Appendix 6

Will the decision/proposal impact…	Impact	If an impact or potential impacts are identified			
		Describe impacts or potential impacts on emissions from the Council and its contractors.	Describe impact or potential impacts on emissions across Rotherham as a whole.	Describe any measures to mitigate emission impacts	Outline any monitoring of emission impacts that will be carried out
Emissions from non-domestic buildings?	Decreases emissions	Buildings which accounted for nearly half of annual gas use in 2022/23 are within scope of the Council's 3B and 3C Public Sector Decarbonisation Scheme (PSDS) funding bids. Replacing gas boilers with e.g., a heat network connection or air source heat pumps may cut annual greenhouse gas emissions from heating by 36%, by 2030. In 2022/23, 36% of emissions from gas heating was equal to 634 tCO_2e.			Greenhouse gas emissions from heating are monitored for all buildings within the Council's energy procurement portfolio. Schools, academies and gas-fuelled district heat networks are outside the scope of NZ30 emissions; emissions from other buildings are reported annually.
Emissions from transport?	Decreases emissions	Of 119 corporate fleet vehicles to be procured through the Council's Fleet Replacement Plan, 64 will be battery electric vehicles. These vehicles' operational carbon impact may be 70% less than petrol or	Installing cycleways and prioritising buses are intended to facilitate a mode shift from driving to active travel and public transport. However, people's travel choices are constrained by other factors: longer		Emissions from corporate fleet vehicles are within scope of the Council's NZ30 accounting: NZ30 emissions are published annually.

		diesel equivalents', by 2030. Greenhouse gas conversion factors published by the Department for Energy Security and Net Zero set carbon dioxide emissions from biofuels to zero, to account for CO_2 absorbed by fast-growing biofuel sources. Methane and nitrous oxide are not absorbed in the same way and organisations must still estimate tailpipe CO_2 emissions from biofuels, outside the scope of their emissions accounting. However, if HVO biodiesel had replaced conventional diesel across the Council's corporate fleet in 2022/23, then total NZ30 emissions might have been cut by 29%.	journeys are harder to make on foot or bicycle. Car journeys between 0 and 5 km (0 - 3.1 miles) are responsible for 5% of all greenhouse gas emissions from transport in the Borough of Rotherham. Similarly, the Council's investment in EV charging infrastructure is intended to facilitate a transition to battery electric vehicles. In the 2022/23 reporting year, EV charging on the Council's public network saved 110 - 150 kg CO_2e, compared with the same mileage in petrol or diesel cars.		Emissions from travel in Rotherham are monitored by the Department for Net Zero and Energy Security. A South Yorkshire regional transport model (SCRTM1) provides greater local resolution, but the carbon impact of the Council's cycleways and bus priority schemes are too small to be detected in these statistics. Greenhouse gas emissions from electricity use in the Council's EV charging network are monitored and reported as scope 3 emissions.
Emissions from waste, or the quantity of waste itself?	Decreases emissions	Paper and card recycling has been introduced for existing business waste customers, including internal customers such as Council offices. Separate collections of	In 2022/23, kerbside collections of Rotherham households' paper and card (PC) and dry mixed recycling (DMR) were 14.5% and 19.2% contaminated by weight (annual mean		Scope 3 emissions from the Council's own waste are estimated from weight analysis of Business Waste collections, pro-rated by internal customers'

		‘dry mixed recycling’ will be introduced in 2024/25, as per the proposed Climate Change Action Plan (Appendix 2). Generic greenhouse gas conversion factors for recycling are 21.28 $kgCO_2e$ per tonne of material, compared with 23.91 $kgCO_2e$ per tonne of contract waste processed at the BDR Waste Treatment Facility. Recycling material recovered from residual waste at the BDR Waste Treatment Facility may be more contaminated than recycling material which has been collected separately, which is not reflected in the conversion factors above.	average). DMR contamination includes fines which are by-produced in the recycling process: contamination due to households’ recycling choices may be closer to 11.8%. In the same year, 13.2% by weight of residual waste collected from households in Barnsley, Doncaster and Rotherham could have been recycled, in local authorities’ respective kerbside recycling collections. Recycling material is recovered from residual waste at the BDR Waste Treatment Facility, but material which has not been sorted at the kerbside is more likely to be contaminated. If a communications campaign and contamination policy review help households to ‘put the right thing in the right bin’ then the 2024/25 Climate Change Action Plan could have a positive carbon impact, by increasing the amount of		contracted waste capacities. Contamination of household kerbside recycling collections is monitored internally by Waste Management. Composition of Barnsley, Doncaster and Rotherham households’ waste is reported annually, in the BDR Annual Report. Carbon emissions which might be avoided through decreased contamination of households’ kerbside recycling material are mainly outside the Council’s NZ40 emissions scope boundary. In local authority greenhouse gas emissions statistics published by the Department for Energy Security and Net Zero, emissions from energy use are allocated by end-user, but other emissions are allocated according to where they are produced. Avoided carbon emissions from

			valid material being recycled in Rotherham. Recycling avoids greenhouse gas emissions from primary material extraction and manufacturing: a 10% cut in contamination (equivalent to 296 tonnes of waste, over P&C and DMR recycling streams) matched by an additional 296 tonnes of valid material being recycled could avoid 100 tCO_2e.		primary material extraction and manufacturing will mainly affect emissions in other local authority areas and overseas.
Emissions from housing and domestic buildings?	Decreases emissions		Improving the energy performance of Council-owned homes, to at least EPC band C by 2030, may cut greenhouse gas emissions from domestic energy use in Rotherham. Retrofit works completed at the Lanes, East Dene cut annual greenhouse gas emissions by 1.51 tCO_2e mean average per property, or 36.65%. At the 2021 Census, 16.7% of all households living in Rotherham rented from the Council.		Council-owned homes are monitored after the completion of retrofit works, to measure changes in their energy performance and estimated carbon savings. Works have been completed at 130 and 217 properties, in Maltby and East Dene respectively. Emissions from domestic energy use are within scope of local area emissions statistics published by the Department for Energy Security and Net Zero, however the number of

			Funding to improve homes' energy performance in the owner occupied and private rented sectors is available through the Energy Company Obligation (ECO4) and the Council's Community Energy Support Scheme, for households which meet the eligibility criteria.		properties where retrofit works, ECO4 and CESS projects have yet been completed is small, in the context of the Borough's total housing supply.
Emissions from construction and/or development?	Unknown	Multiple projects are outlined in the 2024/25 Climate Change Action Plan which may be described as construction or development: • Commissioning a 1 MWp 'proof of concept' solar PV installation • Installing cycleways and prioritising public transport through other highways works • Adding to the Council's existing network of EV charging infrastructure • Building three zero carbon and ten 'net zero ready' homes	Local area emissions do not explicitly account for embodied carbon emissions. Embodied carbon associated with construction materials e.g., energy use and process emissions from the manufacture of concrete, iron and steel are reported where those materials are produced. Unless the Council uses exclusively local materials, the substantial carbon impact of construction and development in Rotherham is likely to be recorded against other local authorities', or other countries' climate change targets.	As per the 2024/25 Climate Change Action Plan, research is needed to understand embodied carbon across the Council's assets and corporate estate, as well as in construction. The Climate Change Team has started to increase officers' and Members' awareness of the whole life carbon of buildings, by applying generic conversion factors in carbon impact assessments for redevelopment and regeneration projects. For more effective mitigation, learning from case studies should be applied earlier in project design, making the case	Emissions from construction works completed by the Council or its contractors should be within scope of the Council's emissions reporting, as defined by Local Partnerships' Greenhouse Gas Accounting Tool, provided free of charge to local authorities by the Local Government Association (LGA). Albeit the Council has defined the scope boundary of its NZ30 climate change target to comprise scope 1 and scope 2 emissions plus business travel, the Climate Change Team continues to increase its

		• Further developing six priority flood alleviation schemes • Retrofitting Council-owned homes to EPC Band C • Decarbonising heating systems in Council buildings, under phases 3B and 3C of the PSDS Despite being designed to cut greenhouse gas emissions compared with the Council's business as usual operations, each project will have an inherent impact, due to carbon 'embodied' in components and materials.		to retain existing buildings and to avoid demolition wherever possible a core requirement of strategic outline and full business cases.	understanding and capacity to monitor scope 3 emissions: including those from construction and development.
Carbon capture (e.g., through trees)?	Net negative carbon impact (carbon sequestration)	Carbon sequestered by nearly 30,000 trees planted in woodland settings, to create 20 ha (hectares) of new woodland in the 2021/22 and 2022/23 planting seasons: 20 tCO_2e per annum, by 2030. Planting a total 45 ha of new woodland by 2031, as per the Council's *Tree Management*	As trees grow to maturity, the amount of carbon they capture each year increases, up to a maximum value 20 to 25 years since they were first planted. New woodland planted by the Council in the 2021/22 and 2022/23 planting seasons may sequester 200 tCO_2e per annum, by 2040. 45 ha of new woodland could	Tree planting can have an initial carbon impact e.g., by disturbing organic soils of from guards used to protect newly planted saplings. Mitigation is possible through appropriate site selection and choice of planting techniques. Tree guards have been identified as a source of single use plastic and replaced with a	Progress towards tree planting targets is reported annually to the Improving Places Select Commission. Conversion factors published by the Forestry Commission may be used to estimate carbon sequestration by newly planted woodland: a similar methodology was applied in an assessment of South

		Protocol and Guidance, may sequester up to 35 tCO_2e per annum by 2030. These 'negative emissions' may partially offset greenhouse gas emissions within scope of the Council's NZ30 climate change target.	sequester up to 375 tCO_2e per annum by 2040, depending on which year an additional 25 ha is planted. 45 ha is equivalent to 1.37% of land presently in use as forestry or woodland, or 0.16% of total land area in the Borough of Rotherham.	biodegradable alternative, through the Council's SUP audit.	Yorkshire Natural Capital and Biodiversity.

Identify any emission impacts associated with this decision that have not been covered by the above fields:

As noted in the Climate Emergency Annual Report, biodiversity and nature recovery are intrinsically linked with climate change mitigation and adaptation. A 2021 South Yorkshire natural capital assessment highlights carbon storage and carbon sequestration as ecosystem services, which have special relevance to climate change. In Rotherham, existing woodland was estimated to sequester 27,000 tCO_2e each year. If appropriately managed and protected, woodland and other natural habitat may significantly offset any remaining carbon emissions, by 2040.

Please provide a summary of all impacts and mitigation/monitoring measures:

Activity outlined in the 2024/25 Climate Change Action Plan may have a significant, positive impact on the Council's operational greenhouse gas emissions, by decarbonising some corporate fleet vehicles and gas heating systems in some buildings. Combined, these sources accounted for 54% of all greenhouse gas emissions within scope of the Council's NZ30 climate change commitment in the 2022/23 reporting year; how they are cut will depend on the success of an HVO biodiesel trial and a successful PSDS 3C funding bid. NZ30 emissions are monitored and reported annually.

There will be a less significant impact on emissions across the Borough of Rotherham. This may partly reflect the Council's limited influence over emissions within scope of its NZ40 climate change target: in a 2020 report, the Climate Change Committee estimated local authorities could influence up to a third of emissions in their respective areas. Transport comprised 35% of local area emissions in Rotherham, in 2021. Of these, 45% are emissions from travel on motorways, outside the scope of influence of local authorities. As noted above and elsewhere, the Council's investment in cycleways could facilitate a mode shift from cars to active travel, for some journeys. However, car journeys which might reasonably be replaced by bicycle account for only a small proportion of local area emissions. Given the expected magnitude of any cut in NZ40 emissions which may be attributed to the Council's activity, it is unlikely these would be evident from local area emissions statistics, published by the Department for Energy Security and Net Zero in June each year.

Notwithstanding cuts to NZ30 and NZ40 emissions which may be delivered under the Council's 2024/25 Climate Change Action Plan, several projects will have a negative impact in the short term, due to carbon emissions 'embodied' in components and materials. Research to increase the Council's understanding of embodied carbon across its assets and corporate estate is needed, to ensure effective mitigation. An exemplar is available from the Council's tree planting programme, which seeks to minimise any unintended, negative carbon impact, through appropriate selection of sites and techniques. In this way, the Council can realise the best possible value from its investment in a cleaner, greener local environment.

Supporting information:	
Completed by: (Name, title, and service area/directorate).	Arthur King, Principal Climate Change Officer, Strategic Asset Management, Finance & Customer Services
Please outline any research, data, or information used to complete this [form].	• *Annual Service and Environmental Report: Financial Year 2022/23.* BDR Waste Partnership (2023). • *Greenhouse Gas Reporting: Conversion Factors 2022.* Department for Energy Security and Net Zero (2022). Available from: <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2022> • *Data Table 1, Green Book Supplementary Guidance: Valuation of Energy Use and Greenhouse Gas Emissions for Appraisal*. Department for Energy Security and Net Zero (2023). Available from: <https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal> • *UK local authority and regional greenhouse gas emissions national statistics: 2005-2021*. Department for Energy Security and Net Zero (2023). Available from: <https://www.gov.uk/government/statistics/uk-local-authority-and-regional-greenhouse-gas-emissions-national-statistics-2005-to-2021> • *Land use in England, 2021*. Department for Levelling Up, Housing and Communities (2023). Available from: <https://www.gov.uk/government/statistics/land-use-in-england-2021> • *Fleet Replacement Plan*. Rotherham Metropolitan Borough Council (2023). Cabinet – 20 March 2023. Available from: <https://moderngov.rotherham.gov.uk/documents/s140300/Cabinet%20Report_Fleet%20Replacement%20Plan%20SBv4.2.pdf>

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Rotherham Carbon Modelling. SYSTRA (2022). [SCRTM1 carbon emissions from transport analysis].
WCC Carbon Calculation Spreadsheet. UK Woodland Carbon Code (2021). Available from: <https://woodlandcarboncode.org.uk/standard-and-guidance/3-carbon-sequestration/3-3-project-carbon-sequestration>
Carbon Metric Factors 2011 - 2020. Zero Waste Scotland (2021). Available from: <https://www.zerowastescotland.org.uk/resources/carbon-metric-publications>

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<td>If quantities of emissions are relevant to and have been used in this form please identify which conversion factors have been used to quantify impacts.</td>
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<table>
<tr><th colspan="3">Greenhouse Gas Reporting Conversion Factors 2022, Department for Energy Security and Net Zero</th></tr>
<tr><th>Emissions Source</th><th>Greenhouse Gas Conversion Factor</th><th>Unit</th></tr>
<tr><td>Average battery electric vehicle</td><td>0.07578</td><td>kgCO_2e per mile</td></tr>
<tr><td>Average diesel-fuelled car</td><td>0.2749</td><td>kgCO_2e per mile</td></tr>
<tr><td>Average petrol-fuelled car</td><td>0.2744</td><td>kgCO_2e per mile</td></tr>
<tr><td>Biodiesel HVO: within scope of organisations’ GHG emissions reporting</td><td>0.03558</td><td>kgCO_2e per litre</td></tr>
<tr><td>Biodiesel HVO: outside of scope</td><td>2.47</td><td>kgCO_2e per litre</td></tr>
<tr><td>Diesel</td><td>2.558</td><td>kgCO_2e per litre</td></tr>
<tr><td>Electricity</td><td>0.1934</td><td>kgCO_2e per kWh</td></tr>
<tr><td>Natural Gas</td><td>0.2023</td><td>kgCO_2e per kWh (Net CV)</td></tr>
<tr><td>Petrol</td><td>2.162</td><td>kgCO_2e per litre</td></tr>
<tr><td>Recycling</td><td>21.28</td><td>kgCO_2e per tonne</td></tr>
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Residual waste conversion factor, BDR Waste Partnership Annual Report	
Emissions Source	**Greenhouse Gas Conversion Factor / $kgCO_2e$ per tonne**
Contract residual waste disposed of at BDR Waste Treatment Facility	23.91

Consumption-based recycling emissions factors, Zero Waste Scotland Carbon Metric	
Emissions Source	**Greenhouse Gas Conversion Factor / $kgCO_2e$ per tonne**
Glass	-755
Ferrous metals	-1,768
Non-ferrous metals	-9,961
Paper and cardboard	-547
Plastics (excluding films)	-537

Carbon sequestration by newly planted woodland, UK Woodland Carbon Code	
Years Since New Woodland Planted	**Annual Carbon Sequestration / tCO_2e per hectare per year**
0	0
5	0.4160
10	1.4672
15	4.9888
20	14.4512
25	17.2720
30	12.4944
35	9.0816
40	7.2896

Tracking [to be completed by Policy Support / Climate Champions]	Tracking Reference: CIA 214 Louise Preston, Climate Change Manager, Strategic Asset Management, Finance & Customer Services