 3181kgCo2e. Errors in this figure will be around sharing out emissions from shared facilities (eg toilets, council chamber) and differences in energy for different floor space use	DEFRA GHG Conversion Factors 2019 Natural Gas 0.18395kgCO2e/kWh Figure could be improved by: Better sub-metering of gas use.
GHG emission from water usage for water usage at Exmouth Town Hall. Envirowise figures from 2006 gave a typical office water usage figure per person per day of 35 litres. The author has noted that in audits he has carried out that this figure is now more like 30 litres per day typical. This figure has been arrived at by 10 people working 200 days x 30 litres multiplied by the conversion figures for water in and wastewater out from DEFRA to give 63kg CO2e. Errors in this figure will be from using the estimate of usage and also the number of people per day as this has not taken account of part-time workers. These errors will be offset by the fact that visitors and councillors have not been taken into account.	DEFRA GHG Conversion Factors 2019 Water In: 0.344kgCO2e/cu.m Wastewater Out: 0.708 kg CO2e/cu.m Figure could be improved by: Better submetering of water usage. Conversion figures for South West Water. Look at actual % of water in that ends up as wastewater.
GHG emission for electricity usage at Gorfin Hall. January 2019-2020 data supplied by ETC multiplied by DEFRA GHG conversion factor for mains electricity. This gives a figure of 3189 kgCO2e per year	DEFRA GHG Conversion Factors 2019 Mains Electricity 0.2556 kgCO2e/kWh for mains electricity

	Figure could be improved by: Conversion factor that represents GHG emissions for the electricity purchased by the supplier.
GHG for water usage at Gorfin Hall over 9 months was 94cu.m. Annualised this gives 125 cu.m per year. Multiplication by the conversion factor gives 132kgCO2e per year	DEFRA GHG Conversion Factors 2019 Water In: 0.344kgCO2e/cu.m Wastewater Out: 0.708 kg CO2e/cu.m Figure could be improved by: Annual metering of water usage. Conversion figures for South West Water. Look at actual % of water in that ends up as wastewater. figures for South West Water. Look at actual % of water in that ends up as wastewater.
GHG Emission Associated with councillor travel to meetings. The distance of the centrepoint of each ward from Exmouth Town Hall by road was calculated using Google maps. This figure was multiplied by the number of councillors for each ward. This gave an average round trip of 3.4 miles It was assumed that 75% of councillors would make a special trip by car for meetings. The other 25% did not incur GHG emissions to travel to meetings either through cycling, car-sharing or walking. Numbers attending meetings and frequency of meetings was given by ETC as follows: Full 24 members, 12 times per year Planning 11 councillors 24 times per year Finance 11 councillors 4 times per year Others 7 councillors 68 times per year It was assumed that the councillors would travel in medium sized passenger cars. This gives 779kg CO2e oer year.	DEFRA conversion factors 2019 Medium car unknown fuel 0.28502kgCO2e per mile Conversion factor for average medium sized passenger car Figure could be improved by better understanding of modality of travel to meetings, exact mileages travelled, types of vehicle travelled in. This figure will have a very large margin of error.
GHG Emissions associated with use of ETC Vans ETC has two vans: A VW Caddie Van of unknown specification A DFSD Flat Bed Van of unknown specification ETC provided fuel usage figures for the vans as follows: Caddie – 534 litres for 9 months	DEFRA GHG Conversion Factors 2019 – Average biofuel blend diesel (Forecourt fuel). 2.5911 kgCO2e per litre of fuel. This calculation gives no indication of GHG efficiency of the vehicle (ie how kgCo2e emitted per mile for each vehicle)

Flat Bed - 606 litres for 9 months The figures were annualised and then multiplied by the DEFRA Conversion factor for 100% mineral diesel per litre to give: Caddie Van – 1847kg CO2e per year DFSD Van – 2096kg CO2e per year	
GHG emissions from Employee Travel to Work From discussions with ETC it was believed that 4 employees regularly drive to work. If an average round trip of 6 miles for 200 days per year taken solely to get the employee to work is taken in a medium car of unknown fuel this gives 1368kg CO2e per year.	DEFRA GHG Conversion Factors 2019 Medium passenger car of unknown fuel – 0.28502 kgCo2e per mile This figure has a very large margin of error and could be improved by surveying staff modes and frequencies of travel to work and the distance associated with that journey.
Embedded GHG Emissions associated with the ownership of the vehicles. Exact figures for different kinds of vehicles are difficult to come by. Mike Berner-Lee in his 2010 book "How Bad are Bananas?" gave an estimate that a Citroen C1 had a GHG footprint of 6 tonnes CO2e, a Ford Mondeo 17 tonnes CO2e and a Range Rover Discovery 35 tonnes CO2e. An estimated lower end figure of 10 tonnes for each ETC owned vehicle has been applied and this has been discounted to 10% per year assuming a 10 year lifespan with ETC. It is assumed that the vehicle is then sold 2nd hand and used further.	Mike Berners-Lee 2010 This figure is a conservative estimate and could be improved with vehicle OEM data and data on expected lifetime of the vehicle. The margin of error on this fig
GHG Emissions associated with travel on behalf of ETC ETC provided figures for cost of car and train travel for 2019 as follows: Car: £1558 Train: £342 It was assumed that car travel was remunerated at 45p per mile and that 3462 miles were travelled. It was assumed that average rail travel is 25p per km (author's own calculations) and that 1368 km had been travelled by train. Conversion Factors were applied giving: Car Travel: 1007kgCo2e per annum Train Travel 57kgCO2e per annum	DEFRA GHG Conversion Factors 2019 Medium Car Travel of Unknown Fuel 0.29082 KgCo2e per mile Rail Travel 0.04115 KgCo2e per km Figure could be improved by recording type of car that travel was undertaken in and whether car sharing took place. Rail journey mileages and destinations would improve the accuracy

GHG Emissions from External Printing of Neighbourhood Plan A figure from Mike Berners-Lee's 2010 *How Bad are Bananas?* for book printing of 1kg CO2e per kilo of paper was used. Each Neighbourhood plan weighs 510g and there was a print run of 100 giving 51kg and a total GHG emission of 51kgCO2e	Mike Berners-Lee (2010)
GHG Emissions from Flowers This figure in particular needs a health warning but is included as there are potentially large scope for improvement and could theoretically achieve a GHG saving. Figures were taken from a study into the environmental life cycle impacts of the growing of ornamental bedding plants in Northern Italy. Lazzerini G., Luchetto S. et al. *Analysis of greenhouse gas emissions from ornamental plant production: A nursery level approach*. Urban Forestry & Urban Greening 13(3) · December 2014 This study found that GHG emissions from nurseries growing high density ornamental plants (9-15cm dimeter pots) had higher GHG than lower density plants. GHG emissions were much lower field grown than container grown. Plants typically sequester CO2 and it is possible to achieve an overall GHG net benefit with the right conditions. It was assumed that plants were grown at 30 per m2 and that emissions of 30 tonnes per Ha per year were typical with 87% of this being sequestered by the plants. These were typical figures for nurseries in the Italian study. ETC reported that they purchased 2000 plants in summer and 2560 in winter giving a total of 4560. This gives a figure of 595kg CO2e per year	Lazzerini G., Luchetto S. et al. *Analysis of greenhouse gas emissions from ornamental plant production: A nursery level approach*. Urban Forestry & Urban Greening 13(3) · December 2014 It is likely that this figure could be *very* wrong and the true figure could be negative (ie a net GHG benefit). However it is unlikely that it is a magnitude out and so represents a useful starting point. To get a more accurate figure the following figures would need to be known: Container or Field Grown Energy supplied to Greenhouse per m2 and from what source Water supplied to Greenhouse per m2 Planting density GHG of compost used and how much compost used GHG of pots and packaging Chemicals used per m2
GHG from Paper Usage ETC reported that they use 110 reams of paper per year. A ream of paper weighs 2.5kg. Conversion factor for mixed virigin/recycled gives 646kg CO2e per year	Berners Lee (2010) 1 tonne of paper - 80% virgin 20% recycled has a footprint of 2350kg CO2e Accuracy could be improved by knowing paper Manufacturer's GHG emissions.

GHG from Herbicide Usage The conversion figure is a guesstimate based on the GHG emissions of similar refined petrochemicals. It was reported that ETC use 5 litres of glyphosate style weedkiller per year. Many studies have been sponsored looking at the positive GHG emissions impacts of glyphosate based on the fact that it leads to higher crop yields and fewer pesticides being sprayed. In the context of ETC though it is being used to remove weeds. This has an impact on sequestered carbon. The impact is difficult to calculate as, when the plant dies some carbon remains sequestered in woody material. With systemic herbicides these will also kills entire plants unlike mowing or grazing which will kill only leaves and stems. 5 l of glyphosate is enough to treat 3-5ha of land which could be as much as 7 tonnes of GHG sequestration lost. This is beyond the scope of this report but needs consideration.	Likely to have a low level of accuracy Accuracy could be improved by: Knowing the actual herbicide used Knowing the GHG emissions associated with production of that herbicide. Understanding how the herbicide is used – eg what types of habitat is it used on?
GHG from In-House Printing A figure from Mike Berners-Lee's 2010 How Bad are Bananas? for book printing of 1kg CO2e per kilo of paper was used. By taking the number of reams used (500 sheets of paper) and a standard weight (80 grammes per square metre) a total weight of paper was calculated.	Likely to have a low level of accuracy. Different printers will have different GHG emissions. Also the electricity used for the printer has already been accounted for in ETH electricity usage. Accuracy could be improved by knowing the make and model of printer and asking the manufacturer for GHG emissions per impression.
GHG emissions from fuel use at Exmouth Festival A figure for burning of standard 95% mineral Diesel was used and multiplied by the number of litres of diesel billed by the hire company (189 litres). Out of interest the diesel generator burns ¼ of the annual diesel use by one of the vans in just a few days.	DEFRA GHG Conversion Factors 2019 Liquid Fuels "Average Biodiesel Blend" (This is what is available at most forecourts) 2.59411kgCO2e per litre of fuel Reasonable level of accuracy
GHG emissions from waste generated in ETH It was guesstimated that ETC dispose of 2 black bin bags of rubbish a week and that these weigh 5kg each. This gives 520 kg of waste disposed of per year. Waste is sorted at the waste depot before being recycled or incinerated.	DEFRA GHG Conversion Factors 2019 1 tonne of waste recycled or incinerated generates 21.354kgCO2e This figure is likely to have fair to middling accuracy. The conversion figure is an average for the whole UK and factors such as distances to waste depots and incinerators will influence this figure.

A figure from DEFRA conversion factors for closed-loop, open-loop and incineration are all the same so the total weight of waste diposed of was multiplied by this figure.	