Independent GHG Footprint Report

Christchurch International Airport Limited

Basis of Preparation, FY2020-21

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Executive Summary

This greenhouse gas inventory report for the reporting year 2020-21 to support CIAL in advancing their current Airport Carbon Accreditation to Level 4 – Transformation. As a requirement for an upgrade to Level 4, Christchurch International Airport Limited must submit a carbon footprint of the airport's scope 1, 2 and 3 emissions. The Airport Carbon Accreditation program recommends that all relevant data and information for establishing the carbon footprint be consolidated into a carbon footprint report. This document serves as that carbon footprint report. This report details the emission sources included in the carbon footprint, corresponding activity data, methodologies, assumptions, limitations and emission estimates, and organisational and operational boundaries.

The table below summarises the GHG inventory for FY21.

Table 1: Scope 1, 2 and 3 emissions in tonnes CO_2-e in FY21

Scope 1	Scope 2	Total Scope 1 & 2	Scope 3	Total Scope 1, 2 & 3
244	1,307	1,551	232,666	234,216

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1. Purpose of this document

Conversio has been engaged by Christchurch International Airport Limited ('CIAL') to prepare this greenhouse gas ('GHG') inventory report ('carbon footprint') for the reporting year 2020-21 ('FY21') to support CIAL in to assist in maintaining their current Airport Carbon Accreditation at Level 4 – Transformation.

The ACA program is a global carbon management certification program for airports. It independently assesses and recognises the efforts of airports to measure, manage and reduce their GHG emissions through 6 levels of certification: 'Mapping' (Level 1), 'Reduction' (Level 2), 'Optimisation' (Level 3), 'Neutrality' (Level 3+), 'Transformation' (Level 4), and 'Transition' (Level 4+). CIAL is required to submit a carbon footprint annually of the airport's scope 1, 2 and 3 GHG emissions.

Additional requirements at Level 4 include the formulation of a long-term absolute reduction target for scope 1 and 2, or scope 1, 2 and selected scope 3 GHG emissions which is in line with the IPCC 1.5°C or 2°C pathways, development of a carbon management plan which sets out the reduction trajectory and the measures required to achieve the target, as well as the development of a stakeholder partnership plan which details GHG emissions reduction targets and measures leading to effective reductions of Christchurch International Airport's scope 3 GHG emissions.

This carbon footprint has been prepared in accordance with the requirements set out under ISO 14064-1:2018 (Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals), the GHG Protocol's Corporate Standard and Corporate Value Chain (Scope 3) Standard, as well as the requirements set out under the ACA for Level 4 accreditation. Organisational and operational boundaries are set according to the GHG Protocol.

Table 2 summarises the total scope 1, 2, and 3 GHG emissiones for FY21.

Table 2: Total scope 1, 2 and 3 emissions in tonnes CO_2-e in FY21

	Scope 1	Scope 2	Scope 1 + 2	Scope 3	Scope 1 + 2 + 3
FY21	244	1,307	1,551	232,666	234,216

2. Description of Christchurch International Airport

Christchurch Airport is located 10 kilometres northwest of Christchurch city centre, on the western city development edge and is a critical piece of significant national and regional infrastructure. CIAL is responsible for Christchurch Airport's efficient and safe operation and aims to provide the airport's diversity of users with modern, appropriate and competitive facilities and services. Ownership of CIAL is shared 75% by Christchurch City Holdings Limited and 25% by the New Zealand Government.

As the international gateway for Christchurch and the South Island, Christchurch Airport is a major hub and the busiest and most strategic air connection to the world's trade and tourism markets. The airport is New Zealand's second-largest airport, with 12 partner airlines coming from 25 destinations. It provides a significant contribution to both the Canterbury region and the South Island, with the total airport operation employing more than 6,500 employees across a diverse range of companies.

A record 6.93 million passengers travelled in and out of Christchurch Airport in the 2019 financial year. That's more than six times the population of the South Island! Key international markets where Christchurch grew faster than the rest of New Zealand were China (+7.3%), Hong Kong (+21%), Japan (+11.6%) and Malaysia (+9.2%).

3. Reporting requirements

CIAL has been participating in the ACA program at Level 2 since 2018 and has upgraded to Level 4 in late 2020. The ACA requires that emissions are reported in line with the GHG Protocol and that airports also identify where they have direct control over emissions (generally scope 1 and 2 emissions) and where they can guide or influence emissions from other organisations' activities and facilities (mainly scope 3).

As a requirement for accreditation at Level 4, CIAL needs to submit an annual carbon footprint of the airport's scope 1 and 2 emissions, as well as relevant scope 3 emissions. The ACA program recommends that all relevant data and information for establishing the carbon footprint be consolidated into a carbon footprint report. This document serves as that carbon footprint report.

Another requirement of Level 4 accreditation is that the airport aligns its absolute long-term target with the IPCC's 1.5°C or 2°C pathways and demonstrates progress against this trajectory. This carbon footprint report should be updated annually to allow comparison of annual GHG emissions, ensure the airport stays within 15% of that trajectory, and meet the long-term targets and interim milestones.

4. Methodology

4.1 Standards and guidelines

- The requirements set out in the ACA Application Manual, Issue 12, October 2020,
- The New Zealand Ministry for the Environment's Measuring Emissions: A Guide for Organisations, MfE Guide 2020 ('Detailed Guide 2020'),
- ISO 14064 Greenhouse gases Part 1: Specification with guidance at the organization level for the quantification and reporting of greenhouse gas emissions and removals,
- The relevant GHG Protocol standards and guidance, specifically the
  - Corporate Accounting and Reporting Standard (revised edition),
  - Corporate Value Chain (Scope 3) Accounting and Reporting Standard,
  - Technical Guidance for Calculating Scope 3 Emissions (version 1.0), and
  - Scope 2 Guidance.
- The guidance and recommendations set out under the
  - Airports International Council's Guidance Manual: Airport Greenhouse Gas Emissions Management, and
  - Airport Cooperative Research Program's Guidebook on Preparing Airport Greenhouse Gas Emissions Inventories.

4.2 Emission factors

In establishing the GHG inventory, Conversio used emission factors and calculation methodologies available in:

- The Detailed Guide 2020,
- The Airport Council International's Airport Carbon and Emissions Reporting Tool ('ACERT'), and
- The ICAO CORSIA CO_2 Estimation and Reporting Tool.

4.3 Method for calculating emissions

Unless otherwise stated, the method for calculating GHG emissions associated with fuel and electricity consumption is as follows:

- Petrol consumption: Amount of the liquid fuel delivered for the facility during the year as evidenced by invoices issued by the vendor of the fuel;
- Diesel oil consumption: Amount of the liquid fuel delivered for the facility during the year as evidenced by invoices issued by the vendor of the fuel;

- Liquefied petroleum gas consumption: Amount of the liquid fuel delivered for the facility during the year as evidenced by invoices issued by the vendor of the fuel;
- Electricity consumption: Based on supplier invoices; and
- Refrigerant use: Based on amount topped up during reporting year as reported by supplier.

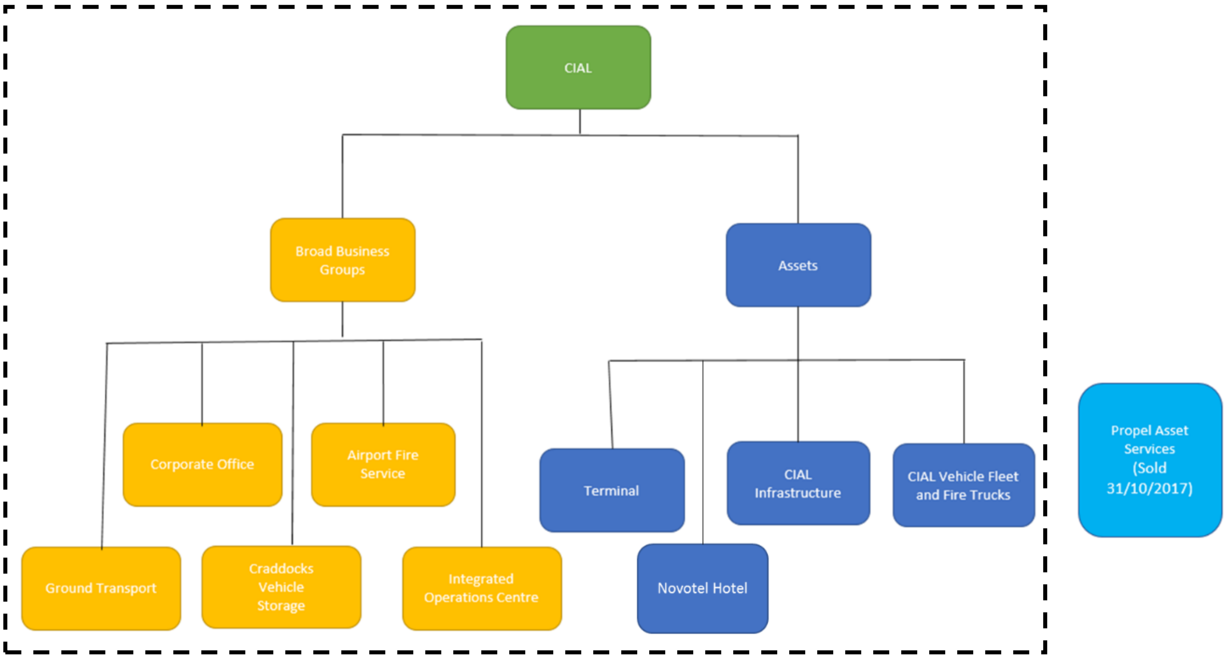
4.4 Rounding of amounts

If the amount for tonnes CO_2-e worked out under a carbon footprint is not a whole number, the number is rounded up to the next whole number if the number at the first decimal place equals or exceeds 5 and rounded down to the next whole number if the number at the first decimal place is less than 5.

5. Organisational boundary and operational control approach

The organisational boundary determines which parts of CIAL are included in the GHG inventory. In the context of airport operations, determining greatest authority to introduce operating, health and safety, and environmental policies can be complex. They may be dependent on the contractual relationship between various parties. In some circumstances, the greatest authority will rest with CIAL as the corporation with day-to-day on-site managerial responsibility. This, however, must be balanced against the ability to introduce operating and environmental policies, which can sometimes rest with the tenant.

Figure 1: Organisational boundary



CIAL has adopted the following position:

- Where tenants are separately metered and billed by the electricity or gas provider or sub-metered within the airport and have the ability to control their own energy use, these are treated as facilities outside CIAL's operational control;
- Where CIAL purchases electricity or gas from a provider and on-sells it to sub-metered tenants who have the ability to control their own energy use, the associated emissions are treated as being outside CIAL's operational control;
- Where sub-metered leased space is/becomes vacant, CIAL's assumes operational control until such time that space is leased by a tenant; and

- Where CIAL on-sell electricity but do not sub-meter electricity or gas, the associated emissions are treated as being within CIAL's operational control.

CIAL has also completed construction of a hotel on its property. CIAL has adopted the following position in determining operational control: CIAL owns the hotel, which is branded as Novotel. Hind Management operates the hotel on CIAL's behalf, and invoices will be paid from CIAL accounts. This approach aligns with the above position of assuming operational control when CIAL is the entity paying for energy invoices.

6. Operational boundary

The operational boundary determines which emission sources will be quantified. Participation in the ACA program at Level 3 requires that all scope 1 (direct), scope 2 (indirect), and all relevant scope 3 (other indirect) emissions be reported.

6.1 Greenhouse gases

Emissions from carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), specified kinds of hydrofluorocarbons and (HFCs) are included in this GHG inventory. Emissions are measured in tonnes of carbon dioxide equivalent (t CO_2-e). The carbon dioxide equivalent (CO_2-e) allows the different greenhouse gases to be compared on a like-for-like basis relative to one unit of CO_2. CO_2-e is calculated by multiplying the emissions of each of the four GHGs covered in this report by its 100-year global warming potential (GWP) specified in the IPCC's Fourth Assessment Report.

6.2 Definition of scopes

The ACA program uses the GHG Protocol's operational boundary definitions for describing direct and indirect emissions. As such, scope 1, scope 2 and scope 3 are defined as per the GHG Protocol and the ACA Guidance Document, Issue 11, page 13 (see also Figure 2 for an overview for emission sources as per ACA program):

- Scope 1: Direct GHG emissions that occur from sources owned and/or controlled by the airport, such as emissions from the combustion of fuels in owned/controlled generators and vehicles.
- Scope 2: Indirect emissions from the generation of purchased electricity consumed by the airport.
- Scope 3: All other indirect emissions, which are the consequence of the airport's activities, but occur from sources not owned and/or controlled by the airport, such as aircraft movements, GSE, transmission and distribution losses, APU usage, etc.

Figure 2: Emission sources at an airport

6.3 Data used for calculating GHG emissions and energy consumption

This GHG inventory is based on the best data available at time of compilation. The discussion of the individual emission sources includes references to the source documents and an outline of methodology and assumptions used in estimating emissions.

Data is aggregated by CIAL's accounting/finance and asset/environment teams.

Based on the data provided and methodologies applied, it is expected that the reported quantity of scope 1 and scope 2 GHG emissions is not significantly different to the true value.

CIAL respects tenants' legal rights to quiet enjoyment of tenancy and/or the need for information to remain commercial-in-confident, and therefore, cannot demand data. Instead, CIAL invites tenant and contractor participation in a voluntary data-sharing arrangement to estimate scope 3 GHG emissions where this information cannot be estimated using on-sold energy information.

This GHG inventory will be updated should more up-to-date or accurate methodologies and/or emission factors become available or if any significant errors (i.e. resulting in a difference in the reported GHG inventory of more than 5%) are identified.

6.4 GHG inventory categories (assumptions/limitations/justifications)

GHG emissions have been aggregated into the following categories:

- Direct GHG emissions from energy consumption, refrigerant use, and fire training;
- Direct GHG emissions from products used by CIAL;
- Indirect GHG emissions from imported energy;
- Indirect GHG emissions from stationary and transport energy consumption;
- Indirect GHG emissions from transportation; and
- Indirect GHG emissions from products and services used by CIAL.

This report is based on calculations that also use the classification of GHG emission sources outlined in ISO 14064-1. ISO 14064-1 no longer refers to scope 1, 2, and 3 emissions but differentiates between direct and indirect emissions only. The emission sources have been categorised and "translated" into the GHG Protocol's scope classification to facilitate consistency and understanding of the data and information provided.

As such, scope 1, scope 2 and scope 3 are defined as per the GHG Protocol:

- Scope 1: Direct GHG emissions that occur from sources that are owned and/or controlled by CIAL, such as emissions from the combustion of fuels in owned/controlled generators and vehicles.
- Scope 2: Indirect emissions from the generation of purchased electricity consumed.
- Scope 3: All other indirect emissions, which are the consequence of the activities of CIAL, but occur from sources not owned and/or controlled by CIAL.

Achieving a complete GHG inventory can require using less accurate or complete scope 3-related data, affecting accuracy and completeness. It can be difficult to determine or verify the source and quality of scope 3 emissions data supplied by third-parties, etc. This GHG inventory is considered to have achieved a sufficiently robust and balanced trade-off between tracking and reporting scope 3 GHG emissions.

6.4.1 Direct GHG emissions from stationary and transport energy consumption

The GHG inventory accounts for direct GHG emissions from diesel and petrol consumption and fire training (LPG, wood).

- Fuels used for transport energy purposes produce slightly different methane and nitrous oxide emissions than if the same fuels were used for stationary energy purposes. Whether fuel is accounted for as fuel for stationary or transport purposes is based on whether fuels are used to move a vehicle.
- Petrol and diesel premium products have been accounted for using the default emission factors for petrol and diesel. The resulting difference is negligible and does not constitute a risk of material misstatement.
- It is noted that in the Detailed Guide 2020, emission factors for fuel consumption are provided at a higher level (i.e., kg CO_2-e/litre) than those for scope 3 travel emission factors (kg CO_2-e/km based on vehicle age, engine size and engine type of vehicle).
- LPG has been accounted for as stationary combustion of LPG for commercial use.
- Extraction, production and transport of fuel emissions have not been estimated because the Detailed Guide 2020 does not provide corresponding emissions.

Table 3: Summary of method to estimate direct GHG emissions from stationary and transport energy consumption

Emissions calculation approach	Total GHG emissions (t CO_2-e) = [fuel consumed (litres/kg)] x [fuel type emissions factor (per litre/kg)]
Activity data source	FY20 ^LLLM 21 Carbon Footprint sources Master 250821.xlsx
Activity data	Fuels used by CIAL, fuel consumption under CIAL's operational control
Emissions factors	Detailed Guide 2020, Tables 3, 4, 5 & 6

6.4.2 Direct GHG emissions from fugitive emissions

CIAL voluntarily accounts for fugitive emissions (losses) from refrigerants for commercial air conditioning. These losses typically arise from gradual leaks during normal operation, losses during service and maintenance, major equipment failures, or decommissioning. Losses considered in this GHG inventory are from gradual leaks during normal operation. The estimation of stock HCFCs, HFCs, and SF_6 contained in any equipment would be based on the stated capacity of the equipment according to the manufacturer's nameplate. Losses considered in this GHG inventory are those from an estimated annual leakage rate (i.e., gradual leaks during normal operation).

Table 4: Summary of method to estimate GHG emissions from fugitive emissions

Emissions calculation approach	Total GHG emissions (t CO_2-e) = [refrigerant(kg) x [GWP(kg)]/1,000*[leakage rate]
Activity data source	FY20 ^LLLM 21 Carbon Footprint sources Master 250821.xlsx
Activity data	List of air-conditioning units under operational control of CIAL, refrigerant types, and refrigerant volumes
GWP and leakage rates	Detailed Guide 2020, Tables B1 & B2, IPCC/TEAP Special Report: Safeguarding the Ozone Layer and the Global Climate System

6.4.3 Direct GHG emissions from products used by CIAL

GHG emission sources included are fire extinguishers used in fire training and de-icing under the operational control of CIAL. Activity data has been entered into the ACERT and the corresponding GHG emissions estimate transferred into the calculation spreadsheet.

Table 5: Summary of method to estimate GHG emissions from fugitive emissions

Emissions calculation approach	Total GHG emissions (t CO_2-e) = [product used (litre/kg)] x [emission factor (per litre/kg)]
Activity data source	• FY20 ^LLLM 21 Carbon Footprint sources Master 250821.xlsx • FY 20 FY21 Deicing_Records_Master_Spreadsheet CIAL.xlsx
Activity data	• Amount of de-icing chemicals used • Total CO_2 in fire extinguishers
Emission factors	ACERT methodology

6.4.4 Indirect GHG emissions from imported energy

GHG emissions estimates associated with grid-purchased electricity are based on total grid-electricity delivered to CIAL facilities as evidenced by meters and utility invoices minus electricity on-charged to tenants.

Emission sources include grid-purchased electricity for the passenger terminal, AFS/IOC, the Novotel, as well as miscellaneous smaller sources, and transmission and distribution losses. This also includes electricity used for water pumps (ICPs can be isolated).

Information on electricity purchased by tenants directly from a supplier was not available. CIAL respects tenants' rights to quiet enjoyment of tenancy and/or the need for information to remain commercial-in-confident, and therefore, cannot demand data. Instead, CIAL invites tenant and contractor participation in a voluntary data sharing arrangement to estimate scope 3 GHG emissions where this information cannot be estimated using on-sold energy information.

Table 6: Summary of method to estimate GHG emissions from grid-purchased electricity

Emissions calculation approach	Total GHG emissions (t CO_2-e) = [electricity consumed (kWh)] x [Electricity grid emissions factor (per kWh)]
Activity data source	FY20 ^LLLM 21 Carbon Footprint sources Master 250821.xlsx
Activity data	• Grid-purchased electricity by CIAL. • Electricity on-charged to tenants. • For transmission and distribution losses, sum of all grid-purchased electricity.
Emissions factors	Detailed Guide 2020, Tables 9 & 11

The ACA program requires airports that operate in markets with access to contractual agreements to report scope GHG emissions using both the location-based and market-based approaches. The location-based approach uses the average emission factor specific to the grid on which the energy consumption occurs. In the case of CIAL, this is the New Zealand grid. As such, the scope 2 emission factor for purchased electricity is the same as the one in section 5.2 of the Detailed Guide 2020.

The market-based method reflects emissions from electricity purchases that companies have purposefully chosen in form of contractual instruments, such as green power options, renewable energy certificates ('REC's), carbon neutral electricity options, direct energy supply contracts, supplier-specific emission factors, or other emission factors representing the untracked or unclaimed energy and emissions (residual mix).

New Zealand does not publish a residual mix and CIAL does not use contractual agreements available in the New Zealand energy market. As such, the location-based and market-based emission factors for scope 2 emissions are deemed to be identical (see Table 7 for the emission factors associated with grid-purchased electricity).

Table 7: Electricity purchased from grid

Emission source	Scope	Unit	kg CO_2-e/unit
Purchased electricity	2	kWh	0.101
Transmission and distribution losses for electricity	3	kWh	0.0087

6.4.5 Indirect GHG emissions from stationary and transport energy consumption

CIAL accounts for GHG emissions associated with full flight (cruise, climb, and descent), auxiliary power unit ('APU') usage, as well as engine run-ups/testing, and tenant LPG and diesel usage.

- Fixed-wing aircraft with a maximum take-off weight ('MTOW') over 5,700kg: Used the ICAO CORSIA CERT. Half-way method used for MTOW over 5,700kg, apportioned 75% of emissions for MTOW less than 5,700kg and helicopters.
- Fixed-wing aircraft MTOW < 5,700kg: Used specific fuel consumption rating for each engine (or similar engine), total engine horsepower, total engine run time (hours, calculated based on route and aircraft cruise speed), and average throttle setting across entire engine run (percentage) to estimate emissions.
- Helicopters: Methodology under development as CIAL does not collect helicopter movement data on a regular basis. As helicopters don't need to operate from an aerodrome, more often than not the route data is incomplete, a flight time value of one hour is assumed. Also estimated is the average throttle setting of 75%.
- Electrified power supply (i.e. GPU usage) is included in scope 2 GHG emission estimate. APU usage assumes an average duration of APU operation before and after flights of 30 minutes for both small-medium and large aircraft. CIAL uses the ACERT to estimate this emission source. Average duration is entered under item 7.2 of the ACERT.

Table 8: Summary of method to estimate indirect GHG emissions from stationary and transport energy consumption

Emissions calculation approach	Total GHG emissions (t CO_2-e) = [fuel consumed (litres/kg)] x [emissions factor (per litre/kg)]
Activity data source	• FY20 ^LLLM 21 Carbon Footprint sources Master 250821.xlsx • Full Flight Emissions FY21 (1).xlsx • FY20 APU Emissions Summary.xlsx • Full Flight Emissions Rohan FY20.xlsx • ETMS Engine run totals for Audit Martin FY20 FY21.docx • ETMS carbon audit data Martin FY20 FY21.csv
Activity data	• CIAL flight data • Aircraft movements and type of aircraft • Number of engine run-ups
Emissions factors	ACERT and ICAO CORSIA CERT

6.4.6 Indirect GHG emissions from transportation

Business travel – flights

Business travel – flights emissions are based on pax.km which uses the distance between origin and destination airports. The Detailed Guide 2020 methodology does not account for distance flown to account for aircraft not taking the most direct route due stacking, weather and traffic.

Table 9: Summary of method to estimate GHG emissions from business travel - flights

Emissions calculation approach	Total GHG emissions (t CO_2-e) = [distance travelled pax.km)] x [emissions factor (per pax.km)]
Activity data source	FY20 ^LLLM 21 Carbon Footprint sources Master 250821.xlsx
Activity data	Flight segments, i.e. origin and destination airports
Emissions factors	Detailed Guide 2020, Tables 36 & 40

The GHG emission estimates include a multiplier to estimate the total impact of aviation on the climate, i.e., the commonly referenced radiative forcing index. While the choice of a multiplier is not necessarily incorrect, radiative forcing is not the correct metric for determining air travel's impact on climate change or the total climate response to long-lived gases. Using CO_2, CH_4 and N_2O emissions together with a radiative forcing index would lead to double-counting of CH4 and not consider the effect of the release of nitrous oxides (NOx) on CH_4 (i.e., destruction thereof) and in turn a decrease in ozone.

The IPCC's fourth assessment report confirms that radiative forcing does not attempt to represent the overall effect on climate change. Radiative forcing and the radiative forcing index were not intended to be used to measure the effect of aviation on the climate.

Business travel – accommodation

Hotel stay emissions are based on travel data provided by CIAL. The number of room nights (number of rooms booked, not number of guests) is then multiplied by a country-specific GHG emission factor.

Table 10: Summary of method to estimate GHG emissions from business travel - accommodation

Emissions calculation approach	Total GHG emissions (t CO_2-e) = [Hotel night stays per country] x [Hotel stay emissions factor]
Activity data source	FY20 ^LLLM 21 Carbon Footprint sources Master 250821.xlsx
Activity data	Room.nights in New Zealand
Emissions factors	Detailed Guide 2020, Table 42

Ground access

Ground access GHG emission estimates are calculated using the ACERT and include staff commute. Access figures are estimates based on the volumes of entries and exits into CIAL car parks. It is assumed that 88% of vehicles use petrol with the remaining 11% using diesel, natural gas (or are hybrid or electric vehicles), that 25% of light duty vehicles use petrol with the remaining 75% using diesel and that shuttles, vans and buses use diesel.

Table 11: Summary of method to estimate GHG emissions from ground access

Emissions calculation approach	ACERT
Activity data source	• FY20 ^LLLM 21 Carbon Footprint sources Master 250821.xlsx • Ground Access data Malcolm FY20.xlsx
Activity data	• Airport operator employee commuting • Busses, shuttles • Cars, taxi, rideshare • Tenant staff/ visitor vehicles
Emissions factors	ACERT

6.4.7 Indirect GHG emissions from products and services used by CIAL

De-icing

Table 12: Summary of method to estimate GHG emissions from fugitive emissions

Emissions calculation approach	Total GHG emissions (t CO_2-e) = [product used (litre)] x [emission factor (per litre)]
Activity data source	• FY20 ^LLLM 21 Carbon Footprint sources Master 250821.xlsx • FY 20 FY21 Deicing_Records_Master_Spreadsheet CIAL.xlsx
Activity data	Amount of de-icing chemicals used
Emission factors	ACERT methodology

Waste disposal to landfill

Waste disposal to landfill does not include recycling or document management (which have been assigned a zero-emission factor). Organic was not assumed to be collected separately. CIAL waste to landfill is classified as commercial waste.

Table 13: Summary of method to estimate emissions from waste disposal to landfill

Emissions calculation approach	Total GHG emissions (t CO_2-e) = [total mass of waste (t))] x [emissions factor]
Activity data source	FY20 ^LLLM 21 Carbon Footprint sources Master 250821.xlsx
Activity data	Tonnes of waste picked up by contractor.
Emissions factors	Detailed Guide 2020, Table 78

Water and wastewater

GHG emissions from water and wastewater treatment include activities as they relate to sourcing water, its treatment, transmission, and reticulation components of the water supply network.

Table 14: Summary of method to estimate GHG emissions from water and wastewater

Emissions calculation approach	Total GHG emissions (t CO_2e) = [Total volume of water consumption] x [water supply and wastewater treatment emissions factor]
Activity data source	FY20 ^LLLM 21 Carbon Footprint sources Master 250821.xlsx
Activity data	Total litres of water supplied and sent to wastewater treatment plants.
Emissions factors	Detailed Guide 2020, Tables 63 & 64

6.5 GHG emission sources not accounted for in carbon footprint

The following emission sources have not been estimated in the carbon footprint:

- Stored CO_2 in fire extinguishers other than those used for fire training – The contribution of this emission source to the total carbon footprint is de minimis.
- SF_6 – CIAL is not aware of any SF_6 sources being used in airport operations.

7. GHG inventory

This GHG inventory is based on the best data available at time of compilation. Based on the data provided and methodologies applied, it is expected that the reported quantity of scope 1, 2 and 3 GHG emissions is not significantly different to the true value.

This GHG inventory will be updated should more up-to-date or accurate data, methodologies, and/or emission factors become available or if any significant errors (i.e., resulting in a difference in the reported GHG inventory of more than 10%) are identified.

Table 15: GHG emissions breakdown

Emission source	Scope	Tonnes CO_2-e	% of total GHG inventory
Diesel - stationary	1	141	0.06%
Diesel - transport	1	60	0.04%
Petrol - transport	1	13	0.01%
De-icing	1	11	0.00%
Fire training	1	9	0.00%
Refrigerants	1	9	0.00%
Electricity (incl. GPU)	2	1,307	0.56%
Aircraft full flight	3	213,811	91.27%
Ground access	3	15,631	6.65%
Aircraft APU	3	1,423	0.61%
Electricity – on-sold	3	517	0.22%
Diesel – transport, tenants	3	304	0.13%
Water and wastewater	3	276	0.17%
Electricity – transmission & distribution losses	3	152	0.07%
Waste to landfill	3	142	0.06%
Staff travel – air travel	3	105	0.04%
LPG – stationary, tenants	3	50	0.02%
Staff travel – accommodation	3	1	0.00%
De-icing – tenants	3	0	0.00%

8. Base year selection and GHG emissions recalculation policy

8.1 Base year selection

CIAL's selection of base year for the purpose of its GHG emissions inventory is 2015. The basis for the choice of 2015 as the base year is that it is the first year for which a complete set of GHG emissions inventory data was collected, and for which the GHG emissions will be able to be recalculated in later years (if needed), as required by ISO 14064-1, to enable a meaningful and consistent comparison of GHG emissions over time.

8.2 Recalculation policy

To enable a meaningful and consistent comparison of later years' GHG emissions against those of 2015, CIAL requires that a GHG inventory be recalculated in later years, as needed, to account for the following:

1. any structural changes to the organisation, where these include acquisitions and divestments, and the outsourcing and insourcing of GHG-emitting activities;
2. changes in GHG emissions calculation methodology that would result in a significant change to the GHG emissions figure; and
3. the discovery of an error, or a number of cumulative errors, that would have a significant impact on the GHG inventory.

8.3 Changes in organisational boundary

In general, GHG inventories are not recalculated for organic growth or decline. According to the GHG Protocol, "organic growth/decline refers to increases or decreases in production output, changes in product mix, and closures and openings of operating units that are owned or controlled by the company". Similarly, ISO 14064-1 states that organisations "shall not recalculate its base-year GHG inventory to account for changes in facility production levels, including the closing or opening of facilities".

The reason for this is that organic growth or decline results in a change of emissions to the atmosphere (as opposed to a mere transfer of emissions from one company's inventory to another in the case of a change in organisational structure) and therefore should be counted as an increase or decrease in CIAL's emissions profile over time.

However, the ACA has different requirements, which are outlined in the ACA Application Manual. To facilitate a like-with-like comparison of the three-year rolling average over time

- "In the case of divestment, the airport shall re-calculate the footprint for the past three years excluding the emissions from the asset which has been divested. These new historical emissions shall be used to calculate the average against which the current year's performance will be compared."
- "In the case of an airport investing in new assets, there will be a period of time where there is not sufficient data to provide a like-for-like comparison against their historical carbon footprints. To balance between the programme's wish to see the impact of the new asset as early as possible and this lack of historical data, until a new asset has been in operation for two full years, the emissions of the new asset shall be reported separately, not as part of the airport's main carbon footprint. Consequently, to identify reductions, only the emissions from the pre-existing asset will be compared to the airport's historical emissions. This will ensure a like-for-like comparison. Once the new asset has been in operation for more than two full years, its emissions data shall be included in the comparison using one of the two approaches set out [in section 8.9 of the ACA Application Manual."

When CIAL replaces an asset without a significant change to its operational boundary (e.g., an old cooling system with a new one), this is not defined as an investment or divestment for the purposes of ACA reporting.

8.4 Changes in calculation methodology

It is expected, and encouraged, that improvements to GHG emissions calculations will be made over time. Examples of improvements may include the use of a more accurate emission factor or the addition to the inventory of emissions sources that had previously been considered insignificant. When such improvements are made, the reason for the resulting change in emissions must be documented. Documentation should include details of the new emissions calculation methods used and/or new emissions sources added, any assumptions made, and those parties involved in the decision to make the change.

8.5 Discovery of significant errors

CIAL's GHG inventories will be recalculated in the case of the discovery of an error or a number of cumulative errors that would result in a significant change in the estimate of GHG emissions being reported. The need to recalculate the current or previous years' GHG inventories is based on determining whether the error(s) result(s) in a change (increase or decrease) in the reported GHG emissions of 10% or more.