OUTPUT: RURAL ROAD IMPROVEMENTS–ROAD SELECTION CRITERIA

1. Since the project outputs were designed under the ongoing Rural Roads Improvement Project (RRIP) II,[1] it was possible to achieve benefits in project design in several key areas. One of them is capacity building for the Ministry of Rural Development (MRD) to design the project with stronger ownership. In this process, MRD formulated road selection criteria, for road rehabilitation, improving from the design of RRIP II. These criteria are described in the following paragraphs.

2. **Selection of Project Provinces**. RRIP II covered ten project provinces. For proposed RRIP III, MRD selected five as the proposed project provinces. The five project provinces are Kampong Cham, Kratie, Prey Veng, Svay Rieng, and Tboung Khmum. MRD reached an internal consensus in selecting the project provinces as appropriate for the size of the project.

3. **Total Project Road Length**. Total project road length to be rehabilitated is approximately 360 kilometers (km). This was based on the availability of financing. To have a shortlist of 360 km of roads, MRD selected from a long list of about 1,200 km, which was subject to a process of screening to arrive at the shortlist. The screening criteria is outlined below.

4. **Specific Criteria for Project Road Screening**. Based on the lessons learned during implementation of upstream projects, MRD formulated the project road screening criteria in their own. The screening had several factors to be taken into consideration. The candidate road should:

(i) either connect to the existing paved national and provincial road network or rural roads already improved, and being improved under RRIP II, or paved roads for other sectors such as agriculture;
(ii) support ADB's past, ongoing, and future interventions for not only the roads sector, but also provide the potential for higher economic growth by reducing transport costs for the movement of people and goods to agricultural area or markets;
(iii) provide the potential for economic growth through easier access to employment opportunities;
(iv) be sufficiently engineered at the outset to enable upgrading to a paved road standard to be achieved without widening the road and the existing road width of which should be at 7 meters (m) to 8 m;
(v) possess widening of structures (bridges and/or culverts) is seen as a necessary intervention with a positive benefit;
(vi) be consistent with MRD's priorities for rural development and decentralization;
(vii) not require resettlement of roadside structures, market sites or communities;
(viii) not produce a negative impact on the local indigenous people;
(ix) not produce a negative effect on the environment, other than the effects that occur during the construction period, and which are to be managed through an environmental management plan;
(x) not negatively affect cultural, archaeological, or tourist sites. Improving access to these sites should be viewed as a benefit in the selection of the roads;
(xi) achieve the economic threshold limit of 12% for the economic internal rate of return;
(xii) be among the most highly trafficked rural roads within any particular province; and
(xiii) provide benefits for a large number of poor rural people living within the project

[1] ADB. 2014. *Report and Recommendation of the President to the Board of Directors: Proposed Loan and Administration of Grant to the Kingdom of Cambodia for Rural Roads Improvement Project II*. Manila (Loan 3151-CAM).

area.

5. Based on the above criteria, MRD screened the project roads of 360 km for rehabilitation under the proposed project.

6. **Climate/Disaster Resilient Road Design**. Generally, during detailed design, all 360 km of project roads will be designed to be climate/disaster resilient. During the feasibility study of the proposed project, four design features have been considered for the roads to be climate resilient. These were: (i) increasing embankment heights; (ii) providing cross drainage; (iii) selecting embankment materials suitable for increased permeability; and (iv) providing hardtop surface with double bituminous surface treatment pavement to be resistant to heavy rainfalls during wet season. More specifically, (i) the pavement of roads should consist of at least 20 centimeter (cm) thickness of granular subbase course layer in order to reinforce subsoil stability; (ii) the aggregate base course layer should be at least 20 cm, which is the same standard as the national roads to adequately support long term road life; and (iii) the surface should be paved by double bituminous surface treatment, but in flood zones, and market areas, a 20-cm thickness of reinforced concrete pavement. In addition, green planting has been considered to strengthen embankments for road sections that are exposed to higher risk of damage due to flooding.

7. For the increased embankment heights, an average 0.2 m preliminary design height above the conventional road design height has been adopted. However, this will be reconfirmed during the detailed design stage based on detailed hydrological data. For cross drainage, the preliminary design has considered the adequacy of existing structures (pipe and box culverts, and small bridges of single span, as there are no larger bridges) and has included readjustments with additional structures for strengthening cross drainage. This again will be reconfirmed during detailed design while refurbishing the existing structures for their optimal use. For embankment materials, laterite has been considered to be adequate as cost optimal, given the other 2 design features of (i) and (ii) of para. 6, to be reconfirmed during detailed design, especially for road sections that are exposed to higher risk of damage due to flooding.

8. Though there were about 15 locations of spillways in the proposed roads, due to the requirement of emergency access by beneficiaries during rainy season[2], adopting this feature was not considered.

9. During the preliminary design, the drawback of higher embankments in a few sections of the roads was noted, and for road safety and safer road environment, these critical sections will be treated with safety features, like guard rails. On the other hand, based on the statistics on major causes of road crashes in rural roads, user behavior is the key contributory factor, rather than the road environment. It was also observed that the project road sections are unlikely to have through traffic especially for softer modes. Therefore, additional activities have been included in this community-based road safety output to sustain the interventions for changing road user behavior in the long term. These are expected to achieve positive effects on increasing road safety on project roads.

[2] Most rural beneficiaries depend on access by motorcycles even during emergencies. Also, since they do not have alternate routes in most cases of road sections, disposing flood water over a spillway is not a safe option for access during the rainy season.