Modified

GOVERNMENT OF KHYBER PAKHTUNKHWA
TRANSPORT & MASS TRANSIT DEPARTMENT

CONSTRUCTION OF PESHAWAR MASS TRANSIT SYSTEM (BRT)

Peshawar Sustainable Bus Rapid Transit Corridor Project

ADP NO. 1429 (Code # 130525)

PC-I
(REVISED)

Volume – I

October, 2018

ESTIMATED COST: PKR 66.437 Billion

Peshawar Development Authority

GOVERNMENT OF PAKISTAN
PLANNING COMISSION
(INFRASTRUCTURE SECTOR)

<table>
<tr><td>1</td><td>Name of the Project</td><td>Peshawar Sustainable Bus Rapid Transit Corridor Project</td></tr>
<tr><td>2</td><td>Location of the Project – Area Map</td><td>Peshawar BRT Project alignment starts from Chamkanion GT Road through PirZakori Bridge, Peshawar Bus Terminal, Hashtnagri, Hospital Road, Khyber Bazar,Soekarno Chowk,Shoba Chowk, Railway Road, Sunehri Masjid Road, Aman Chowk, University Road, Board Bazar, Hayatabad, terminates at Karkhano Market on Jamrod Road.

See Annexure I for route aligsnment</td></tr>
<tr><td>3</td><td>Authorities responsible for:

i) Sponsoring

ii) Execution

iii) Operation and maintenance</td><td>

Transport & Mass Transit Department, Government of Khyber Pakhtunkhwa(Annual Development Program) with Financial Assistance from Asian Development Bank (ADB) and Agence Francaise de Development (AFD)

Project Cost Share
<table><tr><th>Currency</th><th>ADB + AFD</th><th>GoKP</th><th>TOTAL</th></tr><tr><td>PKR (million)</td><td>53,320</td><td>13,117</td><td>66,437</td></tr></table>**USD conversion rate for old PC-I: 1 USD = PKR 104.7
*USD conversion rate for revised PC-I: 1 USD = PKR 112
****EURO conversion rate is assumed to be 1 EURO = PKR 140, which will be finalized based on the loan agreement with AFD.

Peshawar Development Authority (PDA) and TransPeshawar

TransPeshawar</td></tr>
<tr><td>4</td><td>(a) Plan Provision:

i) If the project is included in the medium term/five year plan, specify actual allocation</td><td>Scheme was included in 2016-17 and current financial year ADP 2018-19.

The project is being undertaken by the Government of Khyber Pakhtunkhwa as a high priority project conceived by CDIA pre-feasibility study (May, 2014) and PPTA feasibility/ preliminary engineering design study (December, 2016). Both studies were undertaken through ADB grant.

Detailed Engineering Design was completed under Project Design Advance (PDA) soft loan by ADB and counterpart funding by GoKP, whereas implementation of the project is ensured through financial assistance from ADB, . The BRT project aims to provide and improve the public transport system of Peshawar City. This will also change the urban fabric of Peshawar and shift the mindset of private motorists to public transport and will have significant advantages in the form of fuel saving, travel time, and cleaner and greener environment.</td></tr>
</table>

	ii) If not then what warrants its inclusion and how is it now proposed to be accommodated	Not Applicable
	iii) If not included in the current plan, if the project is proposed to be financed out of block provision, indicate.	Not Applicable
	(b) Provision in the current year PSDP/ADP	Yes, ADP NO. 1429 (Code # 130525) titled as Peshawar Mass Transit System (Bus Rapid Transit – Asian Development Bank assisted).
5	**Project Objectives:**	Peshawar is the capital of Khyber Pakhtunkhwa (KP) province of Pakistan. Over the past few decades, the city faced rapid increase in population due to its diversity, geo-strategic location, and socio-economic status of the city. Tens of thousands of commuters travel across the city every day which includes common citizens, students, traders, patients, and international passenger traffic. Available transportation facilities are highly deficient and of inferior quality. Old model Buses, Mazda/Mini Buses, Suzuki Pickups, Datsun Pickups and Ford wagons of varied sizes are the only option for the commuters travelling through public transport facilities. The existing transportation system is thus facing multiple problems such as lack of planning & regulation, absence of public transport infrastructure, poor design and management of road infrastructure, no traffic management and reliance on private vehicles which are ultimately causing dire traffic congestion in peak hours and severe environmental issues. Therefore, there is a need to address these problems in a holistic manner following the principles of sustainable transportation planning and management. The project is aimed to achieve the following objectives: • To introduce well planned, designed, efficient, reliable, and comfortable user friendly Bus Rapid Transit system which will be integrated with existing transport facilities; • To provide infrastructure that allows buses to ply in an efficient manner with dedicated right of way for a significant portion of route length; • To introduce feeder routes along with main BRT corridor to accommodate major high capacity existing radial routes; • Provision of Park & Ride facilities with an integration to major commercial centers to minimize private vehicle dependence; • Provision of Walking and Cycling facilities and it's integration with BRT system to make city more accessible for Non-Motorized Travel; • To overall reduce travel time and delays for whole transport system of Peshawar; • To improve the quality of life of commuters in Peshawar

	i) Objectives of the sector/sub sector as indicated in the medium term/five year plan be reproduced	A 20 year public transport road map was developed in Urban Transport Pre-feasibility Study (PFS) which was completed under City Development Initiative for Asia (CDIA) in May, 2014. Six corridors were identified by the Pre-feasibility Study which formed the basis for Bus Rapid Transit (BRT) system of Peshawar. They are to be developed through a phased, corridor-based investment program as part of the 20-year public transport roadmap. The following objectives are linked with the project: • Provide safe, efficient, and well-integrated mass transit system with focus on reliability, affordability, and convenience • Improve safety, energy efficiency and air quality through minimizing private vehicle use • Strengthen existing transportation infrastructure and services by adopting various alternatives • Develop transport infrastructure to support and intensify existing land-use through the introduction of Transit Oriented Development (TOD), leading to densification and enhancement of commercial activities.
	ii) Linkage of the project with other sectoral objectives	The project is aimed to achieve the goals of sustainable development in which 'transportation system' will be efficiently and effectively integrated with 'urban planning', and 'other modes' of transport. Some of the main objectives which will be achieved through the project are as follows: a) A mass transit system (MTS) that facilitates and encourages high density commercial and residential development, and leads to containment of urban sprawl; b) Minimize duplication / overlapping of public transport on formal & informal routes; c) Maximize ridership and ensures integration with other transport modes, and is in line with land use and caters to activity centers i.e. Transport Oriented Development; d) High level of service in terms of speed, safety, frequency and accessibility (geographical and financial), which reduces dependence on other forms of transport (cars, rickshaws and motorcycles etc.); e) Safe, secure, reliable, comfortable, and environmentally sustainable transport system; which meets the needs and aspirations of people of Peshawar
6	**Justification of the project**	**a) Project Area** Peshawar is the capital city of Khyber Pakhtunkhwa (KP). It covers an area of 1,247km2 (438 square miles) and sits in a valley between the Iranian plateau and the Indus valley. It is the gateway to Central and South Asia, and is the oldest living city of Sub Continent. At the time of the last census (2017) Peshawar had a population of 4.26 million. Rapid population growth has been significantly impacted by Afghan refugee migration and internal displacement. Peshawar is a city with an Urban Form that extends in an East-West Direction with GT-Jamrud Road serving as the major artery for the city. This is the major Corridor and is hence being developed as the priority corridor. Poverty is widespread in Peshawar. The city has 18 informal settlements or 'katchiabadis' whose cumulative population is estimated to be 250,000. Service provision in

the katchiabadis is extremely poor. In KPK, almost 44 percent of the population is classified as poor, which is slightly higher than the national average of 40 percent. Therefore, a well-designed, accessible, and affordable public transport system offers substantial benefits to the urban poor.

Peshawar is the administrative and commercial hub of KPK, and subjected to acute traffic congestion, inadequate traffic management, high accident rates and increasing air pollution problems. The deteriorating traffic conditions are affecting the city's efficiency performance and are being considered as a major impediment for the economic growth and development, causing frustration among the residents and prompting popular demands to find urgent solutions. This has prompted the demand to explore the possibility of developing a contemporary and modern public transport system in Peshawar. The Bus Rapid Transit (BRT) is hence being constructed.

b) Project Need & Background

There are a number of prime considerations on this aspect. Among the most relevant ones are:

i) **Poor existing traffic conditions**: First, declining traffic conditions and congestion on key arterials are reaching a stage where the situation is becoming unmanageable for the limited resources available.

ii) **Existing Public Transport System:** Existing public transport in Peshawar is served by Minibuses, Bedford buses, and Wagons, mostly many decades old. Suzuki pickup vehicles are also used as public transport, serving mostly rural area of Peshawar and neighboring towns. All of these public transport vehicles are operated by individuals and managed privately.

On the GT Jamrudroad, the main corridor in Peshawar, these buses are running on the service lane with average speed below 10 km/hour. Public transport passengers are suffering.

iii) **Debilitating Fleet Condition**: The current fleet, although required by Law to have a maximum age limit of 10 years, is dominated with vehicles from the 1980s and 1990's. There is no effective Government oversight on fleet quality or supply against demand and the public suffers as a result. There has not been any noticeable investment in the public transport sector for a number of decades and even the General Bus Stand is at an advanced state of decay.

Annexure II Shows Peshawar wagon and minibus routes

iv) **Public Transport Demand:** PFS screen-line surveys indicated public transport mode share of 60 percent and above at varying times of the day. PFS estimated daily demand for public transport passengers in year 2014 was 500,000. Screen line survey further showed that Corridor 2 has daily public transport passenger flows peaking at nearly 393,700 and the peak hour passenger demand per direction about 20,750.

Such a strong market share needs to be retained, otherwise, passengers will be forced by this poor system to shift on private vehicle. This modal shift will further deteriorate the existing traffic situation to uncontrollable situation.

Following the PFS, the Khyber Pakhtunkhwa Provincial government sought assistance from the ADB to provide financial assistance to design and build the BRT corridor in Peshawar. ADB commissioned a Project Preparatory Technical

		Assistance (PPTA) Consultant to conduct Feasibility Study and Preliminary Design for BRT system in Peshawar. PPTA study conducted a comprehensive feasibility study from January 2016 to December 2016 on Corridor 2 (1A in Feasibility Study), which runs from Chamkani to Hayatabad is therefore, recommended to be built as the first Bus Rapid Transit Corridor in Peshawar. The Detailed Engineering Design was completed from February 2017 to November, 2017 under the Engineering Procurement and Construction Management (EPCM), however, EPCM consultant is still engaged to ensure detailed design variations as per site requirements.Operational design of the project is being completed under Operational Design and Business Model (ODBM) package, and project management, coordination, and capacity building of the allied institutions is being carried out under Project Management, Coordination, and Capacity Building (PMCCB). Upon recommendation by the PDWP in its meeting held on 28.03.2017, the original PC-I for the project pitched at PKR 56.80 Billion was submitted to Planning Commission for approval by the CDWP & ECNEC. However the same was approved by CDWP, and ECNEC at reduced cost of PKR 49.453 Billion during their meetings held on 03.05.2017 & 10.07.2017 respectively. The contracts for the civil work component of the project including BRT infrastructure (BRT Corridor, Bus Stations, Mix Traffic & Service Lanes, Cylce Lanes, Drain, Underpasses (Vehicle / Pedestrian), Elevated Corridor, Elevated U-Turn etc.) and Depots (Bus Depot, Park & Ride Facility, Commercial Areas) were awarded as per ADB guidelines through International Compititive Bidding (ICB), and are being implemented under the full time supervision of Project Management Construction Supervision Consultant (PMCSC) appointed for the purpose through ADB with the administrative control of Peshawar Development Authority. The PC-I for the project was revised at the cost of PKR 67.953 Billion to include the loan financing of Euro 130 Million being extended by AFD and to accommodate variations in the design and scope as elobrated under the Reasons for Revision of PC-I. Upon recommendation by the PDWP during its meeting held on 23.05.2018, the Revised PC-I amounting to PKR 67.953 Billion was submitted to Planning Commission of Pakistan for approval by the CDWP & ECNEC. The Revised PC-I was discussed in the pre-CDWP meetings held in Transport & Communication Section, Planning Commission of Pakistan on 06.07.2018 & 14.07.2018 respectively. The Revised PC-I was subsequently discussed by the CDWP on 16.07.2018 and it was decided to form a committee under the chairmasnhsip of Member (I&RC), Planning Commission and Sr. Chief (T&C) and Chief Economic Appraisal Section of MPDR, Senior level representatives from Finance Division and EAD, Secretary T&MTD Govt. of KP, DG, PDA and representative of KPUMA and TransPeshawar as its members to rationalize scope and cost of the project. The Committee had its 1st meeting on 20.08.2018 wherein upon detail deliberations the following decisions were taken; a. The Govt. of KP /PDA will amend the revised PC-I based on firmed up scope/cost and quantities along with rate analysis for the additional scope in four weeks time after seeking again approval of the provincial component forum/PDWP.

b. The amended PC-I must contain complete record of approvals of variation orders along with indication of competent authority to approve the variation orders.

c. The amended revised PC-I would again be submitted by the Sponsors to this Committee for srrutiny and finalization of scope & cost, before placing the same for consideration of the CDWP/ECNEC.

Accordingly the revised PC-I has been modified at a cost of PKR 66.437 Billion which comprised the following volumes;

- Volume – I – Project Digest
- Volume – II (a) – Detailed BOQs of Package – I
- Volume – II (b) – Detailed BOQs of Package – II
- Volume – II (c) – Detailed BOQs of Package – III
- Volume – II (d) – Detailed BOQs of Rest of Packages

c) Project Description

The project includes construction of dedicated BRT with feeder routes integrated with main corridor covering major trip generation areas of the city: Charsada Road, Kohat Road, Bara Road, Ring Road, and Hayatabad.

Peshawar BRT system will have following additional features:

i. 57 Km Feeder routes service excluding main BRT Corridor Overlap,

ii. 154 Standard Bus Stops at Feeder Routs

iii. 220 Buses (155 x 12m and 65 x 18m)

iv. Commercial Area Development

v. Bike Sharing Scheme at University of Peshawar

vi. Segregated cycle lane along the length of BRT Corridor

vii. Pedestrian Infrastructure improvement and networking along the BRT Corridor.

viii. Shops at selected Underpasses / over-bridges and BRT Stations

In addition to the above features, Main BRT Corridor include innovative stations design equipped with public facilities like parking for bicycles, toilets etc. Moreover, Non-Motorized Transport (NMT) is promoted to create a healthy livable environment, for which, sidewalk provisions, pedestrian crossing bridges, and pedestrian underpasses with commercial shops are provided at different locations.

Annexure III shows the station detail area

Peshawar BRT Corridor

The proposed BRT corridor of 27.37 Km is designed as a signal free corridor, which starts from Chamkani on GT Road through Pir Zakori Bridge, Peshawar Bus Terminal, Hashtnagri, Hospital Road, Khyber Bazar, Soekarno Chowk, Shoba Chowk, Railway Road, Sunehri Masjid Road, Aman Chowk, University Road, Hayatabad, terminates at Karkhano Market on Jamrod Road. The corridor included At-grade, Elevated, and Underpass sections. In addition to the above mentioned main corridor additional elevated strcutrues including the

following and having total length of 2.181 km are also been constructed under the project.

- Chamkani Intercity Flyover with Loop 773 Meter
- G.T Road mix traffic Flyover at BS08 715 Meter
- Gulbahar BS-06 Mix Traffic Flyover / U-Turn 418 Meter
- Malik Saad Flyover additional lane 275 Meter

Annexure I shows the proposed BRT corridor

BRT Operational Model

The operational Model designed for Peshawar Sustainable Bus Rapid Transit Project is direct service operational Model, where buses are able to serve both dedicated corridor as well as off corridor routes.The Operational Design was built considering 7 routes: 1 trunk route operating inside the corridor, 3 direct services operating both on and off-corridor and 3 feeder services operating off corridor. The description of the routes are as follows: -

Route-1 Chamkani to Hayatabad (Trunk Route)- Main Corridor

Route-2 Chamkani to Karkhano (Direct service)- Off + Main Corridor

Route-3 Charsada to Kohat (Direct Service)- Off + Main Corridor

Route-4 Chamkani to Bara (Direct Service)-Off + Main Corridor

Route-5 Tajabad to Phase 6 (Feeder Service)- Off + Main Corridor

Route-6 Tajabad to Phase 7 (Feeder Service)- Off corridor

Route-7 Karkhano to Hayatabad (Feeder Service)- Off Corridor

Keeping in view the type of off corridor buses (Low Floor) some investments are required along off-corridor sections like provision of bus stops, pavement rehabilitation, access control and turning points for the proper operation of BRT direct services. The operation will start 6am in the morning till 10 pm in the evening. In total 220 buses will ply on these routes out of which 155 are 12m standard air conditioned buses and 65 articulated 18m air conditioned buses. Two depots and one intermediate staging facility also provided for bus parking, fuelling, washing and maintenance.

Annexure II Shows the proposed BRT routes Plan with Brief Operational Model Results

BRT System Impacts

The BRT is expected to increase the bus travel speed from currently 14.5 km/hour along the corridor to 25 km/hour on corridor. With multiple bus stopping position and passing lane provided at the station, the BRT is designed to carry up to 21,000 passengers per hour per direction.

Annexure IV shows BRT key design components

	Technical Parameters	• **<u>Design Specification</u>**
		
		Route Length:
		
		• Total BRT alignment: 27.37 Km **+** additional elevated structure 2.181 km
		• At-Grade: 11.853 km
		• Elevated: 12.266 km (excluding additional elevated strcutrue)
		• Underpasses: 3.254 km
		
		• <u>Additional Elevated structure 2.181 km</u>
		  • Chamkani Intercity Flyover with Loop 773 Meter
		  • G.T Road mix traffic Flyover at BS08 715 Meter
		  • Gulbahar BS-06 Mix Traffic Flyover / U-Turn 418 Meter
		  • Malik Saad Flyover additional lane 275 Meter
		
		Annexure V Shows BRT implementation phase
		
		Stations:
		
		• Total: 30 stations
		• At-grade: 20 stations
		• Elevated: 10 stations
		
		Minimum curve radius:
		
		Main Grand Trunk Road 120 m, and on intersections 12 m with tight curve with speed of maximum 20km/h
		
		Maximum gradient:
		
		6% on ramps

		a) <u>Dedicated Lane Structure</u> **Lane Width** - Between stations: 3.5 meter - At stations: 3.5 meter (passing lane), 3 meter (stopping lane) **Pavement:** Rigid Pavement for at-grade BRT Corridor with Premix overlay **Platform Length and Width** Platform length varies dependent on station size. Each Sub-stop for station can accommodate 2 type of different buses at any time. A maximum of 4 buses of any kind can stop at 1 station. - 1 Sub-stop station : 55 m x 5 m - 2 sub-stop standard station: 110 m x 5 m - 2 Sub-stop Offset Station : 205 m x 4 m - 2 Sub-Stop Split Station : 150 m x 4m **Annexure VI** Shows BRT platform types

b) Vehicle Specifications

Type	Standard	Articulated
Dimensions	12-meter	18-meter
Passenger Capacity	75pax	125pax
Seats	28	48
Floor Height	350 mm	
No of Doors (R)	2	3
No of Doors (L)	2	-
Max. Speed	80 km/h	
Air Conditioner	YES	
Fuel Type	Diesel – Hybrid – Electric	
Usefull Life	1.2 million Km or 12 years	

Annexure VII Shows bus configuration

Project Specific Information

The scope of the project includes but not limited to the following;

- BRT Infrastructure
- BRT Depots
- Off-Corridor Routes
- Utilities Relocation and Diversion Routes
- Environmental Mitigation Measures
- Bike Share Scheme
- ITS & Fare Collection System
- Fleet Procurement
- Fleet Scrapping

Further details about BRT infrastructure, BRT depot, and off-corridor routes are narrated below;

i. BRT Infrastructure (Civil Works)

Civil works for the BRT infrastructure covers not only on BRT right of way, but also façade to façade rehabilitation, which covers regular traffic relocation; drainage system, bike lane along BRT corridors; greeneries and re-plantation; pedestrian access and sidewalk improvement along BRT corridor.

BRT at-grade construction

- Land / Corridor Clearing;
- Excavation;
- Sub-grade preparation, subbase, base course
- Concrete Rigid pavement,
- Barrier/Delineator and installation of fence
- Conduiting and Street lighting
- Premix overlay, lane marking
- Widening / rehabilitation of mix traffic and service lanes
- Road furniture
- Bike lane, sidewalk pavement, drainage system

Elevated Structure

- Substructure Works
  - Piling works;
  - Pile caps;

- Superstructure
  - Pier shafts and transoms
  - Precast / cast in-situ girders
  - Rotaries
  - Deck slab
  - NJ Barriers
  - Sound barriers and fence for privacy
  - Premix overlay
  - Lane marking
  - Conduiting and Street lighting

BRT Underpasses

- Excavation,
- Barrel bed and retaining walls
- Wet well and drainage works including installation of pumps
- Barrel top and approach slab
- Back filling
- Base course, compaction
- Premix overlay
- Lane marking
- Art and tiling work
- Installation of grill

BRT Station & Access

- RCC foundation
- Errection of pre fabricated steel structure
- Painting
- Elevators, esclators
- Pedestrian Bridge / Underpass with Shops / Ramps
- Turntiles
- Toilets
- Floor finishing
- Signages
- Station facilities

Additional Pedestrian Overhead Bridges

- Pedestrian bridge with width between 5 – 8-meter wide

ii. <u>Bus Depots</u>

Project caters for construction of three bus depots on the following locations;

Chamkani

- Buses Parking
- Workshop and Washing Facility
- Fuel Station
- TransPeshawar Office, Control Center, and Commercial Area
- Bus Station
- Internal Roads

Dabgari Staging Facility

- Multi Story Building catering for Park & Ride, Commercial Area, Bus Parking and allied facilities.

Hayatabad

- Buses Parking
- Workshop and Washing Facility

- Fuel Station
- Multi Story Building catering for Park & Ride facilities, and Commercial Area

iii. Off-Corridor Bus Stop

Project caters for provision of Bus bays, Bus Shelters / stops, and walkways for the following off-corridor routes

- Charsada Road
- Ring Road
- Kohat Road
- Bara Road
- Hayatabad Phase 6
- Hayatabad Phase 7
- Hayatabad Industrial Area

iv. Intelligent Transport System and Station Management

The scope of Intelligent Transport System (ITS) and station management include supply, installation, testing, commissioning, integration, operation and maintenance of hardware and equipment provided at BRT stations, BRT buses, corridor, control centre and depots.

The Components of Intelligent Transport System are: -

1. Vehicle ITS
   - Deployment of an on-board ITS and Automatic Vehicle Location System on the entire BRT fleet
   - Deployment of Bus Scheduling System, fleet management system and ensure driver adherence to the system.
   - Deployment of Inside-Bus Real-Time Passenger Information (RTPI) system and announcements
   - Deployment of a communication system integrating the on-board systems

2. Stations ITS
   - Deployment of a Real-Time Passenger Information (RTPI) system
   - Deployment of Access Control System
   - Deployment of Automated Fare Collection System
   - Deployment of Point of Sales and Terminal
   - Deployment of Public Address system etc.

3. Control Centre ITS
   - Deployment of a surveillance monitoring and storage systems in the Operations Control Centre with the necessary software
   - Deployment of a video wall and necessary communication and control system in the Operations Control Centre

4. Bicycle Sharing System
   - Deployment of Bike Sharing system
   - Monitoring and control of Bicycle Sharing System

5. Station Management
   - Station Security

- Cleaning
- Station maintenance
- Passenger circulation management

These systems must operate in a fully integrated manner, and must provide solutions for external interfaces to other systems. The command and control centre will deploy automated Key performance indicator system to monitor the overall performance of the ITS and station management services.

v. Fleet Scrapping / Bus Industry Restructuring Program

The purpose of the program is to run through an Industry Transition process from identification of the existing stakeholders to proposing a detailed restructuring plan for post BRT operations and to ensure that the impacted group of bus operators are involved and provided with improved opportunities in the new business model. The entire work is, therefore, divided into following tasks:-

- Detailed Survey of the existing bus Industry
- Focused Group Discussions
- Proposing amicable and acceptable solutions for the operators and the client

The current industry in Peshawar is dominated by a considerable number of formal and informal buses/ rockets, minibuses/ mazda and ford wagons, operators who are operating under a tough environment and relatively weak regulatory structure. It was therefore imperative to collect primary information on existing industry practices, operations, stakeholder profiles, their issues and concern and other gaps in existing structure. The information will become the basis of future negotiations with the operators and will also guide the operational design and business model of the BRT in Peshawar. The indicators and information preferences for analysis, referred through international papers, the ADB guidelines and the consultant's experience include following:

- Bus Operations Analysis
- Stakeholders Analysis
- Stakeholders concerns and issues and their view point on BRT

Peshawar public transport sector has a very old fleet of vehicles on the Major Public Transport Routes. Majority of vehicles are around 30-40 years old with few exceptions, which are even older than 40 years in case of buses/rockets and Minibuses/Mazda.

Due to the old fleet, it is recommended that vehicles in the current public transport system be scrapped with the startup of the new BRT in Peshawar. The proposed Scrapping Plan includes a financial compensation to the vehicles owners, based on the market value of each bus.

7	**Capital Cost Estimate**	**Cost: PKR 66.634 Billion is for;** • BRT Infrastructure construction, • ITS and fare collection, • Bus depots and staging facility construction, • Bike Share System • Parking Plazas with Commercial Development • Fleet procurement • Fleet Scrapping • Institutional Development • Utitlies& Resettlement Cost • Land acquisition **Annexure VIII** shows Summary of Cost Estimate and Abstract Cost Comparision, and Detailed Cost Estimates are placed in Volume – II.
	Date of Estimation	Fiscal Year 2017-18
	Basis of Cost Determination	Original PC-I was based on Preliminary Engineering Design completed under PPTA (ADB Grant) and cost estimates were prepared on the basis of MRS 2016 (Khyber Pakhtunkhwa) plus 20% for schedule items (approval was obtained from Chief Minister, KP on the summary), whereas rates for all NSI items were taken from NHA CSR 2014. For ITS equipment, and all items which are not locally available, rates from international market are applied. Revised PC-I has been based on the Detailed Engineering Design taking in to consideration the quantities of various items of works included in the original scope, design variations as per site requirements, by utilizing the unit rates approved under various contracts,non-BOQ items and for the items where the increase in the quantum is more than 25% & the financial impact crosses 1% of the bid price have been derived by using input of MRS KPK and NHA schedule of rates 2014 with current market rates, whereas rate for all NSI items have been analysied on market rates. USD/PKR Parity old PC-I: 104.7 USD/PKR Parity revised PC-I: 112
	Year-wise drawdown estimates	For detailed cost estimates, refer to **Annexure-VIII**
8	**Annual Operating Cost**	The construction of protective embankments would involve financial costs at market prices of Rs. 66.437 Billion for full project and phased three years. The same have been expressed in economic prices by using different factors. The economic cost thus works out to be Rs. 51.693 Billion and is phased over three year. Annual financial & economic operation and maintenance cost estimated at 1 percent of the capital costs. The financial O&M cost is PKR 664.37 million, while economic O&M cost is PKR 558 million.
9	**<u>Demand/Supply Analysis</u>** **Existing Capacity of Services and its supply/demand**	

	Ridership Demand	The operational Model designed for Peshawar Sustainable Bus Rapid Transit Project is direct service operational Model, where buses are able to serve both dedicated corridor as well as off corridor routes.The Operational Design was built considering 7 routes: 1 trunk route operating inside the corridor, 3 direct services operating both on and off-corridor and 3 feeder services operating off corridor. According to the operational model the initial demand for Network is estimated to be just over 400,000 for the fully operational system.
	Capacity of the project being implemented in public/private sector	The project will be mainly implemented by public sector for construction of infrastructure. private sector can be involved in some areas of implementation to be decided by TransPeshawar.
	Supply – Demand Gap	Supply & demand gap will exist in the project as the BRT will only cover 1 corridor – despite running on 8 different routes. The construction of future corridors of mass transit will minimize the gap in public transport supply and demand in Peshawar.
	Designed capacity and output of the proposed project	With multiple bus stopping position and passing lane provided at the station, the BRT is designed to carry up to 21,000 passengers per hour per direction.
10	**Financing Plan**	The BRT infrastructure, including the ITS/Fare collection system, bus depots, bus fleet, utilities relocation, and institutional development (PMU/PIU, TransPeshawar) would be implemented under the public sector. ADB and AFD offered to provide assistance through loan to fund the above project components. GoKP will be responsible for paying taxes on all construction works, land acquisition and social resettlement costs, as well as other overhead charges.

11	**Financial Income to the Project**	This PC-1 is prepared for the components depicted in Annexure – XXI. Comprehensive financial analysis is conducted excluding the commercial areas development feature of the project which will be covered in the Detailed Design Stage.
	Economic Benefits	The major economic benefits of the project are: 1 Travel time or delay reductions 2 Vehicle cost savings 3 Accident reductions 4 Air Emission and greenhouse gas reductions 5 Parking costs savings from projects that reduce vehicle ownership and use 6 Induced travel, including new trips and changes in mode, route, and time of travel. 7 Travel time reliability. 8 Noise and its effects. Results of the Economic analysis is provided at Annexure - XX.
	Social Benefits	It is currently estimated that out of 4.26 million people living in Peshawar, 520,000 people will have access to BRT within 1 kilometer radius, or approximately 17.5% of people in Peshawar will live and work near transit corridor. In addition to that, walking and cycling will be improved after the BRT. The newly introduced BRT system and non-motorized infrastructure would encourage women to move freely in the city.
	Environmental Impacts	**a) Environmental scenario without BRT** • Most of the roads in Peshawar will suffer from traffic congestion since road volume will exceeds the capacity, • The lack of public transport services and the recent increase in private vehicle ownership will worsen the traffic condition will make cycling and walking safe. • GHG and air pollution will be increased due to traffic congestion. • Polluted air will have negative impacts on human health. **b) Future scenario with BRT** • Reduction in environmental pollution is expected as a result of modal shift from private cars to BRT system. • Total emission factor for CO2 is expected to reduce by approximately 30,988 tons when the system is implemented and up to 73,500 tons in more than 10 years after the implementation. <u>Negative Impacts</u> • During the construction phase, issues may arise from generation of dust, emission of air pollution, noise and traffic congestion due to traffic lane reduction and redirection.

	Financial Analysis	In the financial analysis performed for this project, the FIRR for this project is 8.26% with NPV(benefit) of Rs 40135.95 Million for 20 years of operation period. With maximum fare at Rs 50 per passenger, and capital injection of Rs 500 million at the beginning of the project preparation, the project will be financially sustainable, without requiring any further subsidy once it is in operation.
	Quantifiable Output:	
	P&L and CF Statements	Refer to **Annexure XIX**
	Net Present Value (NPV-benefit)	NPV = Rs 40135.95
	Benefit Cost Ratio	BCR = 0.75
	Internal Financial Rate of Return (IFRR)	FIRR = 8.26%
	Unit Cost analysis:	
	Break Even Point (BEP)	Rs 73080.70 (13 year)
	Payback Period	10 years
	Return on Equity (ROE)	17.5 %
	<u>Economic analysis</u>	
	Taxes & duties separately in the capital and operating cost	
	Net Present Value of (NPV-benefit-eco)	NPV = Rs 54146
	Benefit cost Ratio (BCR)	BCR = 1.20
	Internal Economic Rate of Return (EIRR)	EIRR= 25.78% Refer to **Annexure XX** For detailed economic analysis

<table>
<tr><td></td><td><u>Sensitivity Analysis</u></td><td>Sensitivity test was performed against 10% increase in capital cost and 10% decrease in revenue. The results show that the impact of revenue to the IRR and NPV is more sensitive than the impact of changes in cost.</td></tr>
<tr><td></td><td>Impact of the delays on project cost and viability</td><td>For economic sensitivity analysis against the increase in total cost and decrease in total benefits, the result shows that the cost increase and benefit decrease each have similar impact on EIRR. Whereas on the NPV, the impact of 10% decrease in benefits are much bigger than impact in cost increase.

Sensitivity Analysis
<table>
<tr><td>Case</td><td>Base</td><td>+10% in capital cost</td><td>-10% in Revenue</td><td>+10% in capital costs and -10% in Revenue</td></tr>
<tr><td>FIRR</td><td>8.26%</td><td>7.01%</td><td>7.12%</td><td>5.92%</td></tr>
<tr><td>EIRR</td><td>25.78%</td><td>23.52%</td><td>23.73%</td><td>21.62%</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
</table></td></tr>
<tr><td>12</td><td>a) <u>Implementation Schedule</u></td><td>The Detailed Engineering Design under Project Design Advance was started in February, 2017, and completed in November, 2017, however as per site requirements the design variations are being done in parralell to the construction activities. The contract for the Civil Works and Fleet Procurement were awarded from time to time after approval of the PC-I by the competent forum. The Construction Works started in December, 2017, and expected to be completed by December, 2018 in phase wise manner. Whereas, the fleet procurement, ITS and fleet Scrapping will be completed by the end of March, 2019</td></tr>
<tr><td></td><td>Indicate starting and completion date of the project
Item-wise/year-wise implementation schedule in line chart correlated with the phasing of physical activities</td><td>The project is expected to be completed in a span of 15 months starting in December, 2017 and completed by March, 2019.

Shown in Annexure XXI</td></tr>
<tr><td></td><td>b) <u>Result-Based Monitoring (RBM) Indicators</u></td><td>Shown in Annexure XXII</td></tr>
</table>

13	**<u>Management Structure and Manpower Requirements</u>**	**1. Khyber Pakhtunkhwa Urban Mobility Authority (KPUMA)** KPUMA has been established under Khyber Pakhtunkhwa Urban Mass Transit Act dated 19th October, 2016. It is empowered for the purpose of planning, establishing, co-ordinating, andregulating mass

	Administrative arrangements for implementation of project	transit system and supporting systems and Urban Transport Companies for co-ordinating, constructing, developing, operating, maintaining, and carrying out all ancillary functions. Therefore, to achieve the above, a public transport company named TransPeshawar, has been registered under the companies ordinance 1984 with SECP. **2. TRANSPESHAWAR** TransPeshawar will have following broader functions as directed by the Authority; • Planning, building, and maintaining infrastructures for the mass transit system and related services in accordance with the specifications and conditions of the project. • Specifying operation, enforcement, and maintenance of the Peshawar Mass Transit System, • Procuring and managing public transport services for mass transit system. • Operation of public transport services, as well as monitoring and enforcing appropriate behavior and safe passenger conditions upon the mass transit system. • The company, on behalf of the Authority, may enter into commercial contracts for the delivery, operations, management, and maintenance of components of assigned project. **3. PROJECT MANAGEMENT UNIT** The key aims and objectives of the PMU include: The project will be implemented by KPUMA/TransPeshawar and Peshawar Development Authority (PDA). A PMU has been established in TMTD/TransPeshawar for the implementation and overall project management of the project. PDA Peshawar has been assigned the role of construction implementation under the KPUMA/TransPeshawar.
	The manpower requirements by skills during execution and operation of the project be provided	**4. PROJECT IMPLEMENTATION UNIT (Peshawar Development Authority)** The key aims and objectives of the project implementation unit is to supervise the Engineering Procurement and Construction Management consultant under Project Design Advance facility, as well as construction supervision. Staffing of the PIU is as follows, whereas detailed organogram is given at Annexure – XXIII

Project Monitoring Committee		
Designation	**No. of Post**	**B.P.S**
Additional Chief Secretary	1	20
Secretary LGE&RD	1	20
Secretary TMTD	1	20
Principle Secretary / Commissioner	1	20

Project Implementation Unit		
Designation	**No. of Post**	**B.P.S**
Director General	1	20
Sr. Director Engineer	1	20
Director Coordination	1	19
Director Engr.	3	19
Director Finance	1	19
Transport Specialist	1	19
Dy. Director Engg.	4	18
Dy. Director Audit	1	18
Assit Director Engg.	16	17
Assit Director Audit	1	17
Assit Director Fin	1	17
Sr. Auditor	1	17
Div Account Officer	2	17
Social and restmt spec	1	17
Chief D/Man	1	17
Sr. D/Man	1	16
PA	7	16
Office Assistant	4	16
Comp. Operator	9	16
Account Assistant	1	16
Sr. Cashier	1	16
Accounts Clerk	2	14
Senior Clerk	3	14
Junior Clerk	7	11
Supervisor	8	16
Surveyor	4	10
Survey Helper	8	7
Lab Technician	4	10
Lab Helper	4	7
Driver	18	7
Peon	18	3
Chain Man	1	4
Dack distributor	4	3
Grand Total	**143**	

14	**Additional projects/decisions required to maximize socio-economic benefits from the proposed project**	As part of the BRT project, improvement to the Non-Motorized Transport (NMT) and promoting the concept of Transit-oriented Development (TOD) are also required to support the mass transit, enhance the quality of walking and cycling condition in Peshawar, and further improve the urban environment for Peshawar. In this regard, a NMT report has been prepared by PPTA consultant. **Objectives** The objective of this work is to provide the conceptual NMT and TOD designs complementing the Peshawar BRT project. **Project Scope** Peshawar NMT and TOD Conceptual Design is the complementary features for the first ever BRT plan for Peshawar. The following features are covered: • Pedestrian facilities along the BRT corridor • Cycle access improvement to the BRT stations • Bike Sharing Scheme at University of Peshawar • TOD conceptual design at selected BRT stations • Driveways and service lane access plan and design
15	**<u>Certificate</u>** **The name, designation and Phone # of the officer responsible for preparing and checking be provided. It may also be confirmed that PC-I has been prepared as per guidelines issued by the Planning Commission for the preparation of the PC-I for the infrastructure Sector projects.** **The PC-I along with certificate must be signed by the Principal Accounting Officer to ensure its ownership**	

Summary of Estimated Cost

Feature Description	Total Amount (PKR in Million)		Total Amount (USD in Million)		*GoKP Share (PKR in Million)*		*ADB + AFD Share (PKR in Million)*	
	Original	*Revised*	Original	*Revised*	Original	*Revised*	Original	*Revised*
BRT Infrastructure, Depots, ITS	32,863	52,446	314	468	4,272	8,650	28,590	43,796
Parking Plaza and Off-Corridor Facilities	95	320	1	3	12	48	82	272
Bike Sharing Scheme	132	-	1	-	17	-	115	-
ADB Financing Charges, Supervision Cost, Advertisement	493	1,156	5	10	63	173	430	983
Fleet Scrapping, and Environmental Mitigation Measures	1,068	1,120	10	10	-	168	1,068	952
PIU Implementation Charges, TransPeshawar, and KPUMA	1,553	800	15	7	660	375	893	425
Utilities Relocation	1,680	1,500	16	13	228	225	1,453	1,275
Land Acquisition and Social Resettlement	2,213	1,620	21	14	2,213	1,518	-	102
Fleet Procurement	7,875	7,475	75	67	-	1,959	7,875	5,516
Cotingencies as ADB Requirement	1,375	-	13	-	-	-	1,375	-
Total	**49,346**	**66,437**	**471**	**593**	**7,465**	**13,117**	**41,881**	**53,320**

Reasons for Revision of PC – I

The PC – I for the project has been revised to accommodate the following;

1. The original approvaedPC-I was to be funded jointly by the ADB and Governement of Khyber Pakhtunkhwa. The ADB committed to provide a loan of USD 400 million which constituted 85% of the project cost, whereas, the remaining 15% of the cost was to be provided by the Governement of Khyber Pakhtunkhwa through provincial ADP. The ADB however, due to its other commitments, expressed its inability to fund the entire amount of USD 400 million and agreed to fund USD 335 million and to bridge the funding gap through it co-financiar AFD. Since it is not mentioned in the approved PC-I, therefore, the PC-I is being revised to include loan financingofEuor 130 million being extended by AFD.
2. The approved PC – I was based on tentative quantum of work and cost estimates derived from Preliminary Engineering Design completed by the Consultant under the PPTA, whereas the contract's for various civil works components (Road & Building) were awareded on the basis of BOQs / detailed cost estimates prepared after detailed engineering design. The quantum of work included in the BOQ varied from that included in the PC – I.
3. The approved PC – I was based on MRS 2016 + 20% and NHA CSR 2014 for Non-MRS items. Whereas, the revised PC – I has been prepared on the basis of rates awareded under various packages / contracts with approval of ADB upon International Compititive Bidding (ICB) for BOQ items, and rates for Non-BOQ items have been derived from Market Rate Analysis and approved by the competitive forum.
4. In the approved PC – I lum sum provision for the Bus Depots were provided which has sufficiently enhanced after detailed design and preparation of cost estimates.
5. The approved PC – I catered only for provision of Bus Shelters / Stops on Off – Corridor / Feeder Routes, whereas, the revised PC – I catered for both rehabilitation of routes, provision of Bus Bays, U-Turns, and Sidewalks owing to which the cost of this component is increased.
6. Variations in the design and scope accrued as per site rquirements owing to Right of Way (ROW) and Social constraints which are as under;

    I. <u>Package – I / Reach – I</u>

    i. Additional Flyover for intercity traffic to Chamkani Bus Depot (Annexure – IX)
    ii. Replacement of overhead pedestrian bridge with Underpass at BS-03 owing to constraint of overhead electricity lines. (Annexure-X)
    iii. The change in the design of BS-06 causing replacement of one elevated U-Turn with two flyovers to accommodategrade separation of

BRT and mix traffic U-Turns, and provision of underpass with shops for access to the station. (Annexure-XI)

iv. The design for BS-07 was changed to staggeredowning to limitation of RoW. (Annexure-XII)

v. The design for BS-08 was originally included a vehicular Underpass for traffic coming from Khyber Road (East Bound) was changed owing to existence of underground large city storm water drain. The revised design include remodeling of existing Malik Saad Flyover, construction of new Flyover for mix traffic from Khyber Road.(Annexure-XIII)

vi. Provision of lining for piles owing to weak underground strata.

II. <u>Package – II / Reach – II</u>

i. Replacement of at-grade BRT corridor with elevated at intersection of Sir Syed Road and Airport Road owing to RoW constraints. (Annexure-XIV)

ii. Remodeling of Aman Chowk to provide space and linkage for three Bus Stations to be constructed in future (Annexure-XV)

iii. Provision of additional piles to avoid underground Sewer lines.

III. <u>Package – III / Reach – III</u>

i. At-grade BRT corridor and BS-18 at TehkalPayan was elevated owing to RoWand social constraints. (Annexure-XVI)

ii. BS-20 and BS-21 were stagared owing to RoW constraints.

iii. Elevated extenstion of BRT corridor from Hayatabad to Karkhano Market to increase the rider ship. (Annexure-XVII)

iv. Widening of existing Bridges on Khwar at Hayatabad.(Annexure-XVIII)

It would be appropriate to mention that, FIDIC contract recognizes this circumstance and allows that any additional works in the area in the possession of the Contract should be executed by the incumbent Contractor as a Variation to the Works Contract. On signing the Contracts, the Contractors were granted legal possession of the sites which means that the façade to façade corridor was under the full control of the works area. FIDIC devotes a full section to the Variation Process and spells out who is authorized to instruct variations, under what circumstances variations can be instructed and on what basis the works are costed.