Asset Module Metadata

Summary Information

Attribute	Details
Author(s)/Organisation	RiskScape (National Institute of Water and Atmospheric Research Ltd, GNS Science)
Contact Address	National Institute of Water and Atmospheric Research Ltd 301 Evans Bay Parade Greta Point Wellington 6021 GNS Science 1 Fairway Drive Avalon Lower Hutt 5011
Contact Email	info@riskscape.org.nz
Inventory Name	New Zealand Buildings
Inventory Description	The 'New Zealand Building' inventory developed for asset impact and loss modelling applications using RiskScape software. Building asset information relate to individual buildings defined as, a permanent enclosed structure including a roof, walls and one or more levels, which are used for a variety of activities.. Asset attribute information is stored and presented as vector point features.
Inventory References	Cousins, W. J. 2009. RiskScape – development of a default assets model for Hawke's Bay, *GNS Science Report 2009/50*. 33 p. King, A.B., Bell, R.G. (Programme Managers). (2009). RiskScape Project: 2004 - 2008. *NIWA Science Report 2009/75*. 172p.
Inventory Use Case Description	The 'New Zealand Building' inventory has been applied in a number of impact and risk modelling case studies. A selection of relevant studies are provided in the text box below. Most applications have involved the inventory use in earthquake, flood, tsunami, storm-tide and wind impacts or loss modelling to building damage states and reinstatement costs as well as indirect impacts such as, displacement of people.
Inventory Use Case References	Bell, R. G., Wadwha, S., Paulik, R. (2015). National and regional exposure to coastal hazards and sea-level rise. Areal extent, population and assets. Prepared for Parliamentary Commissioner for the Environment, June 2015. NIWA Client Report No: HAM2015-006. Grace, E. S. (compiler). 2014. Gisborne District Risk Assessment, GNS Science Consultancy Report 2014/279. 149 p. Lane, E. M., Mountjoy, J., Power, W. L., Mueller, C., Paulik, R., Crowley, K. (2015). The hazard and risk of tsunami inundation due to submarine-landslide-generated tsunamis in Cook Strait Canyon. Coasts and Ports 2015 Conference, 15-18 September 2015, Auckland, New Zealand. Paulik, R., Lane, E. 2014: Future tsunami risk at Omaha Beach, Auckland. 7th Australasian Natural Hazards Management Conference 2014, 23-24 September 2014, Wellington, New Zealand.

	Paulik, R., Lane, E., Sturman, J. (2012). Tsunami impact modelling using RiskScape: Omaha Beach, Auckland. New Zealand Coastal Society Conference: Making waves, 20 years and beyond 14-16 November, 2012, Auckland, New Zealand. Paulik, R., Smart, G., Bind, J. (2014). 'Flockton Basin' building impact and loss estimates for the March 5th 2014 Christchurch flood event. 7th Australasian Natural Hazards Management Conference 2014, 23-24th September 2014, Wellington, New Zealand. Paulik, R., Turner, R., Sturman, J., Gray, S., Flay, R. (2013). Using RiskScape to estimate building impacts and loss from the 2012 Hobsonville Tornado, Auckland. "Water & Weather: Solutions for Health, Wealth and the Environment" The NZ Hydrological Society & The Meteorological Society of NZ Joint Conference. 19-22 November 2012, Palmerston North, New Zealand. Smart, G., Paulik, R. (2012). Prioritising Perils: A Case Study. 6th Australasian Natural Hazards Management Conference 2012, 21-22 August 2012, Christchurch, New Zealand. Wright, K. C., Johnston, D. M., Cousins, W. J., McBride, S. K. (2012). Estimating post-earthquake welfare and sheltering needs following a Wellington earthquake. New Zealand Society for Earthquake Engineering (NZSEE) Annual Conference "Implementing Lessons Learnt". April 13-15, Christchurch, New Zealand.
Inventory is a Component of a RiskScape Asset Module	Yes
RiskScape Asset Module Name	The 'New Zealand Buildings' inventory is currently disaggregated and supplied as regional modules for New Zealand.

Asset Information Summary

Attribute	Primary Attribute	Secondary Attribute	Field Name	File Geodatabase Alias	Data Type
RiskScape Asset Type	Buildings	NA	NA	NA	NA
RiskScape Asset Attributes	Building Earning Potential	2011 NZD$	NA	NA	Short Integer
	Condition	1: Sound 2: Deficient	NA	NA	Text
	Construction Type	1 : Reinforced Concrete Shear Wall 2 : Reinforced Concrete Moment Resisting Frame 3 : Steel Braced Frame	NA	NA	Text

		4 : Steel Moment Resisting Frame 5 : Light Timber 6 : Tilt Up Panel 7 : Light Industrial 8 : Advanced Design 9 : Brick Masonry 10 : Concrete Masonry 11 : Unknown Residential 12 : Unknown Commercial			
	Contents Value	2011 NZD$ 0-	NA	NA	Short Integer
	Deprivation Index	1 : DI 1 2 : DI 2 3 : DI 3 4 : DI 4 5 : DI 5 6 : DI 6 7 : DI 7 8 : DI 8 9 : DI 9 10 : DI 10	NA	NA	Short Integer
	Floor Area	0-	NA	NA	Short Integer
	Floor Height	0-	NA	NA	Double
	Floor Type	1 : Timber 2 : Concrete Slab	NA	NA	Text
	Footprint Area	0-	NA	NA	Short Integer
	Occupancy	0-	NA	NA	Double
	Parapet	1 : No Parapet 2 : Has Parapet	NA	NA	Text
	Replacement Cost	2011 NZD$ 0-	NA	NA	Short Integer
	Roof Cladding Class	1 : Clay/Concrete Tile 2 : Concrete Slab 3 : Membrane 4 : Metal Tile 5 : Other - Heavy 6 : Other - Light 7 : Sheet Metal	NA	NA	Text
	Roof Pitch	0-89°	NA	NA	Short Integer
	Storeys	1-	NA	NA	Double
	Use Category	1 : Residential Dwellings 2 : Commercial - Business	NA	NA	Text

		3 : Commercial - Accommodation 4 : Industrial - Manufacturing, Storage 5 : Industrial - Chemical, Energy, Hazardous 6 : Fast Moving Consumer Goods 7 : Government 8 : Territorial Authority/Civil Defence 9 : Lifeline Utilities 10 : Police 11 : Hospital, Clinic 12 : Fire Station 13 : Community 14 : Education 15 : Resthome 16 : Religious 17 : Forestry, Mining 18 : Farm 19 : Lifestyle 20 : Parking 21 : Clear Site 22 : Other			
	Vehicle Value	2011 NZD$ 0-	NA	NA	Short Integer
	Vehicles	0-	NA	NA	Short Integer
	Wall Cladding Class	1 : Weatherboard 2 : Stucco, Roughcast 3 : Corrugated Iron 4 : Plastic 5 : Fibre Cement Sheet 6 : Fibre Cement Plank 7 : Reinforced Concrete 8 : Concrete Masonry 9 : Brick 10 : Glass 11 : Curtain Wall Glazing 12 : Sheet Metal 13 : Other Sheet - Combustible 14 : Other Sheet - Non-Combustible 15 : Other	NA	NA	Text

	Year of Construction	1800 -	NA	NA	Short Integer
Other Attributes	NZTME	-	NA	NA	Double
	NZTMN	-	NA	NA	Double

Caveats and Constraints

Attribute	Details
Use Caveats	The following data sources were used in the development of the New Zealand Building Inventory: • Quotable Value NZ or QV for meshblock-scale aggregated property data for all of New Zealand, and for individual property data for all properties larger than 2000 m2 in New Zealand. Property to land parcel links were available for most of the individual properties. • Statistics New Zealand (population and employment data). • Ministry of Education (school population data). • Local government (building footprint and earthquake prone building data). • User and stakeholder knowledge and investigation of local asset attributes. • RiskScape national building statistics generated from site investigations in New Zealand towns and cities (e.g. Westport, Christchurch, Hastings, Napier). This data in this inventory is partly derived from information purchased from Quotable Value (QV) Ltd, together with 'industry knowledge' and data gathered from surveying the area. All QV data is applied at the meshblock level, and the RiskScape attributes are derived from this information so as to provide a suitable model of the actual building stock. Due to the time required to individually survey buildings, very few buildings in this dataset are verified against their actual condition however, over time and with the cooperation of RiskScape users this dataset will be improved to include progressively more and more verified attribute information. Initial building data are derived from QV datasets. These have a number of issues, not least in the inexact and imprecise nature of the data they contain. There are many values with duplicate addresses while some of these have wrong locations and the building data where they exist is of unknown integrity. Issues associated with deriving national building statistics arose from field surveys. What can be seen from the street is limited to fields such as building storeys, wall and roof cladding, outbuildings etc. This is also true of buildings on rear sections. Often these are not of the same age class as those visible from the street, as infill housing typically happens in older suburbs. This could bias the observations by age class. Estimation of

	building width and depth also varies with observer's experience. Details of internal construction are educated guesses based on external features; e.g. floor construction whether slab or timber, internal structure, cladding etc. These observational problems are more pronounced in commercial/industrial areas. Here they are arguably more important as the value of individual buildings increases and has a large impact on the total risk profile. Floor level calculations are sensitive to ground slope, GPS location and inclinometer accuracy. In Westport 10% of floor levels calculated were below the ground at the house (King and Bell, 2009). In the Napier/Hastings survey, the equivalent figure was 50%. This may relate to the coarser DEM being used (as supplied by HBRC) in this region. Observational errors exist for the floor height measurements, but some could be detected by consideration of photographs, and by comparison with nearby values. Errors are probably present in other measurements too, but can be less easy to find. Alternatively, the necessary error bounds are simply larger (for variables such as building width and depth for example). Assignation of relevant variables to unmeasured buildings also is a difficult problem in regions lacking usable building attribute data. Very few related variables are available to construct models from without local data. For other variables, we have adopted either a constant value or a stochastic approach where values are assigned over the observed range and distribution, but randomly across the region. This approach gives overall regional risk at about the right level but may lead to bias in particular aggregation units (e.g. meshblocks) where the buildings are more similar and have a more restricted distribution of any particular variable. Due to the QV database being based around property rather than building, many 'buildings' are colocated in the source data. This is due to flats or other residences which share the same building. However the process of attribute derivation has a random element to it and thus may not assign the same attributes to two or more colocated assets. For this reason, any assets which are colocated in the dataset are re-located evenly on a circle of radius five metres around the original location. Despite the various problems and uncertainties overall the data seems to be reasonable accurate especially on a meshblock or regional level, where eventual errors level out. This is currently also the most comprehensive database known by the RiskScape project team to be available in New Zealand and contains some building attributes that cannot be found elsewhere (e.g. floor height). Asset attribute quality levels provide RiskScape users with certainty on asset data validity and can be used to quantify the quality of the final result of a model run. Asset data quality levels in RiskScape vary from guessed values estimated from a general understanding of the assets'

	attributes, to measured values resulting from an engineer's examination of asset attributes. Each asset attribute must be described by a quality level from the list below. This may be used by RiskScape to quantify the quality of the final result of an impact or risk analysis. 1. Global Knowledge: Guessed from general understanding of assets. 2. Derived - Low Reliability: Derived by random selection from distributions - low reliability. 3. Derived - High Reliability: Derived by random selection from distributions - high reliability. 4. Supplied: Supplied by a reliable agent on a building by building basis (e.g. council, QV, owner). 5. Observed: Observed by a walk-by survey where only part of the asset is visible. 6 Surveyed: Surveyed by detailed inspection of the specific asset. 7. Measured: Measured by reference to plans and engineering calculation.
Security Constraints	Data is currently provide only at an aggregated level.
Legal Constraints	RiskScape data and models are being supplied to you for your evaluation and for no other purpose. The data [or any information derived from the data] may not be used for commercial purposes. You may not under any circumstances copy, sell or supply the data [or any information derived from the data]. The data is proprietary information and you will hold the data in confidence. Installation of this product indicates your acceptance the terms under which you may evaluate the data. While all reasonable effort has been made to ensure that the data are as accurate as practicable, neither the RiskScape partners nor the other data source organisations can be held responsible for errors in the data, or for any actions taken based on the data. No warranties are given in relation to the data or its suitability. RiskScape partners and the other data source organisations therefore, to the full extent permitted by law, exclude liability, including for negligence, for any loss or damage, direct or indirect and howsoever caused resulting from any person or organisations use or reliance on the data.

History Summary

Revision No.	Date Published	Feature Count	Features Added	Features Modified	Features Deleted	Details
1	01/02/2013	2,275,809	0	0	0	First version of the 'New Zealand Building Inventory' for RiskScape completed.
2	04/12/2015	NA	NA	NA	NA	'New Zealand Building Inventory' metadata template developed for RiskScape Wiki.

Other Metadata

Attribute	Details
Date Added	01/02/2013
Last Update	04/12/2015
Progress	On Going
Data Type	Vector Point
Format	ESRI Point Shapefile
Projection	New Zealand Transverse Mercator (NZTM), NZGD 2000
Geographic Extent	New Zealand land area excluding Stewart Island and other offshore islands.