

Standards for Geospatial Locators

ESA

Core Data Specification

Officials Committee for
Geospatial Information

v1.9.7
April 2004

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Version Control

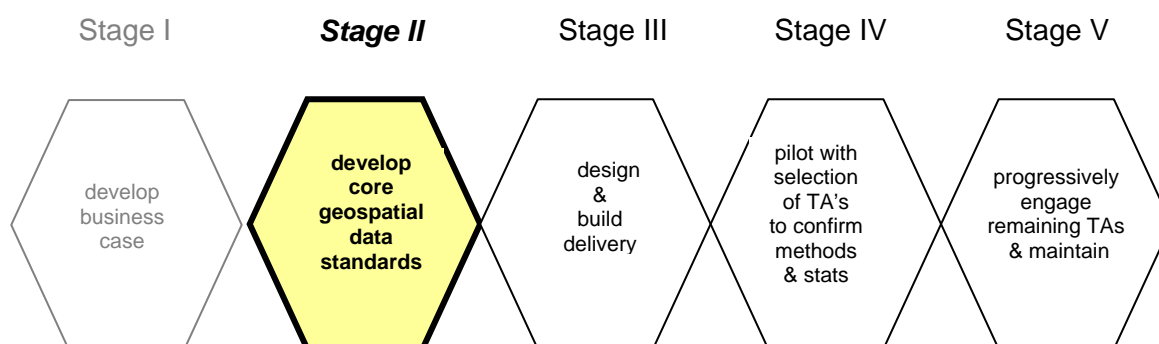
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1 Executive Summary

The preparation of this data specification is Stage II of the ESA Data Improvement Programme and this work has been undertaken under the framework of the Officials' Committee on Geospatial Information (OCGI). The scope of this specification is the core, common, minimum and adequate dataset necessary to support the "locate and verify" function in both emergency service organisations and government administration generally.

This data will be known as the **ESA** (Emergency Services and Government Administration) **Dataset Series** data.

The development of the ESA Core Data Specification was undertaken under the framework of the Officials' Committee on Geospatial Information (OCGI) and was **Stage II** of the ESA data improvement programme.



The scope for the specification stated that it will:

- identify the complete set of components required as **government-held** geospatial data.
- identify the minimum required geospatial data elements – ‘adequate’ for *emergency services responses*¹
- Meet the following high-level conditions:
 - adequate minimum data specifications ie of sufficient quality to meet the specifications for underpinning (foundation) data in CARD, or similar emergency response data environments
 - be consistent with appropriate international standards

¹a core outcome required by Government, assigned to LINZ to administer as **Outcome 4** is the ongoing maintenance of publicly available core geographic information that supports the constitutional framework, national security and **emergency services responses** [CAB(95)M32/8Ei]. This includes biological, health and civil emergencies.

This specification is targeted at data administrators and contract management staff in New Zealand Police, New Zealand Fire Service, Land Information New Zealand and Statistics New Zealand.

There were four development phases to the development of this specification:

- 1 initial data model compilation (utilising UML modelling and the Sybase Power Designer CASE tool and the previous user requirements study²)
- 2 dataset scope definition (including sign-off from the project steering committee of this definition)
- 3 data model enhancement
- 4 review (including use case scenario testing).

The main components of the data specification are:

- 1 a **Feature Catalogue** that identifies, defines and describes all features (and their attributes) to be included within the ESA Dataset Series;
- 2 an **Application Schema** that is a conceptual schema providing a formal description of the data structure and content in addition to the specification of business rules (constraints) for collecting, manipulating and processing of the data;
- 3 a series of **Quality Measure Descriptions** that are aligned to ISO 19113 Geographic Information – Quality Principles. This includes an indicative set of Acceptable Quality Levels (AQL) for each ESA feature that will remain “indicative” until the cost implications of these AQL have been tested in the market place and business implications have been resolved. As well, the quality measure descriptions describe sampling techniques, identify test software routines that will need to be developed, describe evaluation methods and the associated metadata that will need to be recorded.
- 4 a definition of a spatial **Reference System** for the ESA dataset series (un-projected coordinates in terms of the New Zealand Geodetic Datum 2000)
- 5 a profile-like specification of **Metadata** for the ESA dataset series that will need to be created with the initial compilation, any data maintenance and with both the on-line and off-line distribution of the data at the dataset level. ESA metadata will conform with ISO 19115 Geographic Information – Metadata and is focussed on facilitating the data management of the ESA dataset series. This requirement has necessitated a number of minor extensions to ISO/DIS 19115; including an extension to record the number of changes with each

²Report on Improved Core Geospatial Data for Emergency Services and Crown Administration (now known as **ESA** data), 16 November 2000,

maintenance and a second extension to record change indicators so that data improvement campaigns can be planned more rigorously. The metadata component of the ESA specification describes all except one element of NZGLS (the “recommended” element, Mandate) albeit that the ESA metadata specification is structured differently to NZGLS.


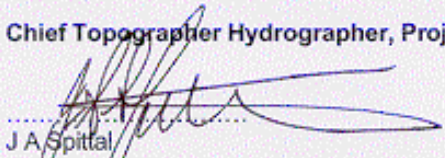
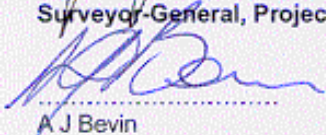
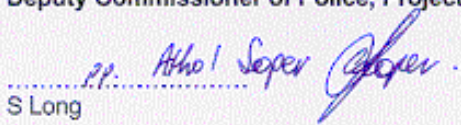


- 6 An extensive set of **Appendices** containing more details to the specification and other collaborative details.

This data specification was approved by the ESA Project Steering Committee on 9 November 2001.

Acceptance of this Dataset Specification

It is agreed that:

1. this specification appropriately defines the “ESA” Dataset;
2. this specification is the standard for core geospatial data used to locate and verify location for NZ Police and NZ Fire Service emergency services’ response function;
3. the Chief Topographer/Hydrographer and the Surveyor-General note that these are the minimum core address data, road network data and place name data needed for emergency services’ responses and a locational data framework for government services;
4. the Chief Topographer/Hydrographer shall be custodian of this core data standard.

Project Coordinator:		
		9.11.01
R R Murcott		
Chief Topographer Hydrographer, Project Steerage:		
		9.11.01
J A Spittal		
Surveyor-General, Project Steerage:		
		9.11.01
A J Bevin		
Deputy Commissioner of Police, Project Co-Sponsor:		
		9.11.01
S Long		
National Rural Fire Officer, Project Co-Sponsor:		
 RR MURRAY DUFFIELD		9.11.01
M Dudfield		
Deputy Government Statistician		
		9.11.01
J Cornish		

2 Introduction

2.1 *Background*

A report on geospatial data for the CARD system was approved in November 2000. The report recommended a way forward to improve core geospatial data for emergency services and other government administrative functions³. It was noted by the Minister of Land Information on 8th February, 2001, and by the Minister of Internal Affairs.

The justification for a single nationally consistent set of geospatial data specifications was agreed by the ESA Steering Committee on 30th November 2000. The specifications were to cover **address** (house number), **road centreline network** and **placenames** data. The specifications will ensure increased *interoperability* between people using different maps or spatial databases compiled by different providers and CARD.

The review indicated that extensive potential economic benefits are likely to accrue when these data are well maintained and used widely among government (central and local), industry and the public. Wide use of consistent data will facilitate *unambiguous communication* of location between people seeking assistance and those offering services (especially important during emergency scenarios).

2.2 *Goal*

The overriding goal of the ESA Core Data Specification is to increase public safety and improve government administration by becoming better able to locate an event or an address through significant initial, and ongoing, improvements in the quality of emergency services and administrative core data (ESA Core Data), namely:

- road name and location
- address number and location
- place name and location

so that many Crown agencies will be able to use it at a lower overall cost to the Crown.

2.3 *Target Audience for ESA Core Data Specification*

This specification is designed to be used by data administrators and contract management staff in the key stakeholder organisations (New Zealand Police, New Zealand Fire Service, Land Information New Zealand and Statistics New

³ Report on Improved Core Geospatial Data for Emergency Services and Crown Administration (now known as **ESA data**), 16 November 2000

Zealand) to help define and manage the initial provision and compilation of the ESA dataset and its subsequent maintenance and management.

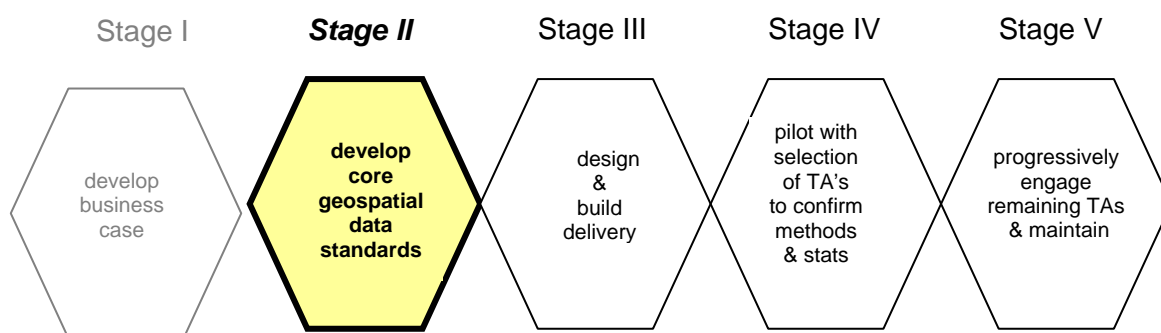
It should be noted however, that the specification is conceptual in nature and there are issues to be specified at the time of implementation such as when contracts and service level agreements are prepared.

Another use for this specification is in the policy area where officials need a full conceptual (non-implementation) definition of the ESA dataset to be compiled and maintained by government.

2.4 Development of ESA Core Data Specification

The development of the ESA Core Data Specification was undertaken under the framework of the Officials' Committee on Geospatial Information (OCGI). It contributes to Goals One and Two of OCGI's strategic plan.

It was **Stage II** of the ESA data improvement programme.



The Stage II objective was to develop data specifications and standards for the following:

1. address data
2. road/railway centreline network
3. all places and feature name data

The authors of this specification were a working group established for the project. Members of the working group, and their roles, are listed in Appendix H- Contributors to ESA Core Data Specification.

2.5 Project Scope

The project scope document⁴ for the project that developed this specification stated that the specifications will:

⁴ ESA Data Specifications Development Plan (revised) Version 1.1; May 2001

- identify the complete set of components required as **government-held** geospatial data.
- identify the minimum required geospatial data elements – ‘adequate’ for *emergency services responses*
- describe all necessary data characteristics.
- Meet the following high-level conditions:
 - adequate minimum data specifications ie of sufficient quality to meet the specifications for underpinning (foundation) data in CARD, or similar emergency response data environments
 - be consistent with appropriate international standards
 - be well documented, easy to navigate, and be readily discoverable and accessible on the Internet (through the LINZ website <http://www.linz.govt.nz>)
 - widely communicated.

The project (and this specification) does not attempt to implicitly deal with the issue of an incident located spatially by way of a reference to an address or place name. There are situations where, later in time, the location of the address or place name (used to reference the original location of the incident) changes and the original reference to an address or place name becomes an invalid means to locate that historic incident. The focus of this specification is on the data required to support “locate and verify” functions in emergency service and government agencies.

2.6 Requirement for Metadata

Metadata allows the data steward to describe a dataset so that users can understand the assumptions and limitations and evaluate the dataset's applicability for their intended use. It is assumed that this neutral ESA Dataset Series, or subsets of it, will be used by many emergency services organisations, and for different applications within their organisations to maintain data in the CARD⁵ environment at the Police/Fire communication centres, to geospatially reference statistics in the Police MAPS⁶ application, or to maintain data in applications like the rural fire GIS⁷. The ESA data will also be accessible to data brokers, data integrators, application builders and map-makers to use in geospatial products for commerce and the public.

The objective of this part of the ESA Core Data Specification is to provide a specification for fully describing ESA metadata. This metadata specification is intended to be used by the data steward, data supply contractors, data brokers, application builders, and data end-users in order to understand all

⁵ NZ Police/Fire Communications and Resource Deployment System

⁶ Map-based Analytical Policing System used for crime analysis and reporting

⁷ Geographical Information System

the basic characteristics of ESA Dataset Series. This part of the ESA specification defines metadata elements, provides a schema and establishes a common set of metadata definitions in line with the draft international standard ISO/DIS 19115 – Geographic Information Metadata.

2.7 Reference Documents

This following list identifies information sources used in the development of this specification:

ESA Documentation

- Report on Improved Core Geospatial Data for Emergency Services and Crown Administration (now known as **ESA** data), 16 November 2000.
- Proceedings: Forum on Use of Suburb Name & Extent as a Geographic Locator, 11 July 2001
- ESA Core Data Specification Project project documentation (Project Scope, Project Initiation Document, Project Quality Plan, Project Communication Plan, Project Risk Register, Project Issues Register & project issues documentation)

ISO Geographic Information Standards

ISO 19100 series of standards (under development within ISO Technical Committee 211), provide a framework for the development of geographic information specifications. This series of Geographic Information standards includes:

<u>Name of ISO/TC 211 Standard⁸</u>	<u>Date Published</u>
ISO/PDTR 19103 Conceptual schema language	2001-03-20
ISO/DIS 19107 Spatial schema	2001-05-08
ISO/DIS 19109 Rules for application schema	2001-07-07
ISO/DIS 19110 Methodology for feature cataloguing	2001-06-12
ISO/DIS 19112 Spatial referencing by geographic identifiers	2001-08-24
ISO/DIS 19113 Quality principles	2001-08-13 ⁹
ISO/DIS 19114 Quality evaluation procedures	2001-04-23

⁸ ISO/TC211 Status abbreviations are:

PDTR	Proposed Draft Technical Report
WD	Working Draft
CD	Committee Draft
DIS	Draft International Standard
FDIS	Final Draft International Standard
IS	International Standard

⁹ Date of approval by TC211 (not publication date)

<u>Name of ISO/TC 211 Standard⁸</u>	<u>Date Published</u>
ISO/DIS 19115 Metadata	2001-08-13
ISO/DIS 19118 Encoding	2001-07-18

Inter-governmental Committee on Survey & Mapping (ICSM) Documentation

- Draft Australian and New Zealand Rural and Urban Addressing Standard
<http://www.anzlic.org.au/icsm/street/>
- Draft National Topographic Data Model - Version 0.3
<http://www.anzlic.org.au/icsm/topo/topo-v03.htm>
- Harmonised Model of Australian states topographic, cadastral and geo-names data collections

Land Information New Zealand Documentation

- Landonline and specifically
BDE Data Dictionary - v3.0
BDE Introduction to Bulk Survey Data v3.0
CRS Data Dictionary - v12.05.99
<http://www.landonline.govt.nz>
- NZTopo
Data Dictionary Data Documentation Guide:
http://www.linz.govt.nz/docs/topography/topographicdata/datadictionary/Version3_4/document/nztopo_data_doc_guide_v3.4.pdf
Data dictionary:
http://www.linz.govt.nz/docs/topography/topographicdata/datadictionary/Version3_4/index.htm
Specification for Geographic Place Name and Descriptive Text Placement
<http://www.linz.govt.nz/rcs/linz/5712/mapprod.pdf>
- NZ Geographic Board. (Draft) National Place Names Data Model version 1.0 Design Report
- Regulatory Standards Setting Process, Regulatory Group Standard 1, Version 1, Regulatory Chiefs (20 June 2001)

New Zealand Police and New Zealand Fire Service Documentation

- NZ Police / Intergraph Public Safety (IPS) specification for CARD¹⁰ data - (Vol 2),:Document ID: GIS009, Revision No: 1.0, Date 29/7/99, Status: Confidential
- New Zealand Fire Service /CARD Specification for localities and common place names
- New Zealand Fire Service CARD System Appendix 3:GIS Maintenance Quality Assurance; Procedures and Checklist. Document ID GIS007, Revision No. 1.4, Date 01/06/2001
- New Zealand Fire Service Operational Acceptance Testing of the ICAD Map Communication Centre Procedures. Document ID ODG2000-11, Revision No. 1.0, Date 24 July 2001
- New Zealand Police Technical QA of Map Data Operational Data Group Procedures (Draft). Document ID ODG2000-09, Revision No. 0.4, Date 20 July 2001
- New Zealand Police, Increment One Introduction to Location IBM INCIS Project Version 30 April, 1998. Status (Confidential)

E-government Documentation

- New Zealand Government Locator Service (NZGLS) Metadata Standard and Reference Manual Version 2.0 (August 2001)
<http://www.e-government.govt.nz/nzglsl/standard/index.asp>

Other Documentation

- AS 1199–88 (Sampling Procedures and Tables for Inspection by Attributes) – endorsed by Standards New Zealand
- Australia/NZ Standard for Street Addressing: Draft Review of Section 8 AS 4590-1999 Interchange of Client Information
- Details on the New Zealand Land Cover Database through
http://www.terralink.co.nz/metadata/ANZLNZ3001800023_external.htm

¹⁰ the **C**ommunications and **R**esource **D**eployment (CARD) system is the operating technology used by the three communications centres, which the New Zealand Police share with the New Zealand Fire Service

2.8 *Related Initiatives*

At the time this specification was developed, the following projects were also underway and had some influence on the specification's development:

E-government

Common data management policies and standards are foundational to the inter-agency collaboration needed for E-government services. The vision for E-government uses the example of change of address notification. Rationalisation of government-held spatial information is recognised under the E-government umbrella of initiatives. Spatial data (location, adjacency, etc) enables joins between discrete datasets. For this reason spatial data becomes a powerful aide for integrating data and synthesising information.

Data standardisation contributes directly to the E-government strategy.

<http://www.e-government.govt.nz/docs/e-gov-strategy-june-2003/chapter7.html#Toc37573287>

E-government metadata

Metadata guidelines for government-held information have been developed – New Zealand Government Locator Service (NZGLS).

NZ Geospatial Metadata Standard

Land Information New Zealand has developed a standard for metadata for government geospatial information. This standard is being implemented in association with the New Zealand Government Locator Service (NZGLS).

Landonline

The core record system of Landonline is a potential data repository, uses a data model that defines address and a road centreline network and defines basic geospatial components & standards.

Online registration of resource consents from Territorial Authorities (Territorial Authority Certification) is a related project and another project deals with encoding geospatial data (XML definitions).

New Zealand Map Projection

<http://www.linz.govt.nz/rcs/linz/pub/web/root/core/Topography/ProjectsAndProgrammes/nzgd2000/index.jsp> explains the new NZ Transverse Mercator projection to be used in NZ mapping.

Intergovernmental Committee on Surveying & Mapping (ICSM)

harmonisation project (of Australian states topographic, cadastral and geo-names data collections)

2.9 *Conformance to ESA Core Data Specification*

Any dataset claiming conformance with this specification shall:

- 1 conform to the ESA Core Data Application Schema;
- 2 comply with the appropriate ESA Quality Measures (including the specified Acceptable Quality Levels (AQL))

- 3 have spatial data expressed in terms of un-projected New Zealand Geodetic Datum 2000 coordinates
- 4 be supplied with metadata complying with ISO 19115

3 Approach Taken to Develop the Specification

3.1 *Development Phases*

There were four phases to the development of this data specification and a certain degree of overlap between the phases. At the end of the Dataset Scope Definition (Section 3.1.2), the findings to that phase were reviewed and approved by the Project Steering Committee prior to the Data Model Enhancement Phase (Section 3.1.3).

The development phases were:

- 1 Initial Model Compilation (including a review of user requirements)
- 2 Dataset Scope Definition
- 3 Data Model Enhancement
- 4 Review (including use case scenario testing)

3.1.1 *Initial Model Compilation*

Initial model compilation consisted of the following steps:

1. Project launch to introduce background data to the modelling team (included explanations of ESA User requirements analysis, Electoral Data Maintenance, Models & processes for official naming of Geographic Features, ICSM Street address standards, Landonline, NZTopo online, NZTopo Maintenance).
2. Creation of a high level Conceptual Data Model.
3. Division of the model into separate packages for Roads, Addresses, Locations, Jurisdictions and Geographic Features.
4. Assimilation and application to the model of UML modelling language and the principals defined in the ISO 19100 series of standards for geographic Information.
5. Separate workshops to debate the details of each package resulting in remodelling of the data classes and associations that emerged (illustrated by class diagrams).
6. Re-engineering of the separate packages into a single integrated model.
7. Documentation of Class and attribute definitions.
8. Creation and maintenance of the Model Issue Log to document issues raised and the resultant decisions made concerning resolution of the issue in terms of changes to the model definition.

3.1.2 Dataset Scope Definition Process

Definition Criteria

A review of the ESA Phase 1 documentation, including the paper to the Minister of Land Information (November 2000) identified certain key criteria applying to the definition of what ESA data should be in the “public domain”. These were the data should be:

- **Core**¹¹ in that it is essential to meet statutory obligations; necessary to achieve business outcomes, strategic result areas, government strategies, purchase & ownership requirements or necessary to meet relevant international obligations;
- **Common** in that the data is used by more than one core government agency;
- **Minimum** in that the data characteristics are just the minimum required to support basic whole-of-government processes (including ESA processes); and
- **Adequate** re-emphasising the minimum criteria in respect of both the scope of the ESA dataset and the quality required.

The Project Steering Committee gave further guidance that the primary consideration should be that the data supports:

- **the Locate, Verify and Respond ESA process** (this was taken to mean the generic process whether it was the Police and Fire Communication Centre process or the electoral process to locate an elector)

Process Steps

There were a series of workshops involving business experts from stakeholder agencies and the project data modellers. The following steps were followed to arrive at the definition of the scope of the ESA Dataset Series.

1. (Using the ESA Dataset Scope Definition table, the latest Data Model diagrams and the ESA criteria) working group members were asked to individually nominate data Classes outside the ESA definition
2. Working Group collectively debated the validity of excluding each nominated Class and a consensus was reached and recorded;

¹¹ The core criteria has been applied purely from an ESA data perspective and the fact that certain other data elements (for instance some topographical features) have not been included within the definition does not necessarily imply that they are not “core” Crown data

3. A revised table was distributed to working group members asking for other ESA uses to be recorded against each potential ESA Class of data;
4. The revised table was reviewed by the project consultant to ensure the criteria had been rigorously applied with respect to the Locate, Verify & Respond requirement
5. The original (Stage 1) User Requirements was reviewed to ensure all original requirements were described in the Data Model and hence subject to the definition process
6. Working Group collectively considered the results of steps 3-5 and refined the definition and the Data Model accordingly
7. Working Group agreed on a series of Base Quality Measures
8. Working Group members (individually) reviewed Data Definitions to identify Classes of data that are "Quality Sensitive"
9. Steering Committee reviewed and ratified (9 July 2001) the definition of what should constitute the "ESA Dataset Series" and as part of this review, identified "essential" ESA data elements, as opposed to "nice to have" ESA data elements. In general, the "nice to have" sub-category included the "Respond" function of the "Locate, Verify & Respond" requirement and the data class Contextual Image and its sub-classes. In ratifying the scope definition of the ESA Dataset Series, the Steering Committee noted that the inclusion of a data element within the ESA Dataset Series did not imply that it would be made available through the implementation phases of the ESA programme, as economic considerations will influence the final content of the ESA Dataset Series.

3.1.3 Data Model Enhancement Phase

Following the Dataset Scope Definition Process the model detail was enhanced using the following processes:

1. Further workshops to debate contentious issues such as Addresses and Suburbs in more detail and to identify appropriate levels of quality for the ESA dataset.
2. Definition of data-types and enumeration classes.
3. Cross-referencing of original User Requirements with the model.
4. Specification of the spatial components within the model.
5. Remodelling the way in which names are handled across the whole model.
6. Refinement of naming, definitions and relationships between classes.

7. Definition, documentation and workshop debate of business rules and the classes, attributes or associations to which they apply.
8. Assimilation of ongoing feedback resulting from consideration of the alignment of the model to the ISO standards.
9. Ongoing adjustment of the model to resolve issues raised by working group members.
10. Documentation of domains for data types where enumeration classes have not been defined.
11. Documentation of quality measures relevant to the ESA dataset and aligned to the ISO standards
12. Documentation of metadata relevant to the ESA dataset and aligned to the ISO standards

3.1.4 Review Phase

The review process involved both the working group and a number of technical reviewers. Where possible the technical reviewers were involved in the deliberations of the working group and had access to draft data models and documents at an early stage so as to engender a common appreciation of the key issues.

Responsibility for the review of specific content areas were:

Business Requirements	<ul style="list-style-type: none"> ▪ Working Group members from stakeholder organisations ▪ Michael Brownie (local authority)
UML Modelling	<ul style="list-style-type: none"> ▪ Dr Richard Pascoe
Alignment with ICSM and ISO standards	<ul style="list-style-type: none"> ▪ Andrew Jones
Data Specification (content & format)	<ul style="list-style-type: none"> ▪ Working Group members (particularly the GIS specialists)

Another component of the review process was the identification of various "Use Case" as scenarios to test whether the ESA Data Model contained or could derive all necessary "data access paths" required to support the "locate and verify" function in each of the key stakeholder organisations. (Section 3.5 reports on this testing).

The first draft of the specification was distributed to the working group and technical reviewers early in August 2001. A number of workshops followed during that month where contentious issues and suggestions for change were discussed and agreed to¹².

3.2 *Unified Modelling Language (UML)*

The decision to work with UML was one of the first significant decisions made. Although Entity Relationship (E-R) modelling is the more traditional modelling approach, the decision to go with UML was made for the following reasons:

- 1 Object Oriented Design and Development is fast becoming the approach of choice by application and system developers and UML is aligned to this approach;
- 2 An increasing number of GIS are incorporating object oriented features and, similarly, leading database systems are more object oriented and have spatial object capability;
- 3 The series of ISO/TC211 Geographic Information standards has used UML as their modelling approach. Similarly the Open GIS Consortium is ensuring its work is aligned to the standards written by ISO/TC211 – this effectively ensuring international consistency in the area of standardisation;
- 4 ICSM working parties have been using UML in their modelling work (eg Rural and Urban Addressing Standard)

3.3 *CASE Tools*

Creation of the initial data model diagrams and continued enhancement and documentation was carried out using Sybase Power Designer v 8.0.0.203. Within the tool-set an Object Oriented Model (.oom) was created consisting of package and class diagrams; association, generalisation and aggregation symbols; definition of cardinalities for associations; class, attribute and relationship definitions and annotations; business rule definitions applied to classes, attributes and relationships; enumeration classes and domains to define data types. Developing versions of the data-model were exported direct from the CASE tool in a variety of file formats so as to support on-line viewing of the data model for review purposes.

3.4 *Alignment with International Standards*

As has been mentioned in the discussion of UML (Section 3.2), we are entering an era of considerable consistency with respect to GIS standards. The close cooperation between ISO/TC211 and the Open GIS Consortium

¹² All major issues were documented and dealt with in a project issues management process – refer to ESA Data Specification Project Issues Register and Project Issues No 1 – 8.

augers well for the adoption of the ISO/TC211 “family” of standards internationally, especially given that many of the major GIS vendors are members of the Open GIS Consortium. Although these standards are often perceived by GIS practitioners to be very complex and not particularly intuitive, on closer study they are found to be a rich resource providing a structure that can be applied to many different situations and disciplines.

For this reason, considerable effort has been made to ensure the ESA Core Data Specification is aligned to the appropriate ISO/TC211 standards. This effort corresponds to the efforts of ANZLIC to provide infrastructural standards for the land information community in Australia and New Zealand.

3.5 Use Case Scenario Testing

102 Use Case Scenarios were made available for testing. These scenarios were predominantly sourced from Fire & Police Communication Centre examples but also included administration scenarios from Geographic Board and electoral processes. Object diagrams based on the underlying Class diagrams (detailed in Appendix A – ESA Core Data Application Schema) were prepared with data values added from the scenario descriptions to illustrate the appropriate data access paths required to support, in particular, the “locate and verify” Use Case for the scenario.

The following table summarises the results of this testing.

Number	Total	Pass	Fail	Partially Out Of Scope	Untested
Stakeholder					
Police	18	13	0	1	4
Fire	72	52	0	3	17
Electoral	4	2	0		2
Names	8	4	0		4

Note

1. Use Case Scenarios that were “partially out of scope” were all deemed to be out of scope for the same reason; to create a location for an event. The following example best describes this category of scenario.

Example. *Create event 2km North of Somes Island*

The ability to locate a position 2 kilometres north of a NamedPlace “Somes Island”. The position 2 km north can be estimated using contextual topographic data. However at that point no data will exist in the data base on which to ‘Locate and Verify’ and the creation of an ‘Incident event’ is out of scope.

2. A number of Use Case Scenarios were untested due to time constraints. However, an initial review of these Use Case Scenarios

suggested that they were unlikely to fail or that there was an extremely low occurrence rate.

3.6 Specification Change Management Process

The Chief Topographer /Hydrographer (on behalf of the steward of the ESA dataset series; the Chief Executive of Land Information New Zealand) is custodian, responsible for ensuring the accuracy and on-going relevance of this specification.

When exercising this responsibility, the Chief Topographer / Hydrographer will be guided by the LINZ Regulatory Standards Setting Process and specifically by the requirement for regular review of standards and consultation with key stakeholders.

A register of change requests shall be maintained for any suggested changes to the specification. Where possible change requests will not only describe the nature of the change but also the business or system drivers for the change, the likely costs and benefits and urgency for the change.

4 ESA Feature Catalogue

4.1 *Introduction to Feature Catalogue*

A fundamental concept of geographic data is the feature. A feature is an abstraction of real world phenomena, about which data are collected, maintained, and disseminated.

The Feature Catalogue provides the description of the geographic data in an overview format likely to be more useful to users not requiring all the details documented in the application schema.

This feature catalogue identifies and defines all ESA feature types and their associated attributes and relationships. It is consistent with the comprehensive description of the ESA Dataset Series found in the application schema. (refer to Section 5 and Appendix A – ESA Core Data Application Schema)

In line with other components of this specification, the feature catalogue conforms with the corresponding ISO/TC211 standard. The relevant standard in this situation is ISO/DIS 19110 Geographic information – Methodology for feature cataloguing and this ESA Feature Catalogue includes all mandatory elements specified in ISO/DIS 19110.

In addition, the following optional elements have been included:

- Value Domain Type – Indicates whether or not domain for feature attribute values is enumerated (if omitted, domain is not specified).
- Value Domain – The name of the Domain. Domains specify permissible values of feature attribute. For full details of specified domains, consult the application schema.
- Code (Feature Attribute Value) – Specified where the Value Domain Type is 1 = “enumerated”.
- Definition (Feature Attribute Value) – Definitions of each of these are included in the application schema where the Value Domain Type is 1 = “enumerated”.

One aspect that this feature catalogue does not conform to ISO/DIS 19110 is that the feature association names are not unique in themselves. However, when the association name, and associated feature types are known, the association is unique within the feature catalogue.

4.2 Feature Catalogue

<u>Feature Catalogue Element</u>	Field Name	Description		
<u>Feature Catalogue</u>	Name:	ESA Feature Catalogue		
	Scope:	topographic, administrative; transportation		
	Field of Application:	to support Emergency Services Locate & Verify function and inter-operability of government services		
	Version Number:	1.9		
	Version Date:	2001-10-01		
	Definition Source:	ESA Application Schema v1.9; Land Information New Zealand (LINZ), Chief Topographer / Hydrographer, 2001-10-01.		
	Feature Catalogue Producer:	Janet Bateson, Critchlow Associates Ltd for Land Information New Zealand		
<u>Feature Type</u>	Name:	Feature		
	Definition:	Abstraction of real-world phenomena.		
	Feature Relationship Names:	/Intersects, FeatureName, IsPartOf, FeatureCollection, SpatialConfiguration, /Intersects		
	Name:	featureName		
	Definition:	The name by which a feature is referred to.		
	Value Data Type:	NameList		
	Value Domain Type:	Name		
	Value Domain:	Name		
	Name:	featureCode		
	Definition:	Code that uniquely identifies the Feature Type within the feature catalogue.		
	Value Data Type:	integer		
	Value Domain:	identifier		
	Name:	custodiansId		
	Definition:	The unique identifier assigned to this record by the custodian of the dataset		
<u>Feature Attribute</u>	Value Data Type:	integer		
	Value Domain:	identifier		
	Name:	esalD		
	Definition:	The unique identifier assigned to this record by the manager of the ESA dataset.		
	Value Data Type:	integer		
<u>Feature Attribute</u>	Value Domain:	identifier		
	Value Domain:	identifier		

<u>Feature Catalogue Element</u>	Field Name	Description		
<u>Feature Attribute</u>	Name:	createDate		
	Definition:	The date on which the feature instance was created.		
	Value Data Type:	date		
	Value Domain:	date		
	Name:	retireDate		
	Definition:	The date on which the feature instance was retired from the dataset.		
	Value Data Type:	date		
<u>Feature Type</u>	Name:	AccessPoint		
	Definition:	A Point object representing the physical point of access to a place		
	Feature Relationship Names:	AddressAccess, AccessPointsForCompositeSite, SpatialConfiguration		
	Subtype of:	Feature		
<u>Feature Type</u>	Name:	AdminSuburb		
	Definition:	A subdivision of a TA for the purposes of Emergency Services administration. Boundaries generally align with meshblock boundaries and are contiguous with each other.		
	Feature Relationship Names:	SuburbAlignedToMeshblock, CollectionOf, SpatialConfiguration		
	Subtype of:	Jurisdiction		
<u>Feature Attribute</u>	Name:	Address		
	Definition:	The conventional means of describing, labelling or identifying an object, place or property.		
	Feature Relationship Names:	AddressHistory, AddressAccess, CollectionOf, SpatialConfiguration, PrincipalAddressOfNamedPlace, /AggregationOfAddresses, AddressPointType		
	Subtype of:	Feature		
	Name:	begin		
	Definition:	The date from which the address was valid		
	Value Data Type:	Date		

<u>Feature Catalogue Element</u>	Field Name	Description		
Feature Attribute	<i>Value Domain:</i>	<i>date</i>		
	<i>Name:</i>	<i>end</i>		
	<i>Definition:</i>	<i>The date at which the address ceased to be valid.</i>		
	<i>Value Data Type:</i>	<i>Date</i>		
	<i>Value Domain:</i>	<i>date</i>		
	<i>Name:</i>	<i>addressPositionType</i>		
	<i>Definition:</i>	<i>This is an enumeration Class whose attributes define the allowable values for the attribute AddressPositionType for the class StreetAddressPosition.</i>		
	<i>Value Data Type:</i>	<i>integer</i>		
	<i>Value Domain Type:</i>	<i>1 (enumerated)</i>		
	<i>Feature Attribute Values:</i>	Label	Code	Definition
		<i>parcelCentroid</i>	<i>2000</i>	
		<i>propertyCentroid</i>	<i>2001</i>	
		<i>homesteadPosition</i>	<i>2002</i>	
		<i>derived</i>	<i>2003</i>	
	<i>Name:</i>	<i>addressStatus</i>		
	<i>Definition:</i>	<i>A classification of street addresses which separates official Street Addresses from unofficial ones.</i>		
	<i>Value Data Type:</i>	<i>integer</i>		
	<i>Value Domain Type:</i>	<i>1 (enumerated)</i>		
	<i>Feature Attribute Values:</i>	Label	Code	Definition
		<i>official</i>	<i>1</i>	
		<i>unofficial</i>	<i>2</i>	
		<i>provisional(not in use)</i>	<i>0</i>	
<u>Feature Type</u>	<i>Name:</i>	<i>AerialCablewayTerminal</i>		
	<i>Definition:</i>	<i>An embarkation point for a conveyor system, built to transport people primarily, in which a carrier unit or units run on wire cables strung between supports.</i>		
	<i>Subtype of:</i>	<i>NamedPlace</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>AfterHoursPharmacy</i>		
	<i>Definition:</i>	<i>A pharmacy that is open outside normal working hours.</i>		
	<i>Subtype of:</i>	<i>NamedPlace</i>		

<u>Feature Catalogue Element</u>	Field Name	Description		
<u>Feature Type</u>	Name:	Airport		
	Definition:	A named place which is an official landing site for aircraft and is used for scheduled flights by major airlines.		
	Feature Relationship Names:	RunwaysBelongingToAnAirport		
	Subtype of:	NamedPlace		
<u>Feature Type</u>	Name:	AmbulanceStation		
	Definition:	An administration and despatch location for ambulances.		
		NamedPlace		
<u>Feature Type</u>	Name:	Bank		
	Definition:	An institution for the safekeeping and lending of money.		
	Subtype of:	NamedPlace		
<u>Feature Type</u> Feature Attribute	Name:	Barrier		
	Definition:	A horizontal barrier which restricts the passage of vehicles or persons.		
	Feature Relationship Names:	BarrierType, BarrierToFlow		
	Subtype of:	TrafficControl, SiteEntrance		
	Name:	barrierType		
	Definition:	Categorisation of type of barrier.		
	Value Data Type:	integer		
	Value Domain Type:	1 (enumerated)		
	Feature Attribute Values:	Label	Code	Definition
		permanent		
		removeable		
<u>Feature Type</u>	Name:	Boat Ramp		
	Definition:	A sloping concrete structure for launching boats		
	Subtype of:	AccessPoint		
<u>Feature Type</u>	Name:	Bridge		
	Definition:	A raised structure carrying a road or railway.		

<u>Feature Catalogue Element</u>	Field Name	Description		
Feature Attribute	<i>Feature Relationship Names:</i>	<i>TypeOfBridge, SpatialConfiguration, CollectionOf, RailUnderBridge, RoadOverBridge, RoadUnderBridge, RailOverBridge, BridgeOverWater</i>		
	<i>Subtype of:</i>	<i>Feature</i>		
	<i>Name:</i>	<i>TypeOfBridge</i>		
	<i>Definition:</i>	<i>An attribute determining the type of bridge</i>		
	<i>Value Domain Type:</i>	<i>1 (enumerated)</i>		
	<i>Feature Attribute Values:</i>	Label	Code	Definition
		<i>railOverRoad</i>	<i>7001</i>	<i>The Bridge carries a railway over a road.</i>
		<i>roadOverRoad</i>	<i>7002</i>	<i>The Bridge carries a road over another road.</i>
		<i>roadOverRail</i>	<i>7003</i>	<i>The Bridge carries a road over a railway .</i>
		<i>roadOverRiver</i>	<i>7004</i>	<i>The Bridge carries a road over a river.</i>
		<i>railOverRiver</i>	<i>7005</i>	<i>The Bridge carries a railway over a river.</i>
		<i>ford</i>	<i>7006</i>	<i>A shallow place where a river or creek may be crossed by wading or driving through.</i>
		<i>culvert</i>	<i>7007</i>	<i>A man-made structure bridging or enclosing a water course.</i>
		<i>road&RailOverRiver</i>	<i>7008</i>	<i>The Bridge carries a road and a railway over a river.</i>
		<i>railOverRail</i>	<i>7009</i>	<i>The Bridge carries a railway over another railway.</i>
		<i>causeway</i>	<i>7010</i>	<i>A raised path or road across water or marshland.</i>
		<i>other</i>	<i>7011</i>	<i>The bridge does not fit any of the other enumerated Bridge Types.</i>

<u>Feature Catalogue Element</u>	Field Name	Description		
<u>Feature Type</u>	Name:	Building		
	Definition:	A man-made structure with a roof providing shelter for people, animals or goods.		
	Feature Relationship Names:	SpatialConfiguration		
	Subtype of:	NamedPlaceType		
<u>Feature Type</u>	Name:	BusStation		
	Definition:	A terminus and parking area for buses where passengers can normally embark or alight.		
	Subtype of:	NamedPlace		
<u>Feature Type</u>	Name:	Cablecar		
	Definition:	A Cable Car which travels at ground level, operated by means of a cable system.		
	Subtype of:	Railway		
<u>Feature Type</u>	Name:	Canal		
	Definition:	A man-made overground open water channel generally suitable for navigation.		
	Subtype of:	FlowingWaterFeature		
<u>Feature Type</u>	Name:	CarPark		
	Definition:	An area of ground or building designated for the parking of cars.		
	Subtype of:	NamedPlace		
<u>Feature Type</u>	Name:	Causeway		
	Definition:	A raised path or road across water or marshland.		
	Subtype of:	Bridge		
<u>Feature Type</u>	Name:	CellphoneSite		
	Definition:	A cellphone transmitter site.		
	Subtype of:	NamedPlace		
<u>Feature Type</u>	Name:	ChemicalInstallation		
	Definition:	An industrial site where chemical substances are manufactured or stored.		
	Subtype of:	NamedPlace		
<u>Feature Type</u>	Name:	Church		

<u>Feature Catalogue Element</u>	Field Name	Description		
	<i>Definition:</i>	<i>A place of worship used by a religious organisation.</i>		
	<i>Subtype of:</i>	<i>NamedPlace</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>City</i>		
	<i>Definition:</i>	<i>As defined in Section 37M of the Local Government Act 1974.</i>		
	<i>Subtype of:</i>	<i>GeneralLocality</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>CivilDefenceCentre</i>		
	<i>Definition:</i>	<i>A Named Place Used as a Civil Defence Centre.</i>		
	<i>Feature Relationship Names:</i>	<i>Occupies</i>		
	<i>Subtype of:</i>	<i>Feature</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>ComplexRoad</i>		
	<i>Definition:</i>	<i>A collection of RoadSectionCentreline which aggregate to form an entity such as a tourist route, motorway, state highway or major road which encompasses several address ranges (eg Great South Road). The complex road does not have any addresses of it's own and it may be coincident with several Roads or parts of Roads..</i>		
	<i>Feature Relationship Names:</i>	<i>SpatialConfiguration</i>		
	<i>Subtype of:</i>	<i>Feature</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>CompositeSite</i>		
	<i>Definition:</i>	<i>A collection of features relating to a single named site which has multiple buildings, owners, tenants and/or access roads and is normally under common management.</i>		
	<i>Feature Relationship Names:</i>	<i>SiteboundaryEntrance, SpatialConfiguration, AccessPointsForCompositeSite, IsPartOf</i>		
	<i>Subtype of:</i>	<i>NamedPlaceType</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>Contextual Image</i>		
	<i>Definition:</i>	<i>A scanned image or a vector dataset which can provide contextual detail covering a specific geographic area or place.</i>		

<u>Feature Catalogue Element</u>	Field Name	Description		
	<i>Feature Relationship Names:</i>	<i>ImageExtent</i>		
	<i>Subtype of:</i>	<i>Feature</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>CulDeSac</i>		
	<i>Definition:</i>	<i>A road which is only connected to rest of the road network at one end.</i>		
	<i>Feature Relationship Names:</i>	<i>Terminates</i>		
	<i>Subtype of:</i>	<i>TrafficControl</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>Culvert</i>		
	<i>Definition:</i>	<i>A man-made structure bridging or enclosing a water course.</i>		
	<i>Subtype of:</i>	<i>Bridge</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>Dam</i>		
	<i>Definition:</i>	<i>A named place which is a man-made structure interrupting the course of a river to form a reservoir.</i>		
	<i>Subtype of:</i>	<i>FlowingWaterHazard</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>DefenceSite</i>		
	<i>Definition:</i>	<i>A place used for Ministry of defence activities.</i>		
	<i>Subtype of:</i>	<i>NamedPlace</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>EarlyLearningCentre</i>		
	<i>Definition:</i>	<i>A place for pre-school child education</i>		
	<i>Subtype of:</i>	<i>NamedPlace</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>Embassy</i>		
	<i>Definition:</i>	<i>The residence or place of business of an ambassador.</i>		
	<i>Subtype of:</i>	<i>NamedPlace</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>EmergencyRoadsidePhone</i>		
	<i>Definition:</i>	<i>A phone located at the roadside specifically for use by the public in an emergency.</i>		
	<i>Subtype of:</i>	<i>NamedPlace</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>Expressway</i>		
	<i>Definition:</i>	<i>A divided arterial highway for through traffic with full or partial control of access and generally with grade separations at major intersections.</i>		

<u>Feature Catalogue Element</u>	Field Name	Description		
	Subtype of:	ComplexRoad		
<u>Feature Type</u>	Name:	FerryTerminal		
	Definition:	A place for embarking and disembarking ferries.		
	Subtype of:	NamedPlace		
<u>Feature Type</u>	Name:	FireStation		
	Definition:	An administration and despatch location for fire engines.		
	Subtype of:	NamedPlace		
<u>Feature Type</u>	Name:	FishFarm		
	Definition:	A named place which is a location on water where fish (including shellfish) are farmed in a captive environment.		
	Subtype of:	NamedPlace		
<u>Feature Type</u>	Name:	FlowingWaterFeature		
	Definition:	A natural water feature consisting of flowing water.		
	Feature Relationship Names:	SpatialConfiguration, Complex		
	Subtype of:	WaterFeature		
<u>Feature Type</u>	Name:	FlowingWaterHazard		
	Definition:	A feature which disrupts the flow of water in a flowing water feature.		
	Feature Relationship Names:	Contains, SpatialConfiguration		
	Subtype of:	WaterFeature		
<u>Feature Type</u>	Name:	FoodOutlet		
	Definition:	Excludes shops & supermarkets. Includes cafes, restaurants, fast food outlets & take-away restaurants		
	Subtype of:	NamedPlace		
<u>Feature Type</u>	Name:	Ford		
	Definition:	A shallow place where a river or creek may be crossed by wading or driving through.		
	Subtype of:	Bridge		
<u>Feature Type</u>	Name:	Forest		
	Definition:	An area densely covered in trees.		
	Subtype of:	NamedPlace		

<u>Feature Catalogue Element</u>	Field Name	Description		
<u>Feature Type</u>	Name:	GeneralLocality		
	Definition:	An identifiable geographic area in the real world with an indistinct boundary. (Not officially defined.) Excludes places which have distinct boundaries, such as properties, parks, buildings.		
	Feature Relationship Names:	LocalityLabel, /Intersects, /Intersects, SpatialConfiguration, CollectionOf, /Intersects		
	Subtype of:	Feature		
<u>Feature Type</u>	Name:	GolfCourse		
	Definition:	An area reserved for playing golf		
	Subtype of:	NamedPlace		
<u>Feature Type</u>	Name:	Hall		
	Definition:	A building for community meetings.		
	Subtype of:	NamedPlace		
<u>Feature Type</u>	Name:	Helipad		
	Definition:	A landing area for helicopters.		
	Subtype of:	AccessPoint		
<u>Feature Type</u>	Name:	Heliport		
	Definition:	A take-off and landing terminal for helicopters which includes a landing area and associated buildings		
	Subtype of:	NamedPlace		
<u>Feature Type</u>	Name:	HistoricSite		
	Definition:	A place of historic importance.		
	Subtype of:	NamedPlace		
<u>Feature Type</u>	Name:	Homestead		
	Definition:	A named place which is the main dwelling on a rural property.		
	Subtype of:	NamedPlace		
<u>Feature Type</u>	Name:	Hospital		
	Definition:	A residential place for providing medical treatment.		
	Subtype of:	NamedPlace		
<u>Feature Type</u>	Name:	Hotel		
	Definition:	Commercially run establishment providing lodging and meals for guests.		
	Subtype of:	NamedPlace		

<u>Feature Catalogue Element</u>	Field Name	Description		
<u>Feature Type</u>	Name:	Hut		
	Definition:	A named place which provides temporary accommodation for trampers or hunters.		
	Subtype of:	NamedPlace		
<u>Feature Type</u>	Name:	HydroTunnel		
	Definition:	A man-made underground tunnel for carrying water.		
	Subtype of:	FlowingWaterFeature		
<u>Feature Type</u>	Name:	Interchange		
	Definition:	The road-section is part of a traffic interchange system, eg large roundabout, overbridge, road connecting two motorways.		
	Subtype of:	Road		
<u>Feature Type</u>	Name:	Island		
	Definition:	An area of land entirely surrounded by water.		
	Subtype of:	NamedPlace		
<u>Feature Type</u>	Name:	Jetty		
	Definition:	A permanent structure against which boats can moor.		
	Subtype of:	AccessPoint		
<u>Feature Attribute</u>	Name:	Jurisdiction		
	Definition:	A defined official area of responsibility belonging to an Authority represented by a non-physical boundary for regulatory or governance purposes. Represented by a Polygon object.		
	Feature Relationship Names:	JurisdictionType, JurisdictionOwner, SpatialConfiguration, /Intersects		
	Subtype of:	Feature		
	Name:	JurisdictionOwner		
	Definition:	An enumeration class defining the allowable values for the name of the organisation who is the owner of a given feature.		
	Value Data Type:	integer		
	Value Domain Type:	1 (enumerated)		
	Feature Attribute Values:	Label	Code	Definition

<u>Feature Catalogue Element</u>	Field Name	Description		
Feature Attribute		<i>statisticsNZ</i>	0	
		<i>transit</i>	1	
		<i>nzPolice</i>	2	
		<i>nzFire</i>	3	
		<i>ruralFireAuthority</i>	15	
		<i>nzPost</i>	4	
		<i>territorialAuthority</i>	5	
		<i>doc</i>	6	
		<i>regionalCouncil</i>	7	
		<i>linz</i>	8	
		<i>telecom</i>	9	
		<i>ministryOfEducation</i>	10	
		<i>ministryOfHealth</i>	11	
		<i>private</i>	12	
		<i>forestry</i>	13	
		<i>roadControllingAuthority</i>	14	
	<i>Name:</i>	<i>JurisdictionType</i>		
	<i>Definition:</i>	<i>The official name for a Jurisdiction Type</i>		
	<i>Value Data Type:</i>	<i>integer</i>		
	<i>Value Domain Type:</i>	<i>1 (enumerated)</i>		
	<i>Feature Attribute Values:</i>	Label	Code	Definition
		<i>12mileLimit</i>	6000	
		<i>200mileEconomicZone</i>	6001	
		<i>adminSuburb</i>	6032	
		<i>ambulanceDistrict</i>	6002	
		<i>areaUnit</i>	6003	
		<i>censusArea</i>	6004	
		<i>censusDistrict</i>	6005	
		<i>censusSubdistrict</i>	6006	
		<i>constituency</i>	6031	
		<i>docConservancy</i>	6007	
		<i>electoralDistrict</i>	6008	
		<i>fireSafetyMargin</i>	6031	
		<i>harbourAuthority</i>	6009	
		<i>healthDistricts</i>	6010	
		<i>landDistrict</i>	6011	
		<i>fireZone</i>	6013	
		<i>forestPark</i>	6014	
		<i>maritimePark</i>	6015	
		<i>meshblock</i>	6016	
		<i>nationalPark</i>	6017	
		<i>offshoreDependancy</i>	6023	
		<i>policeArea</i>	6032	

<u>Feature Catalogue Element</u>	Field Name	Description		
		<i>policeDistrict</i>	6018	
		<i>policeStationBoundary</i>	6019	
		<i>postcode</i>	6020	
		<i>regionalCouncil</i>	6021	
		<i>reserve</i>	6022	
		<i>ruralFireDistrict</i>	6012	
		<i>schoolDistricts</i>	6024	
		<i>telecomExchangeArea</i>	6025	
		<i>territorialAuthority</i>	6026	
		<i>transitNetworkManagementArea</i>	6027	
		<i>unoccupiedCrownLand</i>	6030	
		<i>urbanFireDistrict</i>	6029	
		<i>ward</i>	6028	
<u>Feature Type</u>	<i>Name:</i>	<i>Lake</i>		
	<i>Definition:</i>	<i>An expanse of water entirely surrounded by land not used for storing water for community use.</i>		
	<i>Subtype of:</i>	<i>StandingWater</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>LandfillSite</i>		
	<i>Definition:</i>	<i>A named place which is a location for dumping rubbish.</i>		
	<i>Subtype of:</i>	<i>NamedPlace</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>Locality</i>		
	<i>Definition:</i>	<i>Allowed value for Locality Type. A locality other than a City, Town or Suburb</i>		
	<i>Subtype of:</i>	<i>GeneralLocality</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>Marae</i>		
	<i>Definition:</i>	<i>A named place which is a focal point for maori cultural and social gatherings.</i>		
	<i>Subtype of:</i>	<i>NamedPlace</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>Marina</i>		
	<i>Definition:</i>	<i>A named place which is a formation of floating or fixed wharfs for permanent mooring of boats.</i>		
	<i>Subtype of:</i>	<i>NamedPlace</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>MaritimeObstacle</i>		
	<i>Definition:</i>	<i>A named place which is a some form of obstacle to shipping required to be shown on nautical charts.</i>		
	<i>Subtype of:</i>	<i>NamedPlace</i>		
	<i>Name:</i>	<i>MedicalCentre</i>		

<u>Feature Catalogue Element</u>	Field Name	Description		
	<i>Definition:</i>	<i>A non-residential centre which provides medical treatment for patients.</i>		
	<i>Subtype of:</i>	<i>NamedPlace</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>Meshblock</i>		
	<i>Definition:</i>	<i>The smallest geographic statistical units for which data is collected and processed by Statistics New Zealand. They provide the basis for aggregation into Area Units, Wards, Territorial Authorities and Regions.</i>		
	<i>Feature Relationship Names:</i>	<i>Composition, SpatialConfiguration, CollectionOf</i>		
	<i>Subtype of:</i>	<i>Jurisdiction</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>MHWcoastline</i>		
	<i>Definition:</i>	<i>The boundary between land and sea delineated by the line of mean high water.</i>		
	<i>Feature Relationship Names:</i>	<i>SpatialConfiguration</i>		
	<i>Subtype of:</i>	<i>WaterFeature</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>Monument</i>		
	<i>Definition:</i>	<i>A man-made structure to commemorate a person or event.</i>		
	<i>Feature Relationship Names:</i>	<i>SpatialConfiguration</i>		
	<i>Subtype of:</i>	<i>NamedPlaceType</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>Mooring</i>		
	<i>Definition:</i>	<i>A named place where boats may moor.</i>		
	<i>Subtype of:</i>	<i>NamedPlace</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>Motorway</i>		
	<i>Definition:</i>	<i>A named Motorway, designated by Transit New Zealand.</i>		
	<i>Subtype of:</i>	<i>ComplexRoad</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>MultipleAddressRoad</i>		
	<i>Definition:</i>	<i>This complex road is a combination of adjoining roads of the same name where the overall road contains multiple sets of address ranges.</i>		
	<i>Subtype of:</i>	<i>ComplexRoad</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>NamedPlace</i>		

<u>Feature Catalogue Element</u>	Field Name	Description		
<u>Feature Attribute</u>	<i>Definition:</i>	<i>The name of a distinct place in the real world that has a defined extent and can be located to within +/- 50 metres.</i>		
	<i>Feature Relationship Names:</i>	<i>IsOn, PlaceUse, PrincipalAddressOfNamedPlace, LabelLine, StationForRailway, AdjacentTo, CollectionOf, SpatialConfiguration, TypeOfPlace, PlaceLabel, Occupies, RunwaysBelongingToAnAirport, StationForRailway</i>		
	<i>Subtype of:</i>	<i>Feature</i>		
	<i>Name:</i>	<i>TypesOfUse</i>		
	<i>Definition:</i>	<i>A list of user-defined values to categorise NamedPlaces based on usage.</i>		
	<i>Value Data Type:</i>	<i>integer</i>		
	<i>Value Domain Type:</i>	<i>1 (enumerated)</i>		
	<i>Value Domain:</i>	<i>TypesOfUse</i>		
	<i>Feature Attribute Values:</i>	Label	Code	Definition
		<i>defence</i>	<i>5000</i>	
		<i>residential</i>	<i>5001</i>	
		<i>commercial</i>	<i>5002</i>	
		<i>recreation</i>	<i>5003</i>	
		<i>education</i>	<i>5004</i>	
		<i>transport</i>	<i>5005</i>	
		<i>accommodation</i>	<i>5006</i>	
		<i>entertainment</i>	<i>5007</i>	
		<i>medical</i>	<i>5008</i>	
		<i>emergency</i>	<i>5009</i>	
<u>Feature Type</u>	<i>Name:</i>	<i>NamedPlaceType</i>		
	<i>Definition:</i>	<i>The construction type of the named place.</i>		
	<i>Feature Relationship Names:</i>	<i>TypeOfPlace</i>		
	<i>Subtype of:</i>	<i>Feature</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>NaturalFeature</i>		
	<i>Definition:</i>	<i>A naturally occurring named geographic feature</i>		
	<i>Subtype of:</i>	<i>NamedPlace</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>OfficeBuilding</i>		

<u>Feature Catalogue Element</u>	Field Name	Description		
	<i>Definition:</i>	<i>A building used as a workplace and not generally open to the public.</i>		
	<i>Subtype of:</i>	<i>NamedPlace</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>OilRig</i>		
	<i>Definition:</i>	<i>A named place which is generally an offshore structure for the purpose of drilling for oil.</i>		
	<i>Subtype of:</i>	<i>NamedPlace</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>OpenSpace</i>		
	<i>Definition:</i>	<i>A predominantly open air place.</i>		
	<i>Feature Relationship Names:</i>	<i>TypeOfPlace</i>		
	<i>Subtype of:</i>	<i>NamedPlaceType</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>Orchard</i>		
	<i>Definition:</i>	<i>A commercial fruit growing site</i>		
	<i>Subtype of:</i>	<i>NamedPlace</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>Park</i>		
	<i>Definition:</i>	<i>A named place which is a public (generally grassed) recreation area. May be grassed, bush covered or flower gardens and may include childrens play areas.</i>		
	<i>Subtype of:</i>	<i>NamedPlace</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>PedestrianRoadSection</i>		
	<i>Definition:</i>	<i>A Section of road only suitable for pedestrians.</i>		
	<i>Subtype of:</i>	<i>RoadSectionCentreline</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>PetrolStation</i>		
	<i>Definition:</i>	<i>A named place which is a retail outlet for petrol, diesel or gas.</i>		
	<i>Subtype of:</i>	<i>NamedPlace</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>Plunket</i>		
	<i>Definition:</i>	<i>A community service facility to monitor and advise parents on health matters for young children.</i>		
	<i>Subtype of:</i>	<i>NamedPlace</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>PoliceStation</i>		
	<i>Definition:</i>	<i>An administration and despatch location for Police.</i>		
	<i>Subtype of:</i>	<i>NamedPlace</i>		

<u>Feature Catalogue Element</u>	Field Name	Description		
<u>Feature Type</u>	Name:	Port		
	Definition:	A place which is a commercial loading and unloading area for goods delivered or departing by ship.		
	Subtype of:	NamedPlace		
<u>Feature Type</u>	Name:	PostOffice		
	Definition:	A building where stamps are sold and postal business is conducted.		
	Subtype of:	NamedPlace		
<u>Feature Type</u>	Name:	Prison		
	Definition:	A place which is a permanent long-term detention centre for criminals.		
	Subtype of:	NamedPlace		
<u>Feature Type</u>	Name:	PublicToilet		
	Definition:	A named place which provides public toilet facilities		
	Subtype of:	NamedPlace		
<u>Feature Type</u>	Name:	Pylon		
	Definition:	A named place which is an electricity pylon likely to be referred to as a landmark.		
	Subtype of:	NamedPlace		
<u>Feature Type</u>	Name:	RadioOrTvStation		
	Definition:	A building which accommodates a radio or television broadcasting organisation.		
	Subtype of:	NamedPlace		
<u>Feature Type</u>	Name:	RailSectionCentreline		
	Definition:	A linear object representing the alignment of a section of a railway consisting of contiguous segments which have the same attribute values. A section will end at a rail intersection.		
	Feature Relationship Names:	RailUnderBridge, RailThroughTunnel, TravelsAlong, RailwayComposition, RailType, RailStatus, /SharesGeometry, RailOverBridge, SpatialConfiguration, RailCentrelineNetworkComposition, AdjacentTo		
	Subtype of:	Feature		
Feature Attribute	Name:	RailStatus		

<u>Feature Catalogue Element</u>	Field Name	Description		
	<i>Definition:</i>	<i>An enumeration class defining allowable values indicating whether the road section or rail section is currently open to traffic.</i>		
	<i>Value Data Type:</i>	<i>integer</i>		
	<i>Value Domain Type:</i>	<i>1 (enumerated)</i>		
	<i>Feature Attribute Values:</i>	<i>Status</i>		
		Label	Code	Definition
		<i>open</i>	<i>0</i>	
		<i>disused</i>	<i>2</i>	
<u>Feature Type</u>	<i>Name:</i>	<i>Railway</i>		
	<i>Definition:</i>	<i>A built rail route for the passage of trains on land.</i>		
	<i>Feature Relationship Names:</i>	<i>SpatialConfiguration, RailwayComposition, RailwayComposition</i>		
	<i>Subtype of:</i>	<i>Feature</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>RailwayCrossing</i>		
	<i>Definition:</i>	<i>The point of intersection of a road and a railway, where there is no bridge or tunnel. (ie The passage of a train must interrupt the flow of road traffic).</i>		
	<i>Feature Relationship Names:</i>	<i>sharesGeometry</i>		
	<i>Subtype of:</i>	<i>Barrier</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>Ramp</i>		
	<i>Definition:</i>	<i>An on-ramp or off-ramp for access on and off a limited access road.</i>		
	<i>Subtype of:</i>	<i>Interchange</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>RAPIDAddressStartPoint</i>		
	<i>Definition:</i>	<i>A Point object representing the spatial start point from where RAPID Address numbering is measured.</i>		
	<i>Feature Relationship Names:</i>	<i>/SharesGeometry, SpatialConfiguration, StartOfRAPIDnumbering, MeasuredFrom</i>		
	<i>Subtype of:</i>	<i>Feature</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>Rapids</i>		
	<i>Definition:</i>	<i>Part of a river where the water is very fast and turbulent.</i>		
	<i>Subtype of:</i>	<i>FlowingWaterHazard</i>		

<u>Feature Catalogue Element</u>	Field Name	Description		
<u>Feature Type</u>	Name:	RelativeAddress		
	Definition:	An address described in terms of position relative to a mapped feature.		
Feature Attribute	Feature Relationship Names:	RelativeToFeature		
	Subtype of:	Address		
	Name:	distance		
	Definition:	The distance from a mapped feature to the place which is being addressed.		
Feature Attribute	Value Data Type:	float		
	Value Domain:	distance		
	Feature Attribute Values:	Label	Code	Definition
	Name:	operator		
	Definition:	A valid string describing how the distance attribute is applied to the Feature Attribute.		
	Value Data Type:	string		
	Value Domain:	operator		
	Feature Attribute Values:	Label	Code	Definition
		OPPOSITE		
		DIAGONALLY OPPOSITE		
		PAST		
		NORTH OF		
		SOUTH OF		
		EAST OF		
		DOWNHILL FROM		
		UPHILL FROM		
		WEST OF		
		ABOVE		
		BELOW		
		UPSTREAM FROM		
		DOWNSTREAM FROM		
Feature Attribute		SEAWARD OF		
		INLAND FROM		
	Name:	locationDescriptor		
	Definition:	A descriptive field to capture various textual information which expresses the address of a location relative to another mapped feature.		
	Value Data Type:	string		
	Value Domain:	description		

<u>Feature Catalogue Element</u>	Field Name	Description		
<u>Feature Type</u>	Name:	Reservoir		
	Definition:	A generally man-made expanse of water entirely surrounded by land used for storing water for community use.		
	Subtype of:	StandingWater		
<u>Feature Type</u>	Name:	RestHome		
	Definition:	A residential establishment for elderly people.		
	Subtype of:	NamedPlace		
<u>Feature Type</u>	Name:	residentialComplex		
	Definition:	A collection of features relating to a single named residential site which has multiple buildings, owners, tenants and/or access roads and is normally under common management.		
	Subtype of:	NamedPlace		
<u>Feature Type</u>	Name:	River		
	Definition:	A large natural stream of fresh water flowing along a definite course into the sea, a lake or a larger river.		
	Subtype of:	FlowingWaterFeature		
<u>Feature Type</u>	Name:	Road		
	Definition:	An openway for the passage of vehicles or persons on land. Consists of one or more RoadSectionCentreline having the same roadname that are contiguous or only split by a small distance due to an interchange, staggered junction or other obstacle, within which all street address numbers are Unique.		
	Feature Relationship Names:	StartOfRAPIDnumbering, SpatialConfiguration, IsOn, StreetAddressRoad, FormerPartOfRoad, /IntersectingRoads		
	Subtype of:	Feature		
<u>Feature Type</u>	Name:	RoadCentrelineIntersection		
	Definition:	An intersection between three or more RoadSectionCentreline.		
	Feature Relationship Names:	Intersection		
	Subtype of:	TrafficControl		
<u>Feature Type</u>	Name:	RoadIntersection		

<u>Feature Catalogue Element</u>	Field Name	Description		
	<i>Definition:</i>	<i>An intersection between roadSectionCentreline belonging to two or more different roads.</i>		
	<i>Feature Relationship Names:</i>	<i>/IntersectingRoads, /sharedGeometry, SpatialConfiguration</i>		
	<i>Subtype of:</i>	<i>Feature</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>RoadRestArea</i>		
	<i>Definition:</i>	<i>An area by the road-side where vehicles can park and rest.</i>		
	<i>Subtype of:</i>	<i>NamedPlace</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>RoadSectionCentreline</i>		
	<i>Definition:</i>	<i>A linear object representing the alignment of a section of a road (an openway for the passage of vehicles or persons on land) consisting of contiguous segments which have the same attribute values. A RoadSectionCentreline will always end at the intersection with another RoadSectionCentreline or RailSectionCentreline, at a change of attribute and at the end of the Road to which the RoadSectionCentreline belongs (ie generally at a change of RoadName).</i>		
	<i>Feature Relationship Names:</i>	<i>RoadSectionOwnership, RoadOverBridge, RoadThroughTunnel, CompositionOfComplexRoad, RoadComposition, AddressSystem, RoadStatus, FormerPartOfRoad, RoadUnderBridge, RoadRestrictions, RoadSurface, TypeOfRoadSection, RoadHierarchy, Direction, CarriagewayD</i>		
	<i>Subtype of:</i>	<i>Feature</i>		
	<i>Name:</i>	<i>dualCarriageway</i>		
	<i>Definition:</i>	<i>A flag indicating whether this road-section forms one side of a dual carriageway.</i>		
	<i>Value Data Type:</i>	<i>boolean</i>		
	<i>Value Domain:</i>	<i>flag</i>		
	<i>Feature Attribute Values:</i>	<i>T,F</i>		
	<i>Name:</i>	<i>lanes</i>		
	<i>Definition:</i>	<i>The total number of lanes across this road section (including both directions of travel)..</i>		
<u>Feature Attribute</u>				

<u>Feature Catalogue Element</u>	Field Name	Description		
Feature Attribute	Value Data Type:	integer		
	Value Domain:	NumberMax10		
	Name:	OneWay		
	Definition:	A code value to indicate the allowed direction of travel on this RoadSectionCentreline		
	Value Domain Type:	1 (enumerated)		
	Value Domain:	OneWay		
	Feature Attribute Values:	Label	Code	Definition
		two way	0	
		travelDirectionEqualObjectDirection	1	
		travelDirectionOppositeObjectDirection	-1	
Feature Attribute	Name:	RoadStatus		
	Definition:	A code value indicating whether the RoadSectionCentreline is currently open to traffic.		
	Value Domain Type:	1 (enumerated)		
	Value Domain:	RoadStatus		
	Feature Attribute Values:	Label	Code	Definition
		disused	2	
		historic	3	
		open	0	
		proposed	1	
Feature Attribute	Name:	StreetNumberingScheme		
	Definition:	An enumeration class defining allowable values for the type of street numbering system which applies on an individual road section.		
	Value Data Type:	integer		
	Value Domain Type:	1 (enumerated)		
	Value Domain:	StreetNumberingScheme		
	Feature Attribute Values:	Label	Code	Definition
		consecutive	3	
		erratic	4	
		oddsLeft	1	
		oddsRight	2	
Feature Attribute	Name:	RoadSectionHierarchy		

<u>Feature Catalogue Element</u>	Field Name	Description		
Feature Attribute	<i>Definition:</i>	A code value indicating the of the level of traffic to which a road is subjected. These values are commonly used by Local Authorities to classify Roads.		
	<i>Value Domain Type:</i>	1 (enumerated)		
	<i>Value Domain:</i>	RoadSectionHierarchy		
	<i>Feature Attribute Values:</i>	Label	Code	Definition
		arterial	0	
		collector	2	
		local	3	
		minorArterial	1	
	<i>Name:</i>	Surface		
	<i>Definition:</i>	An enumeration class describing the allowable values for the surface of a Road Section.		
	<i>Value Data Type:</i>	integer		
	<i>Value Domain Type:</i>	1 (enumerated)		
	<i>Value Domain:</i>	Surface		
	<i>Feature Attribute Values:</i>	Label	Code	Definition
		metal	1	
		seal	0	
		other	2	
	<i>Name:</i>	CarriagewayDirection		
	<i>Definition:</i>	An enumeration of categories describing the direction of travel for a Road Section which represents one side of a dual carriageway.		
	<i>Value Data Type:</i>	integer		
	<i>Value Domain Type:</i>	1 (enumerated)		
	<i>Value Domain:</i>	CarriagewayDirection		
	<i>Feature Attribute Values:</i>	Label	Code	Definition
		eastbound	3	
		northbound	1	
		southbound	2	
		westbound	4	
Feature Attribute	<i>Name:</i>	RestrictionType		
	<i>Definition:</i>	An enumeration class defining allowable values for RestrictionTypes that apply to travel along a RoadSectionCentreline.		
	<i>Value Data Type:</i>	integer		

<u>Feature Catalogue Element</u>	Field Name	Description		
<u>Feature Attribute</u>	<i>Value Domain Type:</i>	1 (enumerated)		
	<i>Value Domain:</i>	CarriagewayDirection		
	<i>Feature Attribute Values:</i>	Label	Code	Definition
		4wheelDriveVehiclesOnly	10	
		authorisedOperatorsOnly	7	
		dryWeatherOnly	12	
		fullMotorwayRestrictions	13	
		height	4	
		inaccessibleAtHighTide	14	
		limitedAccess	0	
		noRentalCars	8	
		noStopping	1	
		noUturns	2	
		pedestrianOnly	11	
		speed	6	
		temporaryClosure	9	
		emergencyVehicleAccess	16	
		formedAndWellMarked	18	
		steps	17	
		unformedUnmarked	19	
	<i>Name:</i>	RestrictionValue		
	<i>Definition:</i>	The value of dimension restrictions eg height, width, speed.		
	<i>Value Data Type:</i>	float		
<u>Feature Type</u>	<i>Name:</i>	Runway		
	<i>Definition:</i>	A Polygon object representing the extent of a strip of land designed for the take-off and landing of aircraft.		
	<i>Feature Relationship Names:</i>	runways belonging to an airport, SpatialConfiguration.		
	<i>Subtype of:</i>	AccessPoint		
	<i>Name:</i>	airportNo		
	<i>Definition:</i>	A code number representing the airport to which the runway belongs.		
	<i>Value Data Type:</i>	Integer		
	<i>Value Domain:</i>	NumberMax100		
<u>Feature Type</u>	<i>Name:</i>	School		
	<i>Definition:</i>	A place where children are educated.		
	<i>Subtype of:</i>	Named Place		
<u>Feature Type</u>	<i>Name:</i>	ServiceLane		

<u>Feature Catalogue Element</u>	Field Name	Description		
	<i>Definition:</i>	<i>Road which is primarily used by vehicles servicing a site.</i>		
	<i>Subtype of:</i>	<i>Road</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>ShoppingCentre</i>		
	<i>Definition:</i>	<i>A large enclosed shopping complex containing multiple retail outlets.</i>		
	<i>Subtype of:</i>	<i>NamedPlace</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>SiteEntrance</i>		
	<i>Definition:</i>	<i>The entrance to a site.</i>		
	<i>Feature Relationship Names:</i>	<i>SpatialConfiguration, SiteboundaryEntrance</i>		
	<i>Subtype of:</i>	<i>AcessPoint</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>Slip Road</i>		
	<i>Definition:</i>	<i>A road section which exists for the purpose of channelling traffic from one road to another at an intersection. Its presence generally splits traffic flow at an intersection.</i>		
	<i>Subtype of:</i>	<i>Road</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>SmallRoundabout</i>		
	<i>Definition:</i>	<i>A roundabout consisting of lengths of RoadSectionCentreline > 50m on any 1 leg</i>		
	<i>Subtype of:</i>	<i>RoadCentrelineIntersection</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>SportsCentre</i>		
	<i>Definition:</i>	<i>A commercial centre for sports activities.</i>		
	<i>Subtype of:</i>	<i>NamedPlace</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>SportsClub</i>		
	<i>Definition:</i>	<i>A non commercial club run by private individuals for sports activities.</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>StandingWater</i>		
	<i>Definition:</i>	<i>An expanse of water entirely surrounded by land.</i>		
	<i>Feature Relationship Names:</i>	<i>SpatialConfiguration</i>		
	<i>Subtype of:</i>	<i>WaterFeature</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>StateHighway</i>		
	<i>Definition:</i>	<i>A State Highway of a given number designated by Transit New Zealand.</i>		

<u>Feature Catalogue Element</u>	Field Name	Description		
Feature Attribute	<i>Feature Relationship Names:</i>	<i>shareGeometry, StateHighwayReferenceStations</i>		
	<i>Subtype of:</i>	<i>ComplexRoad</i>		
	<i>Name:</i>	<i>shNumber</i>		
	<i>Definition:</i>	<i>The official Transit New Zealand number for the State Highway.</i>		
	<i>Value Data Type:</i>	<i>Integer</i>		
	<i>Value Domain:</i>	<i>AlphaNumeric</i>		
Feature Attribute	<i>Name:</i>	<i>StateHighwayBridge</i>		
	<i>Definition:</i>	<i>A Bridge intersecting a State Highway</i>		
	<i>Feature Relationship Names:</i>	<i>BridgeReference</i>		
	<i>Subtype of:</i>	<i>Bridge</i>		
	<i>Name:</i>	<i>transitBridgeNumber</i>		
	<i>Definition:</i>	<i>The Transit Reference Station identifier for a State Highway bridge (based on distance from Transit Reference Station).</i>		
	<i>Value Data Type:</i>	<i>Integer</i>		
	<i>Value Domain:</i>	<i>AlphaNumeric</i>		
Feature Type	<i>Name:</i>	<i>Steps</i>		
	<i>Definition:</i>	<i>A permanent accessway for pedestrians formed as steps.</i>		
	<i>Subtype of:</i>	<i>PedestrianRoadSection</i>		
Feature Type	<i>Name:</i>	<i>Stream</i>		
	<i>Definition:</i>	<i>A small river.</i>		
	<i>Subtype of:</i>	<i>FlowingWaterFeature</i>		
Feature Attribute	<i>Name:</i>	<i>StreetAddress</i>		
	<i>Definition:</i>	<i>The reference to a position on a street where a person or object can be found.</i>		
	<i>Feature Relationship Names:</i>	<i>StreetAddressRoad, AddressStatus, StreetNumber, Within, LowAddressRight, LowAddressLeft, HighAddressLeft, HighAddressRight</i>		
	<i>Subtype of:</i>	<i>Address</i>		
	<i>Name:</i>	<i>numberTxt</i>		
	<i>Definition:</i>	<i>A string describing the complete alphanumeric combination that makes this address unique within the street to which it belongs.</i>		

<u>Feature Catalogue Element</u>	Field Name	Description		
<u>Feature Attribute</u>	<i>Value Data Type:</i>	<i>string</i>		
	<i>Value Domain:</i>	<i>AlphaNumeric</i>		
	<i>Name:</i>	<i>source</i>		
	<i>Definition:</i>	<i>The name of the organisation from which this address was sourced.</i>		
	<i>Value Data Type:</i>	<i>name</i>		
	<i>Value Domain:</i>	<i>name</i>		
	<i>Name:</i>	<i>NumberLow</i>		
	<i>Definition:</i>	<i>The low number in the street number range belonging to an individual Street Address.</i>		
	<i>Value Data Type:</i>	<i>integer</i>		
	<i>Name:</i>	<i>NumberHigh</i>		
	<i>Definition:</i>	<i>The high number in the street number range belonging to an individual Street Address.</i>		
	<i>Value Data Type:</i>	<i>integer</i>		
	<i>Name:</i>	<i>RAPID</i>		
	<i>Definition:</i>	<i>This number has been determined according to the RAPID (Rural address property identification) system.</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>Suburb</i>		
	<i>Definition:</i>	<i>A named area within a town or city.</i>		
	<i>Subtype of:</i>	<i>GeneralLocality</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>Subway</i>		
	<i>Definition:</i>	<i>An underground passage for pedestrians or stock.</i>		
	<i>Subtype of:</i>	<i>TunnelCentreline</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>Tavern</i>		
	<i>Definition:</i>	<i>A place which is licenced for the sale and consumption of alcohol.</i>		
	<i>Subtype of:</i>	<i>NamedPlace</i>		
<u>Feature Type</u>	<i>Name:</i>	<i>TerritorialAuthority</i>		
	<i>Definition:</i>	<i>A body having local government jurisdiction for a part of the country.</i>		
	<i>Feature Relationship Names:</i>	<i>SpatialConfiguration</i>		
	<i>Subtype of:</i>	<i>Jurisdiction</i>		

<u>Feature Catalogue Element</u>	Field Name	Description		
<u>Feature Type</u>	Name:	<i>TertiaryEducation</i>		
	Definition:	<i>A tertiary education establishment</i>		
	Subtype of:	<i>NamedPlace</i>		
<u>Feature Type</u>	Name:	<i>TouristRoute</i>		
	Definition:	<i>A named Tourist Route designated by a Regional Authority.</i>		
	Subtype of:	<i>ComplexRoad</i>		
<u>Feature Type</u>	Name:	<i>TouristVenue</i>		
	Definition:	<i>A location which tourists visit.</i>		
	Subtype of:	<i>NamedPlace</i>		
<u>Feature Type</u>	Name:	<i>Town</i>		
	Definition:	<i>Has a population size within the thresholds defining a Town.</i>		
	Subtype of:	<i>GeneralLocality</i>		
<u>Feature Type</u>	Name:	<i>TrafficControl</i>		
	Definition:	<i>A Point where flow of traffic on the RoadSectionCentreline network changes.</i>		
	Feature Relationship Names:	<i>SpatialConfiguration, LocatedAdjacentTo</i>		
	Subtype of:	<i>Feature</i>		
<u>Feature Attribute</u>	Name:	<i>TransitReferenceStation</i>		
	Definition:	<i>A Point object representing the position of a fixed marker post used by Transit New Zealand to reference positions along a State Highway. Reference Stations are placed at intervals of up to 16 km to facilitate management of sections of State Highway.</i>		
	Feature Relationship Names:	<i>LocatedAdjacentTo, SpatialConfiguration, StateHighwayReferenceStations, BridgeReference</i>		
	Subtype of:	<i>Feature</i>		
	Name:	<i>referenceStationNumber</i>		
	Definition:	<i>The Transit New Zealand Reference Station Number (derived on the basis of the distance in Kilometres from the start of the State Highway).</i>		
	Value Data Type:	<i>Integer</i>		
	Value Domain:	<i>NumberMax1000</i>		

<u>Feature Catalogue Element</u>	Field Name	Description		
<u>Feature Type</u>	Name:	Tunnel		
	Definition:	A built structure constructed to allow a Road or Railway to travel underground through elevated terrain.		
	Feature Relationship Names:	SpatialConfiguration, CollectionOf, RailThroughTunnel, RoadThroughTunnel		
	Subtype of:	Feature		
<u>Feature Type</u>	Name:	Vineyard		
	Definition:	A commercial grape growing site for wine production		
	Subtype of:	NamedPlace		
<u>Feature Type</u>	Name:	Waterfall		
	Definition:	A cascade of falling water where there is a vertical or almost vertical step in a river.		
	Subtype of:	FlowingWaterHazard		
<u>Feature Type</u> Feature Attribute	Name:	WaterFeature		
	Definition:	A natural or man-made water-body of sufficient size for its extent to be of significance in the context of Emergency Services and Government Administration functions.		
	Feature Relationship Names:	BridgeOverWater		
	Subtype of:	Feature		
	Name:	description		
	Definition:	Free text description of a water feature.		
	Value Data Type:	string		
	Value Domain:	description		
<u>Feature Type</u>	Name:	Wharf		
	Definition:	A permanent built structure against which boats can moor for the purposes of commercial loading and unloading.		
	Subtype of:	AccessPoint		

<u>Feature Catalogue Element</u>	Field Name	Description
<u>Feature Association</u>	<i>Name</i>	<i>SpatialConfiguration</i>
	<i>Feature Type (Class)</i>	<i>SP_GeneralLocalitySpatialObject (Shortcut)</i>
	<i>Feature Type (Class)</i>	<i>GeneralLocality</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>1..?</i>
	<i>Cardinality (reversed)</i>	<i>1..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>RoadRestrictions</i>
	<i>Feature Type (Class)</i>	<i>Restriction</i>
	<i>Feature Type (Class)</i>	<i>RoadSectionCentreline</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>0..?</i>
	<i>Cardinality (reversed)</i>	<i>0..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>LocatedAdjacentTo</i>
	<i>Feature Type (Class)</i>	<i>TrafficControl</i>
	<i>Feature Type (Class)</i>	<i>TransitReferenceStation</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>0..?</i>
	<i>Cardinality (reversed)</i>	<i>0..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>RoadSurface</i>
	<i>Feature Type (Class)</i>	<i>Surface</i>
	<i>Feature Type (Class)</i>	<i>RoadSectionCentreline</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>0..?</i>
	<i>Cardinality (reversed)</i>	<i>0..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>TypeOfRoadSection</i>

<u>Feature Catalogue Element</u>	Field Name	Description
	<i>Feature Type (Class)</i>	<i>RoadSectionType</i>
	<i>Feature Type (Class)</i>	<i>RoadSectionCentreline</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>0..?</i>
	<i>Cardinality (reversed)</i>	<i>1..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>RoadStatus</i>
	<i>Feature Type (Class)</i>	<i>Status</i>
	<i>Feature Type (Class)</i>	<i>RoadSectionCentreline</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>0..?</i>
	<i>Cardinality (reversed)</i>	<i>1..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>RoadHierarchy</i>
	<i>Feature Type (Class)</i>	<i>RoadSectionHierarchy</i>
	<i>Feature Type (Class)</i>	<i>RoadSectionCentreline</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>0..?</i>
	<i>Cardinality (reversed)</i>	<i>1..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>Direction</i>
	<i>Feature Type (Class)</i>	<i>OneWay</i>
	<i>Feature Type (Class)</i>	<i>RoadSectionCentreline</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>0..?</i>
	<i>Cardinality (reversed)</i>	<i>1..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>CarriagewayDirection</i>
	<i>Feature Type (Class)</i>	<i>CarriagewayDirectionCode</i>
	<i>Feature Type (Class)</i>	<i>RoadSectionCentreline</i>

<u>Feature Catalogue Element</u>	Field Name	Description
	<i>Order Indicator</i>	1 (ordered)
	<i>Cardinality</i>	0..?
	<i>Cardinality (reversed)</i>	0..?
<u>Feature Association</u>	<i>Name</i>	<i>RailThroughTunnel</i>
	<i>Feature Type (Class)</i>	<i>Tunnel</i>
	<i>Feature Type (Class)</i>	<i>RailSectionCentreline</i>
	<i>Order Indicator</i>	1 (ordered)
	<i>Cardinality</i>	0..?
	<i>Cardinality (reversed)</i>	0..?
<u>Feature Association</u>	<i>Name</i>	<i>RoadThroughTunnel</i>
	<i>Feature Type (Class)</i>	<i>Tunnel</i>
	<i>Feature Type (Class)</i>	<i>RoadSectionCentreline</i>
	<i>Order Indicator</i>	1 (ordered)
	<i>Cardinality</i>	0..?
	<i>Cardinality (reversed)</i>	0..?
<u>Feature Association</u>	<i>Name</i>	<i>TravelsAlong</i>
	<i>Feature Type (Class)</i>	<i>RoadSectionCentreline</i>
	<i>Feature Type (Class)</i>	<i>RailSectionCentreline</i>
	<i>Order Indicator</i>	1 (ordered)
	<i>Cardinality</i>	0..?
	<i>Cardinality (reversed)</i>	0..?
<u>Feature Association</u>	<i>Name</i>	<i>RoadOverBridge</i>
	<i>Feature Type (Class)</i>	<i>Bridge</i>
	<i>Feature Type (Class)</i>	<i>RoadSectionCentreline</i>
	<i>Order Indicator</i>	1 (ordered)
	<i>Cardinality</i>	0..?
	<i>Cardinality (reversed)</i>	0..?

<u>Feature Catalogue Element</u>	Field Name	Description
<u>Feature Association</u>	Name	/CompositionOfComplexRoad
	Feature Type (Class)	ComplexRoad
	Feature Type (Class)	RoadSectionCentreline
	Order Indicator	1 (ordered)
	Cardinality	1..?
	Cardinality (reversed)	0..?
<u>Feature Association</u>	Name	/RailwayComposition
	Feature Type (Class)	Railway
	Feature Type (Class)	RailSectionCentreline
	Order Indicator	1 (ordered)
	Cardinality	1..?
	Cardinality (reversed)	1..?
<u>Feature Association</u>	Name	RailUnderBridge
	Feature Type (Class)	Bridge
	Feature Type (Class)	RailSectionCentreline
	Order Indicator	1 (ordered)
	Cardinality	0..?
	Cardinality (reversed)	0..?
<u>Feature Association</u>	Name	/RoadComposition
	Feature Type (Class)	Road
	Feature Type (Class)	RoadSectionCentreline
	Order Indicator	1 (ordered)
	Cardinality	1..?
	Cardinality (reversed)	1..?
<u>Feature Association</u>	Name	RoadSectionOwnership
	Feature Type (Class)	Owner

<u>Feature Catalogue Element</u>	Field Name	Description
	<i>Feature Type (Class)</i>	<i>RoadSectionCentreline</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>0..?</i>
	<i>Cardinality (reversed)</i>	<i>1..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>JurisdictionOwner</i>
	<i>Feature Type (Class)</i>	<i>Jurisdiction</i>
	<i>Feature Type (Class)</i>	<i>Owner</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>0..?</i>
	<i>Cardinality (reversed)</i>	<i>0..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>AddressStatus</i>
	<i>Feature Type (Class)</i>	<i>AddressStatus</i>
	<i>Feature Type (Class)</i>	<i>StreetAddress</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>0..?</i>
	<i>Cardinality (reversed)</i>	<i>1..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>PlaceLabel</i>
	<i>Feature Type (Class)</i>	<i>NamedPlace</i>
	<i>Feature Type (Class)</i>	<i>TopoLabelPoint</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>0..?</i>
	<i>Cardinality (reversed)</i>	<i>1..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>AddressSystem</i>
	<i>Feature Type (Class)</i>	<i>StreetNumberingScheme</i>
	<i>Feature Type (Class)</i>	<i>RoadSectionCentreline</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>0..?</i>

<u>Feature Catalogue Element</u>	Field Name	Description
	<i>Cardinality (reversed)</i>	1..?
<u>Feature Association</u>	<i>Name</i>	<i>AddressPointType</i>
	<i>Feature Type (Class)</i>	<i>Address</i>
	<i>Feature Type (Class)</i>	<i>AddressPositionType</i>
	<i>Order Indicator</i>	1 (ordered)
	<i>Cardinality</i>	1..?
	<i>Cardinality (reversed)</i>	0..?
<u>Feature Association</u>	<i>Name</i>	<i>StreetAddressRoad</i>
	<i>Feature Type (Class)</i>	<i>Road</i>
	<i>Feature Type (Class)</i>	<i>StreetAddress</i>
	<i>Order Indicator</i>	1 (ordered)
	<i>Cardinality</i>	0..?
	<i>Cardinality (reversed)</i>	1..?
<u>Feature Association</u>	<i>Name</i>	<i>StartOfRAPIDnumbering</i>
	<i>Feature Type (Class)</i>	<i>RAPIDAddressStartPoint</i>
	<i>Feature Type (Class)</i>	<i>Road</i>
	<i>Order Indicator</i>	1 (ordered)
	<i>Cardinality</i>	1..?
	<i>Cardinality (reversed)</i>	0..?
<u>Feature Association</u>	<i>Name</i>	<i>IsOn</i>
	<i>Feature Type (Class)</i>	<i>Road</i>
	<i>Feature Type (Class)</i>	<i>NamedPlace</i>
	<i>Order Indicator</i>	1 (ordered)
	<i>Cardinality</i>	0..?
	<i>Cardinality (reversed)</i>	0..?
<u>Feature Association</u>	<i>Name</i>	<i>OwnerOrganisation</i>

<u>Feature Catalogue Element</u>	Field Name	Description
	<i>Feature Type (Class)</i>	<i>OwnerOrganisation</i>
	<i>Feature Type (Class)</i>	<i>Owner</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>1..?</i>
	<i>Cardinality (reversed)</i>	<i>1..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>AddressAccess</i>
	<i>Feature Type (Class)</i>	<i>AccessPoint</i>
	<i>Feature Type (Class)</i>	<i>Address</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>0..?</i>
	<i>Cardinality (reversed)</i>	<i>0..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>TypeOfBridge</i>
	<i>Feature Type (Class)</i>	<i>BridgeType</i>
	<i>Feature Type (Class)</i>	<i>Bridge</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>0..?</i>
	<i>Cardinality (reversed)</i>	<i>1..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>CarriagewayDescription</i>
	<i>Feature Type (Class)</i>	<i>CarriagewayDescription</i>
	<i>Feature Type (Class)</i>	<i>RoadSectionCentreline</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>0..?</i>
	<i>Cardinality (reversed)</i>	<i>0..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>PlaceUse</i>
	<i>Feature Type (Class)</i>	<i>TypesOfUse</i>
	<i>Feature Type (Class)</i>	<i>NamedPlace</i>

<u>Feature Catalogue Element</u>	Field Name	Description
	<i>Order Indicator</i>	1 (ordered)
	<i>Cardinality</i>	0..?
	<i>Cardinality (reversed)</i>	0..?
<u>Feature Association</u>	<i>Name</i>	<i>ImageExtent</i>
	<i>Feature Type (Class)</i>	<i>SP_TP_ContextImageFace (Shortcut)</i>
	<i>Feature Type (Class)</i>	<i>Contextual Image</i>
	<i>Order Indicator</i>	1 (ordered)
	<i>Cardinality</i>	1..?
	<i>Cardinality (reversed)</i>	1..?
<u>Feature Association</u>	<i>Name</i>	<i>OrthophotoComposition</i>
	<i>Feature Type (Class)</i>	<i>Orthophoto</i>
	<i>Feature Type (Class)</i>	<i>AerialPhoto</i>
	<i>Order Indicator</i>	1 (ordered)
	<i>Cardinality</i>	1..?
	<i>Cardinality (reversed)</i>	0..?
<u>Feature Association</u>	<i>Name</i>	<i>RailType</i>
	<i>Feature Type (Class)</i>	<i>RailwayType</i>
	<i>Feature Type (Class)</i>	<i>RailSectionCentreline</i>
	<i>Order Indicator</i>	1 (ordered)
	<i>Cardinality</i>	0..?
	<i>Cardinality (reversed)</i>	0..?
<u>Feature Association</u>	<i>Name</i>	<i>RailStatus</i>
	<i>Feature Type (Class)</i>	<i>Status</i>
	<i>Feature Type (Class)</i>	<i>RailSectionCentreline</i>
	<i>Order Indicator</i>	1 (ordered)
	<i>Cardinality</i>	0..?
	<i>Cardinality (reversed)</i>	1..?

<u>Feature Catalogue Element</u>	Field Name	Description
<u>Feature Association</u>	<i>Name</i>	<i>PrincipalAddressOfNamedPlace</i>
	<i>Feature Type (Class)</i>	<i>Address</i>
	<i>Feature Type (Class)</i>	<i>NamedPlace</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>0..?</i>
	<i>Cardinality (reversed)</i>	<i>1..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>RunwaysBelongingToAnAirport</i>
	<i>Feature Type (Class)</i>	<i>NamedPlace</i>
	<i>Feature Type (Class)</i>	<i>Runway</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Role Name</i>	<i>airport</i>
	<i>Cardinality</i>	<i>0..?</i>
	<i>Cardinality (reversed)</i>	<i>1..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>LocalityLabel</i>
	<i>Feature Type (Class)</i>	<i>TopoLabelPoint</i>
	<i>Feature Type (Class)</i>	<i>GeneralLocality</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>1..?</i>
	<i>Cardinality (reversed)</i>	<i>0..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>/SharesGeometry</i>
	<i>Feature Type (Class)</i>	<i>RoadSectionCentreline</i>
	<i>Feature Type (Class)</i>	<i>RAPIDAddressStartPoint</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>0..?</i>
	<i>Cardinality (reversed)</i>	<i>1..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>LabelLine</i>

<u>Feature Catalogue Element</u>	Field Name	Description
	<i>Feature Type (Class)</i>	<i>TopoLabelCentreline</i>
	<i>Feature Type (Class)</i>	<i>NamedPlace</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>1..?</i>
	<i>Cardinality (reversed)</i>	<i>0..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>SuburbAlignedToMeshblock</i>
	<i>Feature Type (Class)</i>	<i>Jurisdiction</i>
	<i>Feature Type (Class)</i>	<i>AdminSuburb</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Role Name</i>	<i>meshblock</i>
	<i>Cardinality</i>	<i>0..?</i>
	<i>Cardinality (reversed)</i>	<i>0..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>/IntersectingRoads</i>
	<i>Feature Type (Class)</i>	<i>Road</i>
	<i>Feature Type (Class)</i>	<i>RoadIntersection</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>1..?</i>
	<i>Cardinality (reversed)</i>	<i>2..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>RelativeToFeature</i>
	<i>Feature Type (Class)</i>	<i>Feature</i>
	<i>Feature Type (Class)</i>	<i>RelativeAddress</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>0..?</i>
	<i>Cardinality (reversed)</i>	<i>1..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>FeatureName</i>
	<i>Feature Type (Class)</i>	<i>NameList</i>

<u>Feature Catalogue Element</u>	Field Name	Description
	<i>Feature Type (Class)</i>	<i>Feature</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>1..?</i>
	<i>Cardinality (reversed)</i>	<i>0..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>FormerPartOfRoad</i>
	<i>Feature Type (Class)</i>	<i>Road</i>
	<i>Feature Type (Class)</i>	<i>RoadSectionCentreline</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>0..?</i>
	<i>Cardinality (reversed)</i>	<i>0..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>IsPartOf</i>
	<i>Feature Type (Class)</i>	<i>CompositeSite</i>
	<i>Feature Type (Class)</i>	<i>Feature</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>2..?</i>
	<i>Cardinality (reversed)</i>	<i>0..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>/TaComposition</i>
	<i>Feature Type (Class)</i>	<i>TerritorialAuthority</i>
	<i>Feature Type (Class)</i>	<i>Meshblock</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>*</i>
	<i>Cardinality (reversed)</i>	<i>1..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>RoadUnderBridge</i>
	<i>Feature Type (Class)</i>	<i>Bridge</i>
	<i>Feature Type (Class)</i>	<i>RoadSectionCentreline</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>0..?</i>

<u>Feature Catalogue Element</u>	Field Name	Description
	<i>Cardinality (reversed)</i>	<i>0..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>RailOverBridge</i>
	<i>Feature Type (Class)</i>	<i>Bridge</i>
	<i>Feature Type (Class)</i>	<i>RailSectionCentreline</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>0..?</i>
	<i>Cardinality (reversed)</i>	<i>0..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>BridgeOverWater</i>
	<i>Feature Type (Class)</i>	<i>Bridge</i>
	<i>Feature Type (Class)</i>	<i>WaterFeature</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>0..?</i>
	<i>Cardinality (reversed)</i>	<i>0..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>/Intersects</i>
	<i>Feature Type (Class)</i>	<i>GeneralLocality</i>
	<i>Feature Type (Class)</i>	<i>GeneralLocality</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>0..?</i>
	<i>Cardinality (reversed)</i>	<i>0..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>/Intersects</i>
	<i>Feature Type (Class)</i>	<i>Feature</i>
	<i>Feature Type (Class)</i>	<i>GeneralLocality</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>0..?</i>
	<i>Cardinality (reversed)</i>	<i>0..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>/Intersects</i>

<u>Feature Catalogue Element</u>	Field Name	Description
	<i>Feature Type (Class)</i>	<i>Jurisdiction</i>
	<i>Feature Type (Class)</i>	<i>Feature</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>0..?</i>
	<i>Cardinality (reversed)</i>	<i>1..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>/SharesGeometry</i>
	<i>Feature Type (Class)</i>	<i>RailwayCrossing</i>
	<i>Feature Type (Class)</i>	<i>RailSectionCentreline</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>1..?</i>
	<i>Cardinality (reversed)</i>	<i>1..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>MeasuredFrom</i>
	<i>Feature Type (Class)</i>	<i>RAPIDAddressStartPoint</i>
	<i>Feature Type (Class)</i>	<i>RAPIDnumber</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>1..?</i>
	<i>Cardinality (reversed)</i>	<i>1..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>StateHighwayReferenceStations</i>
	<i>Feature Type (Class)</i>	<i>TransitReferenceStation</i>
	<i>Feature Type (Class)</i>	<i>StateHighway</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>1..?</i>
	<i>Cardinality (reversed)</i>	<i>1..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>StationForRailway</i>
	<i>Feature Type (Class)</i>	<i>Railway</i>
	<i>Feature Type (Class)</i>	<i>NamedPlace</i>

<u>Feature Catalogue Element</u>	Field Name	Description
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Role Name</i>	<i>railwayStation</i>
	<i>Cardinality</i>	<i>1..?</i>
	<i>Cardinality (reversed)</i>	<i>1..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>AdjacentTo</i>
	<i>Feature Type (Class)</i>	<i>RailSectionCentreline</i>
	<i>Feature Type (Class)</i>	<i>NamedPlace</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Role Name</i>	<i>railwayStation</i>
	<i>Cardinality</i>	<i>1..?</i>
	<i>Cardinality (reversed)</i>	<i>1..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>LowAddressRight</i>
	<i>Feature Type (Class)</i>	<i>RoadSectionCentreline</i>
	<i>Feature Type (Class)</i>	<i>StreetAddress</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>0..?</i>
	<i>Cardinality (reversed)</i>	<i>1..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>LowAddressLeft</i>
	<i>Feature Type (Class)</i>	<i>StreetAddress</i>
	<i>Feature Type (Class)</i>	<i>RoadSectionCentreline</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>1..?</i>
	<i>Cardinality (reversed)</i>	<i>0..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>HighAddressLeft</i>
	<i>Feature Type (Class)</i>	<i>StreetAddress</i>
	<i>Feature Type (Class)</i>	<i>RoadSectionCentreline</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>1..?</i>

<u>Feature Catalogue Element</u>	Field Name	Description
	<i>Cardinality (reversed)</i>	<i>0..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>HighAddressRight</i>
	<i>Feature Type (Class)</i>	<i>StreetAddress</i>
	<i>Feature Type (Class)</i>	<i>RoadSectionCentreline</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>1..?</i>
	<i>Cardinality (reversed)</i>	<i>0..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>Within</i>
	<i>Feature Type (Class)</i>	<i>Meshblock</i>
	<i>Feature Type (Class)</i>	<i>StreetAddress</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>0..?</i>
	<i>Cardinality (reversed)</i>	<i>1..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>/sharedGeometry</i>
	<i>Feature Type (Class)</i>	<i>RoadCentrelineIntersection</i>
	<i>Feature Type (Class)</i>	<i>RoadIntersection</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>0..?</i>
	<i>Cardinality (reversed)</i>	<i>0..?</i>
<u>Feature Association</u>	<i>Name</i>	<i>Intersection</i>
	<i>Feature Type (Class)</i>	<i>RoadCentrelineIntersection</i>
	<i>Feature Type (Class)</i>	<i>RoadSectionCentreline</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Role Name</i>	<i>roadCentrelineIntesection</i>
	<i>Role Name</i>	<i>trafficControl</i>
	<i>Cardinality</i>	<i>3..?</i>
	<i>Cardinality (reversed)</i>	<i>0..?</i>

<u>Feature Catalogue Element</u>	Field Name	Description
<u>Feature Association</u>	<i>Name</i>	<i>BarrierToFlow</i>
	<i>Feature Type (Class)</i>	<i>RoadSectionCentreline</i>
	<i>Feature Type (Class)</i>	<i>Barrier</i>
	<i>Order Indicator</i>	<i>1 (ordered)</i>
	<i>Cardinality</i>	<i>0..?</i>
	<i>Cardinality (reversed)</i>	<i>2..?</i>

5 ESA Core Data Application Schema

5.1 Introduction to Application Schema

This application schema is a conceptual schema that provides the formal description of the data structure and content required by ESA applications. It contains descriptions of both geographic data and other related data. The application schema defines:

- content and structure of data;
- specifications of business rules (constraints) for collecting, manipulating and processing data by an application.

The purpose of the application schema is twofold:

- to provide a computer-readable data description defining the data structure, which makes it possible to apply automated mechanisms for data management;
- to achieve a common and correct understanding of the data, by documenting the data content, thereby making it possible to unambiguously retrieve information from the data.

A fundamental concept of geographic data is the feature. A feature is an abstraction of real world phenomena, about which data are collected, maintained, and disseminated. The Feature Catalogue provides the description of the geographic data.

5.2 Guide to Application Schema

5.2.1 Structure

The Application Schema is divided into two packages: ESAMainSchema and ESASpatialSchema. The ESAMainSchema also contains sub-packages.

The Structure of the whole document is as follows:

Package Name
Description of model [Package Name]
Diagrams
 Diagram Name (hyperlinked to details below)
 Diagram Graphic
 Diagram class list
 Diagram association list
 Diagram dependency list
Classes
 Class List
 Class Name (hyperlinked to details below)
 Business rule list of class
 List of diagrams containing class
 Description of class

	Annotation of class
	Code preview of class
	Identifier list of the class
	Attribute list of the class
	Attribute name
	Standard check of the attribute
	Description of attribute
	Annotation of attribute
Associations	
	Association Name (hyperlinked to details below)
	Card ¹³ of the association
	Description of association (where available)
	Business rule list of association (where applicable)
	List of diagrams containing association
Generalizations	
	Generalization Name (hyperlinked to details below)
	Card of the Generalization
	Description of Generalization (where available)
	Business rule list of Generalization (where applicable)
	List of diagrams containing Generalization
Dependancies	
	Dependancy Name (hyperlinked to details below)
	Card of the Dependancy
	Description of Dependancy (where available)
	Business rule list of Dependancy (where applicable)
	List of diagrams containing Dependancy
Business Rules	
	Business Rule Name
	Description of business rule
	Annotation of business rule
Domains	
	Domain Name
	Reference list of domain
	Standard check of domain
	Description of domain (where available)

¹³ The term "card" is analogous to a conventional filing card. It is simply a summary of details pertaining to the object.

5.2.2 List of Packages

The packages within the application schema are as follows:

Package Name	Sub-Package Names	Description
ESAMainSchema		This is the main package which describes the set of data components needed as government-held geospatial data to meet the needs of "Locate and Verify" functions for Emergency Services and Government Administration.
ESAMainSchema	BridgeFeatures	This sub-package describes types of Bridges which are features in their own right.
ESAMainSchema	PlaceCategoryFeatures	This sub-package describes categories of Named Places which are features in their own right.
ESAMainSchema	RoadCentrelineRestrictionFeatures	This sub-package describes types of Road Restrictions which are features in their own right.
ESAMainSchema	RoadSectionTypeFeatures	This sub-package describes types of RoadSectionCentreline which are features in their own right.
ESASpatialSchema		This package describes the topological and geometric representations of features contained in the ESAMainSchema. It also describes topological associations between different features.

5.2.3 List of Diagrams

The diagrams within the application schema are as follows:

ESAMainSchema Diagrams

Diagram Name	Description
AccessPoints	Describes the class "AccessPoint" and its immediate relationships.
AddressDetail	Describes the class "Address" and its immediate relationships.
AddressRoadLocality	Describes the interactions between Addresses, Roads and General Localities
ComplexRoadDetail	Describes the class "ComplexRoad" and its immediate relationships.
Context	Describes contextual data that are relevant to ESA applications.
Features	Describes the Classes that represent Geographic Features and appear in the Feature Catalogue.
GeneralLocalityDetail	Describes the class "Address" and its immediate relationships.
Jurisdictions	Describes jurisdiction data that are relevant to ESA users.
Main Features	Brings the most significant classes together onto a single diagram.
Meshblock	Describes the class "Meshblock" and its immediate relationships.
NamedPlace&CompositeSiteDetail	Describes the classes "NamedPlace" and CompositeSite and their immediate relationships.
NamedPlaceTypes	Describes the main types of NamedPlace.
Names	Describes how names are handled within the application schema.
RailwayDetail	Describes the class "Railway" and its immediate relationships.
RoadDetail	Describes the class "Road" and its immediate relationships.
RoadSectionDetail	Describes the class "RoadSectionCentreline" and its immediate relationships.
TrafficControl&Intersections	Describes various types of traffic control and how they relate to road intersections.
Tunnel&Bridges	Describes the classes "Bridge" & "Tunnel" and their immediate relationships
WaterFeature	Describes the class "WaterFeature" and its immediate relationships.

ESAMainSchema sub-package Diagrams

Diagram Name	Description
BridgeFeatures	Describes components from the enumeration class "Bridge Type" that are features in their own right.
PlaceCategoryFeatures	Describes all individual components from the enumeration PlaceCategoryCode" as features in their own right.
RoadCentrelineRestrictionFeatures	Describes components from the enumeration classes "Restriction Type" and "PedestrianRoadRestrictions" that are features in their own right.
RoadSectionTypeFeatures	Describes components from the enumeration class "RoadSectionType" that are features in their own right.

ESASpatialSchema Diagrams

Diagram Name	Description
Access&CompositeSiteSpatialConfig	Describes the topology and geometry of access points applying to composite sites.
AccessPointSpatialConfig	Describes the topology and geometry of access points.
AddressSpatialConfig	Describes the topology and geometry of addresses.
AdminSuburbSpatialConfig	Describes the topology and geometry of AdminSuburbs including boundary alignment to RoadSectionCentreline and Meshblocks, plus their spatial intersections with roads and addresses.
Bridge&TunnelSpatialConfig	Describes the topology and geometry of Bridges and Tunnels, plus their spatial intersections with roads, rivers and railways.
CompositeSiteBoundaryAccess	Describes the topology and geometry of access points located specifically on composite site boundaries.
NamedPlace&CompositeSiteSpatialConfig	Describes the topology and geometry of all types of NamedPlace including Composite Sites (CompositeSite topology and geometry is complicated due to them consisting of an aggregation of many features).
FeatureContextSpatialConfig	Describes the topology and geometry of context image coverage of features

Diagram Name	Description
GeneralLocalityIntersectionsSpatialConfig	Describes the topology and geometry of GeneralLocalities relevant to their intersections with Roads, Addresses and NamedPlaces.
GeneralLocalitySpatialConfig	Describes the detailed topology and geometry of GeneralLocalities.
GenericJurisdictionSpatialConfig	Describes the topology and geometry of Jurisdictions at a generic level.
MeshBlockSpatialConfig	Describes the topology and geometry of Meshblocks including boundary alignment to RoadSectionCentreline, water features and railways, plus their spatial intersections with addresses (address ranges within meshblocks).
NamedPlaceOnRoadSpatialConfig	Describes the topology and geometry of NamedPlaces relevant to their intersections with Roads.
RailwaySpatialConfig	Describes the topology and geometry of Railways.
RoadNetworkSpatialConfig	Describes the topology and geometry of Roads and the overall road network (for the purposes of allowing spatial operations on the road network in general).
RoadSectionTrafficControlSpatialConfig	Describes the topology and geometry of RoadSectionCentreline and TrafficControls, plus their spatial associations with each other.
StateHighwaySpatialConfig	Describes the topology and geometry of State Highways as an example of Complex Roads, plus their spatial associations with Transit Reference Stations.
StreetAddressOnRoadSpatialConfig	Describes the spatial derivation of Street Address Ranges for RoadCentrelineSections.
TerritorialAuthoritySpatialConfig	Describes the topology and geometry of TerritorialAuthorities
WaterFeaturesSpatialConfig	Describes the topology and geometry of Water Features.

5.3 **Main Elements of the ESA Core Data Application Schema.**

5.3.1 **Significant Classes**

This section contains a description of the most significant classes in the context of the ESA application environment. All the classes described in this section are contained within the ESAMainSchema package. The greatest test of this application schema is its ability to allow the user to accurately locate and verify a place, no matter how the location is described. In an emergency situation, names supplied by the public are not necessarily official names and the description of the location may be incomplete. The user needs to be able to take the limited information supplied and verify it using supporting information. The relationship between features such as roads, addresses, buildings and localities is therefore very important. The following definitions need to be considered in conjunction with the rest of the model. For example business rules associated with classes and associations (defined within the application schema) play a significant part in further refining scope and definition of those classes and associations.

Features

In ISO19101, the term “feature” denotes an ‘abstraction of real world phenomena’. The ESA Core Data Application Schema defined here contains abstractions of the real world features listed in The Feature Catalogue (Section 4). These features are selected on the basis of being minimal and adequate for the functions of locate and verify as performed by the Emergency Services and Government Administration agencies.

In keeping with the approach adopted for defining the application schema, all ESA features are subclasses of the generic Feature Class. The feature class provides a mechanism for defining properties of all features in general. Such properties include: feature names; and two forms of identification - that used by the organisation responsible for gathering the data representative of specific instances of features and that used for the purposes of this specification.

The handling of feature names will greatly affect the success of verifying a given location. There are two main classes and two associations involved in the modelling of names. The supertype, Feature is associated with the two classes NameList and Name. Each feature will have a NameList which is mapped to a given name via one of the three following associations:

- currentOfficialName
- otherNames
- primarilyKnownAs

For further detail on how the name handling is managed, refer to the diagrams, definitions and business rules within the application schema.

Every Feature instance has two identifiers:

- custodiansId
- esalD

The custodiansId is the unique identifier assigned to the object by the custodian of the source data. For example for an official StreetAddress, the custodian will be the Territorial Authority who assigned the address. The custodiansId will uniquely identify that address within the scope of the datasets held by the particular Territorial Authority.

The esalD is the unique identifier assigned to the object by the custodian of the overall esa data series. The esalD is unique within the context of feature instances within the whole ESA data series. If the spatial properties of that object are changed then the object is retired and a new object introduced with a new esalD. However if the textual attributes are changed then the esalD for that object is retained.

The section of the specification describing the Feature Catalogue provides further details regarding the concept of a feature. Critical classes are described in the following subsections.

Road

When referring to a road, without proper definition we could be referring to many different things. Therefore definitions of Road related classes are very important within this model. The following definitions (sourced from the Application Schema) apply:

- Road: *"An openway for the passage of vehicles or persons or on land. Consists of one or more RoadSectionCentreline having the same roadname that are contiguous or only split by a small distance due to an interchange, staggered junction or other obstacle, within which all street address numbers are Unique"*.
- RoadSectionCentreline: *"A linear object representing the alignment of a section of a road consisting of contiguous segments which have the same attribute values. A RoadSectionCentreline will always end at the intersection with another RoadSectionCentreline, at a change of attribute and at the end of the Road to which the RoadSectionCentreline belongs (ie generally at a change of RoadName)"*.
- ComplexRoad: *"A collection of RoadSectionCentreline which aggregate to form an entity such as a tourist route, motorway, state highway or major road which encompasses several address ranges (eg Great South Road). The complex road does not have any addresses of its own and it will generally be coincident with several Roads or parts of Roads."*
- RoadIntersection: *"An intersection between roadSectionCentreline belonging to two or more different roads"*. Road intersections are commonly used by Emergency Services to verify location. The ability to locate by this means is therefore also very important.

Address

An address is defined as “The conventional means of describing, labelling or identifying an object, place or property”.

Two basic sub-types of address are modelled:

- A **StreetAddress**: *“The reference to a position on a street where a person or object can be found”.*
- A **RelativeAddress**: *“An address described in terms of position relative to a mapped feature”.*

The integrity of the association between a **StreetAddress** and a unique **Road** to which it belongs is important. The uniqueness of a **StreetAddress** is also dependant on knowing the locality within which an address resides, given that road names are not unique within themselves. The model recognises the concept of an **AdminSuburb** (*A subdivision of a TA for the purposes of Emergency Services administration. Boundaries generally align with meshblock boundaries and are contiguous with each other*).

The ability to associate **Addresses** with named places and larger sites such as hospitals, universities etc is also modelled. Two further definitions of importance here are:

- **NamedPlace**: *“The name of a distinct place in the real world that has a defined extent and can be located to within +/- 50 metres”.*
- **CompositeSite**: *“A collection of features relating to a single named site which has multiple buildings, owners, tenants and/or access roads and is normally under common management”.*

Geographic areas of interest

Location can be described in many different ways. In addition to the class **NamedPlace** (described above), which is a very specific place, the following definitions are used in this model:

- **GeneralLocality**: *“An identifiable geographic area or community of interest in the real world with an indistinct boundary. (Not officially defined.) Excludes places which have distinct boundaries, such as properties, parks, buildings, AdminSuburbs, TAs”.*
- **Jurisdiction**: *“A defined official area of responsibility belonging to an Authority represented by a non-physical boundary for regulatory or governance purposes. Represented by a Polygon object”.*

The types of **GeneralLocality** recognised are:

- city
- town

- suburb
- locality

A Definition for each of these is provided within the application schema (see the diagram GeneralLocality).

NamedPlaces are also divided into more than 50 categories defined by the enumeration class, PlaceCategoryCode.

Any feature being located may reside within one or more jurisdictions (eg a Territorial Authority or a National Park) as well as residing within a less distinct GeneralLocality such as "Bay Of Islands", "Wellington" or "Golden Bay".

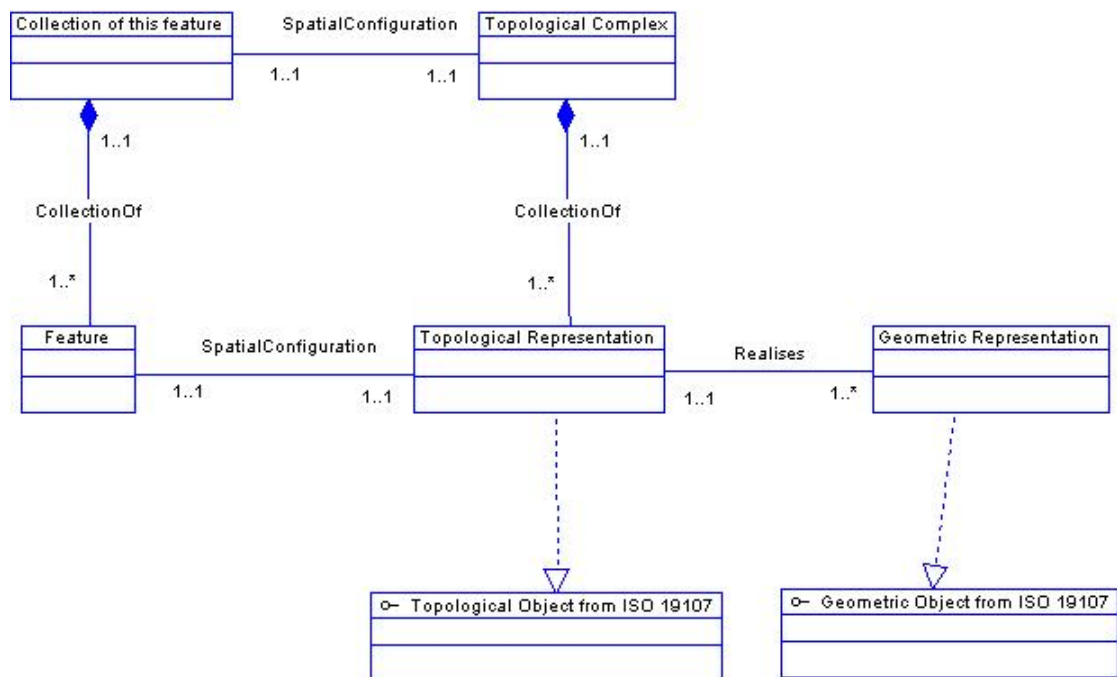
For the purposes of communicating between Emergency Service agencies and managing despatch, a set of administrative boundaries serving as a subdivision of a territorial authority are used. Those are described by the class AdminSuburb, defined above. AdminSuburb is modelled as a subtype of Jurisdiction because the existence of a commonly agreed defined boundary is important in its definition. The relationship between any GeneralLocality and an adminSuburb can be defined by spatial intersection.

5.3.2 Spatial Configurations

The spatial configurations of features and feature associations are described within the second main package of the Application Schema named "ESASpatialSchema".

This package forms the interface between the ESAMainSchema and the Spatial Schema described in ISO/DIS 19107 (Date: 2000-12-19) upon which it is dependant.

Each of the diagrams in this package generally follows the convention shown in the following diagram:



All classes representing the spatial configurations are named using the prefix “SP_”

Topological Representations

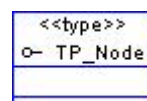
Classes which represent the topological configuration of a feature are named using the prefix “SP_TP_”. The association between a feature and its topological representation is always named “SpatialConfiguration”.

Geometric Representations

Classes which represent the geometric components of a feature representation are named using the prefix “SP_GM_”. The association between the topological object and the geometric objects of which it is comprised is always named “Realises”.

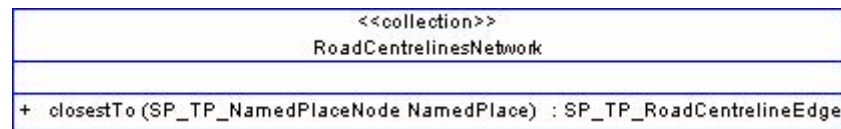
Classes from ISO/DIS 19107

ISO/DIS 19107 defines 39 classes that instantiate geometric or topological objects. Where we have directly used the classes defined in that standard, we have shown those classes using the symbology shown in the following example:



Operations

In some cases operations have been defined in order to define how a spatial association between two sets of objects would be implemented. An operation is “a service that can be requested from an object to effect behaviour”. Operations appear in the diagram as text displayed in the third box of a class object as shown in the example below:



The components of the text defining the operation are:

+ [operation name] ([Parameter Data type] [Parameter Name]):[Return Type]

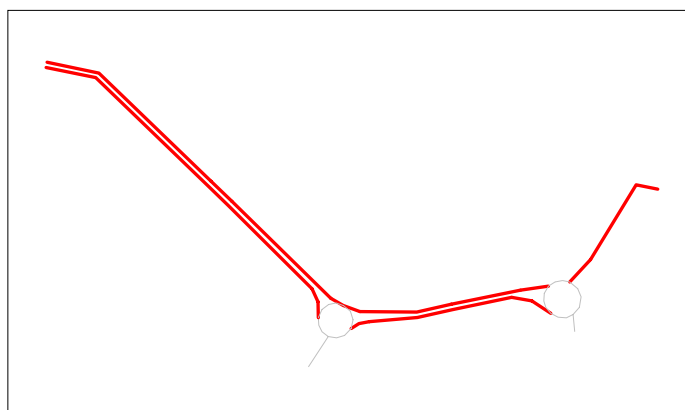
Where an operation is searching a set of features to find the instances that intersect a given object, then it has been necessary to define classes that represent the set of features to be searched. In the example above the entire set of RoadCentrelineSections within the data-set is represented by the class RoadCentrelineNetwork. These collections of features have been labelled with the stereotype “<<collection>>”.

Explanations of Significant Topologies

The following notes may be useful in understanding the topologies of specific features, where the spatial configuration may not be immediately obvious:

SP_TP_RoadComplex

An individual instance of a road is described by the spatial class SP_TP_RoadComplex, realised by the ISO/DIS 19107 class TP_Complex. Although Roads are linear features, individual instances may not necessarily be represented by a simple TP_Edge because a single road may have dual centrelines, branches or gaps as in the example below:



In this example the bold lines represent the centre-lines of Cobham Drive in Wellington. The continuity is interrupted by two roundabouts. The single topological object representing this road is therefore seen to be a discontinuous object.

SP_TP_CompositeSiteComplex

A composite site is by definition made up a set of discontinuous objects representing the features that comprise the composite site. The component objects can be buildings, roads, address points and access points. A boundary polygon may or may not be available. Therefore the spatial configuration has been modelled in such a way that any combination of geometric objects may combine to define the extent of the site. The composite site, in effect, is a complex object composed of the combined topologies of the features of which it is comprised.

SP_TP_BridgeFace and SP_TP_TunnelFace

Bridges and tunnels have been modelled as polygon features represented by the two above named classes. This allows for a single bridge or tunnel to contain more than one centreline, in the circumstances where a dual carriageway or a combination of rail and road centre-lines are carried by the bridge.

SP_GM_CombinedGeneralLocalitySurfacePatch

GeneralLocalities are by definition overlapping entities, so when they are topologically overlaid with each other the result is a greater number of geometric surfaces (SP_GM_CombinedGeneralLocalitySurfacePatches) than the sum of the individual GeneralLocality surfaces (SP_GM_GeneralLocalitySurfacePatches), because the surfaces will be segmented along the lines of overlap.

SP_GM_OrientableCurve

This is a generic class which has a number of sub-types eg SP_GM_WaterOrientableCurve, SP_GM_RoadSectionCentrelineOrientableCurve, SP_GM_RailSectionOrientableCurve, SP_GM_MeshblockOrientableCurve. These have been modelled this way in order to allow, for example, an SP_GM_MeshblockSurface to be derived from the components (representing the geometries of other features).

5.3.3 Other Components of Application Schema

The other components of the ESA Core Data Application Schema are”

- Business Rules
- Domains
- Definitions¹⁴

¹⁴ In the on-line and softcopy version of the ESA Core Data Application Schema, the Definitions Section is a separate file to the Application Schema

6 ESA Quality Measures

Note: This section was updated in April 2004 (v1.9.7). It supersedes Chapter 6 in the *ESA Code Data Specification Version 1.9a* (Oct 2001) and version 1.9.6 (Dec 2002).

6.1 Introduction to Quality Measures

This quality measure specification has been based on:

- ISO 19113 (Geographic Information - Quality principles),
- ISO 19114 (Geographic Information - Quality evaluation procedures)
- ISO 19115 (Geographic Information - Metadata) and
- AS 1199–88 (Sampling Procedures and Tables for Inspection by Attributes) – endorsed by New Zealand Standards

These standards should be referred to where there appears to be any ambiguity in this specification.

Summary of Relevant Quantitative Quality Information

An approach to ascertaining what data quality measures are appropriate for a particular data resource is suggested in ISO 19113 (Geographic Information - Quality Principles). In this approach, 15 “data quality sub-elements” are reviewed and an assessment made as to their relevance. The following table records the results of this assessment with respect to the ESA Dataset series.

Data Quality Element	Data Quality sub-element	Relevant	ESA Quality Measure
Completeness	commission	no	
	omission	yes	ESACompleteness
logical consistency	conceptual consistency	yes	ESAModelConformance
	domain consistency	yes	ESADomainConsistency
	format consistency	no	
	topological consistency	yes	ESATopologicalConsistency
Positional accuracy	absolute or external accuracy	yes	ESAAbsoluteSpatialAccuracy
	gridded data positional accuracy	yes	ESAIImageSpatialAccuracy
	relative or internal accuracy	yes	ESARelativeSpatialAccuracy
Temporal accuracy	accuracy of a time measurement	no	
	temporal consistency	no	
	temporal validity	yes	ESATemporalValidity
Thematic accuracy	classification correctness	yes	ESAThematicCorrectness
	non-quantitative attribute correctness	no	

Data Quality Element	Data Quality sub-element	Relevant	ESA Quality Measure
	quantitative attribute accuracy	yes	ESAAtributeCorrectness

Quality measures and corresponding quality evaluations have been described for each of the relevant “data quality sub-element”. The quality evaluations described are reasonably generic and leave the details of each evaluation to be finalised at the time of implementation.

Within these descriptions is the identification of “quality sensitive” ESA feature types. Although quality evaluations can be made of all ESA feature types, it is essential that the Acceptable Quality Levels (AQL) specified for “quality sensitive” ESA feature types are met.

6.2 Guide to Quality Measure Descriptions

To achieve and maintain the specified levels of quality and provide sufficient detail to facilitate data maintenance, monitor the quality of the ESA data on an ongoing basis and provide an “audit trail” to validate expressions of quality, a rigorous means of testing and recording the test results has been defined.

For this reason, the ESA quality regime includes:

1. a **set of Acceptable Quality Levels (AQL)** for each ESA feature type
2. **sampling techniques**, where it is not feasible to test the complete population of ESA data (Section 6.3)
3. a **series of software routines** to test ESA quality measures associated with compliance to certain characteristics defined in the ESA Core Data Application Schema (software routines have yet to be developed)
4. a **series of defined quality evaluations**, sometimes associated with the software routines and in other cases, with the sampling techniques (described in Appendix F - Detailed ESA Quality Measures Descriptions *.evaluationMethodDescription* field)
5. a **series of metadata elements** for each ESA quality measure, describing the quality measures, recording the results of quality evaluations, and describing the scope of feature types used in the evaluations and a conformance result for each quality measure (described in Appendix F - Detailed ESA Quality Measures Descriptions)

6.3 Main Quality Components

6.3.1 ESA Acceptable Quality Levels

The following table identifies the indicative acceptable quality level (AQL) to apply for each ESA feature type and each ESA Quality Measure.

Please note:

- 1 with this initial version of the ESA Core Data Specification, the cost implications of a particular AQL has not been tested in the market place. Once this market testing has occurred, these AQL may be varied accordingly.
- 2 With some AQL it may be appropriate, in the future, to distinguish between urban and rural areas and have different AQL
- 3 Where an AQL is identified for both ESAAbsoluteSpatial Accuracy and ESARelativeSpatialAccuracy, the relative accuracy AQL should prevail when they conflict.
- 4 Quality Evaluations of ESA datasets must be completed and recorded for all “quality sensitive” feature types. These feature types are shaded below and indicate the ESA Quality Measure that the “quality sensitiveness” applies to. In the table, where a cell is marked with a “ ”, the corresponding AQL is that no exceptions to ESA Core Data Application Schema properties (including topology and business rules) have been reported.

Feature Type	ESACompleteness	ESAModelConformance	ESADomainConsistency	ESATopologicalConsistency	ESAAbsoluteSpatialAccuracy	ESASpatialAccuracy	ESARelativeSpatialAccuracy	ESATemporalValidity	ESAThematicCorrectness	ESAAtributeCorrectness
AccessPoint	< 5%						99.5%	1 year		99.5%
AdminSuburb	0%				5 m RMSE ¹⁵			200 days		99.5%
Address	< 5%						99.5%	100 days		99.95%
BridgeCentreline	< 5%				2.5 m RMSE			200 days	99.5%	99.5%

¹⁵ RMSE – root mean square error

ESA Quality Measure										
Feature Type	ESA Completeness	ESA Model Conformance	ESA Domain Consistency	ESA Topological Consistency	ESA Absolute Spatial Accuracy	ESA Image Spatial Accuracy	ESA Relative Spatial Accuracy	ESA Temporal Validity	ESA Thematic Correctness	ESA Attribute Correctness
ComplexRoad	< 5%				2.5 m RMSE			100 days		99.5%
GeneralLocality	< 2%							1year		99.5%
JurisdictionPolygon	0%				5 m RMSE			200 days		99.5%
NamedPlace	< 2%				20m RMSE			1year		99.5%
Railway	< 5%				5 m RMSE			200 days		99.5%
RailSectionCentreline	< 5%				5 m RMSE			200 days	99.5%	99.5%
Road	< 5%				2.5 m RMSE			100 days		99.95%
RoadSectionCentreline	< 5%				2.5 m RMSE			100 days	99.5%	99.5%
RunwayPolygon	< 5%							200 days		99.5%
RuralAddressStartPoint	< 5%				10 m RMSE			200 days		99.5%
TrafficControlPoint	< 5%				2.5 m RMSE			200 days		99.5%
TransitReferenceStation Point	< 5%				10 m RMSE			1year		99.5%
Subway	< 5%				2.5 m RMSE			200 days	99.5%	99.5%
TunnelCentreline	< 5%				2.5 m RMSE			200 days	99.5%	99.5%
WaterFeature					20 m RMSE		99.5%	1year		99.5%
Contextual Image (Not a feature type)						2.5 m RMSE				

6.3.2 ESA Quality Evaluation Sampling

Dataset Level

For major and significant quality evaluations of ESA data at the dataset series, dataset or feature type level, these evaluations will be based on an area guided random sampling strategy. The sampling strategy will:

1. distinguish between urban and rural areas with respect to land use and where the geographic extents of a dataset cover both situations, two separate samples will be created;
2. utilise any “tile” structure which may be associated with the dataset. Where there is no inherent “tile” structure, a grid (for instance 1 kilometre by 1 kilometre) should be superimposed over geographic extent of the dataset
3. be based on the number of tiles covering the complete dataset, the number of tiles to be included in the sample will be determined using AS1199 – 1988 (which is aligned to ISO 2859). The following table is taken from AS1199 – 1988 and is based on “normal(2)” inspection.

Number of tiles covering ESA Dataset	Number of tiles in ESA Sample
2-8	2
9-15	3
16-25	5
26-50	8
51-90	13
91-150	20
151-280	32
281-500	50
501-1200	80
1201-3200	125

4. the tiles to be included in the sample should be randomly selected

Attribute Type Level

With quality evaluation of ESA data at the attribute type level it may not be feasible to conduct an evaluation based on “guided random sampling”. In such situations, providing the data to be tested is clearly homogenous, probability based sampling can be utilised and a “lot” of data inspected. The size of the lot should be determined using AS1199 – 1988 (which is aligned to ISO 2859). The following table is taken from AS1199 – 1988 and is based on “normal(2)” inspection.

Number of tiles covering ESA Dataset	Number of tiles in ESA Sample
Less than 3200	Use table above
3201 – 10,000	200
10,001 – 35,000	315
35,001 – 150,000	500
150,001 – 500,000	800
500,001 and over	1,250

6.3.3 ESA Quality Metadata

Metadata must be included with any ESA dataset (Section 8). The quality component of this metadata will include:

- 1 details identifying and describing each of the relevant ESA Quality Measures (identified in Section 0) including the relevant AQL;
- 2 a description of a relevant evaluation method for each ESA Quality Measure;
- 3 a record of the last time a quality measure was checked to see that it conformed with the applicable AQL;
- 4 a series of results of all evaluation tests undertaken to test each ESA Quality Measure. These results include which feature types were tested.

Quality metadata is recorded for each ESA Quality Measure. This means that the following details describing ESACompleteness will also be required for each of the other nine ESA Quality Measures (these details can be found in Appendix F. Code list values are described in Appendix D.)

Metadata Component	Metadata Entry Values & Explanatory Notes
DQ_Element (101)	
.nameOfMeasure (102)	Value = "DQ_CompletenessOmission"
.measureIdentification (103)	
.authority (208)	
.organisationName (378)	Value = "LINZ"
.positionName (379)	Value = "Chief Topographer / Hydrographer"
.role (381) - refer CodeList B.5.5	Value = "data steward"
.code (209)	Value = "ESACompleteness"
.measureDescription (104)	Value = "Features of a feature type that are missed"
.evaluationMethodType (105) – refer CodeList B.5.6	Value = "directExternal"
.evaluationMethodDescription (106)	Value = "Determine appropriate sample areas (refer Section 6). An experienced operator should review the sample areas to identify "missing" features. This review can be by way of on-the-ground field checking or a review of recent imagery of these areas. If a review of imagery is done, it is allowable to utilise the same imagery as was used in the capture or revision of these features providing a different operator performs this test. Total number of missing features identified by the test operator to be expressed as a % of the expected number of instances of the feature type in the test sample areas."
.dateTime (108) refer to B.4.2	Value to be added by testing organisation – <i>Date or range of dates Quality Measure was applied</i>
.result (109)	
DQ_ConformanceResult (131)	
.specification (132)	
.title (362)	Value = "ESACompleteness"
.date (364)	Value = date to be added by LINZ following creation of ESA dataset series and the adoption of this metadata

Metadata Component		Metadata Entry Values & Explanatory Notes
	.explanation (133)	Value = "Percentage of missing features must not exceed 2%"
	.pass (134) (Boolean 0=Fail , 1=Pass)	Value to be added by testing organisation
	DQ_QuantitativeResult (135)	
	.value (139)	Value to be added by testing organisation
	.scope (extension)	
	.features (153)	Value to be added by testing organisation when the evaluation is applied to a sub-set of quality sensitive feature types of the total resource defined in the quality scope -
	.extent (334)	
	.geographicalElement (338)	Value to be added by organisation providing data maintenance service – <i>to be used where evaluation is based on a sample and the sampling strategy is area based</i>

7 ESA Reference System

7.1 *General*

All coordinates for ESA spatial data will be held unprojected¹⁶ in terms of the New Zealand Geodetic Datum 2000 (NZGD2000).

ESA applications can use the new New Zealand Transverse Mercator (NZTM) projection to provide map-based coordinates that are suitable for users.

Metadata descriptions for NZGD2000 and NZTM have been described in [Appendix G – Reference System Metadata Details](#).

7.2 *Transformation from New Zealand Map Grid Projection*

As much of the ESA data is currently defined in terms of the New Zealand Map Grid projection, it will be necessary for this data to be transformed to NZGD2000. As different transformation methods generate different spatial accuracies, where ESA data is sourced from NZMG referenced data, the transformation method to be used shall be the LINZ (Reverse) Distortion Grid method. The 4 and 7 parameter transformations “built in” to many GIS will not be acceptable. In situations where ESA data is sourced from NZMG referenced data, appropriate metadata elements will be used to describe the NZMG referenced source data. Of particular importance is to include the description of the transformation method used to transform the data to NZGD2000 within the metadata descriptions (within the lineage metadata elements).¹⁷

¹⁶ The term unprojected coordinates is used in this specification to describe neutral coordinates such as latitude and longitude. It is acknowledged that technically latitudes can be projected onto different conceptions of the spheroid but the term unprojected is used here to apply to coordinates which have not been projected onto a plane.

¹⁷ Authoritative documentation is available from the LINZ website about the NZMG transformation (to NZ Geodetic 1949) namely OSG Technical Report 4.1 (December 1998)

8 ESA Metadata

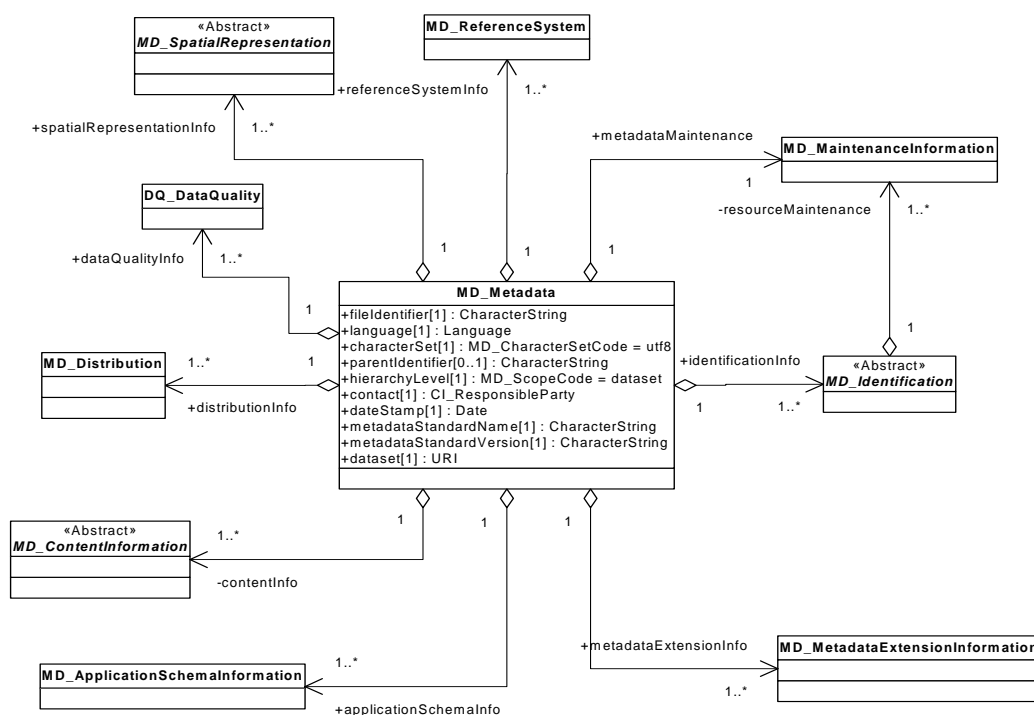
Note: This section was updated in April 2004 (v1.9.7). It supersedes section Chapter 8 in the *ESA_Code_Data_Specification_Version_1.9a* (Oct 2001) and the revision of Chapter 8 version 1.9.6 (Dec 2002).

8.1 Introduction to ESA Metadata

8.1.1 General

Metadata for ESA datasets will conform to ISO 19115 Geographic Information – Metadata; and this specification has been updated to reflect the published “International Standard (IS)” version of ISO 19115¹⁸.

This metadata component of the ESA specification is in the form of a profile based on ISO 19115. In line with ISO 19115, the ESA metadata is defined in terms of UML Class diagrams. The following diagram is a high level diagram. More detailed Class diagrams are in Appendix B.



Refer to Section 8.3.2

A.1 Metadata Entity Set¹⁹

¹⁸ Publication date of ISO 19115 is 2003-05-08

Although the focus of this specification is to produce a conceptual model defining the ESA data, the definition of an ESA metadata profile requires certain implementation issues to be considered. Integrity and consistency of the ESA dataset is essential for the acceptance of the ESA data by the widest possible community of users. A comprehensive record of how the ESA data was compiled, the data sources, quality measurements and quality evaluations for the ESA data will reassure users that they are dealing with data that is fit for their particular uses.

The requirement to ensure any ESA data is accompanied with metadata, imposes responsibilities on data distributors and data maintaining organisations. These organisations should appreciate that this profile-like metadata definition for ESA data describes only the minimum of metadata deemed necessary. They will need to exercise professional judgment if some aspect of their efforts in maintaining or compiling ESA data is not adequately described within this metadata specification. In such situations further relevant metadata elements should be added to the accompanying ESA metadata, utilising the approach described by ISO19115. Similarly, Land Information New Zealand (as the ESA data steward) is likely to refine the metadata component of this specification as implementation issues arise.

8.1.2 Purpose

ESA data must meet appropriate quality levels and have the confidence of all users of ESA data. To achieve this purpose, ESA metadata must:

1. facilitate efficient & effective data maintenance processes
2. engender confidence in the quality of ESA data in the minds of key stakeholders, particularly Emergency Services' data integrators, application builders and data end-users
3. encourage the wide use of ESA data across the community of land information users; and
4. encourage the creation of metadata as "best practice" for the land information industry

8.1.3 Metadata Creation

Metadata is required for all data resources created for:

1. the initial population of the ESA dataset series
2. the maintenance of any component of the ESA dataset series

Further references on footer on next page

¹⁹ The labelling of the UML Class Diagrams (including those in Appendix B) follows that used in ISO 19115 (Annex A) with a series of diagrams from A.1 to A.16. However, as the ESA metadata specification is a profile of ISO 19115, there will be diagrams "missing" from this sequence as the ESA profile does not include some of the metadata elements described on certain diagrams (eg A.11 Portrayal Catalogue Information)

3. the distribution of any dataset from the ESA dataset series (on-line and off-line)

Any online or offline distribution of ESA data will contain relevant metadata. Likewise, any ESA maintenance dataset should include metadata.

8.1.4 Metadata Encoding

ESA metadata shall be encoded in conformance with the ISO 19118 Geographic Information – Encoding (this standard incorporates XML encoding).

In addition to ISO 19115, ISO/TC211 is preparing a Metadata Implementation Specification (ISO/TC211 Project No. 19139). The work item to prepare the implementation specification was commenced in the latter half of 2002. This specification includes an XML implementation including a series of XML schema. However, this specification is at an extremely early stage of development and is currently²⁰ referred to as a “working draft”. Using the XML schema, metadata has been prepared for a fictitious dataset forming part of the ESA Core Data Specification for illustrative purposes (see Appendix C).

In the future, until the ISO/TC211 Metadata Implementation specification is finalised, organisations producing XML encoded metadata for ESA datasets should seek the advice of Land Information New Zealand as the XML schema associated with this ESA metadata specification may need to be modified to reflect any changes as the ISO/TC211 Metadata Implementation Specification is finalised.

This specification permits both ESA data and its metadata to be encoded and transferred as a single file as well as separate encoding of ESA data and corresponding metadata. (It seems likely that initially ESA metadata will be encoded separately to ESA datasets.)

8.2 Guide to ESA Metadata Specification

In Section 8.3, there are a series of tables that describe the different metadata components. These components are:

- 1 Metadata Descriptions
- 2 Spatial Metadata Elements
- 3 Data Identification Elements
- 4 Feature Catalogue Details
- 5 Distributor Details

²⁰ Current version of ISO 19139 on which the ESA metadata XML definitions are based is dated 25 November 2003 and referred to as v0.8.

- 6 Data Quality Details
- 7 Crown Copyright Notice
- 8 Data Maintenance Details

(The ESA metadata components follow a similar breakdown used in ISO 19115 to define metadata elements by way of UML Class Diagrams and data dictionary tables.)

In order to simplify these descriptions, the more detailed fields associated with each metadata element are not included in these tables. However, a full metadata specification has been included as Appendix B.

The ESA Metadata specification requires that other components of the ESA Core Data Specification, namely the Quality Measures (Section 6) and Reference System (Section 7) be recorded within the ESA Metadata. For this reason, this section of the ESA specification should be read in conjunction with the previous two sections.

The tables have been structured to give users guidance in determining the relevance of each metadata element to a particular dataset. In the tables the following notational conventions are applied:

- Metadata element naming follows ISO 19115 and the number appearing in brackets refers to the ISO 19115 Data Dictionary entry (in ISO 19115, Annex B). Similar references to data types and code lists refer to ISO 19115 (in ISO 19115, Annex B, Sections B.4 and B.5)
- New metadata elements that are extensions on ISO 19115 are shaded with a trellis background
- The right hand column describes any conditions pertaining to Metadata elements
- Metadata elements that are designated as “Mandatory” in ISO 19115 have been identified in this specification with an annotation in the Conditions column “ISO 19115 Mandatory”
- Values for Metadata elements are enclosed in quotes and prefixed by “Value = “
- Explanatory notes for metadata elements are in italics
- Metadata elements that have sub-elements are in bold font type.
- A metadata element may have multiple instances. The ordinality of a particular element should be determined by reference to the Class diagrams in Appendix B.

8.3 Main Metadata Elements

8.3.1 ESA Conventions

The following conventions will need to be followed in the naming of ESA file name, the recording of organisation names and recording the role of different organisations associated with ESA data. Where feasible, the ESA data steward, Land Information New Zealand will specify the file names, including version numbers to be used in a particular situation.

ESA Data File Names

"esadata"	Characters 1 –7
A dataset identifier to be specified by data steward (at the time of initial distribution or when a data supply or maintenance contract is let)	Characters 8 – 12
A unique dataset identifier	Character 13 –16
"v"	Character 17
Version number in "real number" format. 0.n only to be used for preliminary data supplies. First initial "official" supply to be "1-0". New versions resulting from maintenance updates reflected by incrementing previous version by 0-1. Significant data improvements to dataset to be marked by a new whole number (eg 2-0). Where maintenance is a systematic process, the anniversary of the initial supply/compilation of the dataset should be marked with a new version identified with a new whole number and should be preceded with a series of quality evaluations	Characters (18 – 21) (including decimal point)

ESA Metadata File Names

"esameta"	Characters 1 -7
The same identifier as used for ESA dataset	Characters 8 – 12
"v"	Character 13
Version number in "real number" format. To coincide with the version number given to the ESA data	Characters (14 – 17) (including decimal point)

ESA Feature Catalogue File Names

"esafeat"	Characters 1 -7
The same identifier as used for ESA dataset	Characters 8 – 12
"v"	Character 13
Version number in "real number" format. To coincide with the version number given to the ESA data	Characters (14 – 17) (including decimal point)

Organisation Name

Name to be in full with no abbreviations or acronyms

Role

Code Value	Description	Permitted uses with ESA Data
001	resourceProvider	Only as approved by authorised user of ESA data
002	Custodian	"Land Information New Zealand" and other organisations such as territorial authorities.
003	Owner	"Government of New Zealand"
004	User	Only duly authorised user of ESA data
005	Distributor	Only as designated by steward
006	Originator	Source of constituent component of ESA dataset series
007	PointOfContact	Only as designated by steward
008	PrincipalInvestigator	Only as designated by steward
009	Processor	Only as approved by authorised user of ESA data
010	Publisher	Only as approved by authorised user of ESA data
011	Steward	"Land Information New Zealand"

8.3.2 Metadata Descriptions

The first group of metadata elements describe the metadata itself.

Metadata Component	Metadata Entry Values & Explanatory Notes	Conditions
MD_Metadata (1)		ISO 19115 Mandatory
.fileIdentifier (2)	Value is metadata file name following the naming convention outlined in Section 8.3.1	
.language (3) – refer ISO 639-2	Value = "eng" (<i>English</i>)	Default value
characterSet (4) – refer CodeList B.5.10	Value = "utf8"	Default value
.parentIdentifier (5)	Value is the name of the metadata file for the larger, existing ESA resource. Not to include the metadata filename of a different version of the resource with the same extents	<i>If this resource is a subset of a larger ESA resource that has a metadata file</i>
.hierarchyLevel (6) – refer CodeList B.5.25	Value = "dataset"	Default
.contact (8)	Party responsible for the ESA metadata	ISO 19115 Mandatory
.CI_RespParty(374)		
.organisationName (376)	Value = "Land Information New Zealand"	

Metadata Component		Metadata Entry Values & Explanatory Notes	Conditions
	.positionName (377)	Value = "Chief Topographer/Hydrographer"	
	.role (379) – refer Codelist B5.5	Value = "steward"	ISO 19115 Mandatory
	.dateStamp (9) refer B.4.2 ISO 8601	Value = date to be added by LINZ following creation of ESA dataset series and the adoption of this metadata	ISO 19115 Mandatory
	.metadataStandardName (10)	Value = "ISO 19115 Geographic Information – Metadata ESA Data Specification Profile"	
	.metadataStandardVersion (11)	Value = "1.9.7"	

8.3.3 Spatial Metadata Elements

In addition to specifying the spatial reference system, it is also necessary to specify the characteristics of imagery datasets, whether these are scanned published maps, aerial photograph products or satellite imagery.

Metadata Component		Metadata Entry Values & Explanatory Notes	Conditions
	MD_SpatialRepresentation (12/156)		
	.MD_GridSpatialRepresentation (157)		To describe imagery datasets
	MD_Georectified (162)		Axis, cell, transformation parameter and check point availability details
	MD_Georeferenceable (170)		To indicate availability of control points and orientation parameters
	MD_ReferenceSystem (13/186)	Amplified in Section 7	
	.referenceSystemIdentifier (187)		
	code (207)	Value = "NZGD2000"	ISO 19115 Mandatory
	codeSpace (208.1)	Value = "NZ_ReferenceSystems"	

8.3.4 Data Identification Elements

In common with discovery level metadata, it is also necessary for information management purposes to be able to identify the resource to be managed.

Metadata Component		Metadata Entry Values & Explanatory Notes	Conditions
	MD_Identification (15/23)		ISO 19115 Mandatory
	citation (24)		ISO 19115 Mandatory
	Title (360)	Value="The Emergency Services and Government Administration (ESA) Dataset Series"	ISO 19115 Mandatory

Metadata Component		Metadata Entry Values & Explanatory Notes	Conditions
	.date (362)	Value to be added by LINZ before initial distribution of ESA data	ISO 19115 Mandatory
	.edition (363)	Value = "2.0"	
	.presentationForm (368) refer Codelist B.5.4	Value = "mapDigital"	
	abstract (25)	Value="Consistent road network, address and locality features and associated contextual scanned images systematically maintained and covering all urban and rural areas of New Zealand"	ISO 19115 Mandatory
	purpose (26)	Value="To provide the data necessary to support emergency services locate and verify function in addition to other core common Crown processes associated with emergency services and government administration"	
	status (28) – ref Codelist B.5.23	Value = "completed"	
	pointOfContact (29)		
	.CI_RespParty(374)		
	.organisationName (376)	Value="Land Information New Zealand"	
	.positionName (377)	Value="Chief Topographer/Hydrographer"	
	.contactInfo (387)	Contact details are specified in Appendix B	
	role (379) – ref Codelist B5.5	Value = "steward"	ISO 19115 Mandatory
	MD_DataIdentification (36)		
	resourceFormat (32)		
	name (285)	Value to be added by LINZ before initial distribution of ESA data – <i>when host system details are known</i>	ISO 19115 Mandatory
	version (286)	Value to be added by LINZ before initial distribution of ESA data – <i>when host system details are known</i>	ISO 19115 Mandatory
	.MD_Keywords (33/52)	Keyword details are specified in Appendix B	A value from FONZ and SONZ is required. EPI stream is documented, if relevant and ANZLIC search word can also be documented (ie potentially 4 or more values can be documented)
	MD_Usage (34/62)	Usage details (and any limitations associated with the use)	
	.specificUsage (63)	Document brief description of resource usage	ISO 19115 Mandatory

Metadata Component		Metadata Entry Values & Explanatory Notes	Conditions
	.userDeterminedLimitations (65)	<i>Document briefly applications determined by the user, for which the resource is not suitable</i>	Conditional – If limitations are known
	.userContactInfo (66)	<i>Document brief details of the user</i>	ISO 19115 Mandatory
	.organisationName (376)	Value = "ACompany Ltd"	
	CI_ContactAddress (389)		
	.EmailAddress (386)	Value = "auser@acompany.co.nz"	
	.role (379) - refer CodeList B.5.5	Value = "user"	
	.audience (Extension) refer to Codelist NZ_Audience	Value = "Government"	
	NZ_Mandate (Extension)		
	.reference	Value = "eGIF standard"	
	.type refer to Codelist NZ_MandateTypeCode	Value = "Other"	
	.spatialRepresentationType (37) refer CodeList B.5.26	Value = "vector" for all vector data Value = "grid" for scanned raster contextual images	
	spatialResolution (38)		
	equivalentScale (60)	Value to be added by organisation creating data resource – <i>denominator component of (equivalent) representative scale.</i> <i>Either complete this element or the next element</i>	
	.distance (61)	Value to be added by organisation creating data resource <i>Either complete this element of the previous element</i>	
	language (39)	Value="eng" <i>English</i>	ISO 19115 Mandatory
	characterSet (40) – refer CodeList B.5.10	Value="utf8"	Default value
	topicCategory (41) – refer CodeList B.5.27	Value="Transport"	ISO 19115 Mandatory
	.extent (45)	<i>Geographic, Temporal and Vertical Extent details. Details are described in Appendix B.</i>	

8.3.5 Feature Catalogue Details

A feature catalogue will be required for all ESA datasets. These details note that requirement and provide citation details for the feature catalogue.

Metadata Component	Metadata Entry Values & Explanatory Notes	Conditions
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Metadata Component	Metadata Entry Values & Explanatory Notes	Conditions
MD_ContentInformation (16/232)		
MD_FeatureCatalogueDescription (233)		For datasets with vector spatial definitions
.includedWithDataset (236) - Boolean 1=yes, 0=no	Value ="1"	ISO 19115 Mandatory
.featureCatalogueCitation (238)	Value to be added by organisation creating data resource. <i>Feature Catalogue must be defined in terms of the ESA Core Data Specification</i>	

8.3.6 Application Schema Details

ESA datasets are expected to comply with the ESA Application Schema. These details cite and describe this application schema.

MD_ApplicationSchemaInformation (21/320)		
.name (323)		ISO 19115 Mandatory
.title (360)	Value="ESA Core Data Application Schema"	ISO 19115 Mandatory
.date (362)	Value to be added by LINZ before initial distribution of ESA data	ISO 19115 Mandatory
.edition (363)	Value ="2.0"	
.citedResponsibleParty (367)		
.CI_RespParty(374)		
.organisationName (376)	Value="Land Information New Zealand"	
.positionName (377)	Value="Chief Topographer/Hydrographer"	
role (379) – ref Codelist B5.5	Value = "steward"	
.schemaLanguage (322)	Value = "UML"	ISO 19115 Mandatory
.constraintLanguage (323)	Value = "None – business rules incorporated within UML definitions"	ISO 19115 Mandatory

8.3.7 Distributor Details

Where ESA data is distributed, whether that be by LINZ or some other organisation; online or offline; details on the manner the data is distributed and the distributing organisation are required.

Metadata Component	Metadata Entry Values & Explanatory Notes	Conditions
MD_Distribution (17/270)	<i>Distribution details to be added by distributing organisation – Details are described in Appendix B.</i>	

8.3.8 Data Quality Details

Data quality details are fundamental metadata elements and together with maintenance details provide an audit trail of the dataset that will facilitate more focussed and rigorous maintenance efforts and allow future users to make informed decisions on the dataset's "fitness for purpose".

Metadata Component		Metadata Entry Values & Explanatory Notes	Conditions
	.dataQualityInfo (18)	To be repeated for all ESA Quality Measures – refer Appendix F	
	Scope (79)		ISO 19115 Mandatory
	Level (139) – refer CodeList B.5.25	Value = "dataset"	Default Value ISO 19115 Mandatory
	.report (80)	A quality report is made up of a number of DQ_Element entries.	
	DQ_Element (99)	A series of entries is required for each Quality Measure	Value as defined in Appendix F
	.lineage (81)		
	.statement (83)	<i>General explanation of producers knowledge about the lineage of the dataset</i>	
	.processStep (84)	<i>Information about each event in the creation process of the dataset</i>	To be repeated for all process steps used to create data resource
	.source (85)	<i>Information about each data resource used in the creation of the dataset</i>	To be repeated for all sources used to create data resource

8.3.9 Crown Copyright Notice

The Crown Copyright notice shall be recorded within the metadata.

Metadata Component		Metadata Entry Values & Explanatory Notes	Conditions
	MD_Constraints (20/67)		
	.useLimitations (68)	Value to be added by organisation creating data resource.	To be documented if there is a known limitation
	MD_LegalConstraints (69)		
	.useConstraints (71) – refer CodeList B.5.24	Value= "copyright"	
	.otherConstraints (72)	Value="Crown Copyright, New Zealand, 20nn" eg 2004	

8.3.10 Data Maintenance Details

There are two metadata entities added, by way of extensions to ISO 19115, to describe data maintenance. The first records the date, frequency, scope and nature of all maintenance actions. The second is to record appropriate Change Indicators that may be used to plan maintenance campaigns or

redesign and improve maintenance processes (to meet all ESA Quality Measures in a more cost effective manner).

Metadata Component		Metadata Entry Values & Explanatory Notes	Conditions
MD_MaintenanceInformation (22/142)			
	.maintenanceAndUpdateFrequency (143) - refer CodeList B.5.18	Value to be added and/or defined by data steward (LINZ)	ISO 19115 Mandatory
	.dateOfNextMaintenance (144)	Value to be added by organisation providing data maintenance service.	Where known
	.updateScope (146) - refer CodeList B.5.25	Value to be added by organisation providing data maintenance service.	
	.updateScopeDefinition (147)	<i>To be described in terms of geographic, temporal and vertical extents and what feature types or attribute types are subject to maintenance</i>	
	.updateChanges (Extension)	<i>To record the number and type of changes to have occurred as a result of each maintenance action – See Appendix B for full details</i>	
	.updateExtent (Extension)	<i>To document the geographic extent of the update – See Appendix B for full details</i>	If update extent is different to main resource
	.maintenanceNote (149)	Value to be added by organisation providing data maintenance service. To note any particular characteristics of this data maintenance	If data maintenance service varies significantly from previous data maintenance
	MD_ChangeIndicator		If an appropriate Change Indicator Exists (will be specified by Data Steward)
	.sourceCitation	<i>Name details of Change Indicator</i>	
	.citedResponsibleParty (367)	<i>Name of organisation that publishes the Change Indicator details</i>	
	.relevantFeatures	Value to be added by organisation providing data maintenance service or data steward – <i>List instances of feature types which correlate to change indicator measurements</i>	
	.changeIndication		To be repeated for every change indication measurements

8.3.11 *Metadata Extensions*

Although the metadata component of this specification is aligned to the ISO 19115 Geographic Information Metadata standard, it was necessary to include additional metadata elements to adequately describe the Data Maintenance elements and to strengthen the alignment with NZGLS.

New elements have been added to describe the audience and mandate of the resource. It has also been required to make slight modification to the way extents (geographic, temporal and vertical) and keywords are described. A new codelist element "data steward" has been added to the ISO 19115 CI_RoleCode codelist. Some obligation (cardinality) changes have also been made to change optional or conditional elements to mandatory elements.

ISO 19115 permits such extensions to and so these extensions have been described in the manner prescribed by ISO 19115. (see Appendix B)

8.4 Alignment to NZGLS

The New Zealand Government Locator Service (NZGLS) is a metadata standard intended for use by New Zealand government agencies that create or manage information resources or services that are locatable via the Internet. NZGLS metadata standard aims to ensure a nationally consistent approach to the description of government resources so as to help people to locate the resources they want without needing a detailed knowledge of government structures.

The ESA metadata specification (as described earlier in this section) describes all the NZGLS mandatory elements and many of the optional elements. The following table identifies the correlation between the ESA Metadata specification and NZGLS metadata element.

	NZGLS Identifier	NZGLS Obligation	NZGLS Description	ESA Metadata Equivalent
1	Creator	Mandatory	The name of the organisation or person primarily responsible for the content of the resource, or the provision of the resource	MD_Identification.pointOfContact.organisationName
2	Publisher	Conditional (Mandatory, except Optional when describing a service)	The name of the entity responsible for making the resource available	MD_Identification.pointOfContact.organisationName
3	Contributor	Optional	The name of the organisation or person who has played an important role in creating the content of the resource or service but is not specified in the creator element.	DQ_Quality.lineage.processStep.processor.organisationName
4	Rights	Optional	Information about the rights for management of information resources, such as copyright, or access terms and conditions applying to the resource being described	MD_Constraints.MD_LegalConstraints.otherConstraints
5	Title	Mandatory	The name given to the resource	MD_Identification.citation.title
6	Subject	Mandatory	A succinct description of the subject or topic of the resource	MD_Keyword.keyword where MD_Keyword.thesaurusName=SONZ
7	Description	Recommended	A textual description of the content or purpose of the resource	MD_Identification.purpose
8	Source	Optional	Derivative information on the resource origins	DQ_Quality.lineage.statement
9	Language	Recommended	The language of the content of the resource, or the language in which the service is	MD_Identification. MD_DataIdentification.language

	NZGLS Identifier	NZGLS Obligation	NZGLS Description	ESA Metadata Equivalent
			provided	
10	Relation	Optional	Identification of other resources or services that are related to this current resource and a description of the type of relationship	Only indirectly through: MD_MaintenanceInformation.changeIndicat or.sourceCitation & . citedResponsibleParty
11	Coverage	Optional	Coverage describes the extent or scope of the content of the resource	MD_Identification. MD_DataIdentification.extent.geographicEle ment.geographicIdentifier
12	Function	Mandatory	The business function of the agency to which the resource relates	MD_Identification.purpose
13	Date	Recommended	A date associated with an event in the life cycle of the resource	MD_Identification.citation.date
14	Type	Mandatory (for the Category refinement)	Category or genre of the resource	MD_Identification. MD_DataIdentification.topicCategory
15	Format	Optional	The data format of the resource, or the channels through which the service is delivered	MD_Distribution.distributionFormat
16	Identifier	Conditional (Mandatory when describing online resources)	A unique identifier for a resource	MD_Identification.citation
17	Availability	Conditional (Mandatory when describing services or off-line resources)	How the resource can be obtained, or contact information	MD_Distribution.transferOptions.online & .offline & MD_Distribution.distributor.distributorContac t
18	Audience	Recommended	The target audience of the resource	MD_Identification.nzAudience
19	Mandate	Recommended	A specific legal instrument which requires the resource to be created or provided. A legal instrument can be an Act, Regulations, other secondary legislation such as Rules, or rulings or binding determinations by statutory authorities (such as Court cases)	MD_Identification.nzMandate

Where possible the encoding suggested by NZGLS has been incorporated in the ESA Metadata specification.

A NZGLS compliant metadata description for the complete ESA Dataset Series will be generated and appropriately published by way of an XLS stylesheet designed to transform this ISO 19115 structured metadata to the more simple NZLGS structures (see example in Appendix C). However, where ESA data is distributed, the more detailed metadata as defined by this specification will be attached.

Appendix A – [ESA Core Data Application Schema](#)

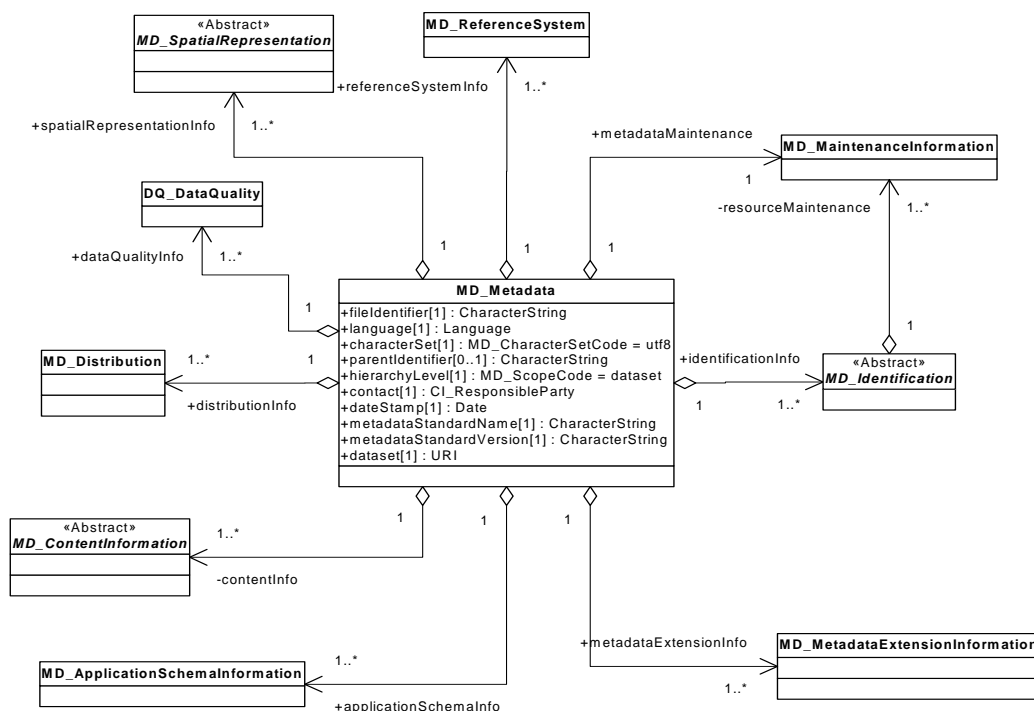
Note: This section has NOT been updated (April 2004)
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Navigate via the hyperlink above to the Application Schema in htm format.

Appendix B – Full ESA Metadata Specification

Note: This section was updated in April 2004 (v1.9.7). It supersedes Appendix B in the ESA_Code_Data_Specification_Version_1.9a (Oct 2001) and in version 1.9.6 (Dec 2002).

If there is any ambiguity between the following UML Class Diagrams²¹ and Informative Tables that cannot be resolved by reference to ISO 19115, the details contained in the UML Class Diagrams should prevail.



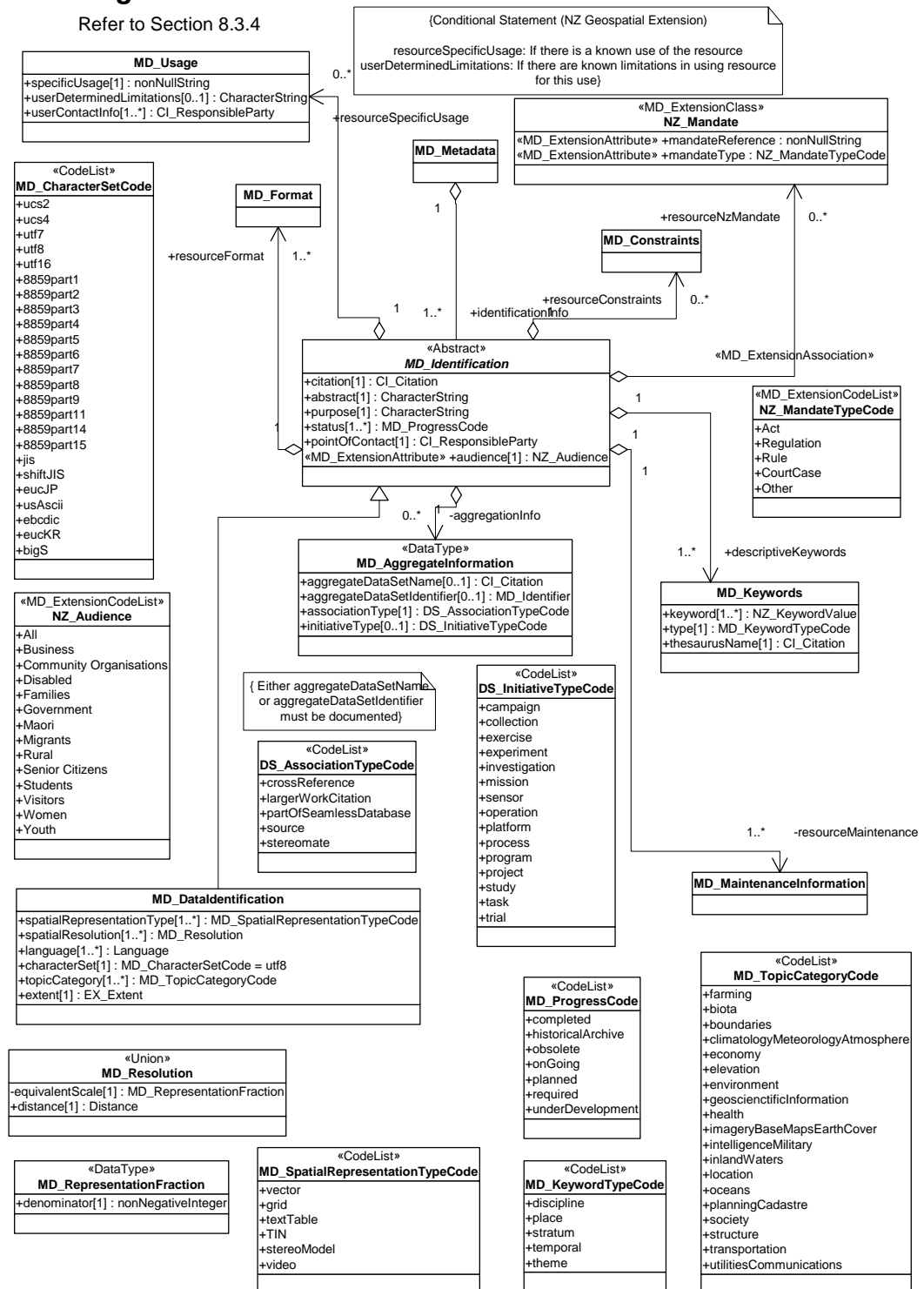
Refer to Section 8.3.2

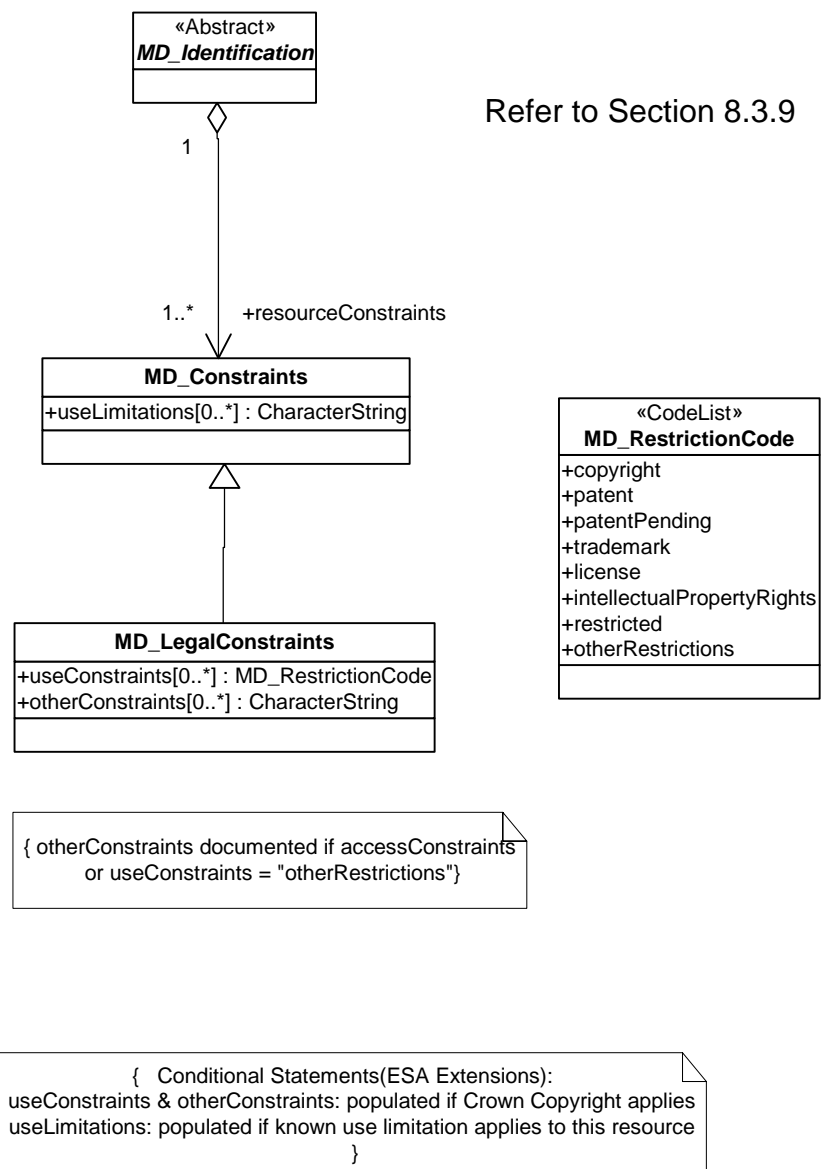
A.1 Metadata Entity Set

²¹ The labelling of the UML Class Diagrams follows that used in ISO 19115 (Annex A) with a series of diagrams from A.1 to A.16. Please note:

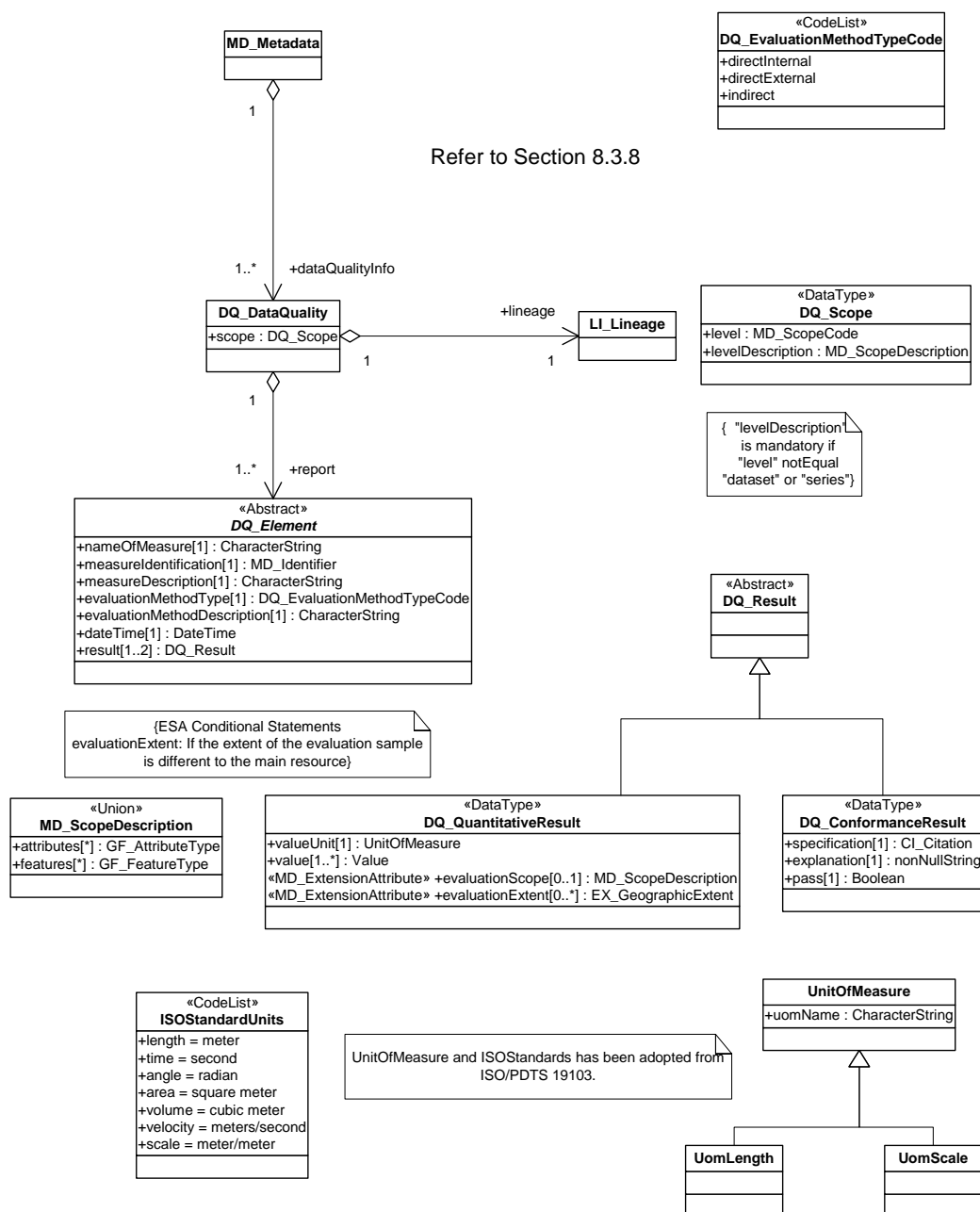
- Diagram A.1 is duplicated in Chapter 8
- Because the ESA metadata specification is a profile of ISO 19115, there will be diagrams “missing” from this sequence as the ESA profile does not include some of the metadata elements described on certain diagrams (eg A.11 Portrayal Catalogue Information)

Refer to Section 8.3.4

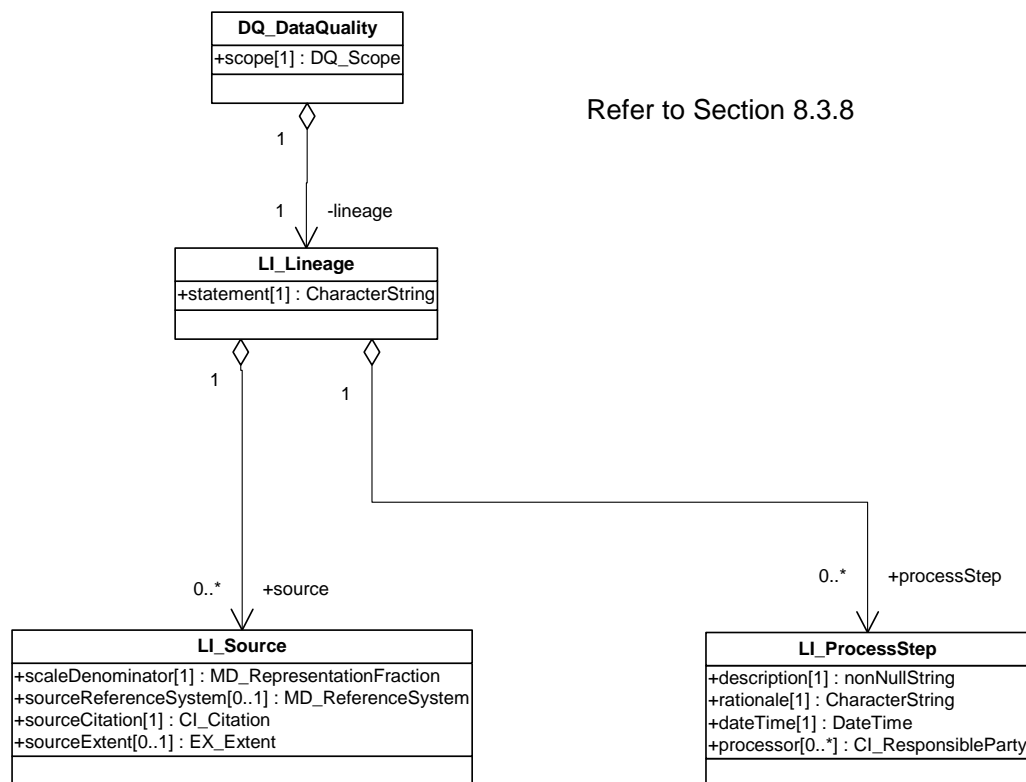




A.3 Constraint Information

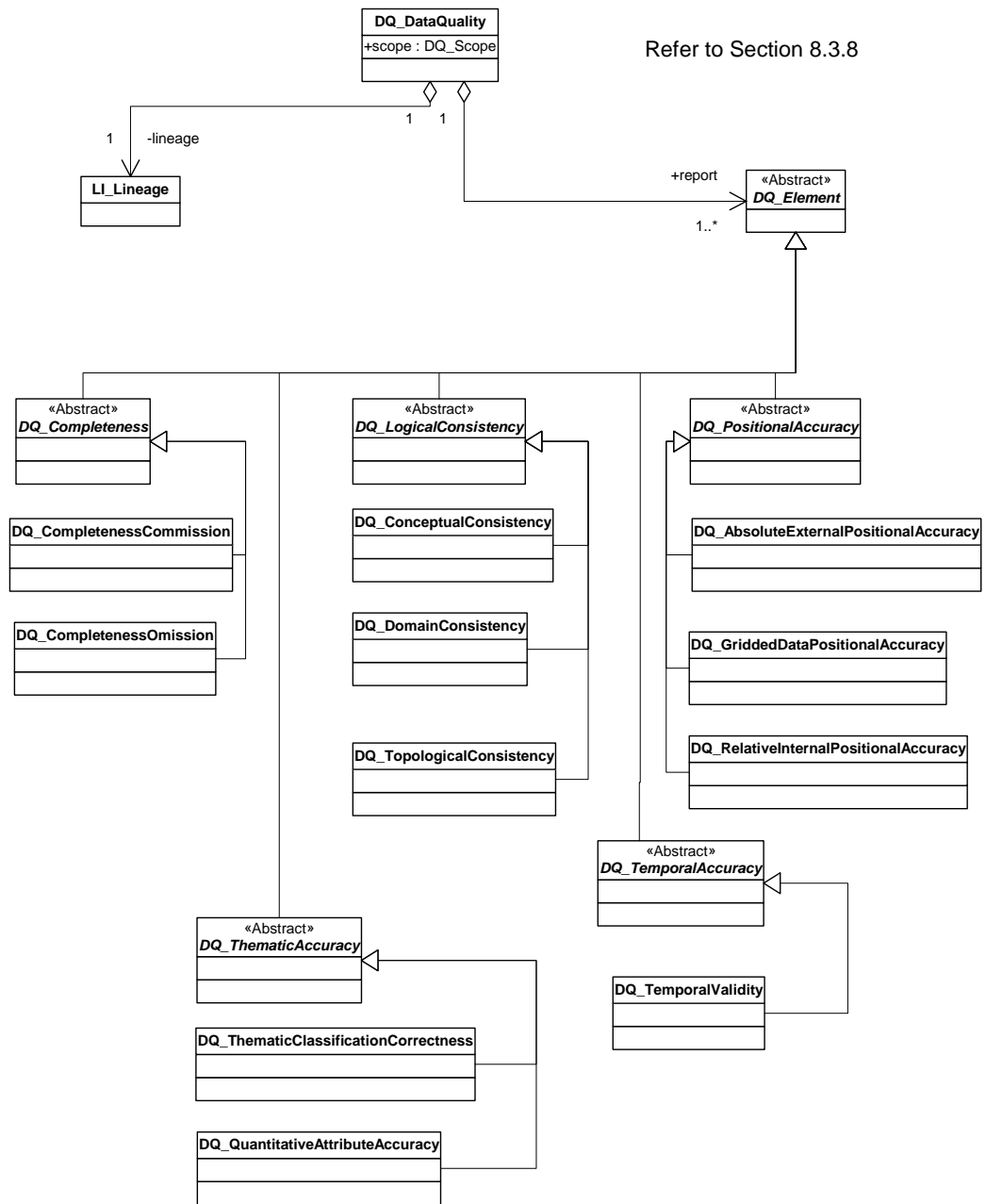


A.4 Data Quality Information

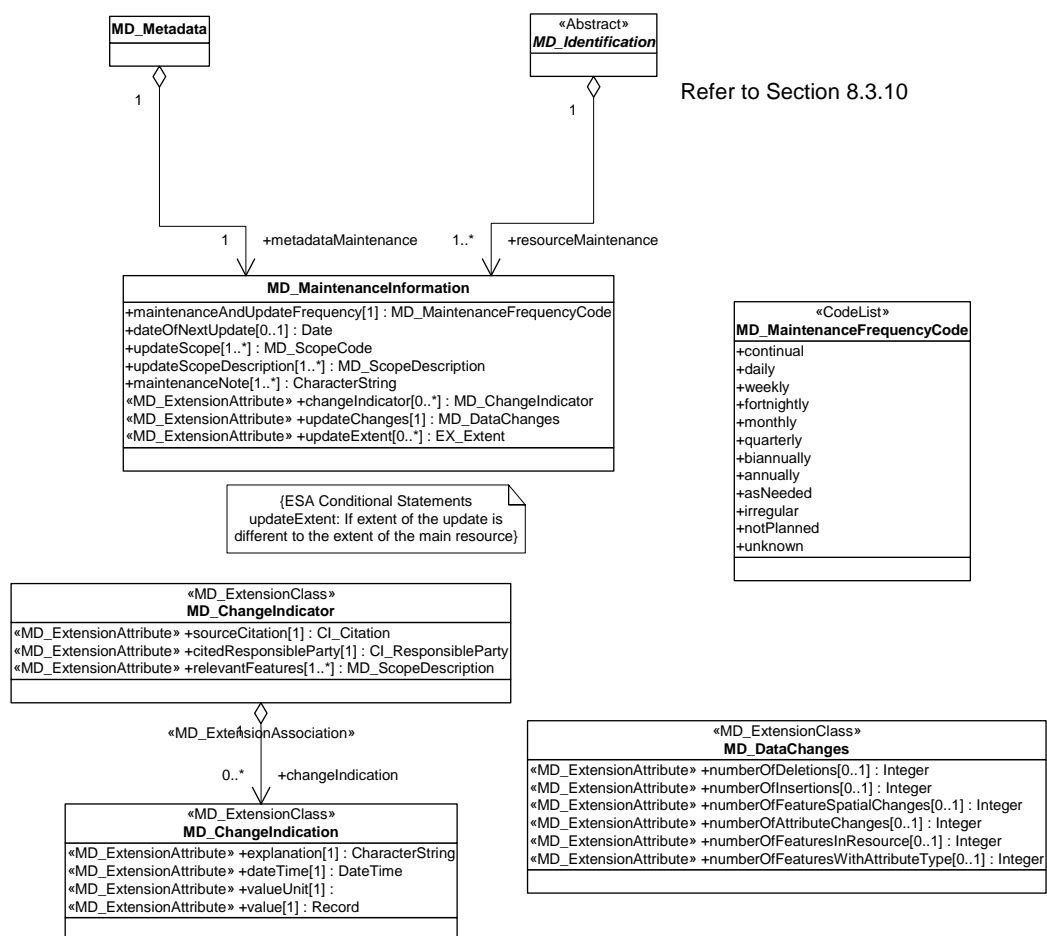


Conditional Statements(ESA Extensions):
 sourceExtent: populated if different to extent of main data resource
 sourceReferenceSystem: populated if different to reference system of main data resource
 processor: populated if different to responsible party cited for main resource

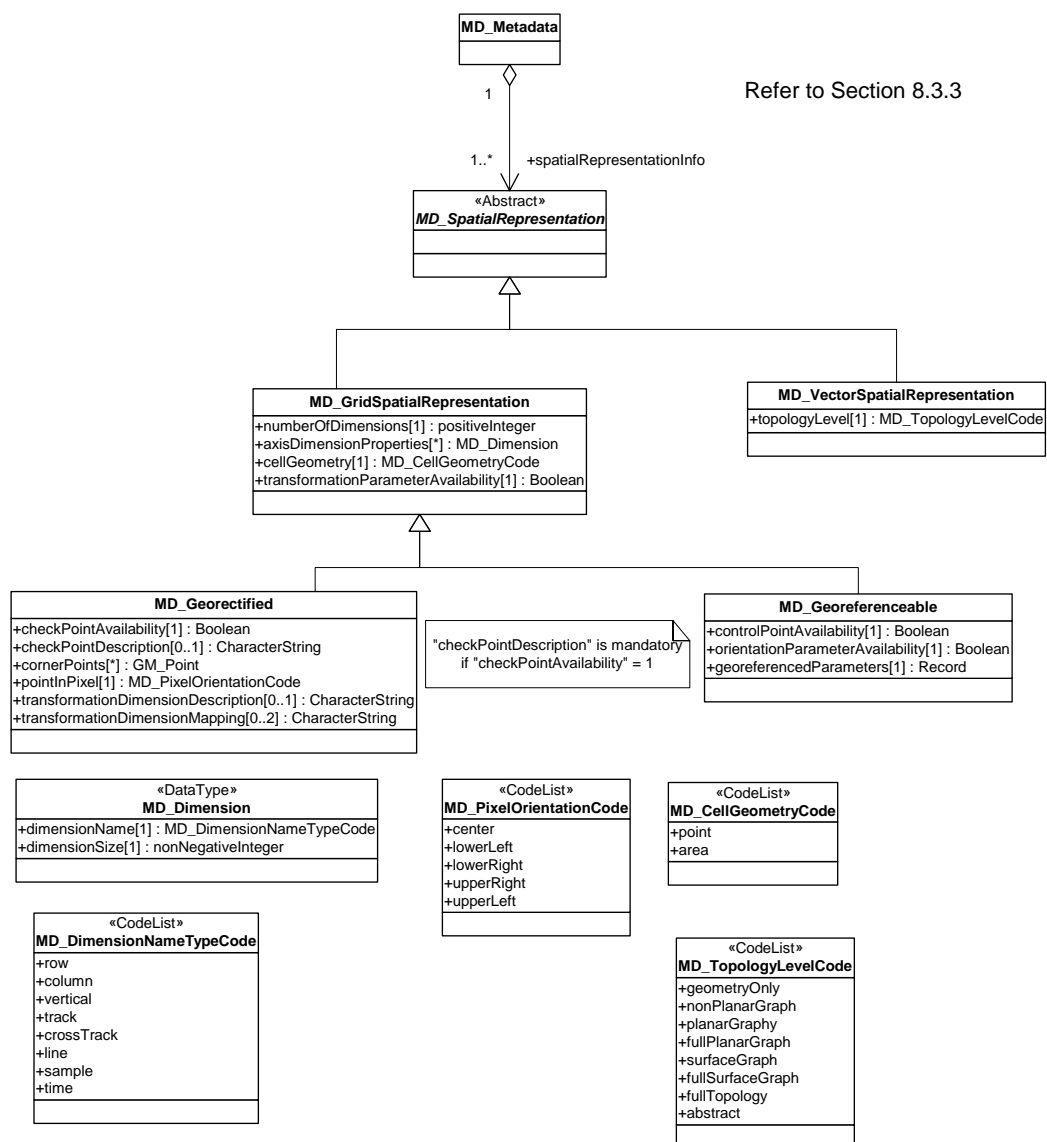
A.5 Lineage Information



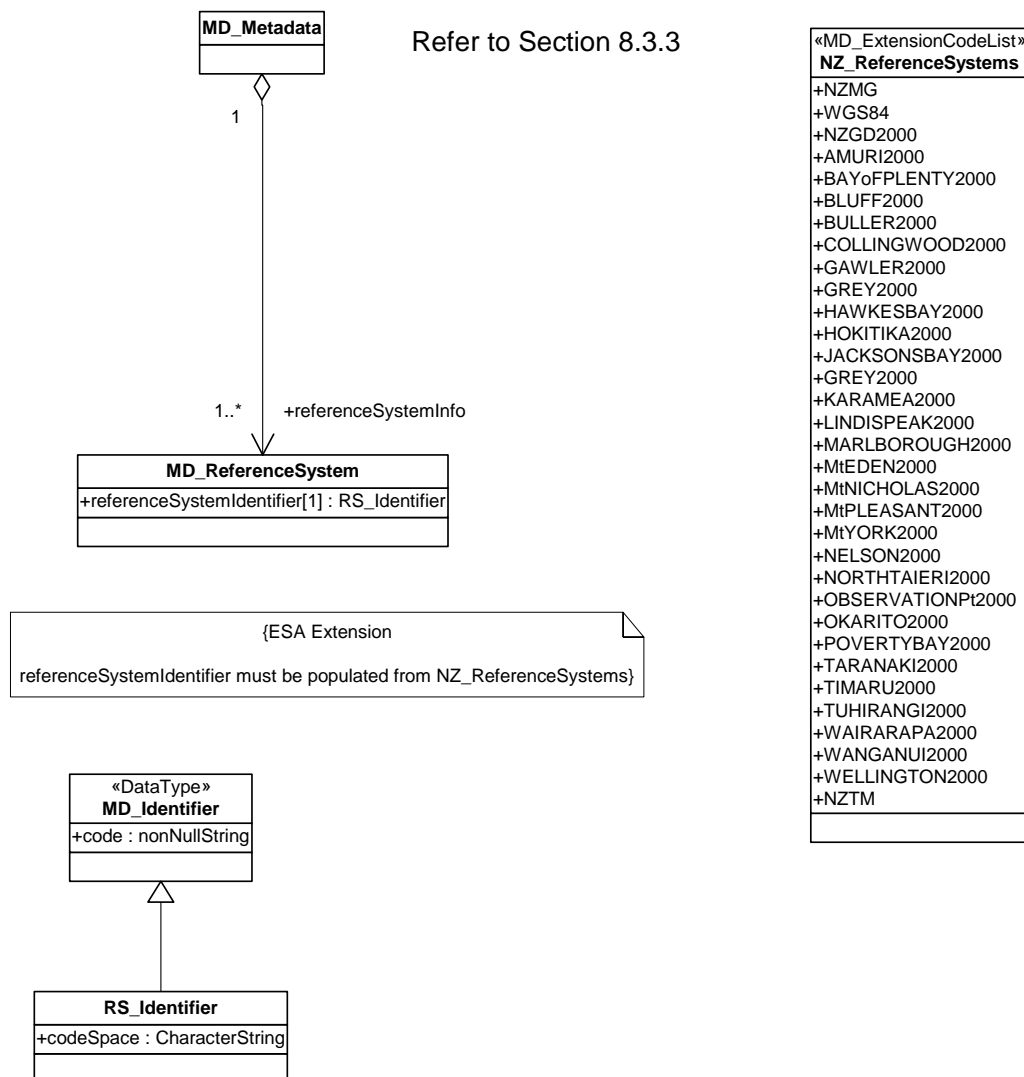
A.6 Data Quality Classes



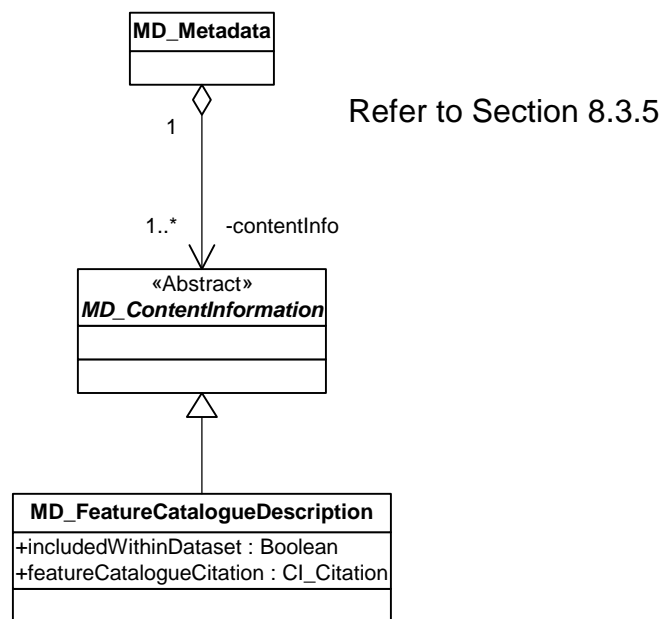
A.7 Maintenance Information



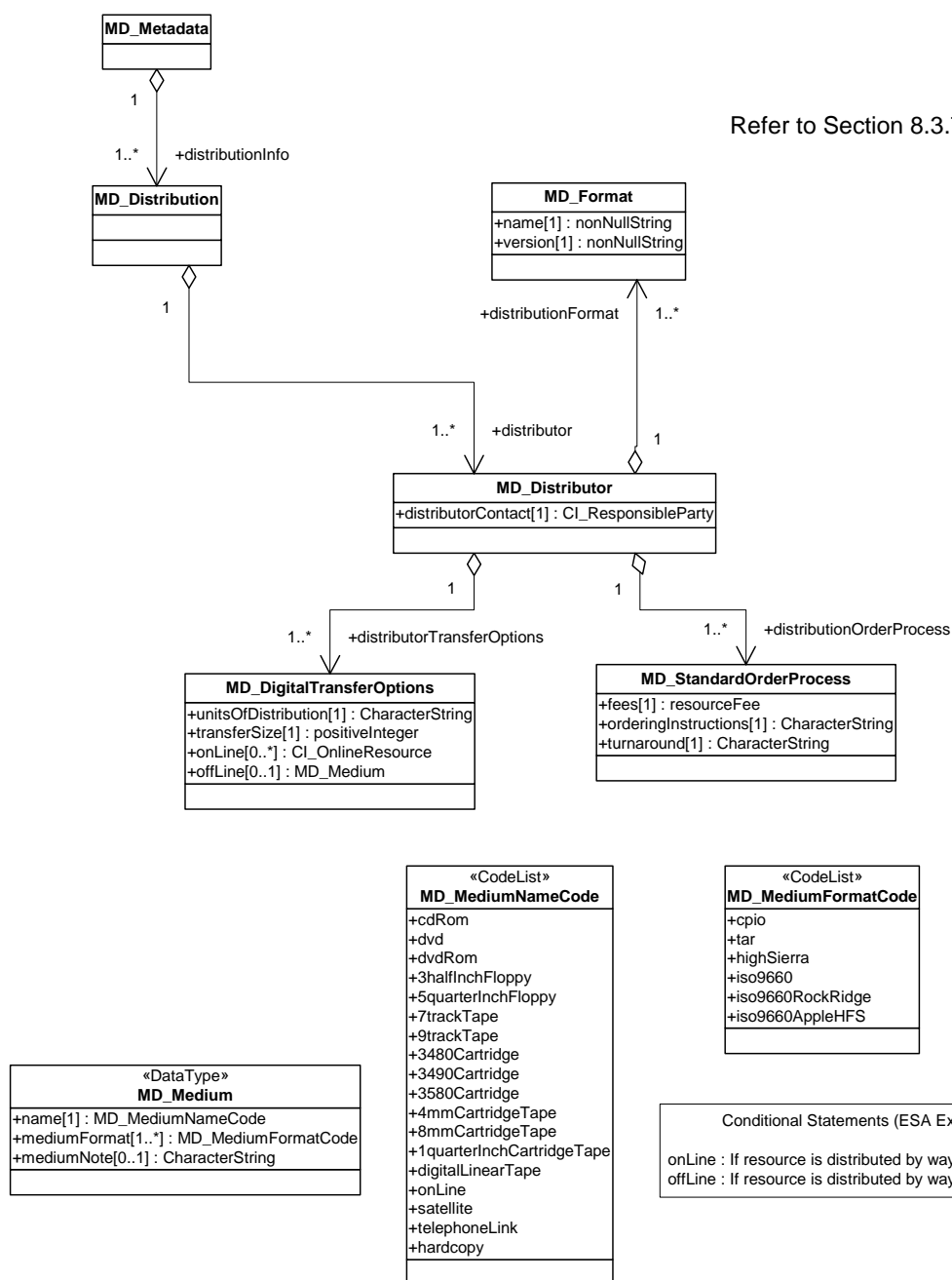
A.8 Spatial Representation Information



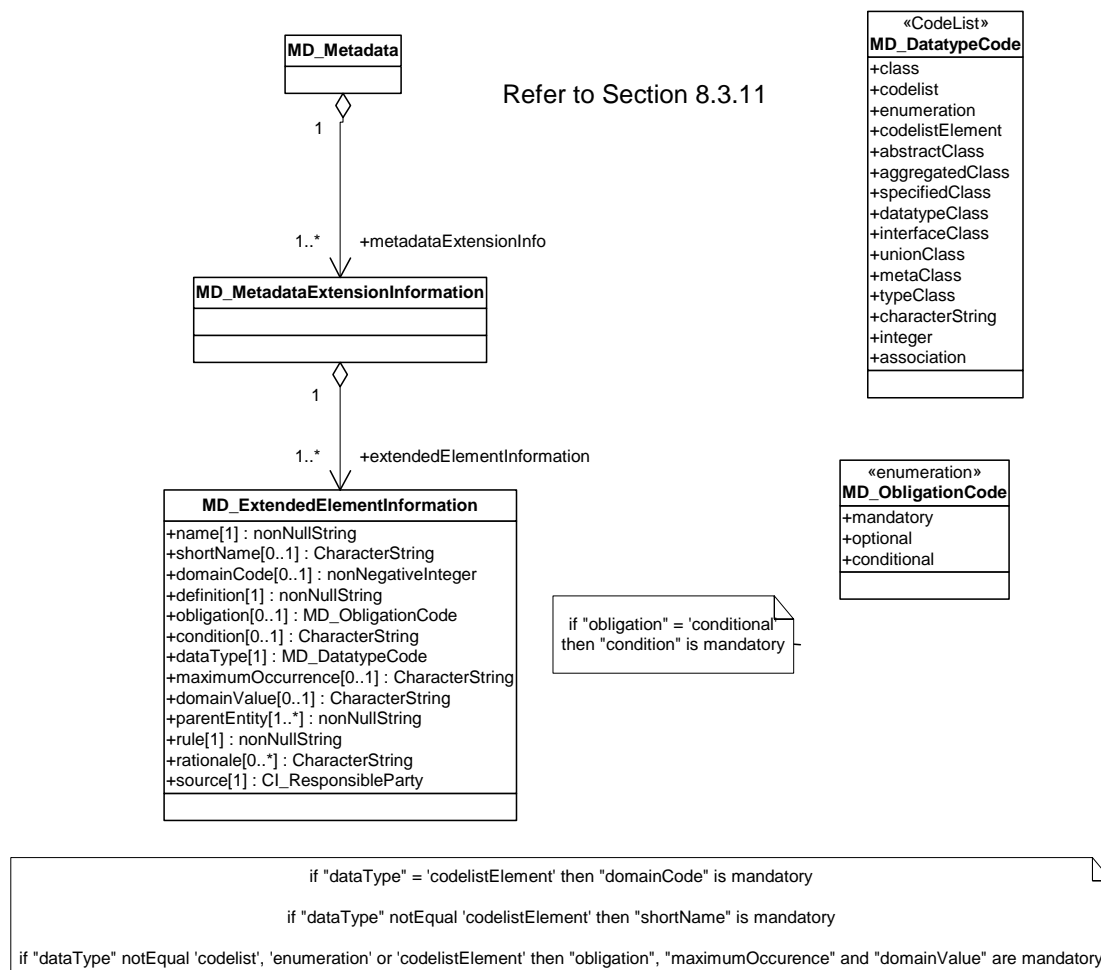
A.9 Reference System Information



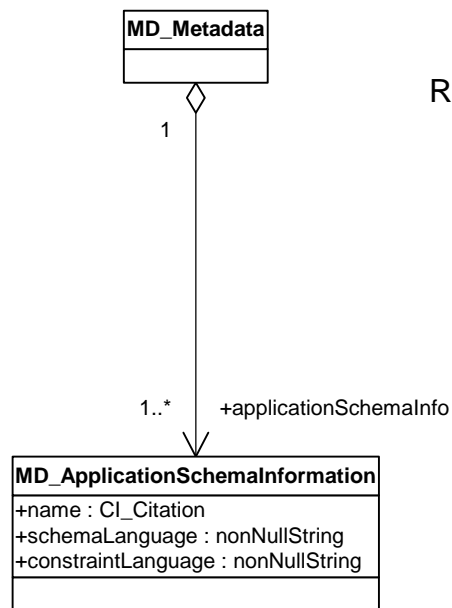
A.10 Content Information



A.12 Distribution Information

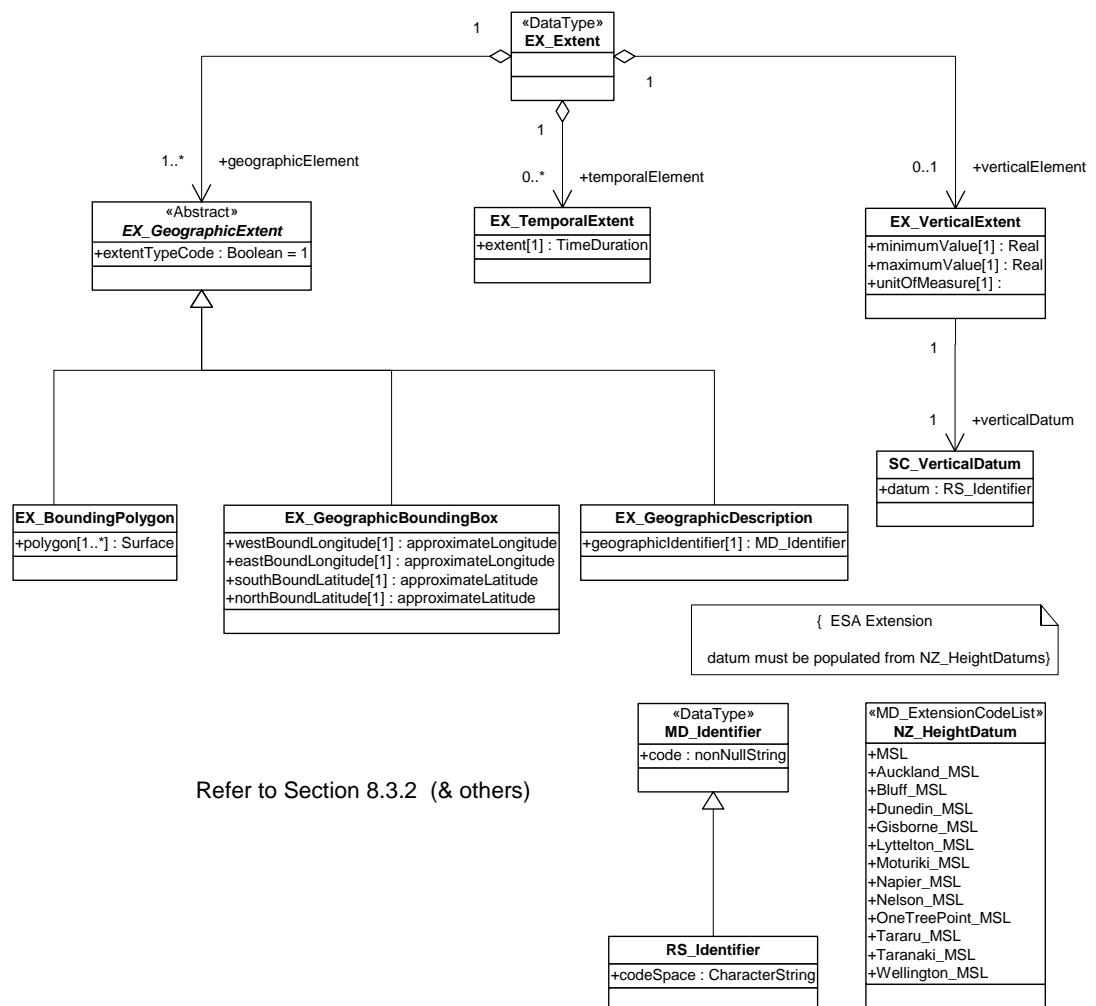


A.13 Metadata Extension Information

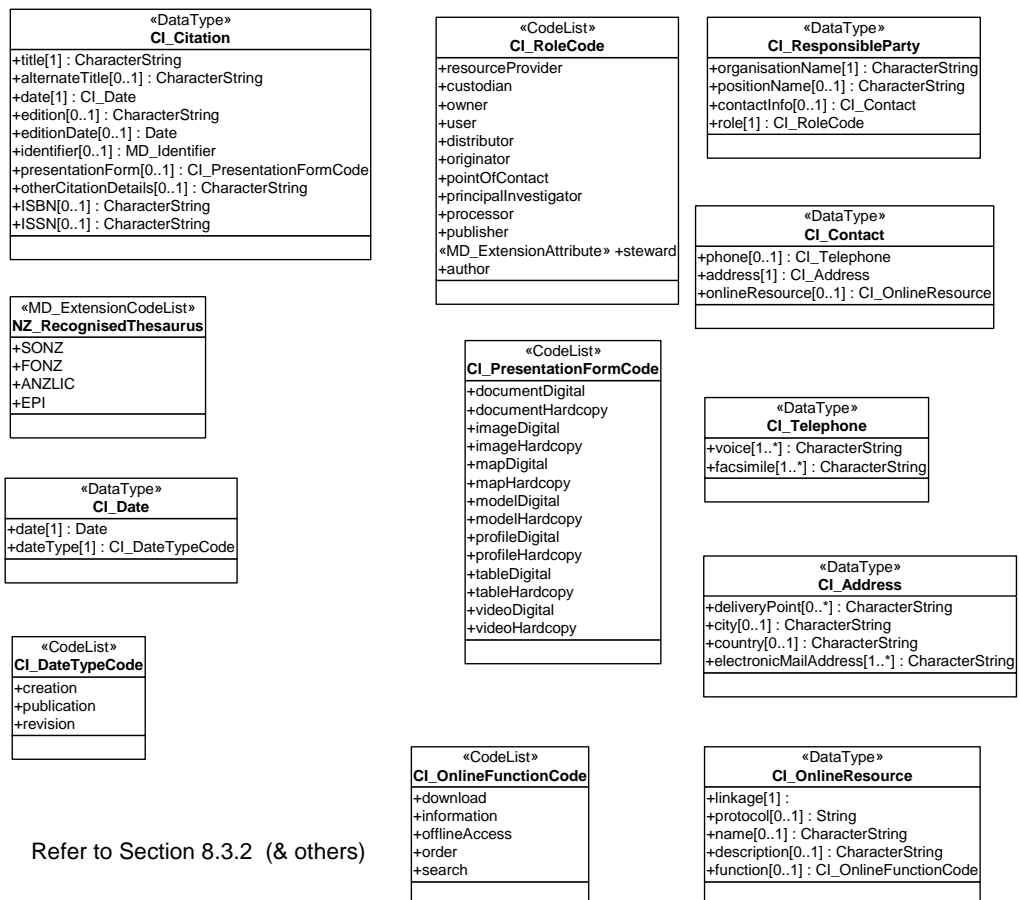


Refer to Section 8.3.6

A.14 Application Schema Information



A.15 Extent Information



CI_Citation Conditional Statements (ESA Extensions)

edition : If object cited = descriptiveKeywords OR Source OR DataResource AND edition control applies, then populate element

editionDate, alternateTitle, presentationForm, identifier, ISBN, ISSN : If object cited = DataResource and there is a known alternateTitle/identifier etc, then populate element

title: If object cited through descriptiveKeywords, then value must come from NZ_RecognisedThesaurusCodelist, then populate element

otherCitationDetails: (Only) If object cited is thesaurus (element from descriptiveKeywords), and then namespace of authoritative codelist (for thesaurus cited) should be recorded

{CI_ResponsibleParty Conditional Statements (ESA Statements)}

positionName and contactInfo: If organisation is not a processor, then populate element }

{CI_Phone and CI_Address Conditional Statements (ESA Extensions)}

phone , onlineResource, deliveryPoint, city and country : If object referenced is Resource or Distributor, then populate element}

A.16 Citation Information

Informative Tables²²

Metadata Component		Metadata Entry Values & Explanatory Notes	Conditions
MD_Metadata (1)			ISO 19115 Mandatory
	.fileIdentifier (2)	Value to be defined	
	.language (3) – refer ISO 639-2	Value= “eng”	Default Value
	characterSet (4) – refer CodeList B.5.10	Value = “004” <i>utf8</i>	Default Value
	.parentIdentifier (5)	Value is the name of the metadata file for the larger, existing ESA resource. Not to include the metadata filename of a different version of the resource with the same extents	<i>If this resource is a subset of a larger ESA resource that has a metadata file</i>
	.hierarchyLevel (6) – refer CodeList B.5.25	Value from CodeList	
	.contact (8)	Party responsible for the ESA metadata	ISO 19115 Mandatory
	.CI_RespParty(374)		
	.organisationName (376)	Value = “Land Information New Zealand”	
	.positionName (377)	Value = “Chief Topographer/Hydrographer”	
	.role (379) – refer CodeList B.5.5	Value = “011” <i>steward</i>	ISO 19115 Mandatory
	.dateStamp (9) refer B.4.2 ISO 8601	Value = “2002-12-01”	ISO 19115 Mandatory
	.metadataStandardName (10)	Value = “ISO 19115 Geographic Information – Metadata ESA Data Specification Profile”	
	.metadataStandardVersion (11)	Value = “1.9.6”	
	.dataSet (11.1)	Value = “http://www.lin.govt.nz/datasets/esa”	Conditional – if resource is available online
	MD_SpatialRepresentation (12/156)		
	.MD_VectorSpatialRepresentation (176)		For imagery datasets
	.topologyLevel (177) – refer CodeList B.5.28	Value=“geometryOnly”	ISO 19115 Mandatory
	.MD_GridSpatialRepresentation (159)		For imagery datasets
	.numberOfDimensions (160)	Value=“2”	ISO 19115 Mandatory Default Value
	.axisDimensionsProperties (161)		ISO 19115 Mandatory
	.dimensionName (180) – refer CodeList B.5.14	Value = “column”	ISO 19115 Mandatory Default Value

²² Prefixes used to describe Classes are taken from or follow the naming conventions in ISO 19115 and ISO 19139 (MD – metadata classes; EX – extent classes; CI – citation classes; DQ – data quality classes; LI – lineage classes)

Metadata Component		Metadata Entry Values & Explanatory Notes	Conditions
	.dimensionSize (181)	Value to be added by organisation creating data resource	ISO 19115 Mandatory
	.dimensionName (180) – refer CodeList B.5.14	Value = “row”	ISO 19115 Mandatory Default Value
	.dimensionSize (181)	Value to be added by organisation creating data resource	ISO 19115 Mandatory
	.cellGeometry (160) – refer CodeList B.5.9	Value = “area” - <i>each cell represents an area</i>	ISO 19115 Mandatory Default Value
	.transformationParameterAvailability (163) – Boolean 0=no, 1=yes	Value = “0”	ISO 19115 Mandatory Default Value
	MD_Georectified (162)		
	.checkPointAvailability (163) – Boolean 0=no, 1=yes	Value = “0”	ISO 19115 Mandatory Default Value
	.cornerPoints (165)		ISO 19115 Mandatory
	.Point (2 or more points to be defined)	Value to be added by organisation creating data resource (defined in terms of GML pos element)	
	.pointInPixel (167) – refer Enumeration B.5.22	Value = “centre” – <i>orientation point is taken as the centre of the pixel</i>	ISO 19115 Mandatory Default Value
	.transformationDimensionDescription (168)	Value to be added by organisation creating data resource describing the information that identifies which grid dimensions are the spatial dimensions	
	.transformationDimensionMapping (169)	Value to be added by organisation creating data resource identifying which grid dimensions are the spatial dimensions	
	MD_Georeferenceable (170)		
	.controlPointAvailability (171) Boolean 0=no, 1=yes	Value to be added by organisation creating data resource .	ISO 19115 Mandatory
	.orientationParameterAvailability (172) Boolean	Value to be added by organisation creating data resource	ISO 19115 Mandatory
	.georeferencedParameters (174)	Value to be added by organisation creating data resource	ISO 19115 Mandatory
	MD_ReferenceSystem (13/186)	Amplified in Section 7	
	.referenceSystemIdentifier (187)		ISO 19115 Mandatory
	.code (207)	Value = “NZGD2000”	ISO 19115 Mandatory Default
	codeSpace (208.1)	Value = “NZ_ReferenceSystems”	
	MD_Identification (15/23)		ISO 19115 Mandatory
	citation (24)		ISO 19115 Mandatory

Metadata Component		Metadata Entry Values & Explanatory Notes	Conditions
	.title (360)	Value="The Emergency Services and Government Administration (ESA) Dataset Series"	ISO 19115 Mandatory
	.date (362)	Value to be added by LINZ before initial distribution of ESA data	ISO 19115 Mandatory
	.edition (363)	Value ="2.0"	
	.editionDate (364)	Value = "2004-01-20"	If resource has editions
	.identifier (365)	Not applicable to ESA	If there is an identifier for the resource
	.ISBN(372)	Not applicable to ESA	If there is an ISBN identifier for the resource
	.ISSN (373)	Not applicable to ESA	If there is an ISSN identifier for the resource
	.presentationForm (368) refer Codelist B.5.4	Value = "mapDigital"	
	abstract (25)	Value="Consistent road network, address and locality features and associated contextual scanned images systematically maintained and covering all urban and rural areas of New Zealand"	ISO 19115 Mandatory
	purpose (26)	Value="To provide the data necessary to support emergency services locate and verify function in addition to other core common Crown processes associated with emergency services and government administration"	
	.audience – refer Codelist NZ_Audience audience	The target audience of the resource	
	.resourceNzMandate NzMandate	Entity that describes the New Zealand statutory mandate for the creation of a data resource or the provision of a service.	Conditional / If there is a statutory mandate for the resource
	.New Zealand mandate reference manRef	The specific reference to the New Zealand statutory mandate for the creation of a data resource or the provision of a service.	
	.New Zealand mandate type – refer Codelist manType	Describes the type of New Zealand statutory mandate justification for the creation of a data resource or the provision of a service.	
	.status (28) – refer CodeList B.5.23 idStatus	Status of the resources Value = "completed"	
	pointOfContact (29)		
	.CI_RespParty(374)		
	.organisationName (376)	Value="Land Information New Zealand"	

Metadata Component		Metadata Entry Values & Explanatory Notes	Conditions
	.positionName (377)	Value="Chief Topographer/Hydrographer"	
	.contactInfo (388)		
	CI_Contactphone (388)		
	Voice(408)	Value="04 4600110"	
	Facsimile(410)	Value = "04 4716894"	
	CI_Contactaddress (389)		
	DeliveryPoint(381)	Value="PO Box 5501"	
	City(382)	Value = "Wellington"	
	Country(385)	Value= "New Zealand"	
	EEmailAddress(386)	Value="no_cth@linz.govt.nz"	
	CI_OnlineResource(390)		
	Linkage(397)	Value = www.linz.govt.nz/metadata -to be confirmed	ISO 19115 Mandatory
	role (379) – ref Codelist B5.5	Value = "steward "	ISO 19115 Mandatory
	.DescriptiveKeywords (33) descKeys	Where keywords have been identified by subject matter experts utilising FONZ or SONZ keywords	
	NZGLS Function Keyword (FONZ)		
	.keyword (53)	<i>Note commonly used or formalised words used to describe function</i>	ISO 19115 Mandatory
	.type (54) - refer CodeList B.5.17	Value = "theme"	
	.thesaurusName (55) – refer Codelist NZ_RecognisedThesaurus	Value = "FONZ"	
	NZGLS Subject Keyword (SONZ)		
	.keyword (53)	<i>Note commonly used or formalised words used to describe function</i>	ISO 19115 Mandatory
	.type (54) - refer CodeList B.5.17	Value = "theme"	
	.thesaurusName (55) – refer Codelist NZ_RecognisedThesaurus	Value = "SONZ"	
	ANZLIC Search Word Keyword – if applicable		
	.keyword (53)	<i>Note commonly used or formalised words used to describe function</i>	ISO 19115 Mandatory
	.type (54) - refer CodeList B.5.17	Value = "discipline"	
	.thesaurusName (55) – refer Codelist NZ_RecognisedThesaurus	Value = "ANZLIC"	
	MfE Environmental Performance Indicator Strand Keyword – if applicable		
	.keyword (53)	<i>Note commonly used or formalised words used to describe function</i>	ISO 19115 Mandatory
	.type (54) - refer CodeList B.5.17	Value = "theme"	

Metadata Component		Metadata Entry Values & Explanatory Notes	Conditions
	.thesaurusName (55) – refer Codelist NZ_RecognisedThesaurus	Value = "EPI"	
	MD_Usage (34/62)	Usage details (and any limitations associated with the use)	
	.specificUsage (63)	Document brief description of resource usage	ISO 19115 Mandatory
	.userDeterminedLimitations (65)	Document briefly applications determined by the user, for which the resource is not suitable	Conditional – If limitations are known
	.userContactInfo (66)	Document brief details of the user	ISO 19115 Mandatory
	.organisationName (376)	Value = "ACompany Ltd"	
	CI_ContactAddress (389)		
	.EmailAddress (386)	Value = "auser@acompany.co.nz"	
	.role (379) - refer CodeList B.5.5	Value = "user"	
	MD_AggregateInformation (35/66.1)	Aggregate dataset information including relationships to other datasets	Conditional – If there are other related aggregate datasets
	.aggregateDataSetName (66.2)	Document citation details of related aggregate dataset	Conditional – if related dataset is documented
	.title (360)	Value="Transit New Zealand Physical Road Centreline Dataset"	ISO 19115 Mandatory
	.date (362)	Value="2002-12-01"	ISO 19115 Mandatory
	.edition (363)	Value = "1.0"	
	.editionDate (364)	Value = "2002-12-01"	If resource has editions
	.presentationForm (368) refer Codelist B.5.4	Value = "mapDigital"	
	.aggregateDataSetIdentifier (66.3/205)	Document identifier of related aggregate dataset	Conditional – if related dataset is documented
	.code (207)	Value = "TNZCL"	ISO 19115 Mandatory
	.associationType (66.4) refer Codelist B.5.7	Value = "crossReference"	ISO 19115 Mandatory
	.initiativeType (66.5) refer Codelist B.5.8	Value = "collection"	Conditional – If the related dataset is related as a result of a common initiative
	MD_DataIdentification (36)		
	resourceFormat (32)		
	name (285)	Value to be added by LINZ before initial distribution of ESA data – when host system details are known	ISO 19115 Mandatory
	version (286)	Value to be added by LINZ before initial distribution of ESA data – when host system details are known	ISO 19115 Mandatory

Metadata Component		Metadata Entry Values & Explanatory Notes	Conditions
	.spatialRepresentationType (37) refer CodeList B.5.26	Value = "vector" for all vector data Value = "grid" for scanned contextual images	
	spatialResolution (38)		
	equivalentScale (60)	Level of detail expressed as the scale of the comparable hard-copy map or chart	Conditional when distance is not populated
	.distance (61)	Ground sample distance	Conditional when equivalent Scale is not populated
	language (39)	Value="eng"	ISO 19115 Mandatory Default Value
	characterSet (40) – refer CodeList B.5.10	Value="004" utf8	Default Value
	topicCategory (41) – refer CodeList B.5.27	Value="018" transportation	ISO 19115 Mandatory
	.extent (45)		
	.geographicElement (336/339)		
	.extentTypeCode (342) – refer CodeList B.3.1.1	Value = "0" for exclusion Value = "1" for inclusion	
	.geographicIdentifier (349)	Value to be added by organisation creating data resource - to describe geographic extent details when there is a defined location associated with a geographic name	Where geographical extent is in terms of a predefined area ISO 19115 Mandatory
	.geographicBox (42)		If there is no geographicIdentifier (349)
	.westBoundLongitude(344)	Value to be added by LINZ before initial distribution of ESA data	
	.eastBoundLongitude(345)	Value to be added by LINZ before initial distribution of ESA data	
	.southBoundLatitude(346)	Value to be added by LINZ before initial distribution of ESA data	
	.northBoundLatitude(347)	Value to be added by LINZ before initial distribution of ESA data	
	.geographicElement (336)	To be used when geographic extent is not rectangular or aligned to a predefined spatial areas	If there is no geographicIdentifier (349) or geographicBox (42)
	.polygon (344)	Value to be added by organisation creating data resource - set of points defining the bounding polygon	ISO 19115 Mandatory
	.temporalElement (337)		

Metadata Component		Metadata Entry Values & Explanatory Notes	Conditions
	.extent (351) – refer B.4.6	Value to be added by organisation creating data resource – <i>to define the date or period that best reflects the on-the-ground currency of this particular data source</i>	ISO 19115 Mandatory
	.verticalElement (338)		
	.minimumValue (355)	Value to be added by organisation creating data resource	ISO 19115 Mandatory
	.maximumValue (356)	Value to be added by organisation creating data resource	ISO 19115 Mandatory
	.unitOfMeasure (357) – refer B.4.3	Value = “metres”	ISO 19115 Mandatory
	.verticalDatum (358)	Value = “mean sea level”	ISO 19115 Mandatory
	MD_ContentInformation (16/232)		
	MD_FeatureCatalogueDescription (233)		For datasets with vector spatial definitions
	.includedWithDataset (236) - Boolean 1=yes, 0=no	Value = “1”	ISO 19115 Mandatory Default Value
	.featureCatalogueCitation (238)		
	.title (360)	Value to be added by organisation creating data resource. <i>Feature Catalogue must be defined in terms of the ESA Core Data Specification</i>	ISO 19115 Mandatory
	.date (362)	Value to be added by organisation creating data resource	ISO 19115 Mandatory
	.edition (363)	Value to be added by organisation creating data resource	
	MD_Distribution (17/270)	Distribution details to be added by distributing organisation	
	.distributor (272)		
	.organisationName (376)		
	.positionName (377)		
	.contactInfo (387)		
	CI_Contactaddress (389)	Postal & Email Address Details	
	.phone (388)		
	.voice (408)		
	.facsimile (409)		
	.address (389)		
	DeliveryPoint(381)		
	City(382)		
	Country(385)		
	EMailAddress(386)		

Metadata Component		Metadata Entry Values & Explanatory Notes	Conditions
	.onLineResource (390)		
	.linkage (397)		
	.distributionOrderProcess (281/296)	Ordering details are described	
	.fees (299)	<i>Fees and terms for retrieving the data.</i>	
	.orderingInstruction (301)	<i>General instructions, terms and services provided by distributor</i>	
	.turnaround (302)	<i>Typical turnaround time for filling an order.</i>	
	distributorFormat (282)		ISO 19115 Mandatory
	name (285)		ISO 19115 Mandatory
	version (286)		ISO 19115 Mandatory
	.distributorTransferOptions (283)		
	.unitsOfDistribution (275)	<i>Tiles, layers, geographic areas etc in which data is available</i>	
	.transferSize (276)	<i>Estimated size of a unit of data in the specified transfer format expressed in megabytes</i>	
	.online (277)		Conditional – if there is an online distribution service
	.unitsOfDistribution (275)	<i>Tiles, layers, geographic areas etc in which data is available</i>	
	.transferSize (276)	<i>Estimated size of a unit of data in the specified transfer format expressed in megabytes</i>	
	.online (277)		Conditional – if there is an online distribution service
	.linkage(397)	<i>Location (address) for on-line address using a Uniform Resource Locator or similar addressing scheme</i>	ISO 19115 Mandatory
	.protocol (398)	<i>Connection protocol used</i>	
	.name (400)	<i>Name of on-line resource</i>	
	.description (401)	<i>How the online transfer process works</i>	
	.function (402) – refer CodeList B.5.3	<i>Eg. Value = "order"</i>	
	.offline (278/291)		Conditional – if there is an offline distribution service
	.name (292) – refer CodeList B.5.20	<i>Eg. Value = cdROM"</i>	
	.mediumFormat (296) refer CodeList B.5.19	<i>Eg. Value = "ISO 9660" (volume and file structure of a CD-ROM)</i>	

Metadata Component		Metadata Entry Values & Explanatory Notes	Conditions
	.mediumNote (297)	<i>Description of other limitations or requirements for using the medium</i>	Conditional – if there are limitations or requirements
	.dataQualityInfo (18)		To be repeated for all ESA Quality Measures – refer Appendix F - Detailed ESA Quality Measures Descriptions)
	Scope (79)		ISO 19115 Mandatory
	Level (139) – refer CodeList B.5.25	Eg. Value = “dataset”	ISO 19115 Mandatory Default Value
	.report (80)		
	DQ_Element (99)		Value as defined in Appendix F - Detailed ESA Quality Measures Descriptions
	.nameOfMeasure (100)	Value as defined in Section 6	To be repeated for all ESA Quality Measures
	.measureIdentification (101)		
	.authority (206)		
	.organisationName (376)	Value = “Land Information New Zealand”	
	.positionName (377)	Value = “Chief Topographer/ Hydrographer”	
	.role (379) - refer CodeList B.5.5	Value = “steward “	
	.code (207)	Value to be defined – Quality Measure naming convention needs to be established	ISO 19115 Mandatory
	.measureDescription (102)	Value as defined in Section 6	To be repeated for all ESA Quality Measures
	.evaluationMethodType (103) – refer CodeList B.5.6	Value as defined in Section 6	To be repeated for all ESA Quality Measures
	.evaluationMethodDescription (104)	Value as defined in Section 6	To be repeated for all ESA Quality Measures
	.dateTime (106) refer to B.4.2	Value to be added by testing organisation – <i>Date Quality Conformance Result was last applied</i>	To be repeated for all ESA Quality Measures
	.result (107)		To be repeated for all ESA Quality Measures ISO 19115 Mandatory
	DQ_ConformanceResult (129)		
	.specification (130)		ISO 19115 Mandatory
	.title (360)	Value to be the same as the equivalent Quality Measure	ISO 19115 Mandatory
	.date (362)	Value = date to be the date of the adoption of the ESA Quality Measures by LINZ	ISO 19115 Mandatory
	.explanation (131)	Value to be added by testing organisation	ISO 19115 Mandatory

Metadata Component		Metadata Entry Values & Explanatory Notes	Conditions
	.pass (132) (Boolean 0=Fail, 1=Pass)	Value to be added by testing organisation	ISO 19115 Mandatory
	DQ_QuantitativeResult (133)		
	.valueUnit (135)	Value to be added by testing organisation LINZ/ data supplier	
	.value (137)	Value to be added by testing organisation	ISO 19115 Mandatory
	.evaluationScope (extension)	Value to be added by testing organisation - <i>a list of the feature type included in the evaluation sample</i>	Where the evaluation is applied to a sub-set of quality sensitive feature types of the total resource defined in the quality scope
	.evaluationExtent (extension)		
	.extent (339)	Value to be added by organisation providing data maintenance service – <i>to be used where evaluation is based on a sample and the sampling strategy is area based</i>	If extent of evaluation sample is different to the extent of the main resource
	.extentTypeCode (342) – refer Codelist B.3.1.1	Value = “0” for exclusion Value = “1” for inclusion	
	.geographicIdentifier (349)	<i>Document the sample in terms of areas with standardised identifiers and extents</i>	
	.lineage (81)		
	.statement (83)	Value to be added by organisation creating data resource	
	.processStep (84)		To be repeated for all process steps used to create data resource
	.description (87)	Value to be added by organisation creating data resource – <i>describe step</i>	To be repeated for all process steps ISO 19115 Mandatory
	.rationale (88)	Value to be added by organisation creating data resource – <i>why process step was required</i>	To be repeated for all process steps
	.dateTime (89) refer B.4.11	Value to be added by organisation creating data resource – <i>day or period covering duration of the process step</i>	To be repeated for all process steps
	.processor (90)	Value to be added by organisation creating data resource	To be repeated for all process steps
	.organisationName (376)	Value to be added by organisation creating data resource	
	.role (379) - refer CodeList B.5.5	Value to be added by organisation creating data resource	

Metadata Component		Metadata Entry Values & Explanatory Notes	Conditions
	.source (85)		To be repeated for all data sources used to create data resource
	.scaleDenominator (94)	Value to be added by organisation creating data resource – <i>denominator component of (equivalent) representative scale. Where no rep scale applies, derive an equivalent scale by assuming absolute spatial accuracy equates to 1mm of “drawn” scale</i>	To be repeated for all data sources
	.sourceReferenceSystem (95)		Conditional – if different to main data resource
	.rsID (187)		
	.code (207)	Eg. Value = “NZMG”	
	.sourceCitation (96)		
	.title (360)	Value to be added by organisation creating data resource	ISO 19115 Mandatory
	.date (362)	Value to be added by organisation creating data resource. <i>Date to be the date that best reflects the on-the-ground currency of this particular data source</i>	ISO 19115 Mandatory
	.edition (363)	Value to be added by organisation creating data resource	
	.citedResponsibleParty (367)		
	.organisationName (376)	Value to be added by organisation creating data resource	
	.role (379) - refer CodeList B.5.5	Eg. Value = “processor”	
	.sourceExtent (97)		
	.geographicIdentifier (349)	Value to be added by organisation creating data resource. <i>Preferably using pre-defined geographic extents that can be described by free text</i>	
	MD_Constraints (35/67)		
	.useLimitation (68) <i>useLimit</i>	<i>Note any limitation affecting the fitness for use of the data resource</i>	Conditional - If any issues or constraints have been identified and adequately documented for the dataset
	MD_LegalConstraints (69)		
	.useConstraints (71) – refer to CodeList B.5.24	Use constraints applied to assure the protection of privacy or intellectual property, and any other restrictions or limitations on obtaining the resource Eg. Value= “copyright”	

Metadata Component		Metadata Entry Values & Explanatory Notes	Conditions
	.otherConstraints (72)	Value="Crown Copyright, New Zealand, 2001"	
MD_ApplicationSchemaInformation (21/320)			
	.name (323)		ISO 19115 Mandatory
	.title (360)	Value="ESA Core Data Application Schema"	ISO 19115 Mandatory
	.date (362)	Value to be added by LINZ before initial distribution of ESA data	ISO 19115 Mandatory
	.edition (363)	Value ="2.0"	
	.citedResponsibleParty (367)		
.CI_RespParty(374)			
	.organisationName (376)	Value="Land Information New Zealand"	
	.positionName (377)	Value="Chief Topographer/Hydrographer "	
	role (379) – ref Codelist B5.5	Value = "steward"	
	.schemaLanguage (322)	Value = "UML"	ISO 19115 Mandatory
	.constraintLanguage (323)	Value = "None – business rules incorporated within UML definitions"	ISO 19115 Mandatory
MD_MaintenanceInformation (22/142)			
	.maintenanceAndUpdateFrequency (143) - refer CodeList B.5.18	Value to be added and/or defined by data steward (LINZ)	ISO 19115 Mandatory
	.dateOfNextMaintenance (144)	Value to be added by organisation providing data maintenance service.	Where known
	.updateScope (146) - refer CodeList B.5.25	Value to be added by organisation providing data maintenance service.	
	.updateScopeDefinition (147)		For datasets with vector spatial definitions
MD_ScopeDescription (149)			
	.attributes (150)	Value to be added by organisation providing data maintenance service. <i>To list all attribute types with new/revised instances</i>	
	.features (151)	Value to be added by organisation providing data maintenance service. <i>To list all feature types with new/revised instances</i>	
	.extent (140)		To be added where geographical extent is less than nationwide
	.geographicalElement (336)		
	.geographicIdentifier (349)	Value to be added by organisation providing data maintenance service	Where geographical extent is in terms of a predefined area
	.temporalElement (337)		

Metadata Component		Metadata Entry Values & Explanatory Notes	Conditions
	.extent (351) – refer B.4.6	Value to be added by organisation creating data resource – <i>to define the date or period that best reflects the on-the-ground currency of this particular data source</i>	
	.maintenanceDataChanges		
	.numberOfDeletions	Value to be added by organisation providing data maintenance service	
	.numberOfInsertions	Value to be added by organisation providing data maintenance service	
	.numberOfFeatureSpatialChanges	Value to be added by organisation providing data maintenance service	
	.numberOfAttributeChanges	Value to be added by organisation providing data maintenance service	
	.numberOfFeaturesInResource	Value to be added by organisation providing data maintenance service	
	.numberOfFeaturesWithAttributeType	Value to be added by organisation providing data maintenance service	
	.maintenanceNote (149)	Value to be added by organisation providing data maintenance service. To note any particular characteristics of this data maintenance	If data maintenance service varies significantly from previous data maintenance
	MD_ChangeIndicator		If an appropriate Change Indicator Exists (may be specified by Data Steward)
	.sourceCitation		
	.title (360)	Value to be added by organisation providing data maintenance service or data steward	ISO 19115 Mandatory
	.date (362)	Value to be added by organisation providing data maintenance service or data steward	ISO 19115 Mandatory
	.edition (363)	Value to be added by organisation providing data maintenance service or data steward	
	.citedResponsibleParty (367)		
	.organisationName (376)	Value to be added by organisation providing data maintenance service or data steward	
	role (379) – ref Codelist B5.5	Value to be added by organisation providing data maintenance service or data steward	

Metadata Component		Metadata Entry Values & Explanatory Notes	Conditions
	.relevantFeatures	Value to be added by organisation providing data maintenance service or data steward – <i>List feature types which correlate to change indicator measurements</i>	
	.changeIndication		To be repeated for every change indication measurements
	.indicationExplanation	Value to be added by organisation providing data maintenance service or data steward	
	.dateTime	Value to be added by organisation providing data maintenance service or data steward	
	.valueUnit (like 135)	Value to be added by organisation providing data maintenance service or data steward	
	.value (137)	Value to be added by organisation providing data maintenance service or data steward	
MD_MetadataExtension (14/303)			See subsequent definitions of ESA Metadata Extensions
MD_ExtendedElementInformation (306)			
	.name (307)		ISO 19115 Mandatory
	.shortName (308)		
	.domainCode (309)		
	.definition (310)		ISO 19115 Mandatory
	..obligation (311) – refer CodeList B.5.21		
	.condition (312)		
	.dataType (313) – refer CodeList B.5.13		ISO 19115 Mandatory
	.maximumOccurrence (314)		
	..domainValue (315)		
	.parentEntity (316)		ISO 19115 Mandatory
	.rule (317)		ISO 19115 Mandatory
	.rationale (318)		
	.source (319)		
CI_Citation (359)			
	.title (360)		ISO 19115 Mandatory
	.date (362)		ISO 19115 Mandatory
	.edition (363)		
	.citedResponsibleParty (367)		
	.organisationName (376)		
	.positionName (377)		

Metadata Component		Metadata Entry Values & Explanatory Notes	Conditions
	.role (379) – refer CodeList B.5.5		

ESA Metadata Extensions to ISO 19115

[Link to tables defining the metadata extensions](#)

Appendix C – ESA Metadata Implementation Example

Note: This section was updated in April 2004 (v1.9.7). It supersedes Appendix C in the ESA_Code_Data_Specification_Version_1.9a (Oct 2001) and in version 1.9.6 (Dec 2002).

These XML implementation examples are for illustrative purposes only. For instance, date, process, source and quality result metadata elements described in this example do not relate to any actual dataset and should **not** be taken as specifying the process or data sources to be used to generate the ESA data.

XML Schema

Two series of XML Schema define this metadata profile and facilitate the encoding and the conformance testing of metadata descriptions (to ensure they do comply with this metadata profile):

The **Level 1** series of XML schemas defines **only** those elements included in this metadata profile.

The **Level 2** series of XML schema includes all the elements included in this metadata profile **plus** the other (non-mandatory) elements from ISO 19115.

Both series of XML schemas utilise the namespace <http://www.linz.govt.nz/metadata/esametadata>

These XML schema are based on the Geographic Information – Metadata – Implementation Specification (ISO/TC211 N1535 – a work item in progress with a status of “working draft” (refer to ISO/TC211 Project No 19139 to track progress and later versions of this work item)) and has been modified to include the ESA metadata extensions. The ESA XML schemas refer to and are structured in the same manner as the series of schema associated with ISO 19139 (version 0.8) and the namespace <http://metadata.dgiwg.org/smXML>.

The development of the ESA XML implementation also utilises and builds on the XML implementation of the NZ Geospatial Metadata Profile (namespace – <http://www.linz.govt.nz/metadata/nzgmadata>). Common elements in this ESA Metadata Profile are referenced to (rather than duplicating) the NZ Geospatial Metadata Profile.

To utilize these schema, a metadata instance document must refer to the top level schema, `esaMetadata_AS.xsd`. As there is a version for both Level 1 and Level 2 conformance, care must be taken to use the version that is appropriate to your situation. Normally, that will be the Level 1 conformance.

These top level schema are accessible on-line at the following URL²³:

www.linz.govt.nz/staticpages/esa-v1_9_7/xml/ESAm1/esaMetadata_AS.xsd
(Level 1)

www.linz.govt.nz/staticpages/esa-v1_9_7/xml/ESAm2/esaMetadata_AS.xsd
(Level 2)

If on-line use is not feasible, a zip file containing this document and all the xml files for both series of schemas (including example instance documents) should be downloaded from :

[../esa-v1_9_7/esa_data_specification_version1_9_7.zip](#)

The path and directory definitions and names are critical as the relationships between the different series of files must be correctly emulated for successful operation. Although, the zip file contains these definitions, the following table also describes the directory structure expected by the various series of XML schema files (ESA Metadata Level 1, ESA Metadata Level 2, NZ Geospatial Metadata Level 1, NZ Geospatial Metadata Level 2, smXML (ISO 19139), GML (version 3.0.1), smil (required by GML) and the xlink.xsd schema).

²³ The hyperlinks to XML files will only display properly on Microsoft Internet Explorer v5.5 or beyond. For users with older versions of Internet Explorer, right mouse click and choose Save As and then use any editor such as WordPad to view these files.

ESAm1 – ESA Level 1 XML schema	ESAApplicationSchema.xsd ESAcontent.xsd ESAdataQuality.xsd ESAdistribution.xsd ESAidentification.xsd ESAmaintenance.xsd ESAmExtensions.xsd ESAmetadataEntity.xsd ESAspatialRepresentation.xsd esaXML.xsd
ESAm2 – ESA Level 2 XML schema	ESAApplicationSchema.xsd ESAcontent.xsd ESAdataQuality.xsd ESAdistribution.xsd ESAidentification.xsd ESAmaintenance.xsd ESAmExtensions.xsd ESAmetadataEntity.xsd ESAspatialRepresentation.xsd esaXML.xsd
NZGm1 – NZ Geospatial Metadata Level 1 XML schema	NZGbasicTypes.xsd NZGcitation.xsd NZGconstraint.xsd NZGextent.xsd NZGmExtensions.xsd NZGreferenceSystem.xsd
NZGm2 – NZ Geospatial Metadata Level 2 XML schema	NZGbasicTypes.xsd NZGcitation.xsd NZGconstraint.xsd NZGextent.xsd NZGmExtensions.xsd NZGreferenceSystem.xsd
samples- example XML instance documents	esametaCLI1v0.01.xml esametaCLI2v0.01.xml & other examples associated with NZ Geospatial Metadata
smXML – XML schema associated with ISO 19139.	Available at http://metadata.dgiwg.org
gml3.0 – top level schema to the GML series of schema Available at http://schemas.opengis.net/gml/	base – low level GML schema smil – smil series of XML schema (required by GML) xlink – xlink.xsd XML schema referred to by both smXML and GML schema

XML Instance Documents

In addition to these schema, an example instance document for both Level 1 and Level 2 can be viewed at the following url:

[Level 1 ESA Metadata XML instance example](#)

[Level 2 ESA Metadata XML instance example](#)

These examples describe a fictitious dataset of road centrelines (not the complete ESA Core Data Specification) and is provided on an informative basis to illustrate ESA metadata requirements.

XML Validation

Minimal conformance with this metadata profile requires that a geographic metadata instance (XML) document can be validated without error against the XML schema provided.

There are many “off-the-shelf” software solutions that can validate XML instance documents against schema (as well as validating XML schema). Software products available that have this functionality include:

- XMLspy (Altova) <http://www.altova.com>
- Eclipse (IBM)²⁴ <http://update.xmlmodeling.com/updates/index.html>
- Microsoft Visual Studio - .NET Version

However, because these validation tools sometimes give differing results for the same XML instance document, it is recommended that the instance document should be validated on two different tools. However, for this version of this metadata profile it should be noted that although all the schema validate in both XMLspy and Eclipse, the example instance documents only validate in XMLspy. As part of the analysis into the validation errors found in the ESA instance documents, it was found that there is a significant number of validation errors reported for the example instance document supplied as part of ISO 19139 XML implementation specification (vmaplv0_metadata_v08.xml) when using either a Xerces based XML parser or the Microsoft XML parser. Some of these reported errors seem quite “deep seated” within the OpenGIS Consortium GML and SMIL schema. When the reported errors with the ISO 19139 example were compared to the reported errors from the ESA example instance documents, it was concluded that these errors did not appear to have been introduced by the new ESA modifications but were a result of the underlying problems in the ISO/TC211 and OpenGIS schema.

²⁴ The Eclipse platform includes a version of the Xerces (Sun) XML validator -<http://jakarta.apache.org>

For this reason, as an interim solution, it is recommended that the second validation pass include a comparison of the reported errors from the ISO 19139 example instance document (vmaplv0_metadata_v08.xml) utilising the same validating tool as has been used as the second validator of the ESA metadata instance document. Where no new types of error have been introduced from what are reported against the ISO 19139 example, and providing the ESA metadata instance does validate with one validator (such as XMLspy), then it should be considered to pass “the two XML validation” conformance test.

Validation of XML instance documents against the schemas described in this document is not all that is required to ensure conformance with this metadata profile.

Other checks are:

1. Have all conditional obligations been properly applied ?
2. Do elements that have a domain of a specified codelist have valid values ?
3. Are all the metadata extensions associated with this metadata profile been included in the XML instance document ?

Appendix D - CodeLists²⁵ from ISO 19115

Note: This section was updated in April 2004 (v1.9.7). It supersedes Appendix D in the ESA_Code_Data_Specification_Version_1.9a (Oct 2001) and in version 1.9.6 (Dec 2002).

B.5²⁶ CodeLists and enumerations

[Extract from ISO 19115]

B.5.1 Introduction

The stereotype classes <<CodeList>> and <<Enumeration>> can be found below. These two stereotype classes do not contain "obligation / condition", "maximum occurrence", "data type" and "domain" attributes. These two stereotype classes also do not contain any "other" values as <<Enumeration>>s are closed (not extendable) and <<CodeList>>s are extendable..

B.5.2 CI_DateTypeCode <<CodeList>>

	Name	Domain code	Definition
1.	CI_DateTypeCode	DateTypCd	identification of when a given event occurred
2.	creation	001	date identifies when the resource was brought into existence
3.	publication	002	date identifies when the resource was issued
4.	revision	003	date identifies when the resource was examined or re examined and improved or amended

B.5.3 CI_OnLineFunctionCode <<CodeList>>

	Name	Domain code	Definition
1.	CI_OnLineFunctionCode	OnFunctCd	function performed by the resource
2.	download	001	online instructions for transferring data from one storage device or system to another
3.	information	002	online information about the resource
4.	offlineAccess	003	online instructions for requesting the resource from the provider
5.	order	004	online order process for obtaining the resource
6.	search	005	online search interface for seeking out information about the resource

²⁵ "Codelist" is the term given to a specialised class that defines values to be controlled with standard code values. Also known in NZGLS as "controlled value lists".

²⁶ B.5 refers to the section heading in ISO 19115 of the authoritative source of codelists for this standard.

B.5.4 CI_PresentationFormCode <<CodeList>>

	Name	Domain code	Definition
1.	CI_PresentationFormCode	PresFormCd	mode in which the data is represented
2.	documentDigital	001	digital representation of a primarily textual item (can contain illustrations also)
3.	documentHardcopy	002	representation of a primarily textual item (can contain illustrations also) on paper, photographic material, or other media
4.	imageDigital	003	likeness of natural or man-made features, objects, and activities acquired through the sensing of visual or any other segment of the electromagnetic spectrum by sensors, such as thermal infrared, and high resolution radar and stored in digital format
5.	imageHardcopy	004	likeness of natural or man-made features, objects, and activities acquired through the sensing of visual or any other segment of the electromagnetic spectrum by sensors, such as thermal infrared, and high resolution radar and reproduced on paper, photographic material, or other media for use directly by the human user
6.	mapDigital	005	map represented in raster or vector form
7.	mapHardcopy	006	map printed on paper, photographic material, or other media for use directly by the human user
8.	modelDigital	007	multi-dimensional digital representation of a feature, process, etc.
9.	modelHardcopy	008	3-dimensional, physical model
10.	profileDigital	009	vertical cross-section in digital form
11.	profileHardcopy	010	vertical cross-section printed on paper, etc.
12.	tableDigital	011	digital representation of facts or figures systematically displayed, especially in columns
13.	tableHardcopy	012	representation of facts or figures systematically displayed, especially in columns, printed on paper, photographic material, or other media
14.	videoDigital	013	digital video recording
15.	videoHardcopy	014	video recording on film

B.5.5 CI_RoleCode <<CodeList>>

	Name	Domain code	Definition
1.	CI_RoleCode RoleCd		function performed by the responsible party
2.	resourceProvider	001	party that supplies the resource
3.	custodian	002	party that accepts accountability and responsibility for the data and ensures appropriate care and maintenance of the resource
4.	owner	003	party that owns the resource
5.	user	004	party who uses the resource
6.	distributor	005	party who distributes the resource
7.	originator	006	party who created the resource
8.	pointOfContact	007	party who can be contacted for acquiring knowledge about or acquisition of the resource
9.	principalInvestigator	008	key party responsible for gathering information and conducting research

10.	processor	009	party who has processed the data in a manner such that the resource has been modified
11.	publisher	010	party who published the resource

B.5.6 DQ_EvaluationMethodTypeCode<<CodeList>>

	Name	Domain code	Definition
1.	DQ_EvaluationMethodTypeCode	EvalMethTypeCd	type of method for evaluating an identified data quality measure
2.	directInternal	001	method of evaluating the quality of a dataset based on inspection of items within the dataset, where all data required is internal to the dataset being evaluated
3.	directExternal	002	method of evaluating the quality of a dataset based on inspection of items within the dataset, where reference data external to the dataset being evaluated is required
4.	indirect	003	method of evaluating the quality of a dataset based on external knowledge

B.5.7 DS_AssociationTypeCode <<CodeList>>

	Name	Domain code	Definition
1.	DS_AssociationTypeCode	AscTypeCd	justification for the correlation of two datasets
2.	crossReference	001	reference from one dataset to another
3.	largerWorkCitation	002	reference to a master dataset of which this one is a part
4.	partOfSeamlessDatabase	003	part of same structured set of data held in a computer
5.	source	004	mapping and charting information from which the dataset content originates
6.	stereomate	005	part of a set of imagery that when used together, provides three-dimensional images

B.5.8 DS_InitiativeTypeCode <<CodeList>>

	Name	Domain code	Definition
1.	DS_InitiativeTypeCode	InitTypCd	type of aggregation activity in which datasets are related
2.	campaign	001	type of aggregation activity in which datasets are related
3.	collection	002	series of organised planned actions
4.	exercise	003	accumulation of datasets assembled for a specific purpose
5.	experiment	004	specific performance of a function or group of functions
6.	investigation	005	process designed to find if something is effective or valid
7.	mission	006	search or systematic inquiry
8.	nonImageSensor	007	specific operation of a data collection system
9.	operation	008	device or piece of equipment which detects or records
10.	platform	009	action that is part of a series of actions
11.	process	010	vehicle or other support base that holds a sensor
12.	program	011	method of doing something involving a number of steps
13.	project	012	specific planned activity
14.	study	013	organised undertaking, research, or development
15.	task	014	examination or investigation
16.	trial	015	piece of work

B.5.9 MD_CellGeometryCode <<CodeList>>

	Name	Domain code	Definition
1.	MD_CellGeometryCode	CellGeoCd	code indicating whether grid data is point or area
2.	point	001	each cell represents a point
3.	area	002	each cell represents an area

B.5.10 MD_CharacterSetCode <<CodeList>>

	Name	Domain code	Definition
1.	MD_CharacterSetCode	CharSetCd	name of the character coding standard used for the resource
2.	ucs2	001	16-bit fixed size Universal Character Set, based on ISO/IEC 10646
3.	ucs4	002	32-bit fixed size Universal Character Set, based on ISO/IEC 10646
4.	utf7	003	7-bit variable size UCS Transfer Format, based on ISO/IEC 10646
5.	utf8	004	8-bit variable size UCS Transfer Format, based on ISO/IEC 10646
6.	utf16	005	16-bit variable size UCS Transfer Format, based on ISO/IEC 10646
7.	8859part1	006	latin-1, west European code set
8.	8859part2	007	latin-2, central European code set
9.	8859part3	008	latin-3, south European code set
10.	8859part4	009	latin-4, north European code set
11.	8859part5	010	cyrillic code set
12.	8859part6	011	arabic code set
13.	8859part7	012	greek code set
14.	8859part8	013	hebrew code set
15.	8859part9	014	latin-5, Turkish code set
16.	8859part11	015	thai code set
17.	8859part14	016	latin-8 code set
18.	8859part15	017	latin-9 code set
19.	is	018	japanese code set used for electronic transmission
20.	shiftJIS	019	japanese code set used on MS-DOS based machines
21.	eucJP	020	japanese code set used on UNIX based machines
22.	usAscii	021	united states ASCII code set (ISO 646 US)
23.	ebcdic	022	ibm mainframe code set
24.	euckR	023	korean code set
25.	big5	024	taiwanese code set

B.5.11 MD_ClassificationCode <<CodeList>>

	Name	Domain code	Definition
1.	MD_ClassificationCode	ClassscationCd	name of the handling restrictions on the dataset
2.	unclassified	001	available for general disclosure
3.	restricted	002	not for general disclosure
4.	confidential	003	available for someone who can be entrusted with information
5.	secret	004	kept or meant to be kept private, unknown, or hidden from all but a select group of people
6.	topsecret	005	of the highest secrecy

B.5.12 MD_CoverageContentTypeCode <<CodeList>>

	Name	Domain code	Definition
1.	MD_CoverageContentTypeCode	ContentTypCd	specific type of information represented in the cell
2.	image	001	meaningful numerical representation of a physical parameter that is not the actual value of the physical parameter
3.	thematicClassification	002	code value with no quantitative meaning, used to represent a physical quantity
4.	physicalMeasurement	003	value in physical units of the quantity being measured

B.5.13 MD_DatatypeCode <<CodeList>>

	Name	Domain code	Definition
1.	MD_DatatypeCode	DatatypeCd	datatype of element or entity
2.	class	001	descriptor of a set of objects that share the same attributes, operations, methods, relationships, and behavior
3.	codelist	002	flexible enumeration useful for expressing a long list of values, can be extended
4.	enumeration	003	data type whose instances form a list of named literal values, not extendable
5.	codelistElement	004	permissible value for a codelist or enumeration
6.	abstractClass	005	class that cannot be directly instantiated
7.	aggregateClass	006	class that is composed of classes it is connected to by an aggregate relationship
8.	specifiedClass	007	subclass that may be substituted for its superclass
9.	datatypeClass	008	class with few or no operations whose primary purpose is to hold the abstract state of another class for transmittal, storage, encoding or persistent storage
10.	interfaceClass	009	named set of operations that characterize the behavior of an element
11.	unionClass	010	class describing a selection of one of the specified types
12.	metaclass	011	class whose instances are classes
13.	typeClass	012	class used for specification of a domain of instances (objects), together with the operations applicable to the objects. A type may have attributes and associations
14.	characterString	013	free text field
15.	integer	014	numerical field

	Name	Domain code	Definition
1.	MD_DatatypeCode	DatatypeCd	datatype of element or entity
16.	association	015	semantic relationship between two classes that involves connections among their instances

B.5.14 MD_DimensionNameTypeCode <<CodeList>>

	Name	Domain code	Definition
1.	MD_DimensionNameTypeCode	DimNameTypCd	name of the dimension
2.	row	001	ordinate (y) axis
3.	column	002	abscissa (x) axis
4.	vertical	003	vertical (z) axis
5.	track	004	along the direction of motion of the scan point
6.	crossTrack	005	perpendicular to the direction of motion of the scan point
7.	line	006	scan line of a sensor
8.	sample	007	element along a scan line
9.	time	008	duration

B.5.15 MD_GeometricObjectTypeCode <<CodeList>>

	Name	Domain code	Definition
1.	MD_GeometricObjectTypeCode	GeoObjTypCd	name of point and vector spatial objects used to locate zero-, one-, and two dimensional spatial locations in the dataset
2.	complexes	001	set of geometric primitives such that their boundaries can be represented as a union of other primitives
3.	composites	002	connected set of curves, solids or surfaces
4.	curve	003	bounded, 1-dimensional geometric primitive, representing the continuous image of a line
5.	point	004	zero-dimensional geometric primitive, representing a position but not having an extent
6.	solid	005	bounded, connected 3-dimensional geometric primitive, representing the continuous image of a region of space
7.	surface	006	bounded, connected 2-dimensional geometric, representing the continuous image of a region of a plane

B.5.16 MD_ImagingConditionCode <<CodeList>>

	Name	Domain code	Definition
1.	MD_ImagingConditionCode	ImgCondCd	code which indicates conditions which may affect the image
2.	blurredImage	001	portion of the image is blurred
3.	cloud	002	portion of the image is partially obscured by cloud cover
4.	degradingObliquity	003	acute angle between the plane of the ecliptic (the plane of the Earth's orbit) and the plane of the celestial equator
5.	fog	004	portion of the image is partially obscured by fog
6.	heavySmokeOrDust	005	portion of the image is partially obscured by heavy smoke or dust

7.	night	006	image was taken at night
8.	rain	007	image was taken during rainfall
9.	semiDarkness	008	image was taken during semi-dark conditions—twilight conditions
10.	shadow	009	portion of the image is obscured by shadow
11.	snow	010	portion of the image is obscured by snow
12.	terrainMasking	011	the absence of collection data of a given point or area caused by the relative location of topographic features which obstruct the collection path between the collector(s) and the subject(s) of interest

B.5.17 MD_KeywordTypeCode <<CodeList>>

	Name	Domain code	Definition
1.	MD_KeywordTypeCode	KeyTypCd	methods used to group similar keywords
2.	discipline	001	keyword identifies a branch of instruction or specialized learning
3.	place	002	keyword identifies a location
4.	stratum	003	keyword identifies the layer(s) of any deposited substance
5.	temporal	004	keyword identifies a time period related to the dataset
6.	theme	005	keyword identifies a particular subject or topic

B.5.18 MD_MaintenanceFrequencyCode <<CodeList>>

	Name	Domain code	Definition
1.	MD_MaintenanceFrequencyCode	MaintFreqCd	frequency with which modifications and deletions are made to the data after it is first produced
2.	continual	001	data is repeatedly and frequently updated
3.	daily	002	data is updated each day
4.	weekly	003	data is updated on a weekly basis
5.	fortnightly	004	data is updated every two weeks
6.	monthly	005	data is updated each month
7.	quarterly	006	data is updated every three months
8.	biannually	007	data is updated twice each year
9.	annually	008	data is updated every year
10.	asNeeded	009	data is updated as deemed necessary
11.	irregular	008	data is updated in intervals that are uneven in duration
12.	notPlanned	009	there are no plans to update the data
13.	unknown	998	frequency of maintenance for the data is not known

B.5.19 MD_MediumFormatCode <<CodeList>>

	Name	Domain code	Definition
1.	MD_MediumFormatCode	MedFormCd	method used to write to the medium
2.	cpio	001	CoPy In / Out (UNIX file format and command)
3.	tar	002	Tap ARchive
4.	highSierra	003	high sierra file system
5.	iso9660	004	information processing – volume and file structure of CD-ROM
6.	iso9660RockRidge	005	rock ridge interchange protocol (UNIX)
7.	iso9660AppleHFS	006	hierarchical file system (Macintosh)

B.5.20 MD_MediumNameCode <<CodeList>>

	Name	Domain code	Definition
1.	MD_MediumNameCode	MedNameCd	name of the medium
2.	cdRom	001	read-only optical disk
3.	dvd	002	digital versatile disk
4.	dvdRom	003	digital versatile disk, read only
5.	3halfInchFloppy	004	3,5 inch magnetic disk
6.	5quarterInchFloppy	005	5,25 inch magnetic disk
7.	7trackTape	006	7 track magnetic tape
8.	9trackTape	007	9 track magnetic tape
9.	3480Cartridge	008	3480 cartridge tape drive
10.	3490Cartridge	009	3490 cartridge tape drive
11.	3580Cartridge	010	3580 cartridge tape drive
12.	4mmCartridgeTape	011	4 millimetre magnetic tape
13.	8mmCartridgeTape	012	8 millimetre magnetic tape
14.	1quarterInchCartridgeTape	013	0,25 inch magnetic tape
15.	digitalLinearTape	014	half inch cartridge streaming tape drive
16.	onLine	015	direct computer linkage
17.	satellite	016	linkage through a satellite communication system
18.	telephoneLink	017	communication through a telephone network
19.	hardcopy	018	pamphlet or leaflet giving descriptive information

B.5.21 MD_ObligationCode <<enumeration>>

	Name	Domain code	Definition
1.	MD_ObligationCode	ObCd	obligation of the element or entity
2.	mandatory	001	element is always required
3.	optional	002	element is not required
4.	conditional	003	element is required when specific a specific condition is met

B.5.22 MD_PixelOrientationCode <<Enumeration>>

	Name	Domain code	Definition
1.	MD_PixelOrientationCode	PixOrientCd	point in a pixel corresponding to the Earth location of the pixel
2.	center	001	point halfway between the lower left and the upper right of the pixel
3.	lowerLeft	002	the corner in the pixel closest to the origin of the SRS; if two are at the same distance from the origin, the one with the smallest x-value
4.	lowerRight	003	next corner counterclockwise from the lower left
5.	upperRight	004	next corner counterclockwise from the lower right
6.	upperLeft	005	next corner counterclockwise from the upper right

B.5.23 MD_ProgressCode <<CodeList>>

	Name	Domain code	Definition
1.	MD_ProgressCode	ProgCd	status of the dataset or progress of a review
2.	completed	001	production of the data has been completed
3.	historicalArchive	002	data has been stored in an offline storage facility
4.	obsolete	003	data is no longer relevant
5.	onGoing	004	data is continually being updated
6.	planned	005	fixed date has been established upon or by which the data will be created or updated
7.	required	006	data needs to be generated or updated
8.	underdevelopment	007	data is currently in the process of being created

B.5.24 MD_RestrictionCode <<CodeList>>

	Name	Domain code	Definition
1.	MD_RestrictionCode	RestrictCd	limitation(s) placed upon the access or use of the data
2.	copyright	001	exclusive right to the publication, production, or sale of the rights to a literary, dramatic, musical, or artistic work, or to the use of a commercial print or label, granted by law for a specified period of time to an author, composer, artist, distributor
3.	patent	002	government has granted exclusive right to make, sell, use or license an invention or discovery
4.	patentPending	003	produced or sold information awaiting a patent
5.	trademark	004	a name, symbol, or other device identifying a product, officially registered and legally restricted to the use of the owner or manufacturer
6.	license	005	formal permission to do something
7.	intellectualPropertyRights	006	rights to financial benefit from and control of distribution of non-tangible property that is a result of creativity
8.	restricted	007	withheld from general circulation or disclosure
9.	otherRestrictions	008	limitation not listed

B.5.25 MD_ScopeCode <<CodeList>>

	Name	Domain code	Definition
1.	MD_ScopeCode	ScopeCd	class of information to which the referencing entity applies
2.	attribute	001	information applies to the attribute class
3.	attributeType	002	information applies to the characteristic of a feature
4.	collectionHardware	003	information applies to the collection hardware class
5.	collectionSession	004	information applies to the collection session
6.	dataset	005	information applies to the dataset
7.	series	006	information applies to the series
8.	nonGeographicDataset	007	information applies to non-geographic data
9.	dimensionGroup	008	information applies to a dimension group
10.	feature	009	information applies to a feature
11.	featureType	010	information applies to a feature type
12.	propertyType	011	information applies to a property type
13.	fieldSession	012	information applies to a field session
14.	software	013	information applies to a computer program or routine
15.	service	014	information applies to a capability which a service provider entity makes available to a service user entity through a set of interfaces that define a behaviour, such as a use case
16.	model	015	information applies to a copy or imitation of an existing or hypothetical object

B.5.26 MD_SpatialRepresentationTypeCode <<CodeList>>

	Name	Domain code	Definition
1.	MD_SpatialRepresentationTypeCode	SpatRepTypCd	method used to represent geographic information in the dataset
2.	vector	001	vector data is used to represent geographic data
3.	grid	002	grid data is used to represent geographic data
4.	textTable	003	textual or tabular data is used to represent geographic data
5.	tin	004	triangulated irregular network
6.	stereoModel	005	three-dimensional view formed by the intersecting homologous rays of an overlapping pair of images
7.	video	006	scene from a video recording

B.5.27 MD_TopicCategoryCode <<CodeList>>

	Name	Domain code	Definition
1.	MD_TopicCategoryCode	TopicCatCd	high-level geographic data thematic classification to assist in the grouping and search of available geographic data sets. Can be used to group keywords as well. Listed examples are not exhaustive. NOTE It is understood there are overlaps between general categories and the user is encouraged to select the one most appropriate.
2.	farming	001	rearing of animals and/or cultivation of plants Examples: agriculture, irrigation, aquaculture, plantations, herding, pests and diseases affecting crops and livestock
3.	biota	002	flora and/or fauna in natural environment Examples: wildlife, vegetation, biological sciences, ecology, wilderness, sealife, wetlands, habitat
4.	boundaries	003	legal land descriptions Examples: political and administrative boundaries
5.	climatologyMeteorologyAtmosphere	004	processes and phenomena of the atmosphere Examples: cloud cover, weather, climate, atmospheric conditions, climate change, precipitation
6.	economy	005	economic activities, conditions and employment Examples: production, labour, revenue, commerce, industry, tourism and ecotourism, forestry, fisheries, commercial or subsistence hunting, exploration and exploitation of resources such as minerals, oil and gas
7.	elevation	006	height above or below sea level Examples: altitude, bathymetry, digital elevation models, slope, derived products
8.	environment	007	environmental resources, protection and conservation Examples: environmental pollution, waste storage and treatment, environmental impact assessment, monitoring environmental risk, nature reserves, landscape
9.	geoscientificInformation	008	information pertaining to earth sciences Examples: geophysical features and processes, geology, minerals, sciences dealing with the composition, structure and origin of the earth's rocks, risks of earthquakes, volcanic activity, landslides, gravity information, soils, permafrost, hydrogeology, erosion
10.	health	009	health, health services, human ecology, and safety Examples: disease and illness, factors affecting health, hygiene, substance abuse, mental and physical health, health services
11.	imageryBaseMapsEarthCover	010	base maps Examples: land cover, topographic maps, imagery, unclassified images, annotations
12.	intelligenceMilitary	11	military bases, structures, activities Examples: barracks, training grounds, military transportation, information collection
13.	inlandWaters	12	inland water features, drainage systems and their characteristics Examples: rivers and glaciers, salt lakes, water utilization plans, dams, currents, floods, water quality, hydrographic charts
14.	location	13	positional information and services Examples: addresses, geodetic networks, control points, postal zones and services, place names

	Name	Domain code	Definition
1.	MD_TopicCategoryCode	TopicCatCd	high-level geographic data thematic classification to assist in the grouping and search of available geographic data sets. Can be used to group keywords as well. Listed examples are not exhaustive. NOTE It is understood there are overlaps between general categories and the user is encouraged to select the one most appropriate.
15.	oceans	14	features and characteristics of salt water bodies (excluding inland waters) Examples: tides, tidal waves, coastal information, reefs
16.	planningCadastre	015	information used for appropriate actions for future use of the land Examples: land use maps, zoning maps, cadastral surveys, land ownership
17.	society	16	characteristics of society and cultures Examples: settlements, anthropology, archaeology, education, traditional beliefs, manners and customs, demographic data, recreational areas and activities, social impact assessments, crime and justice, census information
18.	structure	17	man-made construction Examples: buildings, museums, churches, factories, housing, monuments, shops, towers
19.	transportation	18	eans and aids for conveying persons and/or goods Examples: roads, airports/airstrips, shipping routes, tunnels, nautical charts, vehicle or vessel location, aeronautical charts, railways
20.	utilitiesCommunication	19	energy, water and waste systems and communications infrastructure and services Examples: hydroelectricity, geothermal, solar and nuclear sources of energy, water purification and distribution, sewage collection and disposal, electricity and gas distribution, data communication, telecommunication, radio, communication networks

B.5.28 MD_TopologyLevelCode <<CodeList>>

	Name	Domain code	Definition
1.	MD_TopologyLevelCode	TopoLevCd	degree of complexity of the spatial relationships
2.	geometryOnly	001	geometry objects without any additional structure which describes topology
3.	topology1D	002	1-dimensional topological complex
4.	planarGraph	003	1-dimensional topological complex which is planar
5.	fullPlanarGraph	004	2-dimensional topological complex which is planar
6.	surfaceGraph	005	1-dimensional topological complex which is isomorphic to a subset of a surface
7.	fullSurfaceGraph	006	2-dimensional topological complex which is isomorphic to a subset of a surface
8.	topology3D	007	3-dimensional topological complex
9.	fullTopology3D	008	complete coverage of a 3D coordinate space
10.	abstract	009	topological complex without any specified geometric realization

NZ_Audience <<CodeList>>

	Name	Domain code	Definition
1.	NZ_Audience	NzAudience	Target audience for a resource
2.	All	001	Where the whole community is the target audience
3.	Business	002	Business is the target audience
4.	Community organisations	003	Community organisations is the target audience
5.	Disabled	004	Disabled is the target audience
6.	Families	005	Families is the target audience
7.	Government	006	Government is the target audience
8.	Maori	007	Maori is the target audience
9.	Migrants	008	Migrants is the target audience
10.	Rural	009	Rural is the target audience
11.	Senior citizens	010	Senior citizens is the target audience
12.	Students	011	Students is the target audience
13.	Visitors	012	Visitors is the target audience
14.	Women	013	Women is the target audience
15.	Youth	014	Youth is the target audience

NZ_MandateType <<CodeList>>

	Name	Domain code	Definition
1.	NZ_MandateType	??TopoLevCd	type of New Zealand statutory mandate justification
2.	Act	001	By reference to a specific Act or Parliament or a clause of an Act.
3.	Regulation	002	By reference to regulations
4.	Rule	003	By reference to a rule
5.	Court Case	004	By reference to a court case
6.	Other	005	By reference to some other form of authority

NZ_ReferenceSystems <<CodeList>>

	Name	Domain code	Definition
1.	NZ_ReferenceSystem	RefSysCd	Recognised New Zealand reference systems (initially only coordinate systems but could include temporal reference systems)
2.	NZMG	001	New Zealand Map Grid
3.	WGS84	002	World Geodetic System 1984 (no map projection)
4.	NZGD2000	003	Unprojected New Zealand Geodetic Datum 2000 (no map projection)
5.	AMURI2000	004	Amuri 2000 Meridional Circuit
6.	BAYoFPLENTY2000	005	Bay of Plenty 2000
7.	BLUFF2000	006	Bluff 2000 Meridional Circuit
8.	BULLER2000	007	Buller 2000 Meridional Circuit
9.	COLLINGWOOD2000	008	Collingwood 2000 Meridional Circuit
10.	GAWLER2000	009	Gawler 2000 Meridional Circuit

11.	GREY2000	010	Grey 2000 Meridional Circuit
12.	HAWKESBAY2000	011	Hawkes Bay 2000 Meridional Circuit
13.	HOKITIKA2000	012	Hokitika 2000 Meridional Circuit
14.	JACKSONSBAY2000	013	Jacksons Bay 2000 Meridional Circuit
15.	GREY2000	014	Grey 2000 Meridional Circuit
16.	KARAMEA2000	015	Karamea 2000 Meridional Circuit
17.	LINDISPEAK2000	016	Lindis Peak 2000 Meridional Circuit
18.	MARLBOROUGH2000	017	Marlborough 2000 Meridional Circuit
19.	MtEDEN2000	018	Mt Eden 2000 Meridional Circuit
20.	MtNICHOLAS2000	019	Mt Nicholas 2000 Meridional Circuit
21.	MtPLEASANT2000	020	Mt Pleasant 2000 Meridional Circuit
22.	MtYORK2000	021	Mt York 2000 Meridional Circuit
23.	NELSON2000	022	Nelson 2000 Meridional Circuit
24.	NORTHTAIERI2000	023	North Taieri 2000 Meridional Circuit
25.	OBSERVATIONPt2000	024	Observation Point 2000 Meridional Circuit
26.	OKARITO2000	025	Okarito 2000 Meridional Circuit
27.	POVERTYBAY2000	026	Poverty Bay 2000 Meridional Circuit
28.	TARANAKI2000	027	Taranaki 2000 Meridional Circuit
29.	TIMARU2000	028	Timaru 2000 Meridional Circuit
30.	TUHIRANGI2000	029	Tuhirangi 2000 Meridional Circuit
31.	WAIRARAPA2000	030	Wairarapa 2000 Meridional Circuit
32.	WANGANUI2000	031	Wanganui 2000 Meridional Circuit
33.	WELLINGTON2000	032	Wellington 2000 Meridional Circuit
34.	NZTM	033	New Zealand Transverse Mercator projection

NZ_HeightDatums <<CodeList>>

	Name	Domain code	Definition
1.	NZ_HeightDatum	HtDatumCd	Recognised New Zealand Height Datums
2.	MSL	001	Mean Sea Level
3.	Auckland_MSL	002	Mean Sea Level - Auckland
4.	Bluff_MSL	003	Mean Sea Level - Bluff
5.	Dunedin_MSL	004	Mean Sea Level - Dunedin
6.	Gisborne_MSL	005	Mean Sea Level - Gisborne
7.	Lyttelton_MSL	006	Mean Sea Level - Lyttelton
8.	Moturiki_MSL	007	Mean Sea Level - Moturiki
9.	Napier_MSL	008	Mean Sea Level - Napier
10.	Nelson_MSL	009	Mean Sea Level - Nelson
11.	OneTreePoint_MSL	010	Mean Sea Level - OneTreePoint
12.	Tararu_MSL	011	Mean Sea Level - Tararu
13.	Taranaki_MSL	012	Mean Sea Level - Taranaki
14.	Wellington_MSL	013	Mean Sea Level - Wellington

Appendix E - Glossary of Terms

Term	Explanation
accuracy	Closeness of agreement between a test result and the accepted reference value [ISO 19113]
ANZLIC	Australia New Zealand Land Information Council
Application schema	Conceptual schema of data required by one or more applications [ISO 19103]
AQL	Acceptable quality level [ISO 2859]
Association	The semantic relationship between two or more classifiers that involves connections among their instances [ISO 19103]
Attribute	The description of a named slot of a specified type in a class; each object of the class separately holds a value of the type [ISO 19103]
BDE	Bulk Data Extract (of cadastral Landonline data from Land Information New Zealand)
CASE	Computer Aided Software Engineering
Class	Descriptor of a set of objects that share the same attributes, operations, methods, relationships and behaviour [ISO 19103]
Conformance	Fulfilment of specified requirements [ISO 19113]
Constraint	A semantic condition or restriction represented as an expression [ISO 19103]
Coordinate conversion	Change of coordinates, based on a one-to-one relationship, from one coordinate system to another based on the same datum [ISO 19111]
Coordinate transformation	Change of coordinates, based on a one-to-one relationship, from one coordinate system to another based on a different datum through a one to one relationship [ISO 19111]
CRS	Core Record System – Land Information New Zealand’s integrated database and information system supporting both survey and title processes.
CTH	Chief Topographer Hydrographer; the regulatory head of the National Topographic Hydrographic Authority, LINZ (also see NTHA)
Data quality measure	Type of test applied to the data specified by a data quality scope [ISO 19113]
Dataset	Identifiable collection of data [ISO 19113]
Dataset series	Collection of datasets sharing the same product specification [ISO 19113]
Datum	Parameter or set of parameters that may serve as a reference or basis for the calculation of other parameters [ISO 19111]
Direct evaluation method	Method of evaluating the quality of a dataset based on inspection of the items within the dataset [ISO 19114]

Term	Explanation
Domain	Well defined set of values
DTD	Document Type Declaration (within XML context)
Ellipsoid	Surface formed by the rotation of an ellipse about an axis [ISO 19111]
Encoding	Conversion of data into a series of codes [ISO 19118]
Feature	Abstraction of real world phenomena [ISO 19113]
Geodetic datum	Datum describing the relationship of a coordinate system to the Earth [ISO 19111]
GIS	Geographical Information System
ICSM	Intergovernmental Committee on Surveying and Mapping
ISO	International Organisation for Standardisation
Instance	An individual entity with its own identity and value [ISO 19103]
Map projection	Coordinate conversion from a geodetic coordinate system to a plane [ISO 19111]
Metadata	Data about data [ISO 19113]
Metadata element	Discrete unit of metadata [ISO/DIS 19115]
NRFA	National Rural Fire Authority
NTHA	National Topographic Hydrographic Authority; a regulatory business unit of Land Information New Zealand
NZGLS	New Zealand Government Locator Service
OCGI	Officials' Committee for Geospatial Information
OOM	Object Oriented Model
OSG	Office of the Surveyor-General; a regulatory business unit of Land Information New Zealand
Package	A general-purpose mechanism for organising elements into groups [ISO 19103]
Population	Totality of items under consideration [ISO 3534-2:1993]
Quality	Totality of characteristics of a product that bear on its ability to satisfy stated and implied needs [ISO 19113]
Resource	Asset or means that fulfils a requirement [ISO/DIS 19115]
RMSE	Root mean square error (determined by calculating the deviations of points from their true position, summing up the measurements, and then taking the square root of the sum)
Schema	Formal description of a model [ISO 19103]
Topology	Properties of spatial configuration invariant under continuous transformation [ISO 19103]
UML	Unified Modelling Language

Term	Explanation
Universe of discourse	View of the real or hypothetical world that includes everything of interest [ISO 19113]
XML	Extensible Markup Language

Appendix F - Detailed ESA Quality Measures Descriptions

Note: This section was updated in April 2004 (v1.9.7). It supersedes Appendix F in the ESA_Code_Data_Specification_Version_1.9a (Oct 2001) and in version 1.9.6 (Dec 2002).

The following tables have been structured to give users guidance in determining the relevance of each quality measure element to a particular ESA dataset and hence which elements need to be recorded as part of the metadata for the dataset. In these tables:

- Quality Measure element naming follows ISO 19115 naming and the number appearing in brackets refers to the ISO 19115 Data Dictionary entry (Section B.2). Similar references to data types and code lists refer to ISO 19115 (Sections B.4 and B.5)
- New metadata elements that are extensions on ISO 19115 are shaded with a trellis background
- Quality Measure elements with conditions are described in the right hand column
- components that are designated as “Mandatory” in ISO 19115 have been identified in this specification with an annotation in the Conditions column “ISO 19115 Mandatory”
- quality measure entry values are enclosed in quotes and prefixed “Value = “
- quality measure entry explanatory notes are in italics
- quality measure elements that have sub-elements are shaded (in grey)
- A quality measure element can have multiple instances and the user is not limited to a single instance because there is only one row in the table describing the quality component

Completeness

Metadata Component		Metadata Entry Values & Explanatory Notes
DQ_Element (101)		
.nameOfMeasure (102)		Value = "DQ_CompletenessOmission"
.measureIdentification (103)		
.authority (208)		
	.organisationName (378)	Value = "LINZ"
	.positionName (379)	Value = "Chief Topographer / Hydrographer"
	.role (381) - refer CodeList B.5.5	Value = "data steward"
	.code (209)	Value = "ESACompleteness"
	.measureDescription (104)	Value = "Features of a feature type that are missed"
	.evaluationMethodType (105) – refer CodeList B.5.6	Value = "directExternal"
	.evaluationMethodDescription (106)	Value = "Determine appropriate sample areas (refer Section 6.3.2). An experienced operator should review the sample areas to identify "missing" features. This review can be by way of on-the-ground field checking or a review of recent imagery of these areas. If a review of imagery is done, it is allowable to utilise the same imagery as was used in the capture or revision of these features providing a different operator performs this test. Total number of missing features identified by the test operator to be expressed as a % of the expected number of instances of the feature type in the test sample areas."
	.dateTime (108) refer to B.4.2	Value to be added by testing organisation – <i>Date or range of dates Quality Measure was applied</i>
.result (109)		
DQ_ConformanceResult (131)		
.specification (132)		
	.title (362)	Value = "ESACompleteness"
	.date (364)	Value = date to be added by LINZ following creation of ESA dataset series and the adoption of this metadata
	.explanation (133)	Value = "Percentage of missing features must not exceed 2%"
	.pass (134) (Boolean 0=Fail , 1=Pass)	Value to be added by testing organisation
DQ_QuantitativeResult (135)		
	.value (139)	Value to be added by testing organisation
.scope (extension)		
	.features (153)	Value to be added by testing organisation when the evaluation is applied to a sub-set of quality sensitive feature types of the total resource defined in the quality scope -
.extent (334)		
	.geographicalElement (338)	Value to be added by organisation providing data maintenance service – <i>to be used where evaluation is based on a sample and the sampling strategy is area based</i>

Conceptual Consistency

Metadata Component		Metadata Entry Values & Explanatory Notes
DQ_Element (101)		
.nameOfMeasure (102)		Value = "DQ_ConceptualConsistency"
.measureIdentification (103)		
.authority (208)		
	.organisationName (378)	Value = "LINZ"
	.positionName (379)	Value = "Chief Topographer / Hydrographer"
	.role (381) - refer CodeList B.5.5	Value = "data steward"
	.code (209)	Value = "ESAModelConformance"
	.measureDescription (104)	Value = "All data included in ESA dataset series should adhere to the ESA Data Model and associated business rules/constraints"
	.evaluationMethodType (105) – refer CodeList B.5.6	Value = "direct Internal"
	.evaluationMethodDescription (106)	Value="Routine ESAModelConformance to be run with no exceptions reported"
	.dateTime (108) refer to B.4.2	Value to be added by testing organisation – <i>Date or range of dates Quality Measure was applied</i>
.result (109)		
DQ_ConformanceResult (131)		
.specification (132)		
	.title (362)	Value = "ESAModelConformance"
	.date (364)	Value = date to be added by LINZ following creation of ESA dataset series and the adoption of this metadata
	.explanation (133)	Value = "There should be no exceptions identified"
	.pass (134) (Boolean 0=Fail , 1=Pass)	Value to be added by testing organisation – <i>"1 if Quantitative Result is less =0"</i>
DQ_QuantitativeResult (135)		
	.value (139)	Value to be added by testing organisation

Domain Consistency

Metadata Component		Metadata Entry Values & Explanatory Notes
DQ_Element (101)		
.nameOfMeasure (102)		Value = "DQ_DomainConsistency"
.measureIdentification (103)		
.authority (208)		
	.organisationName (378)	Value = "LINZ"
	.positionName (379)	Value = "Chief Topographer / Hydrographer"
	.role (381) - refer CodeList B.5.5	Value = "data steward"
	.code (209)	Value = "ESADomainConsistency"
	.measureDescription (104)	Value= "All data included in ESA dataset series should adhere to the ESA Data Dictionary domain definitions"
	.evaluationMethodType (105) – refer CodeList B.5.6	Value = "direct Internal"
	.evaluationMethodDescription (106)	Value="Routine ESADomainConsistency to be run with no exceptions reported"
	.dateTime (108) refer to B.4.2	Value to be added by testing organisation – <i>Date or range of dates Quality Measure was applied</i>
.result (109)		
DQ_ConformanceResult (131)		
.specification (132)		
	.title (362)	Value = "ESADomainConsistency"
	.date (364)	Value = date to be added by LINZ following creation of ESA dataset series and the adoption of this metadata
	.explanation (133)	Value = "There should be no exceptions identified"
	.pass (134) (Boolean 0=Fail , 1=Pass)	Value to be added by testing organisation – <i>"1 if Quantitative Result is less =0"</i>
DQ_QuantitativeResult (135)		
	.value (139)	Value to be added by testing organisation

Topological Consistency

Metadata Component		Metadata Entry Values & Explanatory Notes
DQ_Element (101)		
.nameOfMeasure (102)		Value = "DQ_TopologicalConsistency"
.measureIdentification (103)		
.authority (208)		
	.organisationName (378)	Value = "LINZ"
	.positionName (379)	Value = "Chief Topographer / Hydrographer"
	.role (381) - refer CodeList B.5.5	Value = "data steward"
	.code (209)	Value = "ESATopologicalConsistency"
	.measureDescription (104)	Value = "All data included in ESA dataset series should adhere to the ESA Data Model topology constraints both implicit and explicit "
	.evaluationMethodType (105) – refer CodeList B.5.6	Value = "direct Internal"
	.evaluationMethodDescription (106)	Value="Routine ESATopologicalConsistency to be run with no exceptions reported"
	.dateTime (108) refer to B.4.2	Value to be added by testing organisation – <i>Date or range of dates Quality Measure was applied</i>
.result (109)		
DQ_ConformanceResult (131)		
.specification (132)		
	.title (362)	Value = "ESATopologicalConsistency"
	.date (364)	Value = date to be added by LINZ following creation of ESA dataset series and the adoption of this metadata
	.explanation (133)	Value = "There should be no exceptions identified"
	.pass (134) (Boolean 0=Fail , 1=Pass)	Value to be added by testing organisation – <i>"1 if Quantitative Result is less =0</i>
DQ_QuantitativeResult (135)		
	.value (139)	Value to be added by testing organisation

Absolute External Positional Accuracy

Metadata Component		Metadata Entry Values & Explanatory Notes
DQ_Element (101)		
.nameOfMeasure (102)		Value = "DQ_AbsoluteExternalPosAcc"
.measureIdentification (103)		
.authority (208)		
	.organisationName (378)	Value = "LINZ"
	.positionName (379)	Value = "Chief Topographer / Hydrographer"
	.role (381) - refer CodeList B.5.5	Value = "data steward"
	.code (209)	Value = "ESAAbsoluteSpatialAccuracy"
	.measureDescription (104)	Value = Root Mean Standard Error of the position of a representative sample of ESA features with their ground position.
	.evaluationMethodType (105) – refer CodeList B.5.6	Value = "direct External"
	.evaluationMethodDescription (106)	Value = "Using an ESA dataset sample (refer Section6.3.2) , all ESA features falling within the sample areas to have their positions redetermined, preferably by a different technique than used in the original capture. Root Mean Standard Error to be determined.
	.dateTime (108) refer to B.4.2	Value to be added by testing organisation – <i>Date or range of dates Quality Measure was applied</i>
.result (109)		
DQ_ConformanceResult (131)		
.specification (132)		
	.title (362)	Value = "ESAAbsoluteSpatialAccuracy"
	.date (364)	Value = date to be added by LINZ following creation of ESA dataset series and the adoption of this metadata
	.explanation (133)	Value = "RMSE should be less than 2.5 metres"
	.pass (134) (Boolean 0=Fail , 1=Pass)	Value to be added by testing organisation – <i>"1 if Quantitative Result is less < 2.5</i>
DQ_QuantitativeResult (135)		
	.value (139)	Value to be added by testing organisation
.scope (extension)		
	.features (153)	Value to be added by testing organisation when the evaluation is applied to a sub-set of quality sensitive feature types of the total resource defined in the quality scope -
.extent (334)		
	.geographicalElement (338)	Value to be added by organisation providing data maintenance service – <i>to be used where evaluation is based on a sample and the sampling strategy is area based</i>

Gridded Data Positional Accuracy

Metadata Component		Metadata Entry Values & Explanatory Notes
DQ_Element (101)		
.nameOfMeasure (102)		Value = "DQ_GriddedDataPositionalAccuracy"
.measureIdentification (103)		
.authority (208)		
	.organisationName (378)	Value = "LINZ"
	.positionName (379)	Value = "Chief Topographer / Hydrographer"
	.role (381) - refer CodeList B.5.5	Value = "data steward"
	.code (209)	Value = "ESAImageSpatialAccuracy"
	.measureDescription (104)	Value = " Root Mean Standard Error of the definition of features identifiable within a representative sample area of ESA imagery with its ground position shall not exceed 2.5 metres"
	.evaluationMethodType (105) – refer CodeList B.5.6	Value = "direct Internal"
	.evaluationMethodDescription (106)	Value = "Using an ESA dataset sample (refer Section 6.3.2) , ESA road centreline features will be overlaid on the ESA Imagery to be tested and the difference in positions of all road intersections within the sample area to be measured. Significant differences resulting from different currency of the imagery and road centreline data can be ignored . Root Mean Standard Error of remaining differences to be determined."
	.dateTime (108) refer to B.4.2	Value to be added by testing organisation – <i>Date or range of dates Quality Measure was applied</i>
.result (109)		
DQ_ConformanceResult (131)		
.specification (132)		
	.title (362)	Value = "ESAImageSpatialAccuracy"
	.date (364)	Value = date to be added by LINZ following creation of ESA dataset series and the adoption of this metadata
	.explanation (133)	Value = "RMSE should be less than 2.5 metres"
	.pass (134) (Boolean 0=Fail , 1=Pass)	Value to be added by testing organisation – <i>"1 if Quantitative Result is less < 2.5"</i>
DQ_QuantitativeResult (135)		
	.value (139)	Value to be added by testing organisation
.scope (extension)		
.extent (334)		
	.geographicalElement (338)	Value to be added by organisation providing data maintenance service – <i>to be used where evaluation is based on a sample and the sampling strategy is area based</i>

Relative Internal Positional Accuracy

Metadata Component		Metadata Entry Values & Explanatory Notes
DQ_Element (101)		
.nameOfMeasure (102)		Value = "DQ_RelativeInternalPositionalAccuracy"
.measureIdentification (103)		
.authority (208)		
	.organisationName (378)	Value = "LINZ"
	.positionName (379)	Value = "Chief Topographer / Hydrographer"
	.role (381) - refer CodeList B.5.5	Value = "data steward"
	.code (209)	Value = "ESARelativeSpatialAccuracy"
	.measureDescription (104)	Value = "Percentage of point Feature types positioned on the correct side of the road centreline (linear feature type)"
	.evaluationMethodType (105) – refer CodeList B.5.6	Value = "direct External"
	.evaluationMethodDescription (106)	Value = "Using an ESA dataset sample (refer Section 6.3.2) of the ESA road centreline feature types, the ESA point feature types (under evaluation), and any other useful dataset, all instances of point feature types within the sample areas to be checked. With respect to address point feature type, adherence to the "evens/odd" address numbering convention is sufficient to determine compliance or non-compliance. Results to be expressed as a % of the number of point feature types in the two samples."
	.dateTime (108) refer to B.4.2	Value to be added by testing organisation – <i>Date or range of dates Quality Measure was applied</i>
.result (109)		
DQ_ConformanceResult (131)		
.specification (132)		
	.title (362)	Value = "ESARelativeSpatialAccuracy"
	.date (364)	Value = date to be added by LINZ following creation of ESA dataset series and the adoption of this metadata
	.explanation (133)	Value = "Evaluation Result should be greater than 99.5%"
	.pass (134) (Boolean 0=Fail , 1=Pass)	Value to be added by testing organisation – <i>'1 if Quantitative Result is less > 99.5%</i>
DQ_QuantitativeResult (135)		
	.value (139)	Value to be added by testing organisation
.scope (extension)		
	.features (153)	Value to be added by testing organisation when the evaluation is applied to a sub-set of quality sensitive feature types of the total resource defined in the quality scope -
.extent (334)		
	.geographicalElement (338)	Value to be added by organisation providing data maintenance service – <i>to be used where evaluation is based on a sample and the sampling strategy is area based</i>

Temporal Validity

Metadata Component		Metadata Entry Values & Explanatory Notes
DQ_Element (101)		
.nameOfMeasure (102)		Value = "DQ_TemporalValidity"
.measureIdentification (103)		
.authority (208)		
	.organisationName (378)	Value = "LINZ"
	.positionName (379)	Value = "Chief Topographer / Hydrographer"
	.role (381) - refer CodeList B.5.5	Value = "data steward"
	.code (209)	Value = "ESATemporalValidity"
	.measureDescription (104)	Value = "The maximum time taken for on-the-ground changes impacting on feature type descriptions to be reflected in the authoritative ESA Dataset repository"
	.evaluationMethodType (105) – refer CodeList B.5.6	Value = "direct Internal"
	.evaluationMethodDescription (106)	Value = "Using an ESA dataset sample (refer Section 6.3.2), a check will be made of the associated metadata and relevant ESA data elements to ascertain how current the dataset is. Results to be recorded are the "oldest" (ie maximum) instance, expressed in days, since the last "on the ground" maintenance data was collected.
	.dateTime (108) refer to B.4.2	Value to be added by testing organisation – <i>Date or range of dates Quality Measure was applied</i>
.result (109)		
DQ_ConformanceResult (131)		
.specification (132)		
	.title (362)	Value = "ESATemporalValidity"
	.date (364)	Value = date to be added by LINZ following creation of ESA dataset series and the adoption of this metadata
	.explanation (133)	Value = "Maximum time for any feature type shall be less than 100 days"
	.pass (134) (Boolean 0=Fail , 1=Pass)	Value to be added by testing organisation – <i>'1 if Quantitative Result is less than 100 days</i>
DQ_QuantitativeResult (135)		
	.value (139)	Value to be added by testing organisation
scope (extension)		
	.features (153)	Value to be added by testing organisation when the evaluation is applied to a sub-set of quality sensitive feature types of the total resource defined in the quality scope -
.extent (334)		
	.geographicalElement (338)	Value to be added by organisation providing data maintenance service – <i>to be used where evaluation is based on a sample and the sampling strategy is area based</i>

Thematic Classification Correctness

Metadata Component		Metadata Entry Values & Explanatory Notes
DQ_Element (101)		
.nameOfMeasure (102)		Value = "DQ_ThematicClassificationCorrectness"
.measureIdentification (103)		
.authority (208)		
	.organisationName (378)	Value = "LINZ"
	.positionName (379)	Value = "Chief Topographer / Hydrographer"
	.role (381) - refer CodeList B.5.5	Value = "data steward"
	.code (209)	Value = "ESAThematicCorrectness"
	.measureDescription (104)	Value = "Percentage of features with correct feature type category"
	.evaluationMethodType (105) – refer CodeList B.5.6	Value = "direct External"
	.evaluationMethodDescription (106)	Value = "Determine appropriate sample areas (refer Section 6.3.2). An experienced operator should review the sample areas to identify any instances where ESA features have been incorrectly classified. This review can be by way of on-the-ground field checking or a review of recent imagery of these areas. If a review of imagery is done, it is allowable to utilise the same imagery as was used in the capture or revision of these features providing a different operator performs this test. Results to be expressed as a % of the number of ESA features in the sample areas.
	.dateTime (108) refer to B.4.2	Value to be added by testing organisation – <i>Date or range of dates Quality Measure was applied</i>
.result (109)		
DQ_ConformanceResult (131)		
.specification (132)		
	.title (362)	Value = "ESAThematicCorrectness"
	.date (364)	Value = date to be added by LINZ following creation of ESA dataset series and the adoption of this metadata
	.explanation (133)	Value = "Percentage of correctly categorised features should be greater than 99.5%"
	.pass (134) (Boolean 0=Fail , 1=Pass)	Value to be added by testing organisation – <i>'1 if Quantitative Result is less > 99.5%</i>
DQ_QuantitativeResult (135)		
	.value (139)	Value to be added by testing organisation
.scope (extension)		
	.features (153)	Value to be added by testing organisation when the evaluation is applied to a sub-set of quality sensitive feature types of the total resource defined in the quality scope -
	.extent (334)	
	.geographicalElement (338)	Value to be added by organisation providing data maintenance service – <i>to be used where evaluation is based on a sample and the sampling strategy is area based</i>

Attribute Correctness

Metadata Component		Metadata Entry Values & Explanatory Notes
DQ_Element (101)		
.nameOfMeasure (102)		Value = "DQ_QuantitativeAttributeAccuracy"
.measureIdentification (103)		
.authority (208)		
	.organisationName (378)	Value = "LINZ"
	.positionName (379)	Value = "Chief Topographer / Hydrographer"
	.role (381) - refer CodeList B.5.5	Value = "data steward"
	.code (209)	Value = "ESAAtributeCorrectness"
	.measureDescription (104)	Value = "Percentage of attribute types with correct values."
	.evaluationMethodType (105) – refer CodeList B.5.6	Value = "direct External"
	.evaluationMethodDescription (106)	Value = "Using an ESA attribute type level sample (refer Section 6.3.2) including the relevant ESA features and any other suitable data (in terms of interpretative detail and of a similar currency to the ESA data), this test data to be examined by an experienced operator to identify any instances where attribute type values are incorrect. Results to be expressed as a % of the number of instances of attribute type in the sample."
	.dateTime (108) refer to B.4.2	Value to be added by testing organisation – <i>Date Quality Conformance Result was last applied</i>
.result (109)		
DQ_ConformanceResult (131)		
.specification (132)		
	.title (362)	Value = "ESAAtributeAccuracy"
	.date (364)	Value = date to be added by LINZ following creation of ESA dataset series and the adoption of this metadata
	.explanation (133)	Value = "Percentage of correct attributes should be greater than 99.95%"
	.pass (134) (Boolean 0=Fail , 1=Pass)	Value to be added by testing organisation – <i>'1 if Quantitative Result is less > 99.95%</i>
DQ_QuantitativeResult (135)		
	.valueUnit (137)	Value = "Percentage"
	.value (139)	Value to be added by testing organisation
.scope (extension)		
	.features (153)	Value to be added by testing organisation when the evaluation is applied to a sub-set of quality sensitive feature types of the total resource defined in the quality scope -
.extent (334)		
	.geographicalElement (338)	Value to be added by organisation providing data maintenance service – <i>to be used where evaluation is based on a sample and the sampling strategy is area based</i>

Appendix G – Reference System Metadata Details

New Zealand Geodetic Datum 2000

(Preferred Reference System for ESA Datasets)

Metadata Component		Metadata Entry Values & Explanatory Notes	
MD_ReferenceSystem (188)			
	.rsID (189)		
	.authority (208)		
	.organisationName (378)	Value = "Land Information New Zealand"	
	.role (381) – refer CodeList B.5.5	Value = "011' <i>steward</i> "	ISO 19115 Mandatory
	.code (209)	Value = "New Zealand Geodetic Datum 2000 Unprojected"	ISO 19115 Mandatory
	MD_CRS (191)		
	.projection (192)	Amplified below for NZTM	
	.datum (194)		
	MD_Identifier (207)		
	.authority (208)		
	.organisationName (378)	Value = "Land Information New Zealand"	
	.role (381) – refer CodeList B.5.5	Value = "011' <i>steward</i> "	ISO 19115 Mandatory
	.code (209)	Value = "New Zealand Geodetic Datum 2000 (NZGD2000)"	ISO 19115 Mandatory
	.ellipsoid (193)		
	MD_Identifier (207)		
	.authority (208)		
	.organisationName (378)	Value = "International Association of Geodesy"	
	.role (381) – refer CodeList B.5.5	Value = "002"	ISO 19115 Mandatory
	.code (209)	Value = "Geodetic Reference System 1980 (GRS80)"	ISO 19115 Mandatory
	.ellipsoidParameters (195)		
	.semiMajorAxis (204)	Value = "6378137"	ISO 19115 Mandatory
	.axisUnits (205)	Value = "Metres"	ISO 19115 Mandatory
	.denominatorOfFlatteningRatio (206)	Value = "298.257222101"	
	.datumExplanation	Value = "NZGD2000 is based on and aligned to the International Terrestrial Reference System (ITRS) defined by the International Association of Geodesy"	
	.epoch	Value = "2000.0"	

New Zealand Transverse Mercator Projection

(To be used in conjunction with ESA Datasets, if users need a map based coordinate system)

Metadata Component		Metadata Entry Values & Explanatory Notes	
MD_ReferenceSystem (188)			
	.rsID (189)		
	.authority (208)		
	.organisationName (378)	Value = "Land Information New Zealand"	
	.role (381) – refer CodeList B.5.5	Value = "011' <i>steward</i> "	ISO 19115 Mandatory
	.code (209)	Value = "New Zealand Geodetic Datum 2000 NZTM"	ISO 19115 Mandatory
	MD_CRS (Coordinate System) (191)		If a coordinate system other than geographicals (Real data type for latitude and longitude values)
	.projection (192)		
	MD_Identifier (207)		
	.authority (208)		
	.organisationName (378)	Value = "Land Information New Zealand"	
	.positionName (379)	Value = "Chief Topographer / Hydrographer"	
	.role (381) – refer CodeList B.5.5	Value = "011' <i>steward</i> "	ISO 19115 Mandatory
	.code (209)	Value = "New Zealand Transverse Mercator (NZTM) Projection"	ISO 19115 Mandatory
	.projectionParameters (196)		
	.longitudeOfCentralMeridian (220)	Value = "173"	
	.latitudeOfProjectionOrigin (221)	Value = "0"	
	.falseEasting (222)	Value = "1600000"	
	.falseNorthing (223)	Value = "10000000"	
	.falseEastingNorthingUnits (224)	Value = "metres"	
	.scaleFactorAtCentreLine (229)	Value = "0.9996"	
	.datum (194)	See above for details	
	MD_Identifier (207)		
	.code (209)	Value = "New Zealand Geodetic Datum 2000 (NZGD2000)"	ISO 19115 Mandatory

Appendix H- Contributors to ESA Core Data Specification

Participant	Role
Richard Murcott, LINZ, NTHA ²⁷	Project Coordinator
Janet Bateson, Critchlow Associates	Principal Data Modeller
Bryan Clarke, Christchurch City Council	Data Modeller
Dr Richard Pascoe, University of Canterbury	Advisor, UML modelling & ISO/TC211 standards
Neil Pullar, Cadastre Limited	Advisor, land information & project services
Malcolm Macfarlane, NZ Fire Service	Subject Matter Expert (Communication Centre processes and requirements)
Karl Majorhazi, NZ Fire Service	Subject Matter Expert (NRFA ²⁸)
Bas Cuthbert, NZ Fire Service	Subject Matter Expert (corporate Fire Service requirements)
Hans Brounts, Ministry of Civil Defence & Emergency Management	Subject Matter Expert
Howard Pond, NZ Police	Subject Matter Expert
Jill Webster, NZ Police/ LINZ/ Statistics NZ ²⁹	Subject Matter Expert
Clint Libby, NZ Police	Subject Matter Expert (operational Communication Centre requirements)
Tony Labone, NZ Police	Subject Matter Expert (operational Communication Centre requirements)
Mark Kennedy, NZ Police	Subject Matter Expert (operational Communication Centre requirements)
Joyce Baillie, LINZ NTHA	Subject Matter Expert
Dave Balm, LINZ NTHA	Subject Matter Expert
Brian Evans, LINZ Operations / OSG ³⁰	Subject Matter Expert
Anselm Haanen, LINZ OSG	Subject Matter Expert
Paul Lundberg, LINZ	Subject Matter Expert
Wendy Shaw, LINZ OSG	Subject Matter Expert
Michael Brownie, Wellington City Council	Reviewer, Territorial Authority perspective

²⁷ NTHA – National Topographic Hydrographic Authority

²⁸ NRFA – National Rural Fire Authority

²⁹ during the project Jill worked at LINZ, then moved to Map Coordinator, NZ Police; also represented Statistics New Zealand's core geospatial data requirements

³⁰ OSG – Office of the Surveyor-General, LINZ. During the project was working in OSG, and later moved to the Operational division

Participant	Role
Andrew Jones, DEH ³¹	Technical Reviewer: ICSM ³² and ISO standards
Baz Parker, LINZ NTHA	Reviewer: overview

³¹ Department for Environment & Heritage, South Australia

³² ICSM – Intergovernmental Committee on Surveying & Mapping

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