



Report and Recommendation of the President to the Board of Directors

Project Number: 46042-002
September 2015

Proposed Loan People's Republic of China: Shaanxi Mountain Road Safety Demonstration Project

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Asian Development Bank

CURRENCY EQUIVALENTS

(as of 19 August 2015)

Currency unit	–	yuan (CNY)
CNY1.00	=	\$0.15640
\$1.00	=	CNY6.3938

ABBREVIATIONS

ADB	–	Asian Development Bank
AKTB	–	Ankang City Traffic Bureau
EIRR	–	economic internal rate of return
EMP	–	environmental management plan
FFPO	–	Foreign Financed Project Office
GDP	–	gross domestic product
iRAP	–	International Road Assessment Program
km	–	kilometer
LAR	–	land acquisition and resettlement
NPV	–	net present value
PAM	–	project administration manual
PMO	–	project management office
PRC	–	People's Republic of China
SCG	–	Shangnan County Government
SPTD	–	Shaanxi Provincial Transport Department

NOTE

In this report, "\$" refers to US dollars.

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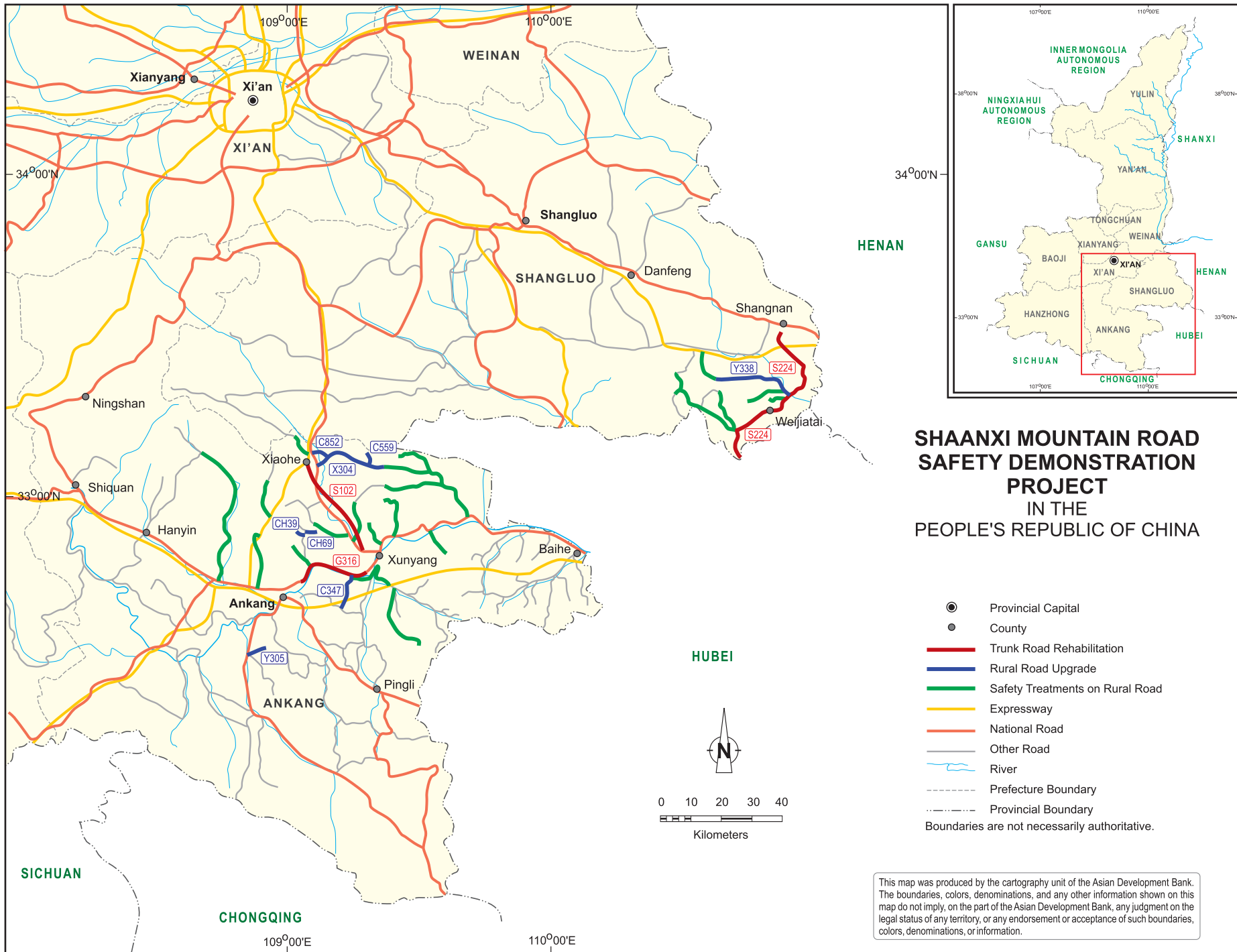
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PROJECT AT A GLANCE

1. Basic Data		Project Number: 46042-002	
Project Name	Shaanxi Mountain Road Safety Demonstration Project	Department /Division	EARD/EATC
Country Borrower	China, People's Republic of	Executing Agency	Shaanxi Provincial Department of Transportation
2. Sector	Subsector(s)	ADB Financing (\$ million)	
✓ Transport	Road transport (non-urban)		200.00
		Total	200.00
3. Strategic Agenda	Subcomponents	Climate Change Information	
Inclusive economic growth (IEG)	Pillar 2: Access to economic opportunities, including jobs, made more inclusive	Climate Change impact on the Project	Medium
Environmentally sustainable growth (ESG)	Global and regional transboundary environmental concerns		
4. Drivers of Change	Components	Gender Equity and Mainstreaming	
Governance and capacity development (GCD)	Organizational development	Effective gender mainstreaming (EGM)	✓
5. Poverty Targeting		Location Impact	
Project directly targets poverty	No	Rural	High
6. Risk Categorization:	Complex		
7. Safeguard Categorization	Environment: A Involuntary Resettlement: A Indigenous Peoples: C		
8. Financing			
Modality and Sources		Amount (\$ million)	
ADB		200.00	
Sovereign Project loan: Ordinary capital resources		200.00	
Cofinancing		0.00	
None		0.00	
Counterpart		199.96	
Government		199.96	
Total		399.96	
9. Effective Development Cooperation			
Use of country procurement systems		No	
Use of country public financial management systems		Yes	



**SHAANXI MOUNTAIN ROAD
SAFETY DEMONSTRATION
PROJECT
IN THE
PEOPLE'S REPUBLIC OF CHINA**

- Provincial Capital
 - County
 - Trunk Road Rehabilitation
 - Rural Road Upgrade
 - Safety Treatments on Rural Road
 - Expressway
 - National Road
 - Other Road
 - River
 - - - Prefecture Boundary
 - - - Provincial Boundary
- Boundaries are not necessarily authoritative.

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I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on a proposed loan to the People's Republic of China (PRC) for the Shaanxi Mountain Road Safety Demonstration Project.¹

2. The project will improve accessibility and road safety by (i) upgrading and introducing safety treatments on trunk and rural roads in the hazardous Qinba Mountains area in southeast Shaanxi,² (ii) implementing a crash reduction program involving only road safety treatments on other hazardous rural roads, and (iii) strengthening road safety design and management practices and introducing road safety education and community awareness programs.³ This will contribute to poverty reduction by lowering transport costs and enabling economic activity, and by reducing fatalities and serious injuries on the trunk and rural road network.

II. THE PROJECT

A. Rationale

3. Shaanxi Province is one of the least-developed provinces with per capita rural income in 2012 at 73% of the national average, ranking 26th among the 31 administrative provinces and autonomous regions in the PRC. On a gross domestic product (GDP) per capita basis, Shaanxi ranks 15th (CNY38,564 in 2012). Fifty of Shaanxi's 107 counties are designated national poverty counties.⁴ Shaanxi has a total land area of 205,800 square kilometers and a population of 37.53 million (2013 census). The southern prefectures of Ankang and Shangluo (in which the project roads are located) have GDP per capita of CNY18,878 (Ankang) and CNY18,097 (Shangluo), both less than half the Shaanxi average. The net average income per head for rural households is CNY5,763 compared with CNY20,734 for urban Shaanxi households.

4. The Qinba Mountains area is especially poor with a poverty incidence exceeding 30% in 2012. It is one of 11 high-poverty areas targeted for concentrated interventions under the China Rural Poverty Alleviation and Development Program (2011–2020). Both Ankang and Shangluo, two prefecture-level cities in the Qinba Mountains area, have strong potential for expansion of the agriculture, mineral, and hydropower industries, and for the development of tourism.

5. A lack of transport infrastructure is constraining economic growth and poverty reduction. Due to road network and capacity limitations, the rural population suffers from a lack of access to markets and economic opportunities. High transport costs directly limit the extent of trade and constrain residents' income-earning potential. Better road connections, with improved capacity, will enable southeast Shaanxi to realize its full economic potential.

6. In the PRC, it is reported that 65,225 people were killed in road crashes in 2010.⁵ The World Health Organization, however, estimates 275,983 road crash deaths at a rate of 20.5

¹ The design and monitoring framework is in Appendix 1.

² The Qinba Mountains area covers the Qinling and Bashan mountain ranges and spans Shaanxi, Hubei, Sichuan, and Henan provinces. Within Shaanxi, six prefectures are included in this area.

³ The Asian Development Bank (ADB) provided project preparatory technical assistance for the Shaanxi Mountain Road Safety Demonstration Project under Shaanxi Trunk Roads Improvement (TA 8440-PRC).

⁴ Counties with an average annual rural per capita net income of less than CNY2,300.

⁵ World Health Organization. 2013. Global Status Report on Road Safety: Supporting a Decade of Action. Geneva. p. 99.

deaths per 100,000 population in PRC.⁶ Between 2005 and 2012, the number of reported crashes has declined while the proportion of reported crashes resulting in fatalities increased—29% in 2012 compared with 22% in 2005—indicating a reporting trend toward fewer but more serious crashes.⁷

7. Reported road fatalities (9,831) and injuries (30,021) in Shaanxi from 2008 to 2012 cost \$5 billion. Ankang and Shangluo are experiencing road fatality and injury rates that far exceed the provincial and national averages with a crash rate 4 times the national average for roads of similar class in the PRC⁸. Analysis of 1,000 kilometers (km) of roads in the Qinba Mountains area found that road fatalities and injuries cost \$84 million (0.3% of Shaanxi's GDP) per year from 2007 to 2011. There is an obvious and urgent need to improve road safety provisions throughout the project area.

8. Most crash victims are male vulnerable road users⁹ aged 21–65 living in rural areas.¹⁰ Across transport modes, road fatalities involve vehicle and truck occupants (28%), motorcyclists (28%), pedestrians (26%), cyclists (17%), and other (1%). As motorcycles and nonmotorized transport modes are most commonly used by the poor, reducing road crashes and related impacts will contribute to poverty reduction and inclusive economic growth.

9. The project area—Xunyang, Hanyin, and Shangnan counties in Ankang and Shangluo—contains many high-risk trunk and rural roads with significant traffic volume and a mix of heavy vehicles, automobiles, motorcycles, nonmotorized vehicles, and pedestrians. Many of the crashes in the area are attributed to driver error aggravated by the steep, mountainous terrain. In many cases, dangerous road conditions can be addressed by modest design interventions at relatively low cost. The development and institutionalization of modern road safety design and management approaches will lead to a sustainable reduction in road deaths and injuries.

10. **Trunk roads.** The highways in the Qinba Mountains area are narrow, with inadequate sight distances, very tight curves, and low axle load limits. Vehicle ownership in the area has grown rapidly, and ongoing major construction projects have led to increased heavy truck traffic leading to accelerated pavement deterioration. Traffic has grown at nearly 10% per year and sections of the network will reach capacity within 5 years. Rehabilitation and upgrading of the trunk road network is required to ensure that adequate capacity can facilitate economic development, and improve accessibility for the local population. On the three project trunk roads, the annual cost per km of road crash fatalities and injuries per km are several times higher than the national averages, resulting in a combined total cost of \$40 million (footnote 8). By incorporating best road safety design practices on the trunk road upgrades, the incidence and cost of road crashes can be significantly reduced.

11. **Rural roads.** The unpaved rural road network constrains agricultural development and limits access to (i) markets for sale of produce and purchase of agricultural inputs; (ii) collection or processing stations for the sale of cash crops; (iii) towns and cities for employment

⁶ World Health Organization. 2013. *Global Status Report on Road Safety: Supporting a Decade of Action*. Geneva. p. 255. Fatality rates average 21.5 per 100,000 population in low-income countries, 19.5 in middle-income countries, and 10.3 in high-income countries.

⁷ National Bureau of Statistics of China. 2013. *Shaanxi Statistical Yearbook 2013*. Beijing.

⁸ ADB. 2015. *Shaanxi Mountain Road Safety Demonstration: Final Road Safety Report Part 1*. Consultant's report. Manila (TA 8440-PRC).

⁹ Vulnerable road users include pedestrians, cyclists, or motorcyclists.

¹⁰ X. Zhang et al. 2013. Basic Characteristics of Road Traffic Deaths in China. *Iranian Journal of Public Health*, Vol. 42, No.1, pp. 7–15.

opportunities; and (iv) important social services such as schools, health facilities, and administrative services. During the wet season, the existing unpaved rural roads become impassable because of landslides or poor road surfaces, leading to perishable crops being lost and reducing access to employment and social services. Rural roads in the project area exhibit a range in level of safety. Road fatalities, and injuries on the most unsafe rural road included in the project cost up to \$6 million annually. Targeted strategic investments on the rural road network will improve both access and transport safety.

12. **Road safety management and education.** On road rehabilitation and road upgrade projects, the Shaanxi Provincial Transport Department (SPTD) ensures that safety provisions address known hazardous road sections. To guide this responsibility, the Highway Safety Enhancement Project¹¹ was launched in 2004. The department of traffic police conducts road safety publicity and education programs for middle and primary schools. A determined focus on improving education and community awareness programs will help raise awareness of the public health threat posed by dangerous driving behavior and hazardous road conditions.

13. **Strategic relevance.** As ADB's largest developing member country, the PRC suffers the greatest road crash fatality and serious injury toll. Successful project implementation and promotion of the road safety project design approach will encourage replication in other provinces of the PRC and in other developing member countries. The project aligns with ADB's country partnership strategy for the PRC, 2011–2015¹² and its sustainable transport initiative,¹³ in the areas of road safety and social sustainability, and the Midterm Review of Strategy 2020¹⁴ giving emphasis to infrastructure financing in underdeveloped areas.

14. ADB's participation will help the PRC mobilize resources with international expertise to demonstrate innovative design solutions, and it will help build local and national road safety capability.¹⁵ Importantly the project will encourage the use of performance-tracking tools to benchmark and monitor road safety performance over time. ADB's engagement in Shaanxi since 2001 has highlighted the need for an early focus on developing safeguards, procurement and financial management capacity at the implementing agency level.¹⁶

B. Impacts and Outcome

15. The impacts will be reduction of road crash fatalities and serious injuries, and provision of efficient and safe all-weather accessibility in southeast Shaanxi Province. The outcome will be a safer and more efficient trunk and rural road network in southeast Shaanxi Province.

¹¹ The Highway Safety Enhancement Project involved a CNY25.34 billion investment over 10 years on 366,000 km of roads to remedy safety problems. The successful preparation of this Shaanxi Mountain Road Safety Demonstration Project influenced the Ministry of Transport to adopt the ChinaRAP road safety design methodology on phase 2 of the Highway Safety Enhancement Project, which will be considered by the State Council in 2015.

¹² ADB. 2012. *Country Partnership Strategy: People's Republic of China, 2011–2015*. Manila.

¹³ ADB. 2010. *Sustainable Transport Initiative Operational Plan*. Manila.

¹⁴ ADB. 2014. *Midterm Review of Strategy 2020: Meeting the Challenges of a Transforming Asia and Pacific*. Manila.

¹⁵ The iRAP interactive design tool informs the designer of the consequences (in terms of deaths and serious injuries) of not allowing for road safety treatments. This powerful illustration is a new approach not seen before in the PRC, and is being piloted for the first time by ADB on this demonstration project.

¹⁶ ADB. 2011. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the People's Republic of China for the Xi'an Urban Road Network Improvement Project*. Manila; ADB. 2003. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the People's Republic of China for the Xi'an Urban Transport Project*. Manila; and ADB. 2001. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the People's Republic of China for the Shaanxi Roads Development Project*. Manila.

C. Outputs

16. **Trunk roads upgraded.** Three trunk roads (approximately 187 km) in the cities of Ankang and Shangluo will be upgraded from class III/IV to class II/III standard incorporating major safety design enhancements.¹⁷

17. **Rural roads upgraded.** Eight rural roads (approximately 140 km) in poor agricultural areas will be upgraded from earthen roads to paved class IV standards, including improved safety design enhancements.

18. **Crash reduction program.** Road safety only investments will be made on 25 additional rural roads (approximately 570 km).¹⁸

19. **Institutional development.** The capacity of the SPTD road safety unit and local traffic bureaus will be strengthened, particularly in road safety management, implementation, and enforcement; the use of road safety equipment, software, and training; and public awareness building. A road safety education and community awareness campaign will be conducted.

D. Investment and Financing Plans

20. The project is estimated to cost \$399.96 million, including taxes and duties (Table 1).

Table 1: Project Investment Plan (\$ million)

Item	Amount ^a
A. Base Cost^b	
1. Trunk roads upgraded	294.61
2. Rural roads upgraded	36.60
3. Crash reduction program	13.11
4. Institutional development	2.36
Subtotal (A)	346.68
B. Contingencies^c	40.91
C. Financial Charges During Implementation^d	12.37
Total (A+B+C)	399.96

^a Includes taxes and duties of \$16.9 million to be financed by the People's Republic of China and the Asian Development Bank (ADB). ADB financing of taxes and duties is deemed acceptable as the (i) amount is within the reasonable threshold identified during preparation of ADB's country partnership strategy, (ii) amount does not represent an excessive share of the project investment plan, (iii) taxes and duties apply only to ADB-financed expenditures, and (iv) financing of taxes and duties is material and relevant to the success of the project.

^b In March 2015 prices.

^c Physical contingencies are 5% of base cost. Price contingencies computed on foreign exchange costs at 2.3% in 2015, 1.0% in 2016, 1.4% in 2017, 1.4% in 2018, and 1.4% in 2019. Price contingencies computed on local currency costs at 2.7% in 2015, 3.0% in 2016, 3.0% in 2017, 3.0% in 2018, and 3.0% in 2019.

^d Includes interest and commitment charges. Interest during construction for ordinary capital resources loan(s) has been computed at the 5-year US dollar fixed swap rate plus an effective contractual spread of 0.5% and maturity premium of 0.2%. Commitment charges are 0.15% per year to be charged on the undisbursed loan amount.

Source: Asian Development Bank estimates.

21. The government requested a \$200 million loan from ADB's ordinary capital resources to help finance the project. The loan will have a 25-year term, including a grace period of 5 years,

¹⁷ People's Republic of China Road Classification Information (accessible from the list of linked documents in Appendix 2).

¹⁸ Examples of road safety only investments include amongst others the provision of enhanced road marking, roadside safety barriers, minor re-alignments to improve sight distances, and lay-bys and over taking lanes on steep inclines. No pavement repairs or upgrades are involved on these roads.

a 10% annuity repayment method, an annual interest rate determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility, a commitment charge of 0.15% per year (the interest and other charges during construction to be capitalized in the loan), and such other terms and conditions set forth in the draft loan and project agreements. The average maturity is 18.31 years, and the maturity premium payable to ADB is 0.20% per annum.

22. The national government is the borrower and will relend the loan proceeds to the Shaanxi provincial government upon terms and conditions acceptable to ADB. The Shaanxi provincial government will onlend to SPTD pursuant to onlending arrangements with terms and conditions satisfactory to ADB, with provision of a guaranteed obligation to repay issued by SPTD to the borrower. Except as ADB may otherwise agree, the terms for such onlending arrangements shall include (i) commitment charge and interest at rates identical to those applied to the loan, (ii) a grace period and a principal repayment period identical to those applied to the loan, and (iii) SPTD bearing the foreign exchange and interest rate variation risks. The indicative flow of funds and the onlending arrangements are in the project administration manual (PAM).¹⁹

23. The financing plan is in Table 2. The government will ensure that counterpart funds necessary for the project are provided in a timely manner, including funds for engagement of external monitoring agencies, land acquisition and resettlement (LAR) activities, operations and maintenance of all project facilities, and any additional counterpart funds required for any shortfall of funds or cost overruns during implementation.

Table 2: Financing Plan

Source	Amount (\$ million)	Share of Total (%)
Asian Development Bank		
Ordinary capital resources (loan)	200.00	50.01
Counterpart funds from Shaanxi Provincial Transport Department, Ankang City Traffic Bureau, and Shangnan County Government	199.96	49.99
Total	399.96	100.00

Source: Asian Development Bank estimates.

E. Implementation Arrangements

24. SPTD will be the executing agency. Shaanxi Provincial Highway Bureau, on behalf of SPTD, will be responsible for overall project organization, coordination, guidance, and supervision. The Foreign Financed Project Office (FFPO) of SPTD will be responsible for day-to-day project preparation, coordination, and liaison work to ensure that the project is implemented in accordance with ADB's guidance and requirements. The Ankang City Traffic Bureau (AKTB) and the Shangnan County Government (SCG), as the implementing agencies, will respectively manage the implementation of trunk and rural roads and road safety components in Ankang City and Shangnan County. Daily management responsibility will be assigned to the four subproject management offices under the jurisdiction of AKTB and SCG.

25. Under AKTB leadership, the Ankang project management office (PMO) will manage construction of trunk roads S102 and G316, seven rural roads, and safety improvements on rural roads in their area. Dedicated management offices will be established for G316 Xunyang–Ankang (36.3 km) and S102 Xunyang–Xiaohe (64.1 km). Hanyin District PMO and Xunyang

¹⁹ Project Administration Manual (accessible from the list of linked documents in Appendix 2).

PMO will manage the construction of local rural roads and road safety improvements in their respective areas. SCG PMO will manage construction of trunk road S224, one rural road (#8), and safety improvements on six rural roads.

26. Procurement financed by the ADB loan will be in accordance with ADB's Procurement Guidelines (2015, as amended from time to time). Consultants will be recruited in accordance with ADB's Guidelines on the Use of Consultants (2013, as amended from time to time). Advance contracting and retroactive financing was approved for the trunk roads subgrade contracts and the recruitment of the project management consultant. Advance contracting does not commit ADB to approve the project or finance procurement costs. Retroactive financing will finance up to \$40 million of eligible expenditure (20% of the ADB loan) incurred prior to loan effectiveness, but not earlier than 12 months before loan signing.

27. **Trunk road procurement.** SCG will manage nine contracts for the upgrade and rehabilitation of S224, of which there are five subgrade contracts; two pavement contracts; one landscaping, safety facility, and traffic engineering contract; and one pavement contract for the rehabilitation-only road section. AKTB will manage nine contracts for the upgrading of G316 and S102, of which there are four subgrade contracts, two pavement contracts, two landscaping contracts, and one tunnel equipment and fit-out contract. Contracts will be procured using national competitive bidding procedures, except the tunnel equipment contract, which will use international competitive bidding procedures.

28. The implementation arrangements are summarized in Table 3 and described in detail in the PAM (footnote 20).

Table 3: Implementation Arrangements

Aspects	Arrangements		
Implementation period	December 2015–December 2019		
Loan closing date	30 June 2020		
Management			
(i) Oversight body	Shaanxi Provincial Highway Bureau, Shaanxi Provincial Transport Department		
(ii) Executing agency	Shaanxi Provincial Transport Department		
(iii) Project coordination and liaison agency	Foreign Financed Project Office of Shaanxi Provincial Transport Department, Xi'an, 2 managers, 1 accountant, 1 safeguard specialist, and 1 assistant		
(iv) Key implementing agencies	Ankang City Traffic Bureau and Shangnan County Government		
(v) Implementation unit	Ankang PMO, Ankang City, 1 manager and 1 safeguard specialist Shangnan County Government PMO, Shangluo City, 1 manager and 1 safeguard specialist Hanyin District PMO, Hanyin, 1 manager, 2 safeguard specialists, and 1 assistant Xunyang PMO, Xunyang City, 1 manager, 1 safeguard specialist, and 1 assistant		
Procurement (ADB-financed contract packages)	National competitive bidding	29 contracts	\$285.8 million
Consulting services	QCBS (90:10)	18 international and 16 national person-months	\$0.75 million
	ICS (external monitoring – environment)	4 national person-months	\$0.04 million
	CQS (road safety capacity building)	5.5 international and 9.75 national person-months	\$0.654 million
	SSS (road safety audit and training services)	134 national person-months	\$0.409 million
	SSS (Walkwise pilot)	7.9 international and 26.25 national person-months	\$0.300 million
Retroactive financing and/or advance contracting	Advance contracting and retroactive financing is proposed for the recruitment of the consulting services and the procurement of the trunk road subgrade contracts.		

Aspects	Arrangements
Disbursement	The loan proceeds will be disbursed in accordance with ADB's <i>Loan Disbursement Handbook</i> (2015, as amended from time to time) and detailed arrangements agreed upon between the government and ADB.

ADB = Asian Development Bank, CQS = consultants' qualifications selection, ICS = individual consultant selection, QCBS = quality- and cost-based selection, PMO = project management office, SSS = single-source selection.

Note: ADB's Operations Services and Financial Management Department approval was granted for SSS consultant recruitment on the basis that the firms have experience of exceptional worth, and possess considerable commercial advantage over the competition. CQS recruitment was approved on the basis that specialist qualifications and experience is required to deliver the project capacity building objectives.

Source: Asian Development Bank.

III. DUE DILIGENCE

A. Technical

29. The project includes subclass and roads of classes II, III, and IV (PRC road standard classes). While compliance with the PRC road design standards improves safety, the demonstration budget was committed to improvements over and above those necessary for code compliance. The \$50 million demonstration on the 896 km of project roads provided an opportunity to illustrate international good design practice.²⁰ In the absence of road safety design modifications, it was estimated that 26,985 deaths and serious injuries would occur on the project roads over a 20-year period. With the agreed design modifications, it was estimated that 5,407 fewer deaths and serious injuries will eventuate. This represents a 25% reduction in deaths and serious injuries, with the associated investment generating a road safety benefit–cost ratio of 6.7:1.²¹

30. The ChinaRAP Safer Roads Investment Plan identified countermeasures that could affordably and economically reduce risk, thereby preventing deaths and serious injuries.²² Countermeasures from 93 options were considered for each 100-meter road segment, ranging from low-cost road markings and pedestrian refuges to higher-cost intersection upgrades and full road duplication. Design features that will improve safety include roadside safety barriers, paved shoulders, realignments, enhanced skid resistance, traffic calming, and pedestrian crossings. The project demonstration purpose was served by introducing countermeasures not commonly used in the PRC including vehicle-activated signs, flexible delineator posts, colored pavement treatments at the entry to villages, and raised pedestrian crossings at schools.

B. Economic and Financial

31. **Economic analysis.** The project is economically viable. The economic internal rate of return (EIRR) and net present value (NPV) at a discount rate of 12% for the upgrade of the three trunk roads are 16.8% and CNY365 million (S102), 25.5% and CNY309 million (G316),

²⁰ Inclusive of contingency allocations the road safety only budget was assigned to (i) output 1: trunk road upgrades (\$32.12 million), (ii) output 2: rural road upgrades (\$2.68 million), (iii) output 3: crash reduction program (\$13.83 million), and (iv) output 4: institutional development (\$1.37 million).

²¹ ADB. 2015. *Shaanxi Mountain Road Safety Demonstration: Final Road Safety Report Part 1*. Consultant's report. Manila (TA 8440-PRC, p. 5).

²² ChinaRAP is a collaboration between the Ministry of Transport Research Institute of Highway and the International Road Assessment Program (iRAP). The iRAP road safety design methodology uses road attribute risk factors (often called crash modification factors) to relate road attributes and crash rates. These are used to assess the likelihood that a crash will occur, and the severity of those that do occur, for both existing roads and road designs. The methodology involves an economic analysis of road safety countermeasure options, with benefits expressed in terms of the value of deaths and serious injuries prevented.

and 26.7% and CNY607 million (S224), including safety benefits. The eight rural road upgrades result in an EIRR of 22.0% and an NPV of CNY193 million (weighted average). The crash reduction program returned an EIRR of 57% and an NPV of CNY455 million. The sensitivity analysis confirmed there is little risk to the project's viability.

32. **Financial analysis.** The project has no revenue-generating components. Construction and incremental operating costs do not represent a substantial financial burden on SPTD, Ankang City, and Shangnan County, all of which have sufficient financial capacity to provide counterpart funds, cover operation and maintenance costs, and service the ADB loan.

C. Governance

33. All procurement to be financed under the ADB loan will be carried out in accordance with ADB's Procurement Guidelines. The relevant sections of ADB's Anticorruption Policy (1998, as amended to date) will be included in all procurement documents and contracts. ADB's Anticorruption Policy was explained to and discussed with the government, the executing agency and implementing agencies, and the FFPO. The specific policy requirements and supplementary measures are described in the PAM (footnote 20). An assessment of financial management capacity indicates that the executing agency and one implementing agency (AKTB) carefully follow the PRC policies and procedures for accounting and financial management. The financial management assessment recommended capacity development measures to ensure the implementing agencies are able to meet financial management requirements. It was concluded that the overall pre-mitigation financial management risk is moderate. The staff of the FFPO and the implementing agencies will undertake targeted training to adequately mitigate the risks starting in the last quarter of 2015.

D. Poverty and Social

34. **Poverty and social.** Two of the three project counties are designated national poverty counties (Xunyang and Shangnan). The remote mountainous location, harsh geographic and climatic conditions, and inadequate road infrastructure are major obstacles to economic development and contribute to persistent poverty in the project area. The project will improve road connectivity, reduce transport costs and travel time, and improve access to economic and employment opportunities and social services. Local people will benefit from enhanced access, improved mobility, and skilled and unskilled employment opportunities generated during construction. The project will result in 25% fewer fatalities and serious injuries than would have been the case without the project. This constitutes a substantial reduction in social and economic costs from road crashes.

35. **Gender.** The project is categorized *effective gender mainstreaming* and involves a gender action plan.²³ Targets for women's employment and project participation are key features embodied in the design and monitoring framework and the social development action plan.

E. Safeguards

36. **Environment (category A).** A consolidated environmental impact assessment and environmental management plan (EMP) covers all project components, complies with the PRC's

²³ Gender Action Plan (accessible from the list of linked documents in Appendix 2).

regulatory requirements and ADB's Safeguard Policy Statement (2009), and was disclosed on the ADB website on 1 April 2015. Public consultation informed the project design and environmental impact assessment process, and will continue during project implementation. The EMP outlines potential impacts, mitigation and monitoring measures, institutional arrangements, training requirements, and implementation budget. The EMP implementation budget is 1.1% of the total project budget. Capacity development and institutional strengthening are proposed to minimize environmental risks. Environmental complaints will be handled through a grievance redress mechanism.

37. Anticipated environmental impacts and risks are mostly modest and can be limited to an acceptable level through EMP implementation and compliance with loan covenants. The main potential impacts are on the water quality of rivers and noise and pollution impacts on sensitive receptors within or close to the project road corridors. Trunk road G316 runs parallel to the north bank of the Shaanxi Han River wetland, triggering ADB's Safeguard Policy Statement for legally protected areas. The responsible authority confirmed that the reserve within the project area of influence is designated for water quality objectives and there are no critical or valuable natural or modified habitats. The proposed EMP control measures are in line with the Shaanxi wetland protection regulation and the collection of road runoff in sedimentation tanks will have benefits for water quality, as runoff is currently unmanaged. Total carbon dioxide emissions from all project roads are 79,000 tons per annum in the medium term (year 2023) and 112,000 tons per annum in the long term (year 2031). Economic analysis demonstrates that project road improvements will result in a net reduction of carbon emissions, although these savings are likely to be offset by induced traffic and embodied carbon during construction.

38. **Climate change (medium risk).** A climate risk and vulnerability analysis study determined that there will be an increased risk of extreme rainfall events and flooding.²⁴ A range of hard and soft climate change adaptation measures have been proposed for the project roads.

39. **Involuntary resettlement (category A).** LAR impacts are attributable mainly to the trunk road component. Measures to avoid or minimize displacement were considered in the project design. Rural road improvement will result in minor LAR. The estimated permanent land acquisition for the project roads is 3,429 *mu* including dry farm land, garden land, forest land, house plots, and barren land.²⁵ The total area of house and building demolition is 62,934 square meters, involving residential houses and other structures. An estimated 12,527 persons in 3,341 rural households will be affected, including 3,013 households affected by land acquisition only and 328 households by both land acquisition and house demolition. LAR impacts are adequately assessed. Project roads are existing roads so land acquisition impacts do not cause significant land loss for affected households. The five resettlement plans prepared to address project-related LAR impacts are adequate. SPTD has previously worked on ADB-financed projects and has sufficient institutional capacity and commitment to manage social safeguards risks emanating from LAR. Capacity building for the implementing agencies on social safeguard implementation is integrated in the project design. Project-affected people were consulted during resettlement plan preparation. Approved resettlement plans have been disclosed to the affected peoples and were posted on the ADB website on 18 May 2015.

40. The LAR cost estimate is CNY189.50 million including land compensation, house relocation, livelihood support, taxes, fees, and contingency funds. Compensation was

²⁴ Project Climate Risk Assessment and Management (accessible from the list of linked documents in Appendix 2).

²⁵ A *mu* is a Chinese unit of measurement (1 *mu* = 666.67 m²).

determined at replacement cost. The LAR budget is included in the overall project budget. SPTD confirmed adequate LAR counterpart funding will be made available. Resettlement implementation will be monitored by an independent agency. A grievance-redress mechanism will address affected people's concerns and ensure grievances are resolved in a timely manner.

41. **Indigenous peoples (category C).** Han Chinese, the PRC's majority ethnic group, comprise 99% of the project area population.

F. Risks and Mitigating Measures

42. Major risks and mitigating measures are summarized in Table 4 and described in detail in the risk assessment and risk management plan.²⁶ The assessment rated overall implementation risk as medium and the project design and implementation measures are considered adequate to address the identified risks. The integrated benefits and impacts are expected to outweigh the costs.

Table 4: Summary of Risks and Mitigating Measures

Risks	Mitigating Measures
Inexperience of implementing agencies	Training on the Asian Development Bank (ADB) environment, resettlement, accounting, disbursement, and financial reporting requirements and procedures will first be delivered in the third quarter of 2015.
Procurement delays	Training on ADB procurement policies and procedures will be provided in the second half of 2015. The executing agency is aware that resettlement plans require updating and ADB approval before contract award.

Source: Asian Development Bank.

IV. ASSURANCES

43. The government, Shaanxi provincial government, and SPTD have assured ADB that implementation of the project shall conform to all applicable ADB policies, including those concerning anticorruption measures, safeguards, gender, procurement, consulting services, and disbursement as described in detail in the PAM and loan documents. The government, Shaanxi provincial government, and SPTD have agreed with ADB on certain covenants for the project, which are set forth in the loan agreement and project agreement.

V. RECOMMENDATION

44. I am satisfied that the proposed loan would comply with the Articles of Agreement of the Asian Development Bank (ADB) and recommend that the Board approve the loan of \$200,000,000 to the People's Republic of China for the Shaanxi Mountain Road Safety Demonstration Project, from ADB's ordinary capital resources, with interest to be determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility; for a term of 25 years, including a grace period of 5 years; and such other terms and conditions as are substantially in accordance with those set forth in the draft loan and project agreements presented to the Board.

Takehiko Nakao
President

4 September 2015

²⁶ Risk Assessment and Risk Management Plan (accessible from the list of linked documents in Appendix 2).

DESIGN AND MONITORING FRAMEWORK

Impacts the Project is Aligned with:

Road crash fatalities and serious injuries in southeast Shaanxi Province reduced (United Nations Decade of Action for Road Safety, 2011-2020).^a

Efficient and safe all-weather accessibility in southeast Shaanxi Province provided (PRC Country Partnership Strategy, 2011 - 2015).^b

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
Outcome Trunk and rural road network efficiency and safety in southeast Shaanxi is improved	a. Car VOC savings (CNY/km) by 2020 from 2014 baseline of G316 : 8% from 2.53 S102 : 11% from 2.47 S224 : 7% from 2.51 b. Car travel time savings by 2020 from 2014 baseline of G316: 15 from 86 minutes (17%) S102: 6 from 45 minutes (13%) S224: 10 from 132 minutes (7%) c. Medium goods vehicle VOC savings (CNY/km) by 2020 from 2014 baseline of G316: 14% from 4.55 S102: 16% from 4.53 S224: 25% from 5.75 d. Medium goods vehicle travel time savings by 2020 from 2014 baseline of G316: 24 from 110 minutes (21%) S102: 12 from 61 minutes (19%) S224: 27 from 186 minutes (14%) e. Crashes, fatalities, and injuries per vehicle km travelled on project roads, reduced by 25% in 2019 from 2011 baseline figures of 517 crashes; 96 deaths; 1,636 injuries. f. Average travel frequency per month for rural households increases from 16.4 in 2014 to 20 by 2020 g. Rural roads are passable all year round by 2020 h. Average travel speed on trunk roads increased from 40 km/hour to 60 km/hour by 2020 i. Percentage of three-star ^c rated project roads increases from 27% to 59% by 2020	a. After-project survey b. After-project survey c. After-project survey d. After project survey e. Traffic police data f. PPTA survey and similar follow-up survey g. Executing agency project monitoring reports h. After-project survey i. Based on feasibility and final designs and ChinaRAP evaluation	Traffic police may not provide data Anticipated driver and local residents behavioral change does not eventuate Expected economic growth fails to materialize Increased quality of road surface leads to higher speeds and, thus, more fatalities and traffic incidents

Result Chain	Performance Targets and Indicators with Baselines	Data Sources and Reporting Mechanisms	Risks
Outputs 1. Trunk roads upgraded	1a. 187 km of trunk roads upgraded from class III/IV to class II/III by 2019 1b. Trunk road iRAP three-star ratings targets by lengths are: Vehicle occupants: 79% Motorcyclists: 53% Pedestrians: 55% Bicyclists: 79% 1c. 20% of unskilled labor to be women	1a. ADB review missions and project management consultant progress reports 1b. ChinaRAP assessment reports 1c. SDAP	Counterpart funding is not sufficient and/or is not available in a timely manner Project implementation consultants are not recruited in a timely manner Lack of adequate coordination between executing agency and local agencies Delay to project commencement affects Ministry of Transport subsidies
2. Rural roads upgraded	2a. 139.6 km of rural roads upgraded to paved class IV standard by 2019 2b. 57% of these rural road lengths have three-star safety rating or better 2c. 30% of unskilled labor to be women	2a. ADB review missions and progress reports 2b. ChinaRAP assessment reports 2c. SDAP	Lack of local agency cooperation in relation to road safety awareness program Shaanxi Provincial Transport Department reluctant to embrace iRAP philosophy
3. Crash reduction program implemented	3a. 24% of these road lengths now have three-star safety rating or better	3a. ChinaRAP assessment reports	
4. Institutional development enhanced	4a. Safety awareness campaign participants in three schools reporting enhanced knowledge of subject area(s) implemented 4b. Community safety awareness campaign should target 50% men and 50% women participation 4c. 110 iRAP training participants reporting enhanced knowledge of subject area(s) 4d. 100 of iRAP participants passing test	4a. Road safety consultant reports 4b. Road safety consultant report 4c. Road safety consultant report 4d. Road safety consultant report	
Key Activities with Milestones			
<p>1. Trunk roads rehabilitation (Q4 2018)</p> <p>1.1 Complete detailed design (Q1 2015). 1.2 Commence land acquisition and resettlement activities (Q4 2015). 1.3 Complete construction of civil works (Q4 2018). 1.4 Implement and monitor environmental management plan (Q3 2015 to Q4 2019).</p> <p>2. Rural road improvement (Q4 2017)</p> <p>2.1 Complete detailed design (Q1 2015).</p>			

Key Activities with Milestones	
<p>2.2 Commence land acquisition and resettlement activities (Q4 2015).</p> <p>2.3 Complete construction of civil works (Q4 2017).</p> <p>2.4 Implement and monitor the environmental management plan (Q1 2016 to Q4 2017).</p> <p>3. Crash reduction program (Q4 2019)</p> <p>3.1 Complete project design (Q1 2015).</p> <p>3.2 Complete construction and/or installation of road safety installations (Q4 2019).</p> <p>4. Institutional development (Q1 2019)</p> <p>4.1 Complete implementation of the road safety program (Q4 2019).</p> <p>4.2 Complete capacity building and iRAP training (Q1 2018).</p>	
Inputs	
Asian Development Bank:	\$200,000,000
Government:	\$199,960,000
Assumptions for Partner Financing	
Not applicable	

ADB = Asian Development Bank, iRAP = International Road Assessment Program, km = kilometer, Q = quarter, SDAP = social development action plan, VOC = vehicle operating cost.

^a United Nations. 2011. *United Nations Decade of Action for Road Safety, 2011–2020*. New York.

^b ADB. 2011. *Country Partnership Strategy: People's Republic of China, 2011–2015*. Manila.

^c An explanation of the iRAP star rating system and the meaning of a three-star rating can be found in the Road Safety Demonstration linked document (accessible from the list of linked documents in Appendix 2).

Source: Asian Development Bank.

LIST OF LINKED DOCUMENTS

<http://adb.org/Documents/RRPs/?id=46042-002-3>

1. Loan Agreement
2. Project Agreement
3. Sector Assessment (Summary): Transport
4. Project Administration Manual
5. Contribution to the ADB Results Framework
6. Development Coordination
7. Financial Analysis
8. Economic Analysis
9. Country Economic Indicators
10. Summary Poverty Reduction and Social Strategy
11. Gender Action Plan
12. Environmental Impact Assessment
13. Resettlement Plan: Hanyin Village Roads
14. Resettlement Plan: Hanyin Highway Road
15. Resettlement Plan: Xunyang Village Roads
16. Resettlement Plan: Xunyang Highway Road
17. Resettlement Plan: Shangnan Highway Road
18. Resettlement Framework
19. Risk Assessment and Risk Management Plan

Supplementary Documents

20. Road Safety Demonstration
21. Project Climate Risk Assessment and Management
22. People's Republic of China Road Classification Information
23. Travel Demand Analysis