



# Report and Recommendation of the President to the Board of Directors

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Project Number: 53326-001  
November 2020

## Proposed Loan and Technical Assistance Grant India: Bengaluru Metro Rail Project

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**Asian Development Bank**

## CURRENCY EQUIVALENTS

(as of 9 November 2020)

Currency unit	–	Indian rupee/s (₹)
₹1.00	=	\$0.0135179
\$1.00	=	₹73.976100

## ABBREVIATIONS

ADB	–	Asian Development Bank
AFD	–	Agence Française de Développement
AIIB	–	Asian Infrastructure Investment Bank
BDA	–	Bangalore Development Authority
BMRCL	–	Bangalore Metro Rail Corporation Limited
COVID-19	–	coronavirus disease
DULT	–	Directorate of Urban Land Transport
EIRR	–	economic internal rate of return
EMP	–	environmental management plan
EWCDT	–	elderly, women, children, differently abled, and trans-persons
GESI	–	gender equality and social inclusion
IT	–	information technology
JICA	–	Japan International Cooperation Agency
KIA	–	Kempegowda International Airport
km	–	kilometer
m <sup>2</sup>	–	square meter
MMI	–	multimodal integration
ORR	–	Outer Ring Road
PAM	–	project administration manual
PPP	–	public–private partnership
TA	–	technical assistance
TOD	–	transit-oriented development

## NOTES

- (i) The fiscal year (FY) of the Government of India and its agencies ends on 31 March. “FY” before a calendar year denotes the year in which the fiscal year ends, e.g., FY2021 ends on 31 March 2021.
- (ii) In this report, “\$” refers to United States dollars.

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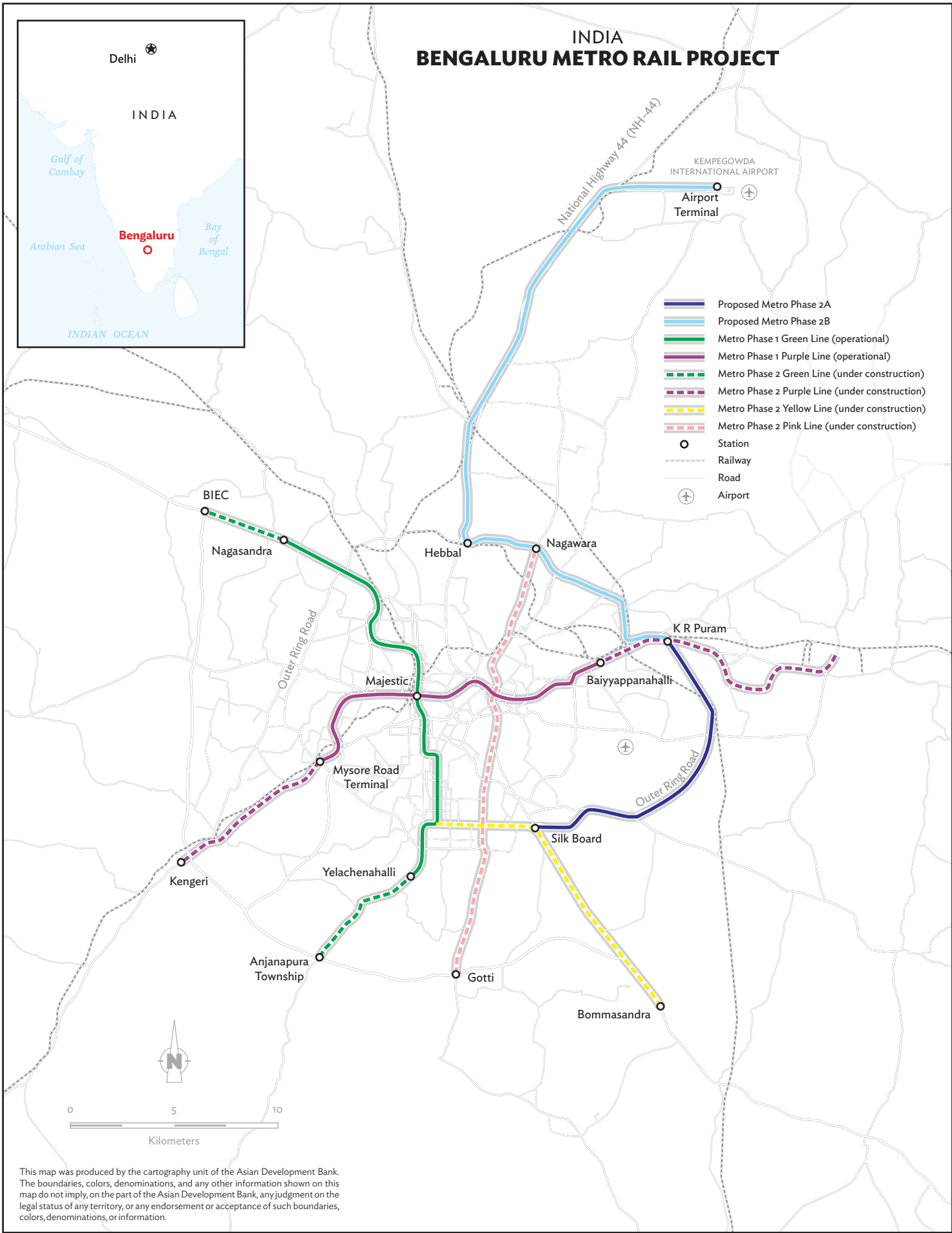
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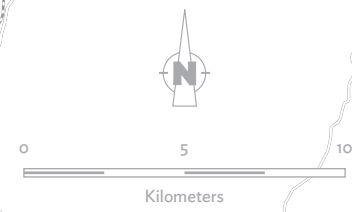
## PROJECT AT A GLANCE

<b>1. Basic Data</b>		<b>Project Number: 53326-001</b>	
<b>Project Name</b>	Bengaluru Metro Rail Project	<b>Department/Division</b>	SARD/SATC
<b>Country</b>	India	<b>Executing Agency</b>	Ministry of Housing and Urban Affairs
<b>Borrower</b>	Government of India		
<b>Country Economic Indicators</b>	<a href="https://www.adb.org/Documents/LinkedDocs/?id=53326-001-CEI">https://www.adb.org/Documents/LinkedDocs/?id=53326-001-CEI</a>		
<b>Portfolio at a Glance</b>	<a href="https://www.adb.org/Documents/LinkedDocs/?id=53326-001-PortAtaGlance">https://www.adb.org/Documents/LinkedDocs/?id=53326-001-PortAtaGlance</a>		
<b>2. Sector</b>		<b>Subsector(s)</b>	
✓ <b>Transport</b>	Urban public transport		<b>ADB Financing (\$ million)</b>
			500.00
		<b>Total</b>	<b>500.00</b>
<b>3. Operational Priorities</b>		<b>Climate Change Information</b>	
✓ Addressing remaining poverty and reducing inequalities	GHG reductions (tons per annum)		40,454
✓ Accelerating progress in gender equality	Climate Change impact on the Project		Medium
✓ Tackling climate change, building climate and disaster resilience, and enhancing environmental sustainability			
✓ Making cities more livable			
	<b>ADB Financing</b>		
	Adaptation (\$ million)		1.47
	Mitigation (\$ million)		498.53
	<b>Cofinancing</b>		
	Adaptation (\$ million)		0.00
	Mitigation (\$ million)		0.00
<b>Sustainable Development Goals</b>		<b>Gender Equity and Mainstreaming</b>	
SDG 9.1	Effective gender mainstreaming (EGM)		✓
SDG 10.3			
SDG 13.a			
	<b>Poverty Targeting</b>		
	General Intervention on Poverty		✓
<b>4. Risk Categorization:</b>	Complex		
<b>5. Safeguard Categorization</b>	Environment: A Involuntary Resettlement: A Indigenous Peoples: C		
<b>6. Financing</b>			
<b>Modality and Sources</b>		<b>Amount (\$ million)</b>	
<b>ADB</b>		<b>500.00</b>	
Sovereign Project (Regular Loan): Ordinary capital resources		500.00	
<b>Cofinancing</b>		<b>318.00</b>	
Japan International Cooperation Agency - Project loan (Not ADB Administered)		318.00	
<b>Counterpart</b>		<b>1,027.00</b>	
Government		1,027.00	
<b>Total</b>		<b>1,845.00</b>	
Note: An attached technical assistance will be financed on a grant basis by the Technical Assistance Special Fund (TASF-6) in the amount of \$2,000,000			
The government's counterpart funding of \$1,027 million is total of: i) \$555.8 million for ADB funding component; and ii) \$471.2 million for JICA funding component.			
<b>Currency of ADB Financing: US Dollar</b>			

# INDIA BENGALURU METRO RAIL PROJECT



- Proposed Metro Phase 2A
- Proposed Metro Phase 2B
- Metro Phase 1 Green Line (operational)
- Metro Phase 1 Purple Line (operational)
- Metro Phase 2 Green Line (under construction)
- Metro Phase 2 Purple Line (under construction)
- Metro Phase 2 Yellow Line (under construction)
- Metro Phase 2 Pink Line (under construction)
- Station
- Railway
- Road
- ✈ Airport



This map was produced by the cartography unit of the Asian Development Bank. The boundaries, colors, denominations, and any other information shown on this map do not imply, on the part of the Asian Development Bank, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries, colors, denominations, or information.

## I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on a proposed loan to India for the Bengaluru Metro Rail Project. The report also describes proposed technical assistance (TA) for Support for Integrated and Sustainable Urban Development along Mass Rapid Transit Corridors in Bengaluru City, and if the Board approves the proposed loan, I, acting under the authority delegated to me by the Board, approve the TA.

2. The project will support the Government of India in expanding the metro railway network in Bengaluru city by financing two new metro corridors totaling 56 kilometers (km) in length. The project will also support the preparation of urban development plans and implementation frameworks based on the principles of transit-oriented development (TOD) and multimodal integration (MMI). In addition, the project will improve the institutional capacity of relevant state government agencies and stakeholders at all levels for the delivery of sustainable and comprehensive urban mobility solutions and planning, designing, and managing TOD-based urban development schemes and programs. The project will improve mobility, livability, and the urban environment in Bengaluru by supporting provision of an efficient, safe, and inclusive transport system for all commuters that caters to the needs of elderly, women, children, and differently abled persons. The project is included in the country operations business plan for India, 2020–2022 of the Asian Development Bank (ADB).<sup>1</sup>

## II. THE PROJECT

### A. Rationale

3. **Bengaluru city.** Bengaluru is the capital city of the state of Karnataka in southern India.<sup>2</sup> It is India's fourth most populous city and one of the largest and fastest-growing metropolitan areas in the country, with an estimated population of 12.34 million in its urban area as of 2017, up from 8.5 million in 2011.<sup>3</sup> Bengaluru district is the most urbanized in Karnataka state, with 91% of its population living in urban areas. The city is a leading center of high-technology industries and information technology (IT), including robotics, biotechnology and engineering, electronics, and IT-enabled services. Manufacturing, services, and small and medium-sized enterprises in diversified sectors also make significant contributions to the local economy.

4. **Urban environment.** The population of Bengaluru grew 49% from 2000 to 2018. Migration from other areas in Karnataka and elsewhere, driven by work opportunities, has accounted for about 30% of that growth.<sup>4</sup> It is expected that the population of Bengaluru city will reach 16.2 million by 2030, from about 11.4 million in 2018.<sup>5</sup> The rapid pace of urbanization has not been without problems, which include urban sprawl, unplanned and/or sporadic development, and inadequate infrastructure. This has resulted in congestion, declining mobility for people and goods, high land prices, deteriorating infrastructure, and environmental degradation. These impacts reduce productivity, inhibit economic efficiency, and negatively affect quality of life. Although the

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<sup>1</sup> ADB. 2019. *Country Operations Business Plan: India, 2020–2022*. Manila.

<sup>2</sup> Bengaluru has been the official name of the city since 2014, although some incorporated and legacy organizations still carry the earlier spelling of "Bangalore."

<sup>3</sup> United Nations, Department of Economic and Social Affairs, Population Division. 2018. *The World's Cities in 2018—Data Booklet (ST/ESA/SER.A/417)*. New York.

<sup>4</sup> Bangalore Metropolitan Region Development Authority. 2016. *Final Report: Revised Structure Plan–2031, Bangalore Metropolitan Region*. Bengaluru.

<sup>5</sup> Bangalore Development Authority (BDA). *Revised Master Plan for Bengaluru-2031 (Draft): Volume 3 Masterplan Document*. Bengaluru.

coronavirus disease (COVID-19) has slowed economic activity in the city, the trend of population growth and urbanization is expected to continue.

5. **Transport congestion.** Rapid population growth and urbanization, a lack of integrated urban planning, and lagging transport network development have contributed to Bengaluru being one of the most congested cities in the world.<sup>6</sup> Peak hour traffic congestion in the city is worse than in other major cities in India, including Delhi and Mumbai, and the cost of congestion in the city is estimated at \$6 billion per year.<sup>7</sup> Vast urban sprawl is lengthening the average travel distance and time for commuters, especially for those travelling by private vehicle, while average travel speeds have been steadily declining.<sup>8</sup>

6. **Public transport.** Compared with other Indian megacities, Bengaluru relies heavily on road transport (footnote 7). Public transport in the city consists of railway, bus, and metro rail. The railway is mainly used for intercity services, although a few morning and evening suburban trains serve commuters living outside the city. Public bus service is the mainstay, mainly operated by Bangalore Metropolitan Transport Corporation, with a fleet of 6,000 city buses providing transportation to more than 3.5 million passengers per day.<sup>9</sup> However, city bus travel has been adversely affected by the rising congestion and declining average travel speeds on the city's roads. Average daily ridership of buses declined from 5.0 million in fiscal year (FY) 2014 to 3.5 million in FY2019.<sup>10</sup> Inadequate public transport and growth in family incomes in Bengaluru have resulted in a sharp increase in private vehicles on the roads. The number of registered vehicles in Bengaluru city rose from 3.2 million in 2009 to 8.6 million in 2020.<sup>11</sup> A 2016 survey found that about 91% of respondent households would be willing to shift to an improved public transport system if it offers attractive savings in travel time and cost.<sup>12</sup>

7. **Road network.** The total road length in the city boundary is about 2,537 km, 20% of which is of four lanes or more. The major roads are the Outer Ring Road (ORR) and six radial arterial roads stretching outward from the city center. The ORR, with a length of about 60 km, envelops Bengaluru's core. Most government, business, commercial, and institutional establishments are within or along the ORR. This has led to high pressure on housing, civic infrastructure, traffic congestion, and pollution. Radial roads and the ORR are heavily congested, and intersections of the ORR and radial roads are often gridlocked despite efforts to improve the roads and construct flyovers. The road network inside the ORR is already close to capacity, and little land is available to strengthen the transport system because of high land prices and dense development. The newer business zones are mainly located along the ORR and along the north–south axis outside the ORR. Meanwhile, outside the ORR, accessibility to transport is constrained because of a less dense road network and fewer public transport services. New circular roads outside the ORR have been proposed and discussed for years, but not implemented.

<sup>6</sup> ADB. 2019. *Fostering Growth and Inclusion in Asia's Cities*. Manila.

<sup>7</sup> Boston Consulting Group. 2018. *Unlocking Cities: The Impact of Ridesharing across India*. Delhi. Peak-hour congestion is defined as additional time to travel in peak hours, expressed in percentage. Bengaluru: 162%; Delhi: 129%; Jakarta: 79%; Manila: 132%; and Mumbai: 135%.

<sup>8</sup> A. Roychowdhury and G. Dubey. 2018. *The Urban Commute: And how it contributes to pollution and energy consumption*. New Delhi: Centre for Science and Environment.

<sup>9</sup> Data was provided by the Bengaluru Metropolitan Transport Corporation through the Bangalore Metro Rail Corporation Limited.

<sup>10</sup> Data was provided by the Bengaluru Metropolitan Transport Corporation through the Bangalore Metro Rail Corporation Limited.

<sup>11</sup> Data obtained from the Government of Karnataka, Transport Department.

<sup>12</sup> Rail India Technical and Economic Service Limited. 2016. *Traffic Demand Forecast and Identification of Phase – III Corridors of Bengaluru Metro*. Bengaluru.



8. **Northern development axis.** Multinational IT and IT-enabled service industries employing numerous professionals are located in IT parks along the ORR, and along National Highway 44 (NH-44). A radial arterial road stretching northeast from the city core, NH-44, is the main access road for Bengaluru's Kempegowda International Airport (KIA).<sup>13</sup> NH-44 is the locus for the growing peri-urban areas north and northeast of Bengaluru, where land is available and KIA acts as a development magnet. This has catalyzed residential and industrial development between Bengaluru city and the town of Devanahalli to the north. The ORR and NH-44 form the main access route from the north to the city.

9. **Bengaluru Metro.** Metro rail is the newest form of public transport in the city. Established in 2005 as a special purpose vehicle jointly held by the Government of India and the State Government of Karnataka, Bangalore Metro Rail Corporation Limited (BMRCL) constructed and operates the Bengaluru Metro. Phase 1 of Bengaluru Metro, which is 42.3 km long, was completed and became fully operational in 2017.<sup>14</sup> It comprises the East–West (Purple Line) and North–South (Green Line) lines. Phase 2 will extend the Purple and Green lines and construct two new corridors (Pink and Yellow lines) with a total length of 72.1 km. Phase 2 is being commissioned progressively, beginning in 2020, and will become fully operational by 2024.<sup>15</sup> Phases 2A and 2B are new phases planned as another two new corridors (expressed in blue and light blue respectively in project map). Developing metro rail connectivity along the ORR and NH-44 toward KIA will significantly improve the public transport situation and reduce the number of private vehicles on the road.

10. **Social inclusion and green transport.** Congestion increases travel time and costs, imposes social and economic costs on society, and impedes economic activity and growth. Constrained mobility has more adverse effects on socially vulnerable people, including the elderly, women, and differently abled persons. Newer metros in India have adopted good practices for gender equality and social inclusion, which this project will also adopt (para. 36).<sup>16</sup> A survey conducted by BMRCL in February 2020 found that 41.1% of Bengaluru Metro users are female, and that women consider metro rail safer than conventional public transport modes. Users also appreciate the affordability of metro rail since about 56.6% of Bengaluru Metro users have monthly incomes of less than ₹50,000 (about \$660). Meanwhile, the rapidly rising quantity of vehicles on the road has caused the air quality in Bengaluru to deteriorate; concentration of particulate matter 10 (PM10) exceeded international standard in 2019.<sup>17</sup> Improved public transport, especially rail-based mass transit, leads to fewer private vehicles on the road and improves air quality and the environment in general.

11. **Multidimensional approach to urban development and transport.** Population growth in Bengaluru city creates challenges related to urbanization, especially traffic congestion, decreased mobility, and poor quality of life. To become a livable and inclusive city that balances economic growth with environmental and social equality considerations, Bengaluru needs to

<sup>13</sup> KIA is the third busiest airport in the country, with 33.3 million passengers in 2018–2019. A second runway and terminal building are under construction to meet projected passenger volume of 55 million per annum by 2025.

<sup>14</sup> Japan International Cooperation Agency (JICA) and Agence Française de Développement (AFD) provided financial support for phase 1, together with domestic financial institutions. Bengaluru Metro is also known as Namma Metro or Bangalore Metro.

<sup>15</sup> AFD, European Investment Bank, and Asian Infrastructure Investment Bank provided financial support for phase 2, together with domestic financial institutions.

<sup>16</sup> ADB. ADB. 2019. [Report and Recommendation of the President to the Board of Directors: Proposed Loan to India for the Mumbai Metro Rail Systems Project](#). Manila.

<sup>17</sup> PM10 refers to particulate matter with a diameter of 10 micrometers or less. International Finance Corporation-Environmental Health Safety guideline is referred. Details are in Environment Impact Assessment reports.

adopt a multidimensional approach covering urban planning, urban development, and public transport development. To meet the development objectives of the city, the state government plans to (i) expand and improve public mass transit systems for the city, including metro rail, suburban rail, and bus transport; and (ii) pursue TOD, an urban development model to realign growth and densities along sustainably developed mass transit corridors to create higher density, compact, mixed use, mixed income, safe, and resource efficient neighborhoods. TOD aims to raise land values along these corridors, generating capital revenues for the state government to meet the city's long-term investment needs. However, implementing the approach will require strengthening the capacity of relevant state agencies.<sup>18</sup>

12. **Government strategy.** Supporting rail-based mass transit is in line with the National Urban Transport Policy 2006 of India, which promotes TOD and emphasizes nonmotorized and public transport over private automobiles.<sup>19</sup> TOD is promoted under the National Transit Oriented Development Policy 2017. Rail-based mass transit will alleviate air pollution in the city, in line with India's Nationally Determined Contribution to reducing global greenhouse gas emissions.<sup>20</sup> Improved public transport and TOD are also in line with the development plan of Bengaluru city (footnote 5). The Rights of Persons with Disabilities Act (2016) of India promotes mobility of vulnerable people. At state level, the Directorate of Urban Land Transport, established in 2007, oversees all urban land transport initiatives in Karnataka state including MMI. BMRCL issued the draft Bengaluru Transit Oriented Development Policy in February 2019.<sup>21</sup> The state government will revise the city master plan to integrate TOD principles in urban development plans and state regulations. The state government is expected to approve the Comprehensive Mobility Plan for Bengaluru by 2021 as a long-term plan of transport in the city emphasizing the needs of the metro. The project remains a high priority for the government because public expenditure on infrastructure can stimulate economic activity by creating jobs, thereby supporting the country's efforts to recover from the COVID-19 pandemic.

13. **ADB's strategic context.** The project is aligned with all three pillars of ADB's country partnership strategy: (i) boosting economic competitiveness by expanding infrastructure networks and corridor development, (ii) providing inclusive access to these infrastructure networks, and (iii) addressing climate change.<sup>22</sup> The project also meets the following operational priorities of ADB's Strategy 2030: (i) addressing remaining poverty and reducing inequalities; (ii) accelerating progress in gender equality; (iii) tackling climate change, building climate and disaster resilience, and enhancing environmental sustainability; and (iv) making cities more livable.<sup>23</sup>

14. **Implications of coronavirus disease on public transport.** Because of the COVID-19 pandemic, public transport demand plunged globally, with people shifting to private transport. However, considering constrained road capacity and the need for environment-friendly transport in Bengaluru, public transport will continue to play a significant role in transport network and a livable city beyond the short and medium term. Under the "new normal" brought about by COVID-19, public transport will be governed by new rules related to social distancing, off-peak commuting,

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<sup>18</sup> State line agencies concerned include BMRCL, the Directorate of Urban Land Transport, the Bengaluru Metropolitan Transport Corporation, and BDA.

<sup>19</sup> Government of India, Ministry of Housing and Urban Affairs. [Urban Transport](#) (accessed on 3 July 2019).

<sup>20</sup> On 2 October 2016, India submitted its Nationally Determined Contribution to the United Nations Framework Convention on Climate Change, which identified reduction of greenhouse gas emissions from the transport sector as a priority area.

<sup>21</sup> BMRCL. 2019. [Bengaluru Transit Oriented Development Policy](#). Bengaluru (draft).

<sup>22</sup> ADB. 2017. [Country Partnership Strategy: India, 2018–2022—Accelerating Inclusive Economic Transformation](#). Manila.

<sup>23</sup> ADB. 2018. [Strategy 2030: Achieving a Prosperous, Inclusive, Resilient, and Sustainable Asia and the Pacific](#). Manila.

contactless ticketing, and contact tracing of users. Implementing these rules will require better MMI, improved operational efficiency, and application of IT. Transport-led urban development emphasizing TOD principles and MMI will alleviate pressure on urban transport and contribute to more livable and walkable cities during the new normal and beyond.

## B. Project Description

15. The project is aligned with the following impact: urban mobility in Bengaluru improved.<sup>24</sup> The project will have the following outcome: efficiency, safety, and gender and social inclusiveness of urban rail transport in Bengaluru increased.<sup>25</sup>

16. **Output 1: New metro lines completed.** The project will finance the construction of new metro line phases 2A and 2B with a total length of 56 km, and 30 stations, about 90% of which comprises elevated structure, with the remaining 10% at ground level. The new metro lines will connect to other metro lines, i.e., yellow, purple, and red lines at three junction stations and Indian railways at one junction station, Phase 2B will also provide accessibility to public transport along the northern development axis (para. 8) along NH-44 up to KIA. Multimodal facilities to be developed at project metro stations include motorcycle pools, taxi stand, bus bays, and pedestrian walkways and bridges, which will enable smooth intermodal connectivity and provide improved last-mile connectivity.

17. **Output 2: Urban development plans and implementation frameworks based on transit-oriented development principles and multimodal integration plan developed for Bengaluru.** The project will support the state government's plan to increase the city's economic productivity through strategic urban renewal and densification, and devise people-oriented, environment-friendly mobility solutions. Consultants hired under the attached technical assistance will deliver (i) a TOD vision plan for the metro corridors and TOD-based urban development plans for six selected zones along the metro corridors; (ii) a TOD implementation framework; and (iii) an MMI plan for physical, informational, operational, and ticketing aspects, and support for institutionalization of this planning process.

18. **Output 3: Capacity of Bangalore Metro Rail Corporation Limited and relevant state line agencies improved in transit-oriented development and multimodal integration.** The concepts of TOD and MMI are new and complex. This output, funded by the attached technical assistance, will strengthen the capacity of state line agencies concerned (footnote 18) to design and implement TOD and MMI plans. The output will support line agencies in preparing TOD and MMI manuals, standard operating procedures, and tool kits. It will also support the development of a communication strategy, including public consultations, to promote public awareness of TOD.

## C. Value Added by ADB

19. The project will include strong gender and social inclusion measures, as per best practices following previous metro projects. The project includes non ADB-administered parallel cofinancing with the Japan International Cooperation Agency (JICA), which will finance rolling stock and signaling and telecommunication. A public-private partnership module is in advanced stage of discussion with Bangalore International Airport Ltd. to construct and lease back the metro line within the airport boundary. In addition, corporate sponsorships of station access and co-branded stations have been finalized or under negotiations as part of public-private partnership

<sup>24</sup> Government of India, Ministry of Urban Development. 2006. *National Urban Transport Policy*. New Delhi; and Government of India, Ministry of Urban Development. 2017. *Metro Rail Policy, 2017*. New Delhi.

<sup>25</sup> The design and monitoring framework is in [Appendix 1](#).

for funding the construction of stations. Maintenance of system and rolling stock will be contracted out mostly with the same suppliers or vendors after the defect liability period while operation remains under BMRCL. BMRCL expressed its commitment to involve private parties for maintenance of assets. ADB's Private Sector Operations Department initiated discussion with BMRCL to build up their capacity to explore non-sovereign borrowing to address future requirements. The project will showcase the multidimensional approach of urban and public transport to pursue effective urban transformation and to facilitate replication to other metro projects elsewhere in India, other South Asian countries and regions. The project will demonstrate effective methodology and implementation arrangement with multiple agencies and stakeholders related to TOD and MMI. ADB's participation contributed to initiating the partnership between Bengaluru and advanced cities, and facilitated knowledge transfer about best practices of transport-led urban development from the advanced cities to Bengaluru.<sup>26</sup>

#### D. Summary Cost Estimates and Financing Plan

20. The project is estimated to cost \$1,055.8 million (Table 1). JICA will provide \$318 million in parallel cofinancing for components of rolling stock and telecommunication and signaling, with corresponding \$471.2 million counterpart financing from the Government of India. These will be under separate contracts and will not be administered by ADB.

21. Detailed cost estimates by expenditure category and by financier are included in the project administration manual (PAM).<sup>27</sup> The loan will finance civil works for new metro lines. BMRCL will finance minor civil works, land acquisition costs, recurrent costs, and taxes and duties.

**Table 1: Summary Cost Estimates**  
(\$ million)

Item	Amount <sup>a</sup>
<b>A. Base Cost<sup>b</sup></b>	
Metro rail construction <sup>c</sup>	963.8
<b>Subtotal (A)</b>	<b>963.8</b>
<b>B. Contingencies<sup>d</sup></b>	<b>82.0</b>
<b>C. Financial Charges During Implementation<sup>e</sup></b>	<b>10.0</b>
<b>Total (A+B+C)</b>	<b>1,055.8</b>

<sup>a</sup> Includes taxes and duties of \$76.5 million. Such amount does not represent an excessive share of the project cost. The government will finance taxes and duties of \$76.5 million by cash contribution.

<sup>b</sup> In mid-2020 prices as of February 2020.

<sup>c</sup> Including land acquisition costs.

<sup>d</sup> Physical and price contingencies, and a provision for exchange rate fluctuation, are included.

<sup>e</sup> Includes interest, commitment, and other charges on Asian Development Bank financing.

Source: Asian Development Bank estimates.

22. The government has requested a regular loan of \$500 million 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; 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; and such other terms and conditions set forth in the draft loan and project agreements. Based on the straight-line method, the average maturity is 15.25 years, and the maturity premium payable to ADB is 0.10% per year.<sup>28</sup>

23. The summary financing plan is in Table 2. ADB will finance the expenditures in relation to

<sup>26</sup> Planned activities will include a study tour to a partner city for government and metro officials as well as workshops.

<sup>27</sup> Project Administration Manual is accessible from the list of linked documents in Appendix 2.

<sup>28</sup> The terms are subject to confirmation by the government.

civil works for the proposed new metro lines.

**Table 2: Summary Financing Plan<sup>a</sup>**

Source	Amount (\$ million)	Share of Total (%)
Asian Development Bank		
Ordinary capital resources (regular loan)	500.0	47.4
Government	555.8	52.6
<b>Total</b>	<b>1,055.8</b>	<b>100.0</b>

<sup>a</sup> Non-Asian Development Bank administered parallel cofinancing of \$318 million from the Japan International Cooperation Agency and its corresponding counterpart financing of \$471.2 million from the government are excluded from the table.

Source: Asian Development Bank estimates.

24. **Climate change adaptation and mitigation.** The climate change assessment revealed *medium* overall risk for the project. Bengaluru is projected to experience increased average temperature and occurrence of extreme weather events (e.g., heat waves, extreme rainfall events leading to floods). The project includes modern design and technology such as the use of head-hardened, heat-treated, and continuous welded rail to withstand extreme temperatures. To minimize flooding and facilitate recharging of groundwater, rainwater harvesting and recharge pits will be installed at stations and viaducts. In addition, waterproofing of tunnel walls and parapet walls at ramp sections will be carried out at the Yelahanka cut-and-cover section under line 2B. These measures to prevent flooding are estimated to cost about \$1.47 million, including incremental costs. The project is considered a positive climate mitigation project as it will result in a modal shift from road to rail, which is a cleaner mode of transport. Hence, the entire \$500 million of ADB financing is considered climate change mitigation and adaptation costs.<sup>29</sup>

## E. Implementation Arrangements

25. The Ministry of Housing and Urban Affairs (MOHUA) acting through BMRCL will be the executing agency for the project. BMRCL has established a project implementation unit in Bengaluru, led by a project director. A general consultant will be engaged by BMRCL using counterpart funds to support the executing agency. The implementation arrangements are summarized in Table 3 and described in detail in the PAM (footnote 27).

**Table 3: Implementation Arrangements**

Aspects	Arrangements		
Implementation period	December 2020–December 2026		
Estimated completion date	31 December 2026		
Estimated loan closing date	30 June 2027		
Management			
(i) Executing agency	Ministry of Housing and Urban Affairs, acting through BMRCL		
(ii) Key implementing agencies	Project implementation unit in BMRCL		
(iii) Implementation unit	Bengaluru, 113 staff		
Procurement	Open competitive bidding (internationally advertised)	6 contracts	\$488.5 million
Retroactive financing and/or advance contracting	BMRCL will use advance contracting and retroactive financing for civil works for the project. Retroactive financing will be up to 20% of the loan proceeds to finance expenditures incurred prior to loan effectiveness, but not earlier than 12 months from the date of the		

<sup>29</sup> \$1.47 million under climate adaptation and \$498.53 million under climate mitigation. Details are in the Climate Change Assessment.

Aspects	Arrangements
	legal agreements.
Disbursement	The loan proceeds will be disbursed following ADB's <i>Loan Disbursement Handbook</i> (2017, as amended from time to time) and detailed arrangements agreed between the government and ADB.

ADB = Asian Development Bank, BMRCL = Bangalore Metro Rail Corporation Limited.

Source: Asian Development Bank.

26. **Project readiness and impact of COVID-19 on implementation.** Readiness is high as the complete scope of the project was appraised by ADB. Environmental and social due diligence has been completed for the entire metro corridor. The detailed designs are ready, based on engineering survey results. Land acquisition and resettlement have progressed. The COVID-19 pandemic has not affected the project implementation arrangements or cost estimate. The implementation period of 6 years is adequate to complete the project without delays. Based on government orders, guidelines and standard operating procedures have been developed and are being strictly implemented for resumption of construction works on phase 2 of the metro. Under the project, construction works will include measures such as social distancing at site, sanitation and disinfection requirements, temperature checks, and mandatory insurance requirements covering COVID-19. Operation of the Bengaluru Metro resumed on 7 September 2020 with standard operating procedures under the government's guideline, introducing social distancing, sanitization, and other safety measures for passengers and workers.

### III. ATTACHED TECHNICAL ASSISTANCE

27. The attached transaction TA, Support for Integrated and Sustainable Urban Development along Mass Rapid Transit Corridors in Bengaluru City, will assist the state government in structuring mobility solutions and developing a new model for sustainable redevelopment and growth for Bengaluru city, taking advantage of the proposed mass rapid transit system expansion plan. The TA will support the state government to prepare urban development plans and implementation frameworks based on TOD principles to facilitate urban rejuvenation in Bengaluru by realigning growth and densities along the new mass transit corridors (para. 11). This new planning approach will reduce Bengaluru's carbon footprint while enhancing land values along the corridor to generate capital revenues to meet the city's long-term investment needs. To provide efficient, accessible, convenient, and safe mobility options for all commuters, the state government will use the TA support to plan enabling infrastructure and to create institutional provisions for seamless integration of different modes of public transport. The TA will strengthen institutional structures and build the capacities of BMRCL, the Directorate of Urban Land Transport, and the state government to plan and implement TOD and MMI. The TA will also help the state government incorporate lessons from similar brownfield TOD developments and MMI initiatives in the region, and identify measures, including broad-based participatory approaches, to ensure stakeholder and market buy-in and enable urban transformation at the required scale for the benefit of all segments of society.

28. The TA is estimated to cost \$2,200,000, of which \$2,000,000 will be financed on a grant basis by ADB's Technical Assistance Special Fund (TASF-Others), and will be implemented over 24 months. The state government, acting through BMRCL, is the executing agency of the TA.<sup>30</sup> The government will provide counterpart support in the form of staff, office space, and other in-kind contributions.

<sup>30</sup> The implementation arrangements are in Attached Technical Assistance Report (accessible from the list of linked documents in Appendix 2).

## IV. DUE DILIGENCE

### A. Technical

29. An external engineering consultant firm funded by BMRCL prepared the detailed design of the civil works. The technical viability is sound, with the use of well-proven technology and standards. About 90% of the project alignment comprises elevated structures on road medians or alongside roads, while the remaining alignment is at ground level. Station locations and layout were prepared to secure connectivity with other lines of the metro, and other transport modes. The impact of climate change was considered and is reflected in the design of the infrastructure. MMI at major junction stations will be further elaborated under the attached TA. The application of similar standards and specifications for rolling stock, telecommunications, signaling, and other equipment, as in previous phases of the metro, will minimize the operational and engineering risks. The project will also introduce new technology such as nationwide integrated fare cards, which will replace the stand-alone card system in place.

### B. Economic and Financial Viability

30. **Economic assessment.** The economic evaluation of the project was conducted in accordance with ADB's guidelines, and compared the project costs and benefits in the "with-project" and "without-project" cases, using a 9% discount rate and economic internal rate of return (EIRR) and net present value as decision criteria. The project will transform Bengaluru into a more livable, inclusive, and green city. Its benefits were measured in terms of vehicle operating cost and travel time savings for both public transport users and road users, reduced road accidents, improved metro passenger safety, and reduced greenhouse gas emissions and air pollution. The EIRR of the project is estimated to be 13.4%, with a net present value of \$798.6 million, although it is based on a demand forecast prepared before the COVID-19 pandemic. A sensitivity analysis indicated that the EIRR remained above 9% under all scenarios, demonstrating that the project would remain economically viable given adverse changes in costs and benefits. As found in the survey (para. 10), public transport users expect the project metro to remain affordable, safe, socially inclusive, and gender-equal.<sup>31</sup>

31. **Financial assessment.** The financial evaluation of the project was conducted in accordance with ADB guidelines.<sup>32</sup> It assessed the incremental costs and earnings that would accrue to the BMRCL as a result of the project, and calculated the financial internal rate of return. The project's weighted average cost of capital was estimated to be 2.63%. For the purposes of financial sustainability, capital costs, irrespective of the financier, include the cost of rolling stock; civil works and its associated facilities, including stations; and a maintenance depot. Operations and maintenance costs include all staff costs, unit maintenance costs, and energy costs. The evaluation conservatively assumes that the traffic level in the first 2 years of operations will remain low and ramp up to the forecast estimates by the third year after commencement. The project revenues include farebox revenues from ticket sales, non-farebox revenues from advertisements, and rentals at metro stations as non-farebox revenue. A conservative approach to determine the non-farebox revenue, at 10% of the farebox revenue, has been adopted. All financial projections are assessed in 2020 prices, in real terms. The estimated financial internal rate of return of the net cash flows for the project is 1.92% in real terms, which is below the weighted average cost of

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<sup>31</sup> Financial Analysis; and Economic Analysis (both accessible from the list of linked documents in [Appendix 2](#)).

<sup>32</sup> ADB. 2019. [Financial Analysis and Evaluation](#). Manila.

capital.<sup>33</sup> The profitability projections indicate an operational loss for the first 2 years of operations.<sup>34</sup> The earnings before interest, taxes, depreciation, and amortization (EBITDA) margin of the project works out to about 41% in FY2027 and increases thereafter. BMRCL will require a sponsor to provide support for its debt service obligations to the extent of ₹4,803 million in 6 years out of 25 years of the projection period (footnote 33). The project's lending decision is based on economic viability rather than financial viability.

### C. Sustainability

32. BMRCL, as a special purpose vehicle set up jointly by the government and the state government, will own, operate, and maintain the new metro lines. BMRCL is dependent on government and state government funding for capital expenditures. Any sovereign borrowing is through the government, while non-sovereign borrowing is limited and/or backstopped by the state government. There is an institutional mechanism to ensure the financial sustainability of the metro whereby any future operational loss will be backstopped by the state government, similar to previous phases of the metro.<sup>35</sup> Since becoming fully operational from phase 1 in 2017, the metro has been recognized as a safe, fast, reliable, and environment-friendly form of public transport in the city. As of FY2019, the metro was able to meet its operational costs (excluding depreciation and finance costs) from its operating revenue, with the state government reimbursing cash losses (mainly due to finance costs). With ridership projected to keep increasing after phases 2, 2A, and 2B are operational, the metro is expected to play a more significant role in the entire transport network to meet travel demand. Also, the project's TOD approach, which will be implemented by a multiagency forum established under the attached TA, will remain mainstream in urban development in the medium and long term. Aside from guaranteeing reimbursement of cash losses to BMRCL, the state government will collect incremental revenues through land value capturing along TOD which will be credited for the benefit of urban transport projects, including the metro, in the state. Credit rating agencies have given BMRCL an AA stable credit rating for its 10-year secured, nonconvertible, privately placed debentures Namma Metro Bonds Series 1.<sup>36</sup>

### D. Governance

33. **Financial management.** The financial management assessment was conducted following ADB's guidelines.<sup>37</sup> BMRCL's relative strengths in financial management include (i) governance by a robust national legislative framework; (ii) an annual external audit by the comptroller and auditor general of India and by an independent firm of chartered accountants with unqualified audit opinions on financial statements and internal control over financial reporting; (iii) nomination or appointment of board members and senior management directly by central and state governments; (iv) organization-wide use of a centralized enterprise resources planning software; and (v) extensive experience with the disbursement and procurement procedures of international development agencies through the construction of previous phases of the metro. The overall pre-mitigation financial management risk was assessed as *moderate*. The primary risk factors include (i) vacancies at key accounting positions (recruitment already in process); (ii)

<sup>33</sup> Details are in Financial Analysis (accessible from the list of linked documents in Appendix 2).

<sup>34</sup> Defined as operational revenue (farebox and non-farebox) less operational expenses (staff, power, and maintenance expenses). Interest expense (finance cost) is not part of operational expenses.

<sup>35</sup> Memo of Understandings will be signed before loan signing of the project among MOHUA, the government of Karnataka, and BMRCL.

<sup>36</sup> BMRCL issued 10-year secured, nonconvertible privately placed debentures Namma Metro Bonds Series 1 in 2014. Credit rating agencies India Ratings & Research Private Limited and Brickwork Ratings rate these debt instruments *AA stable*.

<sup>37</sup> ADB. 2019. [Financial Analysis and Evaluation](#). Manila; and ADB. 2015. [Financial Management Assessment](#). Manila.



manual processing of invoices in the interim period while the enterprise resource planning system is being fully integrated; (iii) out-of-date finance and accounting manuals; and (iv) current use of text-based descriptive accounting codes. BMRCL has agreed to implement a comprehensive financial management action plan to address the identified risks. Key mitigation measures agreed with BMRCL include (i) hiring key accounting staff, (ii) updating the accounting manual, (iii) developing a comprehensive chart of accounts, and (iv) fully automating processes in all areas in the enterprise resource planning along with integration of existing software modules. At the project level, BMRCL has agreed to assign a dedicated team of accounting staff, headed by a general manager, to assume financial management of the project.

34. **Procurement and value-for-money.** The project procurement risk assessment shows *low* to *medium* risk after mitigation measures are implemented. BMRCL follows domestic procurement regulations, which are consistent with the core principles of the ADB Procurement Policy (2017, as amended from time to time). BMRCL has experience with procurement on projects funded by bilateral agencies and multilateral development banks to construct previous phases of the metro. Procurement will follow the ADB Procurement Policy and Procurement Regulations for ADB Borrowers (2017, as amended from time to time). An ADB project team will closely monitor procurement to ensure timely completion of procurement activity. All works packages will be subject to prior review procedures to avoid any risks of noncompliance in the procurement process. Optimizing value-for-money was sought through strategic procurement planning and risk-managed approaches such as (i) open competitive bidding with multiple-contracts bidding, (ii) attractive contract sizes for international bidders, (iii) higher-performance securities to avoid abnormally low bids, (iv) framework for prompt interim progress payments to contractors, (v) additional advance payments for smooth cash flow, and (vi) incentive clauses for early completion. There are strict prohibitions on fraud and corruption through the Fraud Prevention Policy and Whistleblower Policy in the legal framework of BMRCL. ADB's Anticorruption Policy (1998, as amended to date) was explained to and discussed with the government and BMRCL. The specific policy requirements and supplementary measures are described in the PAM.

## E. Poverty, Social, and Gender

35. **Poverty.** Based on 2012 estimates, the poverty incidence<sup>38</sup> in the state of Karnataka is pegged at 21% on average (rural 25%, urban 15%). About 20% of the city's population is believed to be living in slums where poverty is prevalent. The project will improve the interconnectivity and increase the reach of the metro rail network, while supporting the economic development of Bengaluru city and Karnataka state. At a broader level, economic activity and competitiveness will increase, while at the local level, access to urban public and social services such as schools, health facilities, and workplaces will improve. The population, especially the poor and vulnerable, will benefit from the improved urban transport and improved access to economic and social opportunities and amenities.

36. **Gender equality and social inclusion.** The project is classified *effective gender mainstreaming*. BMRCL conducted extensive public consultations and stakeholder engagement activities in preparing a gender equality and social inclusion (GESI) action plan.<sup>39</sup> Building upon the existing gender and development initiatives of BMRCL, the GESI action plan integrates additional GESI activities into the project design, including (i) ensuring that Bengaluru Metro phases 2A and 2B follow international standards and address gender-specific safety and public

<sup>38</sup> Percentage of population below poverty line.

<sup>39</sup> Gender Equity and Social Inclusion Action Plan (accessible from the list of linked documents in Appendix 2).

health concerns, with a focus on the needs of elderly, women, children, differently abled, and trans-person (EWCDT) user groups; (ii) ensuring that TOD and MMI urban development strategies incorporate GESI measures; and (iii) strengthening the capacity of BMRCL and relevant state line agencies to be gender-sensitive and socially inclusive. The project GESI action plan has benefitted from multiple focus group discussions with transgender persons, women's groups, and students from different learning institutions in Bengaluru. In addition, a GESI "walk" in an existing metro station was organized with trans women, persons with visual and mobility impairments, and women's groups. The walk was an opportunity to allow these user groups to offer feedback on issues such as access, movement within the station, and the experience of the train commute.

37. **Public health and safety.** Under the project, metro facilities will be used as platforms for educating the public on public health and safety; prevention of communicable diseases, including COVID-19 and any other pandemic prevention; and the zero-tolerance approach to sexual harassment. Messages will be transmitted via an integrated EWCDT-friendly signage system and multimedia materials in all coaches and stations.

## F. Safeguards

38. In compliance with ADB's Safeguard Policy Statement (2009), the project's safeguard categories are as follows.<sup>40</sup>

39. **Environment (category A).** The project will entail new construction of mostly elevated structures and viaducts with very short at-grade segments, mostly along the centerlines of existing highways. Phase 2A passes through more developed parts of the city, but proposed designs for this line have adopted a site-specific design approach that will greatly reduce environmental and social impacts. The immediate corridor is mostly lined with commercial establishments, with some portions of phase 2B passing through open government lands and large residential areas occupying several segments of the 300-meter assessment corridor for both lines. Stations of phase 2B mostly fall within open grounds. Phase 2A passes through more developed parts of the city but proposed designs for this line have adopted a site-specific design approach that will greatly reduce environmental and social impacts.

40. Several sensitive receptors are along the alignment such as hospitals, religious establishments, and schools; these will require particular attention. Because of the large-scale and elevated nature of most of the construction works, most anticipated risks are related to community and occupational health and safety, especially along congested segments of the alignment with high pedestrian traffic. The risk of COVID-19 spread is a particular concern, both during construction and operation. Other construction-related issues are noise and vibration, dust, water pollution, and large volumes of excavated waste, but these will be mostly limited to the construction phase. However, long-term noise and vibration impacts as well as alteration of the skyline and cityscape were also identified during due diligence.

41. Based on the detailed project report, BMRCL prepared environmental impact assessments and contract package-specific environmental management plans (EMP), in accordance with ADB's Safeguard Policy Statement, which were disclosed on the ADB website on 15 June 2020. The EMPs, which include measures for communicable disease prevention with particular attention to COVID-19 and the safety, health, and environment guidelines for metro projects in India, were included in the bidding documents. COVID-19 provisions may be revised

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<sup>40</sup> ADB. [Safeguard Categories](#).

according to national guidelines and international best practices as the situation evolves. Through its social and environment unit, BMRCL will ensure that all environmental safeguard requirements under the project will be implemented as required in these documents. Consultations with affected communities and key stakeholders were held during project design preparation to gather inputs for the EMPs. Regular consultation meetings will be held between the project management and the community. In addition, a grievance redress mechanism has been established and will be made available online. An external monitor will be engaged to conduct independent monitoring of EMP compliance. Semiannual environment monitoring reports will be prepared and disclosed in the ADB website throughout construction and during the first 2 years of operation.<sup>41</sup>

42. **Involuntary resettlement (category A).** Land acquisition and resettlement for lines 2A and 2B will affect private assets—mainly land and structures that are being acquired under the project. Line 2A will entail impacts on 111 households comprising 46 titled owners and 65 tenants. Total land acquisition for the project section of Line 2A will be 48,215.5 square meters (m<sup>2</sup>), of which 26,379.3 m<sup>2</sup> is private land and the remainder is government land. Line 2B will entail impacts on 380 households comprising 187 titled owners, 189 tenants, and 4 non-title holders. Total land acquisition for the project section of Line 2B will be 319,244.5 m<sup>2</sup>, of which 101,217.38 m<sup>2</sup> is private land and the remainder is government land. Total affected households for the two lines are 491, covering an estimated 816 affected persons. Land acquisition commenced in September 2018 and should be completed by the end of 2020. BMRCL prepared resettlement plans, including due diligence for land that had already been acquired. The resettlement plans outline entitlements consistent with national and ADB safeguard requirements, summarize public consultations and information disclosure, describe the grievance redress mechanism, and stipulate institutional arrangements to ensure that the plans are implemented accordingly. Due diligence on land already acquired indicate consistency with ADB’s Safeguard Policy Statement requirements, particularly the replacement cost principle. BMRCL is found to have the capacity and the commitment to ensure that land acquisition and resettlement are carried out adequately and in accordance with national and ADB requirements. BMRCL will engage an external monitor to validate the implementation of resettlement plans.

43. **Indigenous peoples (category C).** The project will not affect indigenous communities, as defined under ADB’s Safeguard Policy Statement.

## G. Summary of Risk Assessment and Risk Management Plan

44. Significant risks and mitigating measures are summarized in Table 4 and described in detail in the risk assessment and risk management plan.<sup>42</sup>

**Table 4: Summary of Risks and Mitigating Measures**

<b>Risks</b>	<b>Mitigation Measures</b>
Delay in delivery of rolling stock and other equipment to be financed by a cofinancier	BMRCL has committed to ensure timely delivery of the equipment. Close coordination and monitoring of progress of the components are required.
COVID-19 pandemic adversely impacts construction and operation	Standard operating procedures in line with national and state government guidelines are being implemented by BMRCL to ensure that maximum precautions are taken to protect workers at construction sites.
BMRCL’s financial sustainability is dependent	The state government has provided assurances for

<sup>41</sup> Details on institutional setup and monitoring requirements are in Project Administration Manual (accessible from the list of linked documents in Appendix 2).

<sup>42</sup> Risk Assessment and Risk Management Plan (accessible from the list of linked documents in [Appendix 2](#)).

<b>Risks</b>	<b>Mitigation Measures</b>
on support from the state government to backstop operational losses and provide credit enhancement support, including debt servicing. Any delay in release of funds and other support by the state could adversely affect the operations of BMRCL. The economic slowdown caused by the COVID-19 pandemic may significantly impact the state government's ability to finance the operational losses of BMRCL.	sufficient budget, timely release of funds, and provision of credit enhancement support to ensure that the financial sustainability of BMRCL's metro operations is in accordance with government orders. Appropriate financial covenants for limiting BMRCL's exposure to external debt and for periodic fare reviews and revisions to minimize losses are included in the loan agreement.

BMRCL = Bangalore Metro Rail Corporation Limited, COVID-19 = coronavirus disease.  
Sources: Asian Development Bank.

## **V. ASSURANCES**

45. The Government of India, the Government of Karnataka, and BMRCL have assured ADB that implementation of the project shall conform to all applicable ADB requirements, including those concerning anticorruption measures, safeguards, gender, procurement, consulting services, financial management, and disbursement as described in detail in the PAM and loan documents.

46. The Government of India and BMRCL have agreed with ADB on certain covenants for the project, which are set forth in the draft loan agreement and project agreement.

## **VI. RECOMMENDATION**

47. 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 \$500,000,000 to India for the Bengaluru Metro Rail Project, from ADB's ordinary capital resources, in regular terms, 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.

Masatsugu Asakawa  
President

11 November 2020



Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
implementation frameworks based on transit-oriented development principles and multimodal integration plan developed for Bengaluru.	<p>completed, with GESI measures incorporated<sup>e</sup> (2019 baseline: Not applicable) (OP 1.3.3, OP 2.3.2, OP 4.2)</p> <p>2b. By 2023, design guidelines for integration for various components of public transport including metro station, bus stop, bus terminal, multimodal hub; road network and its hierarchy and non-motorized transport infrastructure developed, with GESI measures (2019 baseline: Not applicable) (OP 1.3.3, OP 2.3.2, OP 4.2)</p>	<p>gazette notification</p> <p>2b. Government notification</p>	
3. Capacity of Bangalore Metro Rail Corporation Limited and relevant state line agencies improved in transit-oriented development and multimodal integration <sup>f</sup>	<p><b>Under transaction TA:</b></p> <p>3a. By 2023, at least 200 staff, at least 20% of whom are female, of BMRCL, DULT, BMTCL, BDA, and other related agencies reported increased knowledge and capacity to implement the TOD projects and MMI (2019 baseline: Not applicable) (OP 4.2, OP 6.1, OP 6.1.1)</p> <p>3b. By 2023, at least 2,000 locals along the corridors, with a minimum of 33% females, reported increased awareness on TOD and MMI (2019 baseline: 0)</p> <p>3c. By 2023, measures to support project implementation such as manual, SOP, and toolkit completed (2019 baseline: not completed)</p>	3a.-c. TA consultant's report and project progress report	
<p><b>Key activities with milestones</b></p> <p><b>1. New metro lines completed</b></p> <p>1.1 Commence advance contracting for civil works in Q4 2019.</p> <p>1.2 Award civil works contracts for Phase 2A in Q4 2020.</p> <p><b>2. Urban development plans and implementation frameworks based on transit-oriented development principles and multimodal integration plan developed for Bengaluru.</b></p> <p>2.1 Commence advance contracting for consulting services in Q3 2020.</p> <p>2.2 Mobilize consultant in Q1 2021.</p> <p>2.3 Complete assignment in Q1 2023.</p>			

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
<p><b>3. Capacity of Bangalore Metro Rail Corporation Limited and relevant state line agencies improved in transit-oriented development and multimodal integration.</b></p> <p>3.1 Commence advance contracting for consulting services in Q3 2020.  3.2 Mobilize consultant in Q1 2021.  3.3 Complete assignment in Q1 2023.</p> <p><b>Project Management Activities</b>  Establish project implementation unit by Q4 2019.</p>			
<p><b>Inputs</b>  ADB: \$500,000,000 (loan)  \$2,000,000 (TA grant)  Government: \$555,800,000</p>			
<p><b>Assumptions for Partner Financing</b>  JICA project loan: \$318 million (outputs not administered by ADB that are necessary to reach the outcome include procurement of rolling stock and signaling and telecommunication system)</p>			

ADB = Asian Development Bank; BDA = Bangalore Development Authority; BMRCL= Bangalore Metro Rail Corporation Limited; BMTC = Bangalore Metropolitan Transport Corporation; DULT = Directorate of Urban Land Transport; EWCDT = elderly, women, children, differently abled, and trans-persons; GESI = gender equality and social inclusion; JICA = Japan International Cooperation Agency; km = kilometer; MMI = multimodal integration; OP = operational priority; Q = quarter; TA = technical assistance; TOD = transit-oriented development.

Note: Contribution of the project to the new ADB Results Framework to be determined.

<sup>a</sup> Government of India, Ministry of Urban Development. 2006. [National Urban Transport Policy](#). New Delhi; and Government of India, Ministry of Urban Development. 2017. [Metro Rail Policy](#). New Delhi.

<sup>b</sup> Morning peak time is defined as 7 a.m. to 10 a.m.

<sup>c</sup> Operation-related skilled staff in BMRCL include train operators, junior and section engineers, maintainers, assistant managers, and station superintendents.

<sup>d</sup> EWCDT-responsive features as described in the project's Gender Equality and Social Inclusion Action Plan (accessible from the list of linked documents in Appendix 2).

<sup>e</sup> GESI measures as described in the project's Gender Equity and Social Inclusion Action Plan (accessible from the list of linked documents in Appendix 2).

<sup>f</sup> In addition to BMRCL, state line agencies responsible for planning, designing, and implementing transit-oriented development projects and multimodal integration include DULT, BMTC, and BDA.

Source: Asian Development Bank.

### **LIST OF LINKED DOCUMENTS**

<http://www.adb.org/Documents/RRPs/?id=53326-001-3>

1. Loan Agreement
2. Project Agreement
3. Sector Assessment (Summary): Transport (Rail and Urban)
4. Project Administration Manual
5. Financial Analysis
6. Economic Analysis
7. Summary Poverty Reduction and Social Strategy
8. Risk Assessment and Risk Management Plan
9. Contribution to Strategy 2030 Operational Priorities
10. Attached Technical Assistance Report
11. Climate Change Assessment
12. Gender Equality and Social Inclusion Action Plan
13. Environmental Impact Assessment (Phase 2A)
14. Environmental Impact Assessment (Phase 2B)
15. Draft Due Diligence cum Resettlement Plan (Phase 2A)
16. Draft Resettlement Plan (Phase 2B)
17. Development Coordination