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Government of Nepal
Ministry of Physical Infrastructure and Transport
Department of Roads
Development Cooperation Implementation Division

Strategic Road Connectivity and Trade Improvement Project (SRCTIP)

Babarmahal, Kathmandu

Request for Expression of Interest (REOI)

Notice No.: SRCTIP/01/081-82

Date of Publication: 23 October, 2024

It is notified that Strategic Road Connectivity and Trade Improvement Project requests all the eligible Consultants to submit expression of interest in providing the following services:

S.N.	Contract Identification No.	Service
1	SRCTIP-DOR-RAMS-CS-QCBS-40	The Consultancy Service for the developing and implementation of web based Road Asset Management System integrating HDM 4 based on Department of Road's existing Annual Road Maintenance Plan system.

Interested Consultants may obtain the Terms of Reference (TOR) for the mentioned assignment and further relevant details from https://dor.gov.np/home/notices.

Expression of Interest must be delivered in written form to the given address (in Person or by email) by 19th November, 2024 office hours.

Project Director

Government of Nepal
Ministry of Physical Infrastructure and Transport
Department of Roads
Development Cooperation Implementation Division
Strategic Road Connectivity & Trade Improvement Project (SRCTIP)
Babarmahal, Kathmandu

Notice No. SRCTIP/01/081-82

Contract Identification Number: SRCTIP-DOR-RAMS-CS-QCBS-40

REQUEST FOR EXPRESSION OF INTEREST (REOI)

Date of first publication: 23rd October, 2024

Country: Nepal

Name of project: Strategic Road Connectivity & Trade Improvement Project (SRCTIP)

Credit No.: 6673-NP

Assignment Title: The Consultancy Service for the developing and implementation of web based Road Asset Management System integrating HDM 4 based on Department of Road's existing Annual Road Maintenance Plan system.

The Government of Nepal has received financing from the World Bank towards the cost of Strategic Road Connectivity & Trade improvement project (SRCTIP) and intends to apply part of the proceeds for consulting services.

This consulting service ("the Service") is **The Consultancy Service for the developing and implementation of web based Road Asset Management System integrating HDM 4 based on Department of Road's existing Annual Road Maintenance Plan system**. The service includes review of the existing Annual Roads Maintenance Plan system and develop a new modern GIS and Web-based system with integration of HDM-4.

Terms of Reference is available in the website of the Department of Roads: www.dor.gov.np/home/notices. Anticipated date for commencement of the services is May 2025 and the duration of the assignment is about 12 months of development phase and 48 months of operation support phase.

The Department of Roads, Development Cooperation Implementation Division (DCID) now invites **eligible** consulting firms ("Consultants") to indicate their interest in providing the Services. Interested Consultants should provide information demonstrating that they have the required qualifications and relevant experience to perform the Services. The qualification requirements for short-listing are:

- Minimum 5 years of standing in consulting services.
- Experience of consulting services in civil engineering projects.
- Relevant experience of the Consulting Firm in roads projects with development/ updating of Road Database Systems/ Maintenance planning system.
- Preference will be given to the Consultants having experiences in collection and analysis of road related data using HDM-4.

- Strong technical, managerial, financial and organizational capability of the firm for the assignment (number of permanent professional staffs shall be preferably more than 7).
- The firm shall submit a copy of Firm and VAT/ PAN Registration along with Tax clearance certificate for the last Fiscal Year.
- A firm shall not submit more than one REOI, either individually or as joint venture partner.
- The completed projects within last 10 (ten) years counted from EoI submission deadline shall be considered for evaluation.

The attention of interested Consultants is drawn to Section III, paragraphs 3.14, 3.16 and 3.17 of the World Bank's "Procurement Regulations for IPF Borrowers" September 2023 setting forth the World Bank's policy on conflict of interest.

Consultant may associate with other firms in the form of a joint venture or a sub-consultancy to enhance their qualifications. Consultant shall clearly state the form of association, if any, whether in the form of joint venture or sub consultancy in the Expression of Interest. The Experience of consultant participated as a sub consultant in this assignment will not be taken into account while evaluating the EoIs.

A consultant will be selected in accordance with the Quality & Cost Based Selection (QCBS) method set out in the World Bank's "Procurement Regulations for IPF Borrowers" September 2023.

Further information can be obtained at the address below during office hours or at DoR's website: www.dor.gov.np/home/notices

Expression of interest must be delivered in written form (in Person or by email) during office hours to the address below by 19th November, 2024.

Deputy Director General
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Development Cooperation and Implementation Division
Strategic Road Connectivity & Trade Improvement Project (SRCTIP)
Babarmahal, Kathmandu
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Terms of Reference

The Consultancy Service for the developing and implementation of web based Road Asset Management System integrating HDM 4 based on Department of Road's existing Annual Road Maintenance Plan system

Table of Content

1 INTRODUCTION

Background

1. The Department of Roads (DOR) has financial support from the World Bank to implement Strategic Road Connectivity and Trade Improvement Project (SRCTIP) to improve the efficiency and safety of selected transport infrastructure, improve the efficiency of cross-border trade, and strengthen capacity for strategic road network management. One of the four components of SRCTIP is institutional strengthening. Institutional strengthening comprises capacity enhancement of DOR for improved management of National Highways (NH).

2. DOR is responsible for maintenance and development of National Highways(NH). Although Feeder Roads and Urban Roads are under provincial and local authorities, DOR is managing some of them as well. At present, there is about 18100 km of National Highways, Feeder Roads and Local Roads managed by the DOR, out of which 9600 km is blacktopped, 5,000 is unsealed and 3,500 km is still at planning or under-construction stage.[1]

3. DOR has a web-based Annual Road Maintenance Planning(ARMP) system which incorporates Geographic Information System(GIS) data of SRN from 2023.

4. Under SRCTIP, the DOR is planning to use part of the funds to engage consulting services to upgrade the existing ARMP to a Road Asset Management System(RAMS) with Highway Development and Management Model (HDM-4) integration.

Annual Road Mainteannce Program (ARMP)

5. For the roads under DOR, maintenance is carried out by 33 Division Roads Offices (DROs) and monitored by 4 Federal Roads Supervision and Monitoring Offices (FRSMOs). Each year the Maintenance Branch of DOR, based on the ARMP information and analysis, prepares budget forecast for various maintenance activities for NH and other SRN under DOR.

6. The present web-based ARMP software was introduced from year 2012/2013. It stores road database like road links with chainage, road conditions, Surface Distress Index (SDI), Annual Average Daily Traffic(AADT), International Roughness Index(IRI), pavement history, and item rates for maintenance planning. It has facility of entering and updating road data based on the road condition survey conducted by Highway Management and Information (HMIS) unit and respective DROs. The software also generates maintenance plans and budget requirement for Periodic Maintenance as per predefined maintenance cycle.

7. The ARMP is also integrated with GIS maps so that the output of different maintenance planning and expenditure can be graphically presented. The database is automatically linked with GIS. Various road related information like traffic volume, pothole, road cracks can be presented in GIS. It can also display the photos and videos of the road with chainage that are collected during data collection period.

8. Although the present ARMP system generates Annual Road Maintenance Plans for each year it has limitations as it cannot analyze return of the maintenance investment that is required for network-level road maintenance planning and administration. Furthermore it is based on some empirical tools developed in the past within the DOR from its past experiences in road maintenance planning. At this moment the DOR has felt necessary to have a system that can prepare plans for maintenance not only for a year but also for a longer period of time e.g. 5 to 10 years based on the economic analysis. Such

[1] Source IARMP, 2024

analysis is supposed to be performed with HDM-4 integrating the HDM-4 with the existing ARMP with some upgrading. The RAMS database should be capable of furnishing data required for HDM-4 analysis.

9. The primary purpose of HDM-4 is to assist in analysis and decision-making processes related to the management and development of road networks. DOR used HDM-4 to determine the optimal maintenance expenditure over a 10-year planning period while developing the Priority Investment Plan (PIP) in 2007. DOR intends to establish HDM-4 as an integral part of planning the annual maintenance as well planning and formulating long-term strategic maintenance plans within budget constraints. This will certainly empower the DOR as well as respective DROs to develop strategic plans, budget for year-wise interventions, and also to show scenario if there is budget constraints.

2 OBJECTIVE

10. The main objective of this consulting service is to support the DOR to develop and implement the web-based RAMS integrated with HDM-4 based on the existing ARMP system of the DOR.

    The objective includes:

11. update DOR's road referencing system with new and improved links in the road inventory database.
12. develop and implement web based RAMS integrating the HDM-4 in order to help planning and budgeting for various maintenance activities.
13. demonstrate the developed RAMS system with the sample data available at the DOR showing practical applications of the system in formulating pavement maintenance options within various budgetary constraints.
14. support and enhance the capacity of HMIS-IT Unit and Maintenance Branch team in planning, collecting, analyzing, storing and maintaining the database as well as integrating the system with other relevant systems in Nepal.

3 SCOPE OF SERVICES

Improvement in present database

15. Review of existing ARMP database to identify the gaps for developing it to a RAMS. Update or develop existing road links and road reference numbers considering the administrative boundary and homogeneous section approach required for HDM analysis. Upgrade the system to add attributes related to vehicle fleets, road networks, work standards (maintenance standards and improvement standards) that required for the HDM 4 integration and analysis. For reference, a sample list of attributes or fields required to input to the HDM-4 is given in Annex 1.
16. Update or develop links in GIS and inclusion of attributes in the geodatabase like link name road class, Chainage, length, pavement history, road condition, traffic AADT, climate zones etc.
17. Modify and update the present database so that all maintenance activities including periodic maintenance can be prepared on 1 km interval basis.
18. Review the present traffic survey method and recommend for improvement in method of traffic count and stations to be added to cover entire national highway links.
19. Make provision of various work items in the RAMS that are required for the system to analyze financial and economic costs.
20. Create input file for HDM-4 in "mdb" format along with necessary data.

21. Create methods to run the HDM-4 in server using command line options.
22. Create methods to retrieve and analyze HDM-4 results.
23. Incorporate the HDM-4 optimized data in ARMP planning process and display tables and maps.

Data Preparation and Collection Format

24. Develop a format to collect the required data for HDM from the running or completed projects (secondary source) and suggest for mandatory to fill up data from the projects and submit to Maintenance Branch and HMIS-ICT.
25. Modify and provision of storage and retrieving historical data to define the trend of traffic data, cracks, rutting, raveling, IRI, potholes.
26. Provision of road item cost module in the database structure.
27. Standardize, formats for surface defects data collection, IRI and traffic data so that all these data can be exported to HDM.
28. The system shall be capable of exporting GIS maps in shape files and updating the road links in the RAM by the admin.

Integration of HDM-4 to the RAMS

29. Integrate the HDM-4 in the developed RAMS based on present ARMP system. The aim is to obtain results and utilize them for subsequent planning activities.
30. The RAMS system developed should be capable of replacing the current empirical methods of yearly road maintenance planning with a multiyear road maintenance planning based on the economic analysis with HDM-4 within a constrained/unconstrained budget.
31. The RAMS system should have the database required for HDM -4 such as vehicle fleet, road networks and work standards.
32. The RAMS system should export the output obtained from the HDM-4 analysis or latest analysis to database and subsequently to GIS presentation.
33. The RAMS system shall be capable of importing bridges lists and attributes from the Bridge Management System being used in DoR.
34. RAMS should have adequate and different level of security to run and or to admin the database.

Selection of appropriate road data collection equipment.

35. Recommend cost effective and appropriate equipment to measure and record road conditions and roughness.
36. Considering suitability to the road network, the equipment shall be selected for capturing cracks, rutting, raveling, potholes, IRI, CBR, and deflection. The data output from such equipment should be exportable to RAMS with ease.
37. Review the location and spread of present traffic counting stations and determine new stations to cover the network. Determine the most appropriate equipment for classified traffic counting.
38. Review the location and spread of present axle-load measuring stations and determine new stations to address the overloading issue. Determine the most appropriate equipment for axle load measurement or suggest a mechanism to get vehicle loading data from existing stations under different agencies.

39. Review the location and status of data servers and determine location and capacity of new servers for data storage and hosting. Look into a possibility of using privately owned servers and develop a data management framework.

Demonstration of the RAMS using secondary data

40. The RAMS that developed and integrated with HDM 4 shall be demonstrated on a sample of about 400 km road sections.

41. The data for the demonstration sample shall be taken from the projects and/or HMIS-ICT.

42. The system shall be installed in the servers as instructed by DOR and an operation manual shall be developed and submitted in soft and hard copy or in help menu.

Presentation

43. The consultant shall organize workshops for receiving comments/ suggestions at every stage of report preparation.

Annual Maintenance

44. System operation and maintenance support is required for four years. This includes on call support for debugging and or any issue with the system and any corrections if needed to use the RAMS. The calls for the support from the client should be addressed by the consultants immediately(within 24 hours)

45. During this operation and maintenance support period of four years, the consultant should provide support during the ARMP workshops that are held at four regions of the country.

4 COUNTERPART STAFFS

46. One engineer from Maintenance Branch and two engineers one civil engineer and one computer engineer from HMIS_ICT will be deputed as counterpart engineers for providing data required for the development of RAMS and the consultant need to provide them on the job training during the execution of services.

5 FIRM'S QUALIFICATION

47. The Firm should have as a minimum,

- 5 years of standing in consulting services;
- Experience of consulting services in any civil engineering project
- Relevant experience of the Consulting Firm in roads projects with development/ updating of Road Database Systems/ Maintenance planning system

Preferable Experience:

- Preference will be given to the Consultants having experiences in collection and analysis of road related data using HDM-4.
- Strong technical, Managerial, financial and organizational capability of the firm for the assignment (number of permanent professional staffs shall be preferably more than 7)

6 TIME FRAME AND DELIVERABLES

48. The assignment shall be completed in two phases, Phase 1: Development and implementation within 12 months from the agreement date, Phase 2: Operation and maintenance for four years after completion of development and implementation phase, with the following milestones.

49. **Phase 1**: Development and Implementation

- Review the existing database and ARMP system and prepare an Inception Report clearly specifying the activities, work plan and manning schedule; within 1 Month from the agreement date
- Report on recommendations for the traffic data collection and road condition data acquiring equipment that proposed to be used in long term for RAMS.
- Data collection, database improvement, development of RAMS integrating HDM-4 including operation manual within 6 months. This shall include;
    i. Road inventory database with updated links and other information in a database format that can be accessed thru any freely available database management system with all its source codes installed in the server provided by the DOR
    ii. Updated RAMS with all integration mechanisms with the HDM-4 with all its source codes installed in the server provided by the DOR
    iii. The system should be trial-run on the DOR computer with sample data as per the requirements set on these TOR. The consultants should demonstrate that the RAMS is able to use HDM-4 to analyze and produce Annual Roads Maintenance Plan and strategic planning capacity for a longer period (5-10 years years) and other graphical visualizations on the Maps.
- One day Training on RAMS operation to 100 DOR engineers @ 5 batches and submission of training report within 12 months. (see Training)
- Final Report and Submission of Source code for integration with HDM-4, Technical document and operation manuals, database of the application, User and Admin Credentials within 12 months
- Monthly progress report within first week of calendar month specifying progress and issues, if any.

50. **Phase 2**: Operation and Maintenance

- Assist the DOR in operation and Maintenance of the system for four years through providing services and support for debugging and or any issue with the system, corrections needed to use the RAMS based on practical issues.
- The consultant is required to carry out the assignment so that at the end of phase 2 the DOR should have achieved the following:
    - A RAMS with web and GIS-based road database management system capable of storing, analyzing, retrieving, visualizing road inventory, road condition (Distresses, roughness, structural strength, texture), traffic and all other data required to be input to the HDM-4 for analysis. The database should be populated with some sample data as per the scope (section 3) of this TOR. The system should be installed in the server of the DOR.
    - The established system should be capable of planning of the road maintenance for a period of one, five and ten years based on the economic analysis with prioritization and budget constraints using the HDM-4.
    - The operation manual for the RAMS system in a hard and soft copy.

7 KEY PERSONNEL INPUT

51. The proposed services under this Terms of Reference shall be carried out by a team with adequate qualifications and experience in developing and managing RAMS with indicative inputs as follows:

S.No	Key Professional Position	Input (person-month*)			Qualification
		Development Phase	Operation phase	Total	
1	Team leader	12	4	16	• Minimum Bachelors' degree in Civil Engineering (preferably Master Degree relevant with the asset management system e.g. Transport or roads related civil engineering degree) • With a general experience of more than or equal to 10 years; preferably 15 years or more. • Specific experience in system development related to Road Asset Management or Road Maintenance management or preparation of Annual Road Maintenance Plans. • Training on Asset management related desciplines e.g. HDM, GIS or similar (at least 1 week duration) • Experience of working with HDM-4 / its integration in maintenance planning
2	Senior Road Engineer	12	4	16	• Minimum Bachelors degree in civil engineering (preferably Master Degree in highway/transport Engineering) • With a general experience of 7 years or more; 10 years or more is preferable • Specific experience related to Road Asset Management or road Maintenance management or preparation of Annual Road maintenance plan. • Training on Road Asset management related desciplines e.g. HDM, GIS or similar (at least 1 week duration) • Experience in using HDM 4 software / other Road Database management systems.
3	GIS Engineer-1	12	4	16	• Minimum Bachelors Degree in civil engineering with at least 15 days long GIS training or Bachelors degree in Geomatics Engineering. (preferably Masters Degree in Civil with at least 15 days long GIS training /Geomatics Engineering)

S.No	Key Professional Position	Input (person-month*)			Qualification
		Development Phase	Operation phase	Total	
					• With a general experience of more than 3 years; 5 years or more is preferable • Training on Road Asset management related disciplines e.g. GIS/Road Database management systems or similar(at least 1 week duration) • Specific experience of working in Road Sector, 2 assignments or more is preferable.
4	GIS Engineer-2	6		6	• Minimum Bachelors Degree in civil engineering with at least 15 days long GIS training or Bachelors degree in Geomatics Engineering. (preferably Masters Degree in Civil with at least 15 days long GIS training /Geomatics Engineering) • With a general experience of more than 3 years; 5 years or more is preferable • Training on Road Asset management related disciplines e.g. GIS/Road Database management systems or similar(at least 1 week duration) • Specific experience of working in Road Sector, 2 assignments or more is preferable.
5	Programmer-1	12	4	16	• Minimum Bachelors Degree in computer engineering, Computer Science or related field. (preferably Masters Degree in computer engineering, Computer Science or related field) • With a general experience of more than 3 years; 5 years or more is preferable • Training on Road Asset management related desciplines e.g. GIS/Road Database management systems or similar (at least 1 week duration) • Specific experience in computer applications/ software/web system development. Preference shall be given to experience related to the road sector.
6	Programmer-2	12		12	• Minimum Bachelor's Degree in computer engineering, Computer Science or related field (preferably Masters Degree in computer engineering, Computer Science or related field)

S.No	Key Professional Position	Input (person-month*)			Qualification
		Development Phase	Operation phase	Total	
					• With a general experience of more than 3 years; 5 years or more is preferable • Training on Road Asset management related desciplines e.g. GIS/Road Database management systems or similar (at least 1 week duration) • Specific experience in computer applications/ software/web system development. Preference shall be given to experience related to the road sector.
8	Transport economist	4		4	• Minimum Bachelor's Degree in economics or Civil engineering (preferably Masters Degree in economics or Civil engineering) • With a general experience of more than 5 years; 10 years or more is preferable • Training on Transport Economics/ Asset management related discipline • Specific experience in economic analysis for road sector investments using HDM 4, minimum 2 assignments.

52. Notes: the above list of key professionals and estimated person month for Phase 1 and Phase 2 are for reference only. The Consultant is responsible for reviewing the required services and may propose their requirements for the key professionals and other support staff required to complete the proposed services in Phase 1 and Phase 2, satisfactorily.

8 OBLIGATION

The Employer's Obligation

53. The Employer shall provide the following:

- Access to existing GIS and other data on road alignment, GIS map layers available at the DOR, record on road assets, their maintenance history
- Access to the present ARMP & BMS and other systems owned by the Employer.
- Timely nomination of trainee and workshop participants.
- Server space for the data collected.
- Web-hosting of the RAMS portal.
- HDM-4 software for use during the development phase

The Consultant's Obligation

54. To achieve the objective and outputs based on the Scope of Services stated above, the consultant is required to fulfill the following obligations but not limited to:

- Mobilization of their staff, with accommodation, transport, insurance, and other logistics required to execute the services.
- Bring, operate, and maintain computer hardware/ software, and other equipment for use during the contract period. The Consultant shall take back all such equipment as soon as their function is over.
- Proper use of equipment, software license, data, and assets provided by the Employer. These shall be used only for project purposes and handed back in good condition.
- Prepare training curriculum, develop training material/ handouts, and conduct training. A soft copy of the training material shall be provided to the Employer.
- The training of the participants shall be conducted in Kathmandu. The cost of training should include training hall and audio-visual aids charge, lunch and refreshments, trainers' remunerations if any, training materials (in a flash drive for each participant). Accommodation of the participants shall be managed by the trainees themselves.

9 PAYMENT MODE

55. Payment mode for scope of works shall be made as follows:

a. After Inception report submission	10% of Contract Amount
b. After Submission of Draft Final Report & successful demonstration by the end of the development phase	50% of Contract Amount
c. During four years Maintenance and support phase	0.8% of the total Contract amount per month.
d. At the end of four years Maintenance and support phase	Remaining amount of the contract

10 ANNEXES

56. An indicative list of field on the road database is given below.

Annex 1

Main Category	Sub Category	Group category	Sub-Group category	DATA SOURCE/Responsible
Vehicle Fleet	**Definition**	**Motorised Category**	Small passenger Car	**HMIS-ICT**
			Medium passenger Car	**HMIS-ICT**
			Large passenger Car	HMIS-ICT
			Light Delivery Vehicle	HMIS-ICT
			Light Goods Vehicle	HMIS-ICT
			four wheel Drive	HMIS-ICT
			Light Truck	HMIS-ICT
			Medium Truck	HMIS-ICT
			Heavy Truck	HMIS-ICT
			Articulated Truck	HMIS-ICT
			Minibus	HMIS-ICT
			Light Bus	HMIS-ICT
			Medium Bus	HMIS-ICT
			Heavy Bus	HMIS-ICT
			Coach	HMIS-ICT
		Non-motorised Category	Pedestrian	HMIS-ICT
			Bicycle	HMIS-ICT

			Rickshaw	HMIS-ICT
			Animal Cart	HMIS-ICT
	Basic Caracteristics	**Physical**	Passenger Car Space Equivalent	DOR
			No. of Wheels	Primary Survey/RAMS consultant
			No. of Axles	Primary Survey/RAMS consultant
		Tyres	Tyre type	Primary Survey/RAMS consultant
			Base no. of recaps	Primary Survey/RAMS consultant
			Retread cost	Primary Survey/RAMS consultant
		Utilisation	Annual km	Primary Survey/RAMS consultant
			working hours	Primary Survey/RAMS consultant
			average life	Primary Survey/RAMS consultant
			private use	Primary Survey/RAMS consultant
			passengers	Primary Survey/RAMS consultant
			work related passenger trips	Primary Survey/RAMS consultant
		Loading	ESALF	DOR
			Operating weight	DOR
	Economic Unit Costs	**Vehicle Resources**	new vehicles	Primary Survey/RAMS consultant
			replacement tyre	Primary Survey/RAMS consultant
			fuel	Primary Survey/RAMS consultant
			lubracating oil	Primary Survey/RAMS consultant
			maintenance labour	Primary Survey/RAMS consultant
			crew wages	Primary Survey/RAMS consultant
			annual overhead	Primary Survey/RAMS consultant
			annual interest	Primary Survey/RAMS consultant
		time value	passenger working time	Primary Survey/RAMS consultant

			passenger non-working time	Primary Survey/RAMS consultant
			Cargo	Primary Survey/RAMS consultant
	Edit traffic growth set		annual %/no increase from year 1	Secondary Source /RAMS Consultant
			annual %/no increase from year 6	Secondary Source /RAMS Consultant
			annual %/no increase from year 11	Secondary Source /RAMS Consultant
			annual %/no increase from year 16	Secondary Source /RAMS Consultant
Road Network	**Definition**	**General**	Section Name with start name-end name	
			Section ID	Ongoing/completed DOR Road Projects/ARMP
			Link Name	ARMP
			Link ID	ARMP
			Length with Km from-Km to	ARMP/HMIS_IT GIS
			Carriageway width	Ongoing/completed DOR Road Projects/ARMP
			Shoulder Width	Ongoing/completed DOR Road Projects/ARMP
			Flow direction	Ongoing/completed DOR Road Projects/ARMP
			Surface Class	Ongoing/completed DOR Road Projects/ARMP
	Geometry	**General**	Rise+fall	
			No. of Rises+falls	PROJECT / DIVISION OFFICE
			superelevation	PROJECT / DIVISION OFFICE
			avg. hor. Curvature	PROJECT / DIVISION OFFICE

			acceleration noise due to road geometry	PROJECT / DIVISION OFFICE/ RAMS Consultant
			speed limit	PROJECT / DIVISION OFFICE/ RAMS Consultant
			speed limit enforcement	PROJECT / DIVISION OFFICE/ RAMS Consultant
			altitude	PROJECT / DIVISION OFFICE/GIS HMIS-IT
		speed reduction factors	XNMT	PROJECT / DIVISION OFFICE/ RAMS Consultant
			road side friction	PROJECT / DIVISION OFFICE/ RAMS Consultant
			XMT	PROJECT / DIVISION OFFICE/ RAMS Consultant
	Pavement	**Surfacing**	pavement type	PROJECT / DIVISION OFFICE
			material type	PROJECT / DIVISION OFFICE
			most recent surface thickness	PROJECT / DIVISION OFFICE
			previous/old surface thickness	PROJECT / DIVISION OFFICE
		Strength	calculated dry season model parameters	PROJECT / DIVISION OFFICE
			SNP	PROJECT / DIVISION OFFICE/ RAMS Consultant
			DEF	PROJECT / DIVISION OFFICE
			Structural no	PROJECT / DIVISION OFFICE
			Subgrade CBR, dryseason	PROJECT / DIVISION OFFICE
			Subgrade CBR, wetseason	PROJECT / DIVISION OFFICE
			Calculated SNP by	FWD reading or
			Calculated SNP by	bankelman beam reading or

			Calculated SNP by	layer coefficient: Subgrade CBR, Subbase, base, surface: strength coefficient and thickness/ RAMS Consultant
		Previous works (HDM-4 work type)	Last reconst. or new const year (excluding DLP)	ARMP/ Project/ Division Office
			last rehab (overlay) year excluding DLP	ARMP/ Project/ Division Office
			last resurfacing (reseal) year excluding DLP	ARMP/ Project/ Division Office
			last preventative treatment year excluding DLP	ARMP/ Project/ Division Office
		Road base for stablised base only	Base thiskness, mm	PROJECT / DIVISION OFFICE
			resilent modulus, GPA	PROJECT / DIVISION OFFICE
	Condition		Condition at end of year	PROJECT / DIVISION OFFICE
			IRI m/km	HMIS-ICT
			All structural cracks %	HMIS-ICT
			wide structural Cracks %	HMIS-ICT
			thermal cracks %	PROJECT / DIVISION OFFICE
			Ravelled area %	PROJECT / DIVISION OFFICE/ HMIS-ICT
			No of pothole (no/km)	PROJECT / DIVISION OFFICE/ HMIS-ICT
			Edge break area (m2/km)	PROJECT / DIVISION OFFICE/ HMIS-ICT
			mean rut depth, mm	PROJECT / DIVISION OFFICE/ HMIS-ICT
			rut depth standard deviation, mm	PROJECT / DIVISION OFFICE/ HMIS-ICT
			texture depth, mm	PROJECT / DIVISION OFFICE

			Skid resistance, SCRIM 50km/h	PROJECT / DIVISION OFFICE
			Drainage	PROJECT / DIVISION OFFICE
	Other	**Separate NMT Lanes**	no. of lanes	PROJECT / DIVISION OFFICE
		Compaction, bituminous only	Relative compactions	PROJECT / DIVISION OFFICE
		Shoulder, concrete only	Shoulder type (for concrete only)	PROJECT / DIVISION OFFICE
			width of widening	PROJECT / DIVISION OFFICE
		previous surface condition, bituminous only	Area of all structural cracking	PROJECT / DIVISION OFFICE/ HMIS-ICT
			area of wide cracking	PROJECT / DIVISION OFFICE/ HMIS-ICT
			transverse thermal crack, no/km	PROJECT / DIVISION OFFICE
		Drainage	Drain Type	PROJECT / DIVISION OFFICE
			Elanes, effective no of lanes	PROJECT / DIVISION OFFICE/ RAMS Consultant
	Motorised Traffic		Survey year	HMIS-ICT/ Project Design
			catagorized AADT and Axle load data	HMIS-ICT/ Project Design
	Non-Motorised Traffic		Survey year	HMIS-ICT/ Project Design
			catagorized AADT	HMIS-ICT/ Project Design
	Asset Valuation		Replacement Cost	PROJECT / DIVISION OFFICE
		Asset valuation method for road pavement layers	Initial Roughness - IRI m/km	HMIS-ICT

			Terminal roughness - - IRI m/km	PROJECT / DIVISION OFFICE/ RAMS Consultant
			year asset component age defined year	PROJECT / DIVISION OFFICE
		Asset component	Road formation and sub grade	Replacement cost %
			Road pavement layers	PROJECT / DIVISION OFFICE
			footways, NMT lanes	PROJECT / DIVISION OFFICE
			Bridge and structures	PROJECT / DIVISION OFFICE
			Traffic facility, signs and road furniture	PROJECT / DIVISION OFFICE
Work Standards, Maintenance Standards	**General**		Name	MAINTENANCE BRANCH /HMIS-ICT
			Code	MAINTENANCE BRANCH /HMIS-ICT
			Surface Class	MAINTENANCE BRANCH /HMIS-ICT
	Work Items	**Carriageway**	Cape Seal	MAINTENANCE BRANCH /HMIS-ICT
			Cape Seal with shape correction	MAINTENANCE BRANCH /HMIS-ICT
			crack sealing	MAINTENANCE BRANCH /HMIS-ICT
			drainage	MAINTENANCE BRANCH /HMIS-ICT
			edge repair	MAINTENANCE BRANCH /HMIS-ICT
			fog seal	MAINTENANCE BRANCH /HMIS-ICT

			inlay	MAINTENANCE BRANCH /HMIS-ICT
			mill and replace	MAINTENANCE BRANCH /HMIS-ICT
			overlay - dense graded asphalt	MAINTENANCE BRANCH /HMIS-ICT
			overlay - open graded asphalt	MAINTENANCE BRANCH /HMIS-ICT
			overlay - rubberised asphalt	MAINTENANCE BRANCH /HMIS-ICT
			patching	MAINTENANCE BRANCH /HMIS-ICT
			pavement reconstruction	MAINTENANCE BRANCH /HMIS-ICT
			rejunivation	MAINTENANCE BRANCH /HMIS-ICT
			slurry seal	MAINTENANCE BRANCH /HMIS-ICT
			surface dressing double	MAINTENANCE BRANCH /HMIS-ICT
			surface dressing double with shape correction	MAINTENANCE BRANCH /HMIS-ICT
			surface dressing single	MAINTENANCE BRANCH /HMIS-ICT
			surface dressing single with shape correction	MAINTENANCE BRANCH /HMIS-ICT
			thin overlay	MAINTENANCE BRANCH /HMIS-ICT
		Miscellaneous	Miscellaneous	MAINTENANCE BRANCH /HMIS-ICT
		NMT traffic lane	NMT lane repair	MAINTENANCE BRANCH /HMIS-ICT

		shoulder	shoulder repair	MAINTENANCE BRANCH /HMIS-ICT
		special	Emergency	MAINTENANCE BRANCH /HMIS-ICT
			winter	MAINTENANCE BRANCH /HMIS-ICT
	Items	**General**	Name	MAINTENANCE BRANCH /HMIS-ICT
			short code	MAINTENANCE BRANCH /HMIS-ICT
			surface	MAINTENANCE BRANCH /HMIS-ICT
			feature type	MAINTENANCE BRANCH /HMIS-ICT
			operation	MAINTENANCE BRANCH /HMIS-ICT
	Design		Pavement type	MAINTENANCE BRANCH /HMIS-ICT
			surface material	MAINTENANCE BRANCH /HMIS-ICT
			dry season structural number	MAINTENANCE BRANCH /HMIS-ICT
			surface thickness	MAINTENANCE BRANCH /HMIS-ICT
			Relative compactions	MAINTENANCE BRANCH /HMIS-ICT
		Road base for stablised base only	base thickness	MAINTENANCE BRANCH /HMIS-ICT
			resilent modulus, GPA	MAINTENANCE BRANCH /HMIS-ICT
		Construction defect indicator	Bituminous indicators, brittle or soft	MAINTENANCE BRANCH /HMIS-ICT

			base	MAINTENANCE BRANCH /HMIS-ICT
	interventation	**criteria from recommended parameter**	Cummulative esal or	MAINTENANCE BRANCH /HMIS-ICT
			potholling	MAINTENANCE BRANCH /HMIS-ICT
			ravelling	MAINTENANCE BRANCH /HMIS-ICT
			mean rut depth, mm	MAINTENANCE BRANCH /HMIS-ICT
			rut depth standard deviation, mm	MAINTENANCE BRANCH /HMIS-ICT
			total carriage cracked %	MAINTENANCE BRANCH /HMIS-ICT
			total damaged area	MAINTENANCE BRANCH /HMIS-ICT
			year	MAINTENANCE BRANCH /HMIS-ICT
		criteria from available parameter	all structural cracks %	MAINTENANCE BRANCH /HMIS-ICT
			Cummulative esal or	MAINTENANCE BRANCH /HMIS-ICT
			delay average volume capacity	MAINTENANCE BRANCH /HMIS-ICT
			deteriorated cracks	MAINTENANCE BRANCH /HMIS-ICT
			drainage factor	MAINTENANCE BRANCH /HMIS-ICT
			edgebreak	MAINTENANCE BRANCH /HMIS-ICT

			failure	MAINTENANCE BRANCH /HMIS-ICT
			faulting	MAINTENANCE BRANCH /HMIS-ICT
			grading to IRI	MAINTENANCE BRANCH /HMIS-ICT
			gravel thickness	MAINTENANCE BRANCH /HMIS-ICT
			indexed cracking	MAINTENANCE BRANCH /HMIS-ICT
			interval	MAINTENANCE BRANCH /HMIS-ICT
			material loss	MAINTENANCE BRANCH /HMIS-ICT
			maximum number	MAINTENANCE BRANCH /HMIS-ICT
			MT mean speed	MAINTENANCE BRANCH /HMIS-ICT
			MT minimum speed	MAINTENANCE BRANCH /HMIS-ICT
			peak period volume capacity	MAINTENANCE BRANCH /HMIS-ICT
			potholing	MAINTENANCE BRANCH /HMIS-ICT
			ravelling	MAINTENANCE BRANCH /HMIS-ICT
			roughness	MAINTENANCE BRANCH /HMIS-ICT
			rut mean depth	MAINTENANCE BRANCH /HMIS-ICT
			rut depth standard deviation, mm	MAINTENANCE BRANCH /HMIS-ICT

			severly damaged area	MAINTENANCE BRANCH /HMIS-ICT
			skid resistance SCF	MAINTENANCE BRANCH /HMIS-ICT
			spalling	MAINTENANCE BRANCH /HMIS-ICT
			texture depth, mm	MAINTENANCE BRANCH /HMIS-ICT
			total carriage cracked %	MAINTENANCE BRANCH /HMIS-ICT
			total damaged area	MAINTENANCE BRANCH /HMIS-ICT
			traffic pass	MAINTENANCE BRANCH /HMIS-ICT
			transverse thermal crack, no/km	MAINTENANCE BRANCH /HMIS-ICT
			two way aadt	MAINTENANCE BRANCH /HMIS-ICT
			wide structural Cracks %	MAINTENANCE BRANCH /HMIS-ICT
			year	MAINTENANCE BRANCH /HMIS-ICT
	Costs	**unit cost**	Economic cost	Primary Survey/RAMS consultant
			Financial cost	Primary Survey/RAMS consultant
	Effects, Condition after works	**Roughness and rutting**	derived	MAINTENANCE BRANCH
			user defined roughness	MAINTENANCE BRANCH
			user defined mean rut depth	MAINTENANCE BRANCH
		User defined surface characteristic	surface texture	MAINTENANCE BRANCH

			skid resistance	MAINTENANCE BRANCH
	Asset Valuation		for the different asset components	MAINTENANCE BRANCH /HMIS-ICT
Improvement Standards	**General**		Name	
			short code	MAINTENANCE BRANCH /HMIS-ICT
			feature type	MAINTENANCE BRANCH /HMIS-ICT
			existing surface class	MAINTENANCE BRANCH /HMIS-ICT
			improvement type	MAINTENANCE BRANCH /HMIS-ICT
			duration	MAINTENANCE BRANCH /HMIS-ICT
	Design		speed flow type	MAINTENANCE BRANCH /HMIS-ICT
			accident class	MAINTENANCE BRANCH /HMIS-ICT
			road class	MAINTENANCE BRANCH /HMIS-ICT
			new pavement type	MAINTENANCE BRANCH /HMIS-ICT
			length adjustment factor	MAINTENANCE BRANCH /HMIS-ICT
			increase width or after works width	MAINTENANCE BRANCH /HMIS-ICT
	Interventation	**criteria from recommende list**	cumulative ESAL	MAINTENANCE BRANCH /HMIS-ICT
			delay average volume capacity	MAINTENANCE BRANCH /HMIS-ICT

			MT mean speed	MAINTENANCE BRANCH /HMIS-ICT
			MT minimum speed	MAINTENANCE BRANCH /HMIS-ICT
			peak period volume capacity	MAINTENANCE BRANCH /HMIS-ICT
			two way aadt	MAINTENANCE BRANCH /HMIS-ICT
		criteria from available list	all structural cracks %	MAINTENANCE BRANCH /HMIS-ICT
			cumulative ESAL	MAINTENANCE BRANCH /HMIS-ICT
			daily average volume capacity	MAINTENANCE BRANCH /HMIS-ICT
			deteriorated cracks	MAINTENANCE BRANCH /HMIS-ICT
			drainage factor	MAINTENANCE BRANCH /HMIS-ICT
			edgebreak	MAINTENANCE BRANCH /HMIS-ICT
			failure	MAINTENANCE BRANCH /HMIS-ICT
			faulting	MAINTENANCE BRANCH /HMIS-ICT
			grading to IRI	MAINTENANCE BRANCH /HMIS-ICT
			gravel thickness	MAINTENANCE BRANCH /HMIS-ICT
			indexed cracking	MAINTENANCE BRANCH /HMIS-ICT
			material loss	MAINTENANCE BRANCH /HMIS-ICT

			MT mean speed	MAINTENANCE BRANCH /HMIS-ICT
			MT minimum speed	MAINTENANCE BRANCH /HMIS-ICT
			peak period volume capacity	MAINTENANCE BRANCH /HMIS-ICT
			potholing	MAINTENANCE BRANCH /HMIS-ICT
			ravelling	MAINTENANCE BRANCH /HMIS-ICT
			roughness	MAINTENANCE BRANCH /HMIS-ICT
			rut mean depth	MAINTENANCE BRANCH /HMIS-ICT
			rut depth standard deviation, mm	MAINTENANCE BRANCH /HMIS-ICT
			severly damaged area	MAINTENANCE BRANCH /HMIS-ICT
			skid resistance	MAINTENANCE BRANCH /HMIS-ICT
			spalling	MAINTENANCE BRANCH /HMIS-ICT
			texture depth, mm	MAINTENANCE BRANCH /HMIS-ICT
			total carriage cracked %	MAINTENANCE BRANCH /HMIS-ICT
			total damaged area	MAINTENANCE BRANCH /HMIS-ICT
			traffic pass	MAINTENANCE BRANCH /HMIS-ICT
			transverse thermal crack, no/km	MAINTENANCE BRANCH /HMIS-ICT

			two way aadt	MAINTENANCE BRANCH /HMIS-ICT
			wide structural Cracks %	MAINTENANCE BRANCH /HMIS-ICT
			year	MAINTENANCE BRANCH /HMIS-ICT
	costs,	**unit cost**	Economic cost	Primary Survey/RAM Consultant
			Financial cost	Primary Survey/RAM Consultant
			annual stream cost	Primary Survey/RAM Consultant
			salvage value	Primary Survey/RAM Consultant
	Construction		construction quality indicator, Bituminous surface CDS	PROJECT / DIVISION OFFICE
			construction quality indicator, Base CDB	PROJECT / DIVISION OFFICE
	Pavement	**general**	surface material	PROJECT / DIVISION OFFICE
			dry season structural number	PROJECT / DIVISION OFFICE
			subgrade CBR	PROJECT / DIVISION OFFICE
			surface thickness	PROJECT / DIVISION OFFICE
			Relative compactions	PROJECT / DIVISION OFFICE
		Road base for stablised base only	base thickness	PROJECT / DIVISION OFFICE
			resilent modulus, GPA	PROJECT / DIVISION OFFICE
	Geometry	**general**	geometry class	PROJECT / DIVISION OFFICE
			details, rise+fall	PROJECT / DIVISION OFFICE
			No. of Rises+falls	PROJECT / DIVISION OFFICE
			avg. hor. Curvature	PROJECT / DIVISION OFFICE
			superelevation	PROJECT / DIVISION OFFICE

	speed	**related parameter**	Adral	PROJECT / DIVISION OFFICE
			speed limit	PROJECT / DIVISION OFFICE
			speed limit enforcement	PROJECT / DIVISION OFFICE
			XNMT	PROJECT / DIVISION OFFICE
			XMT	PROJECT / DIVISION OFFICE
			road side friction	PROJECT / DIVISION OFFICE
	Effects,	**user defined roughness**	roughness	MAINTENANCE BRANCH/HMIS-ICT
			mean rut depth, mm	MAINTENANCE BRANCH/HMIS-ICT
		User defined surface characteristic	surface texture	MAINTENANCE BRANCH/HMIS-ICT
			skid resistance	MAINTENANCE BRANCH/HMIS-ICT
	other	**effect**	traffic flow pattern	PROJECT / DIVISION OFFICE
			Elanes, effective no of lanes	PROJECT / DIVISION OFFICE
	Asset Valuation		for the different asset components	MAINTENANCE BRANCH /HMIS-ICT
New Construction	**Definition**	**general**	Section Name	MAINTENANCE BRANCH /HMIS-ICT
			Section ID	MAINTENANCE BRANCH /HMIS-ICT
			Link Name	MAINTENANCE BRANCH /HMIS-ICT
			Link ID	MAINTENANCE BRANCH /HMIS-ICT
			Length	MAINTENANCE BRANCH /HMIS-ICT
			Carriageway width	MAINTENANCE BRANCH /HMIS-ICT

			Shoulder Width	MAINTENANCE BRANCH /HMIS-ICT
			Flow direction	MAINTENANCE BRANCH /HMIS-ICT
			Surface Class	MAINTENANCE BRANCH /HMIS-ICT
	Cost	**unit cost**	Economic cost	Primary Survey/RAM Consultant
			Financial cost	Primary Survey/RAM Consultant
			duration	Primary Survey/RAM Consultant
			annual stream cost	Primary Survey/RAM Consultant
	Geometry	**General**	Rise+fall	MAINTENANCE BRANCH /HMIS-ICT
			No. of Rises+falls	MAINTENANCE BRANCH /HMIS-ICT
			superelevation	MAINTENANCE BRANCH /HMIS-ICT
			avg. hor. Curvature	MAINTENANCE BRANCH /HMIS-ICT
			acceleration noise due to road geometry	MAINTENANCE BRANCH /HMIS-ICT
			speed limit	MAINTENANCE BRANCH /HMIS-ICT
			speed limit enforcement	MAINTENANCE BRANCH /HMIS-ICT
			altitude	MAINTENANCE BRANCH /HMIS-ICT
		speed reduction factors	XNMT	MAINTENANCE BRANCH /HMIS-ICT
			road side friction	MAINTENANCE BRANCH /HMIS-ICT

			XMT	MAINTENANCE BRANCH /HMIS-ICT
	Pavement	**Surfacing**	pavement type	MAINTENANCE BRANCH /HMIS-ICT
			material type	MAINTENANCE BRANCH /HMIS-ICT
			most recent surface thickness	MAINTENANCE BRANCH /HMIS-ICT
			previous/old surface thickness	MAINTENANCE BRANCH /HMIS-ICT
		Strength	calculated dry season model parameters	MAINTENANCE BRANCH /HMIS-ICT
			SNP	MAINTENANCE BRANCH /HMIS-ICT
			DEF	MAINTENANCE BRANCH /HMIS-ICT
			Structural no	MAINTENANCE BRANCH /HMIS-ICT
			Subgrade CBR, dryseason	MAINTENANCE BRANCH /HMIS-ICT
			Subgrade CBR, wetseason	MAINTENANCE BRANCH /HMIS-ICT
			Calculated SNP by	FWD reading or
			Calculated SNP by	bankelman beam reading or
			Calculated SNP by	layer coefficient: Subgrade CBR, Subbase, base, surface: strength coefficient and thickness
		Previous works (HDM-4 work type)	Last reconst. or new const year	PROJECT / DIVISION OFFICE
			last rehab (overlay) year	PROJECT / DIVISION OFFICE

			last resurfacing (reseal) year	PROJECT / DIVISION OFFICE
			last preventative treatment year	PROJECT / DIVISION OFFICE
		Road base for stablised base only	Base thiskness, mm	PROJECT / DIVISION OFFICE
			resilent modulus, GPA	PROJECT / DIVISION OFFICE
	Condition		Condition at end of year	PROJECT / DIVISION OFFICE
			IRI m/km	PROJECT / DIVISION OFFICE
			All structural cracks %	PROJECT / DIVISION OFFICE
			wide structural Cracks %	PROJECT / DIVISION OFFICE
			thermal cracks %	PROJECT / DIVISION OFFICE
			Ravelled area %	PROJECT / DIVISION OFFICE
			No of pothole (no/km)	PROJECT / DIVISION OFFICE
			Edge break area (m2/km)	PROJECT / DIVISION OFFICE
			mean rut depth, mm	PROJECT / DIVISION OFFICE
			rut depth standard deviation, mm	PROJECT / DIVISION OFFICE
			texture depth, mm	PROJECT / DIVISION OFFICE
			Skid resistance, SCRIM 50km/h	PROJECT / DIVISION OFFICE
			Drainage	PROJECT / DIVISION OFFICE
	Other	**Separate NMT Lanes**	no. of lanes	PROJECT / DIVISION OFFICE
		Compaction, bituminous only	Relative compactions	PROJECT / DIVISION OFFICE
		Shoulder, concrete only	Shoulder type (for concrete only)	PROJECT / DIVISION OFFICE
			width of widening	PROJECT / DIVISION OFFICE

		previous surface condition, bituminous only	Area of all structural cracking	PROJECT / DIVISION OFFICE
			area of wide cracking	PROJECT / DIVISION OFFICE
			transverse thermal crack, no/km	PROJECT / DIVISION OFFICE
		Drainage	Drain Type	PROJECT / DIVISION OFFICE
			Elanes, effective no of lanes	PROJECT / DIVISION OFFICE
	Motorised Traffic		Survey year	PROJECT / DIVISION OFFICE
			catagorized AADT	PROJECT / DIVISION OFFICE
	Non-Motorised Traffic		Survey year	PROJECT / DIVISION OFFICE
			catagorized AADT	PROJECT / DIVISION OFFICE
	Asset Valuation		Replacement Cost	MAINTENANCE BRANCH /HMIS-ICT
		Asset valuation method for road pavement layers	Initial Roughness - IRI m/km	MAINTENANCE BRANCH /HMIS-ICT
			Terminal roughness - - IRI m/km	MAINTENANCE BRANCH /HMIS-ICT
			year asset component age defined year	MAINTENANCE BRANCH /HMIS-ICT
		Asset component	Road formation and sub grade	MAINTENANCE BRANCH /HMIS-ICT
			Road pavement layers	MAINTENANCE BRANCH /HMIS-ICT
			footways, NMT lanes	MAINTENANCE BRANCH /HMIS-ICT

			Bridge and structures	MAINTENANCE BRANCH /HMIS-ICT
			Traffic facility, signs and road furniture	MAINTENANCE BRANCH /HMIS-ICT
Projects	**Define project details**	**General**	analyze by section	MAINTENANCE BRANCH /HMIS-ICT
			analyze by project	MAINTENANCE BRANCH /HMIS-ICT
			start year	MAINTENANCE BRANCH /HMIS-ICT
			analysis period	MAINTENANCE BRANCH /HMIS-ICT
			road network	MAINTENANCE BRANCH /HMIS-ICT
			vehicle fleet	MAINTENANCE BRANCH /HMIS-ICT
			currencies	MAINTENANCE BRANCH /HMIS-ICT
		Study sections	assign traffic growth	MAINTENANCE BRANCH /RAMS Consultant
	specify alternatives	**Base alternative**	Maintenance or do minimum	MAINTENANCE BRANCH /HMIS-ICT
		alternative 1	improvement case	MAINTENANCE BRANCH /HMIS-ICT
			maintenance case	MAINTENANCE BRANCH /HMIS-ICT
		alternative 2	new construction case	MAINTENANCE BRANCH /HMIS-ICT
			maintenance case	RAMS CONSULTANT
		traffic diversion	diverted traffic	RAMS CONSULTANT
			generated traffic	RAMS CONSULTANT

	Analysis Projects	**setup run, conduct economic analysis**	base alternative	RAMS CONSULTANT
			discount rate	RAMS CONSULTANT
		model inclusion	energy balance	RAMS CONSULTANT
			emission	RAMS CONSULTANT
			acceleration effects	RAMS CONSULTANT
		include accident cost	fatal	RAMS CONSULTANT
			damage	RAMS CONSULTANT
			injury	RAMS CONSULTANT
			all	RAMS CONSULTANT
		log file	write log file	RAMS CONSULTANT
		run data export details	exclude annual vehicle data	RAMS CONSULTANT
			exclude vehicle period data	RAMS CONSULTANT
		asset valuation	perform run with asset valuation	RAMS CONSULTANT
		run data directory	directory of the destination	RAMS CONSULTANT
		Sensitivity analysis	base case	RAMS CONSULTANT
			new scenario	RAMS CONSULTANT
		Run analysis	HIT START BUTTON	RAMS CONSULTANT
Confugirations				RAMS CONSULTANT
Traffic flow patterns	**Definition**	**Flow distribution data**	Hrs per year or % of AADT per year	RAMS CONSULTANT
Speed flow type		**Genaral**	Name	RAMS CONSULTANT
			No of lanes	RAMS CONSULTANT
			road type	RAMS CONSULTANT
		Capacity Charateristics	Ultimate capacity	RAMS CONSULTANT
			Free flow capacity	RAMS CONSULTANT

			Nominal Capacity	RAMS CONSULTANT
			Jam Speed at capacity	RAMS CONSULTANT
		Speed related	maximum acceleration noise	RAMS CONSULTANT
			speed calibration factor, CALBFAC	RAMS CONSULTANT
			desired speed multiplication factor, VDESMUL	RAMS CONSULTANT
Accident Classes		**name**	name	RAMS CONSULTANT
		accident rates no. per 100 mil. Veh -kim	fatal	RAMS CONSULTANT
			injury	RAMS CONSULTANT
			damage	RAMS CONSULTANT
Climate Zones		**Climate**	name	RAMS CONSULTANT
			Moisture classification	RAMS CONSULTANT
			Miosture index	RAMS CONSULTANT
			Duration of dry season	RAMS CONSULTANT
			Mean monthly precipitation	RAMS CONSULTANT
			Temperature classification	RAMS CONSULTANT
			mean temperature	RAMS CONSULTANT
			Avg. temperature range	RAMS CONSULTANT
			Days T>32 C	RAMS CONSULTANT
			Freez index	RAMS CONSULTANT
		% of time driven	on snow covered roads	RAMS CONSULTANT
			on water covered roads	RAMS CONSULTANT
Currencies			Currency description	RAMS CONSULTANT
			Symbol	RAMS CONSULTANT

			Symbol position	RAMS CONSULTANT
Section agreegate Data	**Agreegate parameter**	**Traffic volume**	low, medium, high or other	RAMS CONSULTANT
		Road Class	Primary, secondary, tertiary or other	RAMS CONSULTANT
		Geometry class	straigth and level or	RAMS CONSULTANT
			Mostly straight and gently undulating	RAMS CONSULTANT
			Bendy and generally level	RAMS CONSULTANT
			Bendy and gently undulating	RAMS CONSULTANT
			Bendy and severely undulating	RAMS CONSULTANT
			Winding and gently undulating	RAMS CONSULTANT
			Winding and severely undulating	RAMS CONSULTANT
		Compaction Quality	Good, fair or poor	RAMS CONSULTANT
		Structural adequecy	Good, fair or poor	RAMS CONSULTANT
		ride quality	Good, fair, poor or bad	RAMS CONSULTANT
		surface condition	new, Good, fair, poor or bad	RAMS CONSULTANT
		surface texture	Good, fair or slipery	RAMS CONSULTANT
Section agreegatee table		**AADT threshold value for low , med, high**	Bituminous	RAMS CONSULTANT
			unsealed	RAMS CONSULTANT
			concrete	RAMS CONSULTANT
		geometry	rise+fall	RAMS CONSULTANT
			no of rise and fall / km	RAMS CONSULTANT
			hor curve deg/km	RAMS CONSULTANT

			superelevation, %	RAMS CONSULTANT
			speed limit KMPH	RAMS CONSULTANT
		Compaction Quality	Relative compaction for diff compaction quality	RAMS CONSULTANT
		Roughness	IRI for Good, fair, poor, bad criteria for all type road	RAMS CONSULTANT
		Pavement Strength	SNP and modulus of rupture for Bituminous or JPCP, CRCP	RAMS CONSULTANT
		Bituminous layers	layers thickness	RAMS CONSULTANT
		Surface distress	all structural cracking for diff class	RAMS CONSULTANT
			wide structural cracking	RAMS CONSULTANT
			transverse thermal cracking	RAMS CONSULTANT
			ravelling	RAMS CONSULTANT
			No. of pot holes per km	RAMS CONSULTANT
			edge break m2/km	RAMS CONSULTANT
			mean rut depth, mm	RAMS CONSULTANT
		Surface texture	texture depth	RAMS CONSULTANT
			skid resistance	RAMS CONSULTANT
Calibration parameter		**Road Deterioration**	wide str. Crking initiated potholes threshold %	RAMS CONSULTANT
			Ravelling initiated potholes threshold	RAMS CONSULTANT
			Max. thickness of surfacing for plastic flow effect	RAMS CONSULTANT

		Work effect	area of wide structural cracking trigger their patching	RAMS CONSULTANT
			% of wide structural cracks in excess of TRIGACW to be patched	RAMS CONSULTANT
			Area of transverse thermal cracking that triggers their patching	RAMS CONSULTANT
			% of transverse thermal cracking in excess of TRIGACT to be patched	RAMS CONSULTANT
RD Calibration Sets		**Bituminous**	RD Calibration item	RAMS CONSULTANT
			Pavement type	RAMS CONSULTANT
			surface material	RAMS CONSULTANT
		CDS	CDS, Construction defect rating for bituminous surfacing (0.5 brittle -1.5 soft)	RAMS CONSULTANT
		CDB	CDB, Construction defect rating for base (0.5 no defect -1.5)	RAMS CONSULTANT
		CRT	CRT, Cracking retarding time due to maintenance in years	RAMS CONSULTANT
		RRF	RRF, Ravelling retarding factor due to maintenance	RAMS CONSULTANT
		Kcia	Kcia, Calibration factor for the structural cracking initiation model	QADC/HMIS_ICT/Outsource CONSULTANT

		Kcpa	Kcpa, Calibration factor for the structural cracking progression model	QADC/HMIS_ICT/Outsource CONSULTANT
		Kciw	Kciw, Calibration factor for the initiation of wide structural cracking	QADC/HMIS_ICT/Outsource CONSULTANT
		Kcpw	Kcpw, Calibration factor for the progression of wide structural cracking	QADC/HMIS_ICT/Outsource CONSULTANT
		Kcit	Kcit, Calibration factor for the transverse thermal cracking initiation	QADC/HMIS_ICT/Outsource CONSULTANT
		Kcpt	Kcpt, Calibration factor for the transverse thermal cracking progression	QADC/HMIS_ICT/Outsource CONSULTANT
		Kvi	Kvi, Calibration factor for ravelling initiation	QADC/HMIS_ICT/Outsource CONSULTANT
		Kvp	Kvp, Calibration factor for ravelling progression	QADC/HMIS_ICT/Outsource CONSULTANT
		Kpic	Kpic, Calibration factor for pothole initiation due to cracking	QADC/HMIS_ICT/Outsource CONSULTANT
		Kpir	Kpir, Calibration factor for pothole initiation due to ravelling	QADC/HMIS_ICT/Outsource CONSULTANT
		Kpp	Kpp calibration factor for the pothole progression model	QADC/HMIS_ICT/Outsource CONSULTANT
		Keb	Keb, calibration factor for the edge break	QADC/HMIS_ICT/Outsource CONSULTANT

		Ktd	Ktd, calibration factor for the texture depth model	QADC/HMIS_ICT/Outsource CONSULTANT
		Ksfc	Ksfc, calibration factor for the skid resistance model	QADC/HMIS_ICT/Outsource CONSULTANT
		Ksfcs	Ksfcs, calibration factor for the speed effect componenet of the skid resistance model	QADC/HMIS_ICT/Outsource CONSULTANT
		Krid	Krid, calibration factor for the rutting initial densification model	QADC/HMIS_ICT/Outsource CONSULTANT
		Krst	Krst, calibration factor for the rutting structural deformation model	QADC/HMIS_ICT/Outsource CONSULTANT
		Krpd	Krpd, calibration factor for the rutting plastic deformation model	QADC/HMIS_ICT/Outsource CONSULTANT
		Kdrain	Kdrain, the drail life model calibration coefficient	QADC/HMIS_ICT/Outsource CONSULTANT
		Ksnpk	Ksnpk, calibration factor for the change in adjusted structural nu. Due to cracking	QADC/HMIS_ICT/Outsource CONSULTANT
		Krsw	Krsw, calibration factor for the wear by the studded tyre model	QADC/HMIS_ICT/Outsource CONSULTANT
		Krds	Krds, calibration factor for the rut depth standard deviation model	QADC/HMIS_ICT/Outsource CONSULTANT
		Kf	Kf, calibration factor for the seasonal effect on snp	QADC/HMIS_ICT/Outsource CONSULTANT

		Kgm	Kgm, calibration factor for the environmental roughness model	QADC/HMIS_ICT/Outsource CONSULTANT
		Kgs	Kgs, calibration factor for the roughness model (structural contribution)	QADC/HMIS_ICT/Outsource CONSULTANT
		Kgc	Kgc, calibration factor for the roughness model (cracking contribution)	QADC/HMIS_ICT/Outsource CONSULTANT
		Kgr	Kgr, calibration factor for the roughness model (rutting contribution)	QADC/HMIS_ICT/Outsource CONSULTANT
		Kgp	Kgp, calibration factor for the roughness model (pothole contribution)	QADC/HMIS_ICT/Outsource CONSULTANT
			Vehicle with studded tyres %	QADC/HMIS_ICT/Outsource CONSULTANT
			Salt used on the roads	QADC/HMIS_ICT/Outsource CONSULTANT
		Kddf	Kddf, calibration factor for drainage	QADC/HMIS_ICT/Outsource CONSULTANT
			No of shoulders	RAMS CONSULTANT
		ESTEP	ESTEP, mm, Elevation difference from pavement to shoulder	RAMS CONSULTANT
			NMT lane surface Type	RAMS CONSULTANT