MARLBOROUGH DISTRICT COUNCIL

Te Kaunihera ā-Rohe o Wairau

Corporate Greenhouse Gas Emissions

2019-2020

Prepared for Marlborough District Council
By CarbonEES

CarbonEES® TOWARDS ZERO

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Glossary

Greenhouse Gas	Greenhouse gases (GHG) are gases that influence the way in which the Earth's atmosphere traps heat. Increasing levels of GHGs in the atmosphere are causing the phenomenon of climate change.
Carbon Dioxide Equivalent (CO_2e)	A standard unit for measuring carbon footprints. The impact of each different GHG is expressed in terms of the global warming potential (GWP) of one unit of CO_2. Standard ratios are used to convert gases into equivalent amounts of CO_2; these are based on each gas's GWP.
GHG Inventory	A measure of the amount of GHGs emitted by an organisation. Typically expressed in terms of CO_2e, and for a 12-month reporting period. Used interchangeably with carbon footprint.
Emission Factor	A metric that converts a specific emission source - such as a litre of diesel - into terms of CO_2 or CO_2e.
Global Warming Potential	A measure of a gas's ability to cause radiative forcing in the atmosphere (or global warming) relative to the ability of CO_2. For example, methane has 25 times the GWP of CO_2 over 100 years, and 72 times the GWP over 20 years. Thus it is 25 times more potent over 100 years and 72 times more potent over 20 years contributing to global warming than CO_2. The difference is due to the rate at which it is broken down by natural processes.
Greenhouse Gas Protocol	This Standard provides guidance for companies preparing a GHG emissions inventory. It defines three Scopes (or operational boundaries) for accounting and reporting purposes (explained below).
Scope 1 Emissions	Direct greenhouse gas emissions that occur from sources owned or controlled by Marlborough District Council, such as emissions from the combustion of diesel in the vehicle fleet.
Scope 2 Emissions	Emissions associated with the purchase of electricity that is consumed by Marlborough District Council.
Scope 3 Emissions	An optional reporting category that covers all other indirect emissions. These emissions are a consequence of Marlborough District Council's activities but occur from sources it does not own or control. Examples include the embodied carbon in materials, and business travel.

Executive Summary

Marlborough District Council commissioned CarbonEES to calculate its organisational greenhouse gas (GHG) inventory for their financial year 2019-2020.

This inventory is a calculated estimate of all GHGs emitted as a result of activities under the control of Marlborough District Council between 1st July 2019 and 30th June 2020. FY 18/19 was chosen as the corporate baseline due to the fact that COVID-19 has created a distortion in FY 19/20, which if used, would create a flawed baseline.

This report serves to compare key emission sources to the baseline year, provide recommendations on carbon reducing opportunities and importantly demonstrate to key stakeholders that the Marlborough District Council is actively involved in measuring, monitoring, and managing its GHG emissions.

Organisational GHG emissions for Marlborough District Council for the 2019/20 reporting period are calculated to be **45,442 tonnes carbon dioxide equivalent (tCO_2e).**

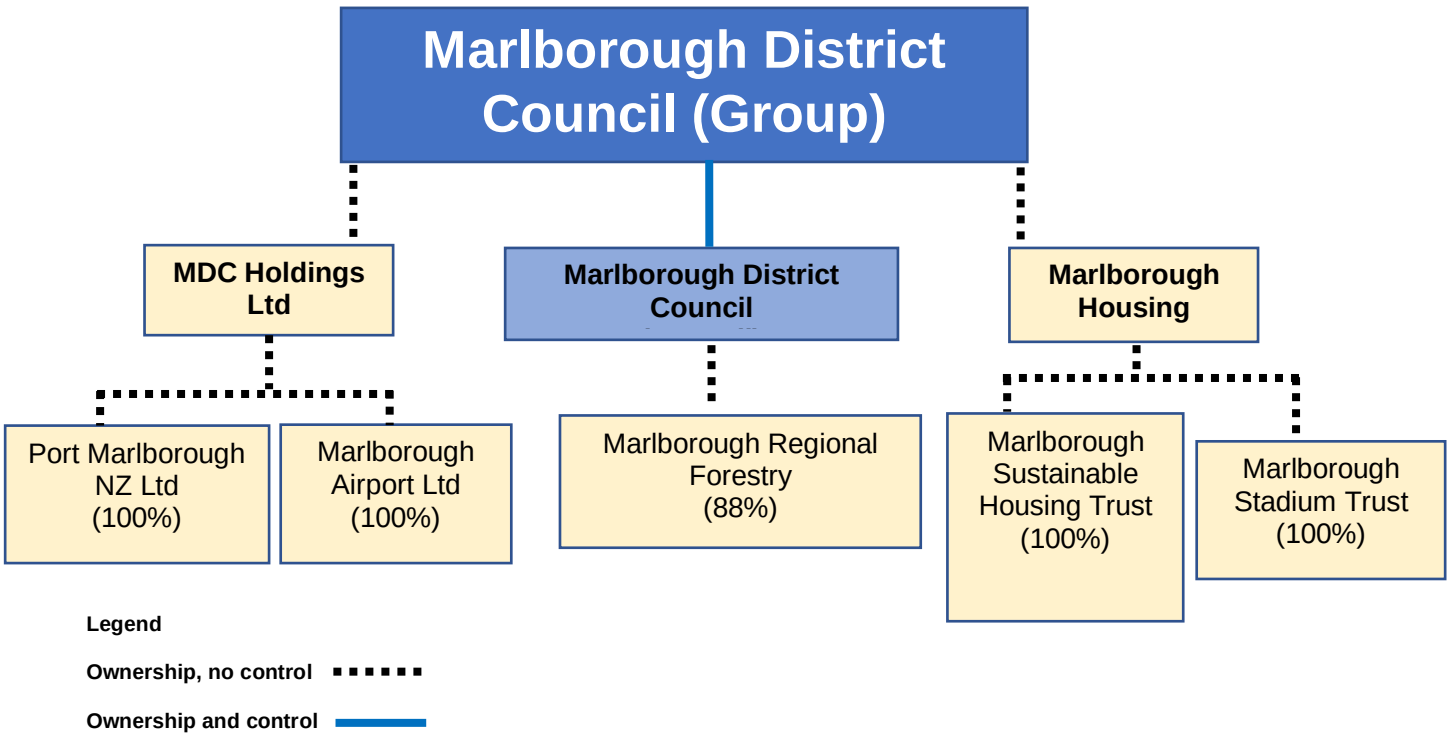
Methodology

The Marlborough District Council GHG Emissions Report was developed in accordance with the "*Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard*" (2004). The emissions calculations for Scope 3 emission sources were informed by "*Corporate Value Chain (Scope 3) Accounting and Reporting Standard*" (2011).

Boundary

The geographic boundary of the Marlborough District Council is defined by the location of Marlborough District Council's facilities. The organisational boundary follows an operational control approach. As such, this emissions inventory includes all sources associated with activities Marlborough District Council had operational control (authority to introduce and implement operating policies) over in the period 1st July 2019 to 30th June 2020.

Figure 1 - Marlborough District Council organisational boundary



Results

Overall, it was calculated that total GHG emissions from Marlborough District Council were 45,442 tonnes of CO_2e from 2019/20. After surrendering 34,341 NZUs to meet the requirements of the Emissions Trading Scheme (ETS), the council's net GHG emissions were 11,101 tonnes of CO_2e from 2019/20

Most of the gross emissions were a result of landfill (75.6%), wastewater treatment (10.4%), capital goods (primarily from construction) (6.5%), and purchased goods and services and purchased electricity, both at (3.2%).

A high-level breakdown of the emission sources and their related gross emissions is provided below.

Figure 2 – Top emissions sources and their related gross emissions 45,442 tCO_2e)

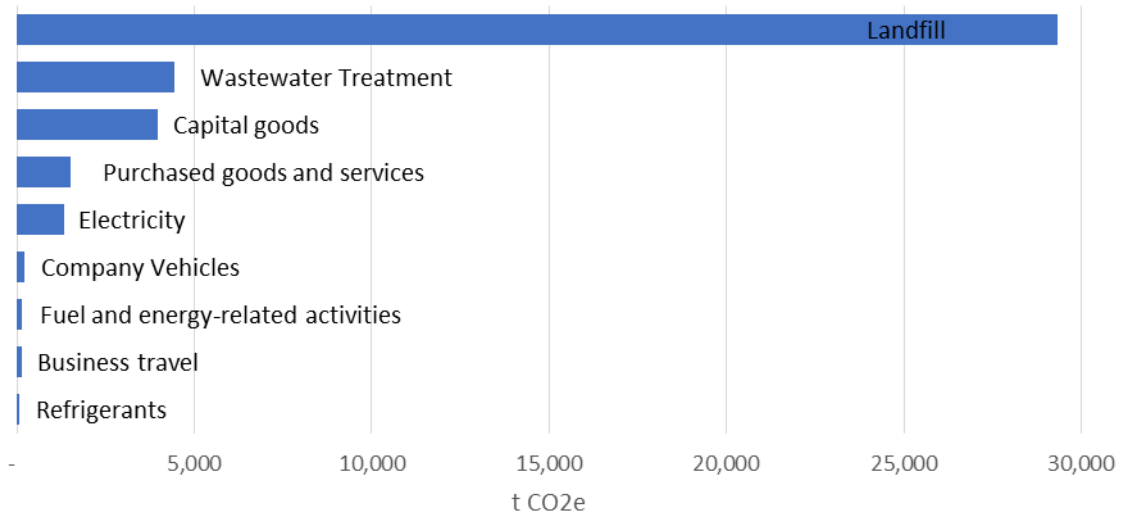


Table 1 – Gross emissions by scope and their proportions

Scope	tCO2e	% of Total
Scope 1 – Direct Emissions (Fuel, Landfill, WWTP)	39,283	86.4%
Scope 2 – Indirect Emissions (Electricity)	1,445	3.2%
Scope 3 – Other Indirect Emissions (Supply Chain)	4,714	10.4%
Total	**45,442**	**tCO_2e**

Opportunities and Recommendations

We see opportunities to reduce organisational emissions around landfill, wastewater treatment, and sustainable procurement.

We recommend:

- Seeking opportunities to minimise district waste, diversion of organic wastes to composting or other non-methanogenic processes and improve the efficiency of gas capture and flaring of Bluegums Landfill
- Looking at opportunities to reduce treatment emissions by first gathering primary data via direct methane emission measurements, then exploring process improvements to reduce methane emissions.
- Implement sustainable procurement policies and guidelines to select relevant providers and require larger contract providers to estimate and report their Scope 1 and Scope 2 emissions (at a minimum) and demonstrate their reduction performance

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1.0 Introduction

Following on from the original FY 18/19 GHG Inventory that Marlborough District Council commissioned to create a baseline, MDC asked CarbonEES to calculate its organisational greenhouse gas (GHG) inventory for the FY 19/20 period. The FY 19/20 period was not chosen as the baseline, due to the impacts of COVID-19 on normal economic activities. This report contains the results and discussion around that assessment and provides recommendations on possible GHG emission reduction measures.

This GHG inventory is a calculated estimate of all GHGs emitted as a result of activities under the control of the Marlborough District Council between 1st July 2019 and 30th June 2020.

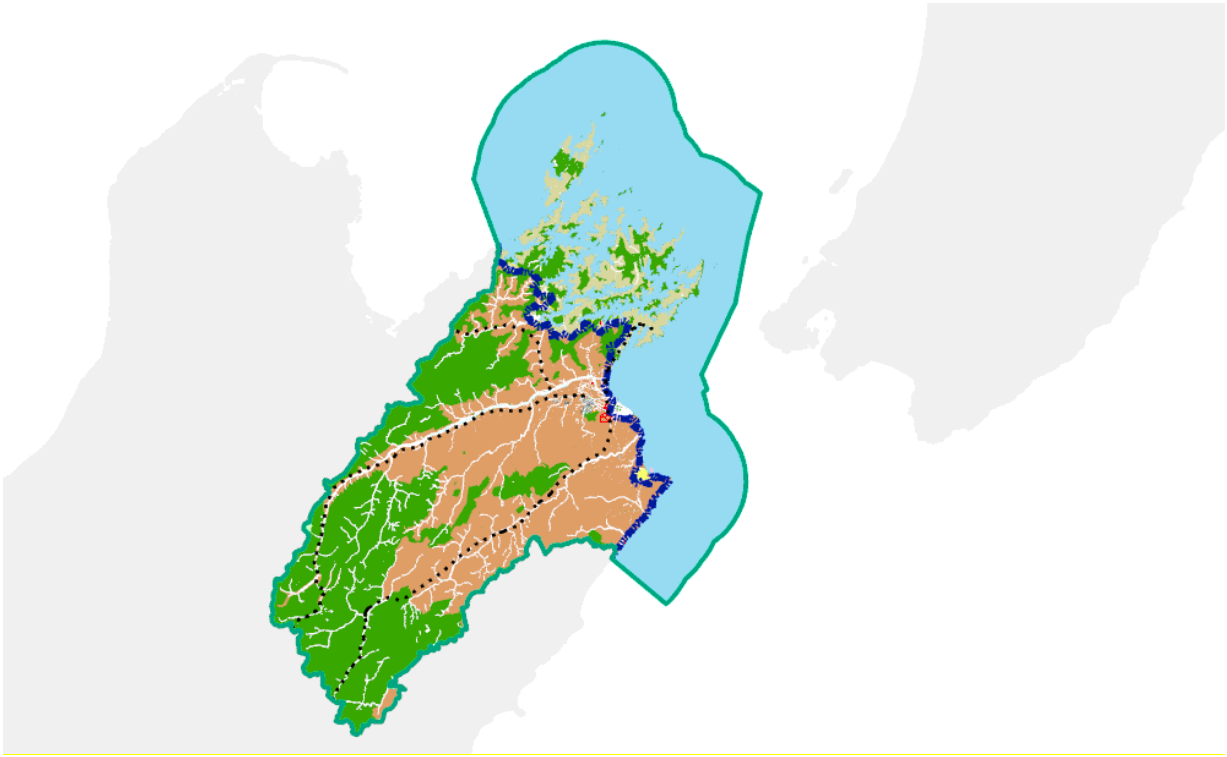
The objectives of this foot-printing project are to:

- Provide information to the Marlborough District Council on their overall organisational GHG emissions for Scope 1, 2 and 3 emission sources
- Highlight key emission sources for future management
- Recommend high level actions that would enable the Marlborough District Council to reduce its emissions
- Provide a GHG emissions baseline to measure future performance against and to provide the context to set an organisational emissions target.

2.0 Methodology

This assessment follows the guidelines in the *Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard*, published by the World Business Council for Sustainable Development and the World Resources Institute, 2004. This section covers the following areas: boundary definition and exclusions, emission factors, activity data, assumptions, and limitations.

Figure 3 – Marlborough District Council geographic boundary



Source: MDC (2021)

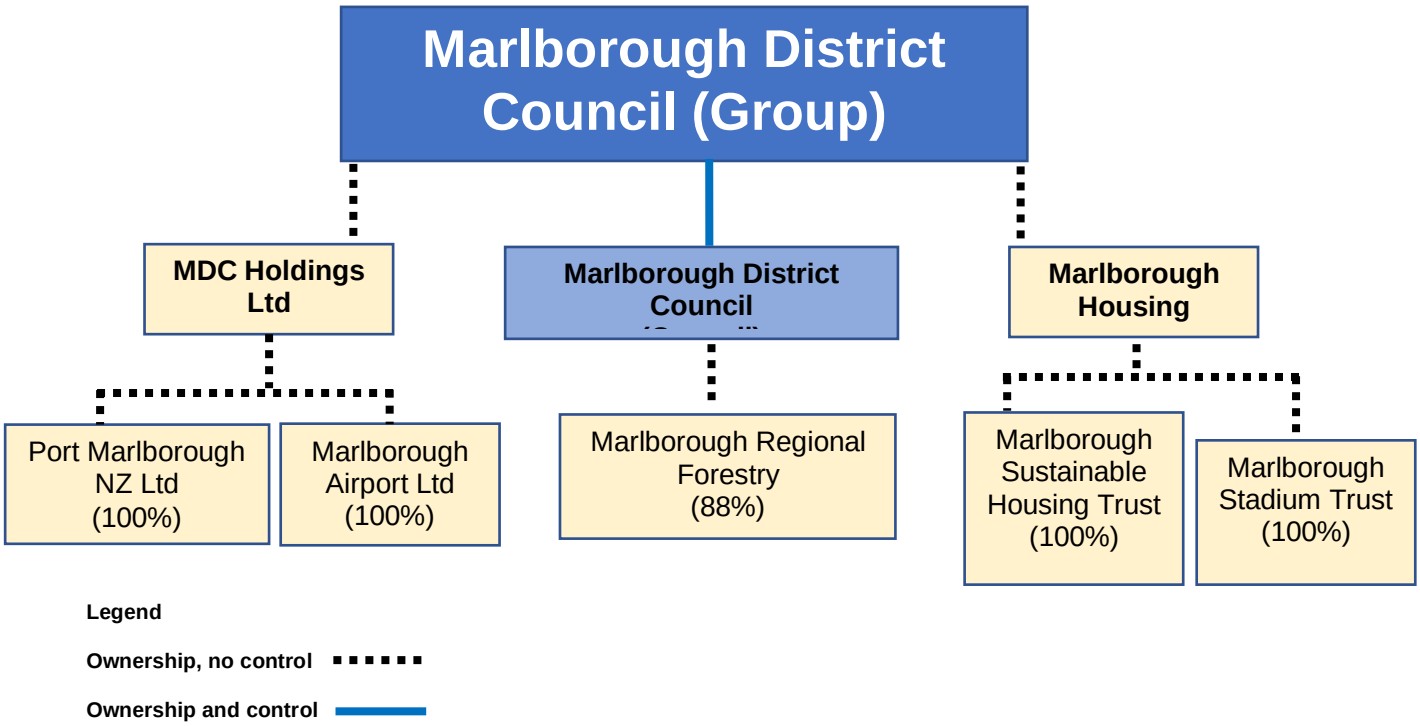
2.1 Organisational Boundary

When undertaking an emissions inventory study, it is essential to first establish the organisational boundary for the inventory. In this study, the organisational boundary is defined using the operational control approach.

As such, this emissions inventory includes all sources and sinks associated with activities where Marlborough District Council has control and the full authority to introduce and implement its operating policies.

Figure 1 illustrates the organisational boundaries as defined in this report. Marlborough District Council includes council owned and operated sites but does not include sites owned but not operated by council. These are considered outside of the organisational boundary due to no operational control.

Figure 1 - Marlborough District Council activities and other groups defined within the organisational boundary



2.1.1 Exclusions

The following emissions have been excluded from the organisational GHG emissions inventory.

Table 2 - Emission sources excluded from Marlborough District Council GHG emissions inventory.

Potential emission source	Reason for Exclusion
Fugitive emissions from vehicles (Scope 1)	Consumption data unavailable. These emissions are assumed to be de minimis (<1%).
Waste generated in operations (Scope 3, Category 4)	Included in Landfill emissions (Scope 1).
Employee Commuting (Scope 3, Category 7)	Deemed to have no operational control.
Upstream leased assets (i.e., assets leased by 3rd parties - Scope 3, Category 8)	No operational control.
Downstream transportation and distribution (Scope 3, Category 9)	Consumption data unavailable. These emissions are assumed to be de minimis (<1%).
Processing of sold products (Scope 3, Category 10)	Not applicable.
Use of sold products (Scope 3, Category 11)	Not applicable.
End-of-life treatment of sold products (Scope 3, Category 12)	Not applicable.
Downstream leased assets (i.e., assets leased to 3rd parties – Scope 3, Category 13)	Not applicable.
Franchises (Scope 3, Category 14)	Not applicable.
Investments (Scope 3, Category 15)	No operational control. Emissions from MDC Holdings Ltd organisations and Marlborough housing have not been included in this inventory.

2.2 Operational Boundary

Within the organisational boundary, an operational boundary of emission sources or activities is then defined. Using the operational control approach, all direct emission sources within the organisational boundary defined above are reported as Scope 1, with all remaining emissions reported as Scope 2 or 3 emissions. The table below provides more explanation on the concept of Scope.

Table 3 - Scopes as defined in the Greenhouse Gas Protocol

	Definition	Example
Scope 1: Direct emissions	Direct emissions that occur from sources owned or controlled by Marlborough District Council	The combustion of fuels in the vehicle fleet
Scope 2: Electricity indirect emissions	Emissions associated with the generation of electricity that is purchased by Marlborough District Council	Electricity consumed in Marlborough District Council buildings
Scope 3: Other indirect emissions	Emissions that are a consequence of Marlborough District Council's activities, but from sources they do not own or directly control	Purchased goods and air travel

2.3 Inventory Emission Sources, Emission Factors and Activity Data

This section describes the activities covered within each Scope. A brief description is provided on each activity, covering where activity data was collected and where emission factors were sourced, along with a comment on the data quality (see Appendix A for details). Emission factors all include the seven greenhouse gases (CO_2, CH_4, N_2O, HFCs, PFCs, SF_6 and NF_3) in accordance with requirements under the GHG Protocol. All emission factors convert to carbon dioxide equivalents (CO_2e) based on the global warming potential (GWP) of the GHG. Emission factors are derived from a range of sources, principally from MfE (2020) with missing factors acquired from DEFRA (2019), Motu (2014) and Tonkin & Taylor (2020). The individual sources are provided in the accompanying Excel spreadsheet.

2.3.1 Scope 1 Direct Emissions

Wastewater Treatment

Marlborough District Council is responsible for treating community wastewater for residents within the district boundary. GHG emissions from these activities were estimated using the population during the financial year provided by council. The emissions factor was taken from MfE (2020); however, due to the very high industrial BOD at two of the treatment plants (Blenheim and Havelock), custom emissions factors were derived. Both the quality of the activity data and the emissions factors are considered to be satisfactory (E2).

Landfill

Marlborough District Council owns and operates Bluegums Regional Landfill. GHG emissions were calculated by measuring the weight of waste by type and applying Unique Emissions Factors (UEFs), as determined by Tonkin & Taylor (2020). The weight of waste by type was provided by council and emissions factors were provided by Tonkin Taylor (2020). Both activity data and emission factors are considered to be robust (M1).

Stationary Fuel Combustion (LPG)

LPG is used at Marlborough District Council sites for water and space heating. Fuel consumption has been provided by Elgas and the emission factors were taken from MfE (2020). Both activity data and emission factors are considered to be robust (M1).

Mobile Fuel Combustion (Diesel, Petrol)

Marlborough District Council has both petrol and diesel vehicles in its fleet. Fuel consumption data has been provided by Fleet Partner and NPD. Emission factors were taken from MfE (2020). Both activity data and emission factors are considered to be robust (M1).

Rental Car (Petrol)

Petrol has been consumed in rental car vehicles which council used during the financial year. Distanced travelled (kms) consumption data has been provided by Avis Rental Cars. Emission factors were taken from MfE (2020). Both activity data and emission factors are considered to be robust (D1).

Fugitive Emissions (Refrigerants)

This covers the leakage of refrigerant gases used in refrigeration systems and the heating, ventilation and cooling (HVAC) systems of council operated sites. Refrigerant consumption data was provided by Martella Refrigeration. Emissions factors were taken from MfE (2020). Both activity data and emission factors are considered to be robust (M1).

2.3.2 Scope 2 Indirect Emissions

Purchased Electricity

Electricity is used at all Marlborough District Council sites for council offices, water pumps and wastewater treatment. Electricity consumption data has been provided by Genesis Energy. Emission factors were provided by MfE (2020) for the 2018 calendar year. Both activity data and emission factors are considered to be of a high quality (M1).

2.3.3 Scope 3 Other Indirect Emissions

Purchased Goods and Services

Activity data for these Scope 3 indirect emission sources were diesel used by the bus contractor Riches and other operating expenses that had not yet been accounted for in the inventory. These were extracted from the Marlborough District Council's OPEX summary that was provided by council. Contractor fuel emissions were calculated using a factor from MfE (2020). The remainder of the emissions under this category were estimated based on Motu (2014) emissions factors for average industry sectors and activities in New Zealand. Both the quality of the activity data and the emissions factors are considered to be satisfactory (E2).

Capital Goods

Activity data for these Scope 3 indirect emission sources were extracted from the Marlborough District Council's CAPEX summary that was provided by council. These include upstream construction and manufacturing emissions. The emissions under this category were estimated based on Motu (2014) emissions factors for average industry sectors and activities in New Zealand. Both the quality of the activity data and the emissions factors are considered to be satisfactory (E2).

Fuel and Energy-Related Activities

As this category estimates the upstream emissions from fuel and energy use, activity data is the same as the relevant Scope 1 and 2 emissions sources (Electricity, Petrol, Diesel) already mentioned. Emissions factors were from MfE (2020) and DEFRA (2019). This data is considered to be of a high quality (M1).

Upstream Transportation and Distribution

These are the emissions from postal, courier and delivery. Activity data was unavailable; however, an estimate has been derived from Marlborough District Council's OPEX summary that was provided by council. The emissions under this category were estimated based on Motu (2014) emissions factors for average industry sectors and activities in New Zealand. Both the quality of the activity data and the emissions factors are considered to be satisfactory (E2).

Business Travel

Air Travel - data has been provided by Air New Zealand and Sounds Air and has been reported for "Domestic' and 'Small Aircraft'. The emissions factors applied to this data have been sourced from MfE (2020). Both activity data and emission factors are considered to be of a high quality (M1).

Accommodation - activity data was unavailable; however, an estimate has been derived from Marlborough District Council's OPEX summary that was provided by council. The emissions under this category were estimated based on Motu (2014) emissions factors for average industry sectors and activities in New Zealand. Both the quality of the activity data and the emissions factors are considered to be satisfactory (E2).

Table 4 – Emissions sources and their related data quality.
Please refer to Appendix A for data quality explanation.

Emissions Source	Data Management	Data Collection
Wastewater Treatment	Satisfactory	E2
Landfill	Robust	M1
Stationary Fuels (LPG)	Robust	M1
Transport Fuels (Petrol, Diesel, Rental Car)	Robust	M1
Fugitive Emissions (Refrigerants)	Robust	M1
Purchased Electricity	Robust	M1
Purchased goods and services	Satisfactory	E2
Capital goods	Satisfactory	E2
Fuel and energy-related activities	Robust	M1
Upstream Transportation and Distribution	Satisfactory	E2
Business Travel - Air Travel	Robust	M1
Business Travel - Accommodation	Satisfactory	E2

3.0 Results

This section presents the results of this GHG Emissions Inventory. It offers a broad overview covering all the activities or groups combined and a detailed review at each individual activity or group. It concludes with a focus on each of the key emission sources.

3.1 All Activities and Scopes

In 2019/20, Marlborough District Council's total gross GHG emissions is calculated as 45,442 tonnes CO_2e, of which 39,283 tonnes are direct emissions (Scope 1), 1,445 tonnes are from electricity indirect emissions (Scope 2) and 4,714 tonnes are indirect Scope 3 emissions.

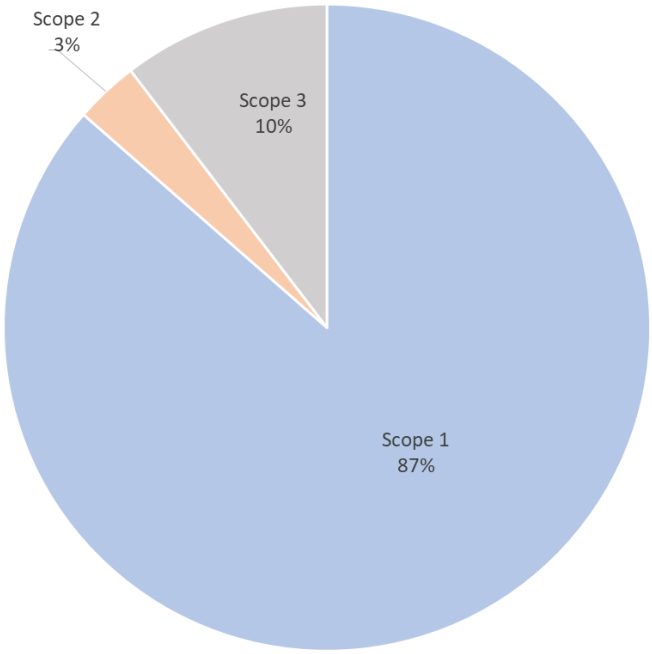
Table 5 – Emissions sources and their related emissions

Source	t CO_2e	% of total
Scope 1		
Landfill	34,341	75.57%
Wastewater Treatment	4,728	10.40%
Transport Fuels (Petrol, Diesel)	210	0.46%
Stationary Fuels (LPG)	3.6	0.01%
Fugitive Emissions (Refrigerants)	-	0.0%
Scope 2		
Purchased Electricity	1,445	3.18%
Scope 3		
Capital goods	2,963	6.52%
Purchased goods and services	1,446	3.18%
Fuel and energy-related activities	159	0.35%
Business travel	97	0.21%
Upstream Transportation and Distribution	49	0.11%
Total	**45,442**	**t CO_2e**

3.2 Organisational Emissions

Most Marlborough District Council organisational emissions are Scope 1 (86.4%), followed by Scope 3 emissions (10.4%) and Scope 2 emissions (3.2%).

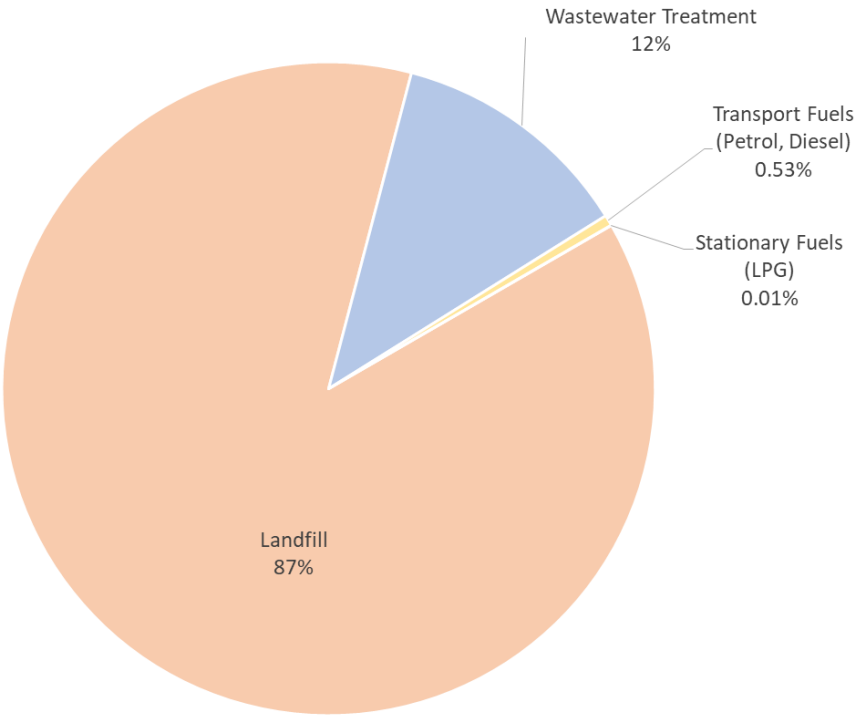
Figure 4 – Organisational Emissions by Scope (total 45,442 tCO_2e)



3.2.1 Scope 1 Emissions

Scope 1 emissions represent the largest source of emissions, accounting for 86.4% of the overall organisational footprint. Most of these Scope 1 direct emissions are from Landfill (87.42%) with the remainder coming from wastewater Treatment (12.04%), Transport Fuels (0.53%), and Stationary Fuels (0.01%).

Figure 5 - Scope 1 Emissions by Source (total 39,283 tCO_2e)

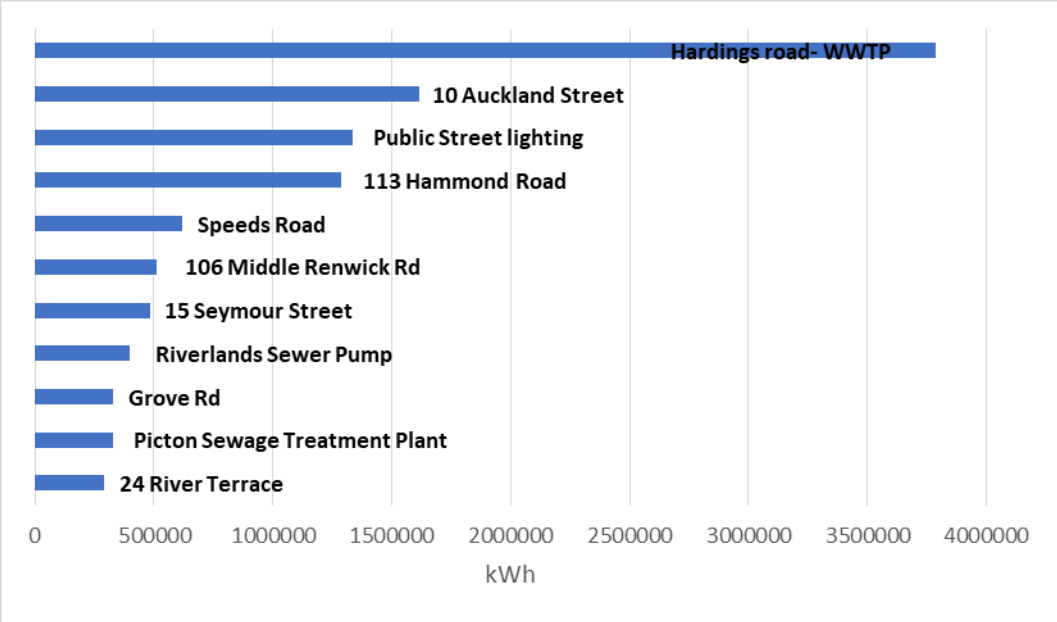


3.2.2 Scope 2 Emissions

Scope 2 emissions are from purchased electricity (at all sites) and during the financial year resulted in 1,445 tonnes of CO_2e or 3.2% of the GHG emissions of Marlborough District Council. Electricity is used for council offices, water pumps and wastewater treatment.

As shown in Figure 6, most of the Scope 2 emissions come from the electricity consumed by the top 10 sites (74%) while the remainder (26%) are from council's other 211 sites.

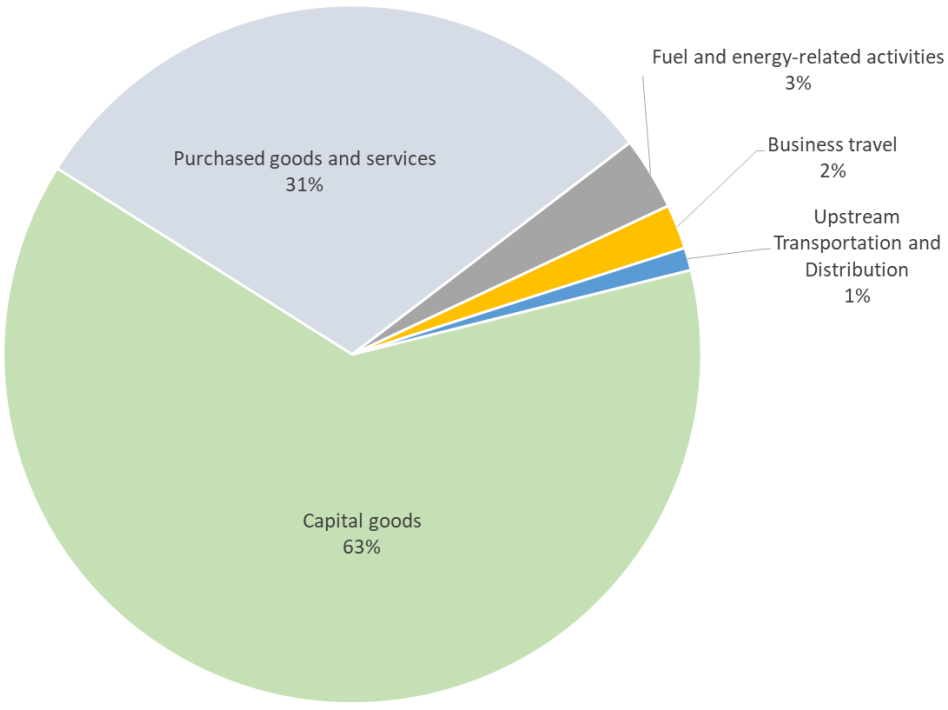
Figure 6 – Top 10 Sites by Electricity Consumption



3.2.3 Scope 3 Emissions

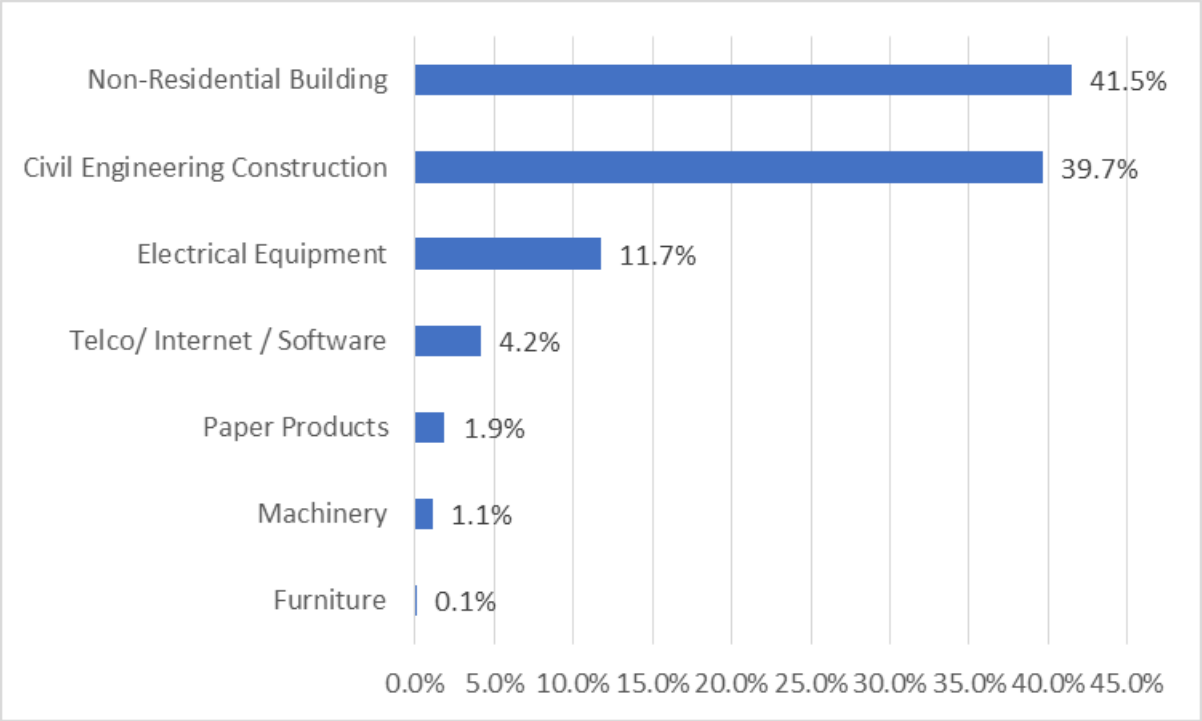
Scope 3 emissions are the other indirect emissions from Marlborough District Council's
activities, resulting in 4,714 tCO_2e or 10.4% of the GHG emissions of Marlborough District Council.

Figure 7 - Scope 3 Emissions by Category (total 4,714 tCO_2e)



Capital Goods (62.86%) represent the largest Scope 3 emission source followed by Purchased Goods and Services (30.67%) and Fuel and Energy-Related Activities (3.37%). Two additional sources make up the remainder of Scope 3 emissions including Business Travel (2.06%) and upstream transport and distribution (1.04%).

Figure 8 – Emissions from Capital Goods by spend type (total 2,963 tCO_2e)



4.0 GHG Emissions Reduction Opportunities

This section describes a range of GHG emission reduction opportunities that Marlborough District Council might consider implementing. In many cases, there will be financial savings or other economic benefits associated with implementing these recommendations. These recommendations are ranked by both the proportion of the total footprint and the degree of control in which council has over the emissions source.

4.1 Reduce Landfill Emissions

Emissions from Bluegums Landfill were 34,341 tCO_2e (or 75.6% of the total footprint) during the financial year. Not only is this by far the largest emissions source for council, but council must also surrender NZUs each year to meet their ETS obligations for these emissions.

Therefore, reducing these emissions will provide the largest financial gain for council in addition to helping reduce overall organisational emissions. To further incentivise reductions in landfill emissions, the price of NZUs has increased more than 80% since the financial year ending 2019, from an average of $22.4/NZU to over $40/NZU in 2021.

There are three ways to reduce emissions from Landfill. The first is to reduce the quantity of district waste sent to landfill (waste minimisation). The second is to reduce the emissions per kg of waste at Bluegums landfill (gas capture and flaring efficiency), and the third is (diversion) to divert organic wastes such as food, paper, wood, yard waste away from landfill and into composting or other streams.

We recommend that council look at opportunities to both minimise district waste and improve the operating efficiency of gas capture and flaring of Bluegums Landfill. It currently operates at 51.4% efficiency, T+T (2020), which is lower than the average range of 60-90%, EPA (2021). As both waste inflow data and UEFs factors are already measured each year, council could expect an attractive return on investment from these emissions reductions.

4.2 Reduce Wastewater Treatment Emissions

The second largest source of Marlborough District Council's GHG emissions is from Wastewater Treatment with 10.4% of the overall footprint. Wastewater Treatment emissions are direct emissions source (Scope 1), so council has operational control over how these sites are operated.

As with reducing Landfill emissions, Wastewater Treatment emissions can be reduced by reducing the inflows and improving treatment methods. However, reducing wastewater inflows may be limited to working with a few large industrial users, therefore, most of the councils' efforts should be focused towards reducing treatment emissions. The rather high BOD levels at Blenheim and Havelock are likely due to the industrial inflows. It is advised to try to quantify the GHG potential of inflows, at the source; so GHG liabilities can be on-charged and addressed.

We recommend looking at opportunities to reduce treatment emissions by first gathering primary data via direct methane emission measurements, then exploring process improvements to reduce methane emissions.

4.3 Implement Sustainable Procurement Policies

6.5% of Marlborough District Council GHG emissions are generated from Capital Goods (Scope 3) purchased during the financial year. This includes construction emissions from infrastructure added to council's balance sheet. Additionally, it includes upstream emissions from purchased machinery, electrical equipment, and paper products.

In addition, 3.2% of the Councils' GHG emissions are from Purchased Goods and Services (Scope 3) purchased during the financial year.

We recommend implementing sustainable procurement policies and guidelines to select relevant providers and to require larger contract providers to estimate and report their Scope 1 and Scope 2 emissions (at a minimum) and demonstrate their reduction performance.

5.0 Discussion

5.1 Emission reduction targets

Now that Marlborough District Council has completed their FY18/19 and FY 19/20 GHG Inventories and has a baseline of their GHG emissions, the next step for Marlborough District Council is to set an organisational (council wide) GHG emissions reduction target.

We recommend that the council set a target in line with our national target of net zero emissions by 2050 as outlined in the Climate Change Response (Zero Carbon) Amendment Bill.

This would require council to focus on primarily on reducing gross emissions as the price of offsets will likely continue to rise. This means that Council should invest in low emission infrastructure today to reduce future offsetting obligations.

5.2 Comparison with FY19

Table 6: Comparison of GHG emissions FY20 to FY19 (Baseline)

Source	FY19 tCO2e	FY20 tCO2e	Change
Scope 1			
Landfill	29,329.8	34,340.8	17.1%
Wastewater Treatment	4,437.1	4,728.0	6.6%
Transport Fuels (Petrol, Diesel)	231.9	210.1	-9.4%
Stationary Fuels (LPG)	3.169	3.584	13.1%
Fugitive Emissions (Refrigerants)	67.2	0.0	-100.0%
Scope 2			
Purchased Electricity	1,326.0	1,444.9	9.0%
Scope 3			
Capital goods	3,966.3	2,962.8	-25.3%
Purchased goods and services	1,517.6	1,446.4	-4.7%
Fuel and energy-related activities	155.0	159.2	2.7%
Business travel	135.3	97.3	-28.1%
Upstream Transportation and Distribution	44.2	49.1	11.2%
Total tCO2e	**41,213**	**45,442.2**	**10.3%**

5.3 Marlborough Regional Forestry (MRF) and Offsets

Marlborough District Council owns an 88% equity share in Marlborough Regional Forestry (MRF). MRF has 3,351 hectares of forestry land of which 9.8 hectares have been allocated to the ETS to receive 2,993 NZUs (Post-1989 credits). Additionally, MDC owns some 320 hectares of pre-1990 forest for which the council received 19,200 NZUs (Pre-1990 credits).

As council holds these NZUs on their balance sheet, they are only applied to an emissions inventory when council surrenders NZUs to the ETS. For the case of financial year 2019/2020, the Council surrendered 34,341 NZUs which is equivalent to offsetting the 34,341 tCO_2e that was emitted by the Bluegums landfill.

The remaining forestry assets which council owns via their equity share in MRF may potentially be eligible for NZUs to use as offsets in the future. We recommend exploring this opportunity with M&R Forestland Management.

5.4 MDC Holdings Ltd (MDCH)

Council has an equity ownership of Marlborough Airport and Port of Marlborough. These entities have not been included in this emissions inventory as they are deemed to be outside of the organisational boundary due to council not having operational control.

However, we recommend that council work with the airport, the port, and any other entities in which the council owns but does not operate to calculate these emissions. If these emissions were known to council they could be included as a Scope 3 emissions source under category 15, Investments.

6.0 References

MfE (2019) - Ministry for the Environment. 2020. Measuring Emissions: A Guide for Organisations. 2020 Detailed Guide. Wellington: Ministry for the Environment.

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Appendix A Data quality

Data Quality

The table below describes the data quality indicators used in the above sections. Explanations of these terms are provided below.

Data management	Data collection		
	Measured	Derived	Estimated
Robust	M1	D1	E1
Satisfactory	M2	D2	E2
Questionable	M3	D3	E3

Measured = Data directly provided by a service provider, contractor or directly obtained from a monitoring device. For example, electricity invoices, contractor receipts, emissions monitoring equipment, incident reports, consultant reports etc.

Derived = Data obtained from calculations, mass balances, use of physical/chemical properties, use of coefficients and emission factors etc., for example converting cubic meters of waste into tonnes.

Estimated = Usually, where there is no other available method for obtaining the data. Such data could be prorated on previous results, use of precedents or historical data, or even a calculated guess.

Robust = Evidence of sound, mature and correct reporting system, where room for error is negligible. Examples would include use of spreadsheets, databases and on-line reporting.

Satisfactory = Examples would include manual, but structured keeping of records, files and results. Some potential for error or loss of data.

Questionable = No logical or structured approach to data or record keeping. High potential for error &/or loss of data. Data may appear to differ from those initially reported.