



Volume 1: Medium Term Priority Urban Infrastructure Program

June 2009
Executive Summary



A. Project Objectives, Background and Context

1. The primary objective of this study was to formulate a Medium Term Prioritized Urban Infrastructure Program (MTPUIP) covering three sectors, transport, drainage and solid waste management (SWM) and associated capacity building measures. The study was carried out under the auspices of the Cities Development Initiative for Asia (CDIA) which is supported by the Asian Development Bank and the foreign aid departments of the governments of Sweden, Germany and Spain. CDIA's objectives are to promote more sustainable urban development by identifying priority infrastructure projects and potential sources of finance to implement them.

2. The study was undertaken between January and June 2009 by a team of international and national consultants appointed directly by the Asian Development Bank who worked closely with a team of engineers and other officials from Khulna City Corporation (KCC). The study would not have been possible without this close working relationship.

3. The proposals result from an intensive process of stakeholder consultations with formal presentations being made at workshops in April and June 2009. Interviews were also carried out with a numerous stakeholders throughout the study, including government agencies, statutory bodies, NGOs and CBOs and private sector organizations.

4. Khulna, Bangladesh's third largest city, has a current estimated population of around 1.17 million¹ which is expected to increase to around 1.33 million by 2015. It is located in the south west of the country on the northern edge of the Sundarbans, the world's largest mangrove swamp. Khulna is a low lying deltaic city bounded to the east by the Bhairab and Rupsha rivers. Maximum and minimum elevations are approximately 4.5m and 2m respectively which, allied to the intense monsoon season, make flooding a perennial hazard.

5. Khulna's economy was for many years based around the jute industry. This industry has been in decline for many years – several factories have closed and most of the rest are operating at a loss. In the 1990s, the economy was boosted by the development of shrimp processing and the establishment of two major universities. Khulna nonetheless remains a generally poor city with around 20% of the population living in slums and just under half in houses built out of impermanent materials (katcha). The urban poverty level is probably around 40% which is much higher than the national urban average of 28%. In consequence, vehicle ownership is very low: around two thirds of households have no personal transport, 26% have bicycles, 7% have motor cycles and only 1.5% own cars.

6. Historically the city developed in a north-south linear pattern along the rivers but more recently new development has increasingly occurred to the west between the urban fringe and the recently completed western bypass. Physical growth has been slow due to a combination of factors: the lack of easily developable land (virtually all new land has to be filled), poor road access to urban fringe areas (few new roads have been built in recent years), a slow rate of economic growth and the low housing affordability of much of the population. As a result, the overall urban density (21,000 per sq km) is high by South Asian standards (but not so high as in cities, e.g. Mumbai and Dhaka, where urban expansion has been more rapid and land supply is also heavily constrained). It is estimated that since 1991, around 85% of new housing has been accommodated within existing urban

¹ This population includes the current KCC area (around 960,000 people) and proposed extension areas to the north, west and south. This enlarged area has been termed the Khulna City Planning Area (KCPA).

communities. This situation is unlikely to be sustainable and efforts will be needed to substantially increase the land available for new development.

B. Selection Principles for MTPUIP Projects

7. A key criterion of all CDIA initiatives is that they must promote sustainable urban development. A consensus is emerging that for development to be sustainable, it must:

- 7.1. promote urban economic growth;
- 7.2. enhance the urban environment and seek to reduce reliance on fossil fuels and costly imported fuel;
- 7.3. be socially inclusive, explicitly taking into account the needs of poor and lower income groups.

8. Furthermore for development to become more sustainable, issues relating to future urban growth and spatial expansion have to be addressed. It will not be enough to simply deal with today's problems.

9. Projects also need to be technically, operationally and financially sustainable.

10. Arising from the above, the general principles adopted in the selection of MTPUIP projects were:

- 10.1. Consistency with at least one of the criteria for sustainable development. They should also not have a major detrimental impact on the others.
- 10.2. Technically appropriate in terms of their design, implementation and operation. Projects requiring detailed technical studies should not be included.
- 10.3. Maximise the use of the existing systems and operational methods.
- 10.4. Absence of significant political, legal or jurisdictional (e.g. outside the KCC area) issues.
- 10.5. Avoidance, wherever possible, of significant land acquisition (especially in urban areas) which would add to the cost, increase adverse social impacts and significantly delay implementation.

11. Projects conforming to these general principles have been identified for the transport, drainage and SWM sectors along with associated capacity building proposals. These are summarized in the following sections.

C. Proposed Transportation Projects

Khulna's Transport System

12. Khulna's road system consists of 600-700 kms of pucca (metalled), semi-pucca (brick-soled) and katcha (unpaved) roads: 2/3rds of the roads are concrete/ bitumen paved while the great majority of the remainder are brick-paved. Almost 80% of road traffic is by non-motorized modes (NMT), principally rickshaws (28%), rickshaw vans (15%), pedestrians (15%) and bicycles (14%). Motorcycles and auto-rickshaws make up most of the motorized traffic². Around 70% of trips are by some form of public transport, 21% by private modes with the remainder being walk trips.

13. Although rickshaws predominate on the streets of Khulna, they are largely unaffordable to the poor, providing instead short distance transportation for middle income households. Essentially the poor walk. The unaffordability of most means of transport is

² The distribution by person trips is somewhat different owing to the high occupancy of buses: a third of person trips are made by bus/ minibus and another 12% by auto-rickshaw; just under half are made by NMT.

however tempered by: (i) the linear pattern of the city and the dispersal of slums throughout the urban area which means that their transport needs will often not be significant; and (ii) rickshaw pulling is one of the dominant occupations of low income households.

14. Khulna's salient transport problems are:
 - 14.1. the poor condition of roads, drains and footways;
 - 14.2. the paucity of intra-urban bus services;
 - 14.3. congestion and disruption caused by rickshaws etc., gathering at key locations such as the bus terminal and major junctions;
 - 14.4. encroachment of footways by pavement sellers and commercial enterprises which causes pedestrians to walk in the road increasing accident risk and impeding traffic;
 - 14.5. increasing road accidents especially involving motor cyclists and rickshaws;
 - 14.6. lack of awareness about safety issues and refuse disposal, which contributes to all the above.

15. Despite its problems, Khulna's transport system is, by world standards, very sustainable: there is negligible air pollution, congestion is low, around half of person trips are non-motorised, and there is little pressure in terms of rapidly increasing vehicle ownership. Furthermore work journeys are generally short due to the high density, mixed use and linear land use pattern.

The Future Transport Strategy

16. The future transport strategy for Khulna city should build on the existing sustainable system, with particular emphasis on public transport and non-motorised sustainable forms of transport. This does not mean that new and improved roads will not be required. A good road network is crucial to the economy and social health of a city: to move goods, to access jobs, schools, health and community facilities, to provide a safe environment for pedestrians, bicyclists and other NMT, and to enable the expansion of bus services and other forms of public transport. In parallel to the development of the road network, a future transport strategy needs to have the following objectives:

- 16.1. promote public transport;
- 16.2. facilitate the future physical expansion of the city;
- 16.3. efficiently manage and maintain the road network;
- 16.4. address problems at identified trouble spots;
- 16.5. raise public awareness regarding issues which adversely affect the operation of the transport system such as driving standards, traffic safety, maintenance of drains, and obstructions on footways.

The Transport Proposals

17. Based on this overall strategy and arising from the research, analysis and stakeholder discussions undertaken during the study, a series of priority transportation projects have been identified for potential inclusion in the MTPUIP. The projects fall into three basic categories: city to bypass link roads, urban road improvements and traffic management. Table ES.1 summarises the costs (including land acquisition) of these projects which amount to BDT 938 million, equivalent to \$13.6 million³.

³ An exchange rate of US\$1 = BDT 69 has been used throughout this report.

Table ES1: Summary of MTPUIP Transport Investment Projects⁴

Name of Project	Length (km)	Type of Project	Cost (Crore Taka)	Cost (US\$ million)
Link Road 1	3.2	Road widening and improvement	35.3	5.1
Link Road 4	2.15	New road and some improvement to existing road.	14.7	2.1
Link Road 7	2.7	Road Improvement	8.6	1.2
Link Road 12a	2.5	New road	15.1	2.2
Outer By Pass	1.8	Road repair and improvement	2.1	0.3
Mujgunni Moha Sarak Road	5.9	Road repair and improvement	6.5	0.9
Bara Bazaar-Joragate	1.6	Road repair and improvement	4.5	0.7
Sonadanga Bus Terminal	na	Terminal improvement and traffic management	3.5	0.5
Picture Palace More	na	Traffic Management	3.5	0.5
Total Cost			93.8	13.5

18. These projects are expected to give rise to the following benefits:
- 18.1. Operational: a more coherent urban road network which integrates the new bypass into the KCC road system; reduced vehicle operating costs and time savings; reduced congestion along Jessore Old Road and its extension to Rupsha Ghat; improved operation of the bus terminal.
 - 18.2. Economic: improved conditions for major enterprises located in the south of the city and hence encourage economic activity; stimulate the development of urban expansion areas between the current urban fringe and the western bypass.
 - 18.3. Environmental: improved drainage along new and reconstructed roads; reduced adverse impacts of traffic on some existing central area roads.
 - 18.4. Social: improved pedestrian environment (which will particularly benefit poor men and women); better road conditions for NMT; reduced accident risk; greater availability of new residential land.

19. The most prevalent adverse environmental impact will be the disruption arising during the construction period which is not only a temporary impact but can be effectively mitigated through controls on construction activities and operations and especially dust and noise controls.

20. Adverse social impacts will occur wherever property or land is acquired. This will involve both agricultural land for the link roads and urban land for selected, localized, widening of existing roads. The second type of adverse social impact will arise from the removal or curtailment of traders and others currently obstructing footways. For poor households, the feasibility of relocation to KDA low cost housing schemes should be investigated. For footway encroachers, transitional payments to enable the affected persons to find an alternative location/ source of income and training programs will need to be investigated.

⁴ 4 schemes which were investigated but which are considered to have excessive adverse environmental or social impacts have been excluded from the Table.

21. The bottom line is that the Khulna road network has to be strengthened in order to (i) cater for increasing traffic demand, (ii) enable the development of new residential areas, and (iii) facilitate the expansion of existing commercial and industrial enterprises. This will inevitably require land and property acquisition which will require some hard decisions to be made. KCC will therefore need to (i) undertake detailed consultations with affected persons and communities, and (ii) assiduously and transparently apply GoB and ADB involuntary resettlement social safeguard policies. It also emphasizes a need for the forward planning of new roads so that their alignments can be safeguarded before development takes place on potential RoWs.

Institutional Issues

22. Developing a sustainable transport system is not just a question of investing in capital projects. Equally important is the effective management, operation and maintenance of the system. In this context, issues of paramount importance are: (i) developing a comprehensive approach to footway improvement and maintenance; (ii) recognizing the importance of rickshaws as a sustainable means of transportation and their role in low income employment; (iii) enforcement of traffic regulations and license fees; (iv) safeguarding of RoWs for new roads in fringe areas; (v) upgrading road maintenance systems and operations; (vi) developing and implementing public awareness campaigns; and (vii) fostering community involvement in road and footway maintenance as well as local road construction activities.

D. Proposed Drainage Projects

Khulna's Drainage System

23. Urban drainage is a major issue in most cities of Bangladesh due to their low-lying topography, their location next to rivers and the short, but very intensive, monsoon season. Khulna is no exception. The city drains both to the east and the west with the watershed being provided by the railway embankment and Khan Jahan Ali Road. On its eastern side, a long, narrow strip of land (around 9 sq km) drains directly into the Rupsha/ Bhairab river. The majority of the city however drains westward into the Mayur river.

24. The city's drainage system is extensive consisting of just under 420 km of which 45 km are main (carrier) drains, 290 km are concrete secondary and tertiary drains, and the remainder are part- or wholly-earthen. Given that only 43km of drains were concreted in 1992, one can conclude that there has been a significant improvement since then⁵.

25. Khulna's drainage network has however developed in an unplanned manner, is not properly integrated, is generally in a poor state of repair and suffers from inadequate routine maintenance. As a result, large parts of the city, including much of the commercial core, experience regular and extensive flooding during the monsoon season. STIFPP estimated that 70% of the city was prone to flooding in 1991 with over half the households in the city being affected by regular flooding and 9% being flooded more than 10 times every year. The Khulna Master Plan (KMP) report identified the whole of Khulna Sadar Thana (containing both old and new commercial centres) and large parts of Khalishpur Thana (the second most populous with several major employers) as being prone to regular flooding and almost two thirds of households having no proper drainage in and around their premises; 40% of slums households experienced severe or regular flooding⁶. As a result, the drainage problems which beset Khulna today are much the same as those identified by STIFPP; with some oversimplification, these can be categorized as follows:

⁵ Secondary Towns Integrated Flood Protection Project (STIFPP), 1991-92, data for primary and secondary drains only.

⁶ Centre for Urban Studies et al., 2006, Slums of Urban Bangladesh: Mapping and Census 2005, Dhaka and Chapel Hill, USA.

- 25.1. Systemic and design weaknesses: the inadequate capacity of the Mayur river to accommodate the runoff from the urban area, the lack of drains needed to create an integrated system, undersized drains which cannot cope with the required flows;
- 25.2. Maintenance issues: The poor condition of existing drains and outfalls entailing a need for major rehabilitation.

26. These problems are exacerbated by the indiscriminate dumping of solid waste, into, or adjacent to, drains and obstructions caused by utility networks and unlawful construction.

Identification of Drainage Projects

27. Following discussions with KCC engineers and others, it was agreed that drainage projects should be identified based on the principles that they should:
- 27.1. target major inadequacies of the current system;
 - 27.2. be located in areas where flooding is known to be particularly severe;
 - 27.3. be packaged so that, when implemented, they provide an integrated and effective drainage system for the target area;
 - 27.4. be technically straightforward in terms of design and implementation;
 - 27.5. avoid projects which involve significant land acquisition as should those with legal or jurisdictional ramifications and which could prejudice the formulation of a new Drainage Master Plan.

The Drainage Proposals

28. Based on these principles, five priority areas of the city, all chosen because of the existence of major drainage and flooding problems, were selected as the geographical focus for MTPUIP projects:
- 28.1. **Area 1** - The Old Commercial Centre: this contains the main market in the city, numerous other shops and small businesses, government offices, and the public hospital. The area drains directly to the Rupsha river via sluice gates and outlet drains which are in poor state of repair and are only partly functional.
 - 28.2. **Area 2** - The New Commercial Centre: this area covers most of the modern commercial area centered on KDA Avenue as well as residential areas to the West. Drainage in this commercially important area is poor, flooding is frequent and is a major contributor to the poor state of the area's roads, several of which are currently being repaired.
 - 28.3. **Area 3** – Boyra: this area covers the developing sub-centre of Boyra which contains several colleges and local commercial facilities as well as well as areas of high, middle and low income housing.
 - 28.4. **Area 4** - Khalishpur – Mujgunni – Bastohara: this area covers the majority of Khalishpur Thana, the second most populous Thana of the city. It includes major concentrations of slum dwellers in the Bastohara, Mujgunni and ward 7 areas as well as several major employers: jute mills, the paper factory, oil depots and the power station.
 - 28.5. **Area 5** – Teligati: this area is located in the north of the current KCC area in Daulatpur Thana. Parts of the area lie outside the current boundary although within the KCC's proposed extension area. It is a developing commercial sub-centre and the city's second educational hub.
29. Integrated packages of proposals have been identified and costed to substantially improve the drainage of all these areas. These are summarized in Table ES2 along with their estimated costs. The total estimated cost of the proposals is around Taka 763.4 million, equivalent to US\$11.1 million.

Table ES2: Summary of Proposed MTPUIP Drainage Projects

Location/ Area	Major Works Proposed	Cost*	Benefs.
1. The Old Commercial Centre	Sluice rehabilitation and re-excavation of canals. New drain and culvert construction and rehabilitation	50.80	155,000
2. The New Commercial Centre and adjacent residential areas	New drain and culvert construction and rehabilitation	120.60	190,000
3. Boyra	New drain construction and rehabilitation	40.60	45,000
4. Khalishpur/ Mujgunni/ Bastohara	New drain construction and rehabilitation and canal re-excavation	509.00	300,000
5. Teligati	New drain construction and rehabilitation and canal re-excavation	42.40	30,000
TOTALS		763.40	720,000
		Million BDT	
		11.06	
		Million USD	

* Indicative estimates based on 2001 Census and 2015 projection; excludes employees and business beneficiaries of whom there will be many.

30. If all these projects are implemented, they are expected to reduce flooding for over 600,000 of Khulna’s residents, around half of the projected KCPA population. Reduced flooding will decrease the loss of income currently experienced by businesses and employees alike, lessen health risks from water-related diseases, improve living conditions, and diminish damage to infrastructure, especially roads. Adverse impacts will be minimal as there will be negligible land acquisition.

Maintenance

31. Any drainage system is, to a large extent, only as good as the effectiveness of maintenance operations. This is especially the case in Khulna where low lying topography and the short-lived but very intense monsoon rains would test the efficacy of even a well maintained drainage network. Yet every report relating to drainage in Khulna and virtually every person interviewed during this study, including KCC engineers, considered that current maintenance operations are well below those needed to keep the drainage system functioning properly.

32. KCC Conservancy staff face substantial problems in maintaining Khulna’s drains: difficulties in gaining access to major drains due to their being covered by large concrete slabs; lack of equipment to excavate the major outflow canals; the poor condition of many existing drains; additional maintenance requirements due to the indiscriminate disposal of solid waste; and limited institutional capacity. The proposals will make future maintenance easier as major drain cleaning operations are included in the specifications. They will also facilitate subsequent maintenance by enabling access to currently inaccessible drains and reducing the number of unlined drains and canals. KCC’s ability to maintain its drains will also be increased through the implementation of capacity building measures recommended for the Conservancy section. Nevertheless, the estimated annual cost of maintaining the drainage system is around BDT 60 million annually, far in excess of current expenditure. There is thus an urgent need for KCC to increase its revenues from property taxes and other sources.

E. Solid Waste Management

Khulna’s SWM System

33. SWM in Khulna, and in many other Bangladeshi cities, is hampered by the absence of adequate national or local legislation relating to municipal SWM and the treatment and disposal of hazardous waste. In particular, there are no mandatory regulations or performance standards for city corporations (e.g. KCC) to establish and manage an effective SWM system; nor are there any sanctions to prevent littering and indiscriminate dumping.

34. As a result SWM in Khulna has developed in a piecemeal and unintegrated manner with NGOs, CBOs, informal recyclers and private enterprises being involved along with KCC. Apart from one ward where KCC operates Door to Door (DtD) collection, its main responsibilities are the transport of waste from Secondary Disposal Sites (SDS) and roadside Dustbin Points (DBP) to the landfill site it operates about 8km to the west of the city. NGOs and CBOs, along with a KCC contracted private company, collect household waste door to door on a daily basis, using rickshaw vans, in parts of several wards and then transport it to the SDS; these are considered to be effective operations, although only a minority of city dwellers receives this service. For the most part, householders take the waste to the SDS themselves or dispose of it indiscriminately.

35. Informal recyclers collect and dispose of the great majority of recyclable materials but this waste only constitutes a minority (around 20% by weight) of the total daily generated household waste. The great majority of household waste is bio-waste. Although there are some composting initiatives, their total output is negligible, 20-25 tons per month when compared to the average daily household waste generation of just under 300 tons. Commercial waste is disposed of by individual enterprises. An NGO collects separated hazardous hospital waste around 1/3rd of Khulna's health facilities but there is no system for its disposal.

36. It is currently estimated that only 50-60% of household waste is collected with most of the remainder being disposed of indiscriminately in drains, at roadsides and into vacant areas - a practice which exacerbates flooding. The major reasons for Khulna's inadequate SWM system are:

- 36.1. The low managerial, technical and financial resources available to KCC to operate an effective SWM system;
- 36.2. The lack of public awareness and commitment by a large proportion of the population which leads to indiscriminate dumping of waste exacerbated by a resistance to NGO operated DtD services for which payments additional to the conservancy charges levied by KCC need to be made.

A New Integrated SWM System for Khulna

37. An effective SWM system is crucial not only for its own sake, i.e. to reduce environmental pollution, potential health risks and generally improve the attractiveness of the urban realm, but to reduce flooding and improve the efficiency of the cities roads. These issues, and the inadequacy of the current SWM system are well appreciated by KCC, NGOs and other stakeholders consulted during the study. Agreement was reached that, while improvements could be made to current operations, the objective should be to establish a fully functional, comprehensive and integrated SWM system in the city in coming years.

Components of the Proposed SWM System

38. The proposed system has been designed to build on the best of current operations, e.g. the DtD collection using rickshaw vans and the activities of informal recyclers, both of which provide employment for the poor. Its main features are:

- 38.1. The introduction of source separation of household wastes;
- 38.2. The extension to DtD collection to the entire urban area;
- 38.3. The replacement of the current poorly managed and inefficient SDS/ DBPs by a network of 12 Transfer Stations;

- 38.4. Upgrading of KCC’s vehicle fleet;
- 38.5. Enhancement of recycling activities through pilot pelletisation and composting projects;
- 38.6. Development of a properly operated and engineered sanitary landfill at Rajband
- 38.7. Phased implementation over a 5 year transition period.

39. These technical components are key to the SWM proposals, yet they will only be fully effective if non-technical aspects relating to legislation, public awareness and institutional capacity are also addressed.

40. Legislation for SWM needs to be strengthened at two levels: national and local. In particular, a new SWM law is required to allocate responsibilities and duties in SWM, to establish environmental sustainable SWM procedures and standards and to enable sanctions to be imposed for non-compliance.

41. Public awareness campaigns and community participation programs are the precondition for the implementation of all improvements in SWM in order to inform, motivate and train the public to cooperate and participate with the SWM service and to improve knowledge regarding public health issues which result from indiscriminate waste disposal.

42. Institutional Strengthening and Capacity Building: KCC has proposed the establishment of a new Solid Waste Management Department (SWMD) from units of the Transport and Conservancy Departments. This proposal is strongly endorsed. Notwithstanding this proposed reorganization, the implementation of the SWM proposals will not be possible without a significant strengthening of the technical and managerial capacity of the staff of KCC and other institutions (KCC, CBO, NGO, Informal waste worker associations).

43. Table ES3 summarises the costs of implementing the proposed SWM system for Khulna over the next 5 years. The total cost of the proposed SWM system is around BDT 450 million, US\$6.5 million. Costs would be significantly lower if land acquisition was not required for some or all the transfer stations and much of the landfill requirement for the next 5 years could be accommodated on the existing Rajband site.

Table ES3. The Proposed SWM System: Summarised Costs

Component	Capital Costs		Recurrent Costs (annual)	
	BDT million	US\$ million	BDT million	US\$ million
Transfer Stations	62.4	0.90	11.8	0.17
Vehicle Fleet (including rickshaw vans for DtD collection)	90.0	1.30	95.1	1.38
Pilot Pelletisation Plant	5.8	0.08	1.2	0.015
Pilot Composting Plant	5.7	0.08	1.2	0.015
Sanitary Landfill (construction and equipment)	273.5	3.96	5.5	0.08
Public Awareness Campaign	11.9	0.17	-	0.00
Total Costs	449.3	6.51	114.8	1.66

44. Annual O and M costs, assuming full implementation, will be in the order of BDT 115 million, USD\$1.7 million. The O and M requirement is much greater than at present and will require a substantial increase in municipal revenues to make it possible (see Section F below). If the DtD collection was privatized, cost savings, based on current ward-based contracts, could be significantly lower. The evidence from current operations suggest that costs can be reduced and efficiency increased through the judicious, and phased, extension of privatised SWM operations.

45. These proposals, when fully implemented, are expected to give rise to the following benefits, at least some of which will accrue to virtually the whole population of the city:

- 45.1. Reduced health risks from degrading wastes.
- 45.2. An improved urban environment: clean streets and less noxious odors.
- 45.3. An improved pedestrian environment due to the reduction of litter on footways and road kerbsides.
- 45.4. Reduced hazardous emissions from the land fill and reduced risk of pollution of ground and surface water from leaching.
- 45.5. Reduced risk of flooding due to drains blocked through indiscriminately discarded garbage.

46. Adverse environmental impacts are likely to be minimal: increased smell pollution adjacent to TS and very localized disturbance during the construction of these. The latter can be mitigated through the enforcement of standard clauses in construction contracts while the former needs to be taken into account in the design of the TS.

47. Adverse social impacts have been minimized in the design of the scheme by incorporating current low income labour practices related to SWM, namely DtD using rickshaw vans and recycling by the informal sector. Adverse impacts will only occur if land is required for either the TS or the sanitary land fill. In both cases, any acquisition will need to be subject to GoB/ ADB guidelines related to involuntary resettlement.

F. Capacity Building Proposals

48. The need to improve the capacity of KCC staff and their management systems has been a recurring theme in the preceding sections with such measures deemed essential for the effective implementation and operation of the MTPUIP proposals. Accordingly a needs assessment of current staff numbers, qualifications and responsibilities was undertaken as part of this study as was an evaluation of current management systems and information needs. Based on these assessments, which involved discussions with officers from all KCC departments, the capacity building proposals summarized in Table ES4 were formulated. Locally based training suppliers have been recommended wherever possible.

49. The total cost of the proposed capacity-building program is BDT13.5 million (\$195,000), which represents a very small proportion of the cost of the overall MTPUIP. If fully implemented around 700 KCC skilled, semi-skilled and manual staff from all departments will have received appropriate training in their designated fields.

Table ES4. Proposed Training and Systems Support

Training	No. of participants	Potential providers	Indicative cost BDT	Indicative cost US\$
Solid waste management	150	KUET / Private / KU	1,735,500	
Drainage	350	KUET/ ESC/ Private	1,527,500	
Transport	25	ESC / KUET / KU / Private	1,852,500	
Urban Development & Environmental Monitoring	75	KU / DU / Private	1,170,000	
Finance & Administration	100	RPATC / NILG / BIM / FIMA/ Private	3,932,500	
Sub-total	700		10,218,000	148,100
Systems	Description		BDT	US\$
Solid waste management	Waste management database, equipment, protective clothing		650,000	
Drainage	Topographical maps		650,000	
Transport	Roads database		650,000	
Urban Development & Environmental Monitoring	Maps, socio-economic database, initial applications of GIS		650,000	
Finance & Administration	Personnel MIS, HRM consultancy		650,000	
Sub-total			3,250,000	47,100
Total			13,468,000	195,200

G. The MTPUIP in Summary

50. Table ES5 summarises the costs of the proposed MTPUIP. Both capital and recurrent costs are shown. The total capital cost will be around BDT 2.2 billion (US\$31.4 million) of which 43% would be for the transport projects, 35% for the drainage and 21% for SWM. Annual recurrent costs would be in the order of BDT 228 million (US\$3.3 million).

Table ES.5. Summary MTPUIP Costs

Component	Capital Costs			Recurrent Costs (annual)	
	BDT million	US\$ million	% age	BDT million	US\$ million
Transportation	938.0	13.6	43%	53.0	0.77
Drainage	763.0	11.1	35%	60.0	0.87
SWM	450.0	6.5	21%	115.0	1.67
Capacity Building	13.5	0.20	1%	0.0	0.00
Total Costs	2164.5	31.4	100%	228.0	3.31

51. The proposed MTPUIP will promote the sustainable development of the city:
- 51.1. The transport projects will strengthen the road network, improve traffic conditions and road safety, enhance the pedestrian environment, and facilitate the development of new urban expansion areas.
 - 51.2. The drainage projects will reduce flooding in large parts of the city, especially in the commercial and business centre. Reduced flooding will decrease the loss of income currently experienced by businesses and employees alike, lessen health risks from water-related diseases, improve living conditions, and diminish the damage to infrastructure, especially roads.

51.3. The proposals for SWM will create an integrated SWM system for Khulna which will substantially reduce the current problems of indiscriminate dumping and littering which, in turn, contribute to the incidence of flooding and the inefficient use of road space; they will also make the city a more attractive place to live and work. The proposals will convert the current sub-standard land fill site into a properly engineered and operated sanitary land fill thereby reducing air and water pollution. Recycling activities will be encouraged through the development of pilot pelletisation and composting plants. Key to the successful implementation of these proposals will be an intensive public awareness designed to inform, motivate and train the public to be more responsible in the disposal of household wastes.

52. All the above would be supported by a capacity building program involving training courses for all levels of KCC staff and those of other relevant organizations, and upgraded management systems and equipment.

53. Taken together, the proposals will benefit the majority of the urban population (poor and not poor, men and women), enhance the urban environment and increase economic activity. These are the three pillars of sustainable development: socially inclusive development, environmental protection and enhancement, and economic growth leading to employment creation.

54. The proposals are also sustainable in that they build on the best features of current systems, e.g., the use of rickshaw vans for daily collection of solid waste, the predominance of non-motorised and public transport modes, and the extensive drainage system. They have also been designed to be technically straightforward and capable of early implementation.

55. Quantifiable economic benefits for the transport proposals (time and vehicle cost savings, and development gains from increased land values) give an indicative IRR of 21.9%. Based on estimated reductions in loss of income due to reduced flooding, the IRR for the drainage projects is 14.7%; this is however likely to be an underestimate of benefits from the drainage projects as it excludes: (i) losses due to damage to property and fixed assets; and (ii) the additional cost of repairing roads due to water damage – both of which are likely to be significant.

56. Adverse impacts will be small and largely related to land and property acquisition, although these have been minimized in the design and selection of schemes. In urban areas, through resettlement planning, to GoB and ADB standards, will be required, especially, where poor households have to be relocated from canal embankments. In rural areas, there is considerable potential for negotiating the required land with existing owners who will benefit from increased land values. Livelihood restorations will also be needed for pavement sellers removed in order to provide unobstructed footways.

H. Financing the MTPUIP

Financing the Capital Costs

57. A resource envelope has been prepared to provide an indication of the funds available to KCC from central government, the upcoming ADB Bangladesh City Region Development Project Loan and other potential financing sources. Using more and less optimistic assumptions on potential funding gives a potential resource envelope to fund the MTPUIP ranging from BDT 1.5 to BDT 3.6 billion (US\$21- 53 million). Although these estimates should be seen as indicative, it is apparent that there is a good likelihood of KCC accessing more funds for infrastructure investment than it has done in previous years.

58. It is considered imprudent to assume that financing will be available based on the maximum level identified by the resource envelope. Accordingly a financing plan has been prepared based on the medium scenario, i.e. BDT 2.6 billion (US\$37 million). This is shown in Table ES.6 where it is compared to the costs of the MTPUIP proposals.

Table ES6. Financing Plan and MTPUIP

Source	BDT million	US\$ million
Committed Funds*	160	2.3
Likely Funds: Government (ADP)	861.0	12.5
Likely Funds: ADB**	621.0	9.0
Sub-total – identified sources)	1,642	23.8
Other sources (not identified)***	923	13.4
Total Capital Costs	2,565	37.2
MTPUIP Components		
Transport	938.0	13.6
Drainage	763.0	11.1
SWM	450.0	6.5
Capacity Building	13.5	0.2
TOTAL	2164.5	31.4
Shortfall/ surplus – WITH finance from 'Other' sources	+ 400.2	+ 5.8
Shortfall/ surplus – WITHOUT finance from 'Other' sources	- 524.4	- 7.6

* Will almost certainly be available from upcoming ADB Loan 'Urban Public Health and Environment Project' and GoB ADB for 2009/10.

** I.e. The Bangladesh City Region Development Project (BCRDP).

*** By subtraction.

59. From this Table, one can conclude the following:

59.1. If the total finance estimated for the medium resource envelope (US\$37 million) is available, all proposed MTPUIP schemes could be implemented with the potential to include other projects identified by the CRDP PPTA, such as the rehabilitation of the Mayur River and link roads 9 and 10 which were not assessed by this study.

59.2. If no additional finance over and above that which is considered to be considered/ likely, it will be necessary to drop one of the Khalishpur drainage schemes and at least one of the link roads. A decision on which schemes should be omitted should be a matter for KCC and the PPTA consultants.

59.3. If another \$7.6 million of finance can be found, over and above that which is estimated to be committed/ likely, all schemes could be built.

60. In summary, given the best estimate of likely finance, virtually all the proposed MTPUIP projects could be implemented over the next 5 years.

61. Irrespective of the final amount of finance available, KCC will have great difficulty in servicing loans for more than a very small proportion of the total amounts shown in the resource envelope: (i) all its capital expenditure is funded by grants (usually from central

government); and (ii) its current financial situation (see below), even with increased revenues, would not provide it with the funds needed to service loans. It is therefore concluded that virtually all funds for capital expenditure for the MTPUIP proposals will need to be provided to KCC in the form of grant finance. This conclusion however reflects the current situation whereby urban infrastructure is almost entirely financed by grants from central government which also is responsible for debt service payments from any foreign loans.

Financing of Recurrent Costs

62. The estimated annual O & M costs amount to BDT 228 million. This is substantially in excess of the BDT 120 million currently raised by KCC, only limited amounts of this sum of which are allocated to running and maintaining infrastructure. Allowing for these limited amounts, the net increase required to fund annual running and maintenance costs is expected to be in the region of BDT 200 million.

63. Current KCC proposals will double withholding (property) tax and raise an additional BDT 60 million but this would still be insufficient. Total revenues of BDT 3-3.5 million could be raised if license fees were collected for all rickshaws and rickshaw vans. Private sector participation initiatives in solid waste management could also contribute somewhere in the order of BDT 30 million. Even with these increased revenues, there would still be a shortfall of over BDT 100 million in 2015. If an effective O and M regime is to be established by 2015, KCC will need to introduce and implement annual measures starting now to bridge this expected shortfall.

64. Furthermore, current property taxes account for a very small proportion of household income. If one assumes that 1.5% of household income is payable as local taxes and charges (in UK, it is around 3%), based on current average urban incomes, the amount raised would be BDT 290 million which is well above the estimated O & M requirement. While the imposition of such increases will require a lengthy transitional period and a major improvement in KCC's overall performance and public awareness campaigns (otherwise people will not pay), this calculation shows that raising the revenue necessary to fund the increased O & M requirement is potentially feasible. Furthermore, there would also be significant funds available to service loans, should some of the capital finance be on a loan and not grant basis.

65. Not all this increase in revenue needs to come from existing tax payers. Efforts should be devoted to improving revenue collection efficiency and to widening the tax net by ensuring that withholding (property) tax is raised from all properties. Nor does all this increase need to come just from property taxes. The same approach could be applied to business taxes and other revenue sources by increasing the coverage and levels of these.

66. An indication of the amount that could feasibly be raised from households payable can be obtained by assuming that 1% of household income is payable as local taxes and charges (in UK, it is around 3%). The amount that would be raised with this assumption is around BDT 225 million (BDT 75 per month per household). This is roughly equivalent to the estimate of the total 2015 O & M requirement. Increases in other taxes and revenue sources could then be used to finance KCC's other services.

67. This calculation shows that raising the revenue necessary to fund the increased O & M requirement is potentially feasible. However the imposition of such large increases will require a lengthy transitional period, a major improvement in KCC's revenue collection performance and extensive public awareness campaigns - otherwise people will not pay! The bottom line is that if people want better services, they will need to pay for them.

68. With respect to loan finance, it is considered that KCC will have great difficulty in servicing loans for more than a minority of the total amounts shown in the resource envelope. Firstly it will need to prove its creditworthiness with financing institutions. Secondly interest only loans are unlikely to be viable as KCC will not be able to accumulate the funds necessary to repay the principal in one installment. Loans based on interest plus repayment of principal would thus be necessary which will increase annual debt service payments. Even allowing for a substantial increase in revenues, calculations indicate that KCC would have difficulty in servicing loans equivalent to even half the finance that might be available under the medium financial envelope. It is therefore suggested that grants will need to form the major part of any funding package provided to KCC. Efforts are required to raise the awareness of potential donors and funding agencies of this situation.

69. There will be an urgent need to upgrade the financial sections of KCC to both improve the efficiency of revenue collection operations and to manage the potentially large increase in funds for capital investment. The proposals for capacity building of KCC's financial departments are thus crucial.

I. Priority Actions

70. Table ES6 shows that the majority of the MTPUIP projects are likely to be implementable within the best estimate of available funding, BDT 2.6 billion. This, or any, level of funding is not however guaranteed. Funds are likely to continue to come from central government and the upcoming ADB PPTA should bring additional finance; funds from other potential donors are less certain. In order to attract these funds, KCC will need to:

- 70.1. promote these projects to potential donors; and
- 70.2. prove that it has the capacity to both implement and maintain the proposed projects.

71. In order to demonstrate the latter, it is strongly recommended that KCC should embark on the following priority actions:

- 71.1. Endeavour to increase municipal revenues.
- 71.2. Improve road and drainage maintenance systems and operations.
- 71.3. Improve operation and management of Secondary Dumping Stations (SDS) and identify sites for pilot transfer stations.
- 71.4. Support current NGO/ CBO public awareness campaigns relating to SWM and drain maintenance, and generally promoting community participation in issues related to neighbourhood infrastructure.
- 71.5. Establish co-ordination and consultation mechanisms with KDA in order to develop a unified approach to the management of the city and the preparation of project proposals.