DIGITAL DATA: DOCUMENTATION

CHRISTCHURCH CITY COUNCIL

CHRISTCHURCH AIRBORNE LASER SCANNING SURVEY

VOLUME 210013704NOB

Summary Data Description

Airborne laser scanning was captured over Christchurch and the adjoining Wiamakariri River between 06th to 9th of July 2003. The data contained within this volume relates to the trajectories and ASCII xyzi files.

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16 Julia Street Fortitude Valley Queensland 4006 Australia.
Facsimile: +61 (0)7 3620 3133 Telephone: +61 (0)7 3620 3111
Other Representatives: Sydney, Melbourne, Perth

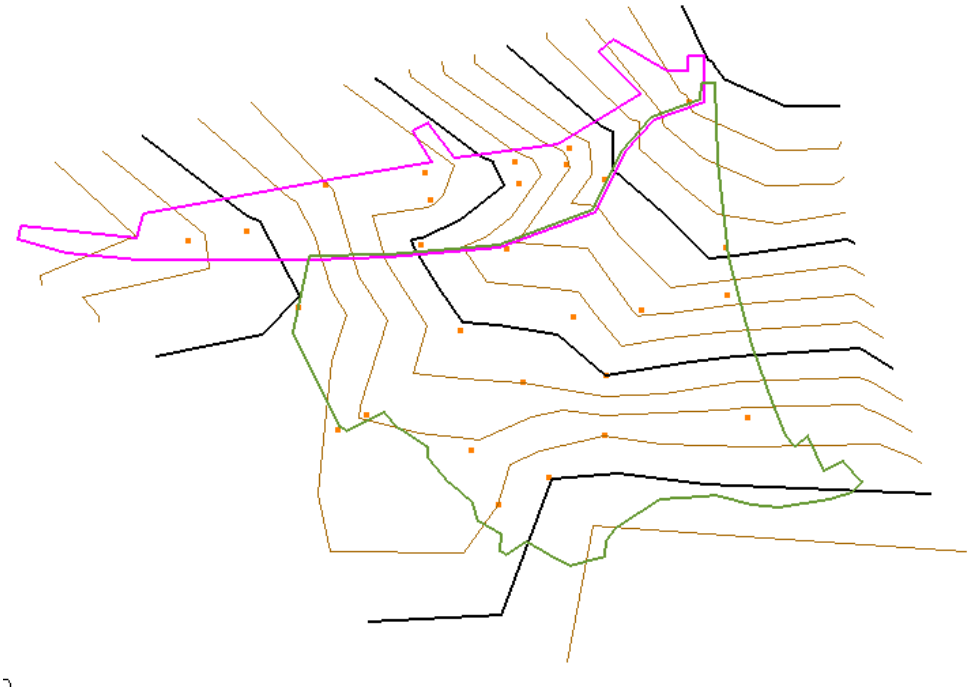
1. PROJECT REPORT

Acquisition: Airborne Laser Scanning (ALS) data was acquired from a fixed wing aircraft between 6th to 9th July 2003. Delays in acquiring the data were due to low cloud over the project area.

Ground Support: GPS base station support was provided by the client without incident. The ground check points acquired by the client allowed an 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 against low-resolution intensity imagery created by AAM further improved the quality of the terrain model.

Further Processing: A local geoid model was created covering the C.C.C and Waimakariri River project areas. The geoid separation between the ellipsoidal and local orthometric heights supplied was computed with a resulting N value. The geoid model was then derived using the N value separation and compared to the International geoid model EGM96 as used by the Concord Conversion program. The EGM96 geoid model is a generalised geoid model with minor variations existing with local project areas. Graphics indicated the EGM96 model with a gentle north/south slope. This was expected, as EGM96 is an estimated geoid model with long wavelength corrections. The local geoid is similar, with what appears to be a ridgeline running in a northeast to southwest direction. The outer extents of the geoid model were then extrapolated to cover the project area. The geoid model has been supplied as a dxf file. All data supplied within this volume has been adjusted to the AAMHatch geoid model.



AAM Local Geoid Model
0.05m Contours

The intensity value attributed each xyz laser point was used to derive a low resolution grey scaled image of the project area. Intensity data was also supplied in digital form being xyzi.

Time stamped flight path files have been provided in digital form for each flight. The time is noted as being GPS time, projection NZMG and the altitude of the aircraft being ellipsoidal heights. The GPS date is Week 1226.

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 AAMHatch to arrange a more appropriate data presentation

2. DATA INSTALLATION

Data format	:	Space delimited ASCII
Number & type of media	:	Two 700MB CD ROM
Media format	:	CD-ROM format
Number of files in dataset	:	42 files and 1 readme.pdf
Data formatted on	:	04.06.2004
Disk volume	:	210013704NOB
AAMHatch Job Managers	:	Mr. D. Jonas 07 3891 1033 Mr. B. O'Hagan 07 3891 1033

README FILE

This document (README.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 files have been ZIPPED to reduce their size.

To recover the data, double click on any of the zipfiles contained on the CD to activate winzip software. Winzip may be downloaded from http://www.winzip.com/

REVISION HISTORY

Volumes previously issued under this project include:

Volume	Date	Data Title	Contents
210013701nob	31.08.01	C.C.C. ALS Survey	All data products
210013702nob	19.12.03	C.C.C. ALS Survey	Additional data north of data supplied in Vol 210013701nob
210013703nob	01.12.03	C.C.C. ALS Survey	2m Gridded files

FILE SIZES AND NAMES

Data is provided in tiles 2km by 2km to the following file naming convention:

eg. CCC012.int
CCC - Christchurch City Council
.int - all laser returns including intensity in x,y,z,i format

A list of the files contained on this volume is provided in Section 7.

SAMPLE LISTING

XYZI data

```
2482601.460 5755566.880 1.460 22.0
2482600.050 5755570.580 1.390 24.0
2482599.570 5755571.150 1.330 26.0
2482601.230 5755561.560 1.360 20.0
```

Trajectory data

GPS-Time	Position		Ellip Ht
343021.0074	2493684.074	5741181.636	37.305
343021.0124	2493683.847	5741181.445	37.305
343021.0174	2493683.619	5741181.252	37.305
343021.0224	2493683.392	5741181.061	37.305

3. ADDITIONAL SERVICES

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

Change horizontal datum	:	to NZTM or other local grid
Improve data classification	:	by tailoring parameters to suit regional variations
Further classification	:	Assist building identification by further classifying non-ground strikes
Data subset	:	by dividing the data into different tiles or polygons
Data presentation	:	by creating contours, profiles, perspectives, flythroughs, colour-coded height plots etc.
Data gridding	:	to convert the measured spot heights into a regular grids

4. METADATA

DATA CHARACTERISTICS

Characteristic	Description
Format	ASCII
Size	62, 322, 988 data points
Captured terrain model	1.3m average point separation
Supplied terrain model	1.8m estimated point density, separated into ground & non-ground
Data thinning	Points not contributing to the terrain definition within 0.13m removed
Laser Intensity	Supplied on all returns
Laser footprint size	0.220m (0.2mrad)
Video	Captured over the project area
Further details	Geoid report methodology, emailed to John Walter on the 09/10/03 File name: geoid_report.pdf

REFERENCE SYSTEMS

	Horizontal	Vertical
Datum	NZGD1949	MSL
Projection	NZMG	N/A
Geoid Model	N/A	
Reference Point	Base Station A 5741299.943 N 2480731.527 E	Base Station A 35.877 RL

SOURCE DATA

	Source	Description	Ref No	Date
Laser scanning	AAM GeoScan	25,000 Hz	810215	6th – 9th July 2003
GPS base data	C.C.C.	Static GPS	810215	6th – 9th July 2003
Base Stn coords	C.C.C.	Unknown	810215	6th – 9th July 2003
Test points	C.C.C.	Unknown	810215	unknown
Geiod Model	C.C.C.	Unknown	810215	unknown

ACCURACY

	Measured Point	Derived Point	Basis of Estimation
Vertical data		0.07	Comparison with 155 test pts
		0.15	Deductive estimate
		0.14	Comparison with 25 pts used in geoid model calculations. This is a measure of system noise across the entire project site based on different flight runs and computed gps trajectories
Horizontal data	< 0.55		System specifications ($^{1}/_{2000}$ flying height)

ACCURACY NOTES:

- Values shown represent standard error (68% confidence level or 1 sigma), in metres
- "Derived points" are those interpolated from a terrain model.
- "Measured points" are those observed directly.

USE OF DATA

- Council planning and analysis

LIMITATIONS OF DATA

- The definition of the ground under trees and dense vegetation may be less accurate.
- The definition of the ground in steep heavily vegetated areas may be less accurate.

5. CONDITIONS OF SUPPLY

The data in this volume has been commissioned by **CHRISTCHURCH CITY COUNCIL**.

The data in this volume is provided to **CHRISTCHURCH CITY COUNCIL** under a license by which the data is not sold, lent or distributed to any other party; and used only for the project for which provided, subject to the following conditions:

1. This file (README.PDF) is always stored with the unaltered data contained in this volume.

2. The data is not altered in any way without the approval of AAMHatch. The data may be copied from this file to another.

3. The data is not used for purposes beyond that intended.

Any responsibility of AAMHatch is removed if any of these conditions is not observed.

4. AAMHatch maintains an archive copy of the data in this volume together with this README file for at least 7 years after delivery.

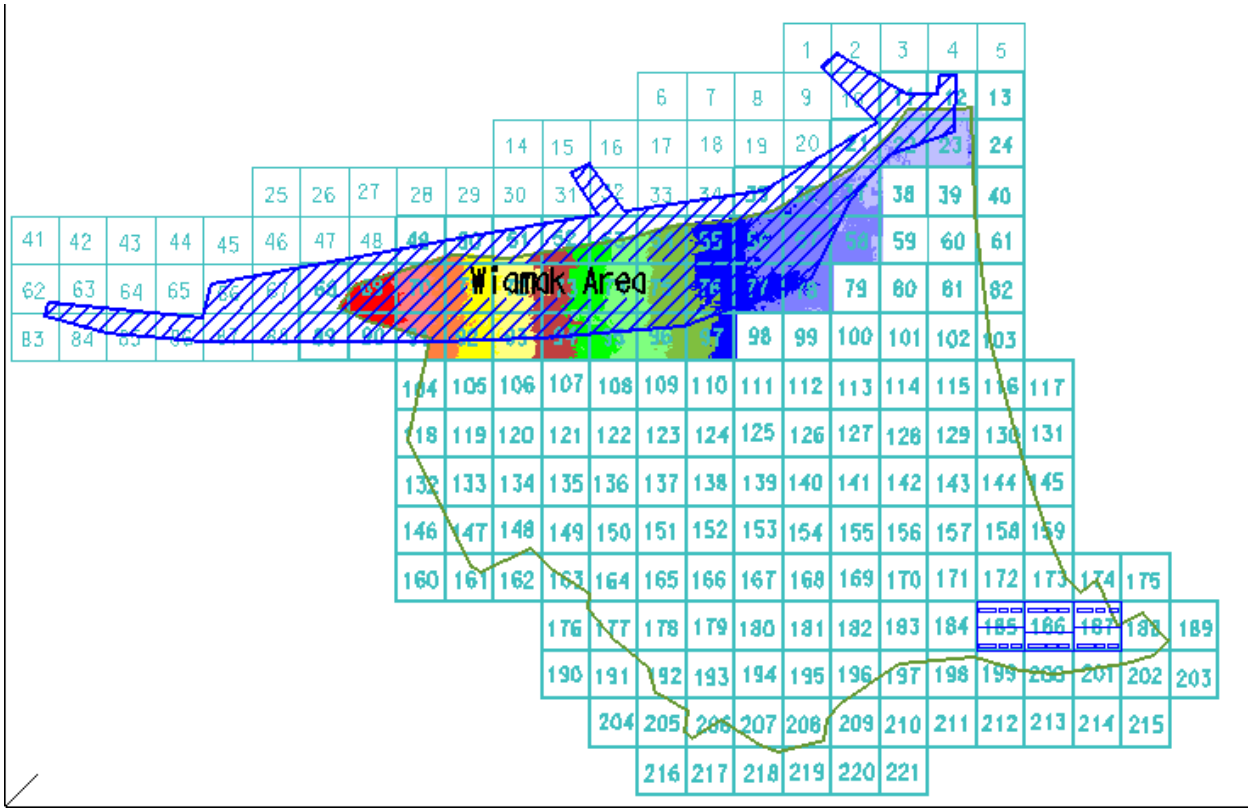
Any problems associated with the information in the data files contained in this volume should be reported to:

AAMHatch

16 Julia Street
FORTITUDE VALLEY
Queensland 4006
Australia
Telephone +61 7 3620 3111
Facsimile +61 7 3620 3133
Email info@aamhatch.com.au
Web www.aamhatch.com.au

6. VALIDATION PLOT

Supplied tiles



7. FILES SUPPLIED

Trajectories

```
01/12/2003  11:56a         179,824,450 Flt2.txt
01/12/2003  11:56a          69,999,490 Flt3.txt
01/12/2003  11:57a         100,432,280 Flt4.txt
01/12/2003  11:57a          72,312,349 Flt5.txt
01/12/2003  11:58a          53,842,297 Flt6.txt
```

ASCII XYZi files

```
31/05/2004  05:04p           5,990,911 ccc011.int
31/05/2004  05:04p           9,225,526 ccc012.int
31/05/2004  05:04p           9,788,476 ccc021.int
31/05/2004  05:06p          75,891,045 ccc022.int
31/05/2004  05:07p          81,119,672 ccc023.int
31/05/2004  05:07p           5,012,621 ccc035.int
31/05/2004  05:08p          43,425,098 ccc036.int
31/05/2004  05:09p          83,071,149 ccc037.int
31/05/2004  05:09p           3,843,001 ccc049.int
31/05/2004  05:10p          14,905,763 ccc050.int
31/05/2004  05:10p          13,401,443 ccc051.int
31/05/2004  05:11p          27,544,816 ccc052.int
31/05/2004  05:11p          43,393,163 ccc053.int
31/05/2004  05:12p          66,394,460 ccc054.int
31/05/2004  05:13p          80,983,793 ccc055.int
31/05/2004  05:15p          92,211,007 ccc056.int
31/05/2004  05:16p          89,633,226 ccc057.int
31/05/2004  05:17p          89,151,539 ccc058.int
31/05/2004  05:17p           4,052,585 ccc068.int
31/05/2004  05:18p          57,136,120 ccc069.int
31/05/2004  05:20p          81,786,776 ccc070.int
31/05/2004  05:21p          90,943,107 ccc071.int
31/05/2004  05:22p          89,272,258 ccc072.int
31/05/2004  05:23p          92,265,837 ccc073.int
31/05/2004  05:24p          94,010,060 ccc074.int
31/05/2004  05:26p          93,115,669 ccc075.int
31/05/2004  05:27p          89,265,740 ccc076.int
31/05/2004  05:28p          88,586,215 ccc077.int
31/05/2004  05:29p          88,830,972 ccc078.int
31/05/2004  05:30p          16,820,829 ccc090.int
31/05/2004  05:30p          56,812,037 ccc091.int
31/05/2004  05:32p          94,802,701 ccc092.int
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```
31/05/2004  05:33p          92,527,985 ccc093.int
31/05/2004  05:34p          94,505,733 ccc094.int
31/05/2004  05:35p          90,907,989 ccc095.int
31/05/2004  05:37p          90,834,551 ccc096.int
31/05/2004  05:38p          88,470,128 ccc097.int
```