

ARAMP

Guidelines

**FOR THE PREPARATION OF THE ANNUAL ROAD ASSET MANAGEMENT PLAN
(ARAMP)**

FINAL FOR PILOTING IN RAP3

2013

ABBREVIATIONS

ARAMP	Annual Road Asset Management Plan
DDC	District Development Committee
DIM	District Inventory Map
DOLIDAR	Department of Local Infrastructure Development and Agriculture Road
DOR	Department of Road
DRCN	District Road Core Network
DTICC	District Transport Infrastructure Coordination Committee
DTMP	District Transport Master Plan
GON	Government of Nepal
LGCDP	Local Governance and Community Development Programme
MFALD	Ministry of Federal Affairs and Local Development
VDC	Village Development Committee
RAIDP	Rural Access Improvement and Decentralisation Programme
RAP	Rural Access Programme
RRRSDP	Rural Reconstruction and Rehabilitation Sector Development Programme
SWAp	Sector Wide Approach
VRCN	Village Road Core Network

CONTENTS

1. Introduction	1
2. Types of interventions	2
2.1 Emergency Maintenance	2
2.2 Routine maintenance	3
2.3 Recurrent maintenance	3
2.4 Specific maintenance	4
2.5 Periodic maintenance	7
2.6 Improvement	7
2.7 New construction	9
3. Data collection	12
3.1 Road inventory	12
3.2 Traffic data	12
3.3 Population data	13
3.4 Annual DRCN budget (ARAMP budget)	13
3.5 Rapid Condition Survey	14
3.6 DTMP improvement and construction list	16
3.7 DDC discretionary road funding	16
3.8 Standard costs	16
4. ARAMP preparation	19
4.1 Introduction to the district	19
4.2 District road inventory	19
4.3 Planned maintenance interventions	19
4.4 Planned improvement and construction interventions	21
4.5 Annual Road Asset Management Plan (ARAMP)	21
4.6 ARAMP Outputs and outcomes	22
4.7 ARAMP Approval	23
Annex 1 Maintenance versus Improvement	24
Annex 2 Example DRCN inventory map	25
Annex 3 Rapid Condition survey form	26

TABLES

Table 1	Survey data for emergency maintenance	15
Table 2	Survey data for specific maintenance	15
Table 3	Survey data for periodic maintenance	15
Table 4	Standard costs for emergency maintenance activities (NPR)	17
Table 5	Standard costs for routine/recurrent maintenance activities (NPR)	17
Table 6	Standard costs for specific maintenance activities (NPR)	17
Table 7	Standard costs for periodic maintenance activities (NPR)	17
Table 8	Standard costs for improvement activities (NPR)	18
Table 9	Standard costs for new construction activities (NPR)	18

1. INTRODUCTION

1. These [ARAMP Guidelines](#) serve to assist the user in the preparation of an Annual Road Asset Management Plan (ARAMP) for the maintenance, improvement and new construction of the District Road Core Network (DRCN). The ARAMP forms the annual implementation plan for the DRCN, building upon the District Transport Master Plan (DTMP) that is prepared every 5 years. In the ARAMP, the maintenance requirements are defined in greater detail, and budget allocations for the year concerned are confirmed for maintenance, improvement and new construction.
2. The ARAMP is to be prepared every year and provides a prioritised list of interventions for the DRCN that are to be carried out with the expected budget allocated to the DRCN in the year concerned (the ARAMP also indicates those interventions that do not fit within the estimated budget for the current year and that may be addressed in case additional funding is obtained or otherwise included in the ARAMP for the subsequent year). As such, the ARAMP provides an overview of all investment needs in the DRCN as well as the investment allocations for the year concerned. Much of the required information is copied from the DTMP Report (or previous ARAMP Reports), whereby data is verified and updated where necessary.
3. These ARAMP Guidelines start by explaining the different types of interventions included in the scope of the ARAMP. Subsequently, the data collection that is necessary in advance of preparing the ARAMP is described, explaining the different data requirements and how the data should be obtained (and updated if necessary). The last chapter describes the ARAMP preparation, explaining the different activities to be carried out in preparing the ARAMP Report.
4. These ARAMP Guidelines should be used together with the [ARAMP Excel Template](#), which provides the standard table templates to be used in the ARAMP Report. The *ARAMP Excel Template* also carries out the necessary calculations based on the data collected and entered by the user. Although it is recommended to make use of the *ARAMP Excel Template* in order to avoid misunderstandings of the ARAMP process and to promote coherence between different ARAMPs, this is not strictly necessary and the tables and calculations can also be prepared without using the *ARAMP Excel Template* (as long as the formulas and prioritisation criteria presented in these *ARAMP Guidelines* are adhered to). The *ARAMP Excel Template* has not been restricted in any way and can be adjusted to the specific needs of any district (or amended for future changes in the ARAMP process). The cells where data should be entered have been shaded orange and only in these cells should the contents be changed. All other cells contain automatic formulas or standard text and the changing of their content should only be done by experienced users wishing to deviate from the standard ARAMP procedures. Some data values have already been entered in advance (e.g. standard costs), but it is strongly recommended that these values be checked and adjusted based on current values from recent experiences in the district concerned.
5. An [ARAMP Report Template](#) is also provided together with these ARAMP Guidelines. This *ARAMP Report Template* provides the structure of the ARAMP Report and serves to promote coherence between different ARAMP Reports, making it easier to compare them and develop consolidated information at national level. The *ARAMP Report Template* explains the contents of each chapter and section, providing templates of the tables and examples of the maps to be included. The *ARAMP Report Template* also refers to the *ARAMP Excel Template* regarding the different tables to be copied into the report. An effort should be made to keep the ARAMP Report as short and simple as possible, while at the same time ensuring that all information described in the *ARAMP Report Template* is provided. Short and simple reports are more likely to be read and understood by those involved in decision making, increasing the chances of an approved ARAMP actually being followed in

practice. Ideally, an ARAMP Report should not exceed 20 pages (additional information can be provided in a separate document containing annexes – e.g. the scanned survey forms).

2. TYPES OF INTERVENTIONS

6. Before discussing the steps involved in preparing an ARAMP, it is important to understand the different types of interventions covered by the ARAMP, the activities involved, the timing of the intervention, the basis for the cost estimation for each type of intervention (e.g. lumpsum, standard cost per kilometre, unit rates per volume) and the manner of implementation. This will facilitate the subsequent preparation of the ARAMP, ensuring that planned activities are placed under the correct intervention type and that cost estimations are prepared in the right way.

2.1 EMERGENCY MAINTENANCE

7. The DOLIDAR *Maintenance Directives* (2008) define emergency maintenance works as works that are to be carried out due to unexpected and sudden blockage of roads that stop vehicular movement due to natural disasters. The aim of emergency maintenance is to quickly reopen the road, reinstate vehicular movement and protect the road from further damage. **Reinstating the damaged road to its original condition after completion of emergency maintenance works is not included under emergency maintenance!** Emergency maintenance includes the following activities:

Activities in paved + unpaved roads

- Clearing of medium/large landslides (>5m³)¹
- Repairing/reinstating embankment (only where traffic is obstructed or endangered, e.g. after washouts)
- Repairing slopes (only where traffic is endangered, e.g. overhanging rocks or cliff)
- Construction of diversion road (only where traffic is obstructed, e.g. in case of washed out road or river crossing)
- Repairs to the road surface (only where the road surface condition causes traffic to be obstructed, e.g. muddy areas or sections with deep ruts)

8. Timing. Emergency maintenance activities are carried out whenever required, although generally they will be necessary during the rainy season to ensure vehicular movement remains possible throughout the year, and at the end of the rainy season to remove landslides and reinstate embankments where these have been washed away.

9. Cost estimation. Activities are not very predictable and will vary from one year to another. The volumes of emergency maintenance to be used in the preparation of the ARAMP are determined during the Rapid Condition Survey. This Rapid Condition Survey is carried out each year at the end of the rainy season to determine the volumes of emergency maintenance for each DRCN road. The cost estimation for the ARAMP will be based on these work volumes and the corresponding unit rates.

10. Implementation. Emergency maintenance will largely be carried out using equipment to ensure a timely response and quick reopening of the road. This will necessarily involve contractors. Contracts should be volume-based using work volumes determined during the annual Rapid Condition Survey (in some cases it may be necessary to carry out an additional detailed survey to determine the volumes of work for a particular road just before starting the contracting procedure).

¹ Smaller landslides are covered under routine maintenance.

11. Emergency maintenance fund. Emergency maintenance requires a quick response to ensure that roads remain passable all year round. Given that most emergency maintenance takes place at the start of the financial year when new funding is not yet approved and available, it is necessary to set aside an amount of money (emergency maintenance fund) to allow prompt response to emergencies. This emergency maintenance fund should be available at the end of the financial year, and should be usable at the start of the next financial year. The size of this fund may be based on the average emergency maintenance costs in past years. The emergency maintenance fund will be used at the beginning of the financial year to rapidly respond to the emergency maintenance needs identified in the Rapid Condition Survey. Based on the same Rapid Condition Survey, a cost estimation will be carried out to determine the budget allocation to emergency maintenance in the ARAMP budget. Once approved, this ARAMP budget allocation will be used to replenish the emergency maintenance fund, replacing the funds already used in responding to the emergency maintenance needs.

2.2 ROUTINE MAINTENANCE

12. The DOLIDAR *Maintenance Directives* (2008) define routine maintenance as small maintenance works to be carried out in all seasons on all roads on a regular basis, comprising simple categories of maintenance works. Routine maintenance involves the cleaning and clearing of different road elements to ensure that they work properly and that damage to the road is avoided. It includes the following activities:

Activities in paved + unpaved roads

- Clearing of small landslides (<5m³)²
- Clearing of drains
- Clearing of culverts
- Clearing under bridges
- Cutting and clearing of vegetation
- Cleaning of traffic signs and road furniture
- Cleaning of weep holes in retaining walls
- Maintenance of bioengineering features

13. Timing. Routine maintenance activities are carried out throughout the year, although the type of activities to be carried out will depend on the season. Most work is required just before and during the rainy season.

14. Cost estimation. Activities are largely predictable and a fixed amount per kilometre per year is budgeted, taking account of topography (there are more landslides in the Hills, for instance). A survey is therefore not required for cost estimation.

15. Implementation. No skilled labour is required and implementation is done by local labour, contracted directly as a maintenance group, through a user committee, or subcontracted by a contractor (the latter especially in the case of blacktop roads). Contracts should be performance-based if the road conditions allow for this, or else volume-based (using fixed unit rates).

2.3 RECURRENT MAINTENANCE

16. The DOLIDAR *Maintenance Directives* (2008) define recurrent maintenance as small maintenance works not falling under routine maintenance that are carried out a few times a year in all roads to repair minor damage resulting from traffic and rainfall. Recurrent

² Larger landslides are covered under emergency maintenance.

maintenance involves minor repairs to the road surface and other road elements to bring them back to their proper condition. It includes the following activities:

Activities in unpaved roads (gravel + earthen)

- Repairs of rills/gullies in the road surface
- Repairs of ruts in the road surface
- Repairs of potholes in the road surface
- Repairs of corrugation of the road surface
- Repairs of backfills over culverts
- Creation of diagonal waterbars across the road surface to avoid water flowing over the road

Activities in paved roads (blacktop)

- Repairs of potholes in the road surface
- Repairs of edge breaks in the road surface
- Repairs of ravelling and stripping in the road surface
- Filling of cracks in the road surface

Activities in paved + unpaved roads

- Repairs of cuts in the road shoulder
- Repairs of ruts in the road shoulder
- Repairs of potholes in the road shoulder
- Repairs of erosion in the drains
- Repairs of minor damage to retaining walls (e.g. replacing stones, fixing gabion wire)
- Repairs of minor damage to structures
- Repairs of erosion damage around structures
- Repairs or replacement of traffic signs and road furniture

17. Timing. These activities are repeated a few times a year in different road sections, depending on need. Most work is carried out in the dry season, with some urgent works carried out in the rainy season.

18. Cost estimation. Average quantities of work are largely predictable and a fixed amount per kilometre per year is budgeted, whereby account is taken of the surface type and the topography. Survey results are therefore not required for cost estimation.

19. Implementation. For unpaved roads skilled labour is not required and implementation is done by local labour, contracted directly as a maintenance group, through a user committee or subcontracted by a contractor (the contracting can be combined with routine maintenance). For blacktop roads, skilled labour and access to proper materials and appropriate equipment are required and this is best contracted out to a contractor (this can be combined with routine maintenance to be subcontracted to local labour). Contracts should be performance-based if the road conditions allow for this, or else volume-based.

2.4 SPECIFIC MAINTENANCE

20. Specific maintenance is not defined in the DOLIDAR *Maintenance Directives* (2008), although these mention preventive maintenance which is largely included under specific maintenance. Specific maintenance was introduced by DOR³ to cover all the spot improvements and repairs that do not occur every year or in every road, and which are very

³ Initially a distinction was made between “minor recurrent maintenance” and “major recurrent maintenance”, but the term “specific maintenance” was introduced to better reflect the localized and specific nature of the maintenance works, and to distinguish it from periodic maintenance and rehabilitation. In other countries it is often referred to as spot improvement or spot rehabilitation.

specific in nature and location. This involves localized repairs and improvements to the road to ensure proper functioning of the different road elements and reduce the need for routine and recurrent maintenance. It includes the following activities:

Activities in unpaved roads

- Dry stone pitching of short section (<500m per section, <5% of road length)
- Gravelling of short section (<200m per section, <5% of road length)

Activities in paved roads

- Sealing of short section (<100m per section, <2% of road length)
- Blacktopping of short section (<100m per section, <2% of road length)

Activities in paved + unpaved roads

- Creation or large repairs to dry-stone retaining wall (<500m³ per wall, <50m³ per km on average)
- Creation or large repairs to gabion retaining wall (<500m³, <50m³ per km on average)
- Slope stabilization and bio-engineering
- Raising of embankment over short section (<100m per section, <2% of road length)
- Removal of banks on shoulders
- Shoulder improvement
- Creation of earthen side drains
- Repairs to the existing drainage system (e.g. erosion)
- Creation of stone-paved drifts where water flows over road (<10m, <1% of road length)
- Removal of hanging cliff/rocks

21. It is important to properly distinguish between specific maintenance that involves small to medium-scale spot improvements and spot repairs in critical sections of the road where there is significant damage or which are prone to repeated damage due to a lack of proper technical standards in that specific section; and improvement works that involve rehabilitation and upgrading of large stretches of road and the creation of large and expensive drainage and protection structures aimed at increasing the technical standard of the entire road. Where required works are not limited to specific critical short sections of the road, where required activities are not listed as specific maintenance activities above, where volumes of work exceed the maximum allowances as listed above regarding individual spot improvements or regarding the average for the road as a whole, or where total average costs exceed NPR 300,000/km, the planned works should be reviewed to separate the specific maintenance works from the improvement works (transferring those works that do not qualify as specific maintenance to be carried out as improvement works). A detailed comparison of activities and work volumes included under specific maintenance, periodic maintenance and improvement is provided in [Annex 1](#).

22. Timing. Specific maintenance activities are carried as needed out in a few road sections in different parts of the DRCN. Most work is carried out in the dry season, with some urgent works carried out in the rainy season.

23. Cost estimations. A survey is required to determine the volume of specific maintenance to be carried out and to estimate the corresponding costs. During the DTMP preparation, a DTMP Survey of the full DRCN is carried out in which the required volumes of specific maintenance are determined (together with periodic maintenance and improvement works). These volumes of work are checked and updated where necessary during the Rapid Condition Survey that is carried out each year at the end of the rainy season. The cost estimation will be based on a multiplication of the unit rates and the corresponding work volumes determined in the DTMP Survey and possibly updated in the Rapid Condition Survey.

24. Implementation. Although some work may be carried out using unskilled labour, skilled labour will generally be required for a number of activities. The works may either be contracted out to a contractor (possibly in combination with periodic maintenance) or to a

labour gang (directly or through a user committee). Contracts should be volume-based using the work volumes determined during a detailed survey carried out just before starting the contracting procedure for each particular road requiring specific maintenance.

2.5 PERIODIC MAINTENANCE

25. The DOLIDAR *Maintenance Directives* (2008) define periodic maintenance as maintenance works to be carried out in intervals of years and of large-scale. This mainly involves activities aimed at rejuvenating the road surface and carrying out repairs over long stretches of road. It includes the following activities:

Activities in unpaved roads (gravel + earthen)

- Repairing corrugations by dragging
- Repairing corrugations and loss of camber by grading
- Regravelling of road surface and shoulder (in existing gravel road)

Activities in paved roads (blacktop)

- Resealing (in existing blacktop road)
- Surface dressing (in existing blacktop road)
- Placing an overlay (in existing blacktop road)
- Placing road markings
- Regravelling of road shoulder

Activities in paved and unpaved roads

- Painting of steel parts

26. Timing. These activities are repeated in a road every few years, depending largely on the surface type and traffic volume. The work is carried out in the dry season.

27. Cost estimation. A survey is required to determine the volume of periodic maintenance to be carried out and to estimate the corresponding costs. During the DTMP preparation, a DTMP Survey of the full DRCN is carried out in which the required volumes of periodic maintenance are determined (together with specific maintenance and improvement works). These volumes of work are checked and updated where necessary during the Rapid Condition Survey that is carried out each year at the end of the rainy season. The cost estimation will be based on a multiplication of the unit rates and the corresponding work volumes determined in the DTMP Survey and possibly updated in the Rapid Condition Survey.

28. Implementation. Although some work may be carried out using unskilled labour, most of the work will involve skilled labour and equipment. The works should normally be contracted out to a contractor (possibly in combination with specific maintenance). However, where the planned activities can be carried out by unskilled labour (or with limited skill requirements) they may be contracted out to a labour gang (contracted directly or through a user committee). Contracts should be volume-based using work volumes determined during a detailed survey carried out just before starting the contracting procedure for each particular road requiring periodic maintenance.

2.6 IMPROVEMENT

29. Improvements refer to road works in existing roads aimed at introducing significant and extensive changes to a road with the purpose of making the road all-weather, bringing it line with the required road standards and/or bringing it to a maintainable standard through rehabilitation (increasing the technical standard of the road). It includes the following activities:

Activities in unpaved roads (gravel + earthen)

- Rehabilitation
- Widening
- Gravelling
- Blacktopping

Activities in paved roads (blacktop)

- Rehabilitation
- Widening
- Blacktopping

Activities in paved and unpaved roads

- Bridge construction
- Slab culvert construction
- Cement concrete causeway construction
- Stone causeway construction
- Pipe culvert placement
- Masonry wall construction
- Gabion wall construction
- Lined drain construction
- Raising of embankment
- Realignment of short section (e.g. in case of steep gradient)

30. Timing. These activities are carried out as needed, whereby improvement needs are identified every 5 years as part of the District Transport Master Plan (DTMP). The works are implemented during the dry season.

31. Cost estimation. A survey is required to determine the volume of improvement works to be carried out and to estimate the corresponding costs. During the DTMP preparation, a DTMP Survey of the full DRCN is carried out in which the required volumes of improvement works are determined (together with specific and periodic maintenance). The DTMP Report defines the different improvement works required in the DRCN and the order in which these are to be carried out. The ARAMP will reflect the improvement works to be carried out in the year concerned as identified in the DTMP, updating the information from the DTMP Report on the basis of works already carried out since the preparation of the DTMP. The volumes of work have already been determined in the DTMP Survey and are indicated in the DTMP Report. Based on these work volumes, the estimated costs will be determined using current unit rates (as a result the estimated costs may differ from the DTMP Report, although this will not affect the ranking).

32. Implementation. Improvement works will generally be carried out using equipment, although labour may be applied in certain localities. The works should be contracted out to a contractor. However, where the planned activities will be carried out by unskilled labour (or with limited skill requirements) they may be contracted out to a labour gang (contracted directly or through a user committee). Contracts should be volume-based using work volumes determined during a detailed survey carried out just before starting the contracting procedure for each particular road concerned selected for improvement in the year concerned.

2.7 NEW CONSTRUCTION

33. New construction refers to the construction of new DRCN roads linking up VDC headquarters that are currently without road access. It involves road construction up to an earthen or gravel standard. It includes the following activities:

Activities in unpaved roads (gravel)

- Opening up (earthen standard)
- Gravelling
- Bridge construction

34. Timing. New construction works are carried out during the dry season. Generally roads are first constructed to an earthen standard, and later improved to a gravel or blacktop standard.

35. Cost estimation. These activities are only carried out in the case of VDC headquarters that lack road access as identified in the District Transport Master Plan (DTMP). The DTMP defines the different new construction works required in the DRCN and the order in which these are to be carried out. The ARAMP will reflect the new construction works to be carried out in the year concerned as identified in the DTMP Report, updating the information on the basis of works already carried out since the preparation of the DTMP. The volumes of work have already been determined in the DTMP Survey and are indicated in the DTMP Report. Based on these work volumes, the estimated costs will be determined using current unit rates (as a result the estimated costs may differ from the DTMP Report, although this will not affect the ranking).

36. Implementation. New construction may be carried out using equipment or using labour. The works should be contracted out to a contractor in case equipment is used, or to a labour gang contracted directly or through a user committee (e.g. a Road Building Group - RBG). Contracts should be volume-based using work volumes determined during a detailed survey carried out just before starting the contracting procedure for each particular road concerned.

3. DATA COLLECTION

37. In order to carry out the planning and prioritization process involved in the ARAMP, certain data first needs to be collected and verified. Some of this data can be copied from the existing DTMP Report or previous ARAMP Reports (although this may need to be updated), while other data needs to be collected through a Rapid Condition Survey. The data collection should be carried out after the rainy season in September, allowing the ARAMP to be prepared and approved before Dasain. The following data needs to be collected:

1. Road inventory
2. Traffic data
3. Population data
4. Annual DRCN budget (ARAMP budget)
5. Rapid Condition Survey
6. Updated DTMP improvement/construction list
7. DDC discretionary road funding
8. Standard costs

3.1 ROAD INVENTORY

38. A road inventory includes data for the length of each DRCN road, differentiated by surface type. In the preparation of the DTMP a road inventory has already been prepared that can be used in the ARAMP (this is included in the DTMP Report). Similarly, road inventories from the previous ARAMP may be used. These inventories will need to be updated with any improvements or new construction carried out in previous years. The inventory data may be checked and updated as part of the Rapid Condition Survey (see section 3.5). The collected and updated road inventory data should be entered into Tables 2.1 and 2.2 of the *ARAMP Excel Template* and forms the basis for the rest of the DTMP process.

39. The latest version of the road inventory map also needs to be collected for inclusion in the ARAMP Report and updated with any changes (an example map for Jhapa district is provided in [Annex 2](#)). This map may be a simple Word-based map, as long as it indicates the relative location of the different DRCN roads in the district, the VDC headquarters and other important geographical information (rivers, borders, SRN network). The map should indicate the different road surface types in the DRCN using different colours and/or line thickness.

3.2 TRAFFIC DATA

40. Traffic data is required to determine the ranking of maintenance interventions for the different DRCN roads. Traffic data collected during the preparation of the DTMP or a previous ARAMP (and included in the DTMP or previous ARAMP Report) can be used. Where traffic levels are considered to have changed significantly since the preparation of the DTMP or previous ARAMP Report, a new traffic survey should be conducted.

41. In case of traffic surveys, shopkeepers and/or other knowledgeable persons along the road are interviewed to obtain an estimate of the number of vehicles making use of the road. Distinction is made between different vehicle categories⁴, as heavier vehicles tend to cause more damage to the road. It is recommended to carry out at least two interviews for every 10 km of road. For the calculation of the number of vehicles in each road, the average is taken of the estimations for the number of vehicles in each category given in each interview. These averages are entered into Table A1.2 in the *ARAMP Excel Template* (only the orange shaded areas). The *ARAMP Excel Template* automatically calculates the total Passenger

⁴ Type 1: motorcycle, type 2: car, jeep or minibus, type 3: tractor, type 4: bus or truck.

Car Units (PCU) and Vehicles Per Day (VPD) using the weights presented in Table A1.1. Table A1.2 can later be copied into an Annex to the ARAMP Report.

3.3 POPULATION DATA

42. Population data is required to determine the impact of the ARAMP on the access of VDCs and the district population to the road network in general and to all-weather maintainable roads in particular. It is also used for ranking improvement and new construction works, although this has already been done in the DTMP and will not be repeated in the ARAMP (instead the DTMP ranking will be used in the ARAMP). The population data from the DTMP Report can be copied in the ARAMP. In addition to the population data, the access of each VDC headquarters to the road network needs to be indicated (this is also copied from the DTMP Report or earlier ARAMPs, but needs to be updated in line with any improvement and new construction works carried out). This data is copied into Table A2.1 in the *ARAMP Excel Template* (only the orange shaded areas). The *ARAMP Excel Template* automatically calculates the size of the district population with access to fair-weather and all-weather DRCN roads and to the SRN. Table A2.1 can later be copied into an Annex to the ARAMP Report.

3.4 ANNUAL DRCN BUDGET (ARAMP BUDGET)

43. In the preparation of the DTMP, the annual budget for the DRCN was estimated based on past budgets and estimated growth rates for the different funding sources. This budget now needs to be verified and updated with actual budget allocations for the year concerned. This information can be collected from the DDC that will have determined the allocations to the DRCN from different funding sources as part of their annual budget preparation. With the district budget approved in August, this information will generally be available from early September.

44. In determining the annual DRCN budget, sources of funding should be clarified as much as possible to avoid confusion and duplication. The most common sources of funding are listed below. In some districts other sources of funding for the DRCN may exist such as VDC grants, members of parliament, community contributions and others. In writing up the budget for the year concerned, the wording of the funding sources below should be used to facilitate understanding and comparison with other districts. Additional funding sources may be included where relevant. The allocation to the road maintenance budget from the different sources should be entered into Table 5.1.1 in the *ARAMP Excel Template*, indicating both the expected allocations according to the DTMP Report, and the adjusted allocations based on actual budgets for the ARAMP.

- **DDC grant** - allocation from the unconditional block grant received from MLD
- **LGCDP grant** - allocation from the LGCDP top-up grant
- **DDC internal revenue** - allocation from the funds collected locally by the DDC
- **Rural road projects** - allocation from rural road projects (either government or donor funds). The acronym of the rural road project should be indicated (e.g. RRRSDP, RAP, RAIDP, etc.)
- **SWAp funding** - allocation received from the Sector Wide Approach for maintenance
- **Road Board Nepal** - allocation received from RBN for maintenance

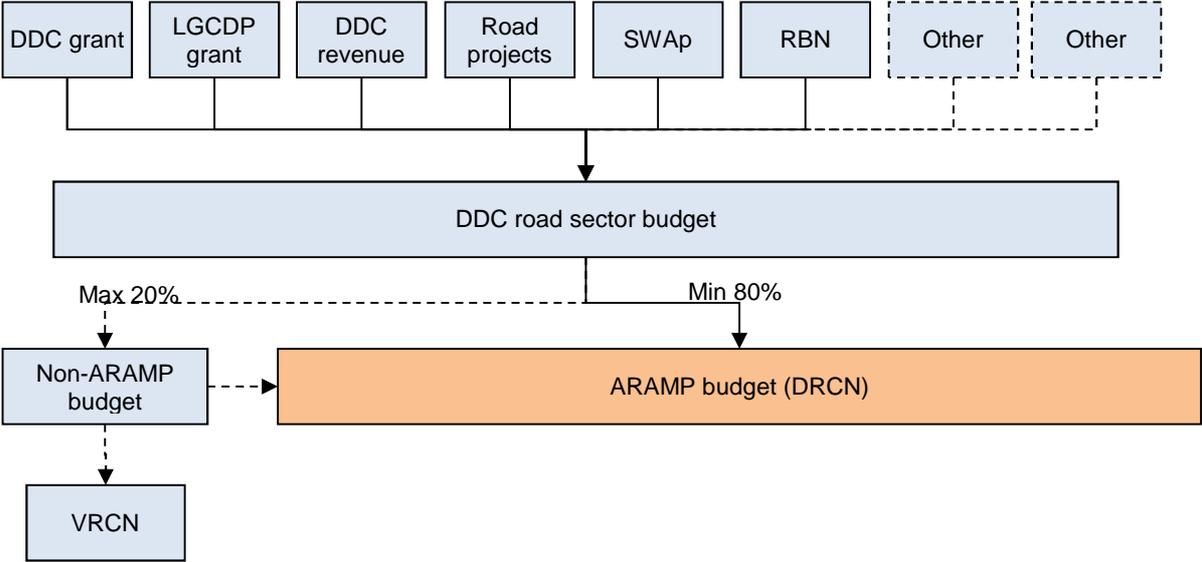
45. Once the annual district road sector budget has been determined, the allocation to the DRCN needs to be defined. A certain percentage of the district road sector budget may be reserved for non-DTMP road works as a DDC discretionary fund (see also the DTMP Guidelines). This percentage of the budget has already been defined in the DTMP. It is possible to adjust the percentage in the ARAMP, but it may not be higher than the percentage defined in the DTMP, and by no means may it exceed 20% of the budget. The

percentage as stated in the DTMP and the percentage determined for the year under consideration are entered into Table 5.1.2 of the *ARAMP Excel Template*.

46. The allocation of this discretionary portion of the budget may be based on priorities set by the DDC using their own criteria, and may be applied to village roads or to works in DRCN roads that have a low priority in the DTMP (and would otherwise not be included in the ARAMP – e.g. new construction). Where the discretionary portion of the budget is allocated to DRCN roads, these works need to be indicated in the ARAMP in order that the resulting ARAMP Report covers all DRCN works for the year concerned. In this case it is recommended to treat the discretionary funds as ARAMP budget, with the condition that they are allocated in a different way from the other ARAMP funds (they follow priorities set by the DDC rather than the ARAMP or DTMP ranking).

47. Where there is a large difference between the estimated annual budget in the DTMP and the actual district road sector budget, the DDC will need to explain and justify the change in budget allocation to the DRCN (ARAMP budget). The percentage of the budget allocated to non-DTMP road works may then need to be reduced to ensure greater compliance with the budget estimated in the DTMP.

Figure 1 DDC road sector budget and ARAMP budget



3.5 RAPID CONDITION SURVEY

48. A Rapid Condition Survey is carried out each year immediately after the rainy season to determine the volumes of emergency maintenance that are required. However, this survey is also used to check the volumes of specific and periodic maintenance that were determined during the DTMP Survey (and updated in previous ARAMPs). Routine and recurrent maintenance involve standard costs according to road length and surface type and do not require a survey.

49. The Rapid Condition Survey is carried out immediately after the rainy season (in September) and covers the entire DRCN. It involves the assessment and measurement of the volumes of emergency maintenance work required and a quick review of the specific and periodic maintenance needs (comparing the situation in the road to the results from the DTMP Survey and updates from previous ARAMPs), identifying any additional specific or periodic maintenance work required. As such, the Rapid Condition Survey does not involve a full survey of all maintenance requirements, but nevertheless results in an updated list of work volumes for emergency, specific and periodic maintenance for the entire DRCN. The

activities, their corresponding units and the procedures for measuring the volumes of work for emergency, specific and periodic maintenance are indicated in the tables below.

Table 1 Survey data for emergency maintenance

Activity	Unit	Measurement
Clearing of medium/large landslides (>5m ³)	m ³	½ x height x width x depth
Repairing/reinstating embankment	m ³	Length x width x average depth
Repairing slopes	m ³	Volume of slope to be repaired
Construction of diversion	m	Length of diversion to be created
Repairing road surface	m ²	Surface area requiring repairs to make it passable

Table 2 Survey data for specific maintenance

Activity	Unit	Measurement
Dry stone pitching (section<500m,<5% length)	m ²	Width of pitching x length of road
Gravelling (section<200m,<5% length)	m ²	Width x length of road requiring gravelling
Sealing (section<100m,<2% length)	m ²	Road width x length requiring sealing
Surface dressing (section<100m,<2% length)	m ²	Road width x length requiring surface dressing
Gabion retaining wall (wall<500m ³ ,<100m ³ /km average)	m ³	Length x height x depth
Dry stone retaining wall (wall<500m ³ ,<100m ³ /km average)	m ³	Length x height x depth
Slope stabilization	m ²	Length x width of area requiring stabilization
Removal of banks	m ³	Length of banks x average height x average depth
Raising of embankment (section<100m,<2% length)	m ³	Length x width x raising height
Shoulder improvement	m ³	Length x width x average raising height
Creation of earthen side drains	m	Length of side drains
Repairs to the drainage system	m ³	Volume to be filled
Creation of stone-paved drifts (drift<100m,<2% length)	m ²	Length x width of required drift
Removal of hanging cliff/rocks	m ³	Volume of material to be removed

Table 3 Survey data for periodic maintenance

Activity	Unit	Measurement
Dragging	m ²	Road width x length requiring dragging
Grading	m ²	Road width x length requiring grading
Regravelling (existing gravel surface)	m ²	Road width x length requiring regravelling
Resealing (existing blacktop surface)	m ²	Road width x length requiring resealing
Surface dressing (existing blacktop surface)	m ²	Road width x length requiring surface dressing
Overlay (existing blacktop surface)	m ²	Road width x length requiring overlay
Road markings	km	Length requiring markings
Painting steel parts	m ²	Estimated surface area to be painted

50. In [Annex 3](#) a copy of the Rapid Condition Survey Form is included which is to be used in the survey. This allows any emergency maintenance needs to be described and volumes of work to be indicated, as well as possible adjustments to the volumes of specific and periodic maintenance (comparing actual volumes to the DTMP Survey forms and updates from previous ARAMPS). Additional general information on the road surface and road condition is collected to assist in updating the road inventory and to facilitate the preparation of the packaging of emergency maintenance works immediately after the survey. Each form covers 5 kilometres – for longer roads several different forms should be used (this should be indicated in the Serial No. cell, indicating the number of the form and the total number of forms for the road concerned). The total work volumes for each road section differentiated by type of activity are subsequently copied from the Rapid Condition Survey Form and from previous DTMP and ARAMP Reports into Tables 3.1.1, 3.3.1 and 3.4.1 of the *ARAMP Excel Template*.

3.6 DTMP IMPROVEMENT AND CONSTRUCTION LIST

51. In the existing DTMP Report the improvement and new construction needs have already been identified and ranked according to priority. However, since the preparation of the DTMP, some works have already been carried out, and the ranked DTMP list of improvement and construction works therefore first needs to be updated. This requires that the works that have already been completed are identified and removed from the DTMP list. It is important to note that the works carried out may not have covered all the improvement and new construction works identified in the DTMP, and that some activities are still required to bring the road to an all-weather maintainable standard. It is therefore important to verify that all works for a specific road identified in the DTMP have indeed been completed before removing the road from the list. Where it is not fully clear whether this is indeed the case and this cannot be confirmed by the DTO engineer, the road concerned will need to be visited in order to verify that indeed all works have been completed (this can be combined with the Rapid Condition Survey). The information from the DTMP Report should be entered into Tables 4.1.1 and 4.2.1 of the *ARAMP Excel Template*, indicating whether works have been initiated (I) or completed (C). It is important that the DTMP ranking order of the roads is followed in entering the road data to ensure the same ranking is applied in the ARAMP.

52. For those roads where the improvement and new construction works have not been completed (only initiated or not yet started), the road codes and volumes of work are copied into Tables 4.4.1 and 4.5.1 of the *ARAMP Excel Template* (adjusting the DTMP volumes of work with regard to work already completed in previous years). Here again it is important that the same DTMP ranking is followed.

3.7 DDC DISCRETIONARY ROAD FUNDING

53. For the DDC discretionary portion of the district road sector budget that is allocated to non-DRCN roads or to DRCN road works with a low ranking in the DTMP, a list of proposed road works will need to be drawn up. The allocation of this percentage of the funding is at the discretion of the DDC, and does not necessarily follow the DTMP or ARAMP procedures. However, where these funds are allocated to DRCN roads, they need to be indicated in the ARAMP.

54. Where the DDC discretionary funds are allocated to DRCN roads, this will generally consist of improvements or new construction of DRCN roads which have a low ranking in the DTMP, but have a high priority for the DDC. The list of proposed DRCN works under this percentage of the funding and related volumes of work needs to be obtained from the DDC and included in Table 4.3.1 of the *ARAMP Excel Template*. The volumes of work may be copied from the DTMP Report or obtained from the DDC. The codes and volumes of work are subsequently copied into Tables 4.4.1 and 4.5.1 of the *ARAMP Excel Template*.

3.8 STANDARD COSTS

55. Based on the volumes of work determined in the DTMP Survey and the Rapid Condition Survey, cost estimates can be prepared for each type of intervention. This is done using standard costs or unit rates. These ARAMP guidelines provide a set of standard unit costs based on an analysis of previous works, which may be used as an initial estimation of the costs involved. However, these standard costs only serve as an indication of the order of magnitude, and need to be replaced with the actual average costs according to the DTO engineers in each district based on recent experiences. As costs tend to vary greatly from one district to the next and change over time, this will allow better cost estimates to be prepared, with subsequent budget allocations more prone to coincide with actual implementation costs.

56. It is recommended to use one single standard cost for the whole district and to avoid making detailed calculations for each road or intervention, as that will cost a lot of time and money and is not necessary for this level of planning (it will be required during the design phase prior to the contracting of the works). The standard costs used should be checked against actual costs at the end of the year, and adjusted for use in the next year's ARAMP. The required standard costs and the proposed unit rates are listed in the tables below. For improvement and new construction, similar standard costs have been applied in the DTMP preparation, but these need to be updated using current costs in order to correct for price inflation. The updated standard costs to be used should be entered in the *ARAMP Excel Template* in Tables 3.1.2, 3.2.2, 3.3.2 and 3.4.2 in the case of maintenance and in Tables 4.4.2 and 4.5.2 in the case of improvement and new construction.

Table 4 Standard costs for emergency maintenance activities (NPR)

Activity	Unit	Unit cost
Clearing of medium/large landslides (>5m ³)	m ³	250
Repairing/reinstating embankment	m ³	80
Repairing slopes	m ³	80
Construction of diversion	m	2,000
Repairing road surface	m ²	50

Table 5 Standard costs for routine/recurrent maintenance activities (NPR)

Activity	Unit	Unit cost
Routine maintenance	km	20,000
Recurrent maintenance (blacktop)	km	100,000
Recurrent maintenance (gravel)	km	30,000
Recurrent maintenance (earthen)	km	20,000

Table 6 Standard costs for specific maintenance activities (NPR)

Activity	Unit	Unit cost
Dry stone pitching	m ²	800
Gravelling	m ²	600
Sealing	m ²	5,000
Surface dressing	m ²	6,000
Gabion retaining wall	m ³	2,500
Dry stone retaining wall	m ³	1,400
Slope stabilization	m ²	60
Removal of banks	m ³	50
Raising of embankment	m ³	60
Shoulder improvement	m ³	60
Creation of earthen side drains	m	20
Repairs to the drainage system	m ³	60
Creation of stone-paved drifts	m ²	800
Removal of hanging cliff/rocks	m ³	80

Table 7 Standard costs for periodic maintenance activities (NPR)

Activity	Unit	Unit cost
Dragging	m ²	100
Grading	m ²	300
Regravelling	m ²	600
Resealing	m ²	1,000
Surface dressing	m ²	1,500
Overlay	m ²	2,000
Road markings	km	10,000
Painting steel parts	m ²	60

Table 8 Standard costs for improvement activities (NPR)

Activity	Unit	Unit cost
Rehabilitation	km	800,000
Gravelling	km	2,200,000
Blacktopping	km	5,700,000
Widening (approximately 1 metre width)	m	2,000
Bridge construction	m	1,200,000
Slab culvert construction	m	150,000
CC Causeway construction	m	100,000
Stone Causeway construction	m	10,000
Pipe culvert placement	unit	10,000
Masonry wall construction	m ³	10,000
Gabion wall construction	m ³	2,500
Lined drain construction	m	1,000
Raising of embankment	m ³	60
Realignment of road section (e.g. steep gradient)	m	4,000

Table 9 Standard costs for new construction activities (NPR)

Activity	Unit	Unit cost
Track opening	km	4,000,000
Gravelling	km	2,200,000
Bridge construction	m	1,200,000

4. ARAMP PREPARATION

57. Once the necessary data has been collected, the next step is the actual preparation of the ARAMP as well as the writing of the ARAMP Report. For this step it is recommended to also consult the *ARAMP Excel Template* and *ARAMP Report Template*. Once the ARAMP has been prepared, it needs to be presented to and approved by the DDC body. The preparation of the ARAMP Report includes:

- [Chapter 1](#) - A written introduction to the district
- [Chapter 2](#) - A description of the current road network in the district (and DRCN map)
- [Chapter 3](#) - The description of the planned maintenance interventions and related costs
- [Chapter 4](#) - The description of the planned improvement and new construction interventions and related costs
- [Chapter 5](#) - The financial resources and their allocation (the actual plan)

4.1 INTRODUCTION TO THE DISTRICT

58. The introduction to the district is a short text providing the general data of the district. It should also include a map of Nepal showing the location of the district. This can be copied from the DTMP Report. This chapter should not exceed 1 page.

4.2 DISTRICT ROAD INVENTORY

59. This second chapter of the DTMP Report will provide an overview of the existing road inventory in the district. It will start by providing an overview of all the roads in the district in terms of type (strategic roads, urban roads, district roads and village roads) and surface type (blacktop, gravel, earthen). Data for strategic roads, urban roads and village roads may be copied from the DTMP, unless more up-to-date data is readily available. This data should be entered into Table 2.1.1 of the *ARAMP Excel Template*. Data for the district road core network should be updated taking into account any upgrading or new construction since the preparation of the DTMP or previous ARAMP. The Rapid Condition Survey will provide the necessary updated inventory data. This updated DRCN data should be entered into Table 2.2.1 of the *ARAMP Excel Template*.

60. Once the data in both tables has been entered, the tables may be copied to the ARAMP Report. Any changes to the road inventory compared to previous ARAMPs or the DTMP should be explained (e.g. mentioning the length of road improved or constructed the previous year). The road inventory map from the DTMP should also be included in the ARAMP Report (if possible this should be updated to show changes in road length and/or surface type). This may be a simple Word-based map as it serves mainly to indicate the relative location of the different DRCN roads. Different colours and line thicknesses should be used to indicate the road surface (see the example in [Annex 2](#)).

4.3 PLANNED MAINTENANCE INTERVENTIONS

61. For [emergency maintenance](#), the volumes of works required as determined in the Rapid Condition Survey should be entered into Table 3.1.1 of the *ARAMP Excel Template*. The standard costs for emergency maintenance should be entered into Table 3.1.2 based on actual rates from recent experiences in the district concerned, allowing the calculation of the estimated costs of the emergency maintenance works in Table 3.1.3. Once the costs have been calculated, the roads are ranked according to the cost per vehicle that uses the road (this is calculated by dividing the total estimated cost by the number of vehicles per day in the road concerned – Table A1.2 in the *ARAMP Excel Template* – see section 3.2). The

ranking is carried out by clicking the button at the top of the column “Cost/vehicle” and selecting “Sort smallest to largest”. The roads will be ranked in order of increasing cost per vehicle and the road with the highest priority (most benefit in relation to cost) will be at the top. All three resulting tables should be copied into the ARAMP Report (make sure to rank the roads before copying the tables).

62. For **routine and recurrent maintenance**, the length of roads to be maintained should be entered into Table 3.2.1 of the *ARAMP Excel Template* (this is done automatically, but needs to be verified). In principle all DRCN roads should be included under routine and recurrent maintenance, except for roads that are not in a maintainable condition and roads receiving periodic maintenance or improvement (this should be checked when preparing the ARAMP, adjusting the automatic inclusion of routine and recurrent maintenance as required). The standard routine and recurrent maintenance costs should be entered into Table 3.2.2 based on actual costs from recent experiences in the district concerned, allowing the calculation of the estimated costs of the routine and recurrent maintenance works in Table 3.2.3. Once the costs have been calculated, the roads are ranked according to the cost per vehicle that uses the road (this is calculated by dividing the total estimated cost by the number of vehicles per day in the road concerned – Table A1.2 in the *ARAMP Excel Template* – see section 3.2). The ranking is carried out by clicking the button at the top of the column “Cost/vehicle” and selecting “Sort smallest to largest”. The roads will be ranked in order of increasing cost per vehicle and the road with the highest priority (most benefit in relation to cost) will be at the top. All three resulting tables should be copied into the ARAMP Report (make sure to rank the roads before copying the tables).

63. For **specific maintenance**, the volumes of works required as determined in the DTMP Survey and verified and updated in the Rapid Condition Survey, should be entered into Table 3.3.1 of the *ARAMP Excel Template*. The standard costs for specific maintenance should be entered into Table 3.3.2 based on actual costs from recent experiences in the district concerned, allowing the calculation of the estimated costs of the specific maintenance works in Table 3.3.3. Once the costs have been calculated, the roads are ranked according to the cost per vehicle that uses the road (this is calculated by dividing the total estimated cost by the number of vehicles per day in the road concerned – Table A1.2 in the *ARAMP Excel Template* – see section 3.2). The ranking is carried out by clicking the button at the top of the column “Cost/vehicle” and selecting “Sort smallest to largest”. The roads will be ranked in order of increasing cost per vehicle and the road with the highest priority (most benefit in relation to cost) will be at the top. All three resulting tables should be copied into the ARAMP Report (make sure to rank the roads before copying the tables).

64. For **periodic maintenance**, the volumes of works required as determined in the DTMP Survey and verified and updated in the Rapid Condition Survey, should be entered into Table 3.4.1 of the *ARAMP Excel Template*. The standard costs for periodic maintenance should be entered into Table 3.4.2 based on actual costs of recent experiences in the district concerned, allowing the calculation of the estimated costs of the periodic maintenance works in Table 3.4.3. Once the costs have been calculated, the roads are ranked according to the cost per vehicle that uses the road (this is calculated by dividing the total estimated cost by the number of vehicles per day in the road concerned – Table A1.2 in the *ARAMP Excel Template* – see section 3.2). The ranking is carried out by clicking the button at the top of the column “Cost/vehicle” and selecting “Sort smallest to largest”. The roads will be ranked in order of increasing cost per vehicle and the road with the highest priority (most benefit in relation to cost) will be at the top. All three resulting tables should be copied into the ARAMP Report (make sure to rank the roads before copying the tables).

65. An overview of all estimated costs of emergency, routine/recurrent, specific and periodic maintenance is provided in Table 3.5.1 of the *ARAMP Excel Template*. This table should be copied into the ARAMP Report. This table presents the total maintenance costs for the

DRCN network for the year concerned. Please note that this table is not ranked according to the priority of the different roads, but is ordered by road code.

4.4 PLANNED IMPROVEMENT AND CONSTRUCTION INTERVENTIONS

66. The volumes of improvement works and new construction works as identified in the DTMP should be entered into Tables 4.1.1 and 4.2.1 of the *ARAMP Excel Template*, together with data on estimated costs, population served and cost per 1,000 people (on which the ranking is based) as defined in the DTMP Report. Once this has been done, the status should be indicated by putting either a “C” in the status column if the work has been completed or an “I” if it has been initiated but not yet completed. The two resulting tables should be copied into the ARAMP Report.

67. In addition to the selected interventions to be carried out using the ARAMP budget in line with the DTMP ranking, the DDC has a discretionary portion of the budget that it may allocate to other road works, irrespective of the inclusion or ranking in the DTMP. Where this funding is allocated to DRCN roads, the road codes and volumes of the works should be entered into Table 4.3.1 of the *ARAMP Excel Template*. The table should be copied into the ARAMP Report.

68. The next step is to copy the road codes and volumes of work from Tables 4.1.1 and 4.2.1 into Tables 4.4.1 and 4.5.1 for those roads where the works identified in the DTMP have not yet been completed. In doing so, the work volumes should be adjusted regarding any portion already completed (in case of roads where works have already been initiated, but not completed). Similarly, for the DRCN roads prioritised for use of the DDC discretionary funding, the road codes and work volumes are copied from Table 4.3.1 to Tables 4.4.1 and 4.5.1. In all three cases, the ranking from the DTMP or indicated by the DDC is followed. Tables 4.4.1 and 4.5.1 should be copied into the ARAMP Report.

69. The costs of improvement and new construction works can be calculated using the standard costs based on actual costs in recent experiences in the district concerned. The standard costs to be used for the improvement and new construction works should be entered in Tables 4.4.2 and 4.5.2 of the *ARAMP Excel Template*. The standard costs used in the DTMP Report are also entered to explain any differences in cost estimation between the DTMP and ARAMP. Based on these standard costs and the volumes of works from the DTMP Report, the costs of the improvement and new construction works are estimated in Tables 4.4.3 and 4.5.3 of the *ARAMP Excel Template*. These tables present the total improvement and new construction costs. The tables should be copied into the ARAMP Report.

70. Although the standard costs for improvement and new construction may be updated in the ARAMP and may result in changes to the estimated costs for the different roads, no new ranking is carried out for the improvement and new construction works as this follows the ranking as determined in the DTMP or by the DDC (in the case of DDC discretionary funds). It is therefore important to ensure that the order of the roads in Tables 4.4.1 and 4.5.1 is in line with the DTMP and DDC ranking.

4.5 ANNUAL ROAD ASSET MANAGEMENT PLAN (ARAMP)

71. The final part of the ARAMP process is the balancing of the available ARAMP budget and the estimated costs of the planned interventions, to determine which interventions can be carried out in this year’s ARAMP and how the ARAMP budget will be allocated to different roads and intervention types.

72. The estimation of the financial resources available at district level for road maintenance has already been described in section 3.4 and entered into Table 5.1.1 of the *ARAMP Excel*

Template. The amount allocated to the ARAMP for the year in question as per the DTMP Report has been entered into Table 5.1.2 of the *ARAMP Excel Template*. Both tables should be copied to the ARAMP Report and any variation between the DTMP allocation and the allocation according to the ARAMP needs to be explained and justified.

73. In the allocation of the ARAMP budget, priority is given to emergency maintenance, followed by routine/recurrent maintenance, specific maintenance and finally periodic maintenance. Remaining funds are allocated to improvement and subsequently new construction. Deviation from this order of budget allocation is only allowed in the case of DDC discretionary funding.

74. Table 5.2.1 of the *ARAMP Excel Template* will automatically calculate the budget allocations for each intervention type. For each intervention type, the roads are automatically ranked according to the ranking determined in earlier tables (for this purpose it is important to ensure that Tables 3.1.3, 3.2.3, 3.3.3, 3.4.3 have been ranked as described in section 4.3). For each road the estimated costs are indicated and the budget allocation needs to be determined – in principle this is the same as the estimated cost and is filled in automatically. Only if the budget is insufficient is the allocation lower than the estimated amount (this is also filled in automatically). This can be adjusted manually but this should only be done in the case of DDC discretionary funds where allocation is not bound by ranking or by the available ARAMP budget.

75. The remaining budget after allocation to the different roads for a certain intervention type is indicated at the bottom of the table – this remaining budget is then available for the next intervention type. The *ARAMP Excel Template* will continue allocating funding in the order of priority according to intervention type and ranking, until the available ARAMP budget has been fully used up or until there are no further maintenance works requiring funding.

76. If there is still ARAMP budget remaining at the end of this allocation process (or if additional funds become available), additional works can be included in the ARAMP by selecting the next improvement or construction works in the list. Where the whole list has already been completed or included, the need for additional works in the DRCN should be determined. Where no further works are identified or funding still remains after inclusion of these works, the remaining funds may be allocated to village roads in support of the VDCs.

77. Once the budget allocation has been completed, Table 5.2.1 of the *ARAMP Excel Template* should be copied to the ARAMP Report. Table 5.2.2 of the *ARAMP Excel Template* is the same ARAMP budget allocation, but ordered by road. For each road, the funding sources to be used need to be indicated in this table (shaded area). This table should also be copied to the ARAMP Report.

4.6 ARAMP OUTPUTS AND OUTCOMES

78. The resulting ARAMP will have certain outputs in terms of kilometres of roads maintained, improved and constructed, as well as outcomes in terms of access of VDCs and district population to fair-weather and all-weather roads.

79. The ARAMP outputs are automatically estimated in Table 5.3.1 of the *ARAMP Excel Template*, whereby it is assumed that the portion of required funding allocated to a particular road, will result in the same portion of the planned length of maintenance, gravelling, blacktopping or new construction works being completed by the end of the ARAMP. Where a large portion of the costs is used for additional works, it may be necessary to adjust these road lengths. The resulting table should be copied into the ARAMP Report.

80. The ARAMP outcomes are calculated in Tables 5.4.1 and 5.4.2 of the *ARAMP Excel Template*. For this calculation, it is necessary to fill in Table A2.2 of the *ARAMP Excel*

Template, indicating for each VDC its level of access at the start of the ARAMP period and at the end of the ARAMP period (after the planned ARAMP works have been completed). Levels of access range from no road access, to fair-weather access to DRCN roads, all-weather access to DRCN roads or direct access to the SRN. The level of access is indicated by placing an “X” in the appropriate column, one for the before situation and one for the after situation (two X’s in each row). The table can be copied from the DTMP or previous ARAMPs, but will need to be updated to take into account improvement and new construction works carried out. Once Table A2.2 in the *ARAMP Excel Template* has been filled in and updated, Tables 5.4.1 and 5.4.2 will be automatically generated. These two tables need to be verified and subsequently copied into the ARAMP Report.

81. Lastly, it is recommended to include an ARAMP map indicating the main works to be carried out under the ARAMP concerned. This is basically the road inventory map, with added indications of the gravelling, blacktopping and road construction works, as well as any bridges and slab culverts to be built. Example ARAMP maps can be found in the *ARAMP Sample Reports*.

4.7 ARAMP APPROVAL

82. With this, the draft ARAMP is finalized and needs to be presented to the DDC body for approval. This is done with the help of the road inventory map and ARAMP map. It is recommended to prepare large maps for this purpose to facilitate participation and understanding. Use of a projector is also possible.

83. For each intervention type, the required volumes of works are explained, as well as their estimated costs. Here use is made of Table 3.5.1 for maintenance works, Table 4.4.3 for the improvement works and Table 4.5.3 for new construction works.

84. The available ARAMP budget is presented using Table 5.1.1, discussing any variation from the DTMP estimation. Subsequently the ARAMP is discussed on the basis of Tables 5.2.1 and 5.2.2, explaining that the road ranking for each intervention is on the basis of the cost per vehicle in the case of maintenance, and the cost per 1,000 people served in the case of improvement and new construction. The sequence of budget allocation (emergency maintenance – routine/recurrent maintenance – specific maintenance – periodic maintenance – improvement – new construction) is also explained. The exception to this allocation order in the case of DDC discretionary funding is also discussed. Based on this sequence, the budget allocation to the different intervention types and roads is presented and discussed.

85. During these presentations, any comments are taken into consideration and may result in the amendment of the ARAMP if they are found to be justified and in line with the ARAMP process. The important thing is that the ARAMP is accepted and will be followed by the DDC. To a large extent the ARAMP should follow the procedures and prioritization criteria in these Guidelines, but a certain degree of leniency is allowed to incorporate particular priorities of the district. However, this leniency is only permitted with regards to the ranking and prioritization of interventions. **Interventions that do not pertain to the DRCN or are not included in the DTMP cannot be included in the ARAMP!**

86. Once the ARAMP has been finalized and approved by the DDC body, a letter to this effect should be prepared and signed by the LDO. This letter will be included as the Foreword to the ARAMP Report.

ANNEX 1 MAINTENANCE VERSUS IMPROVEMENT

Activity	Specific Maintenance	Periodic Maintenance	Improvement
General scope	To treat short critical sections in order to reduce damage and ensure continued access in the future	To treat extended road lengths to bring them back to their original standard	To treat large areas and extended road lengths to bring them to a higher standard
Average cost	<NPR 300,000/km	<NPR 7,000,000/km	No limit
Dry stone pitching	Each section <500m, total length <5% of road length	-	-
(Re)Gravelling	Each section <200m, total length <5% of road length	Regravelling of existing gravel surface, no length limit	Gravelling of earthen road, no length limit
(Re)Sealing	Each section <100m, total length <2% of road length	Resealing of existing blacktop surface, no length limit	-
Surface dressing/Otta seal	Each section <100m, total length <2% of road length	Surface dressing of existing blacktop surface, no length limit	Blacktopping of unpaved road, no length limit
Asphalt concrete	-	Overlay on existing blacktop surface, no length limit	Blacktopping of unpaved road, no length limit
Rehabilitation	-	-	Rehabilitation of poor condition road to its original standard, no length limit
Widening	-	-	Widening of road in curves or over full length, no length limit
Realignment (e.g. steep gradient)	-	-	Realignment of section of road that does not comply with technical standards
Raising of embankment	Each section <100m, total length <2% of road length	-	Raising embankment over extended length, no length limit
Dry stone retaining wall	Each wall <500m ³ , average volume in road <50m ³ /km	-	-
Gabion retaining wall	Each wall <500m ³ , average volume in road <50m ³ /km	-	No size or number limit
Masonry retaining wall	-	-	No size or number limit
Earthen side drains	No length limit	-	In combination with road surface improvements
Lined side drains	-	-	No length limit
Repairs to the drainage system	Repairs to existing drainage system	Repairs to existing drainage system in combination with surface maintenance	Construction of new drainage structures
Stone-paved drifts/causeways	Each drift <10m, total length <1% of road length	-	No size or number limit
CC causeway	-	-	No size or number limit
Pipe culvert	-	-	No length or number limit
Slab culvert	-	-	No length or number limit
Bridge	-	-	No length or number limit

