

HAMILTON CITY COUNCIL

HAMILTON LIDAR 2023

VOLUME: PRJ43435_01-02

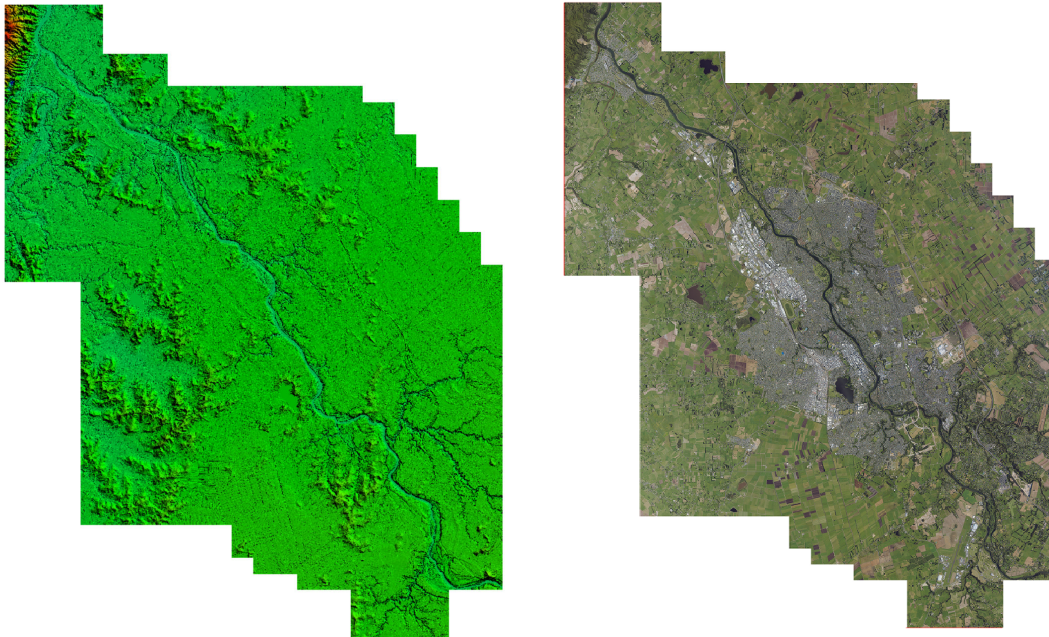
PROJECT SUMMARY

Hamilton City Council have contracted Woolpert to capture and process LiDAR over Hamilton 2023-2024 season.

This volume includes the NZVD2016 deliverables. DEM, DSM and LAS has been updated following client feedback.

Capture was completed on 11th November 2023.

The survey was planned to achieve $\leq 20\text{cm}$ vertical accuracy (95% CI), $\leq 100\text{cm}$ horizontal accuracy (95% CI) with an emitted pulse density of 8ppsm, and ground classification to ICSM level 2. Concurrent imagery was collected with the LiDAR to colourise the LiDAR and supplied as a Quicklook mosaic.



DATA SUMMARY

This volume includes the following data in NZTM2000 projection, NZVD2016 vertical datum:

- 1240 x NZ Topo50 1:1000 tiles
- Colourised Classified Point Cloud – LAS v1.4
- DEM 0.5m and 1m, hydroflattened, ESRI ASCII grid
- DSM 0.5m and 1m, hydroflattened, ESRI ASCII grid
- DEM 1m, hydroflattened, GeoTIFF
- DSM 1m, hydroflattened, GeoTIFF
- Intensity Images 0.2m gsd, GeoTIFF (NZVD2016 only)
- Quicklook Orthophoto Mosaic, JPG2000 format
- Contours 0.5m interval, ESRI Shapefile format. Attributes 0.5 = Minor, 1m = Intermediate, 5m = Major
- Contours 0.5m, DXF
- Contours 1m, DXF
- Contours 5m, DXF
- Unclassified Point Cloud – LAS v1.4
- Ancillary files in ESRI Shapefile format – Flightlines, Breaklines, Project Extent, Tile Index & Ground Control Data in xlsx format
- File listing in text file format
- Metadata file: This document in PDF format

CONTENTS

1. Data Information..... 4

2. Metadata 6

3. Conditions Of Supply 9

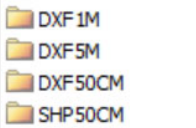
4. Validation 10

1. DATA INFORMATION

Data supply: AWS
 Number of files: 40,033 data files, 2 file lists, 1 metadata report
 Data formatted on: 04-07.03.2024. Amendments supplied 05.04.2024
 Metadata Document: This file

Previous Deliveries	Date	Title	Contents
PRJ43434_01	20.04.2023	Hamilton Imagery 2023	Proof of capture 50cm mosaic
PRJ43434_01	07.06.2023	Hamilton Imagery 2023	Final Imagery Products
PRJ43435_01	04.03.2024	Hamilton LiDAR 2023	NZVD2016 LAS, DEM, DSM, imagery
PRJ43436_01	06.03.2024	Hamilton Imagery 2024	Proof of capture 50cm mosaic
PRJ43435_01	07.03.2024	Hamilton LiDAR 2023	NZVD2016 Unclassified LAS, Contours
PRJ43435_02	05.04.2024	Hamilton LiDAR 2023	NZVD2016 LAS, DEM, DSM - rework

File Details of this Delivery	Contents
Hamilton_Quicklook_Mosaic_20231110_NZTM.jp2	12.5cm gsd imagery, JPG2000 format
Ancillary files: PRJ43435_01_HamiltonLiDAR2023_Extent_NZTM.shp PRJ43435_01_HamiltonLiDAR2023_Breaklines_Bridge_NZTM.shp PRJ43435_01_HamiltonLiDAR2023_Breaklines_NZTM.shp PRJ43435_01_HamiltonLiDAR2023_Flightlines_NZTM.shp PRJ43435_01_HamiltonLiDAR2023_TileIndex_NZTM.shp PRJ43435_Hamilton2023_Control_NZTM.shp	ESRI Shapefile format
Folder: Classified LAS e.g. CL2_BD33_2023_1000_1017.las	Colourised Classified LAS v1.4 format

Folder: DSM/1m e.g. DSM_BD33_2023_1000_1017.asc/prj & tif/tfw Folder: DSM/50cm e.g. DSM05_BD33_2023_1000_1017.asc/prj	DSM ESRI ASCII and GeoTIFF format DSM ESRI ASCII format
Folder: DTM/1m e.g. DEM_BD33_2023_1000_1017.asc/prj & tif/tfw Folder: DTM/50cm e.g. DEM05_BD33_2023_1000_1017.asc/prj	DEM ESRI ASCII and GeoTIFF format DEM ESRI ASCII format
Folder: Intensity e.g. INT_BD33_2023_1000_1017.asc/prj & tif/tfw	Intensity imagery 20cm gsd in GeoTIFF format
Folder: Unclassified LAS e.g. UNC_BD33_2023_1000_1017.las	Unclassified LAS v1.4 format
Folder: Contours  e.g. CONT_BD33_2023_1000_1017.shp e.g. CONT_BD33_2023_1000_1017.dxf e.g. CONT1_BD33_2023_1000_1017.dxf e.g. CONT5_BD33_2023_1000_1017.dxf	Contours in Shapefile and DXF format Attributes: Minor = 0.5m, Intermediate = 1.0m, Major = 5m 50cm contours Shapefile format 50cm contours DXF format 1m contours DXF format 5m contours DXF format
Readme_PRJ43435_01-02.pdf	Metadata Report
PRJ43434_01_File_list_20240305.txt PRJ43435_01_file_list_20240307.txt PRJ43435_02_file_list_20240405.txt	List of product files delivered in this volume

2. METADATA

Source Data	Source	Description	Ref No	Date
Imagery	AAM	Leica Terrain Mapper2-527	FL020819	10.11.2023
GPS Base Data	GeoNET /LINZ	GeoNET CORS - HAMT, LINZ GDB co-ordinates	As above	As above
Control	Sounds Surveying	RTK GNSS	PRJ43435	29-30.11.2023

LiDAR Characteristics	Description
Format	LAS 1.4
Emitted Density	8 ppm2
Tile size	480m x 720m (NZTopo50 1:1000 tiles)
ICSM Classification	Level 2. Ground surface improvement

Number	Point Class	Description	ICSM	CI %
1	Default	Unclassified	1	95
2	Ground	Bare ground	2	98
3	Low vegetation	< 2 m	1	95
4	Medium vegetation	2-8 m	1	95
5	High vegetation	> 8 m	1	95
6	Buildings, structures	Buildings, houses, silos etc.	1	95
7	Low Noise	Spurious low point returns (unusable)	1	95
9	Water	Any point in water	2	98
11	Road Surface	Sealed Public Roads	2	98
17	Bridge	Any bridge or overpass	2	98
18	High Noise	Spurious high point returns (unusable)	1	95

Ortho Characteristics	Description
Format	JPG2000
Ground Sample Distance	12.5cm
Terrain Model	Concurrent LiDAR
Tile size	480m x 720m (NZ Topo 50, 1:1000 tiles)
Sample Type	8-bit Integer
Image Bands	RGB
Orientation/AT	Direct Referencing
Capture Constraints	Nil

Reference Systems	Horizontal	Vertical
Datum	NZGD2000	NZVD2016
Projection	NZTM2000	N/A
Geoid Model	N/A	NZGeoid2016

Accuracy Specification	Measured Point	Derived Point	Basis of Estimation
Field Survey	5 cm		Survey methodology used
LiDAR (Horizontal)	< 100 cm		Project design
LiDAR (Vertical)	< 20 cm		Project design

Project specifications and technical processes were designed to achieve data accuracies as above.

Notes On Expected Accuracy

- Values shown represent 95% confidence level (2 sigma), in centimetres.
- “Derived points” are those interpolated from a terrain model.
- “Measured points” are those observed directly.
- Accuracy estimates for terrain modelling by LiDAR refer to the terrain definition on clear ground.

- 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 – LiDAR Data

- Vertical Accuracy Validation - Ground data in this volume has been compared to ~380 test points obtained by field survey and assumed to be error-free. The test points were distributed in 8 sites across the mapping area and located on clear ground. Comparison of the test points with elevations interpolated from measured data resulted in:

Mean difference:	0.003 m
St. Deviation:	0.043 m
Standard Error (RMS):	0.043 m or 0.085 m @ 95% CI

A shift of -0.067m was applied to the data, before testing against the test points to produce the results shown above.

- Horizontal Accuracy – the LiDAR point cloud was compared to survey data and found to fit well in position, within the specified range.
- Data classification has been manually checked and edited against available imagery.

3. CONDITIONS OF SUPPLY

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

The data in this volume is provided by Woolpert to **HAMILTON CITY COUNCIL** under the Terms of Engagement described in **MSA_HCC_AAM_08022023**. Which provides the client with unrestricted copyright to all delivered Imagery and LiDAR) data and reports, allowing it to release data for widespread re-use with a Creative Commons license (CC BY) with attribution to the buyer in line with the New Zealand Government Open Access Licensing framework (NZGOAL). This specification places no restrictions on the rights of Woolpert to resell data or derivative products.

1. This file (Readme_PRJ43435_01-02.pdf) will always be stored with the unaltered data contained in this volume.

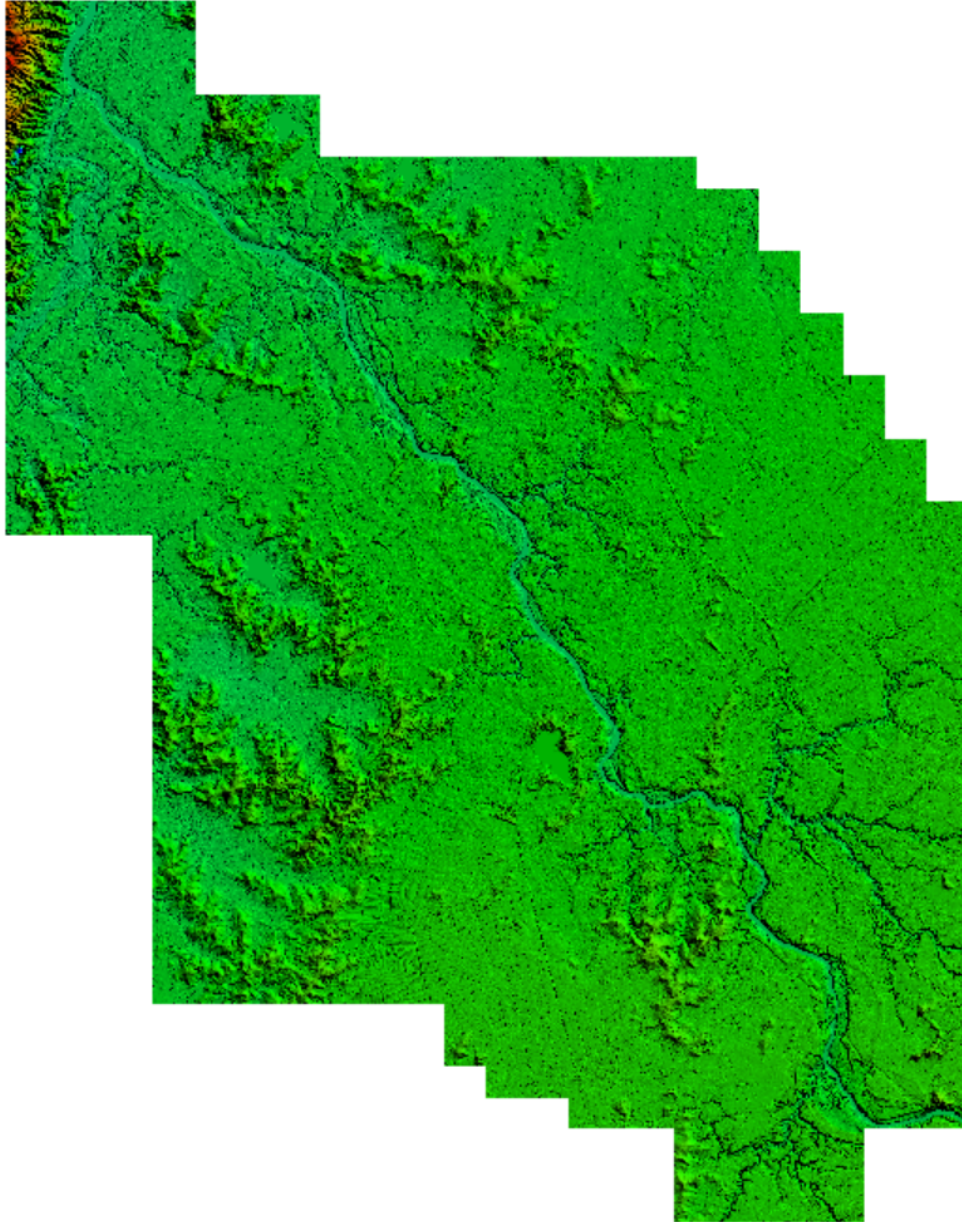
This data is provided in accordance with the specifications agreed with **HAMILTON CITY COUNCIL**. Any problems associated with the information in the data files contained in this volume should be reported to Woolpert, Asia-Pacific.

Woolpert NZ Limited
Level 1
6 Ossian St
Napier 4110
New Zealand

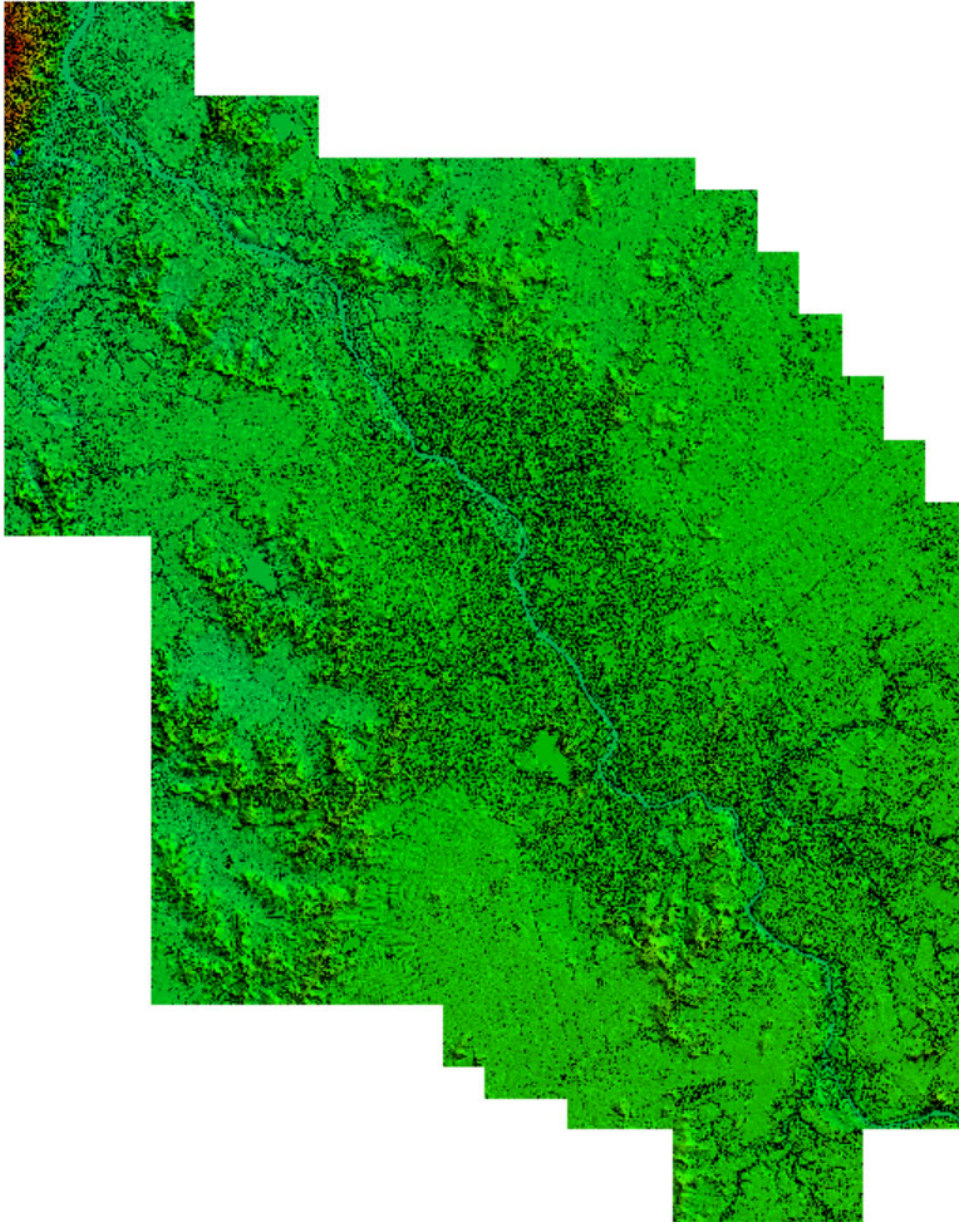
[woolpert.com](https://www.woolpert.com)
[Twitter](#) [Facebook](#) [LinkedIn](#) [Instagram](#)

4. VALIDATION

DEM



DSM



Imagery

