SECTOR ASSESSMENT (SUMMARY): ROAD SUBSECTOR

A. Status of the Road Sector

1. While Cambodia is serviced by road, rail, air, and water transport, road transport dominates the domestic transport of goods and passengers. Roads are critical to the social and economic development of Cambodia. The road network of about 39,400 kilometers (km) includes national roads, or the primary national highways (about 4,800 km), and provincial roads, or the secondary national highways (about 6,600 km). The management of national and provincial roads is the responsibility of the Ministry of Public Works and Transport (MPWT). The remaining network of about 28,000 km of rural roads is the responsibility of the Ministry for Rural Development (MRD).

2. The primary roads consist of (i) national roads (NR 1 to NR 9), which are national highways that extend from Phnom Penh to provincial capitals and are the main access points into and out of the country; and (ii) less important national roads with two-digit numbers, which are provincial highways that connect the provincial capitals and link them to minor border crossings and important domestic centers. The secondary (provincial roads) and tertiary (rural and strategic roads) networks serve local transport needs.

3. The road network had greatly deteriorated by the early 1990s, as a result of the civil war. However, since 1992, with assistance from the Asian Development Bank (ADB) and other multilateral and bilateral development partners, the government has focused on rehabilitating the core national infrastructure that is required for the economy to develop in a sustainable manner. These development efforts have increased the length of the paved national road network to about 2,700 km, which amounts to slightly less than 25% of the total national and provincial road network.

4. The road network was mostly built before 1960, and has a significant number of bridges, with about 4,000 on the national and provincial roads alone. The general design standards cater to lighter traffic than current loads, with many existing bridges designed for gross vehicle road weights of 10 tons (t), well below the current standard of up to 30 t. Many bridges have often collapsed as a result of overloading, and some are now seriously damaged or have failed. Most of the road network is dilapidated and large parts of the country are effectively isolated during the wet season. The MPWT considers that at least half of the primary road network and nearly all the secondary and tertiary roads are in need of urgent repair, rehabilitation, or reconstruction. Road condition surveys in 2007 confirm that 28% of the network is in good or fair condition, 35% is in poor condition, 28% is in bad condition, and 6% is under reconstruction or rehabilitation.

5. Therefore, despite the improvement of national roads to paved condition after the civil war, many provincial and most rural roads are in poor condition. Until recently, however, the secondary national network, which links provinces to the national road network and provides intra-provincial links to the tertiary and rural network and to Cambodia’s largely rural population, has received little attention. The result is that the road network is split into networks of primary and tertiary roads that are only loosely and unreliably interconnected. The situation hinders the development of cash-crop production in rural areas, where markets in many places are limited to the local area because of lack of access. It also means that provincial centers and numerous natural and cultural sites with tourism potential are inaccessible at times. As a result of the poor condition of such access roads, many important bilateral cross-border trade routes are inaccessible, thus imposing substantial diversion costs on the transport system as longer alternative routes have to be taken.

6. Cracks, ruts, potholes, edge failures, and pavement failures characterize the unrehabilitated sections of the road network. The government recognizes that the poor state of the country’s road infrastructure poses a significant hindrance to economic development and emphasizes the urgency of reestablishing the country’s transport infrastructure.

B. Road Traffic Issues

7. Vehicle numbers. Given the growing network of trafficable roads, the increasing number of motor
vehicles in the country, and the robust growth of Cambodia’s economy, traffic has increased rapidly. In 2003 there were approximately 450,000 registered motor vehicles in the country, of which approximately 73% were motorbikes; 23% were cars, pickups, and other light vehicles; and 4% were trucks, buses, and other heavy vehicles. This increased to 873,000 vehicles in 2007, almost doubling in 5 years, indicating an increase of 20% annually.

8. **Overloading.** Propelled by the economic development, overloading of cargo vehicles has become a severe cause of road damage in Cambodia in the past 5 years. This leads to premature deterioration of road pavements and threatens the stability of the many bridges designed for light traffic. The legal axle load in Cambodia is 10 t. There is evidence that some trucks, particularly those carrying cement, take on as much as 60 t over a truck-trailer combination. A survey carried out in 1997 identified an average axle weight of 10 t with maximum axle weights of up to 16 t. Further, the survey indicated that about 24% of the vehicles with two or more axles were overloaded. Enforcement of axle load limits in Cambodia is ongoing but weak, and thus it is essential that an effective axle load control program be formulated and implemented in order to greatly extend pavement life and lower bridge maintenance costs. This is particularly important for bridges, which constitute a very large part of the network, as exceptionally heavy vehicles can damage structures irreparably.

9. The government on 3 September 1999 approved sub-decree 744, Maximum Load Limit of Transport Vehicles Using the Road Network in Cambodia. It details the load limits and sets penalties for overloading. Such penalties should reflect actual damage and discourage overloading. Pavement design is based on the fact that vehicle damage to a road depends entirely on the axle load of those vehicles. The penalties listed in the sub-decree increase only linearly with increasing loads, but damage to the road in reality increases exponentially as the load increases. Small increases in axle load above the legal limit of 10 t can result in a severe increase in damage to the road pavement. As far as practicable, penalties should reflect the exponential increase in damage.

10. The MPWT, supported by the Japan International Cooperation Agency, launched an axle load control program in 2005 to address this issue, and in 2006 the government enacted the necessary legislation for enforcement of this program. ADB also supported the program through its ongoing Greater Mekong Subregion: Cambodia Road Improvement Project by providing seven permanent weigh stations on national roads. These have been operational since 2009, on a pilot basis. Since this operation requires wider coverage to be effective, this initiative needs further assistance by establishing more weigh stations on national roads, and portable weigh stations on rural roads, with an effective enforcement scheme.

11. This overloading is also an issue on rural roads because overloaded trucks haul agricultural products and carry quarry materials for construction. While ADB is currently supporting the axle load control program for the national road network, new measures are necessary for the rural road network as well, where permanent weigh stations are not an easy option because the network is extensive.

12. **Traffic accidents.** Deteriorating road safety is a growing concern. Cambodia has one of the highest incidences of road accidents in the world. In 2007, there were 18 fatalities per 10,000 vehicles, an increase of 50% from 2000. This is over twice the incidence of fatalities in neighboring Thailand (6.5 fatalities per 10,000 vehicles). Based on studies carried out in other countries, the cost attributable to accidents can be assumed to be equivalent to 1%–3% of gross domestic product annually. Moreover, traffic accidents have a disproportionate impact on pedestrians and cyclists, who are typically from the poorer levels of society. Thus, for economic and social reasons, Cambodia’s worsening road safety record needs to be addressed while it is still manageable. In this context, ADB implemented a regional road safety technical assistance project in 2002 with the Association of Southeast Asian Nations, and currently supports the MPWT’s national road safety action plan through its ongoing Road Asset Management

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1 ADB. 2002. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the Kingdom of Cambodia for the Greater Mekong Subregion: Cambodia Road Improvement Project*. Manila (Loan 1945-CAM).

2 ADB. 2002. *Technical Assistance to the Association of Southeast Asian Nations for Road Safety*. Manila (RETA 6077, for $555,000, approved on 18 December).
Project\textsuperscript{3} and Cambodia Northwest Provincial Road Improvement Project.\textsuperscript{4} ADB’s continued involvement is needed to ensure sustainable results.

13. A focused, comprehensive, well-planned, and multidimensional road safety program is urgently needed in Cambodia. The government has demonstrated its commitment by issuing a draft sub-decree that sets out the key issues to be included in the comprehensive road safety program: (i) an accident data system; (ii) establishment of the National Road Safety Council, with representation from several key ministries, including the MPWT where the secretariat will be located; (iii) infrastructure improvement; (iv) legislation; (v) traffic police enforcement; (vi) education and publicity; (vii) driver training and testing; (viii) vehicle testing and inspection; and (ix) emergency services. The ongoing engagement of donor agencies is needed to ensure sustainable results.

14. As far as rural roads are concerned, increased traffic speeds resulting from improved paved road surfaces can also impose tremendous safety risks to rural communities. In line with the national umbrella programs for road safety and ADB’s ongoing support through MPWT, the rural roads improvement projects will need to assist the MRD in designing and managing a rural road safety program for the project provinces.

15. **Climate change adaptation.** Given the natural disasters that Cambodia has faced in recent years in addition to frequent flooding during the wet season, the need to address climate change considerations is essential. Future assistance in the rural roads sector needs to focus on this subject, particularly in relation to road design and planning for emergency preparedness, mitigation, and response.

C. **Financial and Institutional Sustainability of the Road Sector**

16. As the improved national road network extends further throughout the country, the rural economy becomes more dependent on it. However, sustainability of this network is an issue as it is deteriorating because of the lack of adequate road maintenance combined with rapidly growing traffic, poor road maintenance standards, and design and construction deficiencies. Inadequate road maintenance is primarily due to a shortage of financial resources; poor management, planning, and implementation of road maintenance; and the weak technical capacity of road agencies and local contractors.

1. **Road Maintenance Management and Financing**

17. **Maintenance budget.** The management of a road network must be based on business principles, using economic criteria to prioritize and schedule maintenance works. An asset management approach is most appropriate as a long-term goal for maintaining and preserving the road network. In Cambodia’s situation, this implies a move from the present crisis-response management mode to a network management mode as the core network stabilizes and normal periodic maintenance works can be scheduled in a cost-effective manner. Essential to that approach is the establishment of the maintenance management system with its basic building blocks that include a road and bridge inventory, a system for updating the inventory and accompanying condition surveys, and application of evaluation tools to prioritize and schedule periodic maintenance. An ADB-financed study has developed a decentralized approach to road condition monitoring and the programming and management of routine maintenance that is suitable for implementation by provincial public works departments. The study initiated implementation of the maintenance management system in three pilot provinces, with the system now being adopted by the MPWT for replication in the remaining provinces of Cambodia. The system is based on a relatively straightforward road condition assessment procedure that involves (i) vehicle operating speeds and travel time, (ii) drainage considerations, and (iii) engineering judgment.

\textsuperscript{3} ADB. 2007. *Report and Recommendation of the President to the Board of Directors: Proposed Loan and Administration of Grant to the Kingdom of Cambodia for the Road Asset Management Project.* Manila (Loan 2406-CAM).

\textsuperscript{4} ADB. 2009. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the Kingdom of Cambodia for the Greater Mekong Subregion: Cambodia Northwest Provincial Road Improvement Project.* Manila (Loan 2539-CAM).
18. To ensure an effective and sustainable planning and programming process, it is essential to ensure security of funding and a reliable cash flow with the attendant technical and financial audit instruments. The MPWT has two sources of funding for maintenance and development of the road network: general funds from the annual budget and special funds accumulated in the Fund for Repair and Maintenance of Roads. General funds allocated in the annual budget in effect cover only periodic maintenance and pavement rehabilitation.

19. The current level of maintenance spending, including capital expenditure for recurrent maintenance and rehabilitation, is approximately 15% of total requirements and is clearly insufficient to meet the needs of the sector. The shortfall is partly explained by the dilapidated state of most of the road network after more than 20 years of neglect, which translates into high maintenance requirements, combined with the government’s limited funding capacity. In 2000 and 2001, the MPWT’s expenditure on the primary and secondary road network (the national and provincial roads) averaged approximately $12.5 million per year, of which 20% ($2.5 million) was recurrent expenditure for routine maintenance, and 80% ($10.0 million) was capital expenditure for repair and rehabilitation of pavements. Annual average external agency funding added an estimated $60 million for road rehabilitation and improvement; the government’s expenditure for counterpart funding of externally financed projects was approximately $6 million equivalent, making for total maintenance and rehabilitation funding of $79 million per year.

20. In recent years, the government has not been expending funds on the construction of new roads; rather it has been allocating increasing amounts to road maintenance, following the requirements of ADB’s ongoing Greater Mekong Subregion: Cambodia Road Improvement Project (footnote 1). Specifically, road maintenance expenditure in 2008 was about $42.5 million, increasing from $7.0 million in 2006 and $26.0 million in 2007. This is about 20 times the expenditure in 2002 and 2003, when the annual total maintenance expenditure was only about $2.0 million–$3.0 million (para. 19). Also, in 2007 ADB provided additional support to address the maintenance-related issues and improve the private sector contracting industry with its Road Asset Management Project.

21. ADB further assisted this new road maintenance regime by approving in 2008 the Greater Mekong Subregion: Southern Coastal Corridor Project (footnote 1) that would rehabilitate and maintain some provincial roads. This proposed project will further supplement the sustainable maintenance works program initiated in ADB’s ongoing Road Asset Management Project (footnote 2) and the Greater Mekong Subregion: Southern Coastal Corridor Project (footnote 3). This overall program will strengthen the road maintenance skills of local contractors and improve the cost efficiency of road maintenance works.

22. In the case of MRD, this lack of funds situation is even worse, with the maintenance budget usually being reduced to about 60% of the planned budget, in actual disbursement. The national budget allocation is reduced mainly due to MRD’s weak institutional capacity. With this proposed project paving 500 km of rural roads, thereby rehabilitating the road assets to a good and usable state, and then systematically remedying MRD’s weak institutional capacity, it is expected that MRD will have more budget allocated in the future. This capacity will be further strengthened through the second project in 2012. With the two projects in tandem addressing the rehabilitation of road assets into a paved state and the sustainability of road maintenance, major changes are expected in the rural road subsector in the near future.

2. Sustainable Organizational Structure for the Ministry of Public Works and Transport and the Ministry of Rural Development

23. Institutional constraints also contribute to the low level of road maintenance funding. The MPWT needs to strengthen capacity and develop an effective organizational structure to carry out credible and efficient maintenance planning and implementation. The Ministry of Economy and Finance should then be able to respond more efficiently in approving, disbursing, and monitoring funds for defined maintenance programs. Disbursement of the approved road maintenance budget has been low and approved budget

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5 ADB. 2007. Report and Recommendation of the President to the Board of Directors: Proposed Loans to the Kingdom of Cambodia and the Socialist Republic of Viet Nam for the Greater Mekong Subregion Southern Coastal Corridor Project. Manila (Loans 2372-VIE and 2373-CAM).
allocations have been falling. This development urgently needs to be reversed before substantial damage is inflicted upon the rehabilitated parts of the road network.

24. The current MPWT was created by royal decree in January 1996 and was vested with the responsibility to administer and regulate the public works and transport sectors of the Kingdom of Cambodia. The MPWT’s capabilities in addressing issues and needs in the transport sector require improvement through reorganization and institutional strengthening, particularly with respect to (i) defining more fully the MPWT’s functions, responsibilities, and job descriptions; and (ii) setting in place (a) the management processes necessary for the development of policies and plans, and (b) the guidance and control necessary to verify that developments and operations conform to those policies and plans. ADB’s Greater Mekong Subregion: Cambodia Road Improvement Project helped the MPWT to develop much-needed institutional changes through its reorganization. This initiative was supplemented by ADB’s Road Asset Management Project (footnote 2) of 2007. This project established a Road Asset Management Office as the road asset manager for the MPWT, which reinforced the MPWT’s reorganization momentum.

25. As mentioned in para. 22, MRD needs institutional strengthening. The main areas of weakness are lack of technical capacity, lack of personnel, lack of budgeting and administrative capabilities, and a weak decentralization process. These are further aggravated by the poor capacity of the local contracting industry for rural road maintenance. These need a systematic and long-term remedy, as addressed during the proposed project and its phase 2 (planned for 2012). The proposed project has a component on asset management that focuses on institutional strengthening for MRD and contractor industry strengthening, and project implementation will be conducted in a decentralized manner. The provincial departments of rural development of project provinces will implement the proposed project under guidance from the head office of MRD. Further, the civil works will be procured under international competitive bidding, since the current contractor industry is not capable of handling contracts larger than $1.0 million. The contractor industry will be supported through subcontracts under large contracts. The contracts will be supervised by international supervision consultants, who will support MRD in project implementation capacity strengthening. Therefore, the proposed project will be the first such project for MRD that paves 500 km of rural roads; it will create a strong foundation for MRD in project implementation, road asset management, and sustainable maintenance, thus supporting decentralization involving provincial departments of rural development.

D. Strategic Directions

26. **ADB strategy.** ADB’s country strategy for Cambodia supports ADB’s overall strategy for poverty reduction through broad-based growth, inclusive social development, and stronger governance for sustainable development. Given the continuing challenges of rural access and sector-wide best practices, the country strategy for the road sector has shifted from large-scale public sector projects for national roads to (i) fostering technical cooperation, standard setting, and private investment in national transport; and (ii) supporting subregional projects that, for example, promote access to remote rural areas or operationalize cross-border transport agreements.

27. ADB’s country strategy and program 2005–2009 identified Tonle Sap Basin as the geographic focus and introduced basin-level strategic planning in Cambodia. The strategy is designed to promote and facilitate pro-poor, sustainable economic growth; improved access to assets; and better management of natural resources and the environment. ADB designed the Tonle Sap initiative as a long-term investment framework for the government to coordinate development assistance in the Tonle Sap Basin. The project will assist in improving rural road conditions to open new opportunities that bring sustainable and inclusive growth to some of the poorest communities. ADB’s assistance in the Tonle Sap region comprises 10 loan and grant projects amounting to $188.7 million including the amount cofinanced by the other development partners. These projects focus on three sectors: (i) rural development, which includes the rural roads subsector; (ii) environment and natural resources; and (iii) irrigation. Several other bilateral development partners are also providing external assistance in the Tonle Sap area, including the Agencé Française de Développement, the Australian Agency for International Development, the Canadian International...
Development Agency, the Danish International Development Agency, the European Union, the Food and Agriculture Organization of the United Nations, the Global Environment Facility, the International Development Association, the International Fund for Agricultural Development, the Japan International Cooperation Agency, the Korean International Cooperation Agency, the People's Republic of China, the United Nations Development Programme, and the World Food Programme. The experience of ADB and other development partners' projects around the Tonle Sap Lake underscores the need to complement investments through improved access to productive rural services, improved rural infrastructure, and sustained capacity development that is aligned with the government's decentralization and deconcentration reforms.

28. ADB's country operations business plan 2009–2012 for Cambodia aims to foster pro-poor and socially inclusive growth by enhancing environmentally sustainable agriculture and rural development. In light of the indirect impacts of the global economic crisis, it seeks to do this by diversifying the sources of rural growth and bolstering poverty reduction efforts. The geographic focus of rural livelihood efforts will continue to be the Tonle Sap Basin, where most of Cambodia's rural poor live. The country operations business plan includes four road sector projects in the program. ADB's Greater Mekong Subregion Cambodia Northwest Provincial Road Improvement Project (footnote 3) will improve connectivity internally within the region and externally around the border areas with Thailand. This project will be complemented by two Rural Roads Improvement projects, programmed for 2010 and 2012 to rehabilitate and maintain the connecting rural roads to improve the rural poor's access to markets and social services. These two projects will have a phased approach to resolve the aforementioned issues in the rural roads subsector in a systematic way. The first one will rehabilitate about 500 km of road assets to a paved condition and initiate other institutional support programs to sustain the maintenance capacity of MRD. The second project will carry this momentum forward and rehabilitate further road assets in the network. A Provincial Roads Asset Management Project is programmed for 2011.

29. **Government strategy.** The government's poverty reduction strategy for 2009–2013 (the Rectangular Strategy for Growth, Employment, Equity, and Efficiency, Phase II) started in 2004 with the first phase, and now is in its second phase. It emphasizes generating economic growth through the private sector, with rehabilitation and development of the country's physical infrastructure as a precondition. This is consistent with the government's primary strategy for the road sector, which, since 1994, has been to focus road investments on rehabilitating national highways and selected provincial, rural, and urban roads. The government's strategy has restored a core transport system that connects the country's main centers and has significantly contributed to integrating the national economy with the regional and global economies. Also, the government has initiated a process of decentralization and reforms. For example, the delivery of transport infrastructure services, which was previously centrally managed by the MPWT, is now delegated to the provinces. The MPWT itself is in the process of shifting its focus away from direct management of transport infrastructure towards planning and oversight of the sector, supported by ADB, the World Bank, and the Japan International Cooperation Agency. However, its shortage of skills and resources both in the provinces and centrally affect its ability to undertake these new roles, and thus further assistance is needed on a continuous basis. MRD is in a similar situation, but is in even greater need of support from development partners.

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