GOVERNMENT OF THE REPUBLIC OF NAMIBIA

MINISTRY OF WORKS, TRANSPORT AND COMMUNICATION

DEPARTMENT OF TRANSPORT

NATIONAL TRANSPORTATION MASTER PLAN STUDY

VOLUME 1

SUMMARY OF FINDINGS AND RECOMMENDATIONS

Final Report September 1998

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and SweRoad

NATIONAL TRANSPORTATION MASTER PLAN STUDY: FINAL REPORT

VOLUME 1

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NATIONAL TRANSPORTATION MASTER PLAN STUDY: FINAL REPORT

1. Background

The Government of the Republic of Namibia (GRN), through its Ministry of Works, Transport and Communication (MWTC) has commissioned the Swedish Consultants KM International AB in association with VKE (Namibia) Inc., Nordic Consulting Group (NCG) and Swedish National Road Consulting AB (SweRoad) to undertake a National Transportation Master Plan Study (NTMPS). In order to cover all aspects of the Study, the Consultant has also sub-contracted the firms Opus International Consultants (NZ), AFRICON and SwedeRail.

2. Objectives of this Report

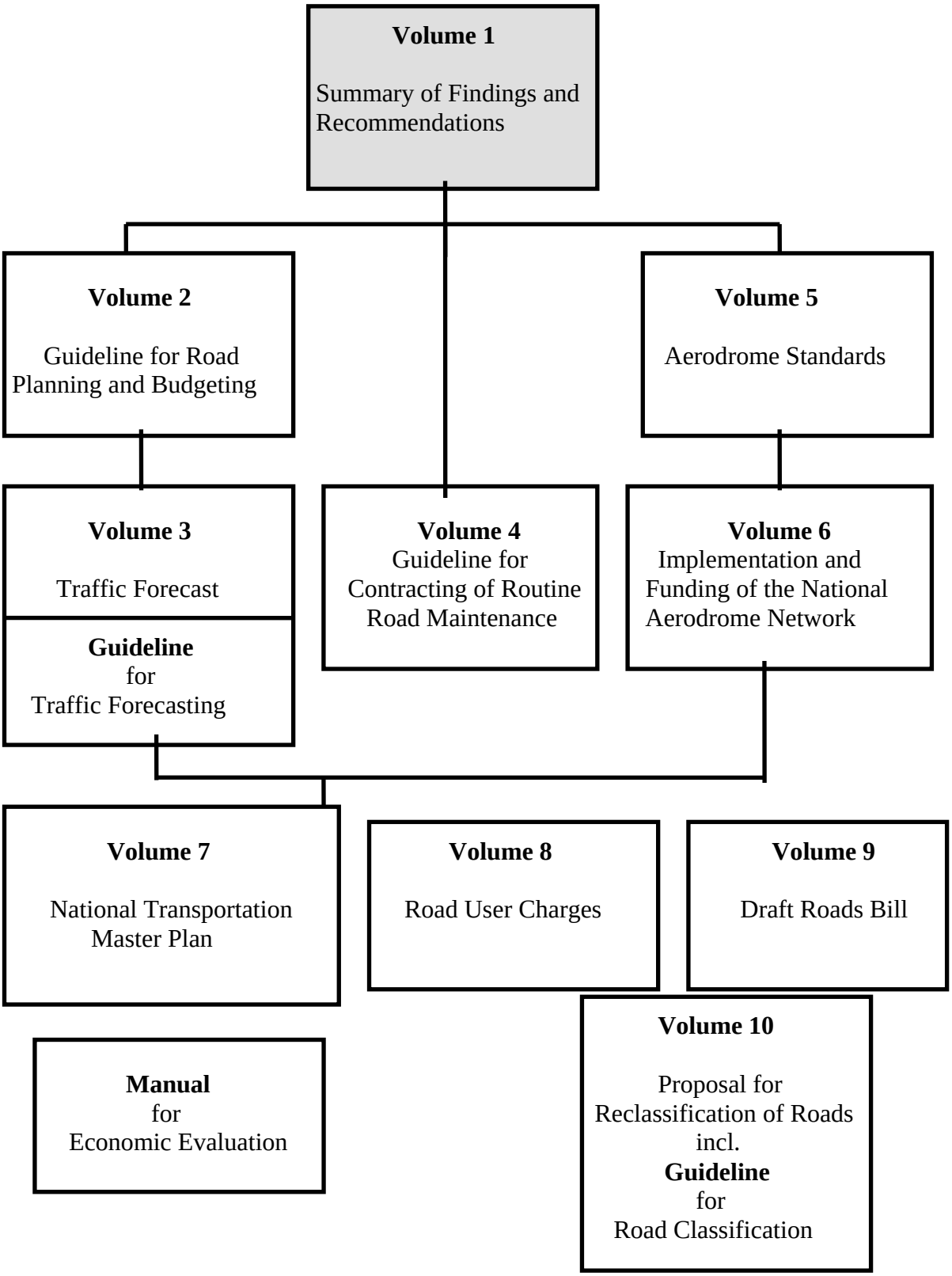
The objectives of this report are

- to present how the work was done by the Study Team;
- to present the background of deliverables attached to this report (Volumes 2 - 10, incl manuals);
- to summarise the main findings and recommendations covered by the abovementioned volumes.

Figure 2.1 on page 2 shows the layout of the study report and the relationship between the different study outputs.

Terms of Reference for the NTMPS are presented in Annexure A.

Figure 2.1 Main Structure of Study Outputs



3. Work done

3.1 General approach

The main deliverable of the Study is the National Transportation Master Plan. This issue was dealt with through the following steps:

1. Analysis of existing data and plans;
2. Study of policies and trends;
3. Compilation of data;
4. Forecasts;
5. Identification of appropriate methods for project evaluation;
6. Project identification and screening;
7. Project evaluation;
8. Investment programme.

Two separate high priority issues were identified by the MWTC - development and implementation of road user charges and a national traffic information system - and were therefore dealt with of at an early stage of the Study.

The more significant deliverables from the Study are:

1. Inception Report, 17 January 1997
2. Policy Principles Underlying an Aerodrome Master Plan for Namibia, 22 February 1997
3. Framework for a National Aerodrome Master Plan, 26 February 1997
4. Situational Assessment of Namibian Aerodromes, 27 May 1997
5. Final Report on Road User Charges, 28 May 1997
6. Issues Related to a new Roads Bill for Namibia, 23 June 1997
7. Draft Issues Report on Road Project Evaluation, 25 June 1997
8. Draft Issues Report on Road Classification, 7 October 1997
9. Road Planning and Budgeting in Namibia, A Guideline, October 1997
10. Aerodrome Standards Report, 27 November 1997
11. Abbreviated Proposal for Reclassification of Proclaimed Roads in Namibia, 3 December 1997
12. Draft Guideline on Contracting of Routine Road Maintenance, 3 December 1997
13. Draft Report on Traffic Forecast, 5 December 1997

A Draft Final Report and the separate volumes No. 2 - 7 attached to this Final Report were submitted in draft form to the Client for comments on 2 July 1998.

Some deviations from the reporting schedule contained in the Terms of Reference were considered appropriate after discussion with the Client. The deviations are presented in Annexure B.

Some of the more important documentation considered during the Consultant's work are:

1. White Paper on Transport Policy, 26 June 1995
2. First National Development Plan (NDP1), Volumes I and II
3. National Transport Development Plan, Step 1, Final Report, SOGREAH/SYSTRA, France, December 1996

The Study has to a certain extent been carried out as a joint exercise between the Ministry staff and the Consultant. The present shortage of qualified staff in the Ministry has however imposed restrictions on the initial ambitions in this respect. Extensive consultations with staff from the MWTC and other government and private organisations and consultants in the transport sector were made during the Study. Information and explanations on specific issues were given to DOT staff on a number of occasions (See Table 3.1).

Further details are given on the individual tasks in Sections 3.2 - 3.16.

Table 3.1 Significant events during the NTMPS

Date	Subject	Participants, excl. Consultant
5/11 1996	Review of current methods, instruments and procedures for road planning, etc (Tasks 3 & 4)	DOT Task Force G Seydack
5/12 1996	Workshop on Road User Charges	DOT+ Stakeholders
10/2 1997	ToR for Aerodromes Tasks 5, 14 and 15	FW Poolman, EH Lowe, B Zapke, DCA staff, DTIMC
11/4 1997	Inputs to the RUC Model	Zapke, Gericke, Detering, De Klerk, Seydack
21/4 1997	Workshop on Road User Charges	Poolman, Gericke, Seydack, Ravenscroft, Brock, Mundia, Stakeholders
14/5 1997	MWTC comments on Draft Final Report on RUC	Poolman, Gericke, Bruzelius, Ravenscroft
9/7 1997	Workshop on National Aerodrome Network	Dep. PS, Poolman, Lowe, Zapke, DCA staff, Swart (MRLG&H), Stakeholders
23/9 1997	Road Planning and Budgeting	Lowe, Detering, Zapke
14/10 1997	Presentation of Draft Guideline for Road Planning and Budgeting	Gericke, Nel, Swart, Runji, Mvungi, Al Jaf
4/2 1998	Discussion on Road Classification	Lowe, Detering, Kiggundu, Swart, H. Hess (Stewart Scott Namibia), G. Nolting (Bicon),
6/2 1998	Discussion and DOT comments on Draft Guideline on Road Planning and Budgeting	Kiggundu, Gericke, Detering, Swart, Al Jaf, Seydack
25/2 1998	Workshop on Road Project Evaluation Methods & Feasibility Studies/Road Master Plans	Lowe, Gericke, Seydack, Thieman, Tekie, Iddi
26/2 1998	Presentation to DOT of Proposed Methods for Traffic Forecast	Gericke, Detering, Seydack, Tekie, Iddi
26/3 1998	Workshop on Strategies and Projects for Inclusion in the National Road Master Plan	Poolman, Lowe, Kiggundu, Gericke, Detering, Swart, Nel, Runji, Mvungi, Al Jaf, Thieman, Iddi, Mkwizu, Becker, du Plessis, Hartmann, Hundemer, H H Schmidt (NTAB), Seydack
3/4 1998	Workshop on Implementation of the National Aerodrome Network	Poolman, Kiggundu, Detering, DCA Director & Staff, MRLG&H, MOF
14/5 1998	Presentation of HDM-4 by Dr H R Kerali, University of Birmingham	DOT staff, private consultants

3.2 Review of existing data, studies, current plans, policies, methods, instruments and procedures used in the transport sector (Tasks 1-4)

These tasks were completed and reported on in the Inception Report, 17 January 1997.

3.3 Review current legislation for roads, including system for classifying roads (Task 6)

A brief review of the existing Roads Ordinance (Ord. 17 of 1972) and the Advertising on Roads and Ribbon Development Ordinance (Ord. 30 of 1960) was reported on in the Inception Report. A more in depth review was reported on in the report "Issues Related to a new Roads Bill for Namibia, 23 June 1997.

A review of the current international and Namibian practices on road classification was made and a "Draft Issues Report on Road Classification" was submitted to DOT on 7 October 1997.

3.4 Review current arrangements for the registration of drivers, the issuing of driver's licences, the registration of vehicles, the registration of traffic offences and certification of vehicles (Task 7)

A review of the current arrangements for registration and licensing of motor vehicles was contained in the Inception Report on NaTIS, 14 October 1996. For details on the issuing of driving licences see Section 3.7 below.

3.5 Review current arrangements for road taxation, develop and prepare for implementation of a road user charges in the short and long term and implement road user charges in the short term (Tasks 8 and 11-13)

These tasks were completed and presented in the Final Report on Road User Charges, 28 May 1997. The Consultant received a Letter of Approval of the work done in October 1997. The report is included here as Volume 8.

3.6 Aerodromes (Tasks 5, 14, 15 and 22)

The Terms of Reference require that the Consultant shall review the current methods, instruments and procedures for the development, planning, management, maintenance and funding of aerodromes (Task 5).

AFRICON Transportation Division, RSA, was engaged as a sub-consultant to carry out these tasks. The reviews (Task 5) were originally planned to be done

as a first step. However, the Client emphasised the urgency of a master plan for aerodromes which resulted in a different approach focusing on tasks 14 and 15. The Consultant therefore submitted at an early stage the following two draft reports:

- Policy Principles Underlying an Aerodrome Master Plan for Namibia, 22 February 1997; and
- Framework for a National Aerodrome Master Plan, 26 February 1997

To complete task 5 the current arrangements for aerodromes in Namibia were therefore addressed later and resulted in a third report titled

- Situational Assessment of Namibian Aerodromes, 27 May 1997.

The mentioned reports were condensed into a two page paper as a basis for discussions with stakeholders during a workshop on aerodromes conducted in Windhoek, 9 July 1997. A separate report on the National Aerodrome Network Workshop was subsequently submitted and circulated to the participants and other interested parties.

In addition, the consultant assisted the Ministry in writing an Information Memorandum to Cabinet concerning the Proposed National Aerodromes Policy on 18 July 1997 and a Briefing Note to Cabinet on the same subject on 29 September 1997. The mentioned documents briefly discussed the network criteria and contained a list of 41 aerodromes, of which eight under the future Airports Company, to be included in the National Aerodrome Network. The network was approved by Cabinet in October 1997.

Furthermore, the Consultant, assisted by AFRICON, worked out details on appropriate standards for the national aerodrome network and made proposals on how to fund and implement the network. The funding and implementation was discussed in a workshop on 3 April 1998 involving the most important stakeholders (See Table 3.1 on page 5)

Since then the Consultant has prepared the following documents, attached to this Final Report:

- Aerodrome Standards Report, Volume 5
- Implementation and Funding of the National Aerodrome Network, Volume 6

3.7 Design a Customised NaTIS for Namibia and implement the new computer-based road traffic information system (Tasks 9 and 10)

A system design for Namibia was presented in the Draft Final Report on NaTIS, 29 January 1997. A number of proposals in that report - such as the selection of agents to undertake the running of the system in the field - were however not approved by the Ministry.

The Consultant was subsequently instructed to

- focus on the sub-system for vehicle registration and licensing, including collection of fees and accounting;
- show which option is the best to get this sub-system operational;
- arrange urgently meetings with the potential agents for Windhoek, *viz.* NamPost and Windhoek City Council;
- provide recommendations to DOT on appropriate agents for NaTIS, to be used as a basis for a Cabinet submission.

In order to fulfil these obligations the Consultant engaged Messrs Fischer & Associates as sub-consultants during February-March 1997 to prepare an Outline Specification for the Agency Function of Vehicle Registration and Licensing in Namibia. The main purpose of the Outline Specification was to enable calling for offers from the identified potential agents.

By a letter dated 21 February 1997 the Ministry appointed Fischer & Associates to implement the vehicle registration and licensing module of the NaTIS in Namibia, which services *inter alia* entailed the preparation of tenders for software and hardware for NaTIS. The involvement of F&A at this stage was hence considered a cost-effective option.

Through these events the role of KM International AB changed from what was originally required in the ToR. From March 1997 onwards the Consultant has thus only served as a management advisor to the Ministry in terms of the implementation of the Namibian Traffic Information System (NaTIS).

The Consultant has on 27 May 1998 been relieved from the requirement to prepare a Final Report on NaTIS since it would serve no real purpose.

The Consultant also made a specific proposal on how the Ministry should proceed with the issue of driving licenses.

The framework for driving licenses has already been established in the SADC Protocol on Transport, Communications and Meteorology, 24 August 1996, in which a harmonised format was agreed upon. In an Annex to the Protocol the driving license codes and the options for security devices to be included in the license card are prescribed.

On request from the Client the Consultant has assisted in the preparation of tender documents for card production.

The implementation of NaTIS is now in progress, using Fischer & Associates as consultant, and the role of KM was to follow the work and assist the Ministry as required.

3.8 Develop procedures and instruments to be used by NamRoad (= the new Roads Authority) for the planning of road construction and maintenance, including budgeting techniques (Task 16)

The Consultant presented his findings on the existing road project evaluation methods in his "Draft Issues Report on Road Project Evaluation, 25 June 1997". Comments were received in writing from Dr Nils Bruzelius on 21 July 1997 and from the Ministry on 6 October 1997. Based on the report and the comments received, the Consultant has proceeded with further details on the appropriate evaluation methods, criteria, etc., to be used by the Roads Authority. In conclusion, the Ministry and its advisors has accepted the basic principles proposed by the Consultant, such as

- using simple and transparent tools
- applying local experience in the collection and processing of data, including technical relationships between road and road user costs
- applying the HDM-4, when available, for economic analyses.

On 14 October the Consultant presented and handed over in a meeting with DOT/MOWT 2000 a Draft Guideline for Road Planning and Budgeting in Namibia.

Comments on the first draft report were requested by the Consultant in a letter to the Ministry on 5 December 1997 in order to facilitate the short term input by KM in March-April. In order to further increase the transparency and input from the Client a meeting was held on 6 February 1998.

A Workshop on Strategies and Projects for Inclusion in the National Road Master Plan, including Procedures and Tools for the Preparation of Estimates for the One Year and Five Year Plans was conducted on 26 March with participation from the Ministry (central and regional) as well as the National Transport Advisory Board and consultants. After further discussions in meetings with the Ministry and receiving comments on the final draft the Consultant finalised the guideline which is contained in Volume 2.

The principles for economic evaluation of projects and strategies contained in Appendix E of the draft guideline for road planning and budgeting has now been included in the DOT Economic Evaluation Manual, updated as such by the Consultant.

3.9 Traffic forecast (Task 17)

The Consultant's approach to this task was commented on in the Inception Report. Thus, after having analysed the existing traffic data the Consultant conducted an Origin/Destination survey restricted to four stations on the trunk and main road network. The data was analysed and presented in cross-tables containing traffic between 39 zones within and 10 outside Namibia.

In a second step, through desk studies of existing statistics and reports, and through interviews with people involved in development planning, the Consultant described three scenarios for the economic development of the whole country as well as for various regions in Namibia towards the years 2000, 2005 and 2012.

Using the relationships identified between traffic growth and economic development, average annual traffic growth rates were developed for trunk roads and per region for a medium growth scenario and a base road network.

The result of these activities were presented in a separate Draft Report on Traffic Forecast including a Draft Guideline for Traffic Forecast on 5 December 1997.

After having received some comments from DOT and Dr Bruzelius a practical demonstration of the proposed forecasting methods was arranged on 26 February 1998.

On request from DOT the consultant has added two further road links to the road network and has now prepared the Final Report on Traffic Forecast, contained in Volume 3.

The outputs from the traffic forecasting exercise were used in the preparation of the Master Plan.

A guideline for traffic forecasting, a draft copy of which was contained as Appendix 5 to Volume 3, has been revised in terms of presentation and converted into a separate document.

3.10 Implement procedures and instruments to be used by the Roads Authority for the planning of road construction and maintenance, including budgeting procedures (Task 18)

The planning and budgeting instruments and procedures proposed by the Consultant in Volume 2 have been used in the preparation of the Master Plan as well as the first drafts of one year and five year plans for road construction and maintenance required in terms of the new legislation.
It was agreed with the Client to postpone the training of Ministry and Roads Authority staff until November 1998 or February 1999.

3.11 Develop procedures and instruments for contracting of road works (Task 19)

The Consultant initiated this task by making a review of the existing procedures and instruments used in Namibia. The result of the review was presented in a "Draft Issues Report on Contracting of Road Works, 10 September 1997". Comments were received in meetings with representatives of DOT and MWTC 2000 on 6 October 1997 after which two additional documents for discussion were prepared by the Consultant, titled

1. Brief Comments on Choice of Model for Maintenance by Contract, 15 October 1997; and
2. Discussion Paper on Contracting of Routine Road Maintenance, 31 October 1997

The Terms of Reference require the Consultant to design" all the instruments and procedures required by NamRoad for contracting" of road construction and maintenance. It was however noted that the instruments and procedures for major road and bridge works were adequately covered by the existing documentation of the Ministry and the FIDIC General Conditions of Contract. The Ministry had also already decided to engage another consultant for the preparation of simplified General Conditions of Contract and standard Specifications for labour-based works. It was therefore agreed in a meeting on 31 October 1997 that the needs for development by the Consultant were in the following fields:

- Simplified General Conditions of Contract for routine road maintenance;
- Amended Standard Specifications for regravelling (simplifying the CSRA Standard Specifications for Road and Bridge Works, 1987); and
- Standard Specifications for routine road maintenance.

The Consultant however concluded that a simplification of the specifications for regravelling would increase the risks of the Client to such an extent that it would not be advisable. That part of the task was therefore not further studied.

The Consultant prepared a Draft Guideline for Contracting of Routine Road Maintenance, submitted to the DOT on 3 December 1997. The Draft Guideline is included here in Volume 4.

3.12 Implement procedures and instruments to be used by the Roads Authority for contracting (Task 20)

When the proposal for contracting procedures has been approved by the Client the Consultant will organise training of staff envisaged to be employed by the new Roads Authority. The training will be co-ordinated with training mentioned in 3.10 above.

3.13 Procedures and instruments to be used by MWTC for short term and long term planning (Task 21)

This task is related to the work done in task 16. It is envisaged that the same kind of tools will be used by the Ministry as by the Roads Authority. The utility analysis method described in the updated Economic Evaluation Manual is envisaged to be a useful tool for the Ministry and the Roads Authority for the evaluation of not economically viable (social) roads.

3.14 Formulate a master plan for the development of road network, rail network and airports for the period up to 2012 (Task 22)

The Master Plan is contained in Volume 7 of the Study reports. The Master Plan covers medium and long term strategies and plans for road, rail and air transport infrastructure. The proposals in the three different modes were handled in three separate processes involving the main actors in each mode.

The Master Plan however integrates the planning of the various modes to the extent which has been possible given the different institutional frameworks. As far as possible the Consultant has tried to apply a consistent approach to the plan.

The first part of the Master Plan contains background information, facts and data necessary for the understanding of the analyses and proposals presented in the plan.

As mentioned in section 3.6 above the aerodromes part of the Master Plan was completed in July 1997 as a basis for a Cabinet submission.

The roads section of the Master Plan has been developed step by step during the first half of 1998, starting with fine tuning of the evaluation parameters to be used for the evaluation of road programmes and projects.

The next step was the identification of potential road candidates for inclusion in the future plans for road development and maintenance projects. That part of the work was focusing on the potential projects for:

- new roads;

- pavement rehabilitation;
- surfacing of unsurfaced roads;
- widening/realignment of surfaced roads; and
- widening/replacement of bridges.

Projects and strategies for roads and bridges were then evaluated using the simple procedures prepared under task 16. Review of previous feasibility studies by other consultants were also an integral part of this activity.

During May 1998 a short term input was made by the Swedish Railway Specialist in the Study Team in order also to incorporate the railways in the Master Plan. That exercise was done in close co-operation with representatives from TransNamib Limited, which provided all the necessary information on their current operations and plans. The time available was however not sufficient for in- depth evaluations of projects for the Master Plan. A feasibility study is under way through another consultant concerning the Tsumeb - Oshakati extension of the railway network.

3.15 Make recommendations with respect to the present legislation for roads (Task 23)

It has been agreed with the Client that the Consultant shall concentrate his effort in this task on a layman's draft for a new Roads Ordinance. Discussions on the principles of the new legislation were held with the concerned staff of the DOT in May. A layman's draft is included in Volume 9.

3.16 Make recommendation for reclassification of roads (Task 24)

An abbreviated proposal for reclassification of proclaimed roads was submitted to MWTC on 5 December 1997. The contents of the report were discussed in detail in a meeting with representatives of the Ministry and consultants BICON and Stewart Scott Namibia on 4 February 1998. After making adjustments in accordance with the comments received in the meeting and further consultations with the abovementioned consultants a final draft proposal including a brief manual for the Ministry and the Roads Authority on how to handle road classification issues in future was submitted on 20 April 1998. Further discussions were held with Ministry staff recently in conjunction with the updating of the Herero Roads Master Plan. The final proposal is included here as Volume 10. The report also contains a guideline for road classification.

4. Summary of conclusions and recommendations

4.1 Volume 2, Road Planning and Budgeting

The new Roads Authority will be required by legislation to annually prepare Estimates of Expenditure for a one year and a five year plan to be submitted to the Road Fund Administration for their approval., The Consultant has designed the planning and budgeting tools required by the Roads Authority (RA) in terms of the Road Fund Administration Act and the Roads Authority Act.

The guideline contained in Volume 2 deals with long term (strategic) and short term (five year) planning and budgeting and has been prepared so that it can be used by planners in the Roads Authority, as well as in the Ministry of Works, Transport and Communication and the Road Fund Administration.

Apart from providing an uncomplicated, transparent and systematic approach on the use of information to support road planning, the guideline will also serve to create an awareness and a culture of pro-active planning. This will ultimately aim at a long term balancing and economically efficient use of resources available in the road sector. Such resources include finance, people, assets and the environment.

The guideline in short comprises the following:

- The budgeting process according to the new legislation;
- Goals and objectives to be considered in the planning process;
- Description of the road planning process and the main actors taking part in the process;
- Review of the most important available parameters and statistics presently relevant to the provision of roads in Namibia;
- Description of the preparation of short, medium and long term plans;
- Illustration of plans by means of practical examples;
- A worked out five year plan and a budget for the fiscal year 1999/2000; and
- Proposals for further work and improvements to the planning process.

The general view and philosophy of the guideline is that economic road planning and budgeting should be seen as an interactive process including both a top-down and bottom-up approach.

The top-down approach deals mainly with the 'strategic planning' part, *i.e.* what to do, goals and targets (to do the right things) and how to achieve it, while the bottom-up activities are geared towards and focused on the 'short term planning and budgeting' part of the process (when and where to do it).

Furthermore, the top-down exercise should be seen as a national network level discussion and screening in order to assess the global long term sustainable funding level, and the bottom-up exercise is mainly a project identification phase using condition assessment and economic evaluation tools for project justification and ranking.

The bottom-up approach will be the main approach for the annual exercise of calculating the funds to be included in the one-year and five-year estimates. It will however, in the absence of a full-fledged Road Management System, be augmented by and calibrated with the top-down approach. This in addition takes cognisance of longer term effects and needs, such as backlog and peak requirements in the construction and maintenance of roads, and loan repayments. Eventually, the top-down and bottom-up approaches must converge.

It must also be emphasised that the guideline has no intention to cover all aspects as to assessing and recommending standards and targets, but rather concentrates on the principles and the elements of the process and recommends some unsophisticated but feasible tools. Proposed standards, targets and tools should of course be re-evaluated and refined step by step with time, keeping in mind that the more sophisticated the tools, the higher the demand on data capturing and updating. It is also worth mentioning that tools should support decision making and not make decisions.

Recommendations on Road Planning and Budgeting

- Apply an uncomplicated, transparent and systematic approach on the use of information to support road planning
- Economic road planning and budgeting should be seen as an interactive process including both a top-down and bottom-up approach
- The bottom-up approach should be the main approach for the annual exercise of calculating the funds to be included in the one-year and five-year estimates
- In the absence of a full-fledged Road Management System, the bottom-up approach should be augmented by and calibrated with the top-down approach
- The further development of a Road Management System as a basis for efficient planning and budgeting should be given high priority in the process of implementation of the new organisations in the road sector

4.2 Volume 3, Traffic Forecast

Namibia has, in comparison with other countries in the region, a well developed road network particularly in relation to its small population. Traffic flows are generally low. Thus the focus within the forecasting period up to the year 2012 will be on maintenance and improvements of the present network rather than investments in completely new links. The main use of forecasts will therefore be as an input in a maintenance management system and for forecasting the need for pavement upgrading (i.e. gravel road to bitumen road). At the same time it is likely that one or two new road links will be introduced before the end of the forecasting period. Traffic forecasts will also be used for road user revenue projections.

A simple approach to forecasting is to base it on historic trends. A more complex approach involves demand modelling based on traffic generation, distribution, modal split and traffic assignment to the network.

Following a discussion of the advantages and disadvantages of these different approaches it was concluded to use a more refined technique on the trunk road network and to use a historic trend analysis for the low volume network. The latter represent 90% of the road network but account for only 30% of total traffic. Although the trend model is difficult to implement now it will be straightforward once the existing Traffic Surveillance System (TSS) has been improved.

For the trunk road system which carries 70% of traffic volumes a simplified demand model has been used. This approach overcomes the shortage of reliable historical traffic data caused by a collapse of parts of the existing TSS.

The simplification is made possible due to the straightforward network with few alternative routes and concentrated activity centres. By a fairly limited Origin-Destination study combined with data from previous studies it was felt that a fairly accurate traffic distribution matrix could be constructed as a starting point for the forecast.

Input data for the forecasting must be limited to data which are readily available. In this respect, employment data were chosen as indicators of economic growth. Starting from 1996, employment figures will be annually updated by the Central Statistical Office (CSO). It will thus be possible to track the development of economic activity in the different regions. For the forecast presented here trends had to be derived from projections in the First National Development Plan.

The model also requires forecasts of future cross border traffic. For the forecast presented here, historic data were used in addition to assumptions on future development of Walvis Bay, adherence to Government trade policies and estimates on the development in neighbouring countries.

In future it should be possible to develop trend forecasts based on data from the road user charging system which includes the collection of fees at the international borders.

The forecasting model based on this simplified approach will have limitations. The model will be less suitable to handle certain policy questions such as:

(i) The effect of road user charges on traffic growth for different modes.

(ii)The effect of railway investments on road traffic growth

(iii)The effect of traffic patterns when gravel roads are being paved.

However, with the traffic surveillance system being further developed it will provide the possibility to develop simple models to assist decision-makers in addressing such questions.

It will also be possible at a later date to upgrade the model and refine it to include more zones and also other modes. It may also be feasible to integrate the model with the overall databases for road management.

Although the Main and District roads account for almost 90% of the total road network in terms of length they only carry 30% of the traffic. A simple traffic growth model is therefore used. Input in this model are the EADT link figures calculated for 1991 and 1996 by DOT. Traffic growth was calculated for each road class and maintenance region. Estimates are made separately for heavy and light traffic. However, for low volume roads these data must be used cautiously. The model displays the growth over the time period and calculates the compounded growth rate per annum for the period. It then allows the user to decide whether the compounded growth rate is still valid or if another growth factor should be applied.

The initial effort was seriously hampered due to limited traffic counts available. Only two data points were available for each road link which implies that the calculated growth rate might not reflect long term growth trends. It is recommended that these values are manually “calibrated “ by the road engineers of the different maintenance regions to ensure that better correlations are achieved with actual traffic growth.

The outcome of the future use of the proposed forecasting system is entirely dependant on the quality of the Traffic Surveillance System. The present system is not adequate in that respect. However, the Traffic Surveillance Section of the DOT has prepared a “Proposal on Improvement of Quality and Usability of Traffic Data Collected at DOT’s Permanent Traffic Counting Stations, dated 22 April 1998. The Consultant has reviewed the proposal and offers the following comments.

Data from the permanent stations are primarily used for the process of transforming ADT figures to EAADT figures, i.e. applying seasonal adjustment factors to coverage counts. A second use is to establish traffic growth trends whereas a third use is to get data on traffic composition, i.e. light and traffic respectively. Data from the permanent stations can also be used for calibration of forecasting models.

For the purpose of traffic forecasting the permanent stations need to cover the whole country and also different road classes. Of the existing 10 stations eight are situated on trunk roads and two on main roads. None of these permanent stations are in the Oshakati DOT Maintenance Region. It is proposed by the TS Section to establish 15 stations in the first priority group which will allow inclusion of more main and district roads. Those stations will particularly improve the monitoring of traffic in the northern part of Namibia. The rationale for those 15 locations is clear and the Consultant supports the proposal in that respect. The proposal covers 26 permanent stations. The decision on the number of stations that are needed should be based on the statistical analysis of the first priority 15 stations. It may be more efficient to spend additional funds on increasing the coverage counts.

It should be investigated if it is cost-effective to contract out the maintenance and monitoring of the traffic counters at the stations to the private sector.

Another issue for evaluation is whether it could be possible to use staff from the Maintenance Regions to collect data and transmit by modem to head office. It is also important to develop the software for calculation of coverage count factors. Otherwise the expansion of the permanent stations cannot be fully efficient.

Recommendations on Traffic Forecasting

- For the trunk road system which carries 70% of traffic volumes a simplified demand model is recommended, based on the relationship between employment and traffic growth
- Use a historic trend analysis model for the low volume network
- Expand the system of permanent traffic counting stations to - in a first step - 15 stations covering all DOT regions as well as trunk, main and district roads

4.3 Volume 4, Contracting of Routine Road Maintenance

The Consultant was required by the Terms of Reference to design all the instruments and procedures required by the Roads Authority for contracting of road construction and maintenance works. However, it was found that there were already adequate procedures in place for road construction and another consultant was already preparing procedures and instruments for labour-based works. The Consultant could therefore concentrate on contracting of routine road maintenance.

The purpose of the guideline is to provide advice and support to the Roads Authority and its appointed consultants for preparation of tender documents, and for the efficient administration and management of routine road maintenance by contract. Most of these activities are presently done as departmental works. The guideline can also be used as an instrument for development and training of contractors.

The guideline is focused on contracting of routine road maintenance and covers

- the main principles for contracting
- General Conditions of Contract
- Standard Specifications
- Tender Documents
- Illustrating Samples

The Consultant is of the opinion that the Roads Authority should begin the transition to routine road maintenance through contracts based on unit prices and measured quantities. Routine road maintenance based on functional requirements must be seen as a long term target, commensurate with the experience gained and level of sophistication achieved by the new contractors entering the market.

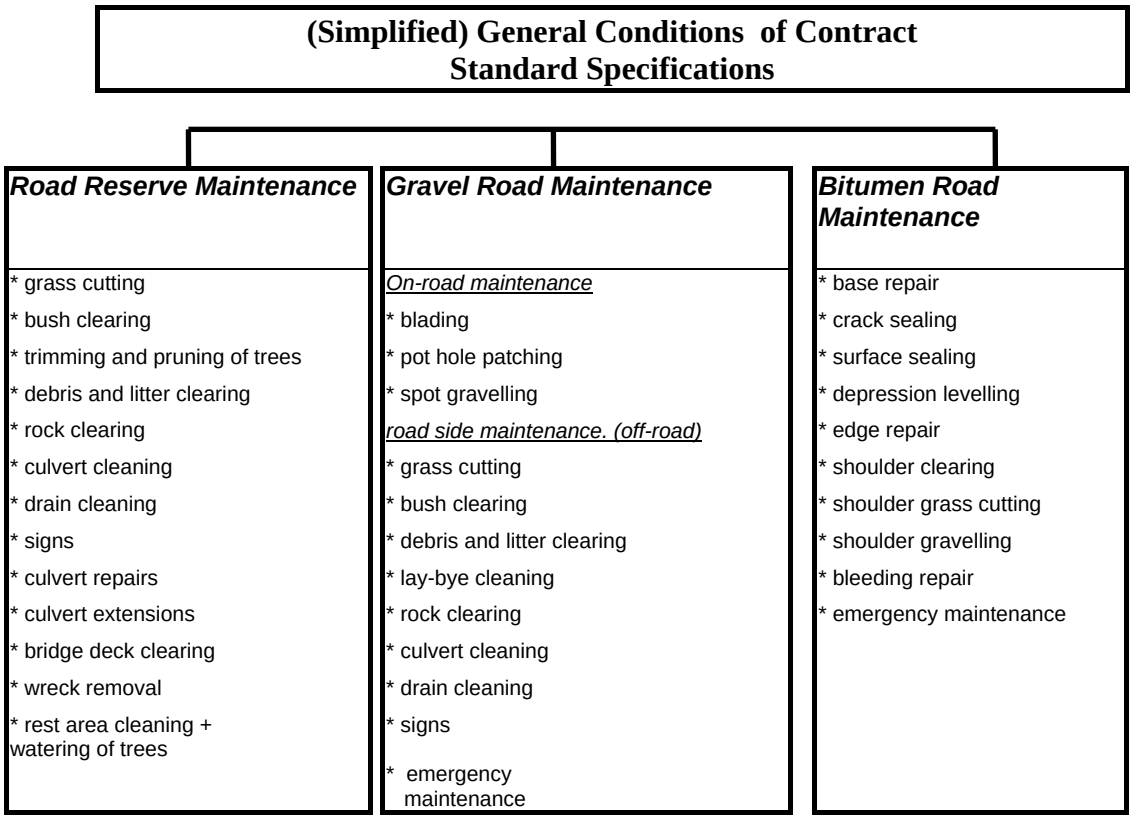
Based on the current practices which appear sound the main structure of the system for contracting of routine road maintenance shown in Figure 4.1 overleaf has been developed.

It is expected that the model for routine gravel road maintenance will be commensurate with the existing contracts for blading which normally include most of the activities listed in the box in the middle of Figure 4.1.

Consequently, since only a few of the activities listed in the left box concerning road reserve maintenance will apply to gravel roads, specific contracts for road reserve maintenance are normally expected only to be used for bitumen roads. For gravel roads it seems practical to combine the road reserve maintenance with the maintenance of the gravel road pavement.

For bitumen roads which are normally maintained by equipment-based methods it seems more natural to apply a separate contract for the on-road maintenance of the road (*i.e.* roadway and side slopes), and another for the road reserve. This would facilitate the development of local small contractors using labour-based methods for the maintenance of the road reserve.
In sparsely populated areas however the two contract models would be combined also for bitumen roads.

Figure 4.1. Main contents of recommended contract models



Recommendations on Contracting of Routine Road Maintenance

- The model for gravel road maintenance should be commensurate with the existing contracts for blading
- Contracts for gravel road maintenance should cover all activities, including road reserve maintenance
- For bitumen roads which are normally maintained by equipment-based methods it seems more natural to apply a separate contract for the on-road maintenance of the road (*i.e.* roadway and side slopes), and another for the road reserve
- The Roads Authority should begin the transition to routine road maintenance through contracts based on unit prices and measured quantities. Routine road maintenance based on functional requirements should be seen as a long term target, which would require more sophisticated contractors and control mechanisms

4.4 Volume 5, Aerodrome Standards

The report focuses on those aerodromes which will be the responsibility of the MWTC. In setting standards for the provision and maintenance of aerodrome infrastructure the following has been taken into account:

- The establishment of the Namibian Airports Company (NACo) and the fact that certain aerodromes would be transferred to the NACo
- The aerodrome classification that would be employed.

Three classes of aerodromes were identified, namely:

- Class A : Aerodrome capable of handling large jet aircraft and a high volume of traffic, and facilities to handle international flights and passengers
- Class B : Infrastructure capable of handling smaller aircraft and volumes, not necessarily a point of entry
- Class C : Minimum facility for access by air, implying a non-licensed facility with rudimentary infrastructure.

The aerodromes that will be the responsibility of the MWTC will only belong to Classes B and C and no standards were therefore set for Class A.

The aerodrome standards that are applicable to a specific type of aerodrome are determined by the following:

- The role of the aerodrome in the National Aerodrome Network approved by Cabinet.
- Legislation applicable to licensed and unlicensed aerodromes in Namibia.
- ICAO standards as Namibia is a contracting state.

The requirements of the mentioned determinators are as follows:

The network requirements are that a Class B aerodrome is not necessarily a point of entry but that it should be capable of handling smaller aircraft and volumes, whilst a Class C aerodrome is the minimum facility for access by air.

Current Namibian legislation requires the following from an aerodrome license holder:

- aerodrome must be maintained in a serviceable condition
- aerodrome must be kept free from unauthorized access
- all obstructions must be marked
- an apparatus must be installed and maintained that indicates surface wind direction
- required marking must be maintained in a conspicuous condition.

For a non-licensed aerodrome the pilot is responsible for ensuring that the landing area conforms to the minimum basic length required for a specific aircraft and that the approach areas are safe.

ICAO standards for aerodromes are contained in Annex 14 to the Convention on International Civil Aviation.

Therefore to set standards for infrastructure that need to be provided at Class B and C aerodromes the requirements of the three determinations need to be taken into account.

Broad infrastructure elements constituting an aerodrome were identified and defined

Standards for the different elements were set for Class B and C aerodromes.

In certain cases the requirements of the different determinators overlap for certain aerodrome elements and although it would be ideal to satisfy ICAO requirements in all cases it became evident that this would prove to be a very expensive exercise. In certain cases it was therefore decided to satisfy only the requirements as contained in legislation applicable to airports.

Recommendations on Standards for the National Aerodrome Network

The aerodrome standards that are applicable to a specific type of aerodrome should be determined by the following:

- The role of the aerodrome in the Namibian Aerodrome Network.
- Legislation applicable to licensed and unlicensed aerodromes in Namibia.
- ICAO standards as Namibia is a contracting state.

4.5 Volume 6, Implementation and Funding of the National Aerodrome Network

This report addresses two main topics. Firstly, it recapitulates the nature and extent of the network, including an appraisal of the funding requirements of the network. An aspect which is explored in more depth than previously is the impact of the application of the so-called Okongo principle (which includes aerodromes in the network not because they are identified in terms of the policy principles, but due to the investment previously undertaken in them). Secondly, it looks forward by proposing institutional mechanisms and an assignment of responsibilities to manage the network in future. The specific focus areas here are the selection of an appropriate management agent, and how to fund the network. Finally, these proposals are consolidated into an implementation plan.

The following table indicates the scope of the National Aerodrome Network (as approved by Cabinet):

No.	Criterion[1]	Location	Owner[2]	Class[3]
1	Intercontinental. Access	Windhoek	NACo	A
2	Domestic hub	Eros	NACo	A
3	Regional access	Walvis Bay	NACo	A
4	Region HQ	Swakopmund	Munic	C[4]
5	Region HQ	Oshakati	MWTC	C[4]
6	Region HQ	Rundu	NACo	B
7	Region HQ	Keetmanshoop	NACo	B
8	Region HQ	Katima Mulilo	NACo	B
9	Economic centre	Lüderitz	NACo	B
10	Region HQ	Ondangwa	NACo	B
11	Region HQ	Tsumeb	Pvte	B
12	Region HQ	Otjiwarongo	Munic	B

(continued on next page)

No.	Criterion[1]	Location	Owner[2]	Owner[2]
13	Region HQ	Gobabis	MWTC	C
14	Economic centre	Oranjemund	Pvte	C
15	Region HQ	Mariental	MWTC	C
16	Remote access	Khorixas	Munic	C
17	Remote access	Karibib[5]	MWTC	C
18	Remote access	Karasburg	Munic	C
19	Region HQ	Opuwo	MWTC	C
20	Remote access	Maltahöhe	Munic	C
21	Remote access	Bethanie	Munic	C
22	Remote access	Okakarara	MWTC	C
23	Region HQ	Eenhana	MWTC	C
24	Remote access	Otjinene	MWTC	C
25	Remote access	Kamanjab	MWTC	C
26	Remote access	Aroab	Munic	C
27	Remote access	Aminuis	MWTC	C
28	Remote access	Rosh Pinah	Pvte	C
29	Region HQ	Uutapi	MWTC	C
30	Remote access	Sesfontein	MWTC	C
31	Remote access	Otjituuo	MWTC	C
32	Remote access	Tsumkwe	MWTC	C
33	Remote access	Bagani	MWTC	C
34	Remote access	Nepara	MWTC	C
35	Remote access	Okongwati	MWTC	C
36	Remote access	Terrace Bay	ME&T	C
37	Remote access	Okaukuejo	ME&T	C
38	Remote access	Rietfontein	Pvte	C
39	Remote access	Zais	ME&T	C
40	Remote access	Sesriem	ME&T	C
41	Remote access	Tweerivieren	Pvte	C

Notes on the table :

1. *Criterion:* *Criterion for the identification of a network aerodrome*
2. *Owner:* *NACo = Namibian Airports Company*
   MWTC = Ministry of Works, Transport & Communication
   Pvte = Private owner
   Munic = Municipality, town or village
   ME&T = Ministry of Environment & Tourism
3. *Class:* *Standard of facility*
4. Would have been B, but in close proximity to NACo aerodromes (See previous page)
5. Negotiations on the future of Karibib have resulted in it being earmarked for operation by the Ministry of Defence. Grootfontein has similarly been earmarked. However, Grootfontein is not part of the network due to its proximity to Tsumeb.

As far as agents for the maintenance of individual aerodromes is concerned, the likely candidates are the Road Contractor being formed under MWTC 2000, private contractors or local authorities. A major implication of using such agents directly is that they will still need to be co-ordinated and controlled. If the MWTC engages individual contractors, it must be equipped administratively to deal with this task. It is proposed that a network agent would be more appropriate. It should then be one of the conditions of contract with the network agent that it will make use of small-scale and geographically localised enterprises in its contracting process.

The options for funding are, essentially, that:

- MWTC funds the network wholly through a budget appropriation (as happens currently, although the budget is spread over three departments);
- a combination of Government (MWTC) and user charges are used (in which case the split and the form of user charging must be formalised). A variant of this option is where user charges are only recovered for B-level aerodromes (which are per definition there for the users);
- subsidisation is received from another source (Airports Company or Roads Fund Administration) to make up either the MWTC or the user contribution; or
- user charges only are used.

The amount of funding required *per se* is not a sufficient motivation to search for new sources of funding. This is especially so in the light of the relatively small amount which could justifiably be recovered from users. Also, the other implications of user charging do not justify moving away from the MWTC budgeting process.

Recommendations on Implementation and funding of the National Aerodrome Network

- The likely candidates for maintenance of the network are the Road Contractor being formed under MWTC 2000, private contractors or local authorities.
- It is proposed that an aerodrome trade account be established in favour of MWTC. It is furthermore proposed that it be fed by means of fuel levies. Such levies will be paid into the account monthly by the fuel importers, who will provide the MWTC with the necessary documentation of proof. The trade account will be administered by the MWTC who will report annually to the Auditor General in the prescribed manner.
- An aerodromes register would greatly facilitate the MWTC and make possible a more sensitive evaluation of aerodromes.
- it is recommended that funds be appropriated from the Central Revenue Fund

4.6 Volume 7, National Transportation Master Plan

The emphasis in this Master Plan is on national transport infrastructure maintenance and development in the road, railway and air transport sectors. All transport services and internal transport and infrastructure within urban areas are therefore excluded.

The main purpose of the Master Plan is to give the Government of Namibia and its affiliated agencies guidance into the programmes and projects needed in order to comply with the agreed goals and strategies for transport infrastructure during the period up to the year 2012.

This report (Volume 7) may be read as a stand-alone document but in order for the reader to obtain more information of specific details reference is made to other reports of the National Transportation Master Plan Study (NTMPS) as shown in Figure 2.1.

Reference is made to the following extracts from the Master Plan:

A draft five year plan for roads has been elaborated and is contained in summary forms selected from Volume 2, Guideline for Road Planning and Budgeting Procedures as follows:

- Estimates of expenditure - Summary of five year plan;
- Five year plan - Rehabilitation of Roads & Bridges;
- Five year plan - Partial surfacing of gravel shoulders;
- Five year plan - Spot improvements;
- Five year plan - Surfacing of gravel roads; and
- Five year plan - New Roads and Bridges and Major Upgrading Projects

The summary of the five year plan is presented in Annexure C.

A special plan for the railway network is proposed to be elaborated whereby the railway investment proposals are calculated on a socio-economic basis as is the case for road investments.

A feasibility study for an extension of the rail system from Trumeb to Oshakati is presently being executed

In order to become more competitive, effective and client friendly, higher speeds and axle loads should be accommodated, initially only from the Southern border to Walvis Bay.

No significant development of the proposed National Aerodrome Network is envisaged at present within the scope of this Master Plan. However, since the Class B aerodromes at Tsumeb and Otjiwarongo do not comply with the geometric standards related to the National Aerodrome Network there might be a need for upgrading in future.

Based on changes in the network criteria, the standards index and/or the detailed standards, the national network may need to be updated (i.e. aerodromes added in, taken out or re-prioritised). It is proposed that this takes place once every five years.

The network review may result in specific aerodrome projects being identified. For each such project (if it can be executed in terms of the budget), a detailed design must be undertaken, a contractor engaged and the work carried out and supervised. As MWTC should attempt to limit its operational and executive duties, work resulting from the identification of a project should be out-sourced as far as possible.

The Terms of Reference do not require the inclusion of projects related to sea transport. However, at a late stage of the work the Study Team obtained a copy of a feasibility study for deepening of the Port of Walvis Bay. There was not enough time to penetrate the feasibility study in detail. It seems, though, that such a project, which appears to be financially and economically viable may have a significant influence on the future transport volumes on the road and rail networks in Namibia.

The Ministry must consider this when updating traffic forecasts in future, particularly for the Trans-Kalahari Development Corridor and road/rail connections to Northern Namibia, Angola and Zambia.

4.7 Volume 8, Final Report on Road User Charges

This Final Report concentrates on the detailed design of a three tier RUC system involving vehicle licence fees, fuel levies and weight-distance charges. Cross-border charges, abnormal vehicle charges and overload fees are also covered.

A brief summary is provided of the current situation, government policy and international agreements relating to road user charges in Namibia. It is clear that the Namibian Government is committed to implementing a comprehensive system of road user charges including cross-border charges with appropriate institutional and legislative structures. Legislation and international agreements are in place or are being prepared to allow for the implementation of cross-border charges.

Section 5 contains a discussion on components of a comprehensive RUC system for Namibia. Recommendations are made on transparency and

accountability issues relating to the long term RUC system. It is suggested that attention should be given at an early stage to clarifying relationships with the various Government ministries currently involved with parts of the RUC system. Legislation for the long term RUC system should be used to clarify the accountabilities for the charging instruments, the Road Fund and decisions on road expenditure and how these accountabilities relate to the roles of the various Government ministries.

Section 6 documents the vehicle data used in this RUC Study. The data is essentially an extrapolation of data used in previous RUC studies for Namibia. Extrapolation is used to give estimates of vehicle numbers and use for the financial years 1998/99 to 2000/01.

Updated estimates have been prepared of the costs to be recovered by the long term RUC system and these are documented in section 7. Two cost recovery budgets are presented for each of the financial years 1998/99 to 2000/01 - a "smoothed" budget which is the recommended budget and a "scaled" budget which has a reduced level of expenditure.

The recommended total RUC recovery is N$384 million in 1998/99, N$415 million in 1999/2000 and N$448 million in 2000/01. The "scaled" recovery level is approximately 86% of these figures.

Both budget scenarios average the costs to be recovered by the RUC system over the three financial years except for inflation. In most cases this gives over-recovery in the first two years which is balanced in the third year. The over-recovery, which occurs mainly because loan financing is being used in the first two years, can be looked on as making a contribution towards later loan repayment commitments. It is recommended that the RUC rates be adjusted yearly to allow for the actual rate of inflation in road costs.

A new set of road user charges have been calculated for each of the financial years referred to above and for each budget scenario and are documented in section 8. The calculation method is essentially the same as that used in previous RUC studies for Namibia.

It is recommended that the calculated vehicle licence fees be reduced by 50% and those for light vehicles be adjusted to account for under or over recovery by the recommended fuel levies. The vehicle licence fees recommended for 1998/99, based on the "smoothed" budget scenario, are:

	Annual Licence Fee, N$	**% Increase (Decrease) on Current Fee**
Petrol Powered Vehicles:		
Motorcycle	192	433
Car	306	183
LDV	349	142
Mini Bus	303	110
LGV	0	(-)
Bus	793	(83)
2 Axle SUT	1 465	(62)
3 Axle SUT	2 897	(38)
2 Axle Truck Tractor	7 563	98
3 Axle Truck Tractor	7 808	66
Diesel Powered Vehicles:		
Car	792	633
LDV	835	480
Mini Bus	887	516
LGV	244	(46)
Bus	793	(83)
2 Axle SUT	1 465	(62)
3 Axle SUT	2 897	(38)
2 Axle Truck Tractor	7 563	98
3 Axle Truck Tractor	7 808	66
Other	0	(-)
Unpowered Vehicles:		
1 Axle Trailer or Semi-Trailer	245	(93)
2 Axle Trailer or Semi-Trailer	490	(93)
3 Axle Trailer or Semi-Trailer	735	(89)
Caravan	31	(35)
Light Trailer	0	(-)

The above fees use vehicle type and number of axles as the fee determinant instead of tare weight which is used currently.

The recommended fuel levies, based on the "smoothed" budget scenario are:

	1998/99	**1999/2000**	**2000/01**
Petrol Levy, cents/litre	60.0	63.0	66.0
Diesel Levy, cents/litre	35.0	37.0	39.0

The above petrol levies require an increase in the price of petrol ranging from 2.6 cents/litre to 8.6 cents/litre if other components remain constant. On the other hand the price of diesel could be reduced by between 10.9 cents/litre and 14.9 cents/litre. For diesel-powered vehicles the reduction in the fuel price will be more than offset by the introduction of weight-distance charges for heavy vehicles and the recommended increase in vehicle licence fees for light vehicles.

The estimated RUC revenue in N$ million at the recommended level of fees and charges is:

	1998/99	**1999/2000**	**2000/01**
Vehicle Licence Fees	55	60	65
Petrol Levy	174	188	203
Diesel Levy	67	74	81
Weight-Distance Charges	88	93	99
Total Budget	384	415	448

An issue that needs to be addressed is control of the refund of the RUC diesel levy which will involve some N$55 million to N$70 million per year.

The detailed design of a weight-distance charging system is presented in section 9. The system will apply only to heavy load vehicles (5 228 single unit trucks or truck tractors plus approximately 2 270 trailers or semi-trailers in 1998/99). It is recommended that trailers and semi-trailers be treated separately from truck tractors and that the weight-distance charges be based on the legal maximum gross vehicle mass for the vehicle.

Recommended weight-distance charges (N$ / 100 kilometres), for the "smoothed budget scenario, are:

	1998/99	**1999/2000**	**2000/01**
Petrol Powered Vehicles:			
2 Axle SUT	6.49	6.46	6.50
3 Axle SUT	5.29	5.11	5.03
2 Axle Truck Tractor	14.13	14.38	14.74
3 Axle Truck Tractor	9.50	9.47	9.56
Diesel Powered Vehicles:			
2 Axle SUT	14.92	15.22	15.60
3 Axle SUT	16.91	17.20	17.59
2 Axle Truck Tractor	22.56	23.14	23.83
3 Axle Truck Tractor	21.12	21.56	22.12
Unpowered Vehicles:			
1 Axle Trailer (single tyres)	10.62	10.95	11.31
1 Axle Trailer (dual tyres)	3.36	3.42	3.49
2 Axle Trailer (single tyres)	20.18	20.81	21.52
2 Axle Trailer (dual tyres)	9.49	9.73	10.02
3 Axle Trailer (single tyres)	22.38	23.06	23.83
3 Axle Trailer (dual tyres)	11.69	11.98	12.32

The recommended system of weight-distance charges includes the use of hubodometers to measure distance travelled. This recommendation is made with the proviso that demonstrable on-road enforcement must be applied to ensure compliance with the hubodometer requirements which are extensive. Detailed recommendations are given on the control, installation and enforcement of hubodometers.

To minimise bad debts and to facilitate enforcement it is recommended that a system of weight-distance licences be used. These weight-distance licences would be "sold" by registration and licensing agents as well as being available 7 days a week from a central office by telephone or facsimile with appropriate credit arrangements. A separate administration fee per licence is recommended to cover the cost of issuing the licence.

After careful consideration it is recommended that allowance be made for distance travelled off public roads. A refund system is proposed for this with claims made against licences purchased.

Cross-border charges compatible with the domestic weight-distance charges are presented in section 10. The charges would only apply to foreign registered heavy load vehicles and are significantly lower than the maximums set under the international agreements for the Southern African region. It is recommended that distance be assessed from the consignment note required to be carried by the international agreements. This requires close attention to the accuracy of consignment notes and adequate on-road enforcement to ensure that travel within Namibia is correctly represented.

Charges for vehicles operating under abnormal vehicle permits and fees for overloaded vehicles are given in section 11. These fees have been calculated as an extension of the weight-distance system.

Introduction of the weight-distance charging system is not recommended unless nation-wide computer support is available. This can be provided by modification to the NaTIS system for vehicle registration and licensing currently being implemented in Namibia. As mentioned above, the weight-distance charging system should also not be implemented without adequately trained and motivated enforcement resources.

Implementation of the long term RUC system is dependent on:

- Establishment of a national network of vehicle registration and licensing agents.
- Implementation of the vehicle subsystem of NaTIS nation-wide complete with modifications to support weight-distance charges.
- Establishment of border post facilities with adequate resources to handle cross-border charges.
- Enactment of the draft Road Traffic and Transport Bill.

- Implementation of legislation for weight-distance charges (Recommended provisions are included in Appendix M).

  Weight-distance charges could be implemented in advance of the establishment of a Road Fund and its administration, however these are desirable components in the acceptability of a RUC system.

  A detailed implementation plan for the short term system is given in Appendix N. It is recommended that the long term RUC system not be implemented until all components are in place. This means that the earliest implementation date for the system is early 1999.

4.8 Volume 9, Layman's Draft of a New Namibian Roads Act

This task of the NMTPS has examined the main legislation which governs the provision of roads in Namibia, the Roads Ordinance, 1972. The following principles were followed when re-drafting this legislation to bring it up to date in the light of the many changes that have occurred in Namibia in the last twenty years:

- Namibia has become an independent nation with a constitution which directly impacts on all her legislation.

- Terminology used in the Ordinance is outdated or inappropriate to Namibia at this stage in her development.

- Certain aspects of the roads legislation should be covered in Ministerial regulations as opposed to being retained in a Parliamentary act. This would allow the Minister to expediently amend those aspects which are often of a routine and detailed nature without bringing such matters to Parliament.

- The road classification system used in the Ordinance requires amendment.

The changes proposed and included in the layman's draft Roads Act have been organised in two distinct categories:

- Global changes in the legislation, initiated by changes in terminology and administrative system; and

- specific changes to meet new policies or technical considerations in Namibia.

4.9 Volume 10, Proposal for Reclassification of Roads

4.9.1 Trunk Roads (TR)

The existing definition in the Roads Ordinance of a trunk road seems adequate and no change is considered necessary. However, it seems necessary to clarify the statement in the Ordinance by a separate Regulation or guideline which specifies in more detail the intentions of the Ordinance. The main reason is that there is a number of roads crossing international borders which cannot reasonably constitute the status of a trunk road. The following statement is proposed to be included in the Regulation.

Trunk Roads typically

- constitute the backbone of the national road network;
- connect the national capital and the most important regional centres[1] through the most frequented border crossings and major ports with the neighbouring countries and the sea.

4.9.2 Main Roads (MR)

The main roads concept is also well established and does not call for any major change. However, the definition requires from the Minister to decide which centres are important or not. In addition, the Consultant has found that a number of main roads, particularly in the commercial farming areas, do not primarily connect centres but rather serve as arterial roads in those areas. The following alternative general definition in the Roads Ordinance should be considered.

"The Minister may -

(a) ……

(b) declare a proclaimed road which is of strategic importance for the development of the regions within Namibia to be a main road;

(c) …….

(d) ……..."

In a Regulation by the Minister and/or in a Guideline by the Roads Authority there should be a clarification of the main functions of a main road, for example:

Typical main roads

- connect regional centres with each other if not connected by a trunk road;
- connect regional centres with district centres[2];

[1] A regional centre is defined by the seat of a Regional Council. There are 13 Regions in Namibia.
[2] A district centre is defined by the seat of a Local Authority. There are 29 Local Authorities in Namibia.

- connect economic growth points with the regional centres;
- connect district centres with each other;
- connect important tourist areas or centres with the trunk road network; or
- serve as arterial roads in large farming areas.

4.9.3 District Roads (DR)

Since the present definition of a district road is not based on function the following amendment is suggested:

"The Minister may -

(a) ……

(b) ……

(c) declare a proclaimed road which is of importance for the development of a district to be a district road;

(d) ……"

In a Regulation by the Minister and/or in a Guideline by the Roads Authority there should be a clarification of the main functions of a district road, for instance:

Typical district roads
- carry a reasonable amount of traffic;
- connect economic growth points with district centres; or
- serve as collector roads in areas of importance to national economy (industry, agriculture, tourism, etc.), nature and environment within a district.

4.9.4 Other roads

There does not seem to be any reason at this stage to change the definition of a farm road, a minor road or a private road in the Roads Ordinance.

4.10 Economic Evaluation Manual

This manual is aimed at providing guidelines for the economic appraisal of road investment proposals.It must be used by the Consulting Engineer during feasibility studies and when updating economic indicators during the design process.

The main purpose of the manual is to ensure uniformity in the economic evaluation of road projects so that the results of different studies are comparable. This is very important when priorities have to be allocated to various proposed projects.

It will also be used in the road planning and budgeting process by the Department of Transport, the Roads Authority and the Road Fund Administration as a basis for prioritising between projects for road improvement and development.

It is assumed that the users of this manual are familiar with the *basic* theory of investment appraisal and therefore only some principles, computer programs and some parameter values will be given to facilitate uniform application of economic evaluation in Namibia.

Since the Namibian Trunk Road Network can be considered as rather complete it is envisaged that the majority of feasibility studies in future will be made for main and district roads. The full procedures for economic evaluation will likely only be warranted in a small number of cases. Simplified procedures for economic evaluation may therefore be used for cases such as surfacing of gravel roads, upgrading from track to gravel road, or widening of an existing bitumen road. Annexure 2 of the manual contains instructions and worked out examples of typical project cases where simplified procedures apply as well as standardised cost data to be used in the calculations.

Annexure A. Terms of Reference

Annexure B. Original and Adjusted Reporting Schedule

Report	Task no.	Planned date of delivery	Actual date of delivery	Comments to major deviations
Inception Report on NaTIS	1, 2, 7	14/10/96	14/10/96	
Inception Report on Road User Charges	1, 2, 8	14/11/96	14/11/96	
Overall Inception Report	1, 2	15/1/97	17/01/97	
Draft Interm. Report on NaTIS	7, 9	04/11/96	04/11/96	
Final Interm. Report on NaTIS	7, 9	25/11/96	29/11/96	
Draft Final Report on NaTIS	10	27/01/97	29/01/97	Report not approved by the Client
Final report on NaTIS	10	20/02/97	Not applicable	Consultant relieved from delivering this report by hand-written note from the Client's representative 27/05/98
Draft Interm. Report on Road User Charges	8, 11	04/12/96	29/11/96	
Final Interm. Report on Road User Charges	8, 11	20/02/97	13/12/96	
Draft Final Report on Road User Charges	12, 13	23/04/97	16/04/97	
Final Report on Road User Charges	12, 13	30/06/97	28/05/97	
Draft Intermediate Report	3-6, 14, 16, 17, 19, 21	29/09/97	03/12/97	Changed time schedule for concerned tasks approved by the Client's representative in conjunction with approval of staff changes by letter 01/05/97. New structure of the report (Brief progress report and appended task reports).
Final Intermediate Report	3-6, 14,16, 17, 19, 21	27/11/97	Not applicable	Extended feed-back process. Revised separate reports delivered task by task and included in the draft final report.
Draft Final Report	15, 17, 18, 20, 22-24	02/07/98	01/07/98	
Final Report	15, 17, 18, 20, 22-24	30/09/98		