National Rural Infrastructure Development Agency

Standard Operating Procedure

For

Rural Road Maintenance

Performance Based Maintenance Contract through e-Marg in Defect Liability Period

Developed by

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CHAPTER-1
Maintenance of Rural Roads

1.1 Introduction

Rural roads comprise about 85 percent of the total road network. They are often treated as the last links in the transport networks. However, they are critically important in terms of providing access to social and economic services. Rural roads act as facilitators to promote and sustain agricultural growth, improve basic health, provide access to schools and economic opportunities. Thus they hold the key to accelerate poverty alleviation, socio-economic transformation, national integration and breaking the isolation of village communities. Whilst not mentioned specifically in the Millennium Development Goals (MDGs), rural roads contribute significantly to their achievements (Box 1).

Box 1: Sustainable Access by Rural Roads contributes significantly to the achievement of MDGs

- *Whilst rural roads are not mentioned specifically in the MDGs, it is clear that they contribute directly through the provision of access. To recall, the MDGs are:*

  - *Goal 1. Eradicate extreme poverty and hunger*
  - *Goal 2. Achieve universal primary education*
  - *Goal 3. Promote gender equality and empower women*
  - *Goal 4. Reduce child mortality*
  - *Goal 5. Improve maternal health*
  - *Goal 6. Combat HIV/AIDS, malaria and other diseases*
  - *Goal 7. Ensure environmental sustainability*
  - *Goal 8. Develop a global partnership for development*

- *It can be easily noted that access is a significant factor for the achievement of Goals 1, 2, 4, 5 and 6.*
- *It is not merely the construction of a rural road which provides access* ***but the effective maintenance which ensures sustainability of that access.***

Source: ILO: Rural Roads Maintenance – Sustaining the Benefits of Improved Access by Chris Donnges, Geoff Edmonds and Bjorn Johannessen, SETP-19 (2007).

Maintenance of rural roads needs to be an integral part of poverty reduction strategies to enable our country to succeed in achieving the MDGs. Maintenance of rural roads is therefore, not simply a financial and economic issue but also a

humanitarian priority. The PMGSY has packaged first five year routine maintenance with the construction/upgradation contracts to be undertaken by the same contractor. The implementation of this programme is entrusted to the Ministry of Rural Development (MORD). The National Rural Infrastructure Development Agency (NRIDA) provides management and technical support to the programme. Actual execution of works is handled by rural engineering agencies and public works departments in the states through their respective State Rural Roads Development Agency (SRRDA). However, maintenance still remains an area of concern as the no. of PMGSY roads now under maintenance is large and sheer volume of work requires a proper management system supported by the digital tools for the planning, budgeting, scientific evidence based monitoring, tracking of quality, payment system, etc. This will enable an effective upkeep of roads in serviceable condition in its designed service life and interventions thereafter as valuable assets and assets management system.

1.2 Importance and Need for Maintenance of Rural Roads

PMGSY Roads are constructed for a design life of 10 years. Para 17.1 of PMGSY Guidelines regarding maintenance states that putting in place of institutional measures to ensure systematic maintenance and providing adequate funding for maintenance of the rural Core Network, particularly the Through Routes, will be a key to the continuance of the PMGSY programme in the States. **PMGSY, for the first time brought in the concept of Defects Liability Period, where the contractor is obligated to carry out maintenance of the road constructed by him for the first five years and also rectify any deficiencies noticed during this period**. This strategy has also helped in assuring good quality during construction by the contractors. Under the PMGSY, 6.07 lakh km of roads have been completed, out of which about 1.71 lakh km roads are under 5 year routine maintenance and the remaining 4.36 lakh km of roads are under post 05 years status. With the pace of implementation of PMGSY increasing in the last few years, the post 05 year roads are likely to increase further. An area of concern before the Ministry of Rural Development has been persistent lack of maintenance by the states as per the programme guidelines. Timely maintenance of these road assets is important to maintain their function i.e. access on a sustainable basis. See Box-2 for benefits of sustained maintenance. Focus has to be on both the status that are the first five years after construction and post five years respectively thereby covering the entire design life of rural roads.

Huge outlay can be saved if timely and proper maintenance mechanism with requisite funding is put in place by the states. The proposed Guidelines for Rural Infrastructure Maintenance will focus on improving rural road maintenance and management of assets being created at huge cost of economy. There is a need for recognition among states to provide adequate funds for maintenance and preserve the rural road assets being created at a huge cost to the economy.

Box 2: Benefits of Sustained Maintenance

- *Lower vehicle operation cost, longer life of vehicles*
- *Improved business environment for farmers and local entrepreneurs*
- *Better access to local communities for education, healthcare and agricultural extension services*
- *Savings in government budget to avoid premature reconstruction and rehabilitation expenditure*
- *Prolongs life of roads*
- *Enhances community satisfaction*
- *Regular and direct employment to local communities, especially, women self help groups*
- *Reflects good governance by government*

1.3 Purpose of Maintenance: Why and Who is benefited?

The purpose of maintenance is to ensure that the road remains serviceable throughout its design life. Maintenance is important because it:

(a) Prolongs the life of the road by reducing the rate of deterioration, thereby safeguarding previous investments in construction and rehabilitation;
(b) Lowers the cost of operating vehicles on the road by providing a smooth running surface;
(c) Keeps the road open for traffic and contributes to more reliable transport service; and
(d) Sustains social and economic benefits of improved road access.

1.4 Objectives of the SOP

The continued expansion and improvement of the road network have created new and growing challenges in terms of an increasing maintenance burden. In order to sustain the benefits of the investments made in building and improving roads, there is a need to boost the capacity in terms of providing adequate maintenance and proper effective monitoring system. The system shall be a web based digital platform as in e ï governance, ensuring an evidence based solution to keep track on funds allotment, utilization, effective maintenance and monitoring mechanism to ensure compliance to Standard Bidding Document and a reliable system of effective contract management during 5 year defect liability period(DLP), coupled with transparency and citizen feedback. The idea of 5 year DLP which is based on the concept of Performance Based Maintenance Contracts(PBMC), was first introduced in PMGSY

roads by incorporating it in the standard bidding document (SBD), by NRIDA. The objective of this policy is to explain the PBMC concept, its execution in relation to the provisions of SBD through a digital solution called ñeMARGò. eMARG is a web based software solution for all functions related to the execution of the concept of PBMC. The digital solution/ tool has been developed by NIC Bhopal that is successfully deployed and is being implemented as an effective solution of maintenance management problems of roads in Madhya Pradesh. The up scaled version is now being implemented through a national eMARG for all states. e-Marg as a solution/ tool effectively addresses some of the key challenges (mainly related to execution and effective monitoring) in maintenance as recognized from time to time. Box 3 captures the key challenges faced by the road agencies in attending to the maintenance of rural roads.

Box 3: Rural Road Maintenance: The Key Challenges

(Based on situation analysis of maintenance in a few states)

It needs to be recognized that the problem of rural road maintenance is not merely the lack of finance. There are also technical and institutional issues which require careful consideration. Further, the measures required to improve the situation are often under-estimated. These include the scale of support, capacity development and the lead time required by the road agency to provide regular and timely maintenance to the roads within its jurisdiction.

A. Policy Framework

- *Effective road sector strategy.*

B. Maintenance Funding

- *Inadequate funding for maintenance.*
- *Weak integration of resources made available.*
- *Effective management of maintenance funds.*

C. Maintenance Planning

- *Weak data collection and analysis: inventory, condition, traffic.*
- *Near absence of rational planning for ensuring routine maintenance and prioritizing periodic maintenance.*
- *Preparation of Annual Maintenance Plans.*

D. Institutional and Technical Capacity

- *Inadequate quality and quantity of training in maintenance operations for road agencies and contractors.*
- *Weak quality audit of maintenance works.*
- *Inadequate incentives to contractors.*
- *Inadequate supervision, inspections.*

Source: Situation Analysis of Maintenance of Rural Roads in the states of Himachal Pradesh, Uttar Pradesh, Bihar, Arunachal Pradesh (2003, 2006, 2007). Studies sponsored by NRRDA, World Bank. (Some of the Key Challenges as per report)

1.5 Key Result Area (KRA) of SOP/Expected Outcome Results

An area of concern before the Ministry of Rural Development towards implementation of the PMGSY has been persistent lack of maintenance by the states as per the programme guidelines. There is also an issue of proper reporting of the use of maintenance funds in terms of well-defined maintenance plans and activities for road stretches under the jurisdiction of each PIU. The Key Result Area (KRA) of this SOP/Expected Outcome Results is to address these issues and to explain the concept of PBMC and its execution on ground through a digital platform ensuring following.

(a) Routine maintenance of rural roads on a regular and timely basis.
b) Periodic maintenance at regular intervals based on road condition and as a preventive maintenance strategy.
c) Rehabilitating the roads to climate-resilient standard, reducing the backlog in road maintenance.
d) Improving maintenance skills and institutional capacity,
e) Establishing a comprehensive and reliable inventory of roads, bridges and culverts,
f) Establishing a linkage between the inventory and geographical information system spatial database,
g) Upgrading road and bridge maintenance standards

Main Outcome shall be to keep all rural roads in serviceable condition for road users year-round in a sustainable manner.

1.6 e-Marg as web based enterprise solution

The key challenges in implementation of maintenance planning, budgeting, execution and monitoring is the large number of roads spread over huge area , involvement of number of contractors , assessment of performance of roads , scrutiny of bills with respect to performance and keeping evidence of the same for monitoring at senior level regarding proper utilization of funds spent. Here eMARG comes as a solution, which has been successfully time tested, implemented by MPRRDA and the same is being replicated for all states, with state specific needs as per their in put /feedback collected during several workshops held by NRIDA with all states. Though it is a continuing process and as such eMARG system will evolve continuously for some time. States need to ensure compliance of NRIDA SBD in its entirety to ensure uniform standard of maintenance all over the country.

Therefore, it has been felt necessary to put in place the SOP (Standard Operating Procedures) for maintenance of the roads at operational level for securing adequate and timely maintenance of the rural road network. Keeping this in view and to monitor the maintenance of Rural Roads at state level and at the same time at country level, a software system named ôeMARGô has been developed by NIC, with facility of bill submission by contractors, uploading of road inspections, uploading of Geo Tagged/ time stamped photographs and making online payments. This software will provide the inspection details as well as payment details of each and every road. The software will be used by all SRRDAs. This SOP explains the use of eMARG and various activities involved with implementation of eMARG. The comprehensive training on the concept of PBMC as per SBD of NRIDA, use of

software etc has been discussed in several training workshops conducted in states and the system is in implementation stage. This SOP is to document the whole process.

1.7 e- Marg to improve Implementation Efficiency

Road maintenance has a poor record of transparency, appearing as a seemingly bottomless pit of funding. It is essential to carry out the work of maintenance in a transparent and well documented manner. We have an example of PMGSY before us. While road maintenance is not a complicated technical issue, it still requires some basic activities to be carried out. The operational capacity to implement maintenance works on the ground requires:

- Planning capacity to assess the condition of the road network, plan, design and prioritize maintenance activities;
- ability to manage the contracting process and supervise and monitor the work done by the contractors;
- technical expertise to evaluate the effectiveness of current standards and practices and tests and develop alternative approaches,
- provision for monitoring and evaluation, and
- technical and financial reporting and auditing.

To ensure effective use of the contractors for rural road maintenance, it is necessary to have management and monitoring procedures to ensure that the work is being carried out to the required standard. eMARG as a technical tool is the solution to all such implementation challenges and provides a comprehensive solution to improve implementation efficiency.

1.8 Existing PMGSY Guidelines on Maintenance

The existing guidelines as per PMGSY was further reiterated vide JS RC and DG NRIDA letter no. NRRDAA-P017(23)/4/2018-Dir(p-1)(FMS: 363582/686 Dated 01/04/2019. These are reproduced below for states to comply and accordingly make provisions in their annual maintenance plan and in the bid document provisions for 5 year DLP.

Para 8.2 of PMGSY-II guidelines states that the States are expected to make following provisions for maintenance of the proposed roads:

1. Routine maintenance for 5-years post construction in a composite contract with the construction contractor.
2. Renewal after the above period.
3. Routine maintenance post the above period.
4. Balance life cycle to be followed by another up-gradation.

Further, as per Para 17.2 of PMGSY Programme guidelines, all PMGSY- II roads (including associated Major Rural Links/ Through Routes of PMGSY link routes) will be covered by 5-year maintenance contracts, to be entered into along with the construction cost, with the same contractor, as per the Standard Bidding Document. The entire cost for routine maintenance for 5 years post construction period and 6th year renewal cost are entirely borne by the States.

As per Para 17.3 of guidelines, Through Routes (whether upgraded under PMGSY or subjected to maintenance contract as an associated Through Route of a PMGSY Link route as per Para 6.6.2) on expiry of 5 years post construction maintenance including renewal as per cycle. The State Government should make the necessary budget provision and place the funds to service the zonal maintenance contracts at disposal of the SRRDA in the Maintenance Fund Account.

The State Governments have agreed in-principle to provide funds for 6th year renewal cost while submission of proposals under PMGSY II. Accordingly, the 6th year renewal cost of each road is uploaded by the States on OMMAS.

While sanctioning PMGSY-II proposals, the State Governments have been asked to provide for the 6th year renewal cost in the project proposal itself. Accordingly, all States are making a provision for the same. It is seen that after the 6th year renewal, the roads are not under further 5 year guarantee period. From general experience of some of the states, it is seen that roads which have been renewed after 5 years are also being taken up under 5 year guarantee period. Accordingly, the states should mandate performance guarantee for further 5 years after 6th year renewal.

The State should prepare an annual maintenance plan and budgetary requirement for maintaining PMGSY roads in the following three categories:

i. Routine maintenance of PMGSY roads under pre 5 years.
ii. Periodic renewal of the roads which have completed 5 years and
iii. Finally, the routine maintenance of the roads post 5 years.

The total fund requirement for maintenance and the budgetary allocated by the state government should be submitted to MoRD/NRIDA before 30th April of every year. This exercise shall be done through eMARG which is now being rolled out in all the States.

A provision is made in OMMAS for assessment of annual budgeting of Maintenance of PMGSY roads. The states need to update the details of maintenance (both pre 5 years and post 5 years) in OMMAS and this will be a pre-requisite for sanction of projects under PMGSY-II and III. The expenditure made and release of funds shall be reviewed by MoRD/NRIDA continuously based on the entries made in OMMAS.

The states need to contract out the routine maintenance for 5 years after renewal of the PMGSY roads under post 5 year category. The defect liability period for renewal

works shall be 5 years as in the case of construction. This 5 yearsô routine maintenance after renewal is applicable for all PMGSY road renewed using Performance Incentive fund and through State funds.

Further, the States need to make necessary provisions in bid document for 5 years routine maintenance from the date of completion of renewal work in the bid document of 6th year renewal contract itself. The model bid document adopted by MPRRDA is attached herewith for reference.

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CHAPTER – 2

PERFORMANCE BASED MAINTENANCE CONTRACT (PBMC)

2.1 What is PBMC

The traditional way of contracting out road maintenance is based on the amount of work being measured and paid at agreed rates for different work items. These are also referred to as unit price contracts.

In contrast, Performance-Based Maintenance Contracts define minimum conditions of road, Cross drainage works, and traffic assets that have to be met by the contractor.

Payments are based on how well the contractor manages to comply with the performance standards or service levels defined in the contract, and not on piece work.

In PBMC the contractor has to keep road in good riding condition throughout the year. No separate measurements are required and only routine inspection has to be done bimonthly. Any deficiency found during inspection is to be attended by the contractor. The payments are based on predefined performance matrix.

2.2 Experience of M.P

PBMC has been in practice in Madhya Pradesh for PMGSY roads since year 2009. After implementation of PBMC,(scale to measure) the performance of road on maintenance parameters proved to be an important and effective tool. As a result of this, the contractors were encouraged to maintain the roads and get timely payments. With improved condition of the roads, the maintenance mechanism of the state was appreciated very much even at the national level. In addition, it was easy to get required maintenance fund allocation from the state Govt.

2.3 Advantages of Performance Based Maintenance Contracts-

The PBMC is based on visual inspection of general maintenance condition of roads. There is no requirement for detail measurement & verification of items related with maintenance. Contractor needs to visit the road regularly to observe the requirement of maintenance on roads and execute the items required to ensure good condition of the road. Following are major benefits of the PBMC-

i. **Cost savings** - The payment is released on the basis of maintenance condition of roads. Target shall be to keep the road always 100 % free of maintenance problem. The payment is done on pre-declared rate only and there is no provision of any extra expenditure to be incurred and there is no possibility of any cost overrun.

ii. **Easy to operate**- PBMC is easy to operate as execution and payments are not based on measurements, No record of items executed materials consumed by the contractor is to be maintained. However for evidence based performance assessment, the digital web based solution is to be used called eMARG as referred in this SOP.

iii. **No risk with department**- PBMC as well as defect liability makes the contractor more responsible and department is at no risk.

iv. **Assurance of quality**- The road has to perform well all the time to the satisfaction of road user. Contractor himself has to be quality conscious while doing any maintenance activity to ensure his long term benefits.

v. **Achieving a sustainable road management system**- Regular inspections are part of the PBMC. The defects are noticed well in time and the contractor has to attend the same at the earliest. This makes the system more sustainable.

vi. **Flexibility in approach**- Since it is not item based, contractor can choose his methodology to attend the defects, wherever possible use innovative methods and keep the road always in good condition. Department can also schedule inspections as per convenience of the engineers.

vii. **Increased transparency**- The payments are calculated on the basis of indices on a scale of 100 points. Evaluation is done online through eMARG which can be cross checked by observing the uploaded photographs. The redressal of public complaints can be handled in a better way. This makes the system more transparent.

2.4 Execution of PBMC-

As per the provisions given in SBD, contractor submits the bill every month for maintenance. Before making payment, the performance evaluation is to be done. Following guidelines shall be followed at the time of performance evaluation.

The ultimate objective is to keep the road free from defects all the time and keeping it in good condition always. While assessing the performance and amount due to the payment, it is the responsibility of Engineer to ensure that road remains in serviceable condition throughout the year to his/her entire satisfaction.

1. Performance evaluation along with routine inspection shall be done in every two months.

2. For performance evaluation, the road is divided in to kilometer wise segments.

3. During performance evaluation, the maintenance condition of the road is evaluated on the basis of performance indicator (as given in enclosed Appendices) of 100 points. Format enclosed as per **Appendices A&B.**

4. If any segments of the road / entire road get less than 80 marks, no payment shall be made for that segment/ road.

5. If same segments of the road gets less than 80 marks in two successive performance evaluation, PEs, then no payment shall be made for the entire road, irrespective of the marks obtained in other segments.

6. If same segment gets less than 80 marks in third PE also, the action against contractor shall be initiated as per contract. The process for termination of contract and encashment of bank securities shall be initiated as per provisions of SBD of NRIDA.

   [By this provision contractor cannot ignore any particular segment of the road continuously for long time]

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CHAPTER – 3

MAINTENANCE NORMS AND ROUTINE MAINTENANCE

3.1 Specifications for Rural Road Maintenance are as below:-

- IRC - 82: 11382 - Bituminous roads
- IRC ï SP 83: 2018 - Concrete roads
- IRC ï SP 35:113130 ï Bridge maintenance
- IRC ï SP: 77 ï 2008 Gravel roads
- IRC ï SP: 17 ï Overlay of bituminous or concrete on concrete roads as per requirement
- IRC ï SP: 98 ï Guidelines for use of Waste Plastic in Bituminous Mixes
- IRC ï SP: 100 ï Use of Cold Mix Technology in Construction and Maintenance of Road using Bitumen Emulsion
- IRC ï 35 ï Code of Practice for Road Marking
- Specification for Rural Roads (First Revision) Publish by IRC January 2014
- Quality Assurance Hand Book Volume-I & Volume-II Published by NRRDA 2014
- Specification for Rural Roads by MORD , Section 1900 on maintenance
- Rural Road safety manual by NRIDA

3.2 NRIDA Maintenance Guidelines, some references

- Workshops on Roll out of e-Marg for all the States.
- Guidance Note to States on ñManaging maintenance of Rural roadsò issued by NRIDA in Octoberô2014.
- Handbook On ñManaging maintenance of Rural roads in Indiaò issued by NRIDA in Octoberô2014.
- Policy framework on ñMaintenance of Roadsò issued by NRIDA in March, 2014.
- Maintenance incentives released to the States by the Ministry.

3.3 Objective of Maintenance activities:-

The basic objective of road maintenance is implicit in the word itself. It is done to ensure that the road that has been constructed, or improved, is to the extent possibly kept in its original condition. All roads require maintenance as they are subjected to traffic and the forces of weather. Even with the highest possible quality of construction, maintenance is essential to get optimum service from the road structure during its design life. By applying preventive maintenance, the deterioration of the road and its components can be slowed down, thus postponing the need for costly investments in rehabilitation and securing the planned design life.

Maintenance ensures that the road remains serviceable throughout its design life. Maintenance is important because it:

i. Reduces the rate of deterioration, thereby safeguarding previous investments in construction and rehabilitation,
ii. Lowers the cost of operating vehicles on the road by providing a smooth running surface,
iii. Improves safety of road users,
iv. Improves the reliability of the road allowing it to remain open for traffic on a continuous basis and thus contributes to more reliable transport services, and sustains social and economic benefits of improved road access.

3.4 Types of Maintenance Activities:-

The maintenance activities are divided into two categories:

a) Preventive maintenance ï Before the failure of road
b) Corrective maintenance- After the failure of road

I. **Preventive Maintenance –**Preventive maintenance includes repairs to small sized potholes, crack sealing, maintenance of shoulders, drainage systems, etc.

II. **Corrective Maintenance-**Corrective maintenance includes patch repairs, surface treatments, renewal and overlays.

3.5 Routine maintenance: It is carried out on regular basis to keep carriageway, shoulders, drains, cross-drainage works and other road components in good condition throughout the year. These are generally small-scale works but are widely dispersed and can be efficiently carried out using simple tools, equipment or manual methods.

Routine maintenance activities are further defined as either cyclic or reactive, although the distinction between these terms is not always very clear.

Cyclic activities are performed at a predetermined interval throughout the year purely as a preventive measure because of events that are known in prior to occur (e.g. cleaning drains before and during seasonal rainfall), and are scheduled at fixed times during the year.

Reactive activities are performed in response to a triggering condition that requires action before the problem gets out of hand (e.g. blocked culvert, crack sealing and pothole patching)

Routine maintenance consist of following activities

a) Maintenance of Bituminous surface road including filling pot holes and patch repairs where necessary
b) Filling up edges of asphalt surface.
c) Dressing of berms, maintenance & making up of shoulders, Erosion control on shoulders, slopes
d) Restoration of rain cuts and dressing of earthen embankments, turfing whenever necessary.
e) Re-fixing displaced guard stones, white washing guard stones, parapets of CD and bridges.
f) Fixing disturbed cautionary & informatory board, village name board etc.
g) White washing and Geroo(Terracotta) painting of trunks of trees.
h) Cutting of branches of trees etc that obstruct the flow of traffic and line of sight, and cleaning wild growth on berms and trimming of grass and weeds etc.
i) Maintenance of catch water drains, clearance and de-silting of cross drains, cause ways, other waterways and side drain.
j) Clearing and re-shaping of unlined road side drains.
k) Making up for the loss of profile (for gravel roads).
l) Rectifying Corrugated Surface (for gravel and WBM Roads).
m) Filling up local depressions, ruts, potholes and erosion control (for gravel and WBM Roads).
n) Re-gravelling (for gravel roads).
o) Repairing damaged edges and Rectifying revealed surface (for WBM).
p) Painting & rewriting of Km & Hecto stones, information board, Logo & other road Signs
q) Maintenance of 200 m, 500 m and Kilo Meter stones
r) Maintenance of guard rails and parapet rails
s) Reshaping to maintain camber
t) Bridge repairing

The activities and frequencies thereof are mentioned in operation manuals in **Annexure 14.1**, which is as under-

S No	Name of Item/ Activity	Frequency of operation in one year
1	Restoration of rain cuts and dressing of berms as per clause 1902 of the Specifications.	Once generally after rains (In case of 1902 of the Specifications. areas having rainfall more than 1500 mm per year, as and when required).
2	Making up of shoulders as per clause 1903 of the Specifications.	As and when required
3	Maintenance of Bituminous surface road and / or gravel road and/or WBM road including filling pot holes and patch repairs	As and when required

	etc. as per clause 1904, 1906 of the Specifications.	
4	Maintenance of drains as per clause 1907 of the Specifications.	Twice (In case of hill roads as and when required).
5	Maintenance of culverts and cause ways as per clause 1908 and 1909 of the Specifications.	Twice (In case of hill roads as and when required).
6	Maintenance of road signs as per clause 1910 of the Specifications.	Maintenance as and when required. Repairing once in every two years.
7	Maintenance of guard rails and parapet rails as per clause 1911 of the Specifications	Maintenance as and when required. Repairing once in a year.
8	Maintenance of 200 m and Kilo Meter stones as per clause 1912 of the Specifications.	Maintenance as and when required. Repairing once in a year.
9	White washing guard stones	Twice in a year
10	Re-fixing displaced guard stones	Once in a year
11	Cutting of branches of trees, shrubs and trimming of grass and weeds etc. as per clause 1914 of the Specifications.	Once generally after rains (In case of areas having rainfall more than 1500 mm per year, as and when required.)
12	White washing parapets of C.D. Works	Once in a year

3.6 Special Repairs works

Special repairs become necessary in case of floods, other natural calamities or any other reason beyond the control of contractor responsible for maintenance during DLP.

Special Repairs works may consist of following:-

i. Clearing of landslides
ii. Repair/Reconstruction of damaged part of the road/ retaining/breast walls
iii. Repair/Reconstruction of damaged drains

Such type of works shall be carried out from NDRF/SDRF. State may also allocate separate fund for this purpose. However, the reason for damage need to be explored and it should be ensured that the damages are beyond the control of the contractor responsible for maintaining the road during DLP.

3.7 Up-gradation

With construction of PMGSY roads since last two decades, there has hence been a significant change in nature and volume of traffic. As a result, roads are damaged due to increase in traffic. Up gradation works consist of following: -

a) Relaying of crust due to increase in traffic
b) Pavement strengthening necessitated due to the increased annual maintenance cost.

Such type of works shall be executed from the state fund. However, the reason for need of upgradation should be established before sanction. It should be ensured that the requirement of up gradation is due to unavoidable reasons and beyond the control of the contractor performing maintenance during DLP. A detailed investigation shall be done before taking up upgradation work, and the reasons should be well documented.

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CHAPTER – 4

MAINTENANCE PLANNING AND ROAD INVENTORY

4.1 Objectives

The objective is to keep all rural roads accessible for road users throughout the year in a sustainable manner. The main focus should be on: -

(a) Routine maintenance of rural roads on a regular and timely basis.
(b) Improving maintenance skills and institutional capacity,
(c) Establishing a comprehensive and reliable inventory of roads, bridges and culverts,
(d) Establishing a linkage between the inventory and geographical information system spatial database,
(e) Upgrading road and bridge maintenance standards

4.2 Basic Issues-

(a) Ownership of Roads-

It has been seen that the roads are better maintained wherever the construction agency is also responsible for maintenance. The department which has constructed the road will be owner of the road and the responsibility of maintenance will be of that department only.

(b) Change in the ownership of the road

Under Special conditions, If it becomes necessary to transfer the road to some other department, then the same can be transferred after mutual consent between both the departments. The ownership of the road and responsibility for maintenance and further upgradation will be of the department which has taken over the road. On the other hand if it is transferred to other department/ agency, it gets least priority in maintenance.]

(c) The period of maintenance contracts as per maintenance policy is as under:-

(i) Bituminous Roads - 05 years

(ii) Gravel Roads - 02 Years

However PMGSY guidelines and Standard Bidding Document provides for 5 years maintenance period irrespective of type of their surface course.

(d) Removal of encroachment on rural roads shall be done by the committee presided by the Block level officer with representation of the members from Revenue, Forest and Rural roads as per prevailing State rules. District Magistrate / Collector may review the progress at regular intervals.

4.3 Road Network- Block-wise road network has been available in OMMAS for DRRP.

4.4 Road Inventory

A database will be prepared of all roads covering road inventory, road section inventory and details of culverts and bridges. The same will be renewed and updated every two years. For this, the forms given in the following Annexure will be adopted:-

(i) Form1:Road Inventory database (see **annexure 1**)

(ii) Form 2: Road Section Inventory (see **annexure 2**)

(iii) Form 3: Bridges, Culverts and causeways inventory details (see **annexure 3**)

4.5 Concept of RCI- As per operations manual, condition of roads is measured by PCI (Pavement Condition Index) which may not give correct picture of the pavement. The concept of Road Condition index (RCI)has been developed with an objective to have a closer view of pavement as well as overall road parameters. In RCI survey, detailed inspection of road at every 100 M interval is carried out and observation of pavement, shoulder, side slopes etc. is recorded to arrive at the value of RCI. The priority of routine maintenance, renewal or up gradation may be decided on the basis of RCI value. This is being done in Chhattisgarh and Madhya Pradesh on pilot basis.

4.6 Net Asset(Replacement)Value of the Roads. The Net Asset Value of road inventory at present and per Km average rates need to be calculated every year. The maintenance expenditure may be compared with this asset value. It may be seen that with little expenditure on maintenance work, the valuable road asset is being saved. This is a convincing fact for getting sufficient maintenance fund from the Govt. Net asset value will be calculated for rural road network. See Table- 4.1 below.

Table 4.1 : Replacement Value Calculation

Sr No	Type of Road	Unit Cost * Rs Lakh/km	Total Length km	Total Asset value Rs Crore
1	Newly Constructed			
2	Upgraded			
3	Renewed			

* At prevailing rates

4.7 Long term Plan

Apart from this, the amount to be taken in the five-year maintenance of Roads will also be mentioned in accordance with the following Table 4.2.

Table 4.2: Annual Maintenance Amount

S. No.	Year**	Amount*
1	1st Year	
2	2nd Year	
3	3rd Year	
4	4th Year	
5	5th Year	

* At prevailing pre declared rates as mentioned in NIT.

** For bituminous/ concrete roads 5 years and for gravel roads 2 years

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CHAPTER – 5

STANDARD BIDDING DOCUMENT

It gives the provision that the defect liability period for maintenance shall be 5 year from the date of completion. The contractor has to keep road in serviceable condition at all times, any defect or maintenance is the responsibility of the contractor till DLP is over. Even if the contractor fails to keep the roads in good condition, the DLP maintenance period may be extended for one year or else contract may be terminated. In case of termination of contract, the balance maintenance shall be done through fresh contract as per terms of contract.

The relevant clauses in SBD for maintenance during DLP are reproduced below-

Clause 32. Correction of Defects noticed during the Defects Liability Period and Routine Maintenance of Roads for five years.

32.1 *The Engineer shall give notice to the Contractor for any Defects before the end of the Defects Liability Period, which begins from the Completion Date and ends after five years. The Defects Liability Period shall be extended for as long as the Defects remain to be corrected.*

32.2 *Every time notice of Defect/Defects is given, the Contractor shall correct the notified Defect/Defects within the duration of time specified by the Engineer's notice.*

32.3 *The Contractor shall do the routine maintenance of roads, including pavement, road sides and cross drains including surface drains to the required standards and in the manner as defined in clause 1.1 and keep the entire road surface and structure in Defect free condition during the entire maintenance period which begins from the Completion Date and ends after five years. .*

32.4 *The routine maintenance standards shall meet the following minimum requirements:-*

- *i. Potholes on the road surface to be repaired soon after these appear or brought to his notice either during the Contractor's monthly inspection or by the Engineer.*
- *ii. Road shoulders to be maintained in proper condition to make them free from excessive edge drop offs, roughness, scouring or potholes.*
- *iii. Cleaning of surface drains including reshaping to maintain free flow of water.*
- *iv. Cleaning of culverts and pits for free flow of water.*
- *v. Maintenance of road signs, pavement markings and other traffic control devices*
- *vi. Any other maintenance operation required to keep the road traffic worthy at all times during the maintenance period.*

32.5 *To fulfill the objectives laid down in sub clauses 32.3 and 32.4 above, the Contractor shall undertake detailed inspection of the roads at least once in a*

month. The Engineer can increase this frequency in case of emergency. The Contractor shall forward to the Engineer, the record of inspection and rectification each month. The Contractor shall pay particular attention on those road sections which are likely to be damaged or inundated during rainy season.

32.6 *The Engineer may issue notice to the Contractor to carry out maintenance of defects, if any, noticed in his inspection, or brought to his notice. The Contractor shall remove the defects within the period specified in the notice and submit to the Engineer a compliance report.*

Clause 33 Uncorrected Defects

33.1 *If the contractor has not corrected a defect pertaining to Defect Liability Period under clause 32.1 and clause 32.2 of these Conditions of Contract, to the satisfaction of the engineer, within the time specified in the engineer's notice, the engineer will assess the cost of having the defect corrected, and the contractor will pay this amount, on correction of the Defect.*

Clause 38.2 (c) *If the bill for a month is not received from the Contractor by the 10th day of the succeeding month or/ and if the Engineer has not certified that the Contractor has carried out the maintenance work for defects brought to his notice under clause 32.6 within specified period, no payment will become due to the Contractor for that month*

The provision of submission of bills by contractor is as per condition in Clause 38.2 (a) & (c) as under-

38(a) *The Contractor shall submit to the Engineer a bill every month for the routine maintenance of the roads from the date the maintenance period starts i.e. from completion date as defined in Clause 1.1, it will be supported with a copy of the record of the Contractor's monthly inspection and other instructions received from the Engineer.*

38(c) *If the bill for a month is not received from the Contractor by the 10th day of the succeeding month or/ and if the Engineer has not certified that the Contractor has carried out the maintenance work for defects brought to his notice under clause 32.6 within specified period, no payment will become due to the Contractor for that month*

The payment per KM per year, as per road width and traffic density rates are pre-declared in B.O.Q. & forms the part of agreement. On the basis of provision in contract, any defect on the road is to be attended as soon it is observed. If contractor keep the road in good serviceable condition, the payment will made to the contractor. Release of performance guarantee, security deposit shall be done only after successful completion of 5 year DLP and maintenance period as per provisions of SBD.

In case the contractor fails in keeping road in good and serviceable condition and does not attend defects, strict action will be taken against the defaulting contractor as per SBD.

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CHAPTER – 6

e-MAINTENANCE OF RURAL ROADS WITH eMARG

6.1 Introduction

PMGSY was introduced on 25 December 2000 with a view to provide single all-weather road connectivity to unconnected habitations having population of more than 500 in plains and more than 250 in tribal/hilly areas. So far 153,491 no. of roads with 607,898 km of road length have been completed to provide single connectivity including upgradation to 155,184 no. of habitations in the country. Recently next phase of the scheme, PMGSY III has been launched with the objective of developing long through routes from existing PMGSY and other rural roads to connect rural growth centres and habitations. Thus massive rural road infrastructure has been created. The execution of maintenance of these roads and monitoring the maintenance activities carried thereof is a huge task.

eMARG, an e-governance solution has been developed by NIC for online monitoring of maintenance works of PMGSY roads. The functional features of eMARG are listed below:

1. Individual User registration, Freezing and locking of road packages on eMARG portal.
2. Roles-based scope and services (District, State, National, Administrator level).
3. System generated bills based on rates of maintenance as per the agreement.
4. Bill submission by the contractors and facility to track the same
5. Uploading of geo-tagged photographs taken during inspections.
6. Online approval of bills by PIU in charge.
7. Online payment to the contractors.
8. Regular inspections and evaluation reports.

6.2 Salient Features of eMarg-

1. **Roll based login facility to PIU officers (EE, AE, Sub Engg)-**AE/Sub Engg/EE can carry out routine inspections and performance evaluation using the login credentials. PIU-in-charge can use the login facility to finalize performance evaluation grading and to approve the bill amount to be paid two the contractor. Other officers may also be given login facility to carry out Additional Feedback Inspections.

2. **Login facility for contractors**- Every contractor has to get his/her firm registered on eMARG with the firm details, bank details and contractorôs PAN. Thereafter, the contractor can upload maintenance related bills on eMARG and check the status of the submitted bills.
3. **Inspection module**-
    i. **Routine Inspection**- Routine inspection is carried out to check the general condition of the road. Routine inspection is mandatorily performed at least once in two months for each road. PIU officials have to upload the inspection reports through eMARG Mobile App along with geo-tagged photographs taken during the inspections.
    ii. **Performance Evaluation**- Performance Evaluation of roads is done on a 100 point performance scale. Performance Evaluation is mandatorily performed one in every two months for each road. This evaluation forms the basis for payment of maintenance related bills.
    iii. **Additional Feedback Inspection**- If need be, any officer having access to login credentials can conduct additional inspections of a road falling under his jurisdiction using the eMARG Mobile App. This will require him/her to upload two geo-tagged and time-stamped photographs of the affected area of the road along with his/her comments.
4. **Monitoring of maintenance through various reports and queries**-

    Reports can be generated for the following circumstances:
    i. Routine inspections and performance evaluation along with geo-tagged and time-stamped photographs.
    ii. For roads for which no payment has been made in a specified time period.
    iii. Status of submitted bills.
5. **Payment module**- The e-bills uploaded by the contractors will be paid online by the PIU-in-charge using digital signatures, thereby making the payments secured.
6. **Notifications:** Timely SMS/e-mail notifications will be sent to contractors and PIU officials regarding the status of inspections and bill payments. (Mentioned in Chapter 8)
7. **Login facility for Bank**-

    Bank will be provided with login credentials which enables the bank to view and download payment scroll. Payment made to the contractors is authenticated by the bank on the basis of scrolls received.
8. **Public Grievances & Redressal system**
    i. Open for public to lodge complaints with geo-tagged photographs of the affected road. System automatically routes complaints to concerned PIU-in-charge through SMS alert.

ii. The officer-in-charge has to resolve the complaint and upload the photo of repaired road.

iii. The identity of the complainant is not disclosed in the portal.

6.3 Guidelines for Routine Inspection (RI):-

a) Every road must be inspected for Routine Inspection (RI) at least once in two months.

b) Routine inspection can be carried out by any of the PIU officers including SubEngg/JE/AE/DE/AEE/EE or equivalent.

c) RI is to be carried out using eMARG mobile app only.

d) For the purpose of RI, each road shall be divided into segments of one kilometer or part thereof. Complete road length shall be compulsorily inspected during a routine inspection.

e) For each inspection two geo-tagged and time-stamped photographs shall be uploaded. The chainages for capturing photographs shall be system generated.

f) While taking photographs it shall be ensured that GPS service for the app is active. Also ,the inspecting officer has to make sure that before capturing the photograph GPS signal is stabilized for the specified location.

g) During RI, inspected part shall be graded as Satisfactory (S), Satisfactory but requires improvement (SRI) and Unsatisfactory (U) as per the prescribed format.

h) The concerned officers and contractor can view the detailed report of the RI using their respective log-in credentials.

i) In case of Unsatisfactory(U)grading of a road, the concerned contractor will be notified through SMS and the defects of the road need to be rectified by him/her.

6.4 Guidelines for Performance Evaluation (PE):

a) Every road must be evaluated at least once in two months.

b) PE can be carried out by any of the PIU officers including SubEngg/JE/AE/DE/AEE or equivalent.

c) All the PE conducted need to be finalized by the respective PIU-in-charge. While finalizing PE, PIU-in-charge may change the marks given to the road by the inspecting officer, along with mentioning the reasons for the change made.

d) For the purpose of PE, each road shall be divided into segments of one kilometer or part thereof. Complete road length shall be compulsorily evaluated for PE.

e) The format for PE is enclosed as **Appendices A&B.**

f) The concerned officers and contractor can view the detailed report of

the PE using their respective log-in credentials.

6.5 Guidelines for Additional Feedback Inspection (AFI):

a) AFI is only for the feedback purpose.

b) AFI can be carried out by any of the officers having log in credentials.

c) AFI must be carried out only using eMARG mobile app.

d) AFI can be done for any of the road segment selected by the inspecting officer.

e) For each inspection two geo-tagged and time stamped photographs shall be uploaded as per the choice of inspecting officer along with the remarks for the same.

f) While taking photographs it shall be ensured that GPS service for the app is active. Also, the inspecting officer has to make sure that before capturing the photograph GPS signal is stabilized for the specified location.

g) The concerned officers and contractor can view the detailed report of the AFI using their respective log-in credentials.

h) For all the AFI, contractor will be notified through the SMS. Concerned contractor can also view the details of the AFI and he/she will have to take action accordingly.

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CHAPTER 7

QUALITY CONTROL AND INSPECTIONS

'One stitch in time saves nine'. It is necessary to timely maintain roads and assure the quality of the maintenance works carried out.

All activities being carried out under maintenance must be done by following relevant IRC specifications. eMARG is a useful tool for ensuring quality in maintenance work of PMGSY roads.

7.0 Inspections

There is provision of regular bimonthly routine inspections of PMGSY roads by the PIU officials. Apart from this, any officer having access to user log-in can randomly perform inspection of a road under his jurisdiction and upload geo-tagged and time-stamped photographs. To ensure timely upkeep of the roads, the following actions shall be taken by the concerned officials:

A. PIU Level-

1. At least one Routine Inspection in two months is mandatory for every road.
2. Routine Inspection is to be done for every kilometre stretch of the road.
3. Defects, if any, observed in the inspected road will be intimated by the inspecting officer to the concerned contractor and the contractor will get the defects rectified.
4. All rectification work shall be as per relevant IRC specifications and section 1900 of MoRD.

B. Monitoring at SRRDA Level-

SRRDA will make plan for cross verification of maintenance work through inspections by officers at state level and/or by officers beyond the jurisdiction of the road to be inspected. Every year before and after rainy season, inspection schedule shall be issued by SRRDA HQ, assigning duties to officers for inspection of sample roads. The guidelines for selection of officers and sample roads are as under:

1. The inspection shall be carried out by an officer not below the rank of PIU-in-charge who is beyond the jurisdiction of the road to be inspected.
2. The inspecting officer will upload the inspections and geo-tagged and time-stamped photographs on eMARG, so that monitoring can be done at SRRDA level also.
3. The roads will be graded as S-Satisfactory, SRI-Satisfactory but requires improvement or U- Unsatisfactory.
4. The inspecting officer will select the roads on the basis of locations on district

map. The inspecting officer may randomly select a particular main road and visit any PMGSY road staring from that route. This will eliminate any particular choice on selection process. This will give actual maintenance condition of the PMGSY roads in that region.

5. Such Inspection schedules shall be issued twice a year, one just before monsoon and other about two months after monsoon.

In addition to this, SQMs/NQMs shall also be assigned with the inspection schedule for maintenance works. Special inspection drives shall be scheduled for SQMs/NQMs at least once in a year.

Senior officer of SRRDA and/or any officer of NRIDA shall carry out surprise inspection of PMGSY roads under maintenance.

The SRRDA shall regularly review the outcomes of all inspections and the concerned PIUs of the inspected roads will be rewarded / penalised accordingly.

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CHAPTER – 8

NOTIFICATIONS

1. The contractor will get notification through SMS/e-mail to submit his/her monthly bill before seven days of due date.
2. PIU-in-charge will get notification through SMS/e-mail as and when contractor will submit his/her monthly bill.
3. PIU-in-charge will get notification through SMS/e-mail as a reminder for bimonthly inspection.
4. PIU-in-charge will get notification through SMS/e-mail as a reminder for bimonthly performance evaluation before seven days of due date.
5. Contractor will get notification through SMS/e-mail as and when his/her submitted bill is cleared by PIU and sent to bank for payment.
6. Bank will send SMS/e-mail to contractor as and when payment is credited to the account of the contractor.
7. SMS/e-mail will be sent to any complainant that uploads the photograph of ill-maintained road. The same SMS/e-mail will be also sent to the concerned PIU in charge.
8. Complainant will get notification through SMS/e-mail from PIU-in-charge as and when his/her complaint is resolved.
9. PIU-in-charge will get SMS/e-mail alert three months prior to the completion of DLP so that timely action can be initiated for next maintenance contract.

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Appendix – A

Routine Maintenance Activities and their frequency with performance index (PI) – BT/Gravel Road

S/N	Name of Item/ Activities	Frequency of operation in a year	PI	
			Plain & Rolling Terrain	Hilly Terrain
1	Maintenance of Bituminous surface road and / or gravel road and/or WBM road including filling potholes and patch repairs etc. as per clause 1904, 1906 of the MoRD Specifications (As per Annexure-14.10 of Operation manual) .	As and when required	50	40
2	Restoration of rain cuts and dressing of side slopes/berms as per clause 1902 of the Specifications. (As per Annexure-14.10 of Operation manual)	Once generally after rains or as and when required.	10	5
3	Making up of berms/shoulders as per clause1903 of the (As per Annexure-14.10 of Operation manual)	As and when required	20	20

4	Maintenance of drains as per clause 1907 of the Specifications. (As per Annexure-14.10 of Operation manual)	Twice (In case of hill roads as and when required).	3	8
5	Maintenance of culverts and cause ways as per clause 1908 and 1909 of the MoRD (As per Annexure-14.10 of Operation manual)	Twice (In case of hill roads as and when required).	4	10
6	Maintenance of guard rails and parapet rails as per clause 1911 of the MoRD Specifications (As per Annexure-14.10 of Operation manual)	Maintenance as and when required. Repairing once in a year	1	1
7	Maintenance of road signs, speed breakers, standing trees adjacent to road wherever required as per clause 1910 of the MoRD Specifications (As per Annexure-14.10 of Operation manual).	Maintenance as and when required. Repairing once in every two years	2	4
8	Maintenance of 200 m and Kilo Meter stones as per clause 1912 of the MoRD Specifications (As per Annexure-14.10 of Operation manual).	Maintenance as and when required. Repairing once in a year	2	2

9	Cutting of branches of trees, shrubs and trimming of grass and weeds etc. as per clause 1914 of the MoRD Specifications (As per Annexure-14.10 of Operation manual)	Once generally after rains (In case of areas having rainfall more than 1500 mm per year, as and when required.	3	5
10	White washing parapets of Works including CD (As per Annexure-14.10 of Operation manual)	Once in a year	2	3
11	Painting of guard stones	Twice in a year	2	1
12	Re-fixing displaced guard stones	Once in a year	1	1
		Total Marks	**100**	**100**

If performance of contractor during the period under consideration fulfils less than 80 out of 100 points, no payment will be made to the contractor for that period. If performance index is in between 80 to 100, proportionate deduction in payment will be made for each item/activity of the work not attended during that period.

Appendix – B

Routine Maintenance Activities and their frequency with performance index – CC Road

Sl. No	Name of Item/Activity	Frequency of operations in the year	Plain & Rolling Terrain	Hilly Terrain
1	Maintenance of Concrete surface including crack sealing spot patching with PCC or bituminous concrete as per provisions of IRC SP 83.	As and when required	50	40
2	Restoration of rain cuts and dressing of side slopes/berms as per clause 1902 of the Specifications. (As per Annexure-14.10 of Operation manual)	Once generally after rains or as and when required.	10	5
3	Making up of berms/shoulders as per clause1903 of the (As per Annexure-14.10 of Operation manual)	As and when required	20	20
4	Maintenance of drains as per clause 1907 of the Specifications. (As per Annexure-14.10 of Operation manual)	Twice (In case of hill roads as and when required).	3	8

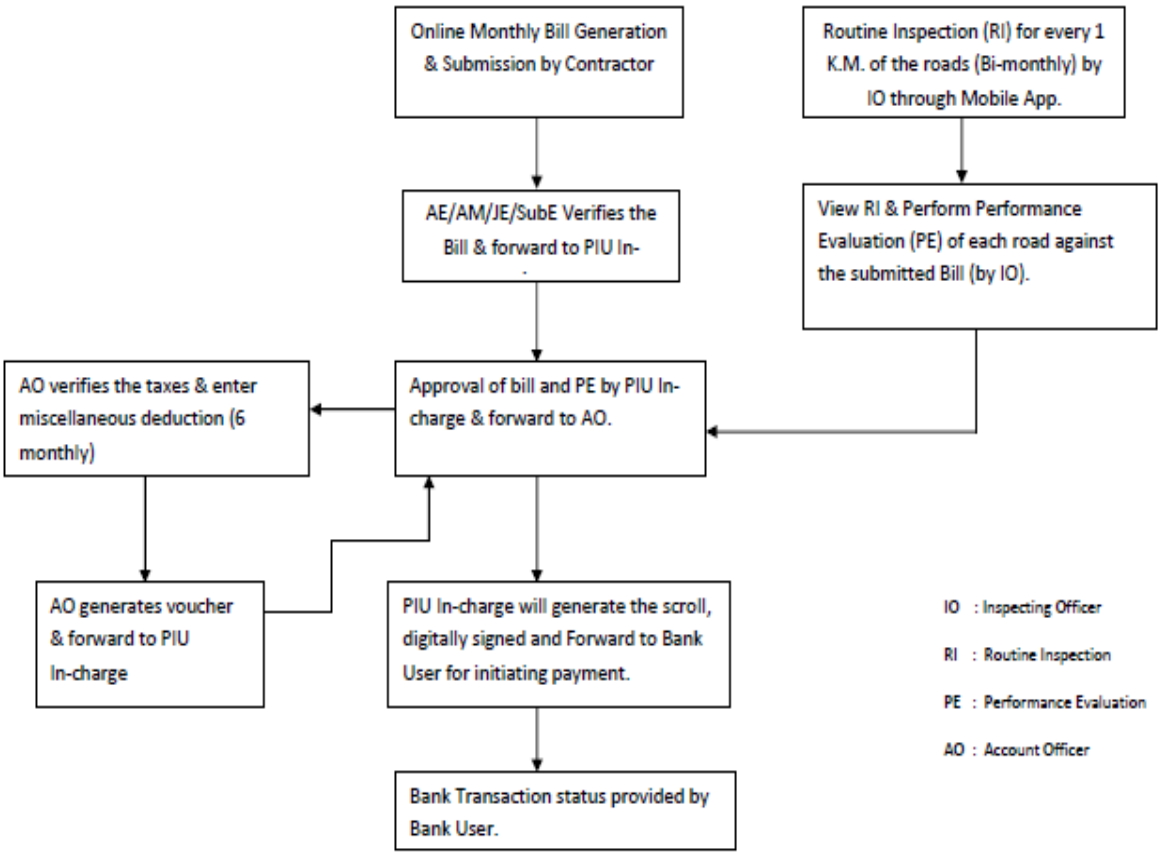
5	Maintenance of culverts and cause ways as per clause 1908 and 1909 of the MoRD (As per Annexure-14.10 of Operation manual)	Twice (In case of hill roads as and when required).	4	10
6	Maintenance of guard rails and parapet rails as per clause 1911 of the MoRD Specifications (As per Annexure-14.10 of Operation manual)	Maintenance as and when required. Repairing once in a year	1	1
7	Maintenance of road signs, speed breakers, standing trees adjacent to road wherever required as per clause 1910 of the MoRD Specifications (As per Annexure-14.10 of Operation manual).	Maintenance as and when required. Repairing once in every two years	2	4
8	Maintenance of 200 m and kilo meter stones as per clause 1912 of the MoRD Specifications (As per Annexure-14.10 of Operation manual).	Maintenance as and when required. Repairing once in a year	2	2
9	Cutting of branches of trees, shrubs and trimming of grass and weeds etc. as per clause 1914 of the MoRD Specifications (As per Annexure-14.10 of Operation manual)	Once generally after rains (In case of areas having rainfall more than 1500 mm per year, as and when required.	3	5

10	White washing parapets of Works including CD (As per Annexure-14.10 of Operation manual)	Once in a year	2	3
11	Painting of guard stones	Twice in a year	2	1
12	Re-fixing displaced guard stones	Once in a year	1	1
		Total	**100**	**100**

If performance of contractor during the period under consideration fulfils less than 80 out of 100 points, no payment will be made to the contractor for that period. If performance index is in between 80 to 100, proportionate deduction in payment will be made for each item/activity of the work not attended during that period.

eMARG

Flow Diagram for Inspection & Payment



Annexure-1

Road Inventory																	
																	Form No.1
Dept. Code	Dist Code	Road Code	Block Name	Vidhan Sabha	Road Class	Road Name	Origin	Destination	Road Length	Road Width	No. of CD structure	Name of Habitation	Habitation Code	Habitation population	Year of Construction	Design Traffic Density (cvpd)	Remarks
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

Annexure—2

Road Section Inventory

Form-2

Dept. Code	Dist Code	Road Code	Block Name	Road Name	Section Number	Chainage from	Chainage To	Section Length	Carriage Way Type	Formation Width	Carriage Way Width	Thickness of Subgrade	Thickness of Sub Base Course	Thickness of Base Course	Thickness of Base Course				Tickness of CC Pavement(if CC pavement)	Subgrade CBR %	Special Condition of Area (black Cotton Water logging area) mention changes
															BM	DBM	SDBC/ BC	OGPC/ MSS			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22

Annexure- 3

Bridge, Culverts and causeway Inventory Details

Form No.3

Dept. Code	Dist Code	Block Code	Road Code	Structure Type	Structure No.	Structure Change	Structure Length	Year of Construction	Const Type	No. of Spans/ Vents	Total Clear Span	Types of Foundation	Pier Type	Structure Condition	Joint and Riding Quality	Repairable or not	Remarks
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18