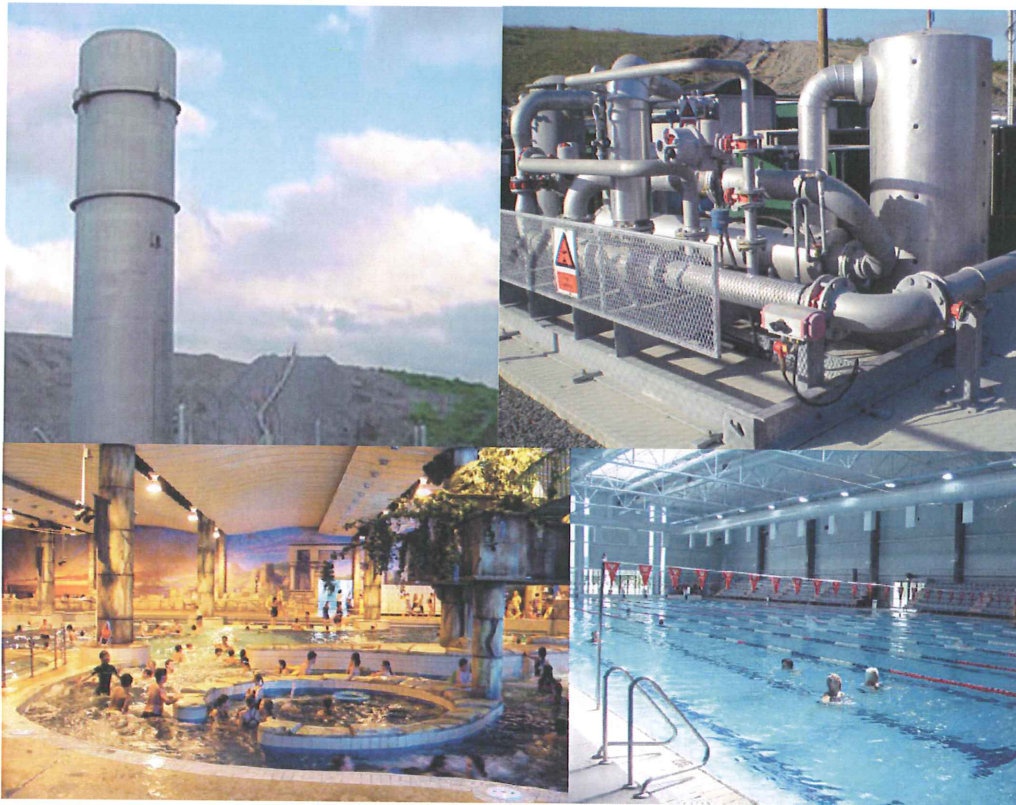


BURWOOD LANDFILL GAS UTILISATION PROJECT

KYOTO PROTOCOL JOINT IMPLEMENTATION PROJECT (TRACK 1)



ANNUAL EMISSION REDUCTION REPORT 2008 CALENDAR YEAR

CHRISTCHURCH CITY COUNCIL

TABLE OF CONTENTS

Document Control Register

Contact Details

Section 1: Project Information

- 1.1 Introduction
- 1.2 Project Team
- 1.3 Project Process Map
- 1.4 Methodology
- 1.5 Quality Assurance

Section 2: Emission Reduction Report

- Table 1. Emissions from Project Construction
- Table 2. Emissions from Project Operation
- Table 3. Electricity & Heat Production
- Table 4. Additional Electricity Production
- Table 5. Methane Combusted by Project
- Table 6. Emissions from Methane Combusted
- Table 7. Net Emission Reductions
- Table 8. Net Emission Reductions with Contract Ratio Applied
- Table 9. Metering & Recording Equipment Calibration
- Table 10. Emission Reduction Impediments
- Table 11. Confirmation of Methodology Applied

Unit Transfer Details

Front page photos from top left to bottom right: Flare at Burwood Gas Treatment Plant; Burwood Gas Treatment Plant; Pools at QEII Leisure Park.

Section 3: Appendices

A Supporting Documentation for 2008 Annual Report:

- A.1** Emission Reduction Data & Calculations 2008
- A.2** Examples of Raw Landfill Gas Data Files
- A.3** Burwood Gas Treatment Plant Power Usage Data
- A.4** Gas Metering Calibration Certificates
- A.5** Schematic and Process & Instrumentation Diagrams of Burwood Landfill Gas Treatment Plant
- A.6** Project Achievements in 2008

B Additional Background Documentation Available on Request:

- B.1** QEII Boiler Efficiency Tests & Historic Emissions
- B.2** QEII Boiler Specifications
- B.3** Project Determination Report (DNV)
- B.4** Project Verification Report (GHD)

DOCUMENT CONTROL REGISTER

Document Version	Date Version Created	Last Edited By	Final Version Quality Checked By	Final Version Approved By	Date Final Version Approved
1	11-12-2008	GE			
2	05-01-2009	GE & TM			
3	27-01-2009	GE & TM			
Final	29-01-2009	GE	TM	MC	29-01-2009
Final (v2)	17-02-2009	GE	TM	MC	20-02-2009
Final (v3)	09-04-2009	GE	TM	MB (Acting for MC)	09-04-2009

CONTACT DETAILS

All correspondence with Christchurch City Council (CCC) regarding this report should be directed to:

Grant Evans (Project Administrator)

Postal Address: City Environment
Christchurch City Council
PO Box 237
Christchurch 8140
New Zealand

Email: grant.evans@ccc.govt.nz

Phone: +64 3 941 8366

Fax: +64 3 941 8987

CCC Web Address: <http://www.ccc.govt.nz>

SECTION 1: PROJECT INFORMATION

1.1 Introduction

Christchurch City Council (CCC), New Zealand, is pleased to submit the first of five annual reports regarding Emission Reduction Units (ERU's) for the Burwood Landfill Gas Utilisation Project, for the 2008 calendar year.

Burwood Landfill opened in 1984 for the disposal of municipal waste generated from Christchurch, accepting waste from both domestic and commercial sources. Approximately half of this waste is organic matter. In 2005, Burwood Landfill closed and a new landfill opened in Kate Valley, north of Christchurch. Since its closure, capping and planting have been carried out at Burwood Landfill as part of a rehabilitation programme before the site is vested as a reserve for recreational purposes.

The Burwood Landfill Gas Utilisation Project (also known as the Burwood Landfill Gas to QEII Park Project) is a Track 1 Joint Implementation Project (JI) under the Kyoto Protocol and an approved emission reduction project under the New Zealand Government's Ministry for the Environment "Projects to Reduce Emissions" (PRE) programme. Gas extracted from the landfill is used to replace Liquefied Petroleum Gas (LPG) used in boilers to heat swimming pools at the QEII Leisure Park, and flared at the Burwood Landfill Gas Treatment Plant. It is this use and destruction of landfill gas from which ERU's for the Burwood Landfill Gas Utilisation Project have been generated.

Note a contract amendment process is currently underway between the New Zealand Ministry for the Environment and CCC. This Amendment, once completed, will allow landfill gas currently being burnt in the flare at the Burwood Landfill Gas Treatment Plant to be piped and burnt (used beneficially) in the following facilities:

1. a co-generator gas engine located at QEII Leisure Park (fully commissioned and operational);
2. gas boilers at the Christchurch Art Gallery (scheduled for completion December 2009);
3. a tri-generator gas engine located in the new central city CCC Civic Offices (scheduled for completion July 2010);
4. a gas boiler at the Christchurch Wastewater Treatment Plant Biosolids Drying Facility (scheduled for completion September 2010).

The development of these facilities is underway and construction emissions will be measured and reported in the appropriate year.

A total of 48,338 ERU's have been achieved by the Burwood Landfill Gas Utilisation Project for the 2008 calendar year. Details regarding data and calculations for these ERU's can be found in Section 2 and Appendix A.1.

For further details regarding the Burwood Landfill Gas Utilisation Project itself, please refer to the final Project Design Document previously supplied, dated September 2007.

1.2 Project Team

The following CCC personnel are directly involved with the Burwood Landfill Gas Utilisation Project (note details differ slightly to those presented within the Project Design Document):

- Name:** **Mark Christison, City Water & Waste Unit Manager**
- Project Role:** Project Sponsor
- Project Responsibilities:** Support project staff where required.
- Brief Background:** Mark heads up CCC's City Water & Waste Unit and is ultimately responsible for the operation and maintenance of the city's water supply & wastewater infrastructure, and the provision of solid waste & recycling services to the community.
-
- Name:** **Grant Evans, Resource Analyst**
- Project Role:** Project Administrator
- Project Responsibilities:** Contract administration
Client and Government liaison
Administration of report audit process
Compilation and submission of annual emission reduction report.
- Brief Background:** Grant is primarily responsible for monitoring and reporting on solid waste & recycling performance for CCC, developing Levels of Service for management plans, and acting as Project Administrator for the Burwood Landfill Gas Utilisation Project.
-
- Name:** **Tony Moore, Principle Sustainability Advisor**
- Project Role:** Project Advisor
- Project Responsibilities:** Peer review and Quality Assurance of annual emission reduction reports.
- Brief Background:** Tony was responsible for establishing the Burwood Landfill Gas Utilisation Project on behalf of CCC and now acts as an advisor to CCC staff for this project. Tony plays a lead role in environmental sustainability for CCC, advising on a number of sustainability related issues within the city.
-
- Name:** **Dave Harris, Landfill Aftercare Manager**
- Project Role:** Site Manager
- Project Responsibilities:** Management of Burwood Landfill Gas Treatment Plant and associated equipment (including calibrations).
Management of emission reduction data collection.
Quality Assurance of emission reduction data.
- Brief Background:** Dave is the Landfill Aftercare Manager for CCC and manages the Gas Treatment Plant at the Burwood

Landfill. Dave is responsible for collecting, analysing and performing quality checks on data gathered for the Burwood Landfill Gas Utilisation Project.

Name: **Bill Kruhlenko, QEII Plant Manager**

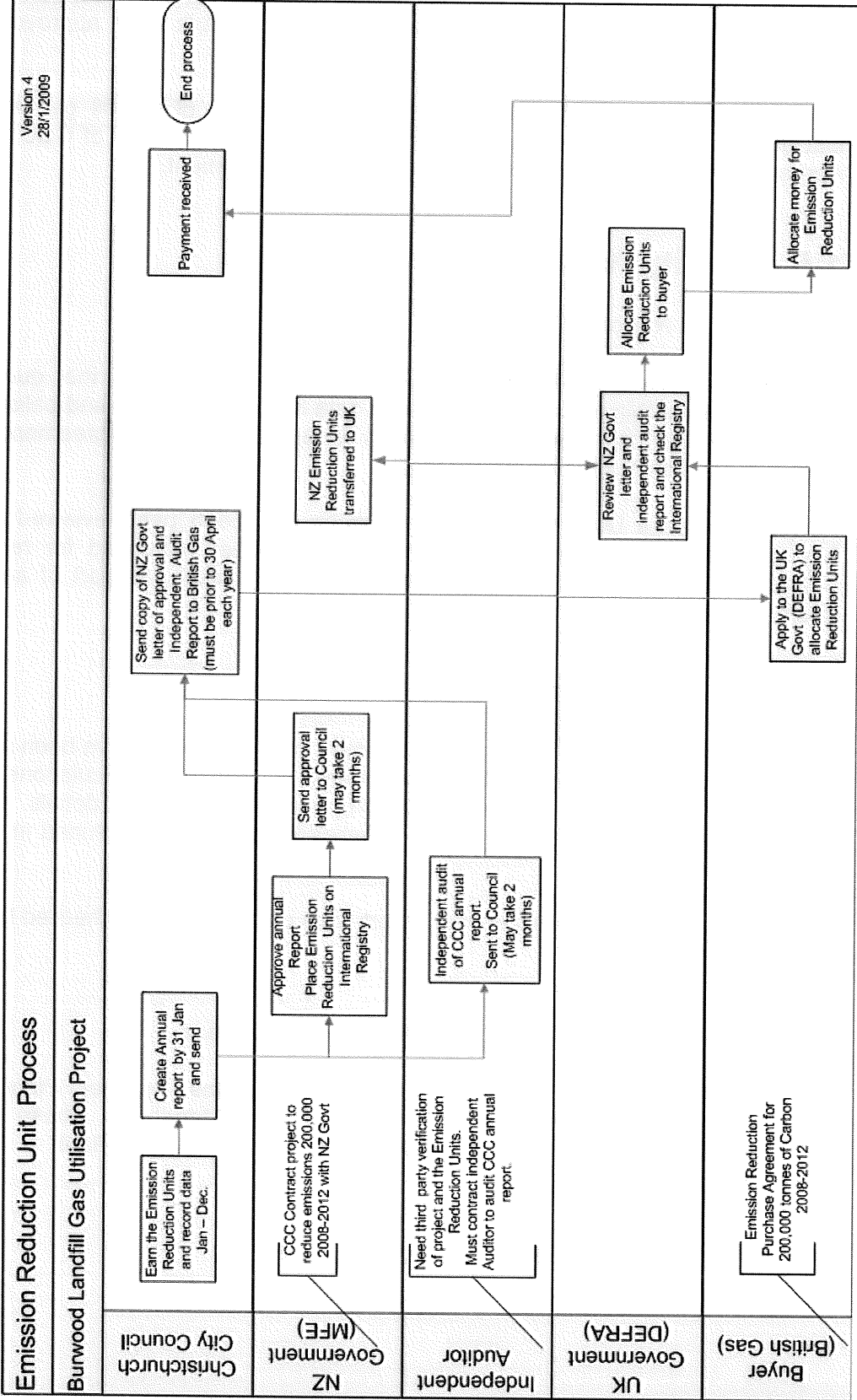
Project Role: Project Support

Project Responsibilities: Provide data and information regarding operation of QEII when required.

Brief Background: Bill manages the operation of plant at the QEII Leisure Park, for which some of the gas extracted from Burwood Landfill is being used to heat swimming pools.

1.3 Project Process Map

The process map below is an internal CCC document that demonstrates the flow of key tasks to be undertaken for the annual reporting of ERU's to the New Zealand Ministry for the Environment and British Gas (ERU buyer):



1.4 Methodology

Methodology adopted for the capture and burning of landfill gas by the Burwood Landfill Gas Utilisation Project (from which consequent ERU calculations have been developed) follows that of ACM0001 (Consolidated Baseline Methodology for Landfill Gas Project Activities) and AMS-III.B (Approved Small Scale Methodology - Switching Fossil Fuels). Both of these methodologies have been approved by the CDM Executive Board for JI projects.

Further to the above, the measurement and recording of landfill gas and ERU calculations have also been undertaken as per Schedule 2 and 4 of CCC's Project Agreement with the New Zealand Ministry for the Environment.

1.5 Quality Assurance

1.5.1 Annual Report

The Project Team have made best endeavours to ensure the quality and completeness of this report and supporting data & documentation, and believe these documents meet the reporting requirements under CCC's Project Agreement with the New Zealand Ministry for the Environment.

This report has a Document Control Register, has been peer reviewed by Tony Moore (Principle Sustainability Advisor), and has been approved for release by CCC's City Water & Waste Unit Manager, Mark Christison, as part of an internal quality process for the project.

1.5.2 Data for Annual Report

In terms of data quality, a number of automated integrity checks have been applied to raw data and formula used for the basis of emission reduction calculations. Please refer to the "Data_2008" worksheet within Appendix A.1 for further details. Note any data identified or deemed to contain anomalies have not been included in emission reduction calculations.

Data and calculations for this annual report have also been cross-checked by Project Team members.

1.5.3 Gas Treatment Plant & Landfill Site Management

Weekly visits to Burwood Landfill and the associated Gas Treatment Plant continue to be undertaken by Dave Harris (Landfill Aftercare Manager). These visits are primarily for gas monitoring purposes and to ensure the Plant is operating satisfactorily.

1.5.4 Project Audits

Previous audits have been undertaken on the Burwood Landfill Gas Utilisation Project by external organisations. These audits provide confidence in the quality and accuracy of data, information, and methodology used for the project. Copies of these audits are available on request and include a Determination Report received from DNV in 2008, and a Verification Report for the 2006 calendar year from GHD (referenced in the Table of Contents as Appendices B.3 and B.4 respectively).

Further to the above, this annual report is subject to a verification audit and will be undertaken by an external organisation.

SECTION 2: EMISSION REDUCTION REPORT**ANNUAL REPORT TEMPLATE FOR LANDFILL GAS PROJECTS (PRE 2)**

Project Title: Burwood Landfill Gas Utilisation Project

Description of Project: To capture and burn landfill gas for heating swimming pools at the QEII Leisure Park and flaring at the Burwood Landfill Gas Treatment Plant

Company: Christchurch City Council

Year Reported on: 2008 Calendar Year

(1) Break down and total of emissions generated during construction using the emission factors listed in Schedule 2 (if applicable to the year being reported on).

CONSTRUCTION EMISSIONS			
Element	Usage	Embodied emission factors	tCO₂-e
Diesel	0	0.00271 tonnes CO ₂ -e per litre	0
Petrol	0	0.00232 tonnes per CO ₂ -e per litre	0
Electricity purchased	0	625 tonnes CO ₂ -e per GWh	0
Iron/Steel – produced in New Zealand	0	2.01 tonnes CO ₂ -e per tonne	0
Aluminium – produced in New Zealand	0	1.62 tonnes CO ₂ -e per tonne	0
Cement	0	0.46 tonnes CO ₂ -e per tonne	0
			Total: 0

(2) Once abatement commences the following to be recorded if used in the operation of this project (if applicable):

Element	Annual Usage	Factor	tCO₂-e
Diesel	0	0.00271 tonnes CO ₂ -e per litre	0
Petrol	240 litres	0.00232 tonnes CO ₂ -e per litre	0.56
Electricity purchased	0.28714 GW hours	625 tonnes CO ₂ -e per GWh	179.46
Iron/Steel - produced in New Zealand	0	2.01 tonnes CO ₂ -e per tonne	0
Aluminium - produced in New Zealand	0	1.62 tonnes CO ₂ -e tonne	0
Cement	0	0.46 tonnes CO ₂ -e tonne	0
			Total: 180.02

Reminder: Emission Reductions cannot exist until after the requirements of 4.4 have been met.

- (3) (a) If the project produces electricity, a record of the quantity of electricity exported by the Project during the year.**
- (b) If the project produces steam/hot water, a record of the quantity and energy content of the steam/hot water generated by the Project during the year¹.**
- A statement of the heat plant efficiency and the equivalent quantity of fuel displaced**

Element and Measure	Total
(i) Electricity (GWh)	0
OR	
(ii) Steam (tonnes)	0
(iii) Steam (energy content)	0
(iv) Hot Water (tonnes)	0
(v) Hot water (energy content)	26,191.39 GJ (QEII Boilers 1 & 2 only)
(vi) Heat Plant efficiency	Boiler 1: 81.2%; Boiler 2: 90.1%
(vii) Equivalent quantity of fuel displaced ²	1,056,871 litres LPG

NB: Emission factor to convert heat output to LPG displaced is 0.06537 tCO₂-e per GJ's of heat output.

- (4) (a) If the project produces electricity, identify and measure any other generation that is not part of the project that flows through the above meters. (This generation to be subtracted from the metered electricity generation to determine the electricity output of the project).**

Measure	Total
Electricity (GWh)	0

- (b) If the project produces steam/hot water, identify and measure any other steam or hot water generation that is not part of the project that flows through the above meters. (This generation to be subtracted from the metered steam/hot water generation to determine the heat output of the project).**

Measure	Total
(i) Steam (tonnes)	0
(ii) Steam (energy content)	0
(iii) Hot Water (tonnes)	0
(iv) Water (energy content)	0

¹ Need to take account of any condensate return

² Calculated after subtracting any figures recorded in 4 (b)

(5) Tonnes of methane combusted. This will be calculated from the weekly methane content measurements in accordance with the methodology set out in Schedule 2 of the Project Agreement. Please append the raw data, calculations and explanatory notes.

Measure	Total (Tonnes)
<i>Methane combusted in landfill flare & gas treatment plant</i>	2,074.45
<i>Methane combusted in QEII Boiler 1</i>	516.22
<i>Methane combusted in QEII Boiler 2</i>	28.09
<i>Methane combusted in co-generator</i>	Not included
Total Methane combusted³	2,618.76 <i>(Please refer to Appendix A.1 for further details)</i>

(6) A calculation showing tonnes of CO₂ emitted by the project as a result of methane combusted. (Tonnes of methane combusted; multiplied by 44/16).

Measure	Total CH₄	Total t CO₂-e
Tonnes CO ₂ emitted	2,618.76	7,201.59

³ Corrected for temperature, pressure and water content

(7) A record of the amount of tCO₂-e Emission Reductions resulting from the Project during the year determined by the relevant emission factors as per Schedule 2 of the Project Agreement.⁴ The construction emissions should be subtracted from this total for each of the years that are reported on when construction takes place. Once abatement commences the total of any emissions recorded in (2) above should be subtracted from the total.

Element	Annual Production	Factor	t CO ₂ -e
Electricity generated (GWh) (3)(a)(i)	0	625 tonnes per GWh	0
OR	0		0
Steam/hot water generated (tonnes) (3)(b)(ii)/(3)(b)(iv)	0	As per schedule	0
Steam/hot water Energy content generated (heat output) (3)(b)(iii)/(3)(b)(v)	26,191.39 GJ	0.06537 tonnes CO ₂ -e per GJ's of heat output	1,712.13
Methane Combusted (6)	2,618.76 tonnes	21 t CO ₂ -e per tonne methane	54,993.94
		Total	56,706.07
		Less construction emissions and/or other project emissions (1),(2)	180.02
		Less tonnes of CO ₂ emitted by the project as a result of methane combusted (6)	7,201.59
		Less other generation <u>not</u> part of the project, recorded by the meters (625 tonnes per GWh) (4)(a)	0
		Less steam/hot water energy content (heat output) <u>not</u> part of the project (4)(b)	0
		Net Emission Reductions for the Year	49,324.47

⁴ Conversion into tCO₂-e

___The tCO₂-e in respect of each of the quantities used in, purchased by or introduced into the project, the electricity or steam/hot water generated and the methane combusted in the project will be calculated according to the conditions and emission factors set out in Schedule 2 of the project agreement.

(8) Emission Units claimed for the year using the emission ratio "C" set out in Clause 5.1 of the Project Agreement.

49,324.47 (Table 7 total) x **0.98** (contract emission ratio) = **48,337.98** ERU's

(Please refer to Appendix A.1 for data and formula used to calculate the above Emission Reduction Units)

(9) Evidence that the metering and recording equipment has been certified by a reputable, independent quality assurance service provider.

Please refer to Appendix A.4 for certification.

Note the "GA2000" gas sensor/analyser that measures the composition of gas flow into the Burwood Landfill Gas Treatment Plant is calibrated on average every 6 months; "Fox Flow" meters that measure gas in-flow to the QEII boilers and co-generator are calibrated on average every 2 years (period required as per specifications, after installation).

(10) A statement detailing anything that has, or has the potential, to be an impediment to achieving the agreed emission reductions during commitment period one.

The Project Team of CCC are not aware of any issues that will impede our ability to achieve the emission reductions set out in our Project Agreement with the New Zealand Government's Ministry for the Environment.

(11) A statement identifying that this report:

- has been prepared using the methodology of Schedule 2 – Measurement of Emission Reductions
- meets all other requirements of Schedule 4 - Contents for Annual Reports of the Project Agreement.

The Project Team of CCC confirm that to the best of our knowledge, this annual report for the 2008 calendar year meets requirements of Schedule 2 and Schedule 4 of the Project Agreement with the New Zealand Government's Ministry for the Environment.

Signature:

John P. Bourke (Utility Unit Manager)

Position: City Water & Waste Unit Manager, Christchurch City Council

Date: 9 April 2009

Unit Transfer Details

Please Note: To obtain the emission reduction units you will need a NZEUR account to transfer the agreed/allowed Emission Units.

1	Project name:	Burwood Landfill Gas Utilisation Project
2	Name of the project developer:	Christchurch City Council
3	Project ID:	NZ-1000030
4	Calendar year for which units are being transferred:	2008
5	Participant's account identifier:	NZ-1149
6	Quantity of units (8):	48,337.98
7	Type of units:	Emission Reduction Units (ERU's)

Note: Units can only be awarded for Emission Reductions during CP1, i.e. from 2008 to 2012.

