



1. Project Data

Project ID P119071	Project Name CN-Hubei Xiangyang Urban Transport	
Country China	Practice Area(Lead) Transport	
L/C/TF Number(s) IBRD-81520	Closing Date (Original) 30-Sep-2017	Total Project Cost (USD) 99,786,201.57
Bank Approval Date 26-Apr-2012	Closing Date (Actual) 31-Jul-2019	
	IBRD/IDA (USD)	Grants (USD)
Original Commitment	100,000,000.00	0.00
Revised Commitment	100,000,000.00	0.00
Actual	99,786,201.57	0.00

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2. Project Objectives and Components

a. Objectives

The objective of the project is, "to improve mobility and accessibility within and to the Xiangcheng District of Xiangyang in an integrated, efficient and safe manner". (Loan Agreement, Schedule 1)

For the purpose of assessing the extent to which the PDO for this project was achieved, the PDO has been parsed into two parts referred to as objectives as follows:



Objective 1: Improve mobility within and to the Xiangcheng District of Xiangyang

Objective 2: Improve accessibility within and to the Xiangcheng District of Xiangyang

This differs from the approach in the ICR, which divided the PDO into five objectives: mobility, accessibility, integrated, efficient, and safe. While the issues of integration, efficiency, and safety could be seen as stand-alone objectives; the PDO formulated these as a "manner" or desirable condition contributing to mobility and accessibility. The relevance of these conditions to mobility and accessibility varied; some were more relevant to mobility and less relevant to accessibility and vice versa. For these desirable conditions there was a clear indicator proposed in the PAD only for "safe manner".

b. Were the project objectives/key associated outcome targets revised during implementation?

No

c. Will a split evaluation be undertaken?

No

d. Components

Component 1: Public Transport (cost at appraisal US\$19.64 million, at closing actual cost was US\$15.32 million) included investment in: (a) construction of traffic management, road user safety (traffic, bus users, and non-motorized travel), and bus priority facilities along Route 13 corridor; (b) reconstruction of select bus bays along the Route 13 corridor in selected locations; (c) construction of two bus depots and upgrading of the bus terminal in front of the city's railway station; (d) acquisition of high capacity buses, and intelligent transit applications (bus management/dispatch and traffic control center); and (e) provision of technical assistance for detailed design and implementation of the application of the integrated corridor management approach (PAD p.3, ICR para 9). The public transport component did not consider changes to passenger tariffs, either fare structure or fare level. Route 13 connects the Fancheng District on the north side of the Han Jiang River to the Xiangcheng District on the south side of the river. It is a major established north-south activity corridor in the urban region.

Changes were made to the project components in two Level 2 restructurings. The 2016 restructuring changes were as a result of the changes to the Urban Master Plan. These included moving the location of the bus terminal to be upgraded from the city's central railway station to the city's eastern railway station. The 2018 restructuring cancelled the bus terminal in the eastern railway station as the passenger traffic at this station grew at a slower pace than expected and the bus terminal was not immediately needed (ICR para 12).

Component 2: Urban Roads (at appraisal financing required was estimated at US\$172.31 million, at closing actual cost was US\$202.95 million) included investment in: (a) construction of the east section of the South Ring road; (b) construction of selected primary roads and secondary roads in the Panggong area; and (c) provision of technical assistance for detailed design and implementation aimed at integration of land use and transport development (PAD p.3, ICR para 9).



The 2016 restructuring added activities to utilize savings from changes to Component 1. Component 2 added roads in the Panggong Area. In the 2018 restructuring branch roads in Panggong area were dropped at the request of the municipality (ICR para 12).

Component 3: Traffic Management (at appraisal financing required was estimated at US\$11.67 million, at closing actual cost was US\$7.39 million) included investment in: (a) construction of management and safety facilities on the Tanxi/Xijie/Dongjie corridor, major junctions on the west section of South Ring Road, and selected roads in Panggong area; (b) acquisition of an area traffic control system, including installation of traffic signals on Route 13 corridor, Tanxi/Xijie/Dongjie corridor, major junctions on South Ring Road, and project roads in Panggong area, and acquisition of equipment for a traffic command center and enforcement and monitoring equipment; (c) carrying out of a road user safety education program; and (d) provision of technical assistance for the use of advance technology for traffic management, including for ensuring the integration of non-motorized transport and parking. (PAD p.4, ICR para 9).

Component 4: Capacity Building (at appraisal financing required was estimated at US\$4.67 million, at closing actual cost was US\$3.18 million). This included: (a) provision of technical advisory services, interalia, for the carrying out of: (i) studies on strategic urban transport issues; (ii) training and capacity building for the Project Implementing Entity's (Xiangyang Municipality's) officials involved in urban transport planning and management; and (iii) training and capacity building for the PMO staff to help them implement the Project in compliance with contract management, fiduciary and safeguard requirements; and (b) acquisition of office equipment for the PMO and office expenditures required for managing the implementation of the Project. (PAD p.4, ICR para 9).

The 2016 restructuring added activities to utilize savings from changes to Component 1. Component 4 had nine studies added, all of which aligned with the PDO (ICR para 12 and Annex 1, List of Studies Conducted).

e. Comments on Project Cost, Financing, Borrower Contribution, and Dates

Project Cost. At appraisal the total cost of the project was estimated at US\$210.87 million, including the four project components, a front-end fee of US\$0.25 million, and interest during construction of US\$2.33 million (PAD, p. 4). At closing the actual total cost of the project was US\$228.85 (ICR, Annex 3). The Financing Data Sheet on page 2 of the ICR shows the total cost of US\$233.11, which includes the front-end fee and interest during construction. The footnote in the ICR Annex 3 indicates the actual total project was US\$233.32 million, including the front-end fee and interest during construction.

Financing. At appraisal the amount of IBRD financing for this project was estimated at US\$100.00 million. At completion IBRD funds disbursed were US\$99.79 million.

Borrower Contribution. At appraisal the Borrower agreed to provide funding for the balance of the project cost, US\$110.87 (PAD, p.4). At completion the Borrower had disbursed US\$133.32 million.

Dates. The project was approved on 26-Apr-2012 and became effective on 27-Nov-2012. It underwent a midterm review on 04-May-2015. The original closing date of 30-Sep-2017 was extended twice; to 30-September-2018 and then to 31-July-2019.



Restructuring. The 2016 Level 2 Restructuring revised the PDO indicators to: (i) set missing baselines, (ii) revised the method for calculating PDO Indicator 2 (Accessibility), (iii) updated the target dates to reflect the changes in the implementation timeline (ICR para 11 and Annex 6). Intermediate results indicator target dates were revised to match the revised project closing date. The indicator, "construction of new road completed" was replaced by a new corporate core indicator, "roads constructed, non-rural". The target number of studies was increased from 5 to 11. The original and revised Results Frameworks are shown in the ICR Annex 1.

The 2016 restructuring increased the disbursement percentage for civil works to be financed by the loan from 75% to 100%, in order to reduce the medium-term pressure on counterpart financing. At the same time, the closing date of the project was extended to 30-Sep-18. The second restructuring in 2018 further extended the closing further to 31-Jul-19 to allow the remaining civil works contracts to be completed and the loan to be fully disbursed (ICR, para 13).

Overall, the changes made in the context of the project's restructuring were not in conflict with the project's theory of change. They did not change the level of ambition of the project. Therefore a split rating of outcomes was not necessary.

3. Relevance of Objectives

Rationale

Country Context. The PDO of the project was and remained highly relevant to China's current long-term urbanization strategy. China's 13th FYP (2016-2020) aimed to "develop better modern comprehensive transportation systems" and promote efficient, integrated, low carbon, smart and safe transportation services, as well as to "construct harmonious and pleasant cities". During the implementation of this project, the government of China recognized that the massive increase in urbanization must be more sustainable and issued the New Urbanization Plan (2014-2020) (NUP) to guide local governments to develop more 'compact, green, smart, and human' cities, which is in line with the PDO. The project is also aligned with Xiangyang's comprehensive transport plan (2007-2020). (ICR para 15).

Alignment with Strategy and Rationale for Bank Involvement. The project objectives were and remained substantially relevant to the current World Bank Country Partnership Framework (CPF) 2020-2025 for China such as "Engagement Area 2: Promoting Greener Growth, and particularly, Objective 2.5: Promoting Low-Carbon Transport and Cities". The CPF aimed to increase the use of public transport, improve transport efficiency and support innovation such as intelligent transport systems, transport integration and transit-oriented development. The Intervention Logic of this objective specifically mentions, "Projects that promote public transit and demonstrate good practice that can be replicated will be supported" (CPF, Intervention Logic box, pg 45).

Sectoral and Institutional Context. The PDO was fully in line with current World Bank priorities. The integrated urban transport approach is reflected in the policy recommendations of the World Bank: the joint flagship WBG-DRC study on 'Urban China: Toward Efficient, Inclusive and Sustainable Urbanization' (2014) concluded that the new approach to urbanization in China should be 'Efficient, Inclusive and Sustainable' (ICR para 17).



This project also supported green transport modes for urban travel . China's Intended Nationally Determined Contribution (INDC) at the Paris Agreement targeted a 60-65% reduction in carbon intensity (defined as GHG emissions per unit of GDP) by 2030, compared to the 2005 level. With transport being the sector with fast-growing GHG emissions in the past decades in China, the project contributed to GHG reduction in Xiangyang urban areas by promoting public transport and non-motorized transport. (ICR para 16).

Previous Sector experience. The CPF references several examples of earlier Bank work related to improving public transit ridership (Gansu Qingyang Urban Infrastructure Improvement; Second Urumqi Urban Transport; Wuhan Integrated Transport Development; Jiaozuo Green Transport and Safety Improvement; Tianjin Urban Transport Improvement; and Yunnan Honghe Prefecture Diannan Center Urban Transport). The latest CPF also references projects related to increasing non-motorized transport (Jiaozuo Green Transport and Safety Improvement; and Tianjin Urban Transport Improvement) (CPF, WBG Program box, pg 45).

Higher Level Objectives for this project were described in the PAD (para 7) and are summarized as Long Term / Outcomes in the Theory of Change (ICR para 6). These are: to improve the competitiveness of various regions of China and the overall investment climate, and to address the needs of disadvantaged groups and underdeveloped areas by financing infrastructure. Specifically: (a) promoting balanced urbanization; (b) reducing poverty, inequality and social exclusion; (c) financing sustainable and efficient growth; and (d) improving public and market institutions. The PDO (improve mobility and accessibility within and to the Xiangcheng District of Xiangyang in an integrated, efficient and safe manner) directly supported these Higher Level Objectives.

Despite the alignment of the PDO with government policy and the Bank assistance strategy the PDO is vague in calling for "improvement", a term which is not defined and open to interpretation. Nevertheless, some clarity on the meaning of improvement was added through the PDO Indicators. The PDO is qualified by three additional considerations: integrated, efficient, and safe, which are associated with how to achieve the PDO, but do not add meaning to the definition of improvement.

"Mobility" and "accessibility" are two related but distinct aspects of measuring travel patterns. Mobility is usually defined as "ease of movement" and is often measured by average network travel time, across all modes of travel. Accessibility is usually defined as the "ability to move between or to reach, specific locations, or a set of locations". Accessibility measures are becoming more widely adopted but depend on either a very simple geographic definition, as is the case for this project, or a more robust measure requiring the use of more sophisticated methods and comprehensive data on passenger movements. It is on the basis of these definitions that IEG will review the ICR.

Taking account of the many issues mentioned above this review rates the relevance of the PDO for this project as Substantial.

Rating

Substantial

4. Achievement of Objectives (Efficacy)



OBJECTIVE 1

Objective

Improve mobility within and to the Xiangcheng District of Xiangyang

Rationale

Theory of Change

The theory of change of this objective was that by improving road and bus infrastructure and introducing new operating technologies and practices, for traffic (focusing on buses) average travel times would be reduced, frequency of bus service would be improved, and road and bus users would find it easier and safer to move about. The specified considerations of integrated, safe, and efficient would be further supported by: (1) improving local capacity building for improved traffic management, (2) public education on traffic rules and safety, and (3) the purchase of additional buses to provide increased service capacity.

Outputs

The outputs of the project's activities were summarized in Figure 2, Theory of Change (ICR, para 6).

The project successfully completed all outputs associated with Objective 1 (ICR, Section II.B, Achievement) and (ICR, Annex 1, B. Key Outputs by Component).

Public transport mobility was improved by a combination of infrastructure investments and operational improvements on Route 13 to create the first bus priority corridor in Xiangcheng District,. The 13.1 km bus priority lane increased the average bus speed from 14.6 km/h to 19.2 km/h. This infrastructure improvement was supported by 40 new high-capacity, gas-electric hybrid buses, improved quality and safety of user access. In the in the Xiangyang urban area 100 bus stops were upgraded or constructed, and 50 safer mid-block pedestrian crossings were placed in operation. The operation of the bus services was supported by the construction of two bus depots and the provision of equipment and training to implement a bus dispatch and control center. The bus dispatch and management system of the bus company was modernized (basic information management, operation plan management, dispatching management, real time monitoring information release, and statistical report). At preparation the buses were not air conditioned and the fare was 1 RMB. At completion all buses have air conditioning and the fare is 2 RMB.

Improvement of road surfaces and the construction of new roads in Panggong district under Component 2 (Urban Roads) contributed to improving the mobility of motorized transport. Component 2 also improved traffic mobility for buses and cars through a combination of improved traffic signal technology (bus priority signals, optimized signal timings, and non-conflicting pedestrian phases), the design of pedestrian crossings (through the establishment of mid-block crossings), and setting up an area traffic control (ATC) system for the traffic police (ICR, para 35).



Traffic management facilities were developed within the Xiangyang urban area under Component 3 (Traffic Management), with an emphasis on Route 13. An area traffic control (ATC) system for Xiangcheng District was implemented, including a traffic management control center for the traffic police. This introduced "intelligent transport systems" (ITS) technologies to improve traffic management, including for ensuring the integration of non-motorized transport and parking. The project installed 44 traffic signals that improved traffic discipline at junctions with non-conflicting phases for all transport modes. According to the ICR traffic safety facilities such as road fences, the 50 mid-block pedestrian crossings, traffic monitoring CCTV cameras, and the traffic violation capture system helped to manage traffic flows better and avoided accidents.

The capacity building component (Component 4) improved mobility through better informed decisions by Xiangyang Municipal Government officials involved in urban transport planning and management, Xiangyang Bus Group Company, and Xiangyang Public Security Bureau Traffic Police Detachment (PAD Annex 3, Implementation Arrangements). The study, "Panggong Area Road Network Capacity Improvement" recommended feasible improvements to roads in Xiangcheng District, especially within the old town of Xiangcheng. These measures, including traffic control, traffic reorganization, and traffic facilities have been adopted by Xiangyang Municipal government. The "Xiangyang Road Traffic Management Improvement Study" also contributed to the improvement in mobility on a city-wide basis better traffic management practices (ICR, Annex 1, B. Key Outputs by Component, List of Studies Concluded).

Road safety was improved through a combination of improved road and bus infrastructure and by introducing new operating technologies and practices (described above), better enforcement, and improved education. The capacity building component included a study on the Improvement of Road Safety Management in Xiangyang City. The road user education program and the police road safety training center established by the project were intensively used: 43 training workshops were organized during the project implementation period and 2,000 participants were trained. The center, which is designed to convey key road safety messages, including to school children, will enable the project to continue to have an impact in the future. The traffic police valued the technical assistance received. The training center will continue to be an important tool to educate the population on road safety (ICR para 32).

Outcomes

Achievement of improved mobility was measured primarily by Indicator 1 (travel time). This is consistent with current transport planning practice. The average speed of buses on the Route 13 corridor during rush hour increased from 14.6 km/h (2013-06-01 baseline, ICR Annex 1.A Results Indicators) to 19.2 km/h (2019-07-31 at completion, ICR Annex 1.A Results Indicators), meeting the target of 19 km/h. This was achieved due to the dedicated bus corridor in operation on Route 13 during peak hours, and the construction of 17 bus priority intersections (the target set in the project) on this route. The frequency of the bus service was improved. At



appraisal buses on Route 13 were dispatched at 7 - 9 minute intervals during peak hours. At completion buses were being dispatched every 4 - 5 minutes.

Route 13 was the first bus corridor in Xiangyang and the Municipality has already used this approach to develop nine other bus corridors. After the successful pilot using the 40 hybrid-electric buses procured under this project, the city adopted the hybrid-electric bus strategy, and currently hybrid-electric buses account about 90% of the bus fleet in Xiangyang. Non-motorized transport is currently being emphasized in traffic management, with better non-motorized transport space designed along the bus corridor and with mid-block and non-conflicting pedestrian crossings (ICR, para 92).

As a result of the city-wide public transport priority strategy, Xiangyang's public transport mode share (city-wide proportion of all trips made using public transit) went up from 14.3% in 2010 to 30.1% in 2019 (ICR para 24 and 41).

Traffic safety improvement was measured by PDO Indicator #4 (Average annual records of fatalities and severely injured associated with traffic accidents, based on continuous three years data) which showed a decline from 37 per year in 2011 to seven per year in 2019. Whether the fatalities or injuries were in a vehicle or pedestrians was not identified in the ICR. These positive results in terms of safety can be attributed to the comprehensive measures taken under the project, including road markings, signs, mid-block pedestrian islands and fences, as well as the use of improved technology (optimized signals with non-conflicting phases, the traffic violation capture system, and CCTV), and road user education programs.

The Efficacy of the achievement of the PDO 1 is rated as High

Rating

High

OBJECTIVE 2

Objective

Improve accessibility within and to the Xiangcheng District of Xiangyang

Rationale

Theory of Change

The theory of change of this objective was that by improving road and bus infrastructure and introducing new operating technologies and practices, for traffic and buses: more people could reach given destinations with the same or reduced effort, or residents in a location could reach more destinations with the same or reduced effort. The specified desirable considerations of integrated, safe, and efficient would be further supported by: (1) improving local capacity building in planning and traffic management, (2) improving joint coordination of



bus and traffic operations using an Integrated Corridor Management (ICM) approach, (3) the purchase of new buses with new technology to allow increased acceleration at lower cost and lower environmental impact of bus operations. The efficiency of the accessible transport system developed by this project will be assessed in Section 5 of this review.

Outputs

The project was designed with a range of interventions to provide comprehensive passenger transportation accessibility to the district. Effective implementation required close integration and coordination between traffic management, bus investments and their operations. This was (according to the ICR) achieved through: a corridor-based transportation model, and a focus on combining road transport infrastructure, signal equipment and their operation, and capacity building for improved transportation management.

The project improved accessibility within and to the Xiangcheng district through the construction of new roads in the Panggong area, improved public transport, and implementation of an Integrated Corridor Management (ICM) approach on Route 13. The 20 km of non-rural roads constructed, specifically the primary and secondary roads in the Panggong Area (which used to be a rural area with rural roads and streets), allow Panggong residents to circulate more easily within Xiangcheng District and access other parts of the city.

A key feature of the project was the ICM approach adopted for Route 13. This managed the circulation of buses, non-motorized transport, car flows, road improvements, road safety, and Intelligent Transport Systems (ITS, for both road/traffic and bus operations) in a complete and coordinated way. At appraisal, this corridor was car-oriented with poor facilities for buses and non-motorized transport, and poor traffic controls at junctions. At completion, the elements of the integrated corridor approach (bus lane, NMT facilities, safety facilities, and ITS equipment) were operating. Seventeen junctions along the Route 13 corridor were equipped with bus priority signals, 36 bus bays were upgraded, and 11 mid-block pedestrian crossings were installed. The integrated approach was supported by the creation of a municipal traffic control center operated by the traffic police and by the investments in bus operations management (bus dispatch and control center). Following questions by IEG the Bank task team confirmed that the bus priority measures are only operational during rush hours.

The 40 new high-capacity, gas-electric hybrid buses procured as part of Component 1, included new technology to allow lower cost of bus operations. Air pressure detectors on the new buses improved the management of tire maintenance and reduced tire costs by 10% (ICR Annex 5, Borrower Comments).



The capacity building component fostered integrated approaches, which contribute broadly to improved accessibility. Study tours enabled Xiangyang stakeholders to witness the benefits of integration in other cities. Some studies had a direct link to accessibility: "The Transit Oriented Development (TOD) study of Xiangyang" provided guidance on the integration of transport planning with urban planning, and the outputs were applied to the development of Dongjin New Zone; "The study of Xiangyang's Parking Infrastructure Planning and Management in Central City" complemented the "integrated corridor management approach" by including parking as a traffic-related issue, which helped ensure the successful implementation of the corridor (ICR, para 40).

Outcomes

The path of urban development in Xiangcheng District, including the Panggong Area, has been shifted from an automobile-focused pattern to a more sustainable pattern incorporating substantial use of public transit and non-motorized modes. This is particularly important given that Panggong was a growing expansion of the existing urban area and could have entrenched a automobile-based suburban transport growth dynamic.

Route 13 was the first bus corridor implemented in Xiangyang. Its successful demonstration of an integrated corridor led to the development of more bus corridors in Xiangyang. At the project closing, the length of bus lanes reached to 48.7 km along 9 major urban roads in Xiangyang. All these bus corridors followed the integrated corridor management approach, as demonstrated by Route 13.

Achievement of PDO 2 is measured primarily by Indicator 2 (Accessibility of residents living Panggong Area to the city center by car and by bus), but also by Indicator 3 (feedback from users). Indicator 2 is calculated as the "Potential number of Panggong residents according to the current urban plan that can reach Fangcheng District (city center) in 30 minutes by car or bus" (ICR Annex 1, A. Results indicators). The indicator identified the city center railway station in the Fangcheng district as the city center. The baseline measure was 42,300 residents (December 2012), and at project closing, the target of 52,000 residents was met. Improvement in travel time as shown by Indicator 1 (see Objective 1 above) also plays a role in improving accessibility as it allows more destinations to be reached within a fixed time.

The positive assessment of accessibility is also supported by PDO Indicator 3 (Feedback of public transport users including disabled and vulnerable groups through a public transport user satisfaction survey on the Route 13 corridor). The passenger satisfaction survey, which covered several aspects of public transport, received a 95% positive score at project closing compared with a baseline level of 75%. The achievement exceeded the target of 90%. The results of the satisfaction survey, which includes questions on speed, punctuality, security and safety, accessibility, and convenience, also point to increased efficiency, as the scores on all these parameters exceeded 90%.



Local capacity to continue promoting sustainable transportation has been strengthened by the demonstration of successful public transit improvements through selected infrastructure and equipment (bus) investment, and by operational innovation. Local capacity has been strengthened by the demonstration of successful road and non-motorized travel improvements and by completion of studies, training, and exposure to other experiences in urban transport in China. The establishment of a Coordination Group of senior officials to oversee the preparation and implementation of the project improved coordination between these officials. The 14 technical assistance studies conducted during the project contributed to a better understanding of issues such as parking facilities planning and management policy in the Xiangyang central district, and integrated transportation in Xiangyang (ICR, para 56).

The Efficacy of the achievement of the PDO 2 is rated as Substantial by this review

Rating
Substantial

OVERALL EFFICACY

Rationale

At closing, the PDOs were achieved and the targets for outcome indicators met. Mobility and accessibility were improved through coordinated investments and the integrated corridor management approach, and the implementation of modern operations and technologies. Road safety and the integration of bus routes were significantly improved. The user satisfaction survey showed a substantial improvement in the satisfaction of riders with the improved services and the incidence of satisfaction in terms of a number of criteria exceeded the target.

Based on the evidence of High and Substantial outcomes achieved against the two project objectives, the overall efficacy of the project's achievements is rated Substantial.

Overall Efficacy Rating

Substantial

5. Efficiency



Economic Analysis. At completion efficiency was determined in the ICR primarily by estimating ex-post the NPV and economic internal rate of return (EIRR) of the main components of the project. This information is found in paragraphs 46 to 49 and in Annex 4 of the ICR. All discount rates used at appraisal and completion were 10%. The estimates of various parameters of efficiency when the project closed in the ICR were judged by this review as being credible.

At completion the EIRR of Component 1 (Public Transit) was estimated to be 15.53%, and the NPV was RMB48.8 million (US\$7.10 million). The estimated US\$ equivalent is based on the exchange rate shown in the ICR namely US\$1 = RMB6.87 (June 30, 2019). No estimate of EIRR was made for this component during appraisal. This component comprised 9.4% of the project total cost at appraisal and 6.7% of the total cost at completion.

At completion the EIRR of Component 2 (Urban Roads) was estimated to be 14.17%, and the NPV was RMB515.5 million (US\$75.04 million). At appraisal the EIRR of this component was estimated to be 17.1%, and the NPV was RMB613 million. The same method was used in both estimates (ICR para 47). This component comprised 82.7% of the project total cost at appraisal and 88.7% of the total cost at completion. The EIRR of this component was slightly lower at completion due to longer construction time and higher cost for roads (from US\$172.31 million, to US\$202.95 million at close). A fractionally greater length of roads was constructed (20.04 km) than the original target (19.92 km).

The combined EIRR of Components 1 and 2 was estimated in the ICR to be 14.27% and the total NPV was RMB564.3 million (US\$ 82.14 million). No estimate of EIRR for these combined components was made at appraisal. Together these components comprised 92.2% of the total project investments at appraisal and 95.4% of the total project investments at completion.

No EIRR was calculated for Components 3 (Traffic Management) and 4 (Capacity Building). Capacity Building is typically not subject to cost-benefit analysis but in light of effective procurement practice for this project I was assumed to be cost-effective. At appraisal the PAD explained why the efficiency of Components 1 and 3 was not analyzed, stating "Both public transport and traffic management investments comprise mostly low-cost investments, which are either essential operational items (such as maintenance facilities, depots, and signals), or enhance quality for transport users (such as transfer interchanges, bus shelters, bus priority, and pedestrian crossing signals). Designs for all works have been optimized from a cost-effectiveness perspective. Such investments typically provide high rates of return in terms of increase in the competitiveness of bus services, reduced travel time for all vehicles, and lower operational costs for all vehicles" (PAD para 28).

The assumptions underlying the economic analysis were presented in Annex 4 of the ICR and are reviewed here. At appraisal the road component was based on a "transport planning model" (ICR Annex 4, para 1) and, "the methodology used in the ICR economic analysis is the same as that used at appraisal" (ICR Annex 4, para 4). The PAD also referenced a "transport planning model" (PAD, para 27). It is not clear from the IRC whether a "transport planning model" included a network-based travel flow model. At completion, "Savings in passenger time costs were estimated based on the shorter travel time estimated based on the growing traffic volume during the service period" and, "reduced travel time on the project roads" (ICR Annex 4, para 8). This reference to road segments in the ICR implied that a network model of traffic flows was not used.

The time saving used for the analysis of the public transport component at completion were based on "observed shorter travel time of buses" (ICR Annex 4, para 6). This again implied that a network model of traffic flows was not used. The lack of a network flow model suggests that overall time savings may be underestimated, since travel times would typically improve on other parts of the system as an equilibrium of flows was achieved across



the whole network. An underestimate of time savings would lower the calculated EIRR. A network flow model is expensive to create and maintain but, after a certain level of development, is a standard tool for designing and evaluating transport initiatives. It would have improved the accuracy of the EIRR estimates and would have allowed the accessibility measure (PDO Indicator #2) to be estimated in a robust way. In conclusion, based on the underlying assumptions made to estimate efficiency, the ICR produced a conservative estimate of the project's EIRR.

Design and Implementation Efficiency.

This review concluded that the project was implemented efficiently. However completion was delayed by unanticipated changes to the Urban Master Plan, which were completed in 2014 (ICR para 12, 49, 61). These changes were reflected in the 2016 restructuring when savings in Component 1 were reallocated to Component 2 for additional road investments. The Master Plan update also meant that additional time was required to complete land acquisition and resettlement, which in turn lead to delays in completing some of the road construction (ICR para 62). Altogether these factors resulted in the need to extend the project from 58 to 80 months, an increase of 22 months or 38% (ICR para 49), but this delay was largely beyond the control of project management.

Despite the project's delayed completion, the EIRR estimate of the two main components (95% of the project) was acceptably high (14.3%) based on conservative estimates of benefits. Based on this and the above discussion, the efficiency of the project is rated as Substantial.

Efficiency Rating

Substantial

a. If available, enter the Economic Rate of Return (ERR) and/or Financial Rate of Return (FRR) at appraisal and the re-estimated value at evaluation:

	Rate Available?	Point value (%)	*Coverage/Scope (%)
Appraisal	✓	17.10	83.00 <input type="checkbox"/> Not Applicable
ICR Estimate	✓	14.27	95.00 <input type="checkbox"/> Not Applicable

* Refers to percent of total project cost for which ERR/FRR was calculated.

6. Outcome

The objectives of this project were substantially relevant to the government's development objectives and to the World Bank's assistance strategy to China. The project's achievements significantly improved the mobility of the residents of Xiangyang and improved their access to the central area through road and bus investments and improved, integrated operations. The targets for all four PDO Indicators have been met. Bus speeds in the



Route 13 corridor have been substantially improved. Access to the central area is functioning well for residents of the Pangong Area. All Intermediate Indicators were met.

The path of transport development has been shifted from an automobile-focused urban pattern to a more efficient and sustainable pattern incorporating considerable use of public transit and non-motorized modes. The Intergated Corridor Management approach has been shown to be practical and beneficial. Road user safety has been dramatically improved.

Local capacity to continue promoting sustainable transportation has been strengthened by the demonstration of successful public transit improvements and the demonstration of successful road and non-motorized travel improvements and by completion of studies, training, and exposure to other experience. The 14 technical assistance studies conducted during the project contributed to a better understanding of issues such as parking facilities planning and transport management policy in Xiangyang central district, and integrated transportation in Xiangyang.

Based on the discussion above and the substantial ratings for Relevance of the PDO, Efficacy of achievements, and Efficiency of implementation. The overall outcome of the project is therefore rated as Satisfactory.

a. Outcome Rating

Satisfactory

7. Risk to Development Outcome

Government Commitment and Local Capacity. There is little risk that improvements in commitment and local capacity will be eroded. The sustainable urban transport concepts demonstrated by the project are currently well recognized by the relevant Xiangyang authorities and agencies. Xiangyang has been selected as one of the candidate cities for the "Transit Metropolis" program initiated by the Ministry of Transport and aims to further improve the share of the public transport modes. Route 13 was the first bus corridor in Xiangyang and the Municipality has already used this approach to develop nine other bus corridors. After the successful pilot using the 40 hybrid-electric buses procured under this project, the city adopted the hybrid-electric bus strategy, and currently hybrid-electric buses account about 90% of the bus fleet in Xiangyang. Non-motorized transport is currently being emphasized in traffic management, with better non-motorized transport space designed along the bus corridor and with mid-block and non-conflicting pedestrian crossings (ICR para 92).

The ICR (para 48) states that a financial analysis was not conducted considering the majority of the project was implemented on public roads. There is, however, no discussion of the fiscal impact on the municipal government of improved road and bus operations or maintenance.

Nevertheless, risks of financing and budgeting for the maintenance of infrastructure, equipment and rolling stock for passenger traffic are assessed as low, given the involvement of the Municipality, the importance of Route 13 to connect the two parts of the city, and the importance of urban transport for the economic vitality of the city (ICR para 95).

The project's public transport component did not specifically consider changes to passenger tariffs, either fare structure or fare level. It did not evaluate financial sustainability of the transit operation. However, from



the narrative in the ICR, the Xiangyang Municipality is supportive of its public transit activities and so the risk of the transit components being financially unsustainable is considered to be low. Following questions by IEG the Bank task team responded that at preparation the fare was 1 RMB and the buses were not air conditioned. At completion the fare was 2 RMB with air conditioned buses. .

Technology risk. The traffic management control center for the traffic police, and the bus dispatch and control center upgraded under the project use state-of-the-art technologies to collect traffic and performance data and use these data to manage traffic and the fleet more efficiently. The ICR mission found that these technologies are being used effectively by the well-trained technical staff. Training programs have been established for the traffic divisions and the sub-company of the bus group (ICR para 93). The risk that technological and operational innovation will not be supported is therefore assessed as low.

Development risk in Panggong area. The project supported many activities in the Panggong area to improve mobility and accessibility. The Panggong area is positioned as a livable, smart, low-carbon riverside sub-center in the latest urban plan, and currently half of the Panggong area has been developed as a dense residential area. In 2018 the Panggong area was selected for inclusion in the Sino-Germany Eco-City Program, with a low-carbon agenda emphasizing compact city, green transport and green buildings (ICR para 94).

The Borrower's ICR (ICR Annex 5) indicates that, "the concepts of people-oriented, public transportation priority, and green development will be deeply implemented in the leadership of Xiangyang municipal government at all levels."

The risk of this newly developing area will return to an almost exclusively automobile-oriented development path is therefore considered moderately low.

8. Assessment of Bank Performance

a. Quality-at-Entry

Project preparation work began in FY10, leading to appraisal in FY13 (26-Mar-2012) and utilizing 77 weeks of staff time. The Bank provided guidance in transforming the project from a purely road investment project to a comprehensive integrated public transport project. The city had originally proposed only the financing of two primary roads, the South Ring road and the East Ring road. Bank project preparation missions helped identify problems, brought international experience and helped explore alternatives; shifted the focus from vehicular transport to an individual's trip experience centered on improving public transport, walking, cycling and safety; and to develop the public participation process. The Bank also provided guidance to the PMO in finalizing the TORs for technical assistance activities (ICR para 84).

The Bank team provided guidance on project management: by enlarging the coordinating group to include all key agencies and institutions, such as the traffic police and public transport operators; and ensuring the composition of the PMO included full time staff for technical, procurement, environment, social, and financial management. The Bank team provided guidance to Xiangyang on adapting international good practices on sustainable urban transport to local conditions. The team also suggested that Xiangyang benchmark with other Chinese cities implementing Bank projects (e.g., Wuhan), and



organized training for PMO staff and municipal officials. The Bank team provided strong support to Xiangyang Municipality, which lacked sufficient capacity to prepare a Bank project of this nature (ICR para 85).

The field-based Bank team and international experts worked closely with Xiangyang agencies to ensure high quality and full compliance with both domestic and Bank requirements on feasibility, design, economic and financial aspects, as well as fiduciary and safeguard considerations. The safeguards assessment documents were well prepared. After properly assessing the potential risks and incorporating appropriate risk management measures, the resettlement action plan and the environmental action plan were developed to provide guidance during implementation (ICR para 86).

However, the ICR states (para 88) that the Bank should have paid more attention to the PDO level indicators to ensure that the efficiency and integration elements of the PDO were captured in the RF more directly.

As noted earlier, and discussed further in section 9 of this review, the project's M&E design could have been more thorough.

Quality-at-Entry Rating

Moderately Satisfactory

b. Quality of supervision

The project was made effective on 27-Nov-2012. According to the ICR the Bank team provided good support to the implementing agency via missions, site visits, and regular communication. There were two implementation support missions annually, which included international and national staff. In all 23 missions were conducted and the Bank ensured that all stakeholders from the municipal level were involved. Aide memoires and implementation status reports (ISRs) were well prepared. The project had a series of five task team leaders (TTLs), who ensured that transitions between them were smoothly organized and joint handover missions were carried out involving the current and incoming TTLs. The first and last TTLs were based in Beijing. According to the ICR (para 87) the Bank teams maintained excellent client relations, despite changes in the leadership of Xiangyang municipal government and the Bank TTLs.

New leadership in the Xiangyang government finalized a new Urban Master Plan in late 2014, which resulted revisions to the road plans and generated new land acquisition needs (ICR para 51). The mid-term review was conducted in May 2015 and highlighted resettlement as a critical issue along with some weaknesses in the results framework and hence M&E. The first restructuring (August 2016) revised ways to measure achievement and related indicators. While funds for land acquisition were available as planned, funds were not available for construction of resettlement housing. Work on resettlement housing started only in 2016, and some of the housing was completed in 2017. Due to the delay in completing resettlement housing, the construction of some of the roads in Pangong was delayed by more than two years (ICR para 52). This resulted in the second restructuring (July 2018) to extend the closing date of the project to allow the remaining civil works contracts to be completed and the loan to be fully disbursed.

When issues arose that were beyond the PMO's scope, the TTL met with the municipal leaders to resolve them. The Bank team focused on resolving difficulties in land acquisition and resettlement to ensure



compliance with Bank safeguards policies. The social specialist conducted a specific technical support mission in December 2017 to address issues affecting resettlement. Procurement, FM, and environmental aspects were supervised in a timely and effective manner, in particular the initial difficulties in FM were promptly addressed (ICR para 88).

The World Bank provided additional technical guidance and training during implementation. For example, the Bank team engaged road safety and road design specialists to review the designs of the project urban roads and the bus corridors. It paid special attention to non-motorized transport and public transport, and to the traffic safety agenda. The Bank team reviewed the reports generated by the technical assistance studies and ensured that these studies provided value for money. The Borrower's ICR is very appreciative of the Bank's role and highlights that the quality of Bank supervision was critical for the successful implementation of the project (ICR para 89).

The Bank team ensured that project-created assets had proper maintenance arrangements. Public transport assets are being maintained by the bus company. The traffic police are in charge of the maintenance of the traffic management facilities. The road assets are maintained by the Xiangyang Municipal Bureau. The traffic police and the Xiangyang municipal bureau have the required budget allocations for the maintenance of project created assets (ICR para 90).

Quality of Supervision Rating

Satisfactory

Overall Bank Performance Rating

Moderately Satisfactory

9. M&E Design, Implementation, & Utilization

a. M&E Design

The Theory of Change was adequately presented in Figure 2, para 6, to achieve the PDOs and longer term outcomes of the project. The Results Framework comprised four PDO level indicators and ten intermediate results indicators.

PDO Indicator #1 (Travel times of bus journeys on the Route 13 corridor) provided a good basis to directly assess the efficacy of mobility (PDO 1). This was entirely consistent with transport economics and transport planning practice.

Although the indicator was named "travel times" it is actually measured the speed of buses in the corridor. The meaning of this indicator needs careful interpretation as the percent improvement in average speed, 31% (from 14.64 km/h to 19.2 km/h), would only coincidentally be the percent improvement in average travel time. The indicator is named accurately because in all cases, even short trips partially using the corridor, travel time would be reduced (improved). A calculated estimate of average travel time depends on the mix of trips. Short trips would have less travel time improvement of long trips. Travel times of trips made exclusively in the corridor would improve more than travel times of trips that had other start or end points off



the corridor. The target specified for Indicator #1 at appraisal, incorrectly, did not include stoppage (dwell) times at bus stops (ICR para 68). This was corrected in the first project restructuring.

PDO Indicator #4 [average annual records of fatalities and severely injured associated with traffic accidents (based on continuous three years data)] provided an indirect measure of mobility, by considering how safety plays into users willingness and ability to make trips.

PDO Indicator #2 (Accessibility of residents living Panggong Area to the city center by car and by bus) provided a direct assessment of the efficacy of accessibility (PDO 2). This simple measure of accessibility was consistent with the limited project resources devoted to estimate a complex metric of travel behaviour.

Measuring accessibility in a more meaningful way would have required detailed geographic data on travel behaviour. This indicator was a best effort to apply a consideration of accessibility to the project. ICR Annex 6, Original and Revised Indicators, Indicator 2 says: "...this indicator measures all residents of the Panggong area, and hence does not fully capture accessibility. The restructuring paper itself indicates that it is a 'poor indicator'; however, its merit is to adopt a user perspective." For Indicator #2 at appraisal, the origin and destination (city center) were not precisely defined (ICR para 68). This was corrected in the first project restructuring.

PDO Indicator #3 (Feedback of public transport users (including disabled and vulnerable groups) through public transport user satisfaction surveys on the Route 13 corridor) provided a measure of outcome through user satisfaction. A positive correlation between better accessibility and user satisfaction is reasonable and so this provides indirect evidence of improved accessibility.

A user survey of satisfaction is potentially a very powerful indicator of outcomes depending on how the survey was designed (sample and questionnaire). The ICR provides no information on the survey design and only very limited reporting on the results. A baseline for Indicator #3 was not established at inception (ICR Annex 1, A, A.1, PDO Results Indicators). The original sample did not include disabled and vulnerable groups (ICR para 68). These issues were corrected in the first project restructuring.

Three of the Intermediate Results Indicators assessed bus infrastructure and equipment improvements, four assessed road infrastructure and operations improvements, and three assessed studies and training completed. The ICR suggested that indicators could have been included on: the number of female beneficiaries of improved mobility and accessibility, and on pedestrian safety (ICR para 69).

b. M&E Implementation

The Results Framework was revised at the first restructuring in 2016: missing baselines were established; the methodologies were revised; and the target dates were modified to the new implementation timeline. These changes improved the RF significantly and from 2016 all indicators were measurable, potentially achievable and time bound. Results indicators were initially collected by the PMO, but a consultancy was contracted in 2015 which ensured that data were collected and analyzed more methodically, and indicator reporting became satisfactory. The M&E data were systematically included in the ISRs and aide memoires (ICR para 70).

The indicators were also included in the Semi-Annual Progress Reports prepared by the PMO, which were furnished on time. During the ICR mission, the PMO and the consultancy provided detailed



explanations on the indicators and their achievement. ICR Annex 6, Original and Revised Indicators provides more detail (ICR para 71).

c. M&E Utilization

Implementation of the M&E system, although delayed, offered the Xiangyang PMO and the Bank a firm basis to assess progress and make appropriate adjustments, including restructuring of the project (ICR para 72).

The positive outcomes for mobility and accessibility through this multimodal intervention and the Integrated Corridor Management approach, as measured directly by observed travel conditions (Indicators #1, #2) and supporting measures (Indicators #3, #4), can be expected to influence future projects in sustainable urban transport. Xiangyang's rapid implementation of additional bus priority corridors is evidence of this effect.

As discussed above, M&E design had weaknesses and the system was not fully operational until 2016. The design of the PDO indicators covered the basics of transport planning without making full use of their potential. On the other hand indicators were considerably improved at the 2016 restructuring and by the end of the project the ICR noted that "From 2016, all indicators were measurable, achievable and time bound, with available baselines, and were relevant to measure the projects achievements. While this review rates the original M&E design as modest, M&E implementation and utilization were rated substantial.

The overall quality of M&E is assessed as Substantial.

M&E Quality Rating

Substantial

10. Other Issues

a. Safeguards

The project triggered Environmental Assessment OP/BP 4.01 and at appraisal the project was assigned Category B. In line with domestic regulations and Bank requirements, an environmental assessment (EA) was carried out in parallel with the feasibility study and helped integrate environmental considerations in the technical design. An Environment Management plan (EMP) was also prepared and adopted by Xiangyang Municipal Government (ICR para 74)

According to the ICR the EMP was implemented satisfactorily over the project life. The PMO hired an external environmental monitoring consultant to monitor compliance of EMP implementation. The twelve environmental monitoring reports submitted to the Bank during project implementation did not indicate any significant non-compliance with the EMP. At project closing, compliance with environmental safeguards was rated satisfactory (ICR para 75).



Social safeguards

The project triggered OP 4.12: involuntary resettlement. A Resettlement Action Plan (RAP) and a Resettlement Policy Framework (RPF), acceptable to the Bank, were prepared and disclosed prior to appraisal. A revised Urban Master Plan was adopted by the municipality in late 2014. The changed plan increased the number of people estimated to be resettled, as well as the voluntary splitting of the original-surveyed households (ICR para 76)

The need to revise land acquisition and resettlement activities was the principal reason for a delay in project implementation. The PMO (led by the Xiangyang Development and Reform Commission) was located in the Xiangyang Construction Investment Corporation. The PMO through this corporation was responsible for road construction. The Xiangcheng District Government was responsible for land acquisition, and the Xiangcheng Urban Investment Company, an agency of Xiangcheng District Government, was responsible for the construction of resettlement housing. A lack of coordination between these three agencies was the main reason for resettlement delays (ICR paras 77 and 100). According to the ICR, although all parties were committed to the work, the implementation plans and priorities were not coordinated in terms of timeline. The PMO coordinated with the relevant parties and provided a detailed resettlement progress report for four delayed road contracts until resettlement issues were resolved. Xiangyang Municipal Government modified the compensation process in 2015 and successfully set up a new policy of cash compensation as an alternative to the existing policies (ICR para 77). Consequently at project closing, all 776 families affected by land acquisition were compensated and 768 families were resettled (ICR para 76).

According to the ICR (para 78) resettlement was an opportunity for some families to improve their housing situation significantly and also to address gender equity. Housing visited by the ICR mission appeared to be of satisfactory quality and the residents met expressed satisfaction with their new homes. No resettlement related complaints were received during the project (ICR para 77). Compliance with social safeguards is rated satisfactory by the ICR (para 79).

b. Fiduciary Compliance

Financial Management (FM)

According to the ICR, FM was rated satisfactory for most of the project. During the initial years of project implementation there were some delays and inaccuracies in project accounting, delays in submission of interim financial reports (IFRs), delays in payments to contractors, and the use of cash basis accounting. On the job training was provided to the PMO during Bank missions. The PMO attended the integrated fiduciary training workshop organized by the Bank and visited other Chinese cities (e.g., Wuhan) that were implementing Bank projects to gain experience (ICR para 80).

All annual project audit reports were provided to the Bank on time and the PMO actively followed up on issues raised by the auditors and their recommendations. IFRs were provided to the Bank on time from 2015. Disbursement was behind the targeted schedule for most of the project due to delays in land acquisition and resettlement (ICR, para 81).

Procurement



The PMO, with the support of its procurement agency and the PMC, carried out procurement in a satisfactory manner in accordance with Bank guidelines for most of the project and there were no significant procurement issues during implementation. Procurement was carried out mostly under national competitive bidding (NCB); there was only one international competitive bidding (ICB) goods contract for the procurement of e-buses. Training was provided to the PMO throughout project implementation, either onsite by the Bank procurement specialist or at the week-long procurement workshop organized for all Bank PMOs (ICR, para 82, 82).

c. Unintended impacts (Positive or Negative)

The project was not explicitly designed to have an impact on the poorest sections of the population, however benefiting the poor remained an important underpinning for project activities. By improving mobility and providing better access, the project enabled poor citizens to have more opportunities to access jobs, and improved access to health and educational facilities (ICR para 57).

Road construction in the Panggong area changed the physical environment of the original villages, which had narrow roads that were often flooded, to infrastructure more adapted to modern travel demands. The new roads and public transport service increased the economic prospects of residents. The living environment was improved as most residents moved from houses built in the 1980s and 1990s to higher quality housing. Based on the household surveys conducted by the social safeguard monitoring consultant, the average annual income of the sampled affected households grew from RMB28,000 in 2012 to RMB44,000 in 2018, with an annual growth rate of 11.5% (which was more than the GDP growth in Xiangyang during the same period). The value of assets owned by these households after resettlement, mainly housing, was about 4 - 5 times compared to their value before the resettlement (ICR para 58).

d. Other

Although the project did not explicitly incorporate a gender dimension in its design or implementation, improvements in urban transport service would likely have had a significant gender impact. The annual survey measuring traveler's satisfaction was conducted to have no less than 40% of respondents were female (ICR para 52).

The Bank team's social specialist conducted a specific technical support mission in December 2017 to address issues affecting resettlement (ICR para 87). According to the ICR (para 53) the Bank's safeguards policy ensured that the principles of gender equity were respected within the project and that unfavorable customary practices for women on resettlement existed in the project area before the project. This meant that in the absence of the project, the female population may not have had access to information and would not have received the same level of compensation as men. However, project implementation strictly adhered to World Bank involuntary resettlement policies. The PMO's approach was also gender oriented. There was 50% female participation in the local meetings on resettlement, so that women could access information, and were equally compensated and resettled.

11. Ratings



Ratings	ICR	IEG	Reason for Disagreements/Comment
Outcome	Moderately Satisfactory	Satisfactory	The efficiency of this project was rated as substantial in this review for reasons outlined in Section 5.
Bank Performance	Moderately Satisfactory	Moderately Satisfactory	
Quality of M&E	Modest	Substantial	The quality of M&E was assessed in this review as substantial for reasons outlined in Section 9.
Quality of ICR	---	Substantial	

12. Lessons

Based on lessons noted in the ICR the following stand out as being broadly relevant to other similar projects - with some adjustments in their presentation.

Land acquisition and resettlement are complex actions that require good advance work during project preparation and appraisal. The main reason for resettlement delays in this project was the lack of coordination between the PMO (which was responsible for road construction), the Xiangcheng District Government (which was responsible for land acquisition), and the Xiangcheng Urban Investment Company (which was responsible for the construction of resettlement housing). This was overlooked during the initial stages and caused major delays, as did the fact that this project was only one of the many tasks for these institutions, and their work for the project was not planned and coordinated and also not synchronized with the project's timeline. The lesson is that close coordination among the different authorities responsible for land acquisition and resettlement is critical for the project's success and needs to be envisaged and planned in the PAD.

The requirements needed to apply new methods of results measurement must to be understood and fully incorporated in the M&E framework. The project used a relatively new way of measuring transport impact by including accessibility as an indicator in the Results Framework. This could add to the project by allowing a different understanding of transport issues. In this project there was insufficient understanding of the required baseline and a relevant definition of accessibility. There was also insufficient capacity to have available the detailed geographic travel information to allow accessibility to be calculated, in anything other than a simplistic way; either at appraisal or completion. The lesson is that where best efforts are made to initiate new techniques, these must be understood and completely thought through to be used even on a trial basis. If on a trial basis, then it should be identified as such, and probably not form part of the main Results Framework.



13. Assessment Recommended?

No

14. Comments on Quality of ICR

The ICR was well written and candid. It makes good use of evidence related to issues such as passenger traffic, mobility and safety. Nevertheless, there were a few areas where an improvement could have been made.

The public transport user satisfaction survey was an important PDO indicator but the survey method and results were not presented in a clear and comprehensive way. The survey is mentioned in eight places, each describing it in somewhat different ways. For example, most references did not mention the frequency of the survey. It seems it was conducted annually during the project's life (para 52) and for three to five days (para 65) each time. Three of the eight descriptions indicate the survey applies only to one corridor (Route 13) rather than a more general geography, leaving at times the impression this was a more general survey. Only bus users were surveyed, although additional effort was made to include vulnerable people as interviewees. Pedestrians not boarding a bus were not surveyed about their opinions about road safety and road improvements. Based on information in the ICR the survey was very much richer in its results than a simple "over 90% satisfaction" conclusion would indicate. Annex 6 provides the longest description, including, "...it is a composite indicator covering punctuality, service quality of driver, travel time, in-bus comfort, and safety", although the Annex does not describe the frequency of the survey. Elsewhere the ICR states that the survey included, "questions on speed, punctuality, security and safety, accessibility and convenience" (ICR, para 38). The survey results could have been presented: over time, by gender, and as an interesting set of relevant transport issues. The ICR would have provided an opportunity for transmitting more of the survey results to the transport community.

At times the ICR presumes an understanding of technical aspects of the project that have not been made clear in the text. The acronym "ITS" appears in several places in the report, sometimes to mean "intelligent transit systems" and in other places to refer to "intelligent transport systems". Other parts of the ICR mention that an "area traffic control" center (ATC) was built, that bus management and dispatch systems were introduced and that bus priority measures were implemented. But, it was unclear how the buses communicated with the priority signals and how "optimized signal timings" and "non-conflicting pedestrian phases" were designed or implemented. The choice and range of technical innovations implemented in this project was good. Nevertheless, the ICR would have benefitted from being clear, consistent, and somewhat more detailed, about what each of these initiatives were, and which agencies were responsible for operating and maintaining them.

Finally, urban projects are particularly sensitive to the specific geography of the urban place. To fully understand this at completion the ICR could have included a map to clarify the definitions, locations, and relationships between the various geographic elements that are mentioned in the ICR, including: Xiangyang, Xiangcheng District of Xiangyang, Xiangyang City, central district of Xiangyang, Panggong District, Panggong Area, Fangcheng, Main Railway Station, East Railway Station, South Ring Road, East Ring Road, Route 13 corridor, Tanxi Road, Han River Bridge, coverage of Xiangyang City's ATC system, the other nine new bus priority corridors, resettlement areas, Urban Master Plan area, bus depots constructed, "addition of selected Panggong Area roads" (para 12), "key spots such as No. 1 hospital, No. 4 middle school, and the government building" (ICR para 22). To be useful the map would have needed to be to scale and provide overall geographic



context as well as the specified elements (listed above) and other relevant existing transport contextual information such as main bridges, roads and railway lines.

Despite some shortcomings this review rates the quality of the ICR as substantial.

a. Quality of ICR Rating
Substantial