



CANTERBURY REGIONAL COUNCIL

CAI LIDAR 2016-17

VOLUME 11317C02NOK

Summary

Project

AAM was engaged by Canterbury Regional Council to undertake the Aerial Imagery and LiDAR survey over selected sites in the Canterbury Region. This volume contains data collected over Selwyn, Ashburton, Methven, Lake Tekapo, Lake Ruataniwha, Rolleston, Lower Rangitata, Omarama, Otematata, Tekapo Twizel. This data is grouped into contiguous blocks on the HDD supplied.

LiDAR data was captured from a fixed wing aircraft between 7 Nov 2016 and 6 January 2017.

Data

LiDAR data and data products are supplied in this volume as follows:

- Classified Point Cloud in LAS 1.4
- Unclassified Point Cloud in LAS 1.4
- 1m Intensity Image in ECW
- 1m Digital Surface Model (DSM) in ESRI ASCII Grid
- 1m Digital Elevation Model (DEM) in ESRI ASCII Grid
- Breaklines as ESRI Shapefiles
- Base station data in excess of 6 hours, in RINEX format
- Flight Trajectories in Shapefile
- Project Extent and Tile Layout in Shapefile Format.

The vertical accuracy for the ALS data is 0.20 m, 95% confidence level (0.10m, 68%), and the horizontal accuracy is 1.00 m, 95% confidence level (0.50m, 68%). This dataset is supplied in NZTM, vertical datum NZVD2016.

(Ref PWNZ 11317C PW 27106C)

CONTENTS

Page Nos.

1. Project Report.....	3
2. Data Installation	5
3. Additional Services And Extra Data.....	6
4. Metadata.....	7
5. Accuracy.....	8
6. Conditions Of Supply	9
7. Validation Plots.....	10

1. PROJECT REPORT

Safety: No safety Incidents were reported during the project

Acquisition: Airborne Laser Scanning (ALS) data was acquired from a fixed wing aircraft on the following dates:

Date	Job No.	Flight Number or Daily Events	Area
05/Nov/16	11317C	Successful Capture - Flight 01	Ashburton, Waimate Coast
05/Nov/16	11317C	Successful Capture - Flight 02	Ashburton, Waimate Coast, Rakaia, Moeraki
06/Nov/16	11317C	Successful Capture - Flight 03	Ashburton, Lower Rangitata
07/Nov/16	11317C	Successful Capture - Flight 04	Lake Tekapo, Ashburton
27/Dec/16	11317C	Successful Capture - Flight 05	Rolleston
27/Dec/16	11317C	Successful Capture - Flight 06	Rolleston, Darfield
30/Dec/16	11317C	Successful Capture - Flight 07	Ashburton (refly), Methven
30/Dec/16	11317C	Successful Capture - Flight 08	Lake Tekapo
05/Jan/17	11317C	Successful Capture - Flight 09	Takapo Twizel, Ruataniwha, Omarama
05/Jan/17	11317C	Successful Capture - Flight 10	Otematata
06/Jan/17	11317C	Successful Capture - Flight 11	Hakataramea

Ground Support: GPS base station support was sourced from Global Surveys and GeoNET CORS operating in the area. The ground check points were field surveyed by Sounds Surveying Limited, these allowed an independent assessment of the accuracy of the ALS data.

Data Processing: Reduction of the ALS data proceeded without any significant problems. Laser strikes were classified into ground and non-ground points using a single algorithm across the project area. Manual checking and editing of the data classification further improved the quality of the terrain model.

Overage points have been identified by use of the overage flag, all points in the overage are candidate ground points.

Further Processing:

ArcGIS 10.1 Terrain Grids were derived using the Natural Neighbour interpolation. This method uses the closest triangles and applies weights to the proportionate areas from the grid cell centroid to interpolate the value. It uses known elevation data, it does not make any predictions regarding the surface and accurately depicts existing troughs and peaks in the data and supports irregular point spacing, which suits the nature LiDAR data.

The contours supplied on this volume are designated "ENGINEERING CONTOURS" only. They are compiled from a rigorous triangulation of the supplied data. No cartographic licence has been applied. They are intended to provide a visual representation of the terrain data, and are not suitable to be used as a cartographic map.

Data Presentation: The data provided on this volume has been supplied in accordance with a specification agreed with the primary client. Subsequent users experiencing difficulties in handling the data should please contact AAM to arrange a more appropriate data presentation.

Further Issues: There are no further issues to report.

Project Contacts:

Client

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Company

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AAM Data Analyst

AAM-MKS LiDAR Production Management

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2. DATA INSTALLATION

Data format : LAS, SHP, PDF
 Number & type of media : HDD
 Information files on media : Filelist_Volume_11317C02NOK.txt and
 Readme_11317C02NOK.pdf
 Data formatted on : 21/06/2017
 Disk volume : 11317C02NOK

README FILE

This document (Readme_11317C02NOK.pdf) is provided as an Acrobat file in this volume.

To open the file, double click on the PDF file to activate Acrobat Reader Software.

Adobe Acrobat Reader may be downloaded from:

<http://www.adobe.com/products/acrobat/readstep2.html>

LOADING NOTES

Data may be copied using a file copy utility such as Windows Explorer or similar.

FILE SIZES AND NAMES

Data is provided in LINZ NZTopo50, 1:2000 tiles 960m by 1440m to the following file naming convention:

1	Unclassified LiDAR Tiles	UNC_BX22_2016_2000_2501.las [PRODUCT_SHEET_YEAR_SCALE_TILE]
2	Classified LiDAR Tiles	C2_BX22_2016_2000_2501.las [PRODUCT_SHEET_YEAR_SCALE_TILE]
3	Intensity Imagery tiles	INT_BX22_2016_2000_2501.ecw [PRODUCT_SHEET_YEAR_SCALE_TILE]
4	DSM tiles	DSM_BX22_2016_2000_2501.asc [PRODUCT_SHEET_YEAR_SCALE_TILE]
5	DEM tiles	DEM_BX22_2016_2000_2501.asc [PRODUCT_SHEET_YEAR_SCALE_TILE]

(YEAR = Year Project Commenced Capture)

CLASSIFICATION

LiDAR Point Cloud Classification - formatted to comply with ASPRS Standard Classes.

Number	Point class	Description
1	Default	Unclassified
2	Ground	Bare ground
7	Low/high points	Spurious high/low point returns (unusable)
9	Water	Any point in water

3. ADDITIONAL SERVICES**Product Generation**

AAM can perform the following additional services on the data contained on this volume if required:

Change horizontal datum	: to another local grid
Alter geoid modeling	: by transforming ALS data to fit orthometric survey heights
Improve data classification	: by tailoring parameters to suit regional variations
Further classification	: assist building identification by further classifying non-ground strikes
Data thinning	: to remove superfluous points not adding to the terrain definition
Data subset	: by dividing the data into different tiles or polygons
Data presentation	: by creating contours, profiles, perspectives, flythrough, colour-coded height plots etc.
Ground truthing	: by comparing the ALS terrain model with extra independent height data
Data gridding	: to convert the measured spot heights into a regular grid
Extra data	: extra data was collected beyond that supplied on this volume (see below)
Intensity Image	: grayscale image created from laser's intensity returns
Fly – Through/3d Perspectives	: image draping /slope models

4. METADATA

SOURCE DATA

Item	Source	Description	Ref No	Date
Laser System	AAM	Q1560	11317C	<i>Refer to pg3 for capture dates</i>
GPS Base Data	AAM	Static GPS	11317C	"
Base Stn Coords	Global Surveys/GeoNET	CORS	11317C	"
Field Survey Data	Sounds Surveying	RTK GPS	11317C	27.11.2016 to 01.12.2016

LASER DATA CHARACTERISTICS

Characteristic	Description
Device Name	Q1560
Half Scan Angle	30 degrees
Laser Pulse Rate	230 kHz
Overlap Percentage	20%
Laser return	1 st , 2 nd , 3 rd and last
Laser Intensity	All returns
File Format	LAS 1.2
Horizontal Datum	NZGD2000
Vertical Datum	NZVD2016
Map Projection	NZTM
Vertical Accuracy Specification	±0.10m Standard Error (68% confidence level or 1 sigma)
Horizontal Accuracy Specification	±0.50m Standard Error (68% confidence level or 1 sigma)

REFERENCE SYSTEMS

	Horizontal	Vertical
Datum	NZGD2000	NZVD2016
Projection	NZTM	N/A
Geoid Model	N/A	NZGeoid2016

5. ACCURACY

PROJECT DESIGN ACCURACY

Project specifications and technical processes were designed to achieve data accuracies as follows:

	Measured Point	Basis of Estimation
Vertical data	0.10	Project Design
Horizontal data	< 0.50m	System specifications (1/5500 x flying height)
Test points	0.05m	Survey methodology used

Notes on Expected Accuracy

- Values shown are at 68% confidence interval, in metres.
- “Measured points” are those observed directly.
- Accuracy estimates for terrain modelling refer to the terrain definition on clear ground. Ground definition in vegetated terrain may contain localized areas with systematic errors or outliers which fall outside this accuracy estimate.
- Laser strikes have been classified into “ground” and “non-ground”, based upon algorithms tailored for major terrain/vegetation combinations existing in the project area. The definition of the ground may be less accurate in isolated pockets of dissimilar terrain/vegetation combinations.

LIMITATIONS OF DATA

- The definition of the ground under trees may be less accurate.

DATA VALIDATION

- Ground data in this volume has been compared to test points obtained by field survey and assumed to be error-free. The test points were distributed across the mapping area and located on clear open ground. Comparison was made of the field test points with elevations interpolated from measured data, and the mean difference was removed from the data. Final accuracy estimates after removing the mean offset yielded:

Site	No. of Sites/Points	Mean Difference (m)	Std Deviation (m)	RMS (m)
Ashburton	15 / 906	-0.004	0.063	0.063
Methven	2 / 111	-0.002	0.025	0.025
Selwyn/Rolleston	7 / 396	0.007	0.034	0.035
Darfield	2 / 128	0.002	0.022	0.022
Omarama	2 / 84	0.002	0.018	0.018
Otematata	1 / 29	-0.003	0.016	0.016
Tekapo Twizel Ruataniwha	7 / 414	-0.005	0.040	0.040

- Data classification has been manually checked and edited against any available imagery.

USE OF DATA

- Intended use : Preliminary Design subject to final survey
- Intended use : Planning, Conceptual Design
- Intended scale of use : 1:1000

6. CONDITIONS OF SUPPLY

The data in this volume has been commissioned by **CANTERBURY REGIONAL COUNCIL (the CLIENT)**.

The data in this volume is provided by AAM NZ Limited (AAM) to **the CLIENT** under the Contract for Services, Contract No. C16C/164909, dated 16 September 2016.

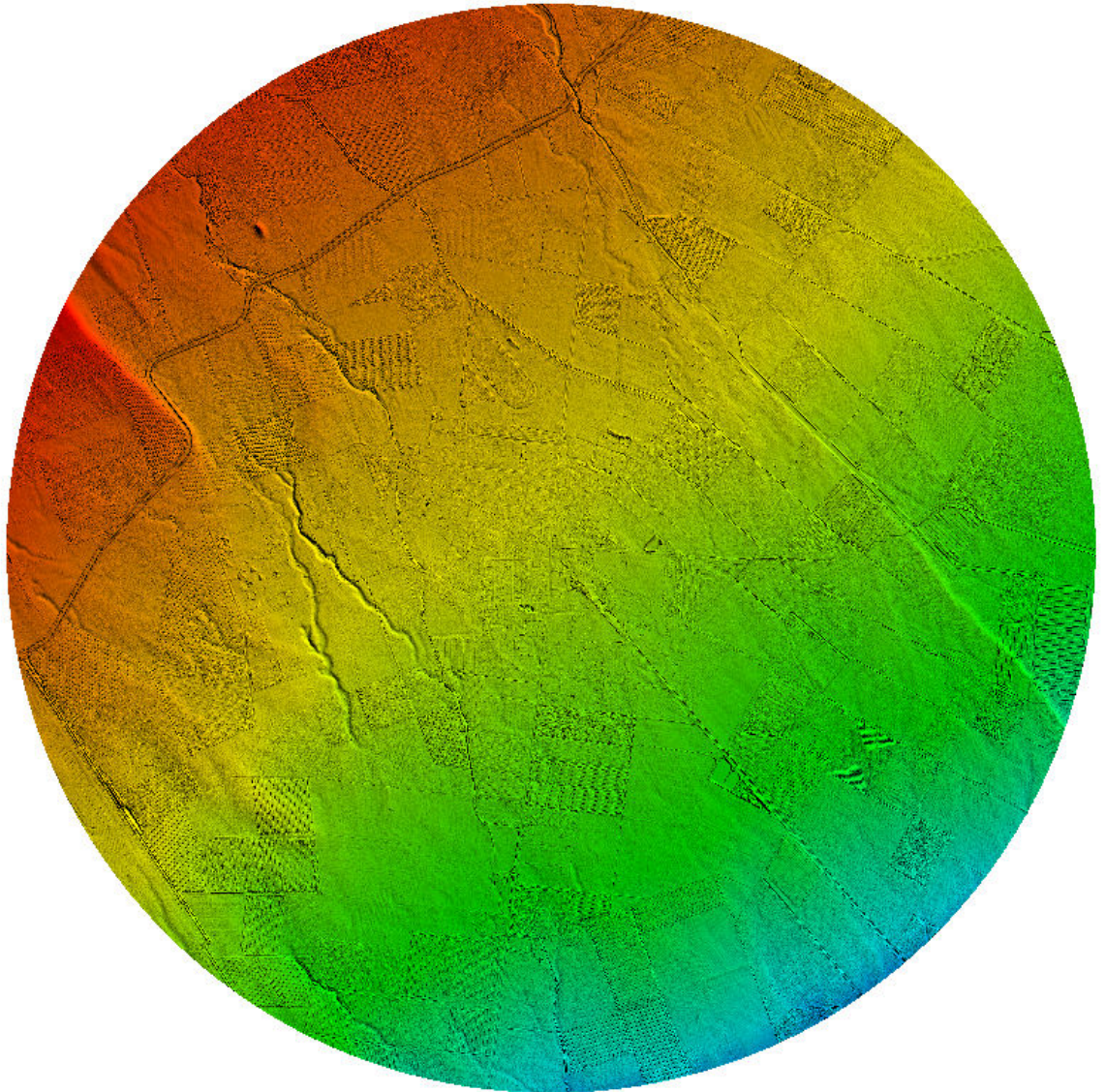
1. This file (Readme_11317C02NOK.pdf) should always be stored with the unaltered data contained in this volume.
2. The data should not be used for purposes beyond that explicitly agreed in the description of the Services provided by AAM.

Any problems associated with the information in the data files contained in this volume should be reported to AAM NZ Limited. A complete list of project related contacts is listed on page 4 under the Project Report heading.

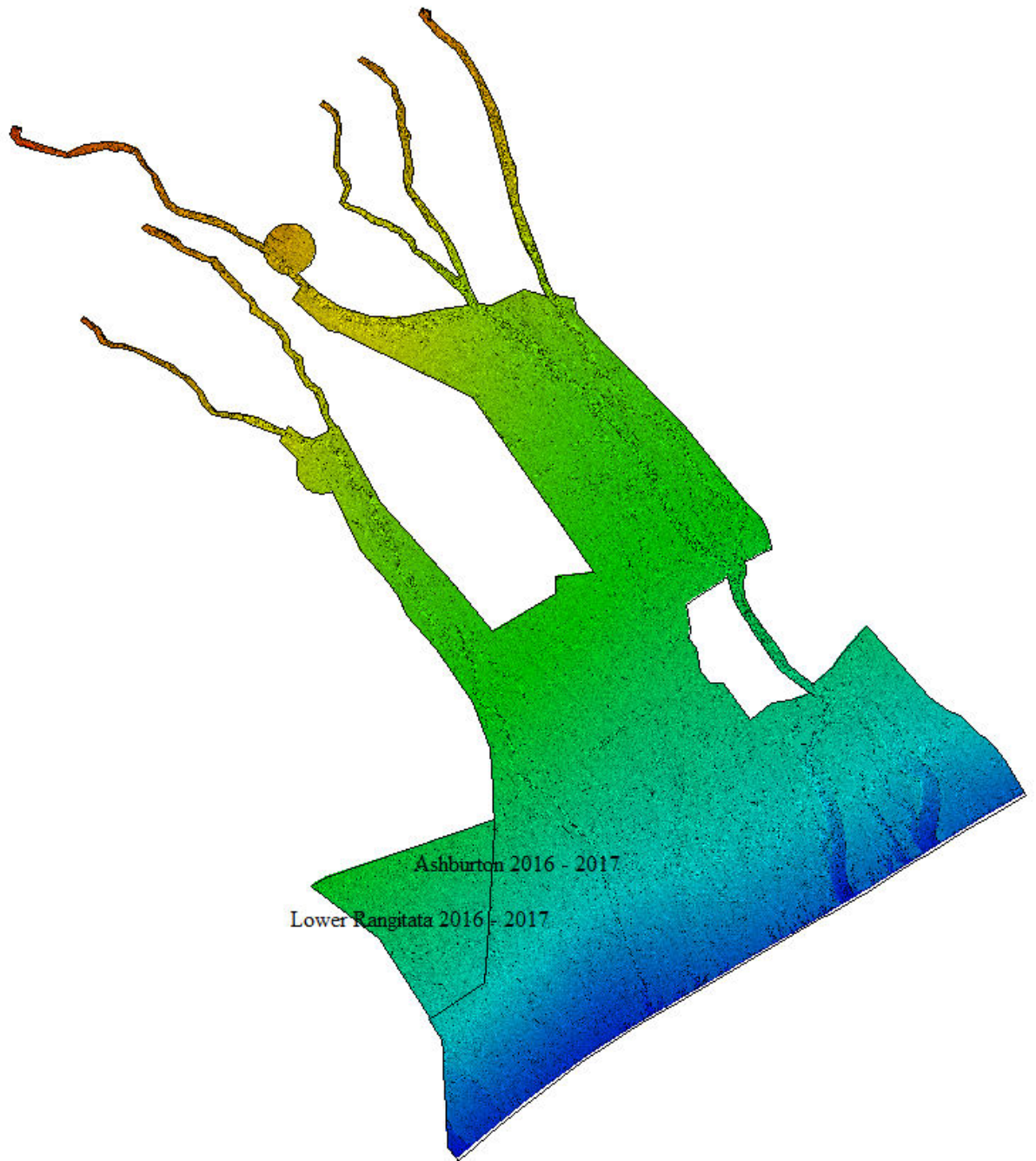
6 Ossian St,
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7. VALIDATION PLOTS

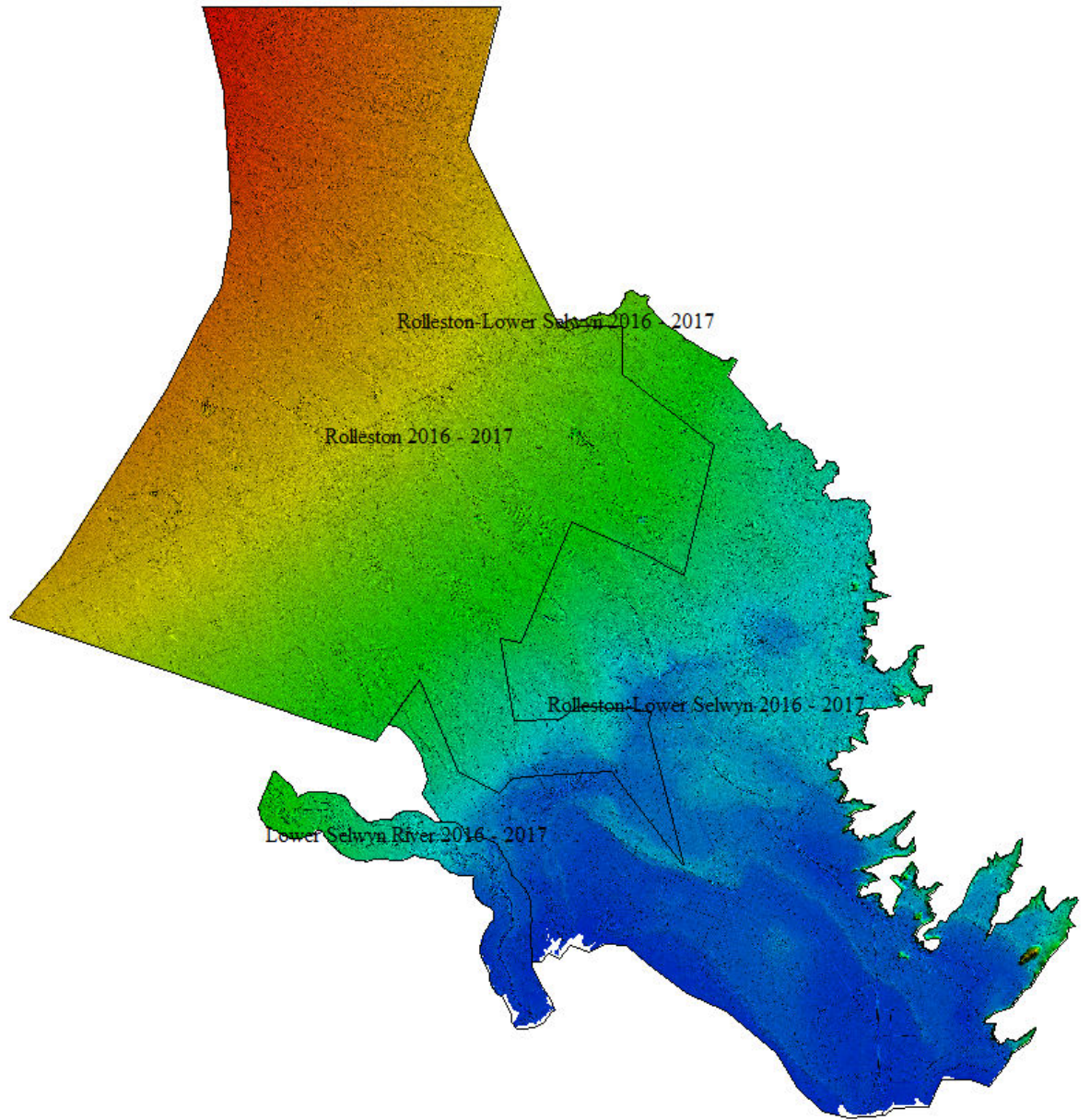
LIDAR coloured by elevation
Methven



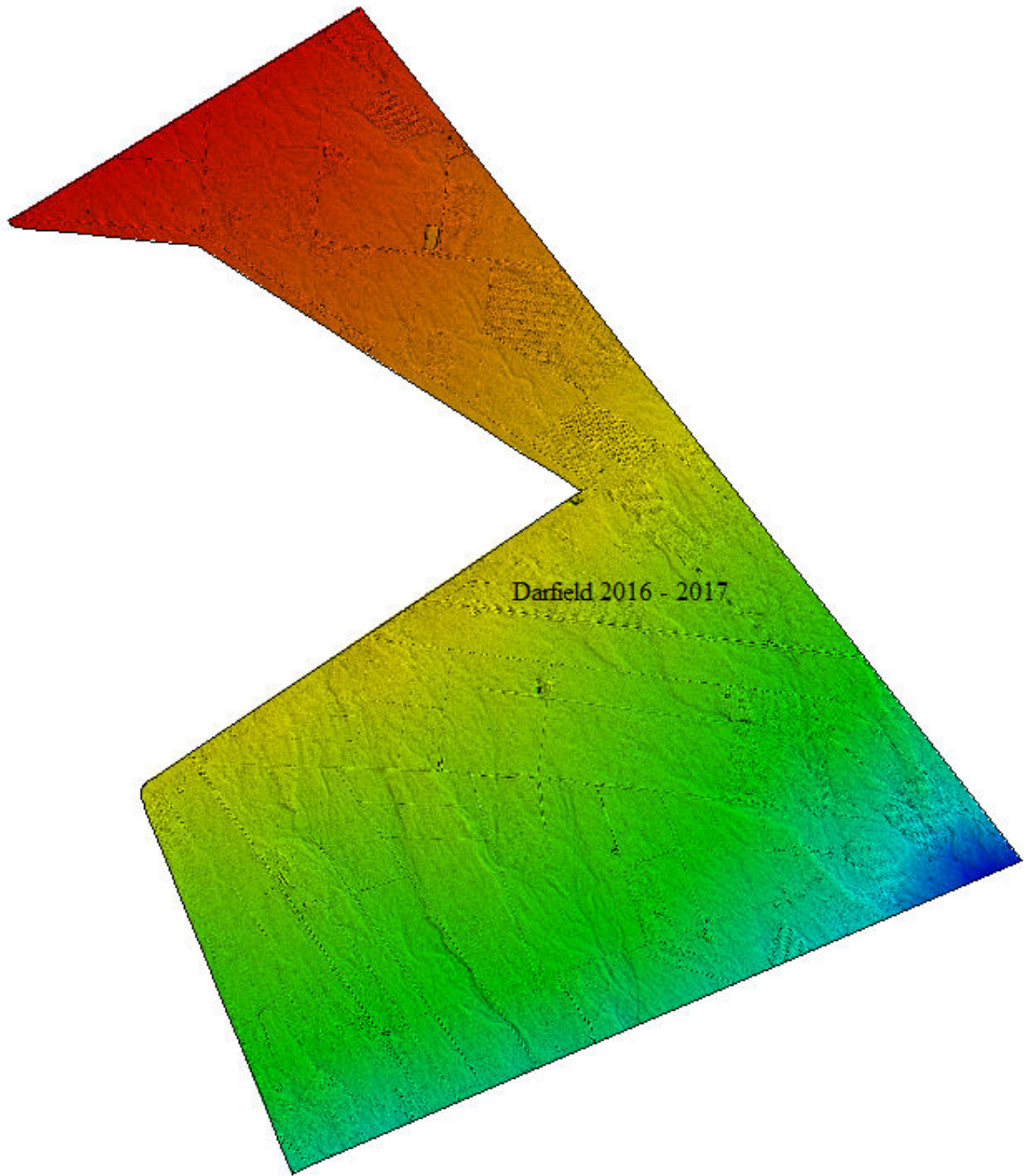
Ashburton / Lower Rangitata



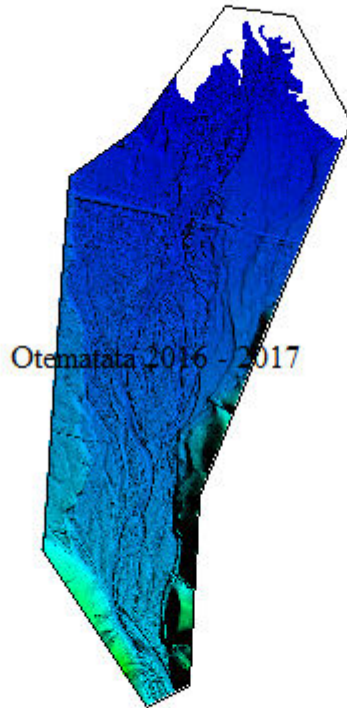
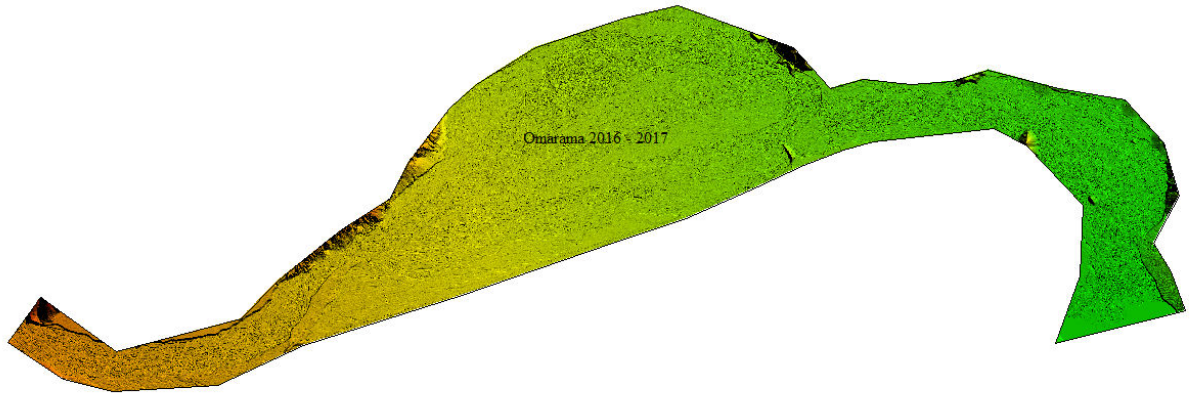
Rolleston / Lower Selwyn



Darfield



Omarama / Otematata



Lake Tekapo / Tekapo Twizel / Lake Ruataniwha

