Data Supply Metadata s2

Project	Christchurch post 23 December 2011 Earthquake LiDAR	12.010
Client	EQC	
Client Contact	c/o Tonkin and Taylor - Sjoerd van Ballegooy	

Summary of Data	Following the series of earthquakes in Christchurch on 23 December 2011 NZ Aerial Mapping (NZAM) collected LiDAR sensor data over a 109 sq km area of interest. This data has been processed into the following digital mapping products: • Project extent data • Classified LiDAR point cloud data • DEM • 0.5m interval contours Please refer to the report section Product Generation and Data Supply for details on these products.

Data Acquisition	NZAM collected LiDAR over the project area on 17 and 18 February 2012. The ESRI shape file *CHCH dec2011 LiDAR_confirmed extent.shp* that accompanies the data contains the extent of the project. A map showing this extent is also included in *Appendix A*. The LiDAR sensor used for the collection was an Optech ALTM3100 (05SEN178). The data was collected flying 900m AGL and using sensor settings of 100kHz PRF, 48 Hz scan frequency, 41.6 degrees full field of view. To support the georeferencing of the sensor a GPS base station receiver was operated at a mark that NZAM established at Christchurch Airport. GPS base station data from Geosystems iBASE network were also used for georeferencing. Independent of this work Andersen & Associates Consulting Surveyors field surveyed LiDAR control sites. These were used to bring the LiDAR dataset into terms of the geodetic reference system at the time of the LiDAR survey. The field survey work was undertaken on 28 and 29 February 2012. The surveyors report for this survey work, *LiDAR Check Sites Feb 2012 Survey Report.pdf*, accompanies this dataset. GNS also provided NZAM with current coordinates for the Geosystems iBASE WIGRAM reference stations.

Data Processing	The LiDAR sensor positioning and orientation (POS) was determined using the collected GPS/IMU datasets and Applanix POSPac software. This work was all undertaken in NZGD2000 coordinate system, and made use of the data collected at the geodetic reference mark for the DGPS processing. The POS data was combined with the LiDAR range files and used to generate LiDAR point clouds in New Zealand Transverse Mercator (NZTM) map projection but NZGD2000 ellipsoidal heights. This process was completed using Optech LMS LiDAR processing software. The subsequent steps were undertaken using TerraSolid LiDAR processing software modules TerraScan, TerraPhoto and TerraModeler. The data was checked for completeness of coverage. The relative fit of data in the overlap between strips was also checked. The point cloud data was then classified into ground, first and, intermediate returns using automated routines tailored to the project landcover and terrain. The data was converted from NZGD2000 ellipsoidal heights into orthometric heights using the LINZ NZGeoid09 and offset separation model. Comprehensive manual editing of the LiDAR point cloud data was undertaken to increase the quality of the automatically classified ground point dataset. This editing involved visually checking over the data and changing the classification of points into and out of the ground point dataset. Supplementary points have been added in some locations to support hydrological flows around and along bodies of water. The height accuracy of the data for the total area has been checked using the combined data from twenty control sites that Andersen & Associates surveyed within the project area. This was done by calculating height difference statistics between a TIN of the LIDAR ground points and the surveyed points. The standard deviation statistic for the data is +/-0.04m. The positional accuracy of the data has been checked by overlaying Andersen & Associates surveyed data over the LIDAR data displayed coded by intensity. The data was found to fit well in position.

Product Generation & Data Supply	The supplied products are all in terms of New Zealand Transverse Mercator (NZTM) map projection and Lyttelton Vertical Datum 1937. The products are in NZTopo50 1:1,000 tiles. The ESRI shape file "tiles" that accompanies the dataset contains this tile layout. The folder *Layout* contains the data extent and tile layout files that have been described earlier. The *Contours* folder contains 0.5m contour interval contours. The contours were interpolated from a TIN created using LiDAR point cloud dataset. The data is in ESRI 3D polyline file format. The data contains the attribute fields TYPE [INDEX|INTER] and ELEVATION {m}. Every 5th contour in the dataset has TYPE=INDEX. The folder *DEM* contains a 1m GRID spacing DEM. This is in ESRI ASCII GRD file format. The DEM were created by interpolating values from TIN formed using the LiDAR points classified as ground and water and the supplementary points. The folder *Classified Point Cloud* contains the classified LiDAR point cloud dataset. This data is in LAS v1.2 file format. Data is contained in the point classes: 1 Unclassified, 2 Ground, 9 Water and 32 Non Ground. The points in class 32 are points that have been measured as having a height greater than 0.5m above the Ground points. They are the LiDAR returns from vegetation, buildings, bridges, cars and all other such items. The points in class 1 are those left over from the ground classification. The folder *DTM Point Cloud* contains the ground classified point cloud including the supplementary points. Data is contained in the point classes: 2 Ground, 15 Breakline points and 17 Waterbody points. If you have requirements for the data in other file formats, map projections please contact NZAM.
Quality Exceptions	There are no quality exceptions to note.

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Appendix A: Project Area and data tile layouts

Area of interest shown as purple outline.

Christchurch post 23 December 2011 LiDAR