PART C:
LOCATION REFERENCING PROCEDURES

4 NETWORK ACTIVITIES

Background

Chapter 4 and 5 outline the **Location Reference Procedures** that are applied to determine, store, maintain and retrieve the information about specific points and segments along a highway. This encompasses:

Network Management*:* Procedures to be followed when there is a change to the network that affects the location referencing (e.g. through construction or SH review process). This includes:

- identification/notification;
- installation or removal of the LR signs;
- creation/modification of the "network", including spatial; and
- entry of associated "inventory" data for all assets.

Operation and Maintenance*:* Procedures governing the use of location referencing and the physical maintenance of the LR signs. These procedures are outlined in Chapter 5.

Network Management

There are a number of **network activities** that impact on the location referencing system. For example, when a road is realigned such that there is a resultant change to the RS length, we must:

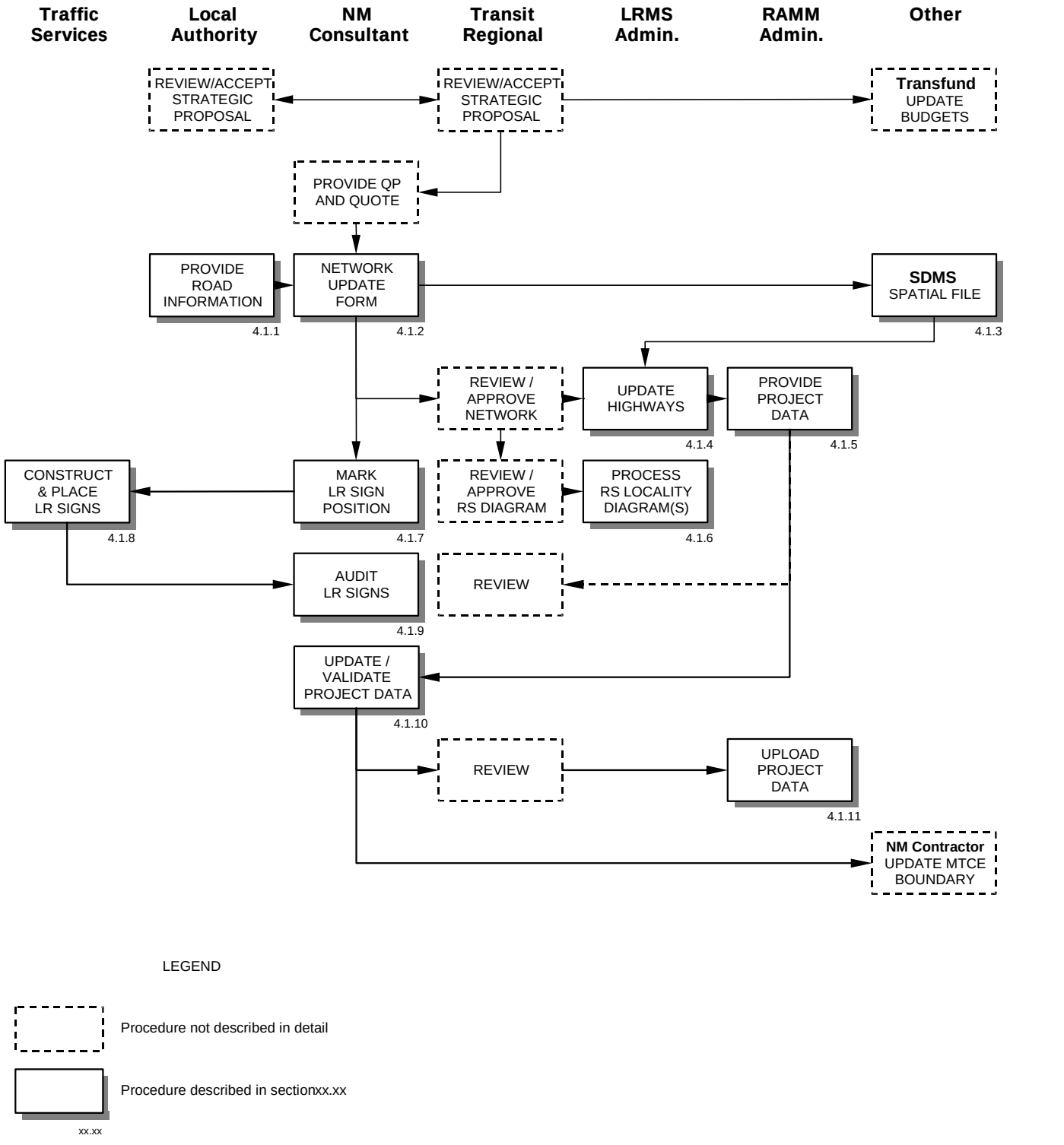
- Measure-up changes,
- Remove signs on the old alignment,
- Reposition signs "downstream" of the new alignment,
- Install signs along new alignment,
- Update RS diagrams (if applicable),
- Update spatial centreline (SDMS Consultant),
- Update linear network (Transit New Zealand HO using 'Highways by Exor'),
- Update Transit New Zealand's Asset Register (RAMM), and
- Update other systems such as BIS, RDS and HIS, TOPS, etc.

This chapter reviews the procedures that must be followed when there are changes to the road network.

In this Chapter

The topics in this chapter are listed below:

4.1 Transfer Local Road to Highway



4.1.1 Provide Road Information

Overview

The Territorial Local Authority (TLA) shall provide Road Information including its assets, pavement, maintenance and condition data to the Network Management Consultant (NMC) to enable the updating of Transit New Zealand's Asset Register.

Procedure

Once the decision of delegating a new state highway from a local authority road has been made, the NMC is responsible for gathering the appropriate information from the TLA, which will facilitate the updating of Transit New Zealand's Asset Register.

Examples of information required is:

- Road information from TLA's Asset Register, including historical pavement, condition and maintenance data, as well as assets, such as signs and culverts.
- Plan showing the road alignment, and
- Any other information that will aid the data collection survey and asset register update.

The TLA shall focus on providing any information that the NMC will be unable to collect during (and any other information that will aid) a visual survey, i.e. pavement layer, surfacing details, subsoil drains, etc.

4.1.2 Network Update Form

Overview

The NMC shall collate information and provide accurate details of the network change to the Transit New Zealand Regional Officer for approval and then to the LRMS Administrator and Spatial Data Management Services (SDMS) Consultant for the purpose of updating Highways by Exor.

Procedure

The NMC shall collate any information, which will facilitate the accurate implementation of the network update into Transit New Zealand's systems.

The NMC shall liaise with the Transit New Zealand Regional Officer to plan the proposed layout of the network. The proposed layout shall be set up in accordance with SHDOM (SM050) Section 3: Road and Section Definitions and this manual.

The NMC will be required to co-ordinate and carry out a field survey for the following purpose:

- Collect route position information,
- Validate and identify all asset data that requires updating,
- Collect any required new asset/information, and
- Collect GPS co-ordinates for RS/ERP locations as required.

The survey shall be carried out in accordance with Transit's Code of Practice for Temporary Traffic Management and SHDOM (SM050) Section 8: Field Validation Procedures.

Once the proposed network has been established, the NMC shall provide details to the SDMS Consultant, such as:

- Network Update Form,
- Survey plans or construction drawings,
- Road sections route position details,
- Road section measurement lengths,
- Data collection survey notes,
- GPS data collected for RS/ERP points, and
- New and updated Reference Station Locality Diagram(s).

The NMC will be required to co-ordinate with the Signs Contractor the installation/upgrade/removal of Location Reference signs.

The NMC shall also populate Section 1 of a Network Update Form[1] (NUF) and supply it to Transit New Zealand Regional Officer as well as the following information for review and acceptance:

- New/Updated Reference Station Locality Diagram(s) [2], and
- Any other information that will facilitate the understanding of the network update, such as survey plans and RS length review survey notes.

The NMC shall supply this information no later than **15 working days** prior to the official state highway opening.

1 Refer to Appendix A

2 Refer to Appendix B

Related Documentation

- State Highway Database Operations Manual, SM050.

4.1.3 SDMS – Spatial File

Overview

The SDMS Consultant shall provide new spatial network alignment to the LRMS Administrator for implementation into Highways.

Procedure

Once the NMC has provided the SDMS Consultant with a copy of

the NUF and supporting state highway alignment information in accordance with the spatial data specification in Appendix G, the SDMS Consultant shall create the new spatial alignment.

The new spatial alignment shall be supplied to the LRMS Administrator in compliance with the SDMS Contract and within **10 working days** of receipt of the data from the NMC. The LRMS Administrator will ensure the SDMS consultant is supplied with the new network (Road ID etc) information to update the master dataset they maintain.

Related Documentation

- SDMS Contract.

4.1.4 Update Highways by Exor

Overview

The LRMS Administrator shall implement changes into Highways as per the NUF supplied by the NMC and new spatial alignment data supplied by the SDMS Consultant.

Procedure

The LRMS Administrator is responsible for ensuring that the NUF has been approved[1] by the Transit New Zealand Regional Officer and liaise with the NMC and/or Transit New Zealand Regional Officer should there be any problems with the NUF.

The LRMS Administrator is responsible for reviewing the NUF against the Locality Diagrams and any other documentation supplied by the NMC to ensure that the correct updates are implemented.

Once approved, the LRMS Administrator shall implement the changes in Highways in accordance with the LRMS Administrators Guide.

The LRMS Administrator shall load the spatial data supplied by the SDMS Consultant and ensure that the spatial data complies with the changes requested in the NUF.

Once the network change has been made in Highways by Exor the LRMS Administrator shall provide the SDMS Consultant with the new Road ID's for the affected network. The SDMS Consultant shall make these final centreline changes and publish them.

The updating of Highways should be carried out no later than **5 working days** from receiving the NUF.

Once all updates have been completed in Highways, the LRMS Administrator shall fill in Section 3 – LRMS Administrator of the NUF and pass it to the RAMM Administrator for further action.

1 Section 2 of the NUF should be signed by the respective Transit New Zealand Regional Officer.

Related Documentation

- LRMS Administrators Guide (online).

4.1.5 Provide Project Data

Overview

The RAMM Administrator shall provide the NMC with project data, which will enable the NMC to implement the new state highway.

Procedure

The RAMM Administrator shall review the NUF and any other documentation supplied. This process will aid the identification of all road sections, which are affected by the implementation of the new state highway.

The RAMM Administrator shall download the RAMM information for the road sections, which were affected by the network update, using RAMM Network Manager – Export Session option.

Once the project data has been extracted from Transit New Zealand's Asset Register, the RAMM Administrator shall fill in Section 3 – RAMM Administrator of the NUF, provide a copy of project data to the NMC and send confirmation of such delivery to the respective Transit New Zealand Regional Officer.

The provision of data shall be completed within **5 working days** from receipt of the NUF from the LRMS Administrator.

Related Documentation

- State Highway Database Operations Manual, SM050.
- Working with RAMM Manual.

4.1.6 Process RS Locality Diagram(s)

Overview

The LRMS Administrator shall update Transit New Zealand's Reference Station Locality Diagram system held at Transit New Zealand National Office.

Procedure

The NMC will provide a copy of the new/updated Reference Station Locality Diagram(s) with the NUF.

It is the LRMS Administrator responsibility to:

- Scan the RS locality diagram(s) supplied by the NMC,
- Update Transit New Zealand's RS locality diagram electronic systems,
- Update Transit New Zealand's RS locality diagram hardcopy system, and
- Archive any superseded electronic and hardcopy RS locality diagram(s).

The RS diagram(s) must be processed within **5 working days** from receipt of the NUF.

4.1.7 Mark LR Sign Position

Overview

In order to guarantee the accurate position of all LR signs within the network, the NMC is required to carry out a survey and mark the position of each LR sign, which will aid the Traffic Services Contractor during installation.

Procedure

Once Transit New Zealand Regional Office agrees with the recommended network layout, the NMC shall carry out a LR signs position marking survey.

The survey shall be carried out in accordance with Transit's Code of Practice for Temporary Traffic Management and SHDOM (SM050) Section 8: Field Validation Procedures.

The survey shall focus on accurate positioning of the LR signs as specified in Part B Sign Design and Placement of this manual.

The NMC shall record a detailed schedule[1], which will be provided to the Traffic Services Contractor for the installation/removal/upgrade of LR signs not later than **10 working days** prior to the official opening of the state highway.

The NMC is responsible for the accurate position of all LR signs and entry into Transit New Zealand Asset Register and hence is encouraged to support the Traffic Services Contractor during the sign installation process.

1 Example of schedule can be found on Appendix E

Related Documentation

- Transit New Zealand's Code of Practice for Temporary Traffic Management.
- State Highways Database Operations Manual, SM050.
- Standardisation of Maintenance Contract (SOMAC).

4.1.8 Construct and Place LR Sign

Overview

The Traffic Services Contractor shall construct and place the required Location Reference (LR) signs in accordance with the schedule provided by the NMC. The Road Marking Contractor shall mark any yellow reference squares.

Procedure

The NMC will supply the Traffic Services and Road Marking Contractor(s) with a schedule of signs to be installed, removed or upgraded.

It is the Contractor's responsibility to construct the requested LR signs in accordance with Part B Sign Design and Placement of this manual.

All fieldwork shall be carried out in accordance with Transit's Code of Practice for Temporary Traffic Management.

The sign installation/removal/upgrade and road marking must be completed prior to the official opening of the state highway.

Related Documentation

- Transit's Code of Practice for Temporary Traffic Management.

4.1.9 Audit LR Signs

Overview

This process has been established to ensure that the NMC can guarantee the accuracy of LR signs on the network.

Procedure

The NMC is responsible for reviewing the installation of LR signs and ensuring they meet the criteria set out on Part B of this manual.

All fieldwork shall be carried out in accordance with Transit's Code of Practice for Temporary Traffic Management. During the field survey the NMC will focus on reviewing:

- Route position,
- Layout,

- Legend,
- Offset,
- Height, and
- RAMM update forms accuracy and completeness.

The NMC will liaise with the Traffic Services Contractor on any issues brought up by this review and approve/certify once satisfied all criteria has been met.

Once approved, it is the NMC's responsibility to implement the sign updates in Transit New Zealand's Asset Register.

The NMC shall carry out the review of all new LR signs as part of the annual field validation process (refer to SM050 Section 8: Field Validation Procedures).

Related Documentation

- State Highways Database Operations Manual, SM050.
- Transit's Code of Practice for Temporary Traffic Management.

4.1.10 Update/Validate Project Data

Overview

The NMC shall implement inventory data updates on a 'Project Copy' of Transit New Zealand's Asset Register and return this information for entry into Transit New Zealand's Asset Register.

Procedure

Following on from section 4.1.5, once the project data has been received from Transit New Zealand's National Office, the NMC is responsible for reviewing the changes carried out on the network and reporting any problems found.

Once the NMC has approved the network changes on the project data supplied by Transit New Zealand's National Office, and has received appropriate information from the TLA, section 4.1.1, the NMC is responsible for updating the inventory information on the project data. The updating of inventory information on the project data shall meet the minimum requirements set out in SHDOM (SM050) Appendix 3: Asset Register. If no data was provided then this task will comprise a full asset inventory survey.

Once all updates have been completed, the NMC shall fill in Section 4 of the NUF and supply a copy to the Transit New Zealand Regional Officer, together with the updated inventory data.

The data delivery shall be supplied in accordance with SHDOM (SM050) Section 4: Data Delivery Procedures. The NMC shall supply the updated inventory data within **15 working days** from

the date the project data is received.

The NMC is responsible for updating the Route Data and Highway Information sheets to show the network change.

Related Documentation

- State Highway Database Operations Manual, SM050.

4.1.11 Upload Project Data

Overview

The RAMM Administrator shall load updated inventory data supplied by the NMC into Transit New Zealand's Asset Register.

Procedure

The RAMM Administrator is responsible for ensuring that the NUF has been approved[1] by Transit New Zealand Regional Officer and liaising with the NMC and/or Transit New Zealand Regional Officer should there be any problems with the NUF.

The RAMM Administrator is responsible for reviewing the updated information supplied by the NMC prior to loading into Transit New Zealand's Asset Register.

If the data is delivered in electronic format, the review shall focus on checking row counts on forms and against the asset register.

If the data is delivered in hardcopy forms, the RAMM Administrator shall review for completeness and compliance with SHDOM (SM050) Appendix 3: Asset Register.

Once the RAMM Administrator has accepted the data, it should be loaded into Transit New Zealand's Asset Register.

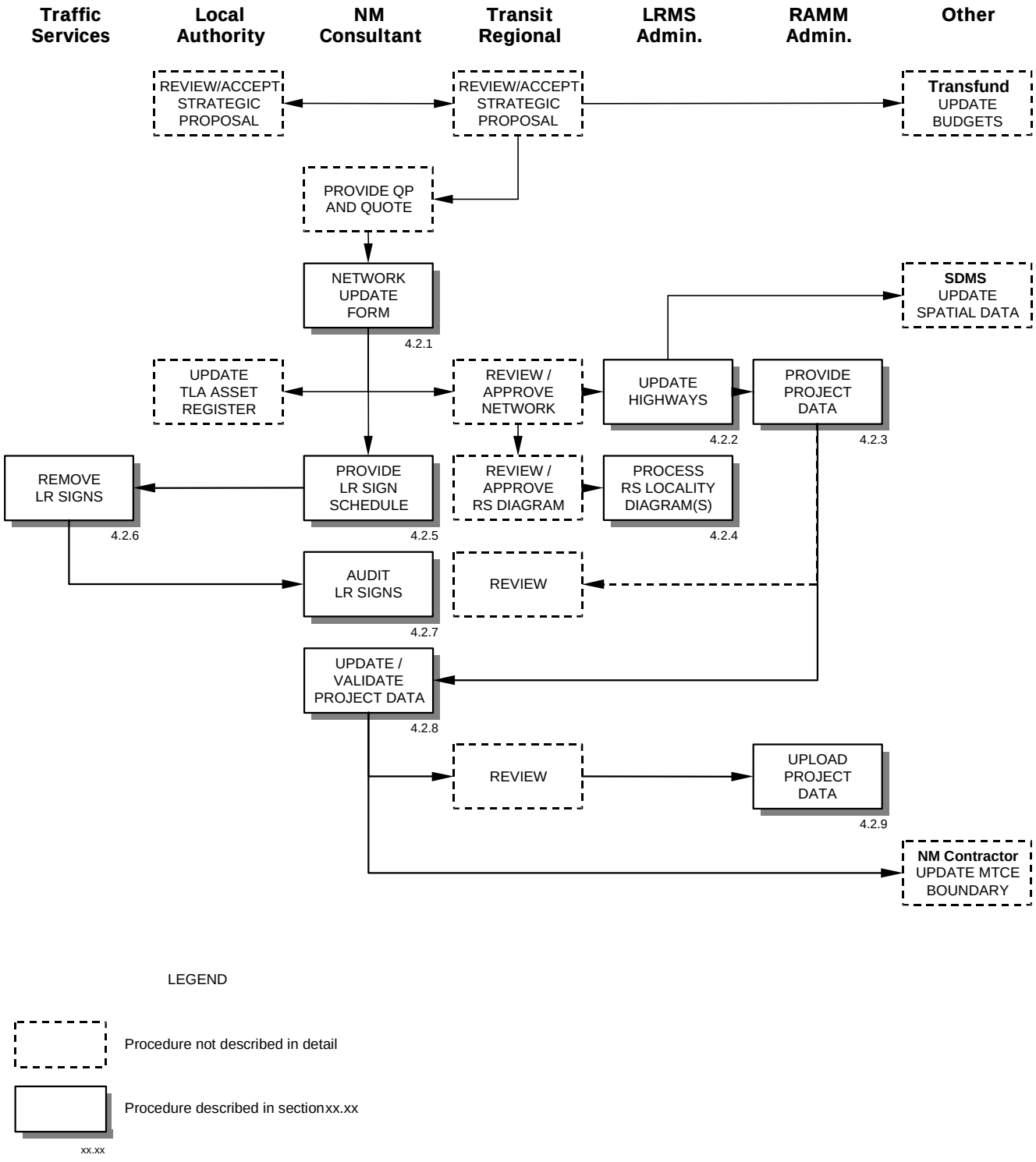
Once completed, the RAMM Administrator shall provide a copy of the completed NUF to the NMC and Transit New Zealand Regional Officer to advice that the implementation of the new state highway in Transit New Zealand's Asset Register has been completed.

1 Section 5 of the NUF should be signed by the respective Transit New Zealand Regional Officer

Related Documentation

- State Highway Database Operations Manual, SM050.

4.2 Revoke a Highway



4.2.1 Network Update Form

Overview

The NMC shall collate information and provide accurate details of the network change to the LRMS Administrator and SDMS Consultant for the purpose of updating Highways.

Procedure

Once the decision to revoke a state highway has been established by Transit New Zealand and the relevant Territorial Local Authority (TLA), the NMC shall collate any information, which will facilitate the accurate implementation of the network update into Transit New Zealand's systems.

Once the data has been collated, the NMC shall liaise with the Transit New Zealand Regional Officer to plan the proposed layout of the network after revoking the state highway.

The proposed layout shall be set up in accordance with SHDOM (SM050) Section 3: Road and Section Definitions.

The NMC will be required to co-ordinate with the Traffic Services Contractor installation or removal of Location Reference signs, once the proposed network layout has been established.

The NMC shall populate Section 1 of a Network Update Form[1] (NUF) and supply it to Transit New Zealand Regional Officer as well as the following information for review and acceptance:

- Updates to Reference Station Locality Diagram(s)[2], and
- Any other information that will facilitate the understanding of the network update.

The NMC shall be responsible for supplying all the road information for the revoked state highway from Transit New Zealand's Asset Register to the TLA for implementation onto their asset register.

The NMC shall supply this information no later than **15 working days** prior to the official revoke of the state highway.

1 Refer to Appendix A

2 Refer to Appendix B

Related Documentation

- State Highway Database Operations Manual, SM050.

4.2.2 Update Highways

Overview

The LRMS Administrator shall implement changes into Highways as per the NUF supplied by the NMC and inform the SDMS Consultant of the network change.

Procedure

The LRMS Administrator is responsible for ensuring that the NUF has been approved[1] by Transit New Zealand Regional Officer and liaise with the NMC and/or Transit New Zealand Regional Officer should there be any problems with the NUF.

The LRMS Administrator is responsible for reviewing the NUF against the Reference Station Locality Diagrams and any other documentation supplied by the NMC to ensure that the correct updates are implemented.

Once approved, the LRMS Administrator shall implement the changes in Highways in accordance with the LRMS Administrators Guide.

The LRMS Administrator shall inform the SDMS Consultant on changes to the spatial data including supplying the NUF, updated Reference Station Locality Diagrams and the new Road ID's for the affected network.

Once all updates have been completed in Highways, the LRMS Administrator shall fill in Section 3 – LRMS Administrator of the NUF and pass it to the RAMM Administrator for further action.

The updating of Highways should be carried out no later than **5 working days** after receiving the NUF.

1 Section 2 of the NUF should be signed by the respective Transit New Zealand Regional Officer.

Related Documentation

- LRMS Administrators Guide (online).

4.2.3 Provide Project Data

Overview

The RAMM Administrator shall provide the NMC with project data, which will enable the NMC to implement the new inventory.

Procedure

The RAMM Administrator shall review the NUF and any other

documentation supplied. This process will aid the identification of all road sections affected by the revoking of the state highway.

The RAMM Administrator shall download the RAMM information for the road sections, which were affected by the network update, using RAMM Network Manager – Export Session option.

Once the project data has been extracted from Transit New Zealand's Asset Register, the RAMM Administrator shall fill in Section 3 – RAMM Administrator of the NUF, provide a copy of the project data to the NMC and send confirmation of such delivery to the respective Transit New Zealand Regional Officer.

The provision of data shall be completed within **5 working days** of receipt of the NUF from the LRMS Administrator.

Related Documentation

- State Highway Database Operations Manual, SM050.
- Working with RAMM Manual.

4.2.4 Process RS Locality Diagram(s)

Overview

The LRMS Administrator shall update Transit New Zealand's Reference Station Locality Diagram system held at Transit New Zealand National Office.

Procedure

The NMC will provide a copy of the affected Reference Station Locality Diagram(s) with the NUF.

It is the LRMS Administrator responsibility to:

- Update Transit New Zealand's RS Locality Diagram electronic systems,
- Update Transit New Zealand's RS Locality Diagram hardcopy system, and
- Archive any superseded electronic and hardcopy RS Locality Diagrams.

The RS Locality Diagram(s) must be processed within **5 working days** from receipt of the NUF.

4.2.5 Provide LR Sign Schedule

Overview

The NMC is required to carry out a survey to create a LR signs schedule, which will aid the Traffic Services Contractor during the

removal of LR signs and the implementation of any other signs where required.

Procedure

Once Transit New Zealand Regional Office agrees with the recommended network layout, the NMC shall carry out a survey, which will establish a schedule of signs to be installed/removed/upgraded.
The survey shall be carried out in accordance with Transit's Code of Practice for Temporary Traffic Management and SHDOM (SM050) Section 8: Field Validation Procedures.

The survey shall focus on removal of LR signs on the revoked highways as well as the accurate positioning of any new LR signs on the remaining highways, as specified in Part B Sign Design and Placement of this manual.

The NMC shall record a detailed schedule[1], which will be provided to the Traffic Services Contractor for the installation/removal/upgrade of LR signs not later than **10 working days** prior to the official revoke of the state highway.

The NMC is responsible for the accurate position of all LR signs and entry into Transit New Zealand's Asset Register and hence is encouraged to support the Traffic Services Contractor during the sign installation process.

1 Example of schedule can be found on Appendix E

Related Documentation

- Transit's Code of Practice for Temporary Traffic Management.
- State Highways Database Operations Manual, SM050.
- Standardisation of Maintenance Contracts (SOMAC).

4.2.6 Remove LR Signs

Overview

The Traffic Services Contractor shall install, remove, upgrade, construct and place the required Location Reference (LR) signs in accordance with the schedule provided by the NMC.

Procedure

The NMC will supply the Traffic Services Contractor with a schedule of signs to be installed/removed/upgraded.

It is the Traffic Services Contractor's responsibility to construct and upgrade requested LR signs in accordance with Part B Sign Design and Placement of this manual.

All fieldwork shall be carried out in accordance with Transit's

Code of Practice for Temporary Traffic Management.

The sign installation/removal/upgrade must be completed prior to the official revoke of the state highway.

Related Documentation

- Transit's Code of Practice for Temporary Traffic Management.

4.2.7 Audit LR Signs

Overview

This process has been established to ensure that the NMC can guarantee the accuracy of LR signs on the network and that the redundant signs from revoked sections are removed.

Procedure

The NMC is responsible for reviewing the installation, removal and upgrade of LR signs and ensure they meet the criteria set out on Part B of this manual.

All fieldwork shall be carried out in accordance with Transit's Code of Practice for Temporary Traffic Management.

For new/upgraded signs, the NMC will focus on reviewing:

- Route position,
- Layout,
- Legend,
- Offset,
- Height, and
- RAMM update forms accuracy and completeness.

The NMC shall focus on ensuring that no Transit New Zealand LR signs are left on the revoked highway.

The NMC will liaise with the Traffic Services Contractor on any issues brought up by this review and approve/certify once satisfied all criteria have been met.

The NMC shall carry out the review of all LR signs as part of the annual field validation process (refer to SM050 Section 8: Field Validation Procedures).

Related Documentation

- State Highways Database Operations Manual, SM050.
- Transit's Code of Practice for Temporary Traffic Management.

4.2.8 Update/Validate Project Data

Overview

The NMC shall implement inventory data updates on a 'Project Copy' of Transit New Zealand's Asset Register and return this information for entry into Transit New Zealand's Asset Register.

Procedure

Following on from Section 4.2.3, once the project data has been received from Transit New Zealand's National Office, the NMC is responsible for reviewing the changes carried out on the network and reporting any problems found.

Once the NMC has approved the network changes on the project data supplied by Transit New Zealand's National Office, the NMC is responsible for updating the inventory information on the project data. The updating of inventory information on the project data shall meet the minimum requirements set out in SHDOM (SM050) Appendix 3: Asset Register.

Once all updates have been completed, the NMC shall fill in Section 4 of the NUF and supply a copy to the Transit New Zealand Regional Officer, together with the updated inventory data.

The data delivery shall be supplied in accordance with SHDOM (SM050) Section 4: Data Delivery Procedures. The NMC shall supply the updated inventory data within **15 working days** from the date the project data is received.

The NMC is responsible for updating the Route Data and Highway Information sheets to show the network change.

Related Documentation

- State Highway Database Operations Manual, SM050.

4.2.9 Upload Project Data

Overview

The RAMM Administrator shall load updated inventory data supplied by the NMC into Transit New Zealand's Asset Register.

Procedure

The RAMM Administrator is responsible for ensuring that the NUF has been approved[1] by Transit New Zealand Regional Officer and liaise with the NMC and/or Transit New Zealand Regional Officer should there be any problems with the NUF.

The RAMM Administrator is responsible for reviewing the updated information supplied by the NMC prior to loading into Transit New Zealand's Asset Register.

If the data is delivered in electronic format, the review shall focus on checking row counts on forms and against the asset register.
If the data is delivered in hardcopy forms, the RAMM Administrator shall review for completeness and compliance with SHDOM (SM050) Appendix 3: Asset Register.

Once the RAMM Administrator has accepted the data, it should be loaded into Transit New Zealand's Asset Register.

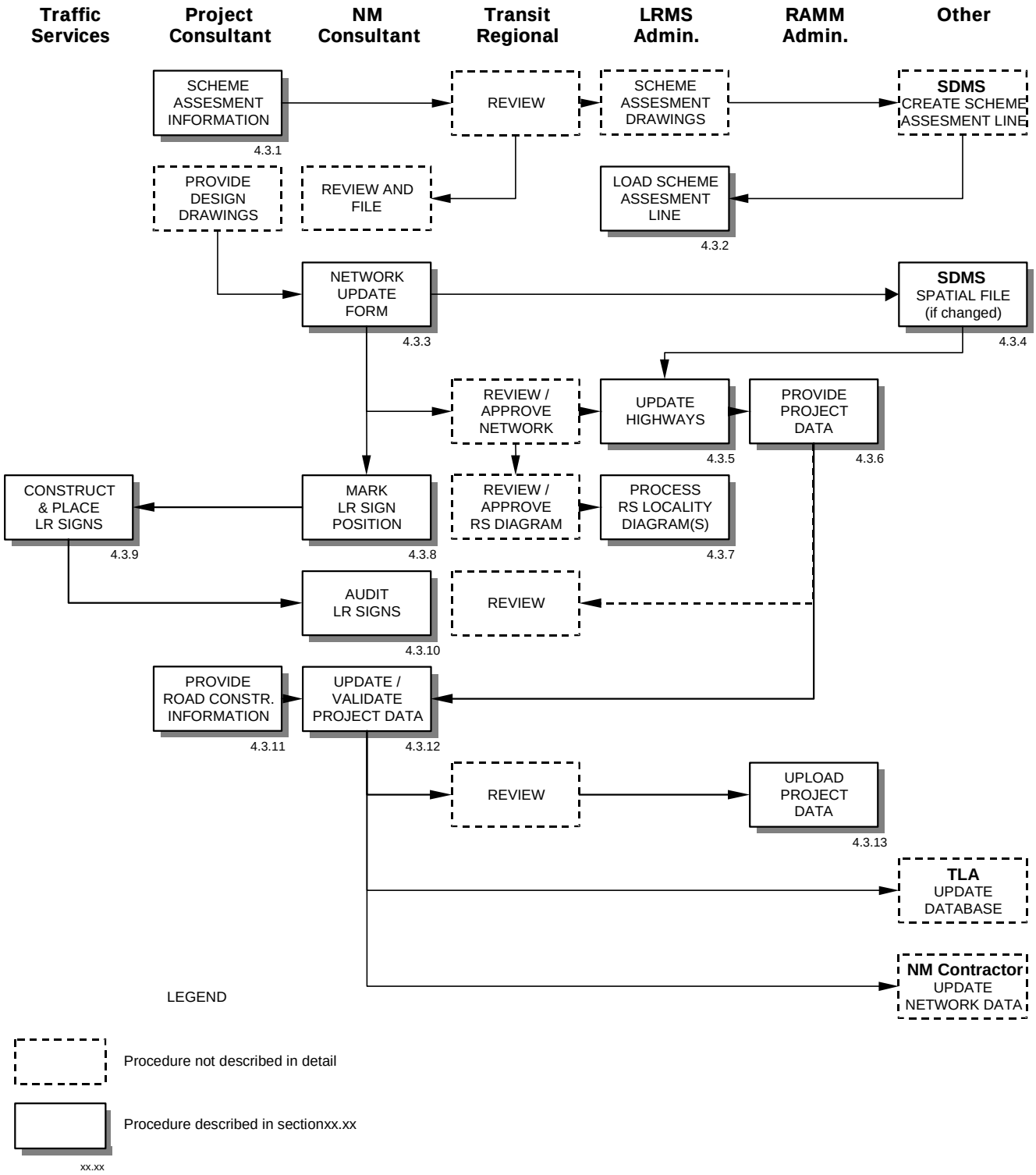
Once completed, the RAMM Administrator shall provide a copy of the completed NUF to the NMC and Transit New Zealand Regional Officer to advice that the implementation of the network change in Transit New Zealand's Asset Register has been completed.

1 Section 5 of the NUF should be signed by the respective Transit New Zealand Regional Officer.

Related Documentation

- State Highway Database Operations Manual, SM050.

4.3 New Construction



4.3.1 Scheme Assessment Information

Overview

The Project Consultant shall provide preliminary information on changes to the physical network (extent and alignment) so it can be displayed in Highways by Exor as a future road.

Procedure

The Project Consultant shall ensure Transit New Zealand has the scheme assessment information. Where available a copy of the Scheme Assessment Report will be supplied along with electronic drawing files that show the proposed final alignment in NZMG. This information should then facilitate identifying the changes on the network due to the physical works.

The NM Consultant and the Transit New Zealand Regional LRMS Champion shall forward the details to the LRMS Administrator who in turn shall forward the details to the SDMS Consultant.

The SDMS Consultant shall create the Scheme Assessment Line (the centreline based on the information provided), and forward to the LRMS Administrator who will load it into Highways as a display of the proposed road alignment.

The Scheme Assessment Line will be reviewed by the NMC upon completion of the physical work and provision of the construction drawings by the Project Consultant. The NMC will then undertake a field review to ensure accurate network updates have been made.

Related Documentation

- Transit New Zealand Standard Professional Services Specification: Investigation and Reporting.

4.3.2 Load Scheme Assessment Line

Overview

The LRMS Administrator shall load the Scheme Assessment Line (spatial file supplied by the SDMS Consultant) into Highways.

Procedure

Once the SDMS Consultant has received the information supplied by the Project Consultant, they shall create a spatial file containing the Scheme Assessment Line for the proposed road alignment.

The new spatial data shall be provided back to the LRMS Administrator within **10 working days** of the data being supplied by the Project Consultant

The Scheme Assessment Line spatial file shall be in the format specified in the SDMS Contract.

The spatial data will be loaded into Highways[1] as a temporary road alignment, which will be used only for the purpose of viewing the future road alignment, i.e. it will not be added to the current network centreline until the NMC has confirmed the road layout at the completion of the physical works.

1 *Refer to the LRMS Administrators Guide (online).*

Related Documentation

- LRMS Administrator Guide.
- SDMS Contract.

4.3.3 Network Update Form

Overview

Upon completion of the physical works, the NMC shall collate information and provide accurate details of the network change to the LRMS Administrator and SDMS Consultant for the purpose of updating Highways.

Procedure

The NMC shall collate any information, which will facilitate the accurate implementation of the network update into Transit New Zealand's systems, e.g. construction drawings.

The NMC shall liaise with the Transit New Zealand Regional Officer to plan the proposed referencing layout of the network.

The NMC will be required to complete, in consultation with the Project Consultant, a data collection survey on the new road alignment, prior to the official road opening.

The NMC is responsible for carrying out the field survey for the following purpose:

- Collect route position information on the new road alignment,
- Identify all asset data that requires updating,
- Collect any new asset/information,
- Collect GPS co-ordinates for RS/ERP, if required, and
- Collect GPS data of the new alignment if no adequate construction or as built drawings exist in an electronic format.

The survey shall be carried out in accordance with Transit's Code of Practice for Temporary Traffic Management and SHDOM (SM050) Section 8: Field Validation Procedures.

The proposed layout shall be set up in accordance with SHDOM

(SM050) Section 3: Road and Section Definitions. In minor realignments, this process will be minimal.

Once the proposed network referencing has been established, the NMC shall review the need for updating the Scheme Assessment Line. Should any changes be required, the NMC shall provide details to the SDMS Consultant, such as:

- Construction drawings (electronic and hardcopy),
- Road Sections route position details,
- Data collection survey notes (where applicable),
- GPS data collected for RS/ERP points,
- Updated Reference Station Locality Diagrams and
- The Network Update Form.

The NMC shall populate Section 1 of a Network Update Form[1] (NUF) and supply it to Transit New Zealand Regional Officer as well as the following information for review and acceptance:

- Updated Reference Station Locality Diagram(s)[2], and
- Any other information that will facilitate the understanding of the network update, such as construction drawings and RS length review survey notes.

The NMC shall supply this information no later than **5 working days** prior to the official road opening.

1 Refer to Appendix A

2 Refer to Appendix B

Related Documentation

- State Highway Professional Services Contract Pro-Forma Manual.
- Transit New Zealand Standard Professional Services Specification: Design and Project Documentation.
- State Highway Database Operations Manual, SM050.

4.3.4 SDMS – Spatial File

Overview

The SDMS Consultant shall provide the updated network centreline to the LRMS Administrator for implementation into Highways.

Procedure

Should the NMC report any changes required on the Scheme Assessment Line (i.e. confirmation regarding the true alignment of the network), the SDMS Consultant shall review and update the Scheme Assessment Line as per details supplied.

The updated network centreline shall then be supplied to the LRMS Administrator in compliance with the SDMS Contract and within

10 working days from receiving the data from the NMC.

Related Documentation

- SDMS Contract.

4.3.5 Update Highways

Overview

The LRMS Administrator shall implement changes into Highways as per the NUF supplied by the NMC and new spatial alignment data supplied by the SDMS Consultant.

Procedure

The LRMS Administrator is responsible for ensuring that the NUF has been approved[1] by Transit New Zealand Regional Officer and liaise with the NMC and/or Transit New Zealand Regional Officer should there be any problems with the NUF.

The LRMS Administrator is responsible for reviewing the NUF against the new/updated Reference Station Locality Diagrams supplied by the NMC and any other documentation supplied by the NMC to ensure that the correct updates are being carried out.

Once reviewed, the LRMS Administrator shall implement the changes in Highways in accordance with the LRMS Administrators Guide.

The LRMS Administrator shall load the spatial data supplied by the SDMS Consultant and ensure that the spatial data complies with the changes requested in the NUF.

Once the network change has been made in Highways by Exor the LRMS Administrator shall provide the SDMS Consultant with the new Road ID's for the affected network. The SDMS Consultant shall make these final centreline changes and publish them.

The LRMS Administrator shall also fill in Section 3 – LRMS Administrator of the NUF and pass the NUF to the RAMM Administrator for further action.

The updating of Highways should be carried out no later **than 5 working days** from receipt of the NUF or spatial data.

1 Section 2 of the NUF should be signed by the respective Transit New Zealand Regional Officer.

Related Documentation

- LRMS Administrators Guide (online).
- SDMS Contract.

4.3.6 Provide Project Data

Overview

The RAMM Administrator shall provide the NMC with project data, which will enable the NMC to carry out inventory updates.

Procedure

The RAMM Administrator shall review the NUF and any other documentation supplied. This process will aid the identification of all road section affected by the physical works.

The RAMM Administrator shall download the RAMM information for the road sections, which were affected by the network update, using RAMM Network Manager – Export Session option.

Once the project data has been extracted from Transit New Zealand's Asset Register, the RAMM Administrator shall fill in Section 3 – RAMM Administrator of the NUF, provide copy of project data to the NMC and send confirmation of such delivery to the respective Transit New Zealand Regional Officer.

The provision of data shall be completed within **5 working days** from receipt of the NUF.

Related Documentation

- State Highway Database Operations Manual, SM050.
- Working with RAMM Manual.

4.3.7 Process RS Locality Diagram(s)

Overview

The LRMS Administrator shall update Transit New Zealand's Reference Station Locality Diagram system held at Transit New Zealand's National Office.

Procedure

The NMC will provide an updated copy of the new/updated Reference Station Locality Diagram(s) with the NUF.

It is the LRMS Administrator responsibility to:

- Scan the RS locality diagram supplied by the NMC,
- Update Transit New Zealand's RS locality diagram electronic system,
- Update Transit New Zealand's RS locality diagram hardcopy system, and
- Archive any superseded electronic and hardcopy RS locality diagram.

The RS diagram(s) must be processed within **5 working days** from receipt of the NUF.

4.3.8 Mark LR Sign Position

Overview

In order to guarantee the accurate position of all LR signs within the network, the NMC is required to carry out a survey to mark the position of each LR sign, which will aid the Traffic Services Contractor during installation.

Procedure

Once Transit New Zealand Regional Office agrees with the recommended network layout, the NMC shall carry out a LR signs position marking survey.

The survey shall be carried out in accordance with Transit's Code of Practice for Temporary Traffic Management and SHDOM (SM050) Section 8: Field Validation Procedures.

This survey shall focus on accurate positioning of the LR signs as specified in Part B Sign Design and Placement of this manual.

The NMC shall record a detailed schedule[1], which will be provided to the Traffic Services Contractor for the installation/removal/upgrade of LR signs not later than **5 working days** prior to the official opening of the road.

The NMC is responsible for the accurate position of all LR signs and entry into Transit New Zealand's Asset Register and hence is encouraged to support the Traffic Services Contractor during the sign installation process.

1 Example of schedule can be found on Appendix E

Related Documentation

- State Highway Professional Services Contract Pro-Forma Manual.
- Transit's Code of Practice for Temporary Traffic Management.
- State Highways Database Operations Manual, SM050.
- Standardisation of Maintenance Contracts (SOMAC).

4.3.9 Construct and Place LR Sign

Overview

The Traffic Services Contractor shall construct and place the required Location Reference (LR) in accordance with the schedule provided by the NMC.

Procedure

The NMC will supply the Traffic Services Contractor with a schedule of signs to be installed/removed/upgraded within the road section where the physical works have been carried out.

It is the Traffic Services Contractor's responsibility to construct and install/remove/upgrade the requested LR signs in accordance with Part B Sign Design and Placement of this manual.

All fieldwork shall be carried out in accordance with Transit's Code of Practice for Temporary Traffic Management.

The sign installation/removal/upgrade must be completed prior to the official opening of the road.

Related Documentation

- Transit's Code of Practice for Temporary Traffic Management.

4.3.10 Audit LR Signs

Overview

This process has been established to ensure that the NMC can guarantee the accuracy of LRMS signs on the network.

Procedure

The NMC is responsible for reviewing the installation of LR signs and ensure they meet the criteria set out on Part B of this manual.

All fieldwork shall be carried out in accordance with Transit's Code of Practice for Temporary Traffic Management.

The NMC will focus on reviewing:

- Route position,
- Layout,
- Legend,
- Offset,
- Height, and
- RAMM update forms accuracy and completeness.

The NMC will liaise with the Traffic Services Contractor on any

issues brought up by this review and approve/certify once satisfied all criteria have been met.

The NMC shall carry out the review of all new LR signs as part of the annual field validation process (refer to Section 8: Field Validation Procedures from the State Highway Database Operations Manual, SM050).

Related Documentation

- State Highways Database Operations Manual, SM050.
- Transit's Code of Practice for Temporary Traffic Management.

4.3.11 Provide Road Construction Information

Overview

The Project Consultant shall provide road construction information to the NMC to enable the updating of Transit New Zealand's Asset Register and assist in an inventory validation survey.

Procedure

Once the physical works project has been completed, the Project Consultant is responsible for supplying the NMC with appropriate information, which will facilitate the updating of Transit New Zealand's Asset Register. All information shall be supplied in an electronic format whenever possible.

Example of information are:

- Road Construction Information form (RCI) Form PSF3B from SM030,
- As-Built drawings (if these are not available constructions drawings shall be supplied), and
- Any other information that will aid the data collection and asset register update.

The Project Consultant shall focus on providing any information that the NMC will be unable to collect during (and any other information that will aid) a visual survey, i.e. pavement layer, surfacing details, subsoil drains, etc.

This information must be supplied to the NMC by no later **than 1 month** after the official opening of the road.

Related Documentation

- State Highway Professional Services Contract Pro-Forma Manual.

4.3.12 Update/Validate Project Data

Overview

The NMC shall implement inventory data updates on a 'Project Copy' of Transit New Zealand's Asset Register and return this information for entry into Transit New Zealand's Asset Register.

Procedure

Once the 'Project Copy' has been received from Transit New Zealand's National Office, the NMC is responsible for reviewing the changes carried out on the road section and reporting any problems found.

Once the Project Consultant has supplied the road construction information, the NMC shall review the data and contact the Project Consultant should more information be required.

Once the NMC has approved the network changes on the project data supplied by Transit New Zealand's National Office, the NMC is responsible for updating the inventory information on the project data. The updating of inventory information on the project data shall meet the minimum requirements set out in SHDOM (SM050) Appendix 3: Asset Register.

Once all updates have been completed, the NMC shall fill in Section 4 of the NUF and supply a copy to the Transit New Zealand Regional Officer, together with the updated inventory data. The data delivery shall be supplied in accordance with SHDOM (SM050) Section 4: Data Delivery Procedures. The NMC shall supply the updated inventory data within **15 working days** from the date the project data is received.

The NMC is responsible for updating the Route Data and Highway Information sheets to show the network change.

The NMC is responsible for contacting and supply adequate information to the TLA, if the physical works carried out on the State Highway Network effect a Local Authority Roading Network. These could vary from road shortening/extensions to culvert modifications.

Related Documentation

- State Highway Database Operations Manual, SM050.

4.3.13 Upload Project Data

Overview

The RAMM Administrator shall load updated inventory data supplied by the NMC into Transit New Zealand's Asset Register.

Procedure

The RAMM Administrator is responsible for ensuring that the NUF has been approved[1] by Transit New Zealand Regional Officer and liaise with the NMC and/or Transit New Zealand Regional Officer should there be any problems with the NUF.

The RAMM Administrator is responsible for reviewing the updated information supplied by the NMC prior to loading into Transit New Zealand's Asset Register.

If the data is delivered in electronic format, the review shall focus on reviewing row counts on forms against the asset register.

If the data is delivered in hardcopy forms, the RAMM Administrator shall review for completeness and compliance with SHDOM (SM050) Appendix 3: Asset Register.

Once the RAMM Administrator has accepted the data, it should be loaded into Transit New Zealand's Asset Register.

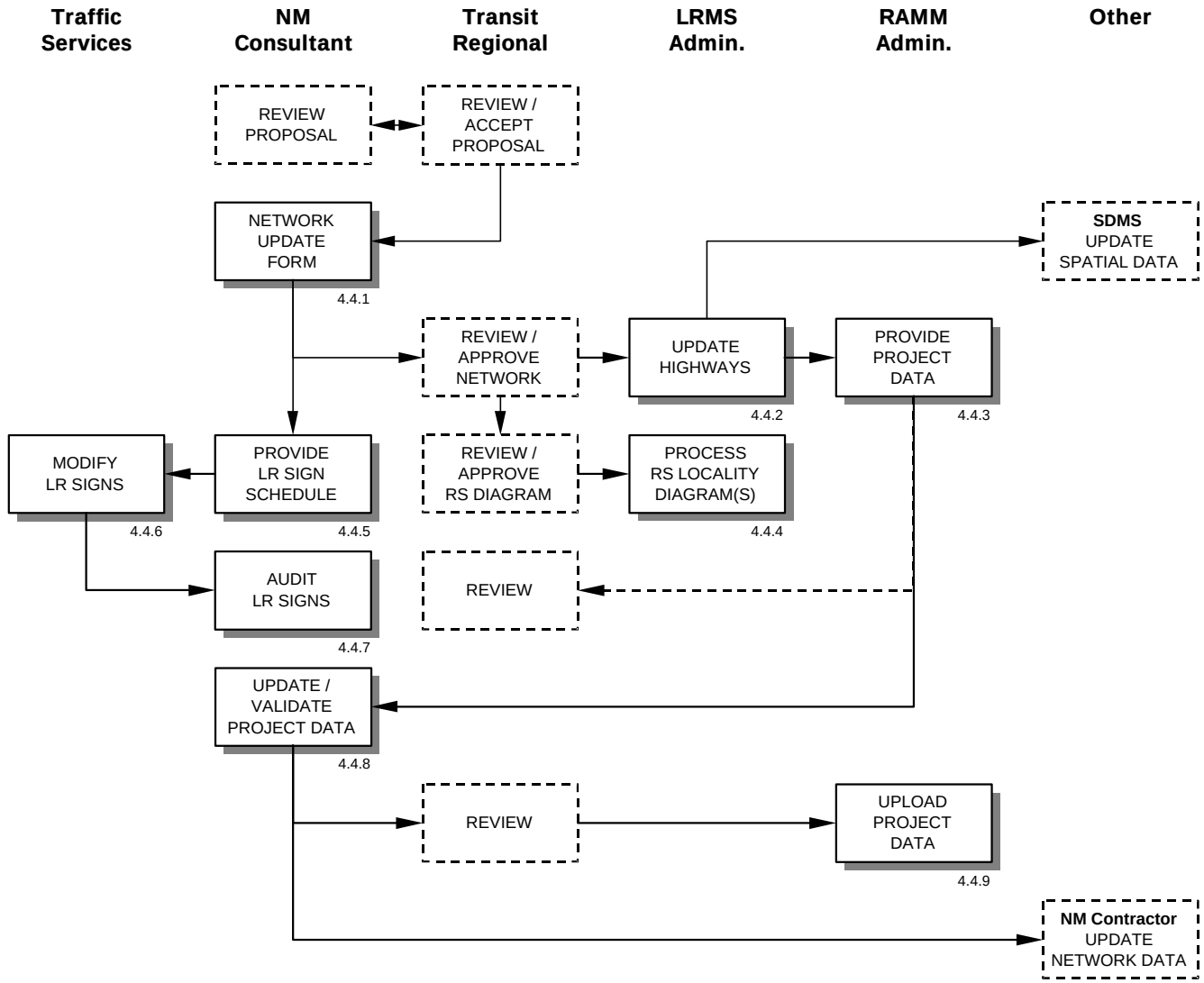
Once completed, the RAMM Administrator shall provide a copy of the completed NUF to the LRMS Administrator, NMC and Transit New Zealand Regional Officer to advise that the implementation of the network change on Transit New Zealand's Asset Register has been completed.

1 Section 5 of the NUF should be signed by the respective Transit New Zealand Regional Officer.

Related Documentation

- State Highway Database Operations Manual, SM050.

4.4 Modify LR Signs



LEGEND

Procedure not described in detail

Procedure described in section xx.xx

xx.xx

4.4.1 Network Update Form

Overview

The NMC shall collate information and provide accurate details of the network change (e.g. moving and RS or extending a divided highway) to the LRMS Administrator and SDMS Consultant for the purpose of updating Highways.

Procedure

Once the decision to modify LR signs has been established by Transit New Zealand, the NMC shall collate any information, which will facilitate the accurate implementation of the network update into Transit New Zealand's systems.

It is the NMC's responsibility to assess the need for a survey and undertake it.

Once the data has been collated, the NMC shall liaise with Transit New Zealand Regional Officer to plan the proposed layout of the network.

The proposed layout shall be set up in accordance with SHDOM (SM050) Section 3: Road and Section Definitions.

The NMC will be required to co-ordinate with the Traffic Services Contractor the physical updating of Location Reference signs, once the proposed network layout has been established.

The NMC shall populate Section 1 of a Network Update Form[1] (NUF) and supply it to Transit New Zealand Regional Officer as well as the following information for review and acceptance:

- Updates to Reference Station Locality Diagram(s)[2],
- GPS data for updated RS or ERP locations, and
- Any other information that will facilitate the understanding of the network update.

The NMC shall supply this information no later than **1 month** prior to the official change to the network.

1 Refer to Appendix A

2 Refer to Appendix B

Related Documentation

- State Highway Database Operations Manual, SM050.

4.4.2 Update Highways

Overview

The LRMS Administrator shall implement changes into Highways as per the NUF supplied by the NMC.

Procedure

The LRMS Administrator is responsible for ensuring that the NUF has been approved[1] by the Transit New Zealand Regional Officer and liaise with the NMC and/or Transit New Zealand Regional Officer should there be any problems with the NUF.

The LRMS Administrator is responsible for reviewing the NUF against the updated Reference Station Locality Diagrams and any other documentation supplied by the NMC to ensure that the correct updates are implemented.

Once approved, the LRMS Administrator shall implement the changes in Highways in accordance with the LRMS Administrators Guide.

The updating of Highways should be carried out no later than **5 working days** from receiving the NUF.

The LRMS Administrator shall inform the SDMS Consultant on changes to the spatial data.

Once all updates have been completed in Highways, the LRMS Administrator shall fill in Section 3 – LRMS Administrator of the NUF and pass the NUF to the RAMM Administrator for further action.

1 Section 2 of the NUF should be signed by the respective Transit New Zealand Regional Officer.

Related Documentation

- LRMS Administrators Guide (online).

4.4.3 Provide Project Data

Overview

The RAMM Administrator shall provide the NMC with project data, which will enable the NMC to implement the new inventory.

Procedure

The RAMM Administrator shall review the NUF and any other documentation supplied. This process will aid the identification of all road sections affected by the network change.

The RAMM Administrator shall download the RAMM information for the road sections, which were affected by the network update, using RAMM Network Manager – Export Session option.

Once the project data has been extracted from Transit New Zealand's Asset Register, the RAMM Administrator shall fill in Section 3 – RAMM Administrator of the NUF, provide copy of project data to the NMC and send confirmation of such delivery to the respective Transit New Zealand Regional Officer.

The provision of data shall be completed within **5 working days** from receipt of the NUF from the LRMS Administrator.

Related Documentation

- State Highway Database Operations Manual, SM050.
- Working with RAMM Manual.

4.4.4 Process RS Locality Diagram(s)

Overview

The LRMS Administrator shall update Transit New Zealand's Reference Station Locality Diagram system held at Transit New Zealand National Office.

Procedure

The NMC will provide a copy of the affected Reference Station Locality Diagram(s) with the NUF.

It is the LRMS Administrator responsibility to:

- Update Transit New Zealand's RS locality diagram electronic systems,
- Update Transit New Zealand's RS locality diagram hardcopy system, and
- Archive any superseded electronic and hardcopy RS locality diagram.

The RS diagram(s) must be processed within **5 working days** from receipt of the NUF.

4.4.5 Provide LR Sign Schedule

Overview

The NMC is required to carry out a survey to create a LR sign schedule, which will aid the Traffic Services Contractor during installation.

Procedure

Once Transit New Zealand Regional Office agrees with the recommended network layout, the NMC shall carry out a survey, which will establish a schedule of signs, to be installed/removed/upgraded.

The survey shall be carried out in accordance with Transit's Code of Practice for Temporary Traffic Management and SHDOM (SM050) Section 8: Field Validation Procedures.

The survey shall focus on accurate positioning of LR signs, as specified on Part B Sign Design and Placement of this manual.

The NMC shall record a detailed schedule[1], which will be provided to the Traffic Services Contractor for the installation/removal/upgrade of LR signs not later than **14 working days** prior to the official opening of the state highway.

The NMC is responsible for the accurate position of all LR signs and entry into Transit New Zealand's Asset Register and hence is encouraged to support the Traffic Services Contractor during the sign installation process.

1 Example of schedule can be found on Appendix E

Related Documentation

- Transit's Code of Practice for Temporary Traffic Management.
- State Highways Database Operations Manual, SM050.
- Standardisation of Maintenance Contracts (SOMAC).

4.4.6 Modify LR Signs

Overview

The Traffic Services Contractor shall construct and place the required Location Reference (LR) signs in accordance with the schedule provided by the NMC.

Procedure

The NMC will supply the Traffic Services Contractor with a schedule of signs to be installed/removed/upgraded.

It is the Traffic Services Contractor's responsibility to construct and install/remove/upgrade the requested LR signs in accordance with Part B Sign Design and Placement of this manual.

All fieldwork shall be carried out in accordance with Transit's Code of Practice for Temporary Traffic Management.

The sign installation/removal/upgrade must be completed prior to the official opening of the state highway.

Related Documentation

- Transit's Code of Practice for Temporary Traffic Management.

4.4.7 Audit LR Signs

Overview

This process has been established to ensure that the NMC can guarantee the accuracy of LRMS signs on the network.

Procedure

The NMC is responsible for reviewing the installation of LR signs and ensure they meet the criteria set out on Part B of this manual.

All fieldwork shall be carried out in accordance with Transit's Code of Practice for Temporary Traffic Management.

During the field survey the NMC will focus on reviewing:

- Route position,
- Layout,
- Legend,
- Offset, and
- Height.

The NMC will liaise with the Traffic Services Contractor on any issues brought up by this review and approve/certify once satisfied all criteria have been met.

The NMC shall carry out this review of all new LR signs as part of the annual field validation process (refer to SM050 Section 8: Field Validation Procedures).

Related Documentation

- State Highways Database Operations Manual, SM050.
- Transit's Code of Practice for Temporary Traffic Management.

4.4.8 Update/Validate Project Data

Overview

The NMC shall implement inventory data updates on a 'Project Copy' of Transit New Zealand's Asset Register and return this information for entry into Transit New Zealand's Asset Register.

Procedure

Once the 'Project Copy' has been received from Transit New Zealand National Office, the NMC is responsible for reviewing the changes carried out on the network and reporting any problems

found.

Once the NMC has approved the network changes on the project data supplied by Transit New Zealand's National Office, the NMC is responsible for updating the inventory information on the project data.

The updating of inventory information on the project data shall meet the minimum requirements set out in SHDOM (SM050) Appendix 3: Asset Register.

Once all updates have been completed, the NMC shall fill in Section 4 of the NUF and supply a copy to the Transit New Zealand Regional Officer, together with the updated inventory data.

The data delivery shall be supplied in accordance with SHDOM (SM050) Section 4: Data Delivery Procedures. The NMC shall supply the updated inventory data within **15 working days** from the date the project data is received.

The NMC is responsible for update the Route Data and Highway Information sheets to show the network change.

Related Documentation

- State Highway Database Operations Manual, SM050.

4.4.9 Upload Project Data

Overview

The RAMM Administrator shall load updated inventory data supplied by the NMC into Transit New Zealand's Asset Register.

Procedure

The RAMM Administrator is responsible for ensuring that the NUF has been approved[1] by the Transit New Zealand Regional Officer and liaising with the NMC and/or Transit New Zealand Regional Officer should there be any problems with the NUF.

The RAMM Administrator is responsible for reviewing the updated information supplied by the NMC prior to loading into Transit New Zealand's Asset Register.

If the data is delivered in electronic format, the review shall focus on reviewing row counts on forms against the asset register.

If the data is delivered in hardcopy forms, the RAMM Administrator shall review for completeness and compliance with SHDOM (SM050) Appendix 3: Asset Register.

Once the RAMM Administrator has accepted the data, it should be loaded into Transit New Zealand's Asset Register.

Once completed, the RAMM Administrator shall provide a copy of the completed NUF to the NMC and Transit New Zealand Regional Officer to advice that the implementation of the network change in Transit New Zealand's Asset Register has been completed.

1 Section 5 of the NUF should be signed by the respective Transit New Zealand Regional Officer.

Related Documentation

- State Highway Database Operations Manual, SM050.

5 OPERATION AND MAINTENANCE

Background

Chapter 4 and 5 outline the **Location Reference Procedures** that are applied to determine, store, maintain and retrieve the information about specific points and segments along a highway. This chapter encompasses:

Operation and Maintenance*:* Contains 'best-practice' procedures governing the use of location referencing and the physical maintenance of the LR signs. This includes:

- Maintenance of LR signs;
- Distance measurement and precision requirements; and
- Updating associated systems with links to the network.

In this Chapter

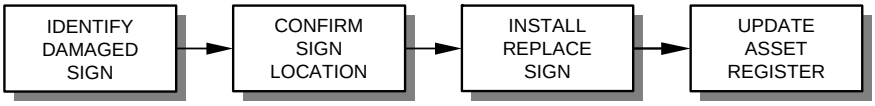
The topics in this chapter are listed below:

5.1 Routine Maintenance of LR Signs

Overview

Reference stations (RS), established route positions (ERP) and kilometre marker posts (KMP) form the fundamental framework for the whole state highway distance markings and are used by Police, Transit New Zealand Consultants and Maintenance Contractors and others who need to know their or someone elses route position. It is important to ensure that these signs remain in place and maintain their accuracy over time. Therefore the maintenance procedures for location referencing signs can vary from those which apply to other traffic services signs.

The following sections outlines the maintenance procedures to be followed for replacing a damaged, missing or non-compliant sign.



5.1.1 Identify Damaged or Missing Signs

Procedure

A ‘damaged’ or missing sign may be identified by a number of sources, namely by:

- Routine contractor inspections,
- Routine NMC inspections,
- The annual audit (refer Section 8 of SM050), or
- Annual Transit New Zealand inspections.

The NMC shall be notified within 24 hours, where a LR sign has been identified as damaged or missing.

5.1.2 Confirm Sign Location

Procedure

The NMC is responsible for carrying out a field survey to confirm the replacement LR sign location(s) prior to the Traffic Services Contractor replacing them. The accuracy of the LR sign placement will depend on the sign type (refer to Section **Error! Reference source not found.**).

For Type A signs, the displacement measurement shall comply with the criteria set on Chapter **Error! Reference source not found.** and Section 5.2.

For Type B, the displacement of the sign shall meet the criteria set

on Chapter **Error! Reference source not found.**.

It is the NMC's responsibility to organise the replacement of the LR sign with the Traffic Services Contractor. To assist with this, the NMC shall create a detailed schedule[1] (for the installation of LR signs), which will be provided to the Traffic Services Contractor not later than **2 working days** after receiving notice of the sign being damaged or missing.

The survey shall be carried out in accordance with Transit's Code of Practice for Temporary Traffic Management and SM050 Section 8: Field Validation Procedures.

1 Example of schedule can be found on Appendix E

Related Documentation

- Transit's Code of Practice for Temporary Traffic Management.
- State Highways Database Operations Manual, SM050.

5.1.3 Install Replace Signs

Procedure

It is the Traffic Services Contractor's responsibility to construct and install the requested LR signs in accordance with Part B Sign Design and Placement of this manual and the NMC's sign schedule.

The normal time for any RS, ERP or KMP to be missing should not exceed 7 days.

The NMC shall be informed when the sign installation (fieldwork) has been completed.

All fieldwork shall be carried out in accordance with Transit's Code of Practice for Temporary Traffic Management.

Related Documentation

- Transit's Code of Practice for Temporary Traffic Management.
- Traffic Services Contractor Contract.

5.1.4 Update Asset Register

Procedure

The NMC is responsible for the accurate updating of Transit New Zealand's Asset Register.

The updating of inventory information shall meet the minimum requirements set out in SM050 Appendix 3: Asset Register.

The NMC is responsible for supplying the updated information to Transit New Zealand Regional Office in order to update Transit New Zealand's Asset Register. The data delivery shall be supplied in accordance with SM050 Section 4: Data Delivery Procedures.

Related Documentation

- State Highways Database Operations Manual, SM050.

5.2 Displacement Measurement Procedure

Overview

Displacements between reference stations (RS) and established route positions (ERP) shall be determined by use of a vehicle fitted with a calibrated electronic odometer. The odometer must be capable of achieving the tolerances required by this specification and those for odometer calibration.

Procedure

Note that the vehicle is to have its odometer calibrated prior to and on the same day to carrying out the measurement.

Odometer calibrations shall be completed in accordance with the 'Guideline for Confirmation of Odometer Calibration' (Section 5.3). Any error in the calibration in excess of the maximum permitted by the specifications requires re-calibration and a repeat of the reference station runs measured since the initial calibration.

The sections below detail the displacement measurement procedures for reference station lengths, established route positions and divided roads.

On completion the vehicle is to re-run the calibration track to verify that the vehicle is still calibrated correctly.

All fieldwork shall be carried out in accordance with Transit's Code of Practice for Temporary Traffic Management.

Related Documentation

- Transit's Code of Practice for Temporary Traffic Management.

5.2.1 Reference Station Length

Overview

A reference station's length is the portion between two reference stations on a single lane or divided road, the distance between the

two ramp reference station's or the circumference of a large roundabout (see Section **Error! Reference source not found.** for definition of a reference station). These portions of road require precise measurements to accurately establish the State Highway network length.

Procedure

The odometer vehicle shall be positioned in the increasing direction so that a convenient reference point on the vehicle is located directly over the reference station start/end line. Check the reference station location diagrams for the location of reference stations and their associated start/end positions.

The vehicle shall then be driven in the increasing traffic lane, where possible without stopping, to the next reference station and stopped so that the same reference point on the vehicle used at the beginning of the run is again positioned over the start/end line of the reference station.

Where a climb lane exists the slow lane shall be used for distance measuring. In all other cases the lane closest to the left-hand side of the road shall be used. The vehicle should attempt to maintain a constant moderate speed (80/100km/hr on open roads and legal speed limits on all other speed-restricted roads) and an alignment consistent with normal wheel tracks.

The odometer reading shall be recorded to the nearest metre. This procedure shall be repeated 3 times in the increasing direction.

Provided the three readings are within ±0.1% (±1 m/km) of the mean, then, the mean is recorded as the true length for that particular reference station run.

If not, the procedure above shall be repeated until three distances are recorded that meet the ±0.1% spread on the mean requirement.

There are exceptions to this procedure including:

- Divided carriageway as detailed in Section 5.2.3, and
- Ramps which shall be driven in the direction of travel.

The procedure for any other exceptions identified will be agreed with the Transit New Zealand regional offices.

All fieldwork shall be carried out in accordance with Transit's Code of Practice for Temporary Traffic Management.

Related Documentation

- Transit's Code of Practice for Temporary Traffic Management.

5.2.2 Established Route Positions

Overview

Established route positions are benchmarks along a reference station and generally occur at approximately 3 to 5 km intervals. They have a location accuracy of +/- 0.1%.

Procedure

The displacement for established route positions shall be determined in the same manner described for reference stations except they shall be measured by determining the cumulative displacement from the preceding reference station.

Where as a result of the establishment of an ERP other nearby measured road features (e.g. KMP) are found to be significantly incorrect, repeat measurements shall be carried out to confirm the ERP. If it is found correct, other nearby features shall be measured and given their corrected route position.

If the odometer calibration is in question, this shall be checked by the procedure specified in Section 5.3, and the appropriate repeat measurements made.

Any anomalies detected shall be resolved.

5.2.3 Divided Carriageways

Overview

A definition of divided carriageways is given in Section **Error! Reference source not found.**.

Procedure

When determining a reference station length or an Established Route Position displacement on the increasing carriageway the measurements shall be made by running in the increasing direction as prescribed in Sections 5.2.1 and 5.2.2.

For the decreasing carriageway the measurements shall be made running in the decreasing direction and the lengths to each ERP and RS recorded.

5.2.4 Measuring Displacement of Assets

Overview

Transit expects the accuracy of asset displacements to be within tolerances achievable using this specification.

Procedure

Displacements for all assets are to be measured using a properly calibrated odometer. Measurements should begin at the preceding green-banded sign.

5.3 Guideline for Odometer Calibration

Overview

The following procedure for the calibration or confirmation of calibration of the vehicle odometer shall be used for the establishment, verification and amendment of reference stations, established route positions and road sections and as may be directed.

Odometer and Host Vehicle

To ensure the required tolerances are achieved, the odometer and host vehicle must adhere to the following:

The odometer shall be of an electronic type, which displays the distance measured to one metre. The vehicle must be in the same condition during the calibration procedure as it will be during the measurement that it was calibrated for; i.e. occupancy, tyres pressure etc.

Calibration Test Track

All odometer calibrations shall be carried out on an approved calibration test location established in the following manner.

The test strip shall comprise an essentially straight, even graded section of chip sealed or permanently surfaced road or pavement of not less than 2000m and preferably of 3000m or more.

The surface pavement distance from the start to end points (also to intermediate points if any) are to be determined by measurement with a maximum allowable tolerance from the true distance of 1 part in 5000. This distance is to be certified by a Registered Surveyor as within this tolerance.

The 'line' of the test strip to be measured is the typical centre line of the vehicle driving in the path of normal wheel tracks.

Calibration Run Confirmation Procedure

The odometer should be initially calibrated by either adopting the manufacturer's recommendations or any other method that will result in an acceptable confirmation in accordance with the requirements set out below.

To confirm calibration, the vehicle shall be positioned so that a convenient reference mark on the vehicle is directly above the painted line on the start benchmark of the run. The odometer shall then be set to zero. The vehicle shall then travel at constant speed along the test track keeping to the path of normal wheel tracks.

It is recommended that the speed of the vehicle during the odometer calibration should be similar to the average likely speed

of the vehicle over the road to be measured for which the vehicle is being calibrated. The vehicle shall be brought to a halt with the reference mark on the car directly over the painted line at the end point of the test strip. The odometer shall be read and compared to the known 'true' length for the test strip.

It is recommended that a minimum of two passes are undertaken and provided the recorded distances are both within ±0.05% (1 m per 2 kms), the odometer is considered calibrated correctly. If not the calibration procedure should be repeated or adjustments made to vehicle or odometer.

When to Calibrate

Any malfunction of the vehicle or odometer may destroy the calibration of the plant. Appropriate repairs shall be made. After any repairs the odometer vehicle shall be subjected to a verification of the calibration or a full re-calibration.

If the vehicle suffers from a punctured tyre the calibration shall be verified or re-calibrated.

Records to be kept

A written record shall be kept of any calibration or calibration verification tests performed.

The Log of Electronic Tripmeter Calibration (Appendix F), details the information which should be recorded.