State highway database operations manual

Manual Number SM050

Transport Services

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NZ TRANSPORT AGENCY WAKA KOTAHI

Te Kāwanatanga o Aotearoa New Zealand Government

More information

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Section 1 – Asset information management overview

1.1 Introduction

Background

The NZ Transport Agency Waka Kotahi, asset management information system is designed as a decision support system for roading managers and practitioners to assist in providing a picture of the roading network condition.

The asset management information system combines information from field surveys and office records to provide statistical data, road maintenance information, road maintenance priorities and estimates of maintenance costs.

1.2 Key elements

Elements

The key elements of the core asset management information system:

- An Asset Register of the roading network, e.g lengths, widths, pavement types, traffic counts, and also inventory items,
- Condition Data, e.g. visual rating – number of potholes, scabbing, cracking and high-speed data – roughness, texture, rutting, skid resistance, etc.
- Reporting outputs. The reporting outputs provide useful information to roading management to support maintenance strategy decisions, programming and budgeting.
- Data collection & quality system. Information must be collected and managed in accordance with a robust quality assurance system.

Factors for Success

The success of any management information system is dependent on the following factors:

- Quality of data
- Completeness of data
- Usefulness of data
- Timeliness of information delivery
- Accuracy of location

The focus of this manual is on the provision of quality and timely information. These two factors in turn contribute to the usefulness of the information the system provides.

References

The current version of all standards, criteria or guidelines referred to in this manual can be determined from NZTA's Standards, Criteria and Guidelines displayed in NZTA's website.

1.3 Purpose and scope of manual

Purpose

To provide a documented framework of operational procedures and activities to ensure the consistency of good management of NZTA's State Highway Asset Management Information System.

Scope

The manual therefore provides:

- The administration and operational structure of NZTA's State Highway asset information system database.
- Activities, responsibilities and reporting requirements.
- Standard procedures and documentation for updating the database.

This manual should be used in conjunction with the relevant software user manual from the respective software vendors.

Asset systems not covered in this manual are:

- State Highway Traffic Monitoring System (TMS)
- Highway Structures Information Management System (HSIMS)

Quality Assurance

The manual is a link in the quality assurance chain between consultants/ contractors, delegated authorities, NZTA Regional Offices and NZTA National Office.

The manual expects that all data provided by consultants and contractors complies in all respects with the quality assurance requirements for data collection of the specific contracts under which updating is required.

1.4 Overview of State Highway asset management information system

Supplier accreditation for database access

Training for accredited RAMM users, is based on a 'Train the Trainers' approach. It is intended that, on completion of the course, the trainer attendees will attain certification, which will enable them to carry out training of others to a level of certification sufficient to allow those trainees to have 'write' access to the NZTA RAMM database. Registration of Trainers and their trainees will be maintained by NZTA on an ongoing basis to manage access privileges to the NZTA RAMM database.

Section 2 – Asset register

2.1 Overview

Introduction

The asset register is the record of the physical elements of the State Highway System that were created, maintained, renewed, or disposed of at

NZ Transport Agency Waka Kotahi's discretion and including:

- Location of assets
- The condition of these assets
- The maintenance effort expended
- The demand (traffic and loadings) the pavement asset is subjected to

NZTA's Asset Register is contained in the Road Assessment and Maintenance Management (RAMM) database (now ThinkProject "Asset and Work Manager" AWM). The initial effort in data collection to establish the RAMM database took place in the late 1980s – early 1990s.

The focus at that time was on the pavement related asset components for the operation of the Treatment Selection Algorithm (TSA). Later extensions to the register included signs, street lighting, markings, railings, minor structures and features information. Some of these components have not been as well defined, or followed a nationally coordinated implementation, as the former pavement related components. Other assets e.g. bridges are recorded in separate databases.

Condition data from manual surveys has been collected since 1989, along with roughness data. The current database holds this annual data from 1992. Skid resistance data is held for surveys completed in 1995 & 1998 onwards.

Maintenance activity (cost and quantity) relating to pavement works has been loaded into RAMM since 1999 and on some networks this data goes back to 1992.

2.2 Extent

Goals

The overall goals are:

- The asset register is complete
- The asset location is maintained
- Data collection methods are cost effective
- Data collected is fit for purpose
- Asset data conforms to the Asset Management Data Standard
- The asset register is maintained to meet the annual planning timeframe.

Elements

Using the definition stated in the introduction, "a record of all physical elements of a State Highway" this includes some of the assets listed below and others like Carriageway.

As of October 2024 asset data collected for the State Highway should conform to the Asset Management Data Standards (AMDS) as outlined on the web page https://www.nzta.govt.nz/roads-and-rail/asset-management-data-standard/.

There is also condition and traffic data that is managed and maintained by NZTA directly which this section does not cover.

Storage

The Asset Register is stored in the Asset and Work Manager AWM software (formerly RAMM) owned by ThinkProject.

Please refer to NZTA's LRMS Manual, SM051 for further information on the state highway referencing system, which is fundamentally a reference post & displacement (i.e. linear) system.

2.3 Applying the asset register

Extent of data capture

NZTA stores in RAMM the fields as defined in the AMDS for each table.

If other fields are required, please contact the Asset Management Data Standard team at amds@nzta.govt.nz prior to collecting the data for approval.

Section 3 – Road and section definitions

3.1 Introduction

Overview

State Highways are identified by a number, across Regional and Local Authority boundaries, and in some instances are hundreds of kilometres long. It is necessary to break the network down into convenient lengths for management purposes; these are known as reference stations and carriageway sections.

Definition of a "road"

A Reference Station Length (RSL) has been chosen as a convenient length in most cases. Hence, for the purposes of NZ Transport Agency Waka Kotahi's Asset Management System, each RSL will usually become a unique road, although divided highways, a one-way pair system, roundabouts and motorway ramps are also unique roads.

References

State Highway Control Manual, Chapter 4 Section 1, specifies the distance marking system to be maintained in accordance with the *Location Referencing Management System Manual SM051*.

Refer to the Location Referencing Management System Manual SM051 for details regarding ramps referencing.

3.2 Road name conventions

Overview

A unique State Highway reference name is generated by NZTA's LRMS, for each road in the database based on the information that is entered about that road.

Elements of a road name

The road name elements are described in the following example:

Example: Road name 01N-0979/05.45-X985-R1-OFF

Element Description	Required	Example
State Highway Number	Always	01N
Reference Station number at the start of the RS length.	Always	0979
Displacement of Established Route Position (if the road does not begin at a reference station)	When required	05.45
Station Type (i.e. RSL for Reference Station, RMP for ramp/interchange or RND for roundabout)	Always	RSL
Direction (if the road is a divided carriageway)	When required	I
Common State Highway number (if road is common with another state highway)	When required	
Roundabout or interchange number.	When required	985
Ramp number	When required	R1

Ramp Type (i.e. On or off) and Hierarchy	When required	OFF

Separators

The elements are separated by the characters '' and '/' and the identifier 'C' for common or "W" for roundabouts or "X" for interchanges. The software adds them when the name is generated. They are real characters in the concatenated name.

3.3 Single carriageway

Overview

The simplest case is a single carriageway road, which requires basic data for implementation.

Criteria

Single carriageway sections typically start/end at Reference Stations. Some single carriageway sections start/end at Established Route Positions and this could be the case where Local Authority Boundaries exist within the RS or they start or end at divided carriageway sections' boundaries.

Data Requirements

The information required to generate a road name for a single carriageway is:

Element Description	Required
State Highway Number	Yes
Reference Station number at the start of the RS length.	Yes
Displacement of Established Route Position (if the road does not begin at a reference station)	When required
Station Type	RSL
Direction (if the road is a divided carriageway)	No
Common State Highway number (if road is common with another state highway)	When required
Roundabout or interchange number.	No
Ramp number	No
Ramp Type (i.e. On or off) and Hierarchy	No
Territorial Local Authority	Yes
Regional Council	Yes

Additional Fields

Additional fields such as Local Name, Suburb, Town are also available in the Road Name Table.

3.4 Divided carriageways

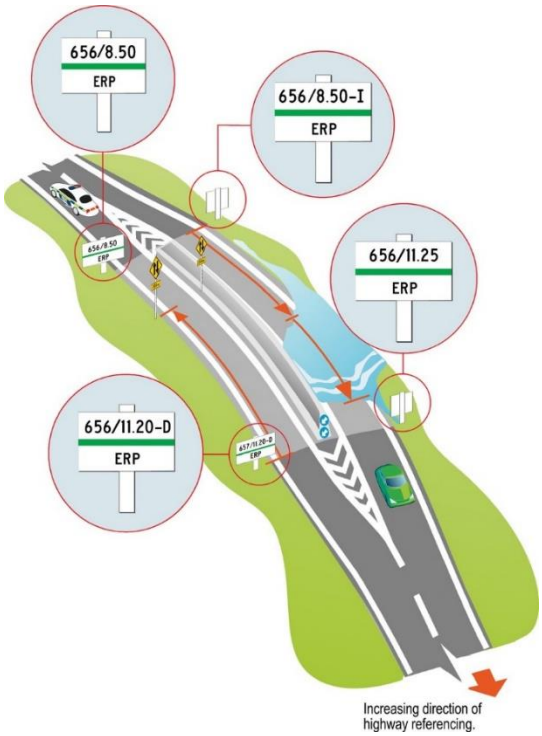
Overview

Roads on each side of the median of a divided carriageway are given a unique name (refer to section 2.5 of LRMS Part B Manual).

Criteria

A divided carriageway section can exist in two situations, as follows:

Where carriageway sections are separated by a physical median barrier (except wire rope), with a length greater than 150 m, or two carriageways exist on separate alignments.



The Location Referencing Management System Manual (SM051) requires an ERP or RS sign to be placed at the start and end of the road-section. Note that the use of RS points is at the NZTA Regional Office discretion.

The letter I for Increasing or D for Decreasing is added to the road name.

Medians at intersections

A divided carriageway section can be implemented, if the distance between the start of the median on one side of the intersection and the end of the median on the other side of the intersection is greater than 150 m.

Since a Reference Station is required at the intersection of two highways, the two sides are dealt with separately, i.e. the distance between the start and end of the median on each side of the intersection needs to be greater than 150 m.

Exception

In any case where insufficient length means it is not required to give the section a unique name, the divided or dual carriageway section could be recorded as a divided section, should there be a need to treat them as two separate roads. For example, a dual carriageway section, which is only 145 m in length, could be entered and named as a divided carriageway. This is at the Regional Office's discretion.

Data requirements

The information required to generate a road name for a divided carriageway is:

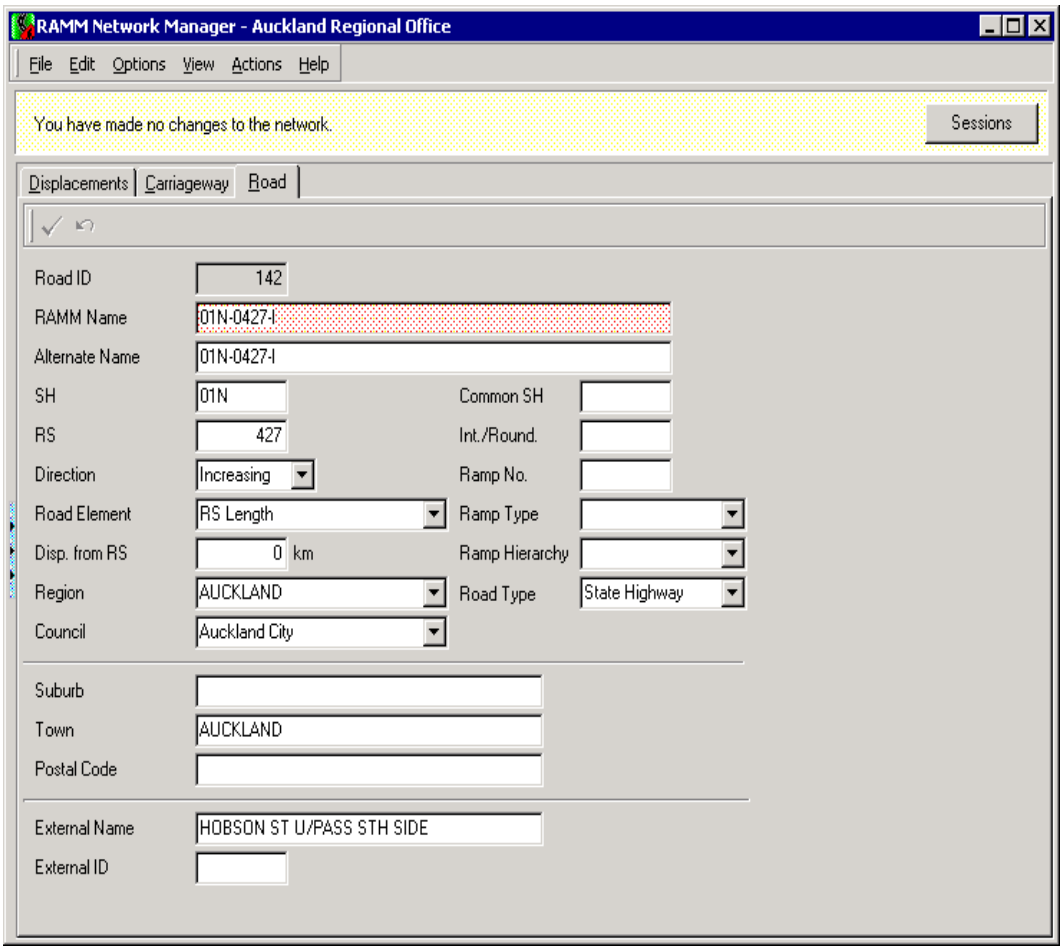
Element Description	Required
State Highway Number	Yes
Reference **S**tation number at the start of the RS length.	Yes
Displacement of **E**stablished **R**oute **P**osition (if the road does not begin at a reference station)	When required
Station Type	RSL
Direction (if the road is a divided carriageway)	Yes
Common State Highway number (if road is common with another state highway)	When required
Roundabout or interchange number.	No
Ramp number	No
Ramp Type (i.e. On or off) and Hierarchy	No
Territorial Local Authority	Yes
Regional Council	Yes

Additional Fields

Additional fields such as Local Name, Suburb, Town are also available in the Road Name Table.

Example

State highway 01N has a divided section between RS 335 and RS 338. For the increasing direction, the road name is recorded as follows:



A second road called 01N-0335-D runs between the same points in the decreasing direction.

3.5 Common Highways

Overview

To avoid double counting it is necessary to identify common routes.

Criteria

Where two State Highways have a common route, RS are placed at the start and end of the common length. All road asset information will be recorded against the lower numbered State Highway.

Data Requirements

The information required to generate a road name for a common highway is:

Element Description	Required
State Highway Number	Yes
Reference Station number at the start of the RS length.	Yes
Displacement of Established Route Position (if the road does not begin at a reference station)	When required

Station Type	RSL
Direction (if the road is a divided carriageway)	When required
Common State Highway number (if road is common with another state highway)	Yes
Roundabout or interchange number.	No
Ramp number	No
Ramp Type (i.e. On or off) and Hierarchy	No
Territorial Local Authority	Yes
Regional Council	Yes

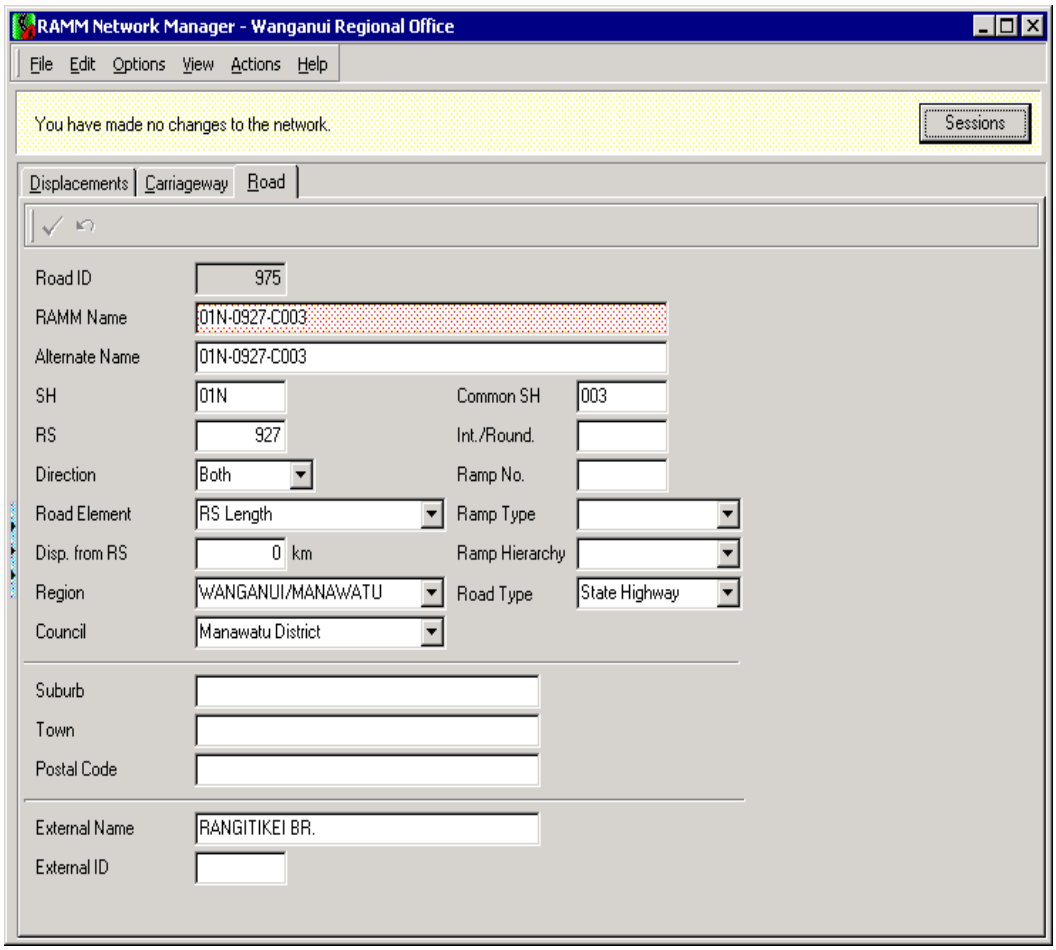
Additional fields

Additional fields such as Local Name, Suburb, Town are also available in the Road Name Table.

Example

The road section on SH 3 between RS 445 and 450 has a common route with SH 01N between RS 845 and 850.

For SH 01N the road is recorded as follows:



3.6 Ramps

Overview

ON and OFF Ramps are components of the State Highway network, mostly on motorways. Ramps can be of considerable length and are therefore recognised as unique roads. All On or Off Ramps connecting the highway are grouped and referenced to a unique interchange number. Ramps are generally numbered in a clockwise direction around the interchange, based on the location of the start of the ramp.

Ramps are referenced as a separate road with positive displacements measured in the direction of traffic flow. Therefore, measurements on an on ramp will start at the RS on the boundary of the local road and end where it intersects with the highway.

Note: Refer to Section 2.6 of the LRMS Manual for more details.

Criteria

For an ON or OFF Ramp to qualify as an unique road, its length from beginning to end will generally be greater than 100 150 metres and have a significant median barrier separating it from the main state highway.

Note that the start of a ramp is where the full lane width starts, if an OFF ramp, or the maintenance boundary if an ON ramp.

Data Requirements

The information required to generate a road name for the ramp is:

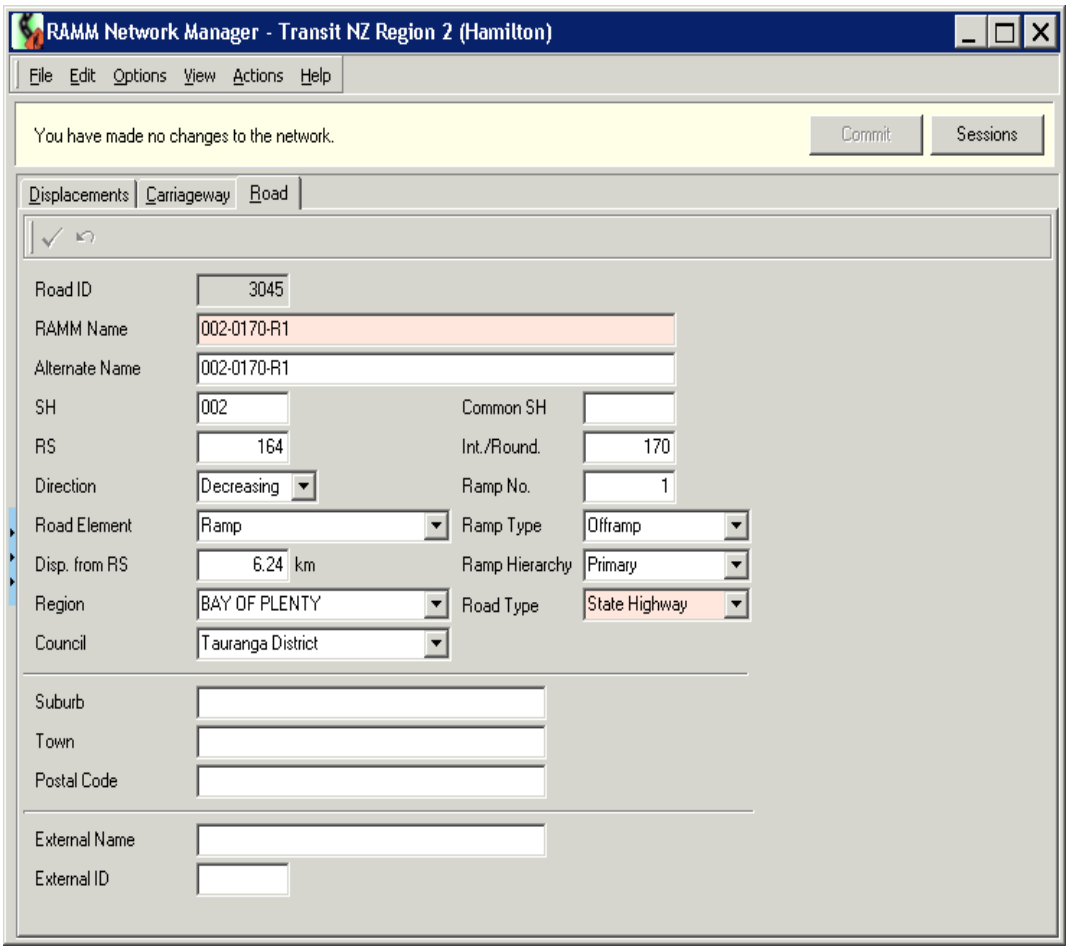
Element Description	Required
State Highway Number	Yes
Reference Station number at the start of the RS length.	Yes
Displacement where the ramp intersects the main SH	Yes
Station Type	RMP
Direction (if the road is a divided carriageway)	When required
Common State Highway number	When required
Roundabout or interchange number.	Yes
Ramp number	Yes
Ramp Type (i.e. On or off) and Hierarchy	Yes
Territorial Local Authority	Yes
Regional Council	Yes

Additional Fields

Additional fields such as Local Name, Suburb, Town and Postal Code are also available in the Road Name Table.

Example

SH 02 has a ramp, which joins the state highway at 6.24 km from RS 164. The road name is recorded as follows:



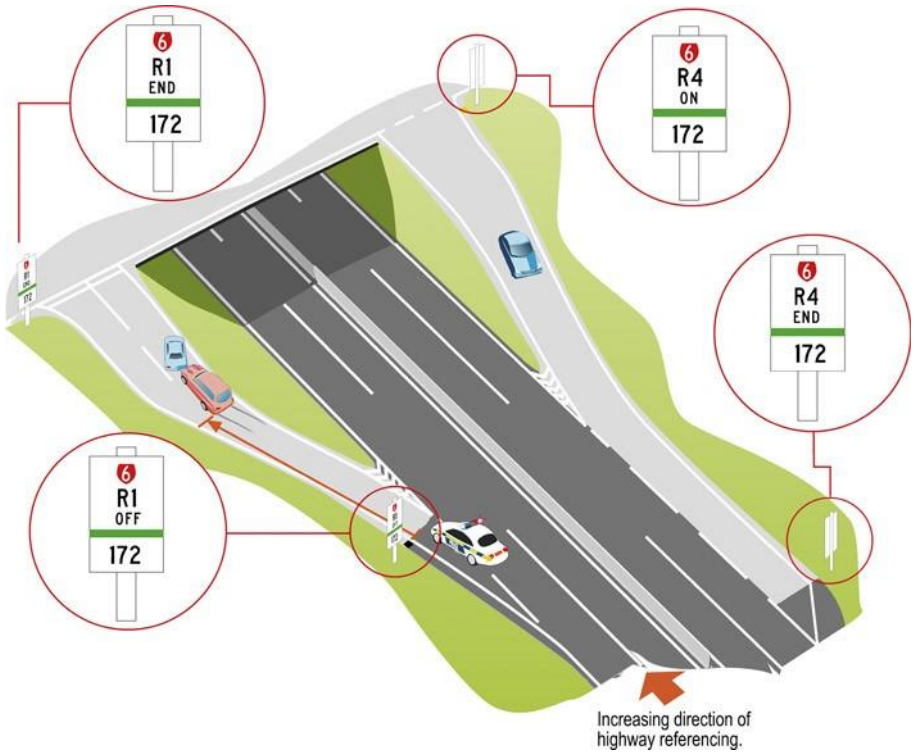
Complex Layouts

Refer to the Location Referencing Management System Manual SM051 for the numbering of ramps/interchanges at complex interchanges.

A Reference Station Locality Diagram, showing traffic direction, state highway, named ramps and boundaries shall be forwarded to the Asset Information Engineer, Highways and Network Operations Group, NZTA National Office.

Motorway Interchanges

The following motorway diamond interchange figure illustrates the correct direction and numbering for the associated ramps. Overall dimensions are determined by the agreed limits of responsibility. Diagram:



3.7 Large Roundabouts

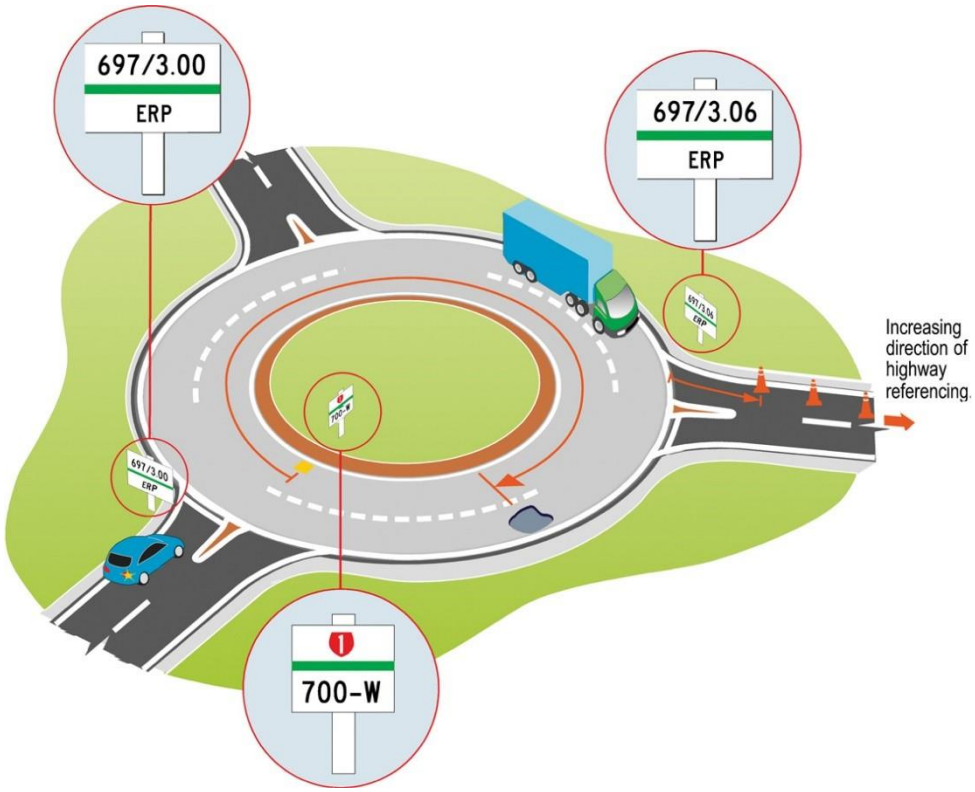
Overview

Roundabouts are recorded as a separate road section due to the need for pavement condition data requirements on these high demand road sections (refer to LRMS Manual section 2.4).

Criteria

Where a roundabout has physical infrastructure with a vertical displacement such as a traffic island, then create a separate road section (single Network Element) to circle or loop around the infrastructure.

ERP signs shall be installed at the entrance and exit of the roundabout, since this road section will be treated as a survey distance break in the main state highway.



Exceptions

Where there is no physical infrastructure (painted roundabout only), then no additional road section (Network Element) is required. Treat as any other intersection.

Data requirements

The information required to generate a road name for a roundabout is:

Element Description	Required
State Highway Number	Yes
Reference Station number at the start of the RS length.	Yes
Displacement where the roundabout intersects the main state highway	Yes
Station Type	RND
Direction. This will always be "I" for increasing, where the roundabout lies on a divided highway	When required
Common State Highway number (if road is common with another state highway)	When required
Roundabout or interchange number.	Yes
Ramp number	No
Ramp Type (i.e. On or off) and Hierarchy	No

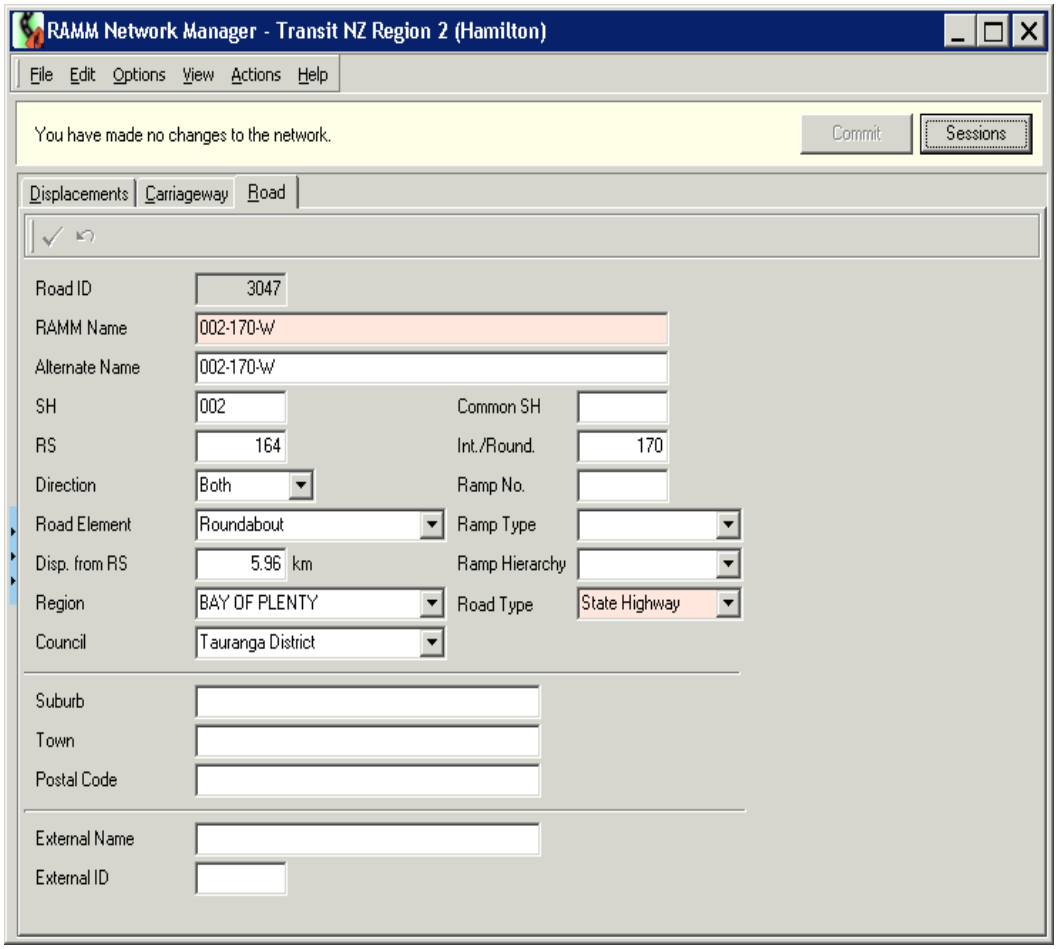
Territorial Local Authority	Yes
Regional Council	Yes

Additional fields

Additional fields such as Local Name, Suburb, Town and Postal Code are also available in the Road Name Table.

Example

State Highway 02 RS 170 has a road name 002-170-W. The roundabout will be recorded as follows:



3.8 Carriageway sections

Overview

Carriageways are the smallest divisions of the network. They are a fundamental element of the NZTA's asset management system. Changes to carriageway section displacements necessitate data manipulation in other tables by complex inventory updating, which can only be done by NZTA National Office, or data manipulation tools found in NZTA's asset management system.

Carriageway section changes are potentially hazardous to data integrity therefore only essential changes to carriageway sections should be contemplated. The original carriageway section concepts must be adhered to when updating.

Carriageway Sections

The following established guidelines apply when selecting carriageway sections:

- Change of pavement type, such as chipseal to structural asphalt concrete, sealed to unsealed, bridge (only bridges>50m in length).
- Significant change in traffic volumes including at nodes as defined by Traffic Monitoring System (TMS).
- Significant change in width, such as additional traffic lane or 2 m or more over a length of 100 m or more (approximately one lane width.)
- Change from rural to urban (<= 70kph), other changes in speed limit and policy changes in National State Highway Strategy (NSHS).
- Change to/from a legally-declared section of motorway.

Lengths of sections

The longer the carriageway section the more averaging of dimensional data and other values will occur which may obscure various outputs. Conversely, very short carriageway sections (<50 m) are a nuisance value. It is difficult to comprehend the need for carriageway sections less than 50 m. The following guidelines should be applied:

- Urban carriageway sections, > 50m and < 500m
- Rural carriageway sections, > 500m and < 5000m

Common State Highways

Carriageway sections of common State Highways are not duplicated. All inventory data (including carriageway data) is to be recorded against the lowest-numbered State Highway only. For example where SH 1N and SH 2 are common, the data is recorded for SH 1N only.

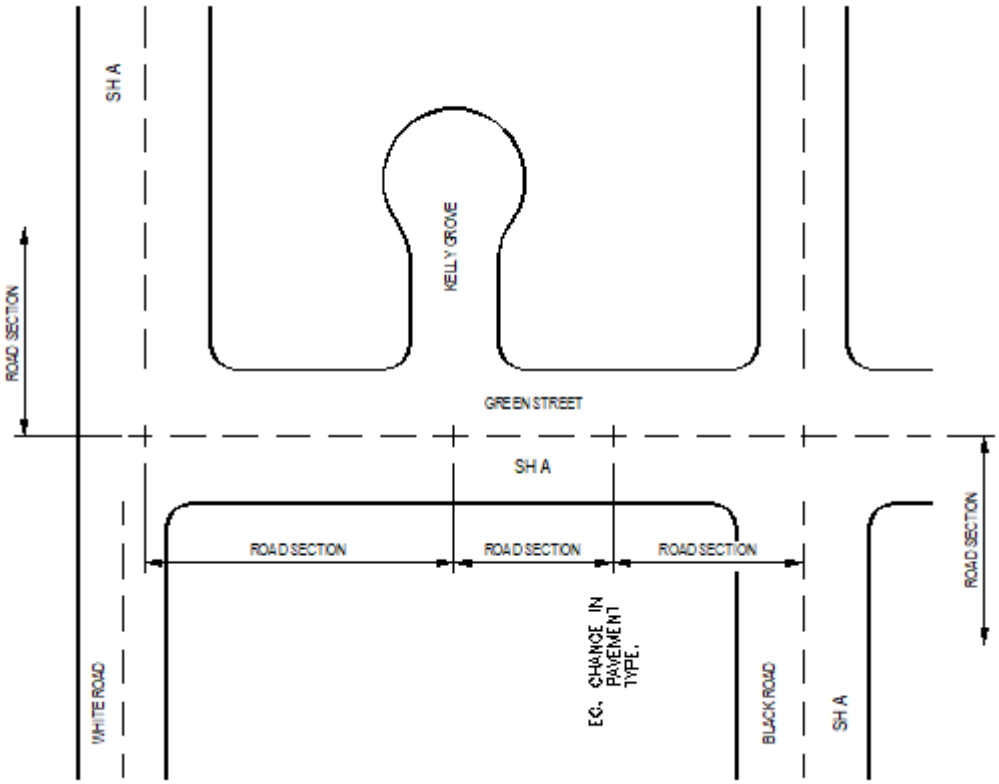
Passing lanes

The start of a passing lane should be taken as where the 2 lanes both become full width and the end of the passing lane should be taken as where the centre line marking of the passing lanes finishes. Note: Care should be taken when road markings are replaced/repainted.

Urban sections

In urban situations a block length is taken as a convenient carriageway section for compatibility with Local Authorities and urban maintenance strategies as shown below.

Diagram:



Network updates

The need to maintain an accurate and up to date network is vital to NZTA's business.

Primary information

It is NZTA's objective to update the base network model for new alignments within 10 days of these being open to traffic.

NZTA National Office implements network changes, and asset data cannot be added until the network change has been completed.

To achieve this timeframe the following minimum must be provided on a Network Update Form to the NZTA regional office for approval:

1. A clear diagram of the network before and after the network change
2. The start points and end points* of any new construction
3. The new measured lengths of any reference station lengths, which have changed, and the new measured lengths of any roads, which have changed.

*To avoid data loss it is important that only sections following an entirely new alignment or which have been totally reconstructed are marked for deletion. The start and end of construction should therefore be identified using both the original and new route positions. Refer to the Network Update Form in the LRMS Manual for more detail.

Secondary information

At the same time, or within 8 weeks of the opening of the above minimum, NZTA requires the following data:

1. New RS diagrams with measured geographic coordinates
2. A spatial representation of the centreline of the new alignment

NOTE: Prior to the start of the High Speed Data (HSD) survey for each Network Management Area, (the programme for which is available on the NZTA website), ALL items 1 to 4 inclusive needs to be collected at least 1 month earlier.

Section 4 – Data delivery procedures

4.1 Introduction

Overview

This section details the process of delivering RAMM data to NZ Transport Agency Waka Kotahi's Master RAMM database.

References

Location Reference Management System Manual, SM051 (LRMS)

The SHDOM manual is to be used in association with the SM051.

The SM051 details the requirements of the current location referencing system and includes the following forms:

- Network Update Form
- Reference Station Locality Diagram
- Route Position Nomenclature
- Location reference sign schedule example
- Log of Electronic Tripmeter Calibration
- Spatial data specification

4.2 NZTA quality process

Introduction

All data delivered to NZTA will go through a quality audit prior to loading.

Inventory modifications captured in the field from projects or regular updates are entered into the database by a level 1 certified user. Project data should also be verified by NZTA project managers. Edits are checked by level 2 certified users and approved for the main SHNZ RAMM database.

Glossary

RAMM Manager - The RAMM Manager is usually the Network Management Consultant (NMC), however, in areas that are managed under a PSMC contract the PSMC contractor is to be taken as the RAMM Manager.

NZTA Project Manager - The NZTA project manager for the state highway asset maintenance, also known as the Area Engineer, whose responsibility is to manage the consultant as defined above (either the NMC, or PSMC contractor).

4.3 General requirements

Introduction

This section discusses requirements that affect all parties involved in the collection and maintenance of asset information data, including:

- NZTA Staff, those at a regional and/or national role involved in asset information quality
- RAMM Manager, responsible for updating and auditing the database
- Field Data Suppliers of asset information collected in the field.

Quality Assurance

NZTA requires all suppliers working on the state highway network to have an internal Quality Assurance (QA) system. This QA system must involve a process to handle non-conformances with corrective actions.

Certification

NZTA has introduced a two-tier certification requirement for individuals involved with the collection of asset information data and the updating of the NZTA master database, these being:

- Level 1 – Field Data Collection
    - All individuals that collect data in the field are required to have been certified to this level.
- Level 2 – Database Updating
    - All individuals that add/update or delete data to the NZTA master database must be certified to Level 2.

As a prerequisite for being certified to Level 2 the individual must be certified to Level 1 – Field Data Collection.

4.4 Field data suppliers

Introduction

The collection of quality data in the field by suppliers is critical to the overall value of an asset information system, 'garbage in garbage out'.

Certification

All individuals that collect data in the field are required to have been certified to Level 1 – Field Data Collection. Note: It is possible for collectors of specialised data (e.g. Signs contractors) to be certified to collect only their 'specialised' type of data.

4.5 RAMM manager responsibilities

Introduction

Confidence in the data accuracy being delivered is important. The outputs from the Asset Register (currently stored in RAMM) are used in the development of Asset Management Plans, Asset Valuation, Contract Schedules, etc. The most efficient method of ensuring quality data is through a Quality Assurance (QA) system during data delivery.

Certification

Data Collection and Auditing - RAMM Managers are required to collect and audit data collected in the field, and to update the NZTA RAMM database. It is therefore, required that staff that collect and audit field data are certified to Level 1 – Field Data collection.

Database Updating - Staff that update the NZTA RAMM Database are required to be certified to Level 2 – Database Updating (which requires Level 1 – Field Data Collection as a prerequisite).

Responsibilities

RAMM Managers are required to collect, update and audit data on behalf of NZTA. This involves:

- Ensuring NZTA standards are met
- Receiving inventory information, maintenance activity data as necessary
- Carry out audits on data captured in the field
- Updating the NZTA master database based on changes to the network.

4.6 National office responsibilities

Role

In the area of data delivery National Office provide technical support to the regional offices.

National office manages the bulk loading of:

- Traffic data

National Office maintains the following tables:

- Road names
- Carriageway
- Lookup codes
- High-speed data (roughness, rutting, texture, geometry, etc.)
- SCRIM
- Falling Weight Deflectometer
- CAS data

National Office also maintains the network model (LRMS system) held within RAMM.

Responsibility

National Office staff will review documentation and may carry out audit checks as required and provide feedback.

Section 5 – Data quality procedures

5.1 Introduction

Background

The accuracy and completeness of all tables in the Asset Register is vital to NZ Transport Agency Waka Kotahi for the following key functions:

- An accurate reliable inventory and valuation of the roading asset can be obtained
- Reliable reporting at the network or project level
- Credibility of the asset information system is important for end users
- Enable accurate inputs for contracts that rely on this data during the tendering and performance monitoring processes.

5.2 Reporting

Overview

The audit and validation work completed by NZTA to assess data quality.

Report Structure

The key data quality reports run by NZTA are as follows:

NOC Data Quality Report - The NOC data quality report is run monthly. The purpose of the report is to assess the quality of data recently entered into the State Highway RAMM database. The report assesses the completeness, accuracy and timeliness It is tied to the data KRA for timeliness.

REG Data Quality Report - The REG data quality report is run annually. The purpose of the report is to benchmark the quality of State Highways asset information against other road control authorities. The report assesses data from a variety of asset databases including RAMM, HSIMS and CAS relating to different maintenance contracts.

AMDS Data Assessment Tool - The AMDS Data Assessment Tool is run monthly or on request. The purpose of the report is to assess database conformance to the Asset Management Data Standards. The report is focused on completeness of mandatory fields. The scope of the AMDS tables covers asset types relating to different maintenance contracts.

Section 6 – Field validation procedures

6.1 Introduction

Background

The accuracy and completeness of all tables in the Asset Register is vital to NZ Transport Agency Waka Kotahi for the following key functions:

- An accurate reliable inventory and valuation of the roading asset can be obtained
- Reliable reporting at the network or project level
- Credible treatment length summaries and the production of multi-year forward works programmes based on the Asset Register
- Statistical comparisons between the regions can be made where databases are consistent and accurate data is provided
- Credibility of the asset information system is important for end users.
- Enable accurate inputs for contracts that rely on this data during the tendering and performance monitoring processes.

6.2 Overview

Purpose

The purpose of the field validation is to:

- Check the longitudinal accuracy of LR signs in accordance with Part B of the Location Referencing Management System (LRMS) Manual, SM051.
- Check the completeness and integrity of all data that can be physically checked
- Correct any errors or omissions
- Highlight any possible areas of concern for further investigation
- Indicate the level of confidence that can be assigned to the current system outputs
- Determine a strategy to reinstate the database to an acceptable standard if significant errors are found
- Make recommendations regarding:
    - The impact any incompleteness has had on the database
    - Improvements to the management of routine data collection
    - Possible changes to NZTA policy

Scope

The field validation work involves extracting the existing data from the Asset Register and checking all road elements that can be physically inspected in the field. A schedule of LR signs that require update shall be supplied to the Maintenance Contractor for field adjustments, while the RAMM operator shall be supplied with details of any other road asset requiring updates on the Asset Register.

Procedure

An overview of the procedure is show below:

Step	Action
1	Confirm the reference station (RS) locations and lengths according to Part B of the LRMS Manual, SM051.
2	Confirm location, accuracy and layout of Location Referencing signs in accordance with Part B of the LRMS Manual, SM051.
3	Review the carriageway section locations and displacements.

4	Validating the inventory data based on the confirmed location reference points.
5	Database updates.
6	Co-ordination of validation work with routine RAMM updates.

6.3 Reference section length checks

Overview

Prior to the commencement of any validation work, the overall Reference Station lengths shall be checked for accuracy in accordance with the following NZTA's publication:

Location Referencing Management System Manual SM051.

Procedure

The procedure for checking the length of a reference station for the purposes of asset register validation is as follow:

Step	Action
1	The vehicle odometer is calibrated and checked on a NZTA approved calibration strip in accordance with SM051.
2	Single continuous pass is made over the RS length at a normal safe driving speed, staying as close to the centre of the increasing lane as possible. The distance achieved shall be recorded to the nearest 1m.
3	The originally recorded RS length is considered acceptable if the measurement is within 0.15% + 1.0m. If the RS length is outside tolerance further measurements are required in accordance with the Location Referencing Management System Manual, SM051.
4	Produce a table showing the RS checks carried out.

Below is an example of the RS check report:

SH	RS	Existing R/S Length (m)	Measured Length (m)	Diff (%)	Diff (m)	Allow Tol. (m)	Accept (Yes/No)
1N	1	14,686	14,671	-0.10%	-15	+/- 23	Yes
1N	16	15,890	15,892	0.01%	2	+/- 25	Yes
1N	32	14,840	14,872	0.22%	32	+/- 23	No
1N	47	14,790	14,794	0.03%	4	+/- 23	Yes
1N	62	20,670	20,700	0.15%	30	+/- 32	Yes
1N	83	5,700	5,696	-0.07%	-4	+/- 10	Yes
1N	88	7,660	7,674	0.18%	14	+/- 13	No
1N	96	13,337	13,347	0.08%	10	+/- 21	Yes

6.4 Validating the carriageway table

Overview

In validating the state highway data, it may be necessary to review and change the carriageway section locations and displacements.

Try to place the splits at the following intervals:

Urban	50 – 500m	(ideally approximately 150-250m)
Rural	500 – 5000m	(ideally 1500 – 2500m).

Criteria

The following criteria controls the location of carriageway sections:

A change in traffic lanes, such as what occurs at a passing lane. Where possible avoid using start/end of the passing lane line to define these points. Try to use a permanent feature within 50m, such at an intersection, bridge, sump, or manhole etc.

A change from urban to rural. Use speed restriction signs, <70km is defined as urban.

A change in pavement type, such as sealed to unsealed, change from thin surface flexible to structural asphaltic concrete or bridge (only where bridges are > 50m in length).

A significant change in width of carriageway. A suggested minimum width change is approximately 3m for a minimum of 150m long, occurring at an obvious location. Avoid poorly defined splits such as short widths, or seal widening at intersections.

A change in traffic volume. This would occur at major intersections and would be a major node in NZTA Traffic Monitoring System (TMS).

A change to/from legally declared Motorway. This would occur when a legally declared' motorway reverts to a NSHS R1, R2, R3, R4 or NSHS Urban or vice versa.

Updating

All carriageway section changes shall be submitted in hardcopy form unless otherwise agreed with NZTA so that these changes can be approved and the database updated.

6.5 Validating inventory data

Overview

After confirmation of the location referencing system, the detail table data can be validated in accordance with the Asset Register that defines the extent of data requirements for each asset type.

It is recommended that the existing data be extracted to spreadsheets for editing.

Validation of the data shall include:

- Checking the completeness of the data and if necessary collecting any missing information
- Collecting any new information required by NZTA
- Correcting any errors in the existing data.

Displacement of Inventory Items

The location referencing signage shall be used for opening and closing surveys. The electronic distance meter shall be reset to the recorded displacements at the start of each new location reference sign.

Ideally any small misclose evident at each location referencing sign should be distributed proportionally (rubber banded) over the displacement measurements. This is perhaps more easily achieved where the data is in electronic form.

Errors of less than 0.1% can be ignored and between 0.1 – 0.3% should be adjusted out. Major misclose shall be thoroughly investigated and the information resurveyed.

Surfacing Widths

If road width variations are significant their effect should be incorporated into the recorded dimensions. Calculate the relevant area and use the area divided by the length to estimate the average width over the surfacing length.

Where there are significant changes in width in a surfacing length > 1.5 for a length > 100m (i.e. crawler lane) a separate record should be created.

Lane Widths

At sites where there is a passing lane, the lane width should assume to be the average of the two lanes.

Surfacing Design Life

Chipseal asset design life should be similar to that assumed in the FWP. The design life default values for various chip seals as set in RAMM can be found in RAMM Manager –(Maintenance / Lookups / Surface / Materials.

Offsets

Should be remeasured when there is a difference between the recorded and measured distance by more than 0.5m.

The exception to this rule is signs, which may have a default of 6m for signs on the main carriageway and 15m for signs on side roads.

Culvert Sizes

Culverts should be measured and recorded to the appropriate “nominal” size. Almost all pipes will have a diameter as a multiple of 75mm and they should be recorded accordingly. Thus a 590 or 620mm diameter pipe should be recorded as 600mm diameter pipe. The next size up would be 675mm diameter and the next size down 525mm diameter.

For box culverts a greater flexibility may be used but dimensions should be recorded to the nearest 0.1m. For example a culvert 2.05m wide x 1.25m deep would be recorded as 2.0m x 1.2m.

Barriers

Barriers between a divided carriageway should be recorded against the increasing direction of the road.

Partial replacement or an extension to an existing barrier should be a separate record; however, the minimum length for such a record is 5m.

6.6 Database updates

Overview

All data delivery shall be in accordance with Section 4, Data Delivery Procedures.

Survey and Batch Headers

Survey header information shall be preserved for all condition and high-speed tables. Batch header numbers shall be preserved for the Maintenance Cost table.

Carriageway Table

Any new carriageway sections shall be set up first. Any necessary changes to existing carriageway sections should then be made (refer to Section 3.7 of this manual for reasons to update carriageway sections).

Inventory Tables

At the conclusion of entering inventory data, the RAMM audit fields “Added On” and “Added By” shall be set to the “current date” and an identifier for the consultant completing the work respectively.

Data Manipulation

All data shall be manipulated into appropriate roads and road sections.

Instructions for deletion of the existing data and loading of the new data shall be supplied. This will include proposed changes to the lookup tables.

Coordination with Routine Updates

The Asset Register validation data delivery work shall be coordinated with routine updates that are required as part of NZTA’s contracts.

In carrying out the validation work, there is a potential to introduce errors or duplicates in the validated data if these routine updates are not managed efficiently.

6.7 Supporting documentation

Overview

Additional to the standard documentation required with data delivery, Section 4, Data Delivery Procedures, a field validation report is required.

Report Requirements

The field validation report shall contain the following components:

- An executive summary
- A summary of the audit results

- Scope of work
- Method
- Discussion of the audit results
- A brief statement describing the reasons for the changes made to each table
- Recommendations for action/improvements to the database.

Example

An example of the recommendations could include:

- Field checks required for larger sample of the network.
- An assessment of the impact any incompleteness has had on the database.
- A request for NZTA to confirm their policy regarding the collection of some data.
- Responsibility for actions, for example NZTA National Office, NZTA Regional Office, Network Management Consultant (NMC).

Section 7 – Traffic data

7.1 Introduction

Overview

State Highway traffic data supports the national State Highway strategy and asset management planning.

This section details the processes in place to update traffic data for the State Highway network.

References

The Traffic Monitoring System (TMS) user manual for the software is distributed with the electronic help file, which is accessible to registered users through the TMS website.
https://tms.nzta.govt.nz/manual/help_index.htm

More information about traffic counting in general can be found in Traffic Monitoring for State Highways (SM052) link- https://www.nzta.govt.nz/resources/traffic-monitoring-state-hways/index.html

7.2 Overview of process

Process

The Annual Average Daily Traffic (AADT) and Loading data from TMS is transferred to RAMM via the TMS / RAMM interface between February and May.

The up-to-date Traffic and Loading data is loaded into RAMM.

Traffic and loading estimates for each RAMM carriageway section is created. These estimates are given a reading date of 31/12/20## (latest year)

TMS and RAMM

Data from TMS is transferred to RAMM. The link between the two systems is established in several ways:

- TMS Count site located by Reference Station and Route Position (RSRP)
- TMS site id
- Upper node (RSRP) defining start displacement of Traffic Link
- Lower node (RSRP) defining end displacement of Traffic Link

Site Ids

The site ID is merely a unique reference for each site, which happens to be generated using site location information. The true location is established from the RSRP.

Site ID format

Each site recorded by the system must have a unique identifier in the format “sssdnnnn” where:

sss = State Highway reference - alphanumeric, case sensitive, i.e. use upper case only

d = Direction

nnnn = Running distance to site from start of the State Highway

The format is explained in further details under SM052.

Site ID Direction Codes

The direction (d) must be one of the following values:

0 – Both Directions

1 - Increasing

2 - Decreasing

3 - Increasing ON ramp, number in a clockwise direction from the increasing lane.

4 - Decreasing OFF ramp

5 - Decreasing ON ramp

6 - Increasing OFF ramp

7 – Spare

8 - Roundabaouts

9 is used where there is more than one monitoring site within a kilometer

Example

The site ID “00250937” represents:

- Site on State Highway 2
- Decreasing On Ramp
- 937 kilometres from the SH origin

7.3 Responsibilities

Actions

NZ Transport Agency Waka Kotahi National Office - National Office staff will load the TMS/RAMM interface traffic file and notify regional offices once completed. It is also the responsibility of National Office to update the Traffic and Loading Tables in consultation/conjunction with regional offices at other times throughout the year.

NZTA Regional Offices - Upon confirmation that the TMS data has been successfully loaded into the RAMM database, regional office staff check the accuracy of the traffic and loading estimates. Once the estimates are generated they can now be checked against the previous years estimates and/or the traffic growth established from the historic traffic and loading counts. All estimated data can be adjusted to match variances between road sections over the traffic link.

7.4 Notification

Notification

Once regional staff have confidence that the traffic data within RAMM (inc. the estimates) is acceptable, notification via email shall be sent to NZTA National Office, Asset Database Administrator.

The traffic champion via email also informs GIS team, EDW team and business owners once the loaded AADT figures (traffic data) in RAMM gets finalized.

Section 8 – LTPP site maintenance

8.1 Introduction

Overview

To understand pavement performance the NZ Transport Agency Waka Kotahi has established a number of Long-term-Pavement Performance (LTPP) calibration sections in order to monitor the deterioration of pavements. These 300m long sections are established across New Zealand. Data from the LTPP sections are used to calibrate the pavement models used in dTIMS by showing the affect of maintenance activities that have been carried out over the life of the calibration section. Accurate models will enable an accurate forward works programme to be developed and maintained.

8.2 Definitions

Definitions

The following definitions are applicable to the LTPP sections:

Benchmark Sections (1km long) – Some LTPP sections overlap or sit within the Benchmark sections. Benchmark sections are used to validate the annual HSD survey.

Sterilised LTPP Sections (300m) long) – Sterilised sections are indicted with a red marker post and a Calibration section sign and numbering starting with CS. On these sections only, maintenance to remove hazards (such as pothole filling) are permitted subject to approval from the Asset Information Engineer, NZTA National Office, Highways and Network Operations Group.

Non Sterilised LTPP Sections (300m long) – These sections are indicted with blue marker post and numbering of these sections start with CAL. Any maintenance required on these sections may be scheduled in consultation with the NZTA National Office.

8.3 Responsibilities

NMM Consultant

The Network Management Consultant is responsible to ensure:

- No unauthorised work.
- All maintenance activity work is discussed and agreed with the Regional Office and NZTA's Asset Information Engineer prior to the commencement of any maintenance activities.
- Full and accurate data, investigation and design data for any work carried out is provided to NZTA.

Regional Office

The Regional Office is responsible to ensure:

- No unauthorised work.
- All maintenance activity work is discussed and agreed with NZTA's Asset Information Engineer prior to the commencement of any maintenance activities.
- Safety.
- Approval of all Traffic Management Plans for the safe working on the site, including the LTPP Data Collection Contractor's TMP.

NZTA National Office

The National Office is responsible to ensure:

- Integrated Management, management of data collection and LTPP database.

8.4 Location of sites

North Island

	Existing Benchmark Site				Calibration Section / Site				
Region/NMA	SH	RS	BM Number	RP (km)	Section Number	Start (km)	End (km)	Sterilised (Y/N)	Texture Measure Required Y/N
Northland	01N	292	1	0.1 to 1.1	CS 1	0.7	1	Y	N
Northland	01N	319	2	13.0 to 14.0	CS 2	13.3	13.6	Y	N
Northland	01N	245	3	6.1 to 6.8	CS 3	6.35	6.65	Y	N
Northland	12	17	4	7.0 to 8.0	CAL 4	14.39	14.69	No	N
Northland	12	185	5	7.95 to 10.75	CAL 5	10.45	10.75	No	N
Northland	01N	20	6	9.37 to 10.44	CAL 6	10.5	10.8	No	N
Northland	15A	0	To be Established		CS 62	0.68	0.98	Y	N
Auckland	01N - Inc.	431	7	1.0 to 2.0	CS 7a	1	1.3	Y	N
Auckland	01N - Inc.	431	7	1.0 to 2.0	CS 7b	1.95	2.25	Y	N
Auckland	01N - Inc.	461	8	3.0 to 4.0	CS 8a	3.1	3.4	Y	N
Auckland	01N - Inc.	461	8	3.0 to 4.0	CS 8b	3.7	4	Y	N
Central Waikato	01N	625	11	6.63 to 7.70	CS 11	7.2	7.5	Y	Y
Central Waikato	5	169	12	6.82 to 7.82	CAL 12	7.2	7.5	No	Y
Central Waikato	01N	777	13	2.32 to 4.18	CS 13a	3.2	3.5	Y	N
Central Waikato	01N	777	13	2.32 to 4.18	CAL 13b	3.88	4.18	No	N
East Waikato	29	50	14	0.02 to 1.20	CS 14	0.55	0.85	Y	Y
West Waikato	01N - Inc.	574	16	4.00 to 5.00	CS 16	4	4.3	Y	N
West Waikato	2	0	17	4.80 to 5.60	CAL 17	5	5.3	No	N
PSMC	3	36	18	1.20 to 2.20	CAL 18	1.6	1.9	No	N
PSMC	3	16	19	13.00 to 14.00	CAL 19	13.5	13.8	No	N
PSMC	31	0	20	5.50 to 6.50	CS 20	5.4	5.7	Y	Y
Gisborne	35	250	21	9.57 to 10.50	CS 21	10.15	10.45	Y	Y
Gisborne	2	375	22	0.68 to 1.56	CS 22	1.16	1.56	Y	Y
Gisborne	2	474	23	5.24 to 5.96	CAL 23	5.3	5.6	No	Y
Hawkes Bay	2	544	24	12.47 to 13.20	CS 24	12.6	13.1	Y	Y
Hawkes Bay	2	729	25	8.56 to 9.60	CAL 25a	8.8	9.1	No	Y
Hawkes Bay	2	729	25	8.56 to 9.60	CAL 25b	9.1	9.4	No	Y
Hawkes Bay	5	204	26	13.63 to 14.82	CS 26	14.2	14.5	Y	Y
Hawkes Bay	5	233	27	10.0 to 11.0	CAL 27a	10	10.3	No	Y
Hawkes Bay	5	233	27	10.0 to 11.0	CAL 27b	10.3	10.6	No	Y
West Wanganui	01N	815	28	11.71 to 12.90	CS 28	11.8	12.1	Y	Y
West Wanganui	4	127	29	8.42 to 9.42	CS 29	8.4	8.7	Y	Y
West Wanganui	4	223	30	3.05 to 4.05	CAL 30	3.1	3.4	No	Y
East Wanganui	01N	985	31	0.50 to 1.50	CS 31	0.6	0.9	Y	Y
East Wanganui	2	751	32	4.52 to 5.52	CAL 32	4.52	4.82	No	Y
West Wanganui	3	258	33	0.55 to 1.75	CS 33	4.1	4.4	Y	Y
West Wanganui	45	97	34	4.49 to 5.97	CAL 34	5.1	5.5	No	Y
Wellington	01N	995	35	14.4 to 15.4	CAL 35	14.4	14.8	No	Y
Wellington	2	858	36	9.0 to 10.0	CS 36	9	9.3	Y	Y
Rotorua DC	5	29	R1	No Benchmark	CAL 53	1.4	1.7	No	Y
Rotorua DC	5	77	R3	11.7-12.7	CS 55	11.7	12	Y	N
Rotorua DC	30	131	R4	4.4-5.4	CS 56	4.4	4.7	Y	N
Rotorua DC	30	170	R5	9.1-10.1	CS 57	9.1	9.4	Y	N
Rotorua DC	30	147	R6	No Benchmark	CAL 54	8.06	8.36	No	Y
Rotorua DC	38	0	R8	14.4-15.4	CAL 58	16.83	17.13	No	N
Rotorua DC	5	47	R11	0.8-1.8	CAL 59	1.22	1.52	No	N

South Island

	Existing Benchmark Site				Calibration Section / Site				
Region	**SH**	**RS**	**BM Number**	**RP(km)**	**Section Number**	**Start (km)**	**End (km)**	**Sterilised (Y/N)**	**Texture Measure Required Y/N**
Marlborough	63	46	**37**	4.586 to 6.000	**CAL 37a**	4.7	5	No	N
Marlborough	63	46	**37**	4.586 to 6.000	**CS 37b**	5.5	5.8	**Y**	N
Marlborough	01S	18	**38**	1.405 to 2.028	**CAL 38**	1.5	1.8	No	N
Nelson	6	131	**39**	16.0 to 17.0	**CS 39**	16.15	16.45	**Y**	N
Nelson	6	225	**40**	10.0 to 11.0	**CS 40**	10	10.3	**Y**	N
North Canterbury	01S	284	**41**	7.5 to 8.5	**CAL 41**	7.8	8.1	No	N
North Canterbury	73	90	**42**	2.0 to 3.0	**CS 42**	2.5	2.8	**Y**	N
South Canterbury	01S	447	**43**	4.0 to 5.0	**CAL 43**	4.5	4.8	No	N
South Canterbury	8	99	**44**	3.5 to 4.5	**CS 44**	4	4.3	**Y**	N
West Coast	6	445	**45**	12.5 to 13.5	**CAL 45a**	12.7	13	No	N
West Coast	6	445	**45**	12.5 to 13.5	**CS 45b**	13.1	13.4	**Y**	N
West Coast	7	239	**46**	1.5 to 2.5	**CS 46**	3	3.3	**Y**	N
Coastal Otago	01S	618	**48**	8.5 to 9.5	**CAL 48**	9.1	9.4	No	N
Coastal Otago	01S	729	**49**	11.5 to 12.5	**CS 49**	12	12.3	**Y**	N
Coastal Otago	8	417	**51**	2.0 to 3.0	**CAL 51**	2.5	2.8	No	N
Coastal Otago	83	0	**52**	4.0 to 5.0	**CAL 52a**	4	4.3	No	N
Coastal Otago	83	0	**52**	4.0 to 5.0	**CS 52b**	4.6	4.9	**Y**	N
Southland	01S	872	**53**	8.02 to 9.02	**N/A N/A**	N/A	N/A	N/A	N
Southland	6	1111	**54**	0.35 to 1.35	**N/A N/A**	N/A	N/A	N/A	N
Southland	01S	933	**55**	0.56 to 1.56	**N/A N/A**	N/A	N/A	N/A	N
Nelson	6	196	**56**	8.0 to 9.0	**N/A N/A**	N/A	N/A	N/A	N/A
Coastal Otago	83	96	**To be Established**		**CS 50a**	7.5	7.8	**Y**	N

Section 9 – Communications policy

9.1 Overview

Purpose

This policy outlines how people should communicate in relation to the operation of RAMM for the NZ Transport Agency (NZTA).

General Guidelines

In general:

- Communications relating to NZTA RAMM databases and the use of RAMM on NZTA databases should occur with the Asset Database Administrator (or deputy) in the first instance;
- The Asset Database Administrator liaises between NZTA and ThinkProject.

9.2 Data updates

Scope

This covers notification of RAMM data being updated. Updating data includes adding, deleting or altering records. Classes of data affected include:

- Road names
- Inventory data
- High Speed data
- Traffic data
- Maintenance Activity data
- Condition Rating data

Purpose

Data users need to know when data that they may want to use has been updated. For example, a consultant may wish to know when the traffic data for his or herarea has been loaded so that they can proceed with a dTIMS model run, or NZTA National Office staff may want to know when all the reseal data for an area has been loaded so that they can run performance reports.

Advance Notice of Network Changes

Prior to performing a network change the Location Referencing Management System Administrator (or someone he/she delegates) should contact the Network Management Consultant or Contractor (in the case of a Performance-Specified Maintenance Contract) to arrange a convenient time to perform this change.

Data Updated by Consultants or Contractors

When a contractor or consultant has performed changes to a NZTA database, he/she should inform NZTA administrator.at the National Office.

Data Updated by NZTA National Office

Within 24 hours of data being updated by NZTA National Office, a member of the Asset Information Group or a deputy will inform the relevant Area Engineer(s). This includes but is not necessarily limited to:

- Network changes
- High Speed data
- Traffic volume and loading data

9.3 Outages

Scope

For the purpose of this policy an outage is an interruption to service normally expected by users of NZTA's RAMM system. An outage can have a number of causes including:

- A problem with communications (e.g., a network problem);
- A problem with the database (e.g., grossly corrupt data or a problem with the database);
- A problem with the RAMM server;
- An upgrade of software.

Outages fall into two categories:

- planned outages for activities such as upgrades or tests of power supplies; and
- unplanned outages, which occur as a result of a problem.

This section covers notification of planned outages and communication on unplanned outages.

Purpose

Users need to know about outages so that they can plan their work.

Planned Outages

If the outage is due to a database change or upgrade, on an upgrade to the operating system, the database engine or to RAMM, the Asset Database Administrator or deputy should inform all users of:

- When the outage will occur;
- The reason for the outage; and
- When the users could reasonably expect to be able to use the system again.

This message will be sent by email and at least 48 hours prior to the outage occurring.

Unplanned Outages

When an unplanned outage occurs, the Asset Database Administrator will inform all affected users as soon as possible, by email, of:

- The cause of the outage; and
- An estimate of when the problem may be fixed.

The Asset Database Administrator will notify users considered best to be informed under the circumstances. This will generally be:

- The NZTA Offices; and
- The National RAMM Contacts for affected Network Management Consultants or Contractors.

In the event of a major disaster such as an earthquake, the above courses of action may be available.

9.4 User requests

Scope

This covers requests for new users or changes to existing users.

Purpose

The Asset Database Administrator needs to be informed when there is a new RAMM user or an existing user needs authorities or details changed, so that the user can be set up or changes made. Once this has been done the new user needs to know that he or she can use RAMM.

Making the Request

People, who want to become NZTA RAMM users or change their user details, should make their request in the first instance to the NZTA administrator.

Informing the User

When a request for a new or changed user has been satisfied the Asset Database Administrator will let the user who made the request know that he or she can now use RAMM or that his or her permissions have been changed.

9.5 User queries and problems

Scope

This covers possible bugs, questions of procedure, codes etc and how-to type questions.

Purpose

Users need to know how to obtain assistance. NZTA also needs to avoid undue disruption to its activities.

Faults

A user who cannot log in to RAMM should contact the Asset Database Administrator.

Possible Bugs

NZTA needs to know of possible problems with the software it is using so users should report possible bugs encountered while using NZTA's RAMM system to the Asset Database Administrator.

Questions of ProcedureUsers who have a query about procedures should contact the Asset Database Administrator or the Asset Information Engineer.

Application Help

NZTA staff may contact the Asset Database Administrator if they need help with RAMM. Staff of Network Maintenance Consultants or Contractors should contact their company RAMM Champions for assistance. The Asset Database Administrator will advise other users of whom to contact for assistance, when they are notified that they have access to NZTA's RAMM system.

9.6 Other situations

Standing Instructions

Standing instructions are usually contained in manuals. The principal manuals relating to the use of RAMM at NZTA are:

- State Highway Database Operations Manual – SM050;
- Location Referencing Management System Manual – SM051;
- Annual Plan Instructions Manual – SM018;
- State Highway Professional Services Contract Proforma Manual – SM030; and
- RAMM Road Condition Rating and Roughness Manual.

Consultation with Consultants and Contractors

NZTA will consult with consultants and contractors on matters related to asset information both formally and informally as needed.

Section 10 – Access policy

10.1 Overview

Purpose

To outline the access policy to NZ Transport Agency Waka Kotahi RAMM databases.

General Statement

The NZTA will generally grant read access to most data on its RAMM databases to anyone who has a RAMM licence. The NZTA will grant read access to all tables except:

- The skid resistance table, and
- Any table containing data which at that time is deemed to be commercially sensitive.

For information on restrictions on access to skid resistance data please refer to the State Highway Control Manual (SM012).

Users often require access to data for part of the network so the NZTA will often restrict the area a user can access to assist the user to find data more quickly.

10.2 Obtaining Access

Method

The access method for clients will be online through NZTA's RAMM databases.

Read Only Logins

All read only access logins for users should be approved by the Asset Database Administrator (or his/her deputy) and activated by the Asset Database Administrator. Logins of this type of access may have a start date and end date associated with them.

Update Logins

All update access logins shall be approved by the Asset Database Administrator (or his/her deputy) and activated by the Asset Database Administrator at NZTA's National Office. Users will need to have obtained Level 2 accreditation to be allowed write access to NZTA's production database. These are obtained from attending and passing a NZTA approved accreditation course. Please refer to Section 1.3 of this manual for further information on accreditation and obtaining a password to access the database.

Setting Up Access

The Asset Database Administrator will grant a user, permissions by assigning the user a role for a security zone. A security zone is a set of roads (e.g. a network management area or sub-area). A role is a set of permissions. Some users will have access to multiple zones and their roles may vary from zone to zone.

10.3 Efficient use of RAMM

Purpose

This section describes how users are expected to make optimal use of the hosted RAMM system so that costs of access are minimised. It sets out the principles by which NZTA will decide if inefficient use is being made of the system, such that the cost of access should be passed on to that user.

NZTA will cover the costs of appropriate use of its own RAMM database

NZTA wants to promote excellence in asset information management by:

- Ensuring that asset data is robust and reliable
- Encouraging analyses of such data for decision making

For these reasons, NZTA will cover the costs of all reasonable access by users to its RAMM database. NZTA will monitor use of the system by individual users to satisfy itself that such access meets these criteria. NZTA will not pay for user access to any users working copies of the database, should users wish to establish such working copies on the hosted service.

The following sections set out guidance on access to NZTA's RAMM database for read only, or read and write access.

Read only access

All costs of viewing and extracting data are covered by NZTA. Users should note the following:

- Access costs whilst running SQL scripts are covered, assuming they are well-structured queries.

Poorly defined queriesPoorly defined SQL scripts might take excessive system time which could be reduced by revising the scripts. Users will be expected to follow best practice in writing scripts. If a script takes longer to run than 10 minutes, users must contact the Asset Database Administrator to report the problem and seek advice on appropriate action.

Read and write access

Costs for access to users with read and write access are covered by NZTA. NZTA (and RAMM Software where appropriate) reserve the right to:

- Consider passing on charges to users, for work associated with fixing any database errors, which they introduced.
- Disallow system access until a user undertake further training/instruction and can demonstrate appropriate skill in system use. While system access is disallowed, the user's organisation will be expected to continue to fulfil its contractual obligations with alternative users as appropriate.

10.4 NZTA Users

Reasons for Access

As asset owner NZTA needs to have access to ensure all their suppliers are maintaining the database to the standards as prescribed in their contracts as well as adding to the database the data that they are responsible for. NZTA staff also requires access for management and reporting purposes.

Access Levels

All NZTA staff may have read only access to the database and may have the role of full viewer. NZTA staff who require write access to the database will have to obtain the necessary accreditation certificate as outlined in Section 1.3 of this manual. This requirement may be waived by the Asset Database Administrator for staff involved in the update of traffic and loading data.

10.5 Consultant Users

Reasons for Access

The following are the reasons why consultants need access to RAMM:

Consultants and Contractors

The network maintenance manager has ultimate contractual responsibility for the RAMM data in his/her area.

As such he/she shall have a RAMM Level 2 accredited person who are able to update the database with any changes that happen on his/her Network in accordance with the specific inventory and condition data tables described in SHDOM (SM050).

Network Bridge Consultant

In some cases bridges may be stored in the asset database. The NMA Bridge Consultant is the person responsible for updating bridge data for a network management area.

As such, he/she shall be a RAMM Level 2 accredited person.

Design/Supervision Consultant

The Design/Supervision Consultant has the responsibility of providing updated data to NZTA following the construction of any new piece of highway or off-road structure. He/she should have a RAMM expert or employ one as a sub-consultant to supply records to the network maintenance manager.

Management Support Quality Assurance Consultant

The Management Support Quality Assurance Consultant has the responsibility of loading high quality, high speed, skid resistance and falling weight deflectometer data into NZTA's databases. He/she needs to be able to view and update these data for the entire country as well as update survey header data.

Valuation Consultant

The Valuation Consultant has the responsibility of providing an annual valuation of State Highway assets to the NZTA. He/she needs the ability to view all assets, and update data pertaining to valuation.

Access Rights Requirements for Consultants & Contractors

The network maintenance manager needs read and write access rights to all major inventory tables as well as the forward work programme, maintenance cost and rating tables. He/she should also have Import, Export and SQL rights to these tables. Employees of consultants will have full viewer, NMC or NMC super-

user roles assigned to them depending on their level of accreditation (refer to section 1.3). These permissions should be for the area he/she is responsible for and only for the duration of that contract.

In certain proven cases, it will be possible for some users to have 'write' access to other network areas apart from their own. E.g. where the consultant is acting as MSQA for another NMA.

Access Requirements for Network Bridge Consultant

The network bridge consultant needs read and write access rights to the bridge tables. He/she should also have Import, Export and SQL read rights to these tables.

Access Rights Requirements for Design and or Supervision Consultant

The Design/Supervision Consultant shall have read only access to the database for the area that the work he/she is responsible for is included in. The Design/Supervision Consultant will also need export rights to the major inventory tables to enable him/her to download to external systems. Therefore, he/she will have a viewer role.

Access Rights for Management Support Quality Assurance Consultant

The Management Support Quality Assurance Consultant shall have read access to all operational databases and write access to high speed, skid resistance and falling weight deflectometer data. He/she will be given an MSQA role in most if not all areas.

Access Rights Valuation Consultant

The Valuation Consultant needs to be able to update the valuation fields of all inventory tables and to update valuation snapshots. He/she will be given the valuation consultant role.

10.6 Contractor Users

Reasons for Access

The following are the reasons for contractors to have access to RAMM.

Pavement Maintenance Contractor

The Pavement, Drainage and Emergency Works Contractor is responsible for delivering updated RAMM data relating to maintenance works as well as scheduling preventative maintenance. The contractor needs access to existing RAMM records along with the Forward Work Program and historical maintenance costs. Some contractors may be contracted to maintain inventory data for their area. Some may also use RAMM Contractor.

Traffic Services Contractor

The Traffic Services Contractor is responsible for the provision of updated sign data to the Consultant or the Contractor. He/she needs to have access to existing signs information to achieve this. Some traffic services contractors may be contracted to maintain data in the database for signs in their area.

Lighting Contractor

The Lighting Contractor may be responsible for the provision of updated lighting data to the Consultant or the Contractor or may be responsible for maintaining this data in the database for their area. He/she needs to have access to existing lighting information to achieve this.

Road Marking Contractor

The Road Marking Contractor may be responsible for the provision of updated road marking data to the Consultant or the Contractor or may be responsible for maintaining this data in the database for their area. He/she needs to have access to existing road marking information to achieve this.

Surfacing Contractor

The surfacing contractor needs read only rights to the hsd_texture, surface, subgrade and pavement tables so will be granted access with a viewer role. This should be limited to his/her contract area only. If accredited to Level 2, this contractor should have read and write access rights to the surface table for his/her area only and for the duration of the contract and will be given the role of markings contractor.

Project Contractor

The project contractor needs access to lookup table information and existing inventory information so he/she can provide data back to the consultant who is responsible for updating of the database.

Access Rights Requirements for NMM Contractor

Each Contractor needs read only rights for his/her area only and for the duration of the contract. Where the contractor is responsible for updating inventory data, Level 2 accredited employees of the contractor will be granted write access with the role of general contractor.

Traffic Services Contractor

If accredited to Level 2, this contractor should have read and write access rights to the signs table for his/her area only and for the duration of the contract and will be given the role of signs contractor.

Lighting Contractor

If accredited to Level 2, this contractor should have read and write access rights to the street lighting tables for his/her area only and for the duration of the contract and will be given the role of lighting contractor.

Road Marking Contractor

If accredited to Level 2, this contractor should have read and write access rights to the markings table for his/her area only and for the duration of the contract and will be given the role of markings contractor.

Surfacing Contractor

The surfacing contractor needs read only rights to the hsd_texture, c_surface table and the surface_structure table only so will be granted access with a viewer role. This should be limited to his/her contract area only. If accredited to Level 2, this contractor should have read and write access rights to the c_surface table for his/her area only and for the duration of the contract and will be given the role of markings contractor.

Project Contractor

The project contractor needs read access to all inventory information for the area he/she is working in and for the duration of his project contract. He/she will be granted access with a viewer role.

10.7 Other organisations

Government Agencies

From time to time government agencies like Police and Statistics departments may require read access. These should be dealt with on a case-by-case basis with access role of viewer.

Educational Institutes

From time to time educational institutes may wish to have access to the RAMM database for research projects. This should be read only access and be approved through the NZTA National Office on a project-by-project basis.

Other Commercial Entities

This should be read only access with a viewer or full viewer role (in the case of a specialist consultant) and be approved by NZTA National Office on a case-by-case basis.

10.8 Public

Access for Information

It is envisaged in the future that members of the public may well have a need for information held in the RAMM database. This should be dealt with on a case-by-case basis and approval given by NZTA.

10.9 Roles

Explanation

A role is a collection of permissions and is given a name. For instance, most users will have a viewer role, which means that they will be able to have read access in RAMM (except skid resistance) plus the ability to export databases and tables. Below are different roles that a user may have when using a NZTA RAMM database.

Viewer

Read-only access to all condition and inventory tables except the skid resistance table, the road names table and maintenance cost data using RAMM and RAMM SQL, ability to export files except the skid resistance table or a database.

Full Viewer

As for viewer but with the ability to view and export the skid resistance table.

NMC (Network Management Consultant)

As for viewer plus the ability to add (either row-by-row in RAMM or using the import facility in RAMM Manager) or update using RAMM, to some specific tables.

Plus, the ability to export, update, copy, create and delete forward works programmes, plus the ability to invoke status check processing for surfacing, pavement, treatment length summarisation and forward works programme calculation.

NMC (Network Management Consultant) Super User

An NMC super-user is an accredited RAMM inventory collection and entry trainer. His or her permissions are as for the NMC plus the ability to delete asset or maintenance cost data using system query language (SQL).

Network Bridge Consultant

A network bridge consultant has the ability to view and update the bridge tables, either row-by-row in RAMM or using the import facility in RAMM Manager.

National Office Consultant

As for NMC Super-User plus the ability to use RAMM Network Manager to alter carriageway and roadnames tables.

General Contractor

An accredited general contractor will have the same permissions as for full viewer plus the ability to add (either by row-by-row in RAMM or using the import facility in RAMM Manager) or update using RAMM, to some specific tables.

A General Contractor will also be able map his or her own staff.

Surfacing Contractor

This role is for accredited users only and has the permissions as for viewer plus the ability to add surfacing data either using RAMM or the import facility of RAMM Manager, plus the ability to update surfacing data row-by-row using RAMM.

Lighting Contractor

This role is for accredited users only and has the permissions as for viewer plus the ability to maintain lighting data using RAMM Contractor.

Signs Contractor

This role is for accredited users only and has the permissions as for viewer plus the ability to add signs data either using RAMM or the import facility of RAMM Manager, plus the ability to update or delete signs row-by-row using RAMM.

Markings Contractor

This role is for accredited users only and has the permissions as for viewer plus the ability to add markings data either using RAMM or the import facility of RAMM Manager, plus the ability to update or delete markings row-by-row using RAMM.

MSQA (Management Support Quality Assurance Consultant)

As for full viewer plus the ability to import some specific tables using RAMM Manager.

Plus, the ability to update and delete from the above tables using RAMM SQL, plus the ability to invoke status check processing for the above condition data tables.

DBA (Database Administrator)

“Full Control” user abilities. This does not include the ability to update the staff permissions table using SQL.

Valuation Consultant

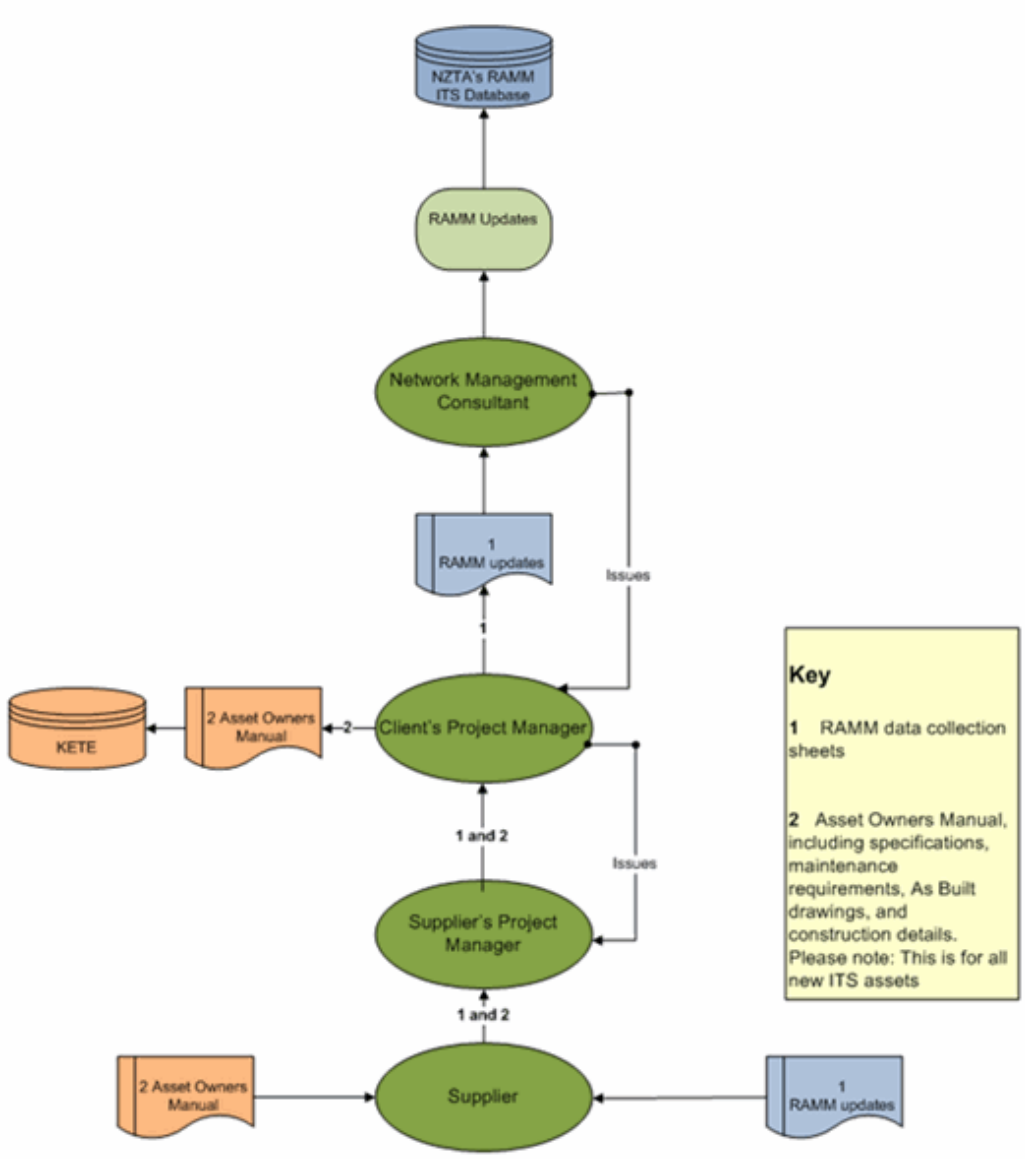
As for viewer plus the ability to update the valuation attributes of all inventory tables, and the ability to alter and export valuation snapshots.

Section 11 – Mechanical and electrical plant

11.1 Data capture process and responsibility

Process

The typical M&E data transfer process is as follows:



Responsibility

The responsibility for the collection and loading of M&E data is described below in terms of projects and general maintenance:

Data Collection and Verification

- Projects
    - The contractor / consultant responsible for completing the as-built information for the project, is responsible for collating the required M&E data in the correct format. Level 1 certification is required.

    - The NZ Transport Agency appointed project manager is responsible for ensuring the data is accurate / complete (matches completed works) and has been verified to be in the correct format by a Level 1 certified person. The project Manager is also responsible for the supply of asset data and as-built drawings to the Network Management Consultant (NMC).
- Maintenance & Support: Moves, Additions & Changes (MACs)
    - The maintenance contractor is responsible for the capture of changes to the asset base, including spares (in store) and deployed assets.
    - Data changes are to be communicated to the NZ Transport Agency appointed Engineer to Contract or Engineers representative within a pre-defined period, by a Level 1 certified person and in the appropriate format (e.g. via an electronic version of the data collection sheet).
    - The Engineer is responsible for verifying the data is in the correct format and is accurate / complete (matches completed works / claims) before passing it to the NMC. The Engineer requires Level 1 certification or needs to engage a suitably qualified person to complete the review.

Data processing

The Network Management Consultant (NMC) receives all M&E data updates (as described above). The NMC needs to perform data checking to ensure that data supplied is in the correct format and meets the SHDOM requirements:

- Data incomplete or not in the correct format: NMC to send back to the data provider for rework.
- Data is correct and acceptable: Upload into the database by a Level 2 certified person.
- Send an email to the engineer to contract or project manager confirming data updates have been completed.

All persons involved in collecting or uploading data in the above process will need to be M&E Level 1 (collection and review) or Level 2 certified (upload to the database), to ensure data quality. Individuals completing high level project reviews are not required to be certified but should ensure the data was collected by a certified person and the information provided matches the project works.

11.2 Activities

Typical activities

Updating the M&E table may be due to a variety of activities, resulting in a change to the asset, such as:

New installations:

New assets installed as part of Capital or minor projects (where no existing assets are currently installed). The new asset is added to the database with a state of “In Service” or “Unavailable” (not online / activated yet).

General Maintenance:

The replacement of components in the field or swapping components between asset locations and stores as required in maintaining the operation of existing M&E assets. This will result in a number of possible actions:

- A new asset added to the database with a state of “In Service”.
- An existing asset being replaced and the state updated to “Disposed” (if not repairable) or “Unavailable” (sent for repair).
- An asset from the store being deployed into the field and the state updated from “In Store” to “In Service” with the location details updated to the deployed location.
- Asset components in the field being rotated to more critical locations with failures, which results in a location update for the rotated asset and a state change for the failed asset (“Disposed” or “Unavailable”)

Renewals and upgrades:

Replacing assets or upgrading components of active M&E assets as part of a planned forward work plan. This will result in the addition of new assets ("In Service"), as well as the change in location details (swapped to another location or store) and the state of the existing assets to "Disposed" or "In Store" (some usable components).

Removal / Disposal:

Assets can be removed from the network or disposed of as a result of:

- Failed components (not repairable) or obsolete assets being disposed;
- Assets removed from a location where it is no longer required and put in store.

These assets will be updated with a state of "Disposed" or "In Store", with the locations updated to the new store location (disposals do not need a location change).

Relocation: Assets or components can be rotated between locations on the network for various reasons. This may include rotating working assets / components in the field from less critical locations to replace failed assets at critical locations. The location details and state could be updated depending on the status of the failing asset.

Assets are rotated between the store and the field to allow components to be sent for repair (without returning to a location to re-install a repaired component). This will result in a location update for both assets, as well as a state change to "In Service" (for asset from store) and "Unavailable" or "In Store" (for the asset being repaired).

Purchase new stock / existing stock: New assets are purchased as spares and kept in storage. Their location details will be specific to the store location and their state will remain "In Store" until they are deployed onto the network. Existing stock in store may be previously purchased stock or working / repaired assets from the field to be used as spares. Their location details are changed to fit their current location and state will change from "In Service" or "Unavailable" to "In store" and vice versa as they are rotated between the field and the store.

Maintenance Costs

Some activities related to the general maintenance of M&E assets (e.g. graffiti cleaning etc) and the replacement of minor components not captured as an individual M&E asset (e.g. circuit boards, wiring etc.), will not result in an update to any M&E assets captured.

These activities are captured as maintenance cost records, in the normal way maintenance activities are recorded for other assets.

General

If any maintenance or project activities (as described above), results in a change of an asset's state, location or other details (e.g. maintenance contractor), the M&E table needs to be updated.

Maintenance activities may result in assets or components being temporarily removed to be repaired, before being re-installed at the same location. If removal / reinstatement is still current at the time of the data delivery, then the database is updated to reflect the asset as "unavailable". This will minimise unnecessary repetitive changes to the database, which may not result in a permanent change. If the repair is unsuccessful and the component requires replacement or removal, the database will need to be updated to indicate the replacement of the failed asset / components.

Monthly data submission for updates is recommended as best practice to ensure asset data is kept up to date.

Assets are never deleted from the database, even if disposed, but are rather managed through updating the state.

Assets located in or rotated to the store may be difficult to differentiate and track, as they do not have a unique location. To ensure the correct asset information is captured and updated when rotating assets between the store and the field, it is critical that a unique and visible form of identification is captured for each asset. This may include the visible serial number or a unique name labelled on the asset (noted in the "Field Name" of asset data). A suitable identification system or process needs to be agreed for a maintenance contract before work commences.