

Document of
The World Bank

FOR OFFICIAL USE ONLY

Report No: 66258-LK

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED LOAN

IN THE AMOUNT OF

US\$213 MILLION

TO THE

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA

FOR THE

METRO COLOMBO URBAN DEVELOPMENT PROJECT

February 13, 2012

Sustainable Development Department
Urban and Water Unit
South Asia Region

This document has a restricted distribution and may be used by recipients only in the performance of their official duties. Its contents may not otherwise be disclosed without World Bank authorization.

CURRENCY EQUIVALENTS

(Exchange Rate Effective January 31, 2012)

Currency Unit = Sri Lanka Rupee (LKR)
LKR 113.90 = US\$ 1
US\$1.55 = SDR 1

FISCAL YEAR

July 1 – June 30

Regional Vice President:	Isabel M. Guerrero
Country Director:	Diarietou Gaye
Sector Director	John Henry Stein
Sector Manager:	Ming Zhang
Task Team Leader	Rosanna Nitti

ABBREVIATIONS AND ACRONYMS

ADB – Asian Development Bank	M&E - Monitoring and Evaluation
BOQ - Bills of Quantities	MC - Mahinda Chintana (10-year Development Framework)
CAS - Country Assistance Strategy	MCCDS: Metropolitan Colombo City Development Strategy
CDM - Clean Development Mechanism	MCUDP - Metro Colombo Urban Development Project
CMA – Colombo Metropolitan Area	MIC – Middle Income Country
CMC - Colombo Municipal Council	MIS – Management Information System
CMCC - Colombo Metropolitan City Corporation	MODUD - Ministry of Defence & Urban Development
CMR – Colombo Metropolitan Region	MOFP - Ministry of Finance & Planning
CPS - Country Partnership Strategy	NIRP - National Involuntary Resettlement Policy
DA - Designated Account	NWSDB - National Water Supply and Drainage Board
DMLMC - Dehiwela-Mount Lavinia Municipal Council	PAP – Project Affected People
ERR - Economic Rate of Return	PDO – Project Development Objectives
ESMF - Environmental and Social Management Framework	PLA – Project Local Authority
FM - Financial Management	PMU - Project Management Unit
FMIS - Financial Management Information Systems	PIA –Project Implementing Agency
FR - Financial Reports	GRM - Grievance Redress Mechanism
GDP – Gross Domestic Product	RAP – Resettlement Action Plan
GoSL - Government of Sri Lanka	R/R – Resettlement / Relocation
IBRD - International Bank for Reconstruction and Development	SBD - Standard Bidding Documents
IDA - International Development Association	SIL - Specific Investment Loan
IFMS – Integrated Flood management System	SJKMC - Sri Jayawardenapura-Kotte Municipal Council
IOM - International Organization of Migration	SLLRDC – Sri Lanka Land Reclamation and Development Corporation
ISDS - Integrated Safeguards Data Sheet	SMF - Social Management Framework
IUFR - interim unaudited financial reports	UDA – Urban Development Authority
JICA – Japan International Corporation Agency	USDA - Urban Settlement Development Authority
KUC - Kolonnawa Urban Council	USS – Underserved Settlements
LA – Land Acquisition	
LRC - local resettlement committee	

Table of Contents

I.	STRATEGIC CONTEXT	1
A.	Country Context.....	1
B.	Sectoral and Institutional Context	1
B.	Objectives to Which the Project Contributes	3
II.	PROJECT DEVELOPMENT OBJECTIVES	4
A.	Project Development Objectives	4
III.	PROJECT DESCRIPTION	4
A.	Project Components	4
B.	Project Financing.....	6
C.	Lessons Learned and Reflected in the Project Design	7
IV.	IMPLEMENTATION	8
A.	Institutional and Implementation Arrangements	8
B.	Results Monitoring and Evaluation	9
C.	Sustainability	9
V.	KEY RISKS AND MITIGATION MEASURES	10
A.	Risk Ratings Summary Table.....	10
B.	The Overall Risk Rating.....	10
VI.	APPRAISAL SUMMARY	13
A.	Economic and Financial Analysis	13
B.	Technical	14
C.	Financial Management	16
D.	Procurement.....	16
E.	Social (including Safeguards).....	16
F.	Environment (including Safeguards).....	19
G.	Other Safeguards Policies Triggered.....	20
	Annex 1: Results Framework and Monitoring.....	21
	Annex 2. Detailed Project Description	24
	Annex 3: Implementation Arrangements	37
	Annex 4 -Operational Risk Assessment Framework (ORAF)	62
	Annex 5: Implementation Support Plan.....	67
	Annex 6: Team Composition	71
	Annex 7- Economic Analysis - Flood and Drainage Management.....	72
	Annex 8 Technical Annex -Flood and drainage component.....	80
	Annex 9: Profile of Project Local Authorities	94
	Annex 10: Maps.....	99

PAD DATA SHEET

SRI LANKA Metro Colombo Urban Development Project

PROJECT APPRAISAL DOCUMENT

South Asia Region
SASDU

Date: February 13, 2012 Country Director: Diarrietou Gaye Sector Director: John Henry Stein Sector Manager: Ming Zhang Team Leader(s): Rosanna Nitti Project ID: P122735 Lending Instrument: Specific Investment Loan (SIL)	Sectors: Flood Protection (100%); Themes: Natural Disaster Management (70%); Urban Services and Housing for the Poor (25%); Municipal Governance and Institution Building (5%) EA Category: A
---	---

Project Financing Data:

Proposed terms: Fixed-Spread Loan (FSL) with commitment-based level repayments

Loan Credit Grant Guarantee Other:

Source	Total Amount (US\$M)
Total Project Cost:	321
Borrower:	108
- <i>Financial Contribution to project components</i>	10
- <i>Taxes and Duties</i>	45
- <i>Separate contribution for the implementation of the Social Management Framework</i>	53
Total Bank Financing:	
IBRD	213

Borrower: Democratic Socialist Republic of Sri Lanka

Ministry of Finance and Planning

The Secretariat

Colombo 1

Sri Lanka

Tel: +94 1 2484510-1

Responsible Agency: Ministry of Defence and Urban Development							
15/5 Baladaksha Mawatha Colombo 3							
Tel: 0094-11-2333930							
Email: cceddp@slt.lk							
Estimated Disbursements (Bank FY-July to June/US\$ m)							
FY	FY12	FY13	FY14	FY15	FY16	FY17	FY18
Annual	1.00	20.50	50.00	62.00	52.00	24.50	3.00
Cumulative	1.00	21.50	71.50	133.50	185.50	210.00	213.00
Project Implementation Period: Start April 30, 2012; End June 30, 2017.							
Expected effectiveness date: April 30, 2012							
Expected closing date: December 31, 2017							
Does the project depart from the CAS in content or other significant respects?						<input type="radio"/> Yes <input checked="" type="radio"/> No	
If yes, please explain:							
Does the project require any exceptions from Bank policies?						<input type="radio"/> Yes <input checked="" type="radio"/> No	
Have these been approved/endorsed (as appropriate) by Bank management?						<input type="radio"/> Yes <input type="radio"/> No	
Is approval for any policy exception sought from the Board?						<input type="radio"/> Yes <input type="radio"/> No	
If yes, please explain:							
Does the project meet the Regional criteria for readiness for implementation?						<input checked="" type="radio"/> Yes <input type="radio"/> No	
If no, please explain:							
Project Development Objective:							
The project development objective (PDO) is to support the Borrower to (i) reduce flooding in the catchment of the Colombo Water Basin, and (ii) strengthen the capacity of local authorities in the Colombo Metropolitan Area (CMA) to rehabilitate, improve and maintain local infrastructure and services through selected demonstration investments.							

The proposed project includes three components:

Component 1: Flood and Drainage Management. This supports priority improvements to flood and drainage management infrastructure in the Colombo Water Basin, development of an integrated flood management system (IFMS), and complementary interventions to improve environment and public facilities along the water bodies.

Component 2: Urban development, infrastructure rehabilitation and capacity building for Metro Colombo local authorities. This component aims to strengthen strategic planning processes at the metropolitan level, and support local authorities in the Colombo Metropolitan Area to rehabilitate and manage streets and drainage infrastructure, and improve local public facilities and other urban services.

Component 3: Implementation Support. This component provides support to implementation agencies in areas such as project management, monitoring and evaluation (M&E), procurement, financial management, and environmental and social safeguards; construction supervision; communications and public awareness; and operating costs and equipments needed by the Project Management Unit (PMU), Project Implementation Agencies and Project Local Authorities.

Safeguard policies triggered?	
Environmental Assessment (OP/BP 4.01)	<input checked="" type="radio"/> Yes <input type="radio"/> No
Natural Habitats (OP/BP 4.04)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Forests (OP/BP 4.36)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Pest Management (OP 4.09)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Physical Cultural Resources (OP/BP 4.11)	<input checked="" type="radio"/> Yes <input type="radio"/> No
Indigenous Peoples (OP/BP 4.10)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Involuntary Resettlement (OP/BP 4.12)	<input checked="" type="radio"/> Yes <input type="radio"/> No
Safety of Dams (OP/BP 4.37)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Projects on International Waterways (OP/BP 7.50)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Projects in Disputed Areas (OP/BP 7.60)	<input type="radio"/> Yes <input checked="" type="radio"/> No

Conditions and Legal Covenants

Financing Agreement Reference	Description of Condition/Covenant	Date Due
Schedule 2, Section I. A. 1.	The Borrower shall maintain a self-standing Project Management Unit within MoDUD with qualified staff in adequate numbers	Ongoing

Schedule 2, Section I. C. 2	The Borrower shall ensure that the Safeguard Instruments required under the Social Management Framework and the Environmental Management Framework are: (a) prepared in form and substance satisfactory to the Bank, (b) submitted to the Bank for review and approval; and thereafter, and (c) adopted and locally disclosed before the commencement of any affected project activities.	Ongoing
-----------------------------	---	---------

I. STRATEGIC CONTEXT

A. Country Context

1. *Sri Lanka needs competitive and dynamic cities to reach its aspiration of becoming an upper-middle-income economy and a global hub by 2016.* A country of little more than 20 million people, Sri Lanka has a nominal gross domestic product (GDP) of \$2,400 per capita. Increasing this to above \$4,000 by 2016, as envisioned in the Government of Sri Lanka's (GoSL's) medium-term development plan (the Mahinda Chinthana, or MC), requires that economic growth exceed 8 percent per year over the next 5 years, and that total infrastructure investments be 35 percent of GDP—up 10 percentage points from the current level of 25 percent. As per the MC, such investments are needed to transform Sri Lanka into a regional naval, aviation, commercial, and energy hub—and a knowledge link between the East and West. The MC envisions such a profound economic transformation being achieved by 2016 through (i) strengthening cities and improving urban job opportunities, (ii) reducing the share of rural employment from two-thirds to half by 2016, and (iii) increasing the share of the urban population from 25 percent to 35 percent. With the end of civil unrest, Sri Lanka is on a path of rapid urbanization and cities must become more productive and their job markets more competitive.

2. *Sri Lanka needs to tap the competitive advantages of the Colombo Metropolitan Region (CMR) to accelerate growth.* Colombo City is the commercial and financial center of the country. The CMR is the international gateway to Sri Lanka and houses most of the country's manufacturing facilities and services. The three cities of Colombo, Gampaha, and Kalutara (all located within the CMR) are by far the most competitive cities in Sri Lanka. Hence, the CMR will continue to drive the country's economic development for decades to come. Most of Sri Lanka's foreign trade passes through the Colombo Port, and the CMR will continue to generate much of the capital, human resources, technology, and services needed for growth in the rest of the country.

B. Sectoral and Institutional Context

Urban Context

3. *Economic density is concentrated in the CMR, which accounts for almost half of national GDP.* A contiguous urban belt encircles Colombo, on the west coast, and spreads both north and south. This is the major urban agglomeration in the country, and is growing faster than any other in Sri Lanka (National Physical Planning Department, 2006).¹ While the CMR covers only about 6 percent of the country's total land area and is home to 28 percent of its population, it accounts for almost 50 percent of national GDP and 80 percent of industrial value added.

¹ The Colombo Metropolitan Region (CMR) broadly coincides with the Western Province, comprising the three districts of Colombo, Gampaha, and Kalutara.

4. *A number of obstacles are preventing the CMR from realizing its full economic potential.*
- Infrastructure and services are inadequate, with key bottlenecks in drainage, sewerage, solid waste, and urban transport infrastructure.
 - The CMR is highly vulnerable to the effects of flooding, the impacts of which are being exacerbated by climate change and sea level rise. In fact, current rainfall trends hint at larger and more frequent rainfall amounts in future, particularly in the Second Inter-monsoonal period, while sea level rise will further impede gravity drainage (Annex 8 provides more details on the subject). May and November 2010 saw the area impacted by the worst floods in four decades. After witnessing the unprecedentedly high economic losses that resulted, stakeholders reached a consensus that the CMR's vulnerability to natural disasters requires immediate attention.
 - The poor design and maintenance of micro- and macro-drainage systems by the local authorities and the Sri Lanka Land Reclamation and Development Corporation (SLLRDC), illegal encroachments on flood retention areas and along canal banks, and industrial pollution—combined with rapidly changing climate patterns characterized by more frequent and intense precipitation—has further aggravated flooding in the metropolitan area.
 - Service and infrastructure provision within the CMR is highly unequal, particularly between the Colombo Municipal Council (CMC) and the peripheral local authorities. Outside the CMC area, solid waste collection is often inefficient, and inadequate sewerage services result in uncontrolled discharge of sewerage into waterways and marshes.
 - The limited financial and human resources available to local authorities, combined with their lack of coordination, hinder effective delivery and operation and maintenance (O&M) of local infrastructure services, while management and coordination at the metropolitan level are virtually nonexistent.

5. *The GoSL has launched an ambitious program of economic and physical regeneration for metropolitan Colombo in a bid to transform it into a modern, world-class capital. This program aims to improve the overall urban environment and attract private capital. It encompasses: (i) improvements to the overall quality of life of low-middle and low-income families living in underserved settlements (mostly through resettlement/relocation to subsidized housing); (ii) investments in metropolitan services and infrastructure such as drainage and flood control systems, urban transport, and solid waste management (SWM); and (iii) area-specific investments aimed at leveraging private sector capital (for example, the improvement of historic areas with high tourist potential). The donors' community and the Bank in particular have been called upon to provide timely support to such programs and sector-investment plans. The Bank's responsiveness to this request for support by the GoSL will be reflected in the upcoming Country Partnership Strategy (CPS) and its renewed emphasis on urban development.*

Institutional Context

6. *The management of metropolitan Colombo involves many institutions. What is generally identified as the Colombo Metropolitan Area (CMA), which accommodates about 2.23 million inhabitants, coincides with the area covered by the Colombo Metropolitan City Corporation*

(CMCC), the creation of which was approved by the cabinet in March 2011 and which comprises the CMC and four peripheral local authorities² within the CMR. The institutional mapping of line agencies currently involved in the planning and delivery of infrastructure and services in the CMA shows that at least 17 are active, each following its own sectoral plans and priorities. The overall lack of interagency coordination results in overlaps and inefficiencies.

7. *Urban planning and flood management in the CMA.* The Urban Development Authority (UDA) is the leading central planning agency, with responsibilities for urban physical planning, regulation, and land development. UDA structural plans that aim to protect wetland areas and canal reservations are not keeping pace with the speed of development on the ground. Meanwhile, the SLLRDC is the main agency responsible for the development of low-lying areas, flood control and drainage investments, and the management and maintenance of the primary canal system. The SLLRDC, however, shares its responsibility with the Ports Authority and Irrigation Department and becomes functionally constraint when managing its system of canals and protect critical retention areas, often having to deal with inherited situations of land filling and the development of retention and reservation areas systematically approved by the UDA and local authorities outside the control of the SLLRDC. The local authorities in the CMA are responsible for the secondary canals and micro-drainage system, which are affected by a chronic lack of maintenance and ad hoc expansion without proper planning. The GoSL moved the UDA and SLLRDC under the Ministry of Defence and Urban Development (MoDUD) in an attempt to use the convening power of this ministry (headed by the president) to ensure interagency coordination around priority issues.

C. Higher Level Objectives to Which the Project Contributes

8. The high level objective of the project is to provide timely support to the GoSL's long-term urban development program for metropolitan Colombo through (i) reducing the physical and socioeconomic impacts of flooding in the capital city area, and (ii) improving overall capacity for the O&M of metropolitan and local infrastructure.

9. The project's high-level objective is aligned with two of the main strategic objectives of the Country Assistance Strategy (CAS) FY 09–12: improving infrastructure provision to strengthen competitiveness and enhancing quality of services. The project is also in sync with the CAS FY 09–12's recognition that enhancing the livability and competitiveness of the CMA is of critical importance for Sri Lanka to solidify its status as a middle-income country.

10. The project was prepared in the context of developing the new Country Partnership Program (CPS), in consultation with the GoSL and other stakeholders. Urban engagement is key to the CPS, which promises to reflect the GoSL's post-conflict development strategy and priorities, as set out in the MC, as well as the recent change in the Bank's engagement with Sri Lanka, which is now eligible for borrowing from the International Bank for Reconstruction and Development (IBRD). As the first Bank engagement in metropolitan Colombo, the proposed project will focus on critical priority infrastructure development while also supporting the broader agenda of metropolitan development. As such, the project will lay the foundations for

² The adjacent municipal councils of Dehiwela–Mt. Lavinia and Sri Jayawardenapura–Kotte, the Urban Council of Kolonnawa, and the Pradeshiya Sabhas of Kotikawatta-Mulleriyawa.

future investment projects, both in metropolitan Colombo and in secondary cities across the country.

II. PROJECT DEVELOPMENT OBJECTIVES

A. Project Development Objectives

11. The project development objective (PDO) is to support the Borrower to (i) reduce flooding in the catchment of the Colombo Water Basin, and (ii) strengthen the capacity of local authorities in the CMA to rehabilitate, improve and maintain local infrastructure and services through selected demonstration investments.

Project Beneficiaries

12. The estimated permanent population of 2,553,000³ people living and working in the Colombo District, within which the CMA and Colombo Water Basin are contained, account for the majority of the project's beneficiaries. The direct beneficiaries of the flood mitigation measures are estimated to be about 232,000,⁴ spread out among the CMC, Dehiwela–Mt. Lavinia Municipal Council (DMLMC), Sri Jayawardenapura–Kotte Municipal Council (SJ-KMC), and Kolonnawa Urban Council (KUC). The total population of the four local authorities is about 1,151,000 based on 2009 official data. Population figures, and thus the number of beneficiaries, are significantly higher if the “floating” population that commutes into the urban core on a daily basis (about 0.5 million⁵) is also considered.

PDO Level Results Indicators

13. Achievement of the PDOs will be monitored through the following proposed key outcome indicators:

- (a). Reduction in the area under risk of flooding (50-year return period) in the project area.
- (b). Increase in percentage of total urban roads maintained by the four PLAs that are in good and fair condition.⁶

III. PROJECT DESCRIPTION

A. Project Components

14. The geographic focus of the project is the CMA and the partly overlapping area covered by the Colombo Water Basin, with a southeast-northwest extension of about 85 square

³ Department of Census and Statistics, Sri Lanka (www.statistics.gov.lk/PopHouSat/Mid%20Year%20Population/midyearsex&district.pdf).

⁴ The total number of people affected directly in the most recent floods that occurred in Colombo City and its surroundings in November 2010 (Disaster Management Centre 2010).

⁵ Basil van Horen, Cities, Volume 19, Issue 3, June 2002.

⁶ Roads with International Roughness Index (IRI) scores between 3 and 7 are considered in good and fair condition based on the Sri Lanka Road Development Authority classification.

kilometers (km²), and a combined extension of about 200 km² (see annex 10 for maps). The Colombo Water Basin is bordered by the Kelani Ganga to the north, the Weris Ganga to the southeast, and the Indian Ocean to the west. Component 1 of the project will specifically target the Colombo Water Basin, while component 2 will target four adjacent local authorities that intersect the Colombo Water Basin: that is, the CMC, DMLMC, SJ-KMC, and KUC.

15. The project comprises the following three components:

Component 1: Flood and drainage management (US\$147.55million). This supports priority improvements to flood and drainage management infrastructure in the Colombo Water Basin, as well as the development of an integrated flood management system (IFMS) and complementary interventions to enhance the economic value and aesthetic qualities of the water bodies. This component includes the following subcomponents:

Sub-Component 1.1 Enhancement of drainage capacity in the Colombo Water Basin including enhancement of runoff from the southeastern upper section of the basin, creation of lakes/retention areas in the central section of the basin, removal of bottlenecks in the downstream reaches of the canals, improvement of the outflow capacity and improvement/ construction of canal bank protections.

Sub-Component 1.2 Rehabilitation and upgrading of the micro-drainage systems in priority flood-prone areas under the jurisdiction of Colombo Municipal Council.

Sub-Component 1.3 Capacity enhancement for flood and drainage management. This aims to improve the capacity of SLLRDC and other selected agencies to ensure the sustainability of project investments over time. It includes the purchase of maintenance machinery, the development of an IFMS for the Colombo Water Basin, and selected investments to improve public usability of canals and lakes.

Sub-Component 1.4 Beira Lake Linear Park and Beddagana Park, including improving embankments and developing a liner/nodal park along the east and southwest shores of Beira Lake, and establishing a natural park around degraded wetlands in Beddagana.

Component 2: Urban development, infrastructure rehabilitation, and capacity building for Metro Colombo local authorities (US\$50.70 million). This component aims to (i) support local authorities in the CMA to rehabilitate and manage their streets and drainage infrastructure, and improve local public facilities, solid waste collection, and other urban services, and (ii) strengthen strategic planning processes at the metropolitan level. It comprises the following two subcomponents:

Sub-Component 2.1 Investment support to local authorities will enhance local capacity through implementing select high-priority infrastructure improvements in four local authorities in the Colombo Metropolitan Area (Colombo, Sri Jayawardenapura-Kotte, Dehiwela -Mount Lavinia, and Kolonnawa) to rehabilitate and improve drainage and roads, upgrade local public facilities, and purchase needed equipments to improve local public services.

Sub-Component 2.2 Institutional strengthening and capacity building for local authorities will comprise of technical assistance to the PLAs including geographic information system (GIS), asset management for urban roads and related drainage, setting of technical standards, preparation of street and drainage rehabilitation and maintenance works (including quality control), and improvements in solid waste collection. It will also support metropolitan development strategies and planning and feasibility studies for selected sectors, including a Metropolitan Colombo City Development Strategy (MCCDS), an integrated master plan for the CMA and surrounding areas; a Solid Waste Management feasibility study and action plan for the CMA and surrounding areas; and another detailed study for selected priority metropolitan services as identified by the MCCDS.

- i. ***Component 3: Implementation Support (US\$4.01 million)***. This comprises: (i) implementation support in the areas of project management, monitoring and evaluation (M&E), procurement, financial management, and environmental and social safeguards; (ii) public awareness and communications support regarding project interventions, management of public expectations, behavior changes and resettlement; (iii) support to the SLLRDC, UDA, and PLAs in construction, supervision, and compliance with environmental and social safeguards; (iv) purchase of vehicles, office furniture, and IT equipment for the Project Management Unit (PMU); and (v) operating costs of the PMU, PIAs and PLAs.

B. Project Financing

Lending Instrument

The lending instrument is Specific Investment Loan (SIL). The GoSL selected a Fixed-Spread Loan (FSL) with commitment-based level repayments because of the embedded flexibility that it offers for better management of the country's sovereign debt. The Loan has a 25-year maturity, including a five-year grace period. The Loan will be denominated in US Dollars.

Project Cost and Financing

Table 1: Cost Estimate and Financing

Project components		Estimated costs, including contingencies, excluding taxes & duties	IBRD	GoSL	% of the Loan
		\$ million	\$ million	S million	
Component 1: Flood and drainage management					
1.1	<i>Enhancement of Drainage Capacity in Colombo water basin</i>	93.90	93.90		
1.2	Micro-drainage system within the CMC	28.05	28.05		
1.3	Capacity enhancement for flood and drainage management	14.00	14.00		
1.4	Beira Lake Linear Park and Beddagana Park	11.60	11.60		
Total Component 1		147.55	147.55		68.25
Component 2: Urban development, infrastructure rehabilitation, and capacity building for Metro Colombo local authorities					
2.1	Investment Support to Local Authorities	45.60	45.60		21.5
2.2	Institutional Strengthening and Capacity Building for Local Authorities	5.10		5.10	
Total Component 2		50.70			
Component 3: Implementation support		4.01		4.01	
Subtotal		202.26	193.15	9.11	
Contingencies		20.22	19.31	0.91	10
Front end fee		0.532	0.532		0.25
Taxes & Duties				45.00	
Total Project Cost		267.64	213.00	55.00	
<i>Borrower's contribution for the implementation of the Resettlement Policy Framework</i>		<i>53.00</i>		<i>53.00</i>	
Total costs including all Borrower's contribution		321.00	213.00	108.00	

C. Lessons Learned and Reflected in the Project Design

16. The following lessons learned have been incorporated into the project design:
- i. *Having a sound city development strategy (CDS) is crucial for a city's sustainable development.* Experience from cities around the world clearly shows that strategic urban development planning can greatly accelerate cities' development and economic growth. Glasgow, Amman, Bogota, Aden, Durban, and London are a few examples of cities that used CDSs to influence future development, strategically prioritize investments, and leverage private sector investment. Metropolitan Colombo still lacks a shared strategic vision. In this context, the preparation of a CDS is a priority to catalyze new and more focused thinking about the city's future, and to support the CMA in achieving its development objectives.

- ii. *It is risky to overburden local authorities with major infrastructure investments; such initiatives are better managed and coordinated at the metropolitan level.* Even the most successful projects implemented in the CMA have demonstrated low levels of post-project sustainability as local authorities became responsible for O&M. This is because local authorities lack sufficient resources and administrative capacity. It is important to ensure that key central agencies are engaged in the implementation and O&M of metropolitan infrastructure and services. For example, local and ad hoc interventions will not effectively meet the challenges of flood management, which requires a basin-level approach based on an updated hydrological model maintained in coordination with local stakeholders.
- iii. *Local authorities should strengthen their capacity to undertake specific sets of responsibilities that fall under their local mandates and capacities.* In addition to coordinating and planning at the metropolitan level, local authorities should strengthen their capacity to deliver critical local services and infrastructure. The CMC offers a good case study of the efficacy of such practice.
- iv. *Strategic planning and catalytic investments require the development of institutional capacity.* Effective and sustainable sectoral interventions require: (i) institutional/organizational setup and instruments for better coordination and execution of interventions at the metropolitan level; (ii) integrated planning, both sectoral and geographical; and (iii) an urban management information system (MIS) to be shared across local authorities and central agencies.
- v. *Local authorities play a critical role in ensuring that a robust solid waste collection mechanism is in place to reduce the amount of uncollected garbage affecting public spaces.* The Bank financed Puttalam Housing Project in Sri Lanka shows that, despite many awareness campaigns to change behaviors and prevent waste dumping in public spaces, drainages and water bodies, the practice continues. Neither awareness nor regulations and laws have been able to mitigate this problem, as it requires a long-term behavioral change. Hence, for the short-medium term, ensuring a robust SW collection mechanism is essential to overcome this problem. The active participation and capacity strengthening of local authority is a key factor.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

17. A self-standing and ring-fenced PMU has been established under the MoDUD to implement the Metro Colombo Urban Development Project (MCUDP). The PMU will operate under the oversight of a steering committee, chaired by the MoDUD's secretary and composed of the SLLRDC, UDA, Ministry of Provincial Councils and Local Authorities, National Water Supply and Drainage Board (NWSDB), Ministry of Irrigation, and PLAs. Other ministries and agencies will be identified as stand-by members (for example, the Central Environmental Authority), to be called when relevant issues need to be addressed.

18. The PMU will remain responsible for all fiduciary, M&E, and reporting aspects of the project, while implementation responsibilities will be assigned to the project implementing

agencies (PIAs, such as the SLLRDC and UDA) and the PLAs, assisted by consultants for detail designs and construction supervision to be mobilized as necessary for selected subprojects. The PMU will play a critical role in coordinating the agencies involved in project implementation to ensure overall quality and timeliness of investments, and monitor the agencies' compliance with the project's environmental and social safeguards. The PMU will also procure the preparation of the Subcomponent 2.1 development studies in coordination with the concerned agencies and facilitate their execution.

19. The PMU is staffed with a project director, civil engineers, a full-time fully accredited accountant, a procurement specialist, an environmental specialist, and a social development specialist. The PMU also receives part-time support from a senior social development specialist from the UDA and senior advice from the Central Environmental Authority as needed.

B. Results Monitoring and Evaluation

21. The PMU will be responsible for overall quality assurance, M&E, and reporting, in coordination with the PIAs (SLLRDC and UDA) and PLAs. Detailed M&E responsibilities will be allocated as follows:

- The SLLRDC, UDA, and CMC will be responsible for monitoring results and collecting and compiling outcome and intermediate results indicators for Component 1.
- Each PLA will be responsible for monitoring the results and collecting and compiling outcomes and intermediate results indicators for Component 2.
- The PMU will be responsible for coordinating the collection and compilation of outcome and intermediate indicators, and for their consolidation based on the results framework presented in annex 1.

22. The SLLRDC, UDA, and PLAs will submit a biannual report covering their outcome and intermediate results indicators. The PMU will compile the information received and produce a consolidated report on a biannual basis.

23. The M&E system for the project is fully designed and TA support for the PMU staff to carry out M&E activities is built into the project. These will build on the existing M&E systems already in place at the level of local authorities and implementing agencies, and will be strengthened during the project implementation.

24. The detailed results framework and baseline indicators are presented in Annex 1.

C. Sustainability

25. To ensure the sustainability of the flood and drainage investments, an IFMS will be developed for the Colombo Water Basin under Subcomponent 1.4. This will include strengthening institutional capacity for the monitoring and management of retention/wetland areas; O&M systems for wetlands, canals, and drainage systems; and monitoring and enforcement of land-use planning to safeguard the capacity of the basin to cope with floods. A Policy and Human Resources Development (PHRD) grant for \$900,000 has already been made available to support the Flood Risk Assessment for metropolitan Colombo, as well as critical feasibility studies and training that will further contribute to the IFMS and its long-term sustainability. Complementary investments in landscaping, waterfront improvements, and water-

based transportation (Subcomponents 1.3 and 1.4) are expected to further enhance the flood and drainage investments by improving the aesthetic and economic value of water bodies, wetlands, and surrounding areas.

26. The sustainability of Flood and Drainage Management interventions under Component 1 will also require addressing the wider issues of (i) SWM, as garbage has been clogging the drainage system, and (ii) sewer discharges in the canals and drainages. Under the project, the PMU will review issues of SWM and sewerage, and prepare relevant feasibility studies for potential follow-up projects for the CMA. In parallel, the Global Partnership on Output-Based Aid (GPOBA) at the Bank, has approved in 2011 a grant of US\$5.08 million to pilot an Output-Based Aid (OBA) approach to increase access to domestic sanitation for low-income households in selected pilot low-lying areas around the CMA. The grant is implemented by the National Water Supply and Drainage Board in coordination with local authorities, including the PLAs of Kollonawa and Deiwala Mount Lavinia, and will provide an alternative model for scaling-up the delivery of sustainable sanitation in under-serviced settlements.

27. The sustainability of the Support to Local Authorities (Subcomponent 2.2) depends on: (i) local implementation capacity and (ii) the ability to fund asset maintenance. The project will provide support to the PLAs to strengthen such implementation capacity by mobilizing consultants (municipal engineers) to work directly with local authorities. Moreover, the infrastructure maintenance capacity, particularly for drainage systems and streets, will be improved under the project through (i) the development of an adequate asset management system, (ii) acquisition of equipment, and (iii) assistance in contracting out future maintenance works.

KEY RISKS AND MITIGATION MEASURES

A. Risk Ratings Summary Table

Table 2: Risk Ratings Summary Table

Stakeholder risk	Moderate
Implementing agency risk	
- Capacity	Substantial
- Governance	Moderate
Project risk	
- Design	Moderate
- Social and environmental	High
- Program and donor	Low
- Delivery monitoring and sustainability	Moderate
Overall implementation risk	High

B. The Overall Risk Rating

28. The overall project risk is rated high. This is partly because it is an Environment Category-A project with potential needs for resettlements. It is the first large-scale urban development project that the Bank has supported in Sri Lanka for some time, and it is also the first time that the implementation agency works on a Bank-financed project.

29. The project's main risks and mitigation measures are summarized as follows:
- i. *Capacity risk.* Though the MoDUD has no track record in implementing a Bank project, the PMU is staffed with all the necessary full-time professional core FM, procurement, social, environmental planning, and engineering personnel. This professional staff performed well during project preparation and more training opportunities will be provided during project implementation to continue to strengthen their capacity. Except for the CMC, however, the PLAs do not have the necessary capacity to keep up with the high volume of investments during project implementation. Therefore, Component 3 of the project includes a budget allocation to mobilize specialized senior advisors and design and supervision consultants to strengthen and complement the expertise of the existing core staff of the PMU and other project agencies. Design and supervision consultants have been assigned to each PLA, to be mobilized from the onset of implementation.
 - ii. *Governance risk.* The project's success depends on (i) the leadership and commitment of the MoDUD and (ii) the full commitment of all the project agencies. These two factors are expected to remain in place during project implementation. Moreover, the Project Steering Committee, chaired by the Secretary of Defence, will meet every 2 months and when necessary to continue to ensure interagency coordination across line ministries. During implementation, the PMU will continue to hold monthly progress review meetings with all the agencies involved to ensure timely delivery of commitments and the exchange of relevant information. The implementation phase will follow the successful decentralized approach adopted during project preparation.
 - iii. *Design risk.* The bulk of the project will be implemented by highly specialized agencies that are technically strong in their areas of expertise. Subcomponent 1.1, dealing with primary and secondary canals, might introduce technical complexities beyond the capacity of the implementing agency (SLLRDC), whereas the use of some state-of-the-art technical solutions might be necessary. The Global Facility for Disaster Reduction and Recovery (GFDRR) made funds available during preparation to mobilize a firm with international expertise to carry out the update of the hydraulic model of the Colombo Water Basin, validate the viability and final design of proposed flood structures, and provide design engineering support during the final stage of the revision of structure design.
 - iv. *Environmental risk.* As documented by the project's Environmental Assessment (EA), the MCUDP will have little negative impact. The disposal of dredged material that might contain hazardous sediments, especially in the lower part of the basin, requires attention. Accordingly, a dredge material disposal plan will be prepared as per the guidelines of the Environmental Management Framework (EMF).
 - v. *Social risk.* While the project is not expected to have social risks beyond those temporary impacts associated with the construction works at building sites, in its later stages, the MCUDP may involve the targeted preventive resettlement of informal settlements in areas prone to flooding or area-specific resettlement necessary to successfully implement selected subprojects. In accordance with OP4.12, the project has a sound Social Management Framework (SMF) to deal with any critical resettlement/relocation (R/R) and post-R/R issues; however, the implementing agencies limited experience in urban

R/R could slow down the implementation of the first subprojects involving R/R. This risk could be mitigated by capacity building and South-South knowledge exchange (with Latin America and East Asia, for example). The GoSL has fair experience in managing urban resettlement schemes in the past; however safeguard risks remain high in view of the involvement of multiple implementation agencies and their relative inexperience in managing social safeguard issues.

It is expected that the robust resettlement management measures and strong communication and public awareness efforts by the GoSL (also supported by the project) will help to minimize both the social and more general stakeholders' risks associated with the project, and facilitate smooth implementation. Any gap identified through annual independent safeguards quality audit will be addressed with special mitigation measures including as necessary updating of the SMF. The overall risks management capacity of the PMU and implementing agencies will be strengthened by the project under the institutional development component, details of which are in the Annex-3. The Bank's implementation support strategy will involve intensive technical support and close supervision of the social safeguards management process and outcomes.

- vi. *Fraud and Corruption (F&C)*. In the recently published 2011 Transparency International report, Sri Lanka ranks 86 out of 182 countries, just behind Thailand, and 2nd in SAR after Bhutan. Therefore Sri Lanka appears to be better than most other countries in the region regarding fraud and corruptions issues, but risks still clearly exist. The government is aware of such risks and improving governance is one key area of partnership between the Bank and GoSL. While the Bank has no prior experience with the Ministry of Defence and Urban Development as implementing agency, experience across the current Bank portfolio shows that the project can mitigate potential F&C risk through annual audits, periodic procurement and financial management reviews, specific training to project staff on F&C, utilization of construction supervision consultants to be financed by the project, and communication campaigns for public awareness. In line with the Sri Lanka National Procurement Guidelines, an Appeal Board chaired by the Secretary of the Ministry will be made available to any bidder who intends to make a complaint. The project will also develop early in the implementation phase an easy to access one-stop shop complaint/reporting mechanisms at the level of the implementing agencies that would allow also civil society members to be involved in monitoring project implementation. This will include an E-complaint system to allow for anonymous reporting from the public. Project related materials will include information on how to report suspicion of fraud and corruption to the Bank's integrity unit (INT) (investigations_hotline@worldbank.org). Any allegation otherwise received will be reported to INT.

30. The overall risk profile of the project and the associated mitigation measures are presented in Annex 4.

VI. APPRAISAL SUMMARY

A. Economic and Financial Analysis

31. Colombo produces almost 50% of the GDP of Sri Lanka. When major flood episodes affect the city (like in May and November 2010) the city is paralyzed for days. While the full estimate and picture of the economic losses and indirect impacts of these floods on the Colombo metropolitan area have never been fully quantified (e.g. impacts on productivity, traffic congestion, loss of working hours, loss of business due to flight cancellation, impossibility to commute, loss of school days, impacts on health, etc), there is a general consensus between stakeholders that flood reduction in the Colombo Metropolitan Area is a priority. The estimated damage (without accounting for economic losses) for a 50-year return period flood episode in Colombo is in the range of \$50million, while the one for a 5-year return period is in the range of \$15 million. A flood-free Colombo is a precondition to support the growing vibrant economy of the city.

32. The economic benefits of the project are presented below by Component.

Component 1: Flood and Drainage Management.

33. The flood control and drainage management program (Sub-components 1.1, 1.2 and 1.3) would benefit, directly or indirectly, about 2.5 million people. The main economic benefits comprise tangible benefits such as the avoided damage to residential and commercial property and the avoided damage to physical infrastructure, the non-market/intangible benefits associated with the increased recreational value of the canal system, and the improvement in the overall city living environment. A simulation Cost Benefit Analysis (CBA) exercise was carried out to estimate the Economic Internal Rate of Return (EIRR) of the entire flood control and drainage management program. The CBA is based on the latest available flooding probability estimates updated to take into account the increase in rainfall patterns over the last 30 years as well as climatic factors. In the absence of city-level data for Metro Colombo, the impact of climatic factors on the probability of flooding and flood damage costs has been estimated based on climate change modeling carried out for two Asian megacities – Bangkok and Metro Manila.⁷ The EIRR is estimated at 11 percent. The CBA will be updated for the entire investment program based on the results of the new hydraulic model, and used as a screening tool to (i) identify the flood damage reduction options with the highest economic return and (ii) assess the economic viability of the overall investment program. For the purpose of the CBA, an intervention is defined to be economically viable if it generates a *minimum* ERR of 10 percent.⁸

34. The main benefits of the Beira Lake Development (Sub-component 1.4) are the increase in the market value of the land adjacent to the lake and the environmental and recreational values associated with the improved stability of the embankments and the increased accessibility to the lake. The Beira Lake development will have a significant positive impact on the real estate value of the waterfront area, estimated to include 100 hectares of developable land in the immediate vicinity of the lake (the “primary catchment area”). The Beira Lake development is also expected

⁷ The impact of climatic factor is equivalent to a 0.8 percent annual increase in flood damage costs. World Bank, ADB and JICA (2010). “Climate Risks and Adaptation in Asian Coastal Megacities – A Synthesis Report”.

⁸ A minimum 10 percent discount rate is considered appropriate for the Component I investments, given that an important part of the project benefits are of public goods nature (improved environmental conditions), and could not be quantified.

to have a positive impact on real estate value beyond the waterfront area for an additional 250 hectares of land (the “secondary catchment area”). The EIRR for this Sub-component is estimated at 28 percent.

35. The EIRR for the entire Component I is estimated at 12 percent, and is considered a lower bound estimate since non-market benefits (or recreational benefits) could not be quantified. The EIRR is robust to different scenarios, including a 20 percent increase in costs and a 20 percent decrease in benefits. The methodological approach and results of the economic analysis are presented in Annex 7.

Component 2(a): Investment Support to Local Authorities.

36. This subcomponent would support selected local infrastructure investments (sub-projects) identified upfront by the four PLAs with the overall economic rationale of rehabilitating local roads, drainages and basic amenities to improve usability and urban environment at local level. The main benefits for the residents of the PLAs will include: (a) reduction in vehicle operating costs and travel time, (b) reduction in the costs of localized floods; (c) increase in the recreational value of basic amenities.

37. The economic valuation is based on the effectiveness and the sustainability of the investments. The economic sustainability of the rehabilitation investments will be guaranteed through the setting and monitoring of appropriate minimum service standards, the establishment of adequate asset management systems and the provision of equipment and technical assistance for the proper maintenance of the assets. The methodological approach for the economic analysis is presented in Annex 7.

C. Technical

38. Subprojects were assessed and prioritized first and foremost based on criteria of relevance to the project development objectives, followed by technical readiness, and combined with the necessary safeguard screenings. Therefore, all the flood-mitigation investments under Component 1 have been selected on technical ground, and the final detailed design of some of them will be validated as soon as the updated hydraulic model is finalized. The model takes into consideration the trends in climate change over the last 20 years and will be designed to be updated with future climate change trends⁹. Component 2 has a solid pipeline of subprojects for CMC with ready detailed designs and procurement plan for the first year. All other municipalities have identified the list of investments, the detailed designs of which will be finalized after the Design and Supervision consultants are mobilized at project inception. In particular:

39. ***For Component 1***, the short- and long-term flood-mitigation measures proposed by the SLLRDC have been found to be technically sound (see Annex 8 for detailed technical analysis). These are based on a set of key principles: (i) for the upper catchment area of the basin, divert all water either eastward and southward to Kelani Ganga and Weras Ganga to limit the inflow to the central section of Parliament Lake, (ii) create lakes/retention areas around Parliament Lake, (iii) remove bottlenecks in the downstream reaches of the canals to maximize the conveyance capacity, (iv) improve the capacity of the system outfalls, (v) improve overall water quality in

⁹ PHRD is providing a grant of \$900,000 to carry out the Flood Risk Assessment for Metro Colombo including impacts of climate change.

the canal system to reduce health hazards, and (vi) improve the canal bank protections to facilitate maintenance.

40. The design of the flood and drainage management interventions requires the development/update of hydraulic and hydrological models for the macro- and micro-drainage systems. In particular: (i) the upgrading of the macro-drainage model managed by the SLLRDC is required to plan for the more complex engineering flood mitigation solutions to be implemented; and (ii) the development of the micro-drainage model for the CMC is required for the evaluation of the micro-system capacity and design, as well as for the determination of the inflow to the main canal system.

41. The project design includes **considerations of climate-change**, in line with established best practices for flood management projects of this magnitude. The boundary conditions of both the macro and micro drainage models will account for the effect of climate change. The rainfall statistics are updated to represent recent developments and expected trends in the rain climate, whereas sea level rise is accounted for by application of the latest IPCC predictions for the duration of the economic lifetime of the interventions.

42. The development/upgrading of the hydrologic-hydraulic models for the macro- and micro-drainage systems managed by the SLLRDC and CMC, respectively, will be guided by an international drainage expert with experience in advanced modeling for urban drainage and canal systems and in GIS applications. Funds from the GFDRR have been mobilized to support the upgrading of the models, to be completed by July 2012. The models will also be critical to provide information for the Metro Colombo Flood Risk Assessment to be carried out in parallel with project implementation (supported by funds from the PHRD facility at the World Bank).

43. The designs of the *Beddagana Park and the Beira Linear Park* underwent a series of reviews to ensure adequate landscaping and preservation of the lakes shores. For the Beira Linear Park a phased implementation was retained with a particular attention to first continuing the construction of protection walls along the lake shores and to restoring of the historic McCollum Gates. For the Beddagana Park only light landscaping interventions with essential facilities were selected to preserve the environment and reinstate the flood retention function of the wetlands located the lake.

44. **For Components 2**, the PLAs already selected upfront priority investment subprojects to be financed under the project to fall under a set of eligible categories agreed as follows: (i) rehabilitation of drainage infrastructure, including landscaping of flood-retention areas; (ii) targeted area-based interventions of urbanscaping; (iii) rehabilitation of streets, including their drainage; and (iv) rehabilitation of maintenance facilities. The selected investment subprojects were prioritized based on criteria of relevance to flood reduction, either at local or basin level, criticality at metropolitan level in terms of use and number/type of beneficiaries, and demonstration value for future replication (Annex 2 provides mode details on the specific selected subprojects). In addition, PLAs also identified goods packages for the acquisition of targeted equipment for street and drainage maintenance works and for solid waste collection; and acquisition of information technology (IT) equipment and specialized software for asset management. All the subprojects selected upfront by the PLAs received approval by the respective Municipal/Urban Councils and were confirmed to be in line with the agreed categories, priorities and objective of Component 2.

45. All PLAs will be supported by the project during implementation through technical assistance for design and supervision, which will also include safeguards monitoring responsibilities. The key technical challenges to ensure the durability of the selected high priority demonstration infrastructure improvements were identified as: (i) detailing of works and finishing with particular attention to the landscaping of public spaces and the treatment of paving serving different functions in the case of the streets rehabilitation and upgrading; and (ii) quality of construction and urban fixtures.

C. Financial Management

46. The FM team of the Bank conducted an assessment of the PMU to ensure that the proposed project's FM arrangements can provide the Bank with accurate and timely information regarding the activities that will be financed under the project, thereby providing reasonable assurance that the Bank's funds will be used for the purposes intended. The proposed overall FM procedures and practices for the project are satisfactory to meet the IBRD's fiduciary requirements as per OP/BP 10.02. The project has a "moderate" FM risk rating. The PMU under the MoDUD is responsible for the project's FM activities, including compliance with the financial covenants of the legal agreement.

D. Procurement

47. Responsibility for procurement will be entrusted to the PMU, which is responsible for preparing the procurement plan for goods, works, and consultancies for contracts. Nevertheless, design and preparation of BOQ and specifications (including preparation of bidding documents) will be the responsibility of the stakeholder institutions. The PMU is staffed with a procurement specialist. SLLRDC and the PLAs also mobilized dedicated officer in charge of procurement. Procurement for the project will be carried out in accordance with the World Bank's "Guidelines: Procurement Under IBRD Loans and IDA Credits" (January 2011) and "Guidelines: Selection and Employment of Consultants by World Bank Borrowers" (January 2011). National bidding documents acceptable to the Bank will be used for smaller-value NCB contracts. The Bank's standard request for proposal (SRFP) will be used irrespective of the method of consultant selection.

48. The Bank's procurement capacity assessment of the PMU and SLLRDC reveals adequate capacity to carry out project procurement (see annex 3). Measures to mitigate residual risks include: (i) training procurement staff, (ii) securing complaint-handling mechanisms, (iii) using standard bidding documents (SBDs) for the procurement of goods and works, following the National Competitive Bidding (NCB) procedures and Bank SBDs for the International Competitive Bidding (ICB) and consulting services, and (iv) planning project procurement in line with the Bank's guidelines. The consolidated Procurement Plan for the first 18 months of the project implementation that has been agreed with the Borrower is available in a separate document. The agreed Procurement Plan and all subsequent updates will be published in the Bank's external website and the Borrower's appropriate publications.

E. Social (including Safeguards)

49. **Safeguards Approach:** The project adopts a social framework approach to investments implemented beyond the first year of project implementation. A social assessment (SA) was

carried out to study the risks and impacts of the project. As per the SA, the majority of the works, chiefly improvement of infrastructure such as existing canals, micro/storm drainage, streets, recreation areas, and similar works are expected to have significant positive social impacts by way of improving the urban environment and livability of CMA. Such works would mostly involve temporary risks relating to access, mobility, health, and safety. A major positive impact will be the improvement in living conditions of households in selected under-serviced settlement that would be preventively relocated from low lying flood-prone areas to secure housing. Long term adverse impacts of the project are likely to be caused by unavoidable land acquisition and resettlement impacts in some subprojects to be implemented in the later implementation stages. As a result, OP 4.12 on Involuntary Resettlement has been triggered for the project.

50. While the exact number of households and magnitude of private land required for different subprojects is not known, based on the SA, it is estimated that about 1,500 squatter households living in underserved settlements (USSs) around the Beira Lake and along canal banks could be relocated to resettlement sites. Ethnic composition of people living in the project area is similar to that of larger population living in the CMC area. The sample survey showed the population of under-served settlements to be distributed mostly between Sinhalese (38.6%), Muslims/Malay (31.4%) and Tamil (28.5%). A Bank-financed Livelihood Assessment of Under-Serviced Settlement in floodable areas in CMC is currently being carried out in partnership with UN-Habitat, together with a prominent NGO and a research institute. This study will further deepen the knowledge of these settlements and the findings of this assessment will be available by project launch, further informing the design and implementation of the resettlement process under the project.

51. **Resettlement Framework:** A highly gender-sensitive and consultative processes with all ethnic and religious minority groups was followed during project preparation. Based on the SA, a Social Management Framework (SMF) has been prepared for the Project, including measures to ensure social sustainability in post-resettlement sites and special provisions for vulnerable groups across gender and age. The SMF provides a resettlement policy framework (RPF) for the whole project to ensure all affected people will be able to improve or at least restore the lost assets and livelihood to the pre-project level. The SMF lays down principles and procedures for: (a) social screening and impact survey for future sub-projects with standard templates; (b) social inclusion and accountability measures¹⁰, including special support for displaced vulnerable households to restore their livelihoods; (c) preparing RAP before awarding work; (d) overall legal and institutional arrangements; (e) entitlement matrix¹¹; (f) implementation arrangements (including disbursement of compensation and rehabilitation benefits); (g) multi-stage grievance redress mechanisms, monitoring and evaluation; (h) information disclosure, consultation, and NGO

¹⁰ Specific guidelines for addressing **social inclusion and accountability** in the resettlement process include information disclosure, consultation, grievance redress, community civil society participation in R/R implementation, special support for displaced vulnerable households to restore livelihoods (e.g. credit access and skill training support for youths from vulnerable resettled families, continuation provision of government welfare poverty alleviation schemes (samrudhi, old age pension) for eligible resettled families, extending housekeeping assignments at resettlement sites and employment in project related works, and opportunity to avail of a shop at the resettlement site on long term lease. Resettled families losing livelihood will receive cash assistance to enable re-establishment of their income.

¹¹ The entitlement matrix offers: compensation for land and structure at replacement value, alternative housing for squatter families in multistory condominiums, shops on long-term lease for displaced shopkeepers, assistance for temporary loss of incomes, additional benefits for vulnerable displaced households, re-establishment of community facilities, and mitigation measures for temporary impacts. The SMF provides additional guidelines for integrating social inclusion, accountability and gender considerations while planning and implementing resettlement social management activities.

participation; (i) implementation schedule including for site hand over for civil work; and (k) indicative budget in compliance with the Bank's safeguard policies on involuntary resettlement OP/BP 4.12 and physical cultural resources OP/BP 4.11 (for more details, see Annex 3). OP 4.10 has not been triggered, as the SMF clarifies that no indigenous community lives in the CMA. *The SMF clearly states that no project affected household or person shall be displaced or evicted under any existing country legislation or administrative instruction without the necessary provision of compensation and rehabilitation benefits as per the entitlement matrix in the SMF.*

52. Social Screening and Abbreviated Resettlement Action Plan (RAP) have already been successfully completed, in line with the SMF for the first-year pipeline of eight sub-projects. The Social screening confirmed that these eight subprojects do not require any land acquisition and one of them involve relocation of two rented shops and one commercial kiosk.

53. **Gender considerations** have been taken into account both at the general level of project design and specifically embedded in the proposed in the SMF. In particular, both women and children are expected to greatly benefit particularly from subprojects of urban scale implemented in the CMC and other local authorities aimed to deliver easy-to-access, open and safe public spaces and playgrounds, with plenty of public lighting along highly frequented streets, parks and beach fronts. The public convenience sub-project will provide separate facilities for women, benefitting especially working women, students and visitors to the city from other parts of the country. Specific gender considerations in the SMF include: (a) provision of title of the alternative house in the joint name of spouses, and in the name of the mother in case of deceased husband; (b) special attention to women headed households with livelihood restoration support; (c) equal provision of employment training opportunities for male and female youths; and (d) gender sensitive provision of facilities in resettlement sites including women and day care centers; (e) and ensuring women's participation in condominium management process.

54. **Resettlement Sites:** The Government of Sri Lanka is implementing a pro-poor housing program, under which it has commissioned construction of new multi-storey buildings with flats of 400 sft. each in several locations in the Colombo area to re-house people living in USS. Of these, the GoSL has committed to earmark 1,500 flats and a proportional number of commercial units and social facilities to meet the potential resettlement requirements for the MCUDP. The flats will be made available in condominiums, currently under construction in two government sites closest to the MCUDP project areas. The Bank oversight in this regard shall be limited to the relocation of the project affected households in such condominiums.

55. As per the SMF, the GoSL is committed to addressing key safeguard issues relating to development of the resettlement sites: (a) environmental suitability, (b) relocation of households affected by the development of the resettlement buildings, (c) attention to social networks between and within community groups, to ensure higher post-resettlement social sustainability and (d) providing necessary infrastructure facilities, such as individual toilets, water supply, condominium management office, community hall, day care center and women common room, open space, recreational areas and shops. The SMF makes provision for post-resettlement measures to ensure sustainability of resettlement sites, including capacity building and hand-holding support. Specific resettlement-site management plans will be developed as a part of resettlement planning before actual relocation.

56. Key **safeguards compliance arrangements** will involve instituting systems and capacity for safeguards management at the PMU and sub-project implementing agencies. This will

include: establishing an inclusive Land Acquisition and Resettlement Committee (LARC) for the Project, hiring of social development specialists for PMU and social development officers (SDOs) to assist implementing agencies handling resettlement activities; mobilizing community development officers (CDO) from the social welfare department *field level operations and hiring Consultants for resettlement planning* and NGO for implementation support; and establishing Land Acquisition and R/R capacity in implementing agencies. MoDUD will establish mechanisms for independent monitoring and quality audit of the safeguards management including land acquisition, R/R and EMP. The safeguards monitoring and review consultants will provide *quarterly implementation progress reports (QPR) and yearly Safeguard Review Reports*. Social accountability measures proposed include information disclosure, civil society participation in planning and monitoring of the project; and grievance resolution mechanisms.

57. **A Multi-stage Grievance Redress Mechanism** will be established, with clear procedures for handling PAP complaints at local, sub-project implementing agency, PMU, and department levels. Above this, there shall be an Independent Grievance Panel (IGP) comprising representatives from the Ministry of Land, Department of Valuation, Ministry of Women Affairs, in addition to an eminent NGO, a lawyer and a retired civil servant of the rank of a Secretary of the GoSL to hear and resolve complaints unresolved by GRCs operating in the Project. There shall be a Technical Assessment Committee instituted by the PMU comprising structural engineering and survey experts to aid and advise the LARC and IGP in resolving compensation related issues. SMF requires holding consultations during resettlement planning and implementation to discuss risks, entitlements, RAPs, and relocation and site handover schedules; and disclosure of relevant documents on project website, in newspapers, and public project outreach centers established at the PMU and implementing agency levels.

F. Environment (including Safeguards)

58. The overall assessment of the project indicates that its net environmental impact will be positive, resulting in improved drainage, public health, safety, and recreation in the Colombo Metropolitan area. The project triggers the safeguard policy on Environmental Assessment (OP/BP 4.01) and the required safeguard documents have been prepared, including an Environmental Management Framework (EMF) and instruments to be applied at the subproject level. These include: (i) a detailed environmental screening for each identified subproject, determining the need for a stand-alone environmental assessment and/or management plan, and (ii) an Environmental Assessment (EA) for those subprojects earmarked for early implementation, to be supplemented by sub-project-specific screening reports, assessments, and management plans.

59. The detailed screening of the eight subprojects ready for implementation in the first year has determined that most impacts are related to general construction, debris disposal, and public inconvenience. These effects are localized, temporary in nature, and able to be mitigated, so a stand-alone Environmental Management Plan (EMP) specific to each investment is sufficient. All other subprojects in the pipeline will be similarly screened. The project EMF and EA were publically disclosed in-country and through the World Bank's Infoshop on 16/11/2011 to comply with the disclosure requirement of a category A project.

60. Some interventions would involve dredging of canals and lakes, which could give rise to potentially significant, adverse, and irreversible environmental impacts in case it is determined,

through a sediment analysis, that the dredge material is contaminated with hazardous material requiring careful disposal. The EMF provides the overall technical framework to be followed in (i) establishing sediment levels and types of contamination in sample locations of the metropolitan Colombo Water Basin and (ii) planning disposal of any identified hazardous sediment. Initial steps to carry out a sediment analysis of significant locations in canals under the project have been already taken in accordance with EMF guidelines.

61. Solid waste management (SWM) and water quality improvement in waterways in the Metropolitan Colombo Area are two key complementary challenges with implications for the sustainability of project outcomes in the long term. Haphazard disposal of garbage and sewage contribute to the poor quality and functionality of the city's canals and drains. While solutions to these challenges go beyond the scope of the MCUDP, the project will benefit from ongoing initiatives by the Solid Waste Management Center at the Ministry of Local Authorities and Provincial Councils and by parallel programs under the Ministry of Environment. The project will complement these ongoing efforts through investments in selected physical interventions to help (i) improve the operational efficiency of waste collection in the project area and (ii) intercept sewer discharges to Beira Lake. The project will also support feasibility studies to find practical and economical solutions for the treatment and disposal of municipal waste and sewerage, which will pave the way for potential follow-up projects on solid waste and sewerage management in the metropolitan Colombo area.

62. With regard to the informal discharge of sewer in lakes and canals through the micro-drainage system, the project is supporting the construction of an interceptor of polluted effluents discharging in the Beira Lake. In addition, it will also finance the feasibility study for the Kotte-Sri Jayawardenapura Sewerage System. In contemporary, the ADB financed Greater Colombo Wastewater Management Project¹² (implemented by CMC and the National Water Supply and Drainage Board) is in its first year of implementation. The objective of this project well complements the MCUDP, as it aims to improve urban environment and public health for 1.5 million urban and suburban residents in Greater Colombo through improved marine and inland water quality and a resulting improvement in hygiene and sanitary conditions in CMC, Deiwala Mount Lavinia and Kolonnawa.

G. Other Safeguards Policies Triggered

63. A limited number of sites might have the potential to trigger OP/BP 4.11 regarding physical cultural resources. Guidelines and requirements related to this safeguard are covered under the EA and are in line with GoSL requirements for projects related to cultural heritage assets.

¹² ADB September 2009, <http://www.adb.org/Documents/RRPs/SRI/36173-SRI-RRP.pdf>

Annex 1: Results Framework and Monitoring

SRI-LANKA- METROPOLITAN COLOMBO URBAN DEVELOPMENT PROJECT

Results Framework

Project Development Objective (PDO):													
The project development objectives (PDOs) are to (i) reduce flooding in the catchment of the Colombo water basin, and (ii) strengthen the capacity of local authorities in the CMA to rehabilitate, improve and maintain local infrastructure and services through selected demonstration investments.													
PDO Level Results Indicators*	Core	Unit of Measure	Baseline	Cumulative Target Values**					Frequency	Data Source/ Methodology	Responsibility for Data Collection	Description (indicator definition etc.)	
				YR 1	YR 2	YR3	YR 4	YR5					
Indicator One: Reduction in the area under risk of flooding (50-year return period) in the project area.	<input type="checkbox"/>	Km2	5.5			3.0		2	Baseline, mid-term (YR3) and at project closure (YR5).	SLLRDC and CMC's hydrological & hydraulic models.	SLLRDC and CMC, in coordination with PMU.	-	
Indicator Two: Percentage of total urban roads maintained by PLAs that are in good and fair conditions in the 4 PLAs.	<input type="checkbox"/>	Percentage of total classified roads	50	53	57	60	65	70	Baseline, mid-term (YR3) and at project closure (YR5).	Feasibility studies and progress reports.	PLAs, in coordination with PMU.	Roads with International Roughness Index (IRI) between 3 and 7 are considered in good and fair conditions based on the Sri Lanka Road Development Authority classification.	
INTERMEDIATE RESULTS													
Intermediate Result (Component One): Flood and Drainage Management													
1.1 Length of primary canals improved by the project.	<input type="checkbox"/>	Km	0	-	-	6		9.2	Baseline, mid-term (YR3) and at project closure (YR5).	Progress report	SLLRDC, in coordination with PMU.	-	
1.2 Increase in drainage capacity (gravity system)	<input type="checkbox"/>	m ³ /s	149			189		268	Baseline, mid-term (YR3) and at project closure (YR5).	Progress report	SLLRDC in coordination with PMU,	=	

1.3 Increase in drainage capacity (pumping system, subject to the results of the hydrological model)	<input type="checkbox"/>	m ³ /s	3.5			10		25	Baseline, mid-term (YR3) and at project closure (YR5).	Progress report	SLLRDC in coordination with PMU,	-
1.4 Micro-drainage subprojects implemented under the Project that reduce risk of flooding in localized areas (10-year return period).	<input type="checkbox"/>	Number	0	0	-	10	15	15	Baseline, mid-term (YR3) and at project closure (YR5).	Progress report	CMC, in coordination with PMU.	-
1.5 IFMS developed and mainstreamed into SLLRDC's operations.	<input type="checkbox"/>	Y=Yes N= No	-	N	N	Y	Y	Y	Annual	Progress report	SLLRDC in coordination with PMU,	-
1.6 Users satisfied with the Beira Lake Development and Beiddagana and Kotte Ramparts Park ¹³	<input type="checkbox"/>	Percentage of interviewed users.	TBD.	-	-	50%		80%	(YR3) and at project closure (YR5).	User satisfaction survey.	SLLRDC in coordination with PMU	User satisfaction surveys carried out within two months of approval. Mid and End Project
Intermediate Result (Component Two): Urban Development and Institutional Building for Metro Colombo Local Authorities, and Implementation Support												
2.1 Metropolitan Colombo City Development Strategy and Integrated Master Plan delivered and endorsed by UDA		Delivered = D Endorsed = E				D		E	Annual	Progress report.	UDA in coordination with PMU	
2.2. Km of road/drainage built/rehabilitated based on prescribed standards.	<input type="checkbox"/>	Km	0	0	20	30		55	Annual	PLAs' municipal data.	PLAs in coordination with PMU	-
2.3 Core asset management system for municipal roads and drainage delivered and fully operational in the four PLAs.	<input type="checkbox"/>	Delivered = D Operational = O	-	-	-	D	O	O	Annual	PLAs' municipal data.	PLAs in coordination with PMU	-
2.4. Households provided with access to regular solid waste collection in the 4 PLAs.	<input type="checkbox"/>	Number of HHs and percentage of total HHs in the four PLAs.	217,468 (80%)			225,000 (85%)		240,000 (90%)	(YR3) and at project closure (YR5).	Progress reports	PLAs in coordination with PMU	Number / percentage of HHs provided with regular access to solid waste collection (at least

¹³ User Satisfaction Surveys will be carried out for both subprojects within two months from project approval to determine the baseline..

												twice a week) in the 4 PLAs.
2.5. Daily door-to-door solid waste collection trips per 1,000 households in the 4 PLAs s	<input type="checkbox"/>	Number of daily trips per 1,000 HHs.	1.7			3		4	(YR3) and at project closure (YR5).	Progress reports	PLAs in coordination with PMU	Number of vehicles used for door-to-door collection multiplied by average number of vehicles' daily trips, per 1,000 HHs in the 4 PLAs
2.6. Users satisfied with area-based demonstration projects in Colombo City.	<input type="checkbox"/>	Percentage of interviewed users.	TBD	-	-	50%	-	80%	(YR3) and at project closure (YR5).	User satisfaction survey.	PLAs in coordination with PMU	User satisfaction surveys carried out within two months of approval. Mid and End Project

SRI-LANKA- METROPOLITAN COLOMBO URBAN DEVELOPMENT PROJECT
Annex 2. Detailed Project Description

A. SRI LANKAN METROPOLITAN COLOMBO URBAN DEVELOPMENT PROJECT

1. The Metro Colombo Urban Development Project (MCUDP) comprises three main components. Component 1 focuses on flood and drainage management and addresses the urgent issue of urban flooding, which regularly paralyzes the economy of the Colombo Metropolitan Area (CMA) with high socioeconomic costs. Component 2 focuses on urban development and infrastructure rehabilitation for Metro Colombo local authorities, aimed at supporting local authorities in the CMA to rehabilitate and manage their drainage infrastructure and urban roads, implement selected demonstration urban improvements investments, and improve solid waste collection. It will also include targeted technical assistance for institutional strengthening and capacity building for central and local authorities. Component 3 consists of implementation support.

B. COMPONENT 1: FLOOD AND DRAINAGE MANAGEMENT

2. This component supports priority rehabilitation and improvement of flood and drainage management infrastructure identified as a priority by the interagency Flood Mitigation Task Force chaired by the Sri Lanka Land Reclamation and Development Corporation (SLLRDC). The investment packages under this component are essential and critical to reduce the impact of future floods in the catchment of the Colombo Water Basin. Most of the structural investments will be aimed at improving the system of primary and secondary canals, retention areas, and drainage of the Colombo Water Basin. This component will also support the development of an integrated flood management system (IFMS) and select demonstration complementary interventions to enhance the economic value and aesthetic qualities of the water bodies.

3. The implementation of the investment packages under this component will be phased. First the investments comprise interventions which are not dependent on the outcome of the mathematical modeling and are at an advanced stage of preparation with limited or no social and environmental impact. These investments will be fast tracked and implemented in year one. More complex flood mitigation engineering interventions, with potential social and environmental impacts and whose preparation requires the results of the hydraulic and hydrological modeling of the macro- and micro-drainage systems will be implemented thereafter.

4. This component will include the following four subcomponents:

- (1.1) Primary and secondary canals and lakes
- (1.2) Micro-drainage system within the Colombo Municipal Council (CMC) (localized floods)
- (1.3) Capacity enhancement for flood and drainage management
- (1.4) Beira Lake Linear Park and Beddagana Park

Subcomponent 1.1: Enhancement of Drainage Capacity in Colombo water basin

5. Floods in Colombo are caused by heavy rainfall and a macro-drainage system with insufficient storage, conveyance and outflow capacity. In the last decade the storage capacity

in the basin has reduced by about 30 percent, due to uncontrolled landfill and flood plain encroachments by illegal settlements. The conveyance capacities are limited by solid waste, floating debris, and bottlenecks in the canals. The outflow capacity of the system is too small, particularly in the north via Mutwal Tunnel and the North Lock and South Lock in the St. Sebastian canal. For monsoon season floods, the outflow is further limited when heavy rainfall in Colombo is likely to coincide with high levels at Kelani Ganga, reducing the outflow through the North Lock to nil. Beira lake discharges via a fixed circular weir the excess rainfall from its own basin further enlarged by pumped outflow from St. Sebastian Canal. The quality of the water is quite poor due to a large number of unauthorized sewerage discharges directly into the canals, aggravating the effects of floods by spreading diseases in inundated areas. Floods in future are likely to aggravate due to climate change, as rainfall trends indicate larger loads on the system and sea level rise impedes gravity drainage.

6. Based on the above listed constraints to effective flood management, this sub-component would include the following flood mitigation measures:

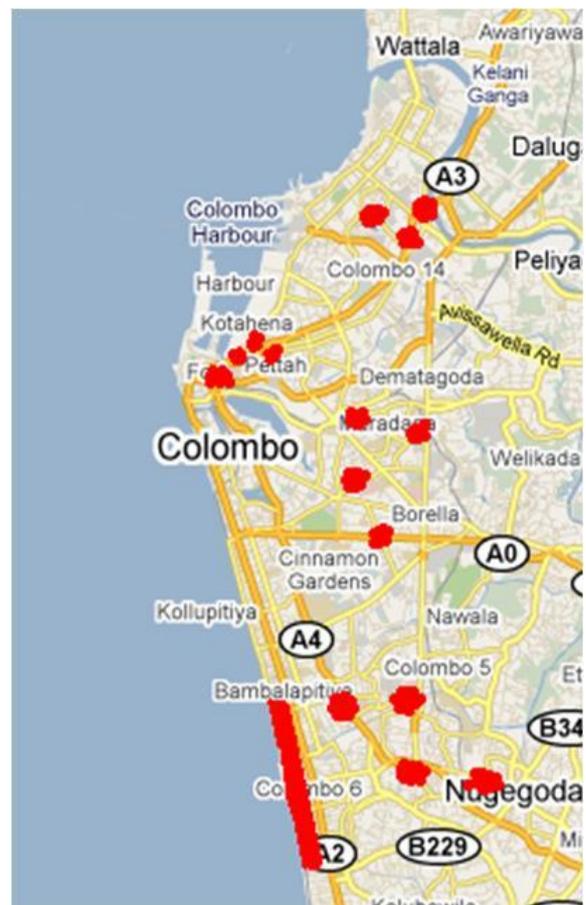
- i. *Main Drain and Mutwal Tunnel*: (i) rehabilitation of Main Drain bank protection (gabions), (ii) reconstruction of Aluth Mawatha Culvert (reinforced concrete box culvert), and (iii) rehabilitation of Mutwal Box Drain, and tunnel inlet and outlet.
- ii. *Dehiwal Canal*: (i) rehabilitation of Dehiwala Canal bank protection from Galle Road Bridge to outfall (gabions), and (ii) removal of rock outcrops in canal bed.
- iii. *St. Sebastian South and Dematagoda Canals*. Rehabilitation of bank protection along St. Sebastian and Dematagoda Canals (gabions and sheet piles).
- iv. *Secondary Canals—Sethsiripaya and Sarana Mawatha Canals*: (i) rehabilitation of canal banks and improvement of culverts of Sethsiripaya Canal, and (ii) rehabilitation of canal banks and improvement of culverts of Sarana Mawatha Canal.
- v. *Madiwela East Diversion Scheme*: (i) design of flood-control gate and spillway of Talangama Tank, and (ii) rehabilitation of bank protection of Madiwela East Diversion Canal between Averihena Tank and Athurugiriya Road (gabions and turfing of earthen sections).
- vi. *Wellawatta and Poorwarama Canals*: (i) rehabilitation of Welawatta Canal bank protection from Galle Road Bridge to outfall (sheet piles), and (ii) rehabilitation of Poorwarama Canal bank protection.
- vii. *Formation of Lakes—Part I*: (i) creation of Lake 06 with outflow control structure, and (ii) creation of Lake 07 with outflow control structure.
- viii. *St. Sebastian North and Sri Wickrama Canals*: (i) rehabilitation of bank protection in St. Sebastian North Canal (gabions and sheetpiles); and (ii) rehabilitation of Sri Wickrama Canal bank protection.
- ix. *North Lock Pumping Station and North Lock Gates*: (i) upgrade of set of North Lock Gates and downstream improvement with embankment protection; and (ii) construction of pumping station at North Lock.
- x. *St. Sebastian South Diversion Canal*. Construction of St. Sebastian South Diversion Canal bypassing Beira Lake, including treatment at outlet.
- xi. *Construction of New Mutwal Tunnel*.

- xii. *Galle Road Bridge across Wellawatta Canal*. Removal of bottleneck in Welawatta Canal at Galle Road Bridge by providing guide walls or additional openings on either side.
- xiii. *Armagoda Culvert at Madiwela East Diversion Scheme*. Provision of additional openings to Amargoda Culvert to enhance the conveyance capacity.
- xiv. *Restoration of Kolonnawa Retention Area*. Construction of gate and pumping station and connecting outlet canal.
- xv. *Formation of Lakes—Part II*. Formation of Lakes 01, 08, and 10.
- xvi. *Beira Lake water quality improvement*. Interception of sewerage draining to storm water drains.

Subcomponent 1.2: Rehabilitation and Upgrading of the Micro-drainage System within the CMC (localized floods)

7. Investments under this subcomponent will aim at improving the capacity and performance of the micro-drainage system in 15 selected flood-prone areas under the jurisdiction of the CMC.

8. The CMC has identified 45 flood-prone areas where flooding is regularly taking place. The main problems causing recurrent flooding can be identified in a combination of (i) unauthorized constructions on and along drainages, (ii) dumping of waste in the drainages that obstructs/blocks free flow, (iii) drainage being impeded by backwater from the main canals system during major floods, and (iv) lack of regular maintenance and cleaning of the drainage system. Furthermore, short duration rainfall amounts were reported to have increased in the past decade. Out of the 45 localized flood-prone areas, the CMC has identified 15 priority subprojects to be financed under Component 1 (see figure A2.1 and table A2.1 below).



Source: Colombo Municipal Council

Figure A2.1. Selected CMC flood-prone areas for micro-drainage rehabilitation and improvement

Table A2.1 Micro-Drainage: Locations and Designations of the CMC Selected Flood-prone Areas

Area #	Locations and Designations
1	Prevention of flooding at Garden No. 175 and No. 211, Nagalagam Street and Garden No. 75, Ferguson Road.
2	Prevention of flooding along K.Cyril. C. Perera Mawatha from George R. De Silva Mawatha up to Arthur De Silva Mawatha Junction.
3	Prevention of flooding at Kimbula Ela Housing Scheme.
4	Prevention of flooding at Amour Street, Sangharaja Mawatha, Jethawana Road opposite Diesel and Motor Engineering (PLC), and Prince of Wales Avenue.
5	Prevention of flooding at Green Lane, George R de Silva Mawatha, and Ratnam Play Ground Area.
6	Prevention of flooding at Saunders Place.
7	Prevention of flooding at Maligawatta Housing Scheme.
8	Prevention of flooding at Norris Canal.
9	Storm water improvements of Wijerama–Horton place junction and surrounding areas.
10	Storm water improvements of Siridhamma Mawatha and surrounding areas.
11	Prevention of flooding at high-level road, Kirullapone Junction, and Robert Gunewardhana Mawatha.
12	Prevention of flooding at Poorvarama Road and Kandewaththa Road.
13	Prevention of flooding at Park Road.
14	Upper catchment of Torrington North canal (Thummulla Junction).
15	Marine Drive development from Dehiwala Bridge up to Bambalapitiya Station Road (7 subcatchments).

Subcomponent 1.3: Capacity Enhancement for Flood and Drainage Management

9. This subcomponent will aim at improving the overall drainage system management for the Greater Colombo Water Basin to ensure the sustainability of project investments over time. This subcomponent will consist of (i) investments for selected landscaping along canals and to support a pilot water-based transport system to demonstrate the viability of using the main canals for public transport, (ii) purchase of canal maintenance machinery, and (iii) development of an IFMS for the Colombo Water Basin.

10. To ensure sustainability of the project's investments, an IFMS is required for the Colombo Water Basin, which includes monitoring and management of the retention/wetland areas; operation and maintenance (O&M) systems for wetlands, canals and drainage systems; monitoring and enforcement of land-use planning to safeguard the capacity of the basin to cope with floods; and interagency coordination protocols and mechanisms. The setting up of this system would be financed by the project and managed by the SLLRDC. The flood-risk assessment for Metro Colombo, financed by a Policy and Human Resources Development (PHRD) grant and expected to be launched by February 2012, will provide the basis to develop such an IFMS during the project implementation period.

Subcomponent 1.4: Beira Lake Linear Park and Beddagana Park

This subcomponent will aim at (i) improving the public fruition of the east and southwest Beira Lake through the development of a continuous promenade (linear park) and green areas (nodal parks) along its shores, and (ii) establishing a natural park on a wetland branch of the Parliament Lake (the Beddagana Park).

(i) Beira Lake Linear Park

11. The project aims at complementing the flood-reduction measures being taken through Component 1 by providing opportunities for urban regeneration along the east and west Beira lake waterfronts with public access to the lake along a linear path/promenade with an average width of 6 meters to be constructed, once the lake shoreline has been stabilized.

12. Currently, the lake is not accessible to the public due to inadequate bank protection and multiple uses along the shoreline. Once bank protection walls are constructed, a linear pedestrian path/promenade can be added on top of the protection walls, which will provide a natural connection of the east and west Beira Lake waterfronts with the already constructed walkways that connect to the southwest Beira lake waterfront. This will provide a contiguous recreation space within the core area of the city that has potential for development by the private sector.

13. A phased approach will be adopted for the Beira Lake Linear park subproject, whereby a first phase divided into two sections will focus on stabilization of the lake shoreline and preservation of the McCallum lock gates. A second phase will focus on the construction of a 4-kilometer (km) linear path/promenade and nodal parks along with footbridges:

Beira Phase 1: Rehabilitation of McCallum Lock Gates and Construction of Shore Protection Wall around Beira Lake

14. The main objective of this intervention is the protection of the shoreline of the lake from further deterioration, by constructing protection walls along 2.5 km of shoreline on the west and east Beira Lakes, and the preservation of the historic McCallum Lock Gates:

- i. *Construction of shore protection wall.* This subcomponent will support the construction of gabion walls to stabilize the East and West Beira Lake shorelines that currently has no bank protection. Gabion walls will be constructed along a 1.5 km stretch of the West Beira Lake commencing from the Northern bank to the Western bank of the West lake. Gabion walls will be constructed on the East lake along a 1 km stretch of shoreline, commencing from the Air force fire department premises to the Hyde Park Corner. Therefore, a total of 2.5 km of lake shoreline will be strengthened. Specific interventions will comprise: (i) gabion wall construction, (ii) railings at banks for safety.
- ii. *Preservation of the McCallum Lock Gates.* This subcomponent will focus on the restoration and preservation of the McCallum Lock Gates, which have historic value and will add to the cultural landscape of the city. Interventions will comprise of: (i) restoration of lock gates; (ii) refurbishment of old buildings of historic value; (iii) hard and soft landscaping of area; (iv) construction of underpass and footbridges to create access to site; (v) provision of street furniture, lighting, and railings for public safety; and (vi) construction of sanitation and other facilities. These interventions are aimed at restoring the area for overall visual improvement and to create public access to the lock gates.

Beira Phase 2: Construction of the East and West Beira Linear and Nodal Parks

15. The subcomponent will focus on the creation of a 4-kilometer pedestrian path/promenade around the lake, with an average width of 6 meters that will be constructed

once all shoreline stabilization work has been completed, and will include (i) soft and hard landscaping, (ii) illumination and railings for pedestrian safety, (iii) installation of street furniture along select locations of the path/promenade for pedestrian comfort, (iv) construction of decks in select locations along the lake, and (v) setting up of Nodal Park that can be used for social gatherings.

(ii) Beddagana Park

16. The objective of the subcomponent is to ensure the protection of the Beddagana Wetland sanctuary and Kotte Ramparts from future encroachments and enable it to function as a flood-retention area for the city, including the protection of the historic areas in close proximity to the sanctuary, whilst providing recreational space and ecotourism opportunities.

17. The target area is located within the Sri Jayewardenapura–Kotte municipality and is a part of the Parliament Lake. The extent of the area is 32 hectares consisting of marshland and wetland habitat. With rapid urbanization happening within the Colombo Metropolitan Area (CMA) and pressure to develop vacant land, the area provides locals and visitors a rare glimpse of a wetland habitat that is home to several species of flora and fauna.

18. While focusing on the protection of the wetland habitat as a flood-retention area, the project will support select investments aimed at protection and landscaping of key areas within the target area to improve livability for local people living in and around the area, while providing access to much-needed recreational space.

19. Interventions will include (i) enhancing the hydrology of the wetland area by cleaning existing canals to reduce the risk of floods in the Sri Jayewardenapura–Kotte area; (ii) reforestation of areas that have been deforested with endemic plants to enhance bird habitats; (iii) provision of bird-watching hides, towers, board walks, nature trails, and orientation centre to create awareness about the sanctuary to visitors; (iv) provision of play areas at the boundary of the wetland sanctuary along with a 2.2 km jogging track with lighting for recreational use for residents in the municipality; and (v) minimal intervention to improve existing bund road. Soft landscaping of the area and removal of invasive plant species will be part of the intervention. Interventions will have minimal impact and will use resources that are environmentally friendly to maintain the natural landscape and vegetation of the area.

20. To implement this subcomponent, the Urban Development Authority (UDA) will work closely with the SLLRDC to maintain the hydraulic integrity of the wetland, and the Central Environment Authority on guidelines for noninvasive provision of the orientation centre and other amenities in close proximity to a wetland sanctuary.

COMPONENT 2: URBAN DEVELOPMENT AND INFRASTRUCTURE REHABILITATION FOR METRO COLOMBO LOCAL AUTHORITIES

21. This component aims at supporting local authorities in the CMA to rehabilitate and manage their drainage infrastructure and streets, implement selected demonstration urban improvements investments and contribute to improve solid waste collection. It will also support targeted capacity building for PLAs and metropolitan development strategies and planning.

22. Component 2 consists of the following two subcomponents:

Subcomponent 2.1 Investment Support to Local Authorities

23. The objective of this sub-component is to support the rehabilitation, improvement and management of local infrastructure services of the PLAs: Colombo, Sri Jayewardenapura-Kotte, Dehiwela-Mt. Lavinia, and Kolonnawa located in the CMA.

24. This subcomponent aims at strengthening local capacity through “on-the-job training”, implementing a number of selected demonstration projects of metropolitan relevance, while at the same time helping the PLAs respond effectively to local demand for better services and infrastructure and gain greater credibility with their constituencies through immediate and visible service-delivery improvements. To do so, this subcomponent would support a selected number of high-priority infrastructure investments (subprojects) identified upfront and implemented under the condition that the PLAs commit to budget for and satisfactorily undertake the O&M of the assets.

25. The investment subprojects were prioritized and selected by the PLAs to fall under a clear set of eligible categories: (i) rehabilitation of drainage infrastructure, including landscaping of flood-retention areas; (ii) targeted area-based interventions of urbanscaping; (iii) rehabilitation of streets, including their drainage; and (iv) rehabilitation of maintenance facilities; (v) acquisition of equipment for solid waste collection; and (vi) acquisition of acquisition of equipment for road and drainage maintenance works, and

26. In the specific case of procurement of goods and equipment under this component, priority was given to (i) the purchase of equipment to strengthen the solid waste collection capacity of the PLAs, given the positive impact of improved solid waste collection on the functioning of the drainage and sewerage system, and (ii) the purchase of information technology (IT) equipment and specialized software for asset management, to support PLAs to improve their asset-management capacity.

27. In line with the above eligible categories, the following list of priority investment subprojects was identified upfront by the PLAs and approved by the respective municipal/urban councils for implementation under the project:

1: Town Hall Square Model Development Zone

28. The objective of this activity is to physically improve and functionally upgrade the Town Hall Square and surrounding area. Town Hall square is located in close proximity to the Central Business District and the National Hospital which sees approximately 60,000 people passing through the area on a daily basis. In addition, 15 bus routes intersect in close proximity to the Town Hall Square making it a point of connectivity within the city. From a historical perspective, the area has remnants of the old Garden City concept introduced during the colonial period, with many architecturally significant buildings located around the

Town Hall Square. The interventions at Town Hall Square aims at retaining the existing architectural and environmental character of the area while improving access to all public areas located within the Town Hall Square.

29. Specific interventions include (i) upgrading of road network around the Town Hall Square, namely the area bounded by *Dharmapala Mawatha, Marcus Fernando Mawatha, and C.W.W. Kanangara Mawatha*; (ii) upgrading of pedestrian sidewalks with improved street lighting and soft landscaping to improve the functionality and overall visual impact of the area; (iii) upgrading of the Town Hall premises to improve pedestrian access and linkages between the surrounding road network; (iv) upgrading and landscaping of centre isles and roundabouts; and (v) upgrading of the *Vihara Maha Devi* park located opposite to the Town Hall Square to enhance functionality and recreational use, whilst creating pedestrian footpaths through the park to improve connectivity.

30. Total area that will be upgraded would be 50.8 hectares. This will benefit the general public that includes commuters to the city and residential population who live in close proximity to the area.

2: Water Front Recreational Park at Crow Island and Marine Drive Promenade with Beach Front Leisure Park

31. The objective of this activity is to physically improve and functionally upgrade two urban waterfront areas highly frequented by a large cross-section of the city's population: (i) Crow Island Beach and (ii) Marine Drive Beach.

32. Interventions will include: entrance gate, information center and security hut, toilet facilities, and parking; walkways and waterfront court, and children's playground; and jogging track and open green areas with seating arrangements. Design elements of the leisure parks will be dependent on costing and the CMC's ability to obtain sufficient clearances from the relevant agencies that have jurisdiction over areas that are bordering the proposed interventions.

3: Pedestrian Overhead Bridges at Kollupitiya and Bamalapitiya Intersections with Galle Road

33. The objective activity is to create safe, convenient and uninterrupted pedestrian links between crowded railway stations and two main intersections at Bamalapitiya and Kollupitiya along the Galle Road, to facilitate ease and safety of movement between the railway stations and bus terminals along these intersections.

34. The Galle Road, which is the main arterial road running through the city, sees a large volume of vehicular traffic. With the introduction of traffic management plans to make Galle Road a one-way system, it is critical to separate the high flow of pedestrian and vehicular traffic at the two intersections, which acts as a connecting point for commuters who use the train and bus routes to reach their destinations. In addition, both intersections have a large number of commercial activities located nearby, especially with two shopping complexes located at Bamalapitiya, which sees the highest number of pedestrian traffic (over 20,000) on a daily basis.

35. Specific interventions include the construction of overhead pedestrian walkways that connect the railway stations at Bamalapitiya and Kollupitiya to the primary and secondary roads namely Galle Road, Dharmapala Mawatha, and Baudholoka Mawatha and the

provision of escalators and elevators to overhead bridges to promote universal accessibility at seven identified nodal points. Total length of overhead pedestrian bridges will be about 570 meters.

4: Improvement of Public Convenience Facilities

36. The objective of this subproject is to upgrade existing public conveniences (public toilets) at 14 selected locations in the city that will provide hygienic and convenient sanitation facilities for the general public who include daily commuters, and domestic and foreign tourists. In keeping with the integrated urban-upgrading programs being implemented through this project, some sanitation facilities will be located in close proximity to *Galle Road, Beira Lake Linear Park, Town Hall Square, Vihara Maha Devi Park*, and within the network of pedestrian walkways that will be upgraded.

37. Interventions will include: (i) demolition of dilapidated and unhygienic public facilities, and (ii) reconstruction of new state-of-the-art sanitation facilities with universal access for the differently able.

5: Walkability Improvements in the City of Colombo

38. This aims at providing pedestrians with safe, clean, and convenient walkways along primary, secondary, and tertiary road networks that provide improved access to commercial and recreational spaces such as the *Beira Lake Linear Park and Town Hall Square*.

39. Activities will include (i) upgrading and/or replacement of uneven and missing sidewalks along 11 km of road network assuring uninterrupted and safe pedestrian flow, (ii) installation of bollards along pedestrian walkways to create a clear barrier between pedestrians and vehicular traffic and to minimize damage to paved walkways, (iii) creation of parking spaces, (iv) improvements and/or replacement of existing street lighting on 10 streets to improve pedestrian safety, (v) introduction of traffic signals to improve traffic safety at three selected roads, (vi) soft landscaping along pedestrian sidewalks to enhance visual impact, (vii) provision of street furniture at select locations for pedestrian comfort, (viii) improvement of storm water drainage along 1.2 km of roadway on *Vauxhall Street* to reduce flooding and contribute to overall drainage improvement of the CMA; (ix) replacement of gulleys and minor repairs to improve flow of storm water along existing drainage lines on all other streets; and (x) asphaltting of 19 streets that will run parallel to sidewalks.

40. To ensure an integrated plan that will reduce any damage to the upgraded pedestrian and road network in the future, utility ducts will be introduced as a part of the intervention. These streets will contribute toward the urban integration of *Galle Road, Town Hall Square, Beira Lake Linear Park*, and key commercial areas by enhancing connectivity within the core area of the city, which will benefit the general public.

6: Galle Road and R.A. De Mel Mawatha (Duplication) Road

41. This subproject will support rehabilitation and improvement of the level of service of two key arteries—*Galle Road and R.A. De Mel Mawatha (Duplication) Road*. The CMC has already rehabilitated the first segment of *Galle Road* (from *Bambalapitiya to Kollupitiya*). *Galle Road* is the main arterial road and commercial spine, which runs through the city and sees a large volume of vehicular and pedestrian traffic. The *R.A. De Mel Mawatha* runs parallel to *Galle Road*, which is gradually seeing more commercial development. Both roads

contribute toward the flow of vehicular traffic coming into and exiting the city especially during peak hours.

42. The road segments to be rehabilitated have a total length of about 10 km:
- (a) Galle Road : (i) from Galle Face roundabout to Kollupitiya Junction (about 2 km) and (ii) from Bambalapitiya Junction to South City limit (about 4 km).
 - (b) R. A. De Mel Mawatha: From Liberty Roundabout to South City limit (about 4 km).
43. The works will consist of:
- Providing cross-sections that comply with the standards for the particular road.
 - Elevating the road formation above the periodical flooding levels.
 - Clearing of side drains, outlets, underground storm water lines, gullies, and manholes and improving where necessary.
 - Rehabilitation of the road pavement including asphalt overlaying.
 - Repairing existing Wellawatta Bridge.
 - Improving existing footwalks and introducing new footways incorporating new parking facilities, special block paving, facilities for the disabled at pedestrian crossings, and tree planting.
 - Improving street lighting.

7: Detailed Design, Construction Services

44. This will support the employment of consultants to (i) prepare/complete detailed design and contract documentation for the works to be undertaken for the CMC, as well as (ii) supervision of the construction of these works.

8: Equipment (Works including Drainage, Waste Collection, Cars, and IT)

45. This will support the purchase of equipment for: (i) drainage and road maintenance works, and (ii) solid waste collection. It will also support acquisition of IT equipment.

9: Sri Jayawardenapura–Kotte Municipal Council (SJ-KMC): Improvement of Street and Drainage Infrastructure, Landscaping of Retention Areas, and Equipment

46. This will support:
- Rehabilitation of about 20 km of selected urban roads including their drainage.
 - Rehabilitation of two drainage infrastructures (canal from No. 60 Waththa to Arunodaya Maewatha Canal and drain at Neggegoda Thilaka Garden).
 - Rehabilitation and landscaping of one flood retention area (Chandra Silva along Buthgamuwa Road) as a pilot demonstration intervention.
 - Purchase of equipment for (i) drainage and road maintenance works, and (ii) solid waste collection as well as acquisition of IT equipment

10: Dehiwela–Mt. Lavinia Municipal Council (DMLMC): Improvement of Street and Drainage Infrastructure, Maintenance Facilities, and Equipment

47. This will support:
- i. Rehabilitation of about 9 km of selected urban roads including their drainage.

- ii. Rehabilitation of three micro-drainage infrastructures: (i) storm water drain from Ratmalana SLTB depot to Lunawa Canal, (ii) drains of Sumanarama Road, and (iii) drains of Dharmarama Road.
- iii. Rehabilitation of facilities for the maintenance of road and drainage works: (i) hanger for heavy vehicles and utility center for Ratmalana, and (ii) office building for DE-Ratmalana.
- iv. Purchase of equipment for (i) drainage and road maintenance works, and (ii) solid waste collection as well as acquisition of IT equipment.

11: Kolonnawa Urban Council (KUC): Improvement of Street and Drainage Infrastructure, Maintenance Facilities, and Equipment

48. This will support:
- i. Rehabilitation of about 5 km of selected urban roads including their drainage.
 - ii. Rehabilitation of seven micro-drainage infrastructures (Dahampura Canal, Wadugodawatta Canal, Garadehipitiya Canal, near the premises of United Motor LMT Orugadawatta, Weheragoda Canal, near Nawaloka Ground, and Kuruniyawatta Canal).
 - iii. Purchase of equipment for (i) drainage and road maintenance works, and (ii) solid waste collection. It will also support acquisition of IT equipment.

12: (SJ-KMC, DMLMC, and KUC) Detailed Design, Construction Services

49. This will support the employment of consultants to (i) prepare/complete detailed design and contract documentation for the works to be undertaken for the SJ-KMC, DMLMC, and KUC, as well (ii) supervision of the construction of these works.

Subcomponent 2.2: Institutional Strengthening and Capacity Building for Local Authorities

Institutional strengthening for PLAs

50. This subcomponent will support TA for institutional strengthening of PLAs in the priority areas of urban road asset management, technical standards, preparation of road rehabilitation and maintenance works (including quality control) and improvement of solid waste collection. This subcomponent will also provide assistance for the operation of an integrated metro-level geographic information system (GIS) platform. With particular regard to urban road asset management and GIS platform:

- *Urban road asset management.* Developing and operating an urban road asset management system is a priority in all the PLAs. Technical assistance will be provided for developing an effective urban road management system for applications in database and information management of pavements and structures (particularly drainage structures); performance evaluation and prediction of road deterioration; strategic planning for urban road network maintenance, including drainage; multiyear maintenance and rehabilitation programming; and prioritization of road maintenance works within given budget constraints. The tasks to be performed by the technical assistance include: (i) review of existing practices in urban road maintenance, (ii) identification of main issues and needs for operational improvements in urban road management, (iii) design and development of a database structure and information management system, (iv) development of procedures for collection of pavement and structure condition data, (v) design of functional models and analysis tools, (vi)

integration of road maintenance subsystems into a single framework, (vii) participation in system installation and operation training during the project implementation phase, and (viii) providing a complete set of user documents and manuals. Activities are expected to be carried out in steps, encompassing: (i) investigation and evaluation of maintenance of business processes and overall system architecture, (ii) development of data collection procedures and criteria for performance measures, (iii) design and development of functional models, (iv) assistance in collection of a complete set of sample data, and (v) submission of application package and provision of training. A GIS linked to the urban road database will allow data to be displayed on maps.

- *Integrated metro-level GIS Platform.* Local authorities expressed interest for developing an integrated GIS platform that would allow linking of GIS systems to cadastre management as a revenue enhancement tool, and the sharing of data and information across local authorities and central agencies. In particular, digitizing cadastre maps and improving the efficiency of tax collection and property assessments are expected to lead to a significant percent increase in property tax collection. The CMC already has a GIS that needs updates and upgrades, the SJ-KMC has taken the initial steps to develop an integrated GIS-MIS system by mobilizing a consultant to design such system, while other PLAs have no GIS system. The project would support the CMC to update and further develop its GIS and the SJ-KMC to develop its GIS.

51. *Supporting metropolitan development strategies and planning.* This subcomponent will also support metropolitan development strategies and planning by financing the following activities:

- i. Development of a Metropolitan Colombo City Development Strategy (MCCDS), including a number of studies related to the revitalization of Colombo City's historical and cultural areas.
- ii. Development of an Integrated Master Plan for the CMR, including urban transport planning and detailed studies for immediate action plans.
- iii. Development of a solid waste management (SWM) strategy, including detailed studies for immediate action plans.
- iv. Detailed studies for selected priority metropolitan services as identified by the MCCDS.

COMPONENT 3: IMPLEMENTATION SUPPORT

52. The objectives of this component are to (i) ensure the effective implementation of the project (including monitoring and evaluation, compliance with environmental and social safeguards, and appropriate reporting), and (ii) help reinforce the capacity at the PLAs, SLLRDC, and UDA for sustaining and replicating project initiatives. It will finance:

- Hiring individual consultants to reinforce the staffing of the Project Management Unit (PMU) and assist the PLAs, SLLRDC, and UDA in the areas of construction supervision services, environment monitoring, social safeguards, and monitoring and evaluation.

- Developing and implementing a public awareness and communication program aimed to ensure that stakeholders and the public at large are regularly consulted, kept informed and aware of the project interventions (including potential resettlement) and their rationale, to manage public expectations, and promote behavior changes that would contribute to the long-term sustainability of investments (e.g. with regard to solid waste disposal).
- Project-related workshops, training, studies, and public information.
- Consultant services necessary for the efficient management of the project and the identification and initial preparation of subsequent projects.
- Incremental operating expenses including (i) utilities (electricity, telecommunications, internet and other computer services), and (ii) essential operating supplies and spares.
- Essential vehicles and equipment (including office equipment).

Annex 3: Implementation Arrangements

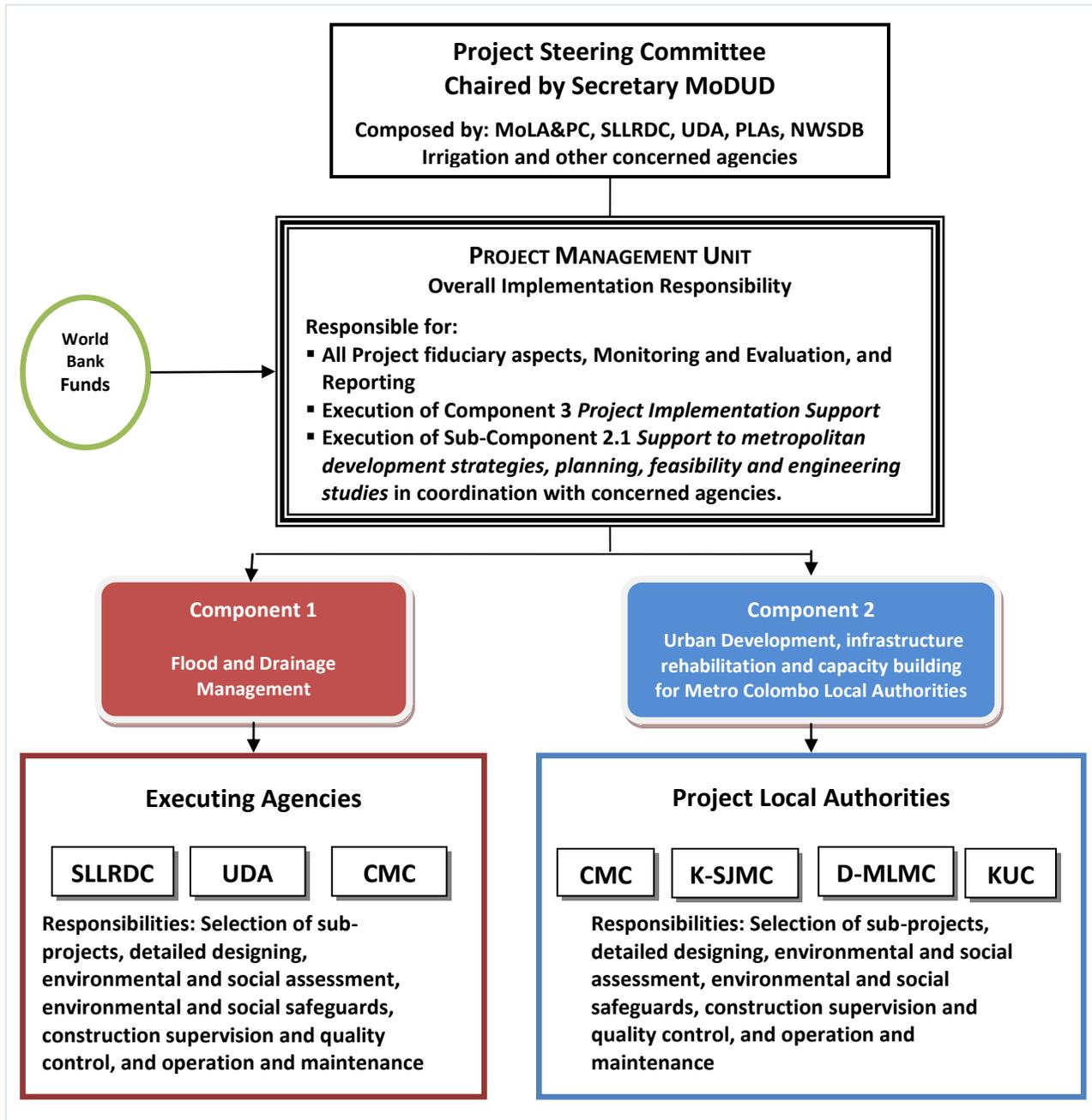
SRI-LANKA- METROPOLITAN COLOMBO URBAN DEVELOPMENT PROJECT

IMPLEMENTATION ARRANGEMENTS

1. A self-standing and ring-fenced Project Management Unit (PMU) has been established under the Ministry of Defence and Urban Development (MoDUD) to implement the Metro Colombo Urban Development Project (MCUDP). The PMU will operate under the oversight of a Steering Committee, chaired by the MoDUD's secretary and composed of the Sri Lanka Land Reclamation and Development Corporation (SLLRDC), Urban Development Authority (UDA), project local authorities (PLAs), Ministry of Provincial Councils and Local Authorities, National Water Supply and Drainage Board (NWSDB), and Ministry of Irrigation. Other ministries and agencies will be identified as stand-by members (for example, the Central Environmental Authority), to be called when relevant issues need to be dealt with.
2. The PMU is responsible for all fiduciary, monitoring and evaluation (M&E), and reporting aspects of the project, while implementation responsibilities will be assigned to the project implementing agencies (PIAs, such as the SLLRDC and UDA) and the PLAs, assisted by consultants for detail designs and construction supervision. The PMU will play also a critical role in coordinating the agencies involved in project implementation to ensure overall quality and timeliness of investments, and monitor the agencies' compliance with the project's environmental and social safeguards.
3. The PMU is staffed with a project director, civil engineers, a full-time fully accredited accountant, a procurement specialist, an environmental specialist, and a social development specialist. The PMU also receives support from a part-time senior social development specialist from the UDA and advisory support from the Central Environmental Authority as needed.
4. The key responsibilities of the project agencies are as follows:
 - The PIAs select projects and prepares tender-ready detailed designs.
 - The PIAs supervise implementation of subprojects and report to the PMU on progress and quality.
 - The PLAs select subprojects, prepare implementation plans and, when capacity is available, carry out detailed designs of the subprojects. The PLAs supervise project implementation and report on progress and quality. When the PLAs have no capacity for design and supervision, the PMU will make available design and supervision consultants to work with the PLAs to carry out these tasks.
 - The PLAs commit for future operation and maintenance (O&M) of delivered infrastructures.
 - The PIAs and PLAs are responsible of compliance with the project's environmental and social safeguards.
 - The PIAs and PLAs will carry out M&E activities.
5. These arrangements were agreed upon based on complexity of the project design, which intervenes at the metropolitan level and requires a great level of coordination between agencies

with different implementation capacities. The Government of Sri Lanka (GoSL) expressed its preference for an implementation model that ensures delegation and assignment of all critical responsibilities to the PIAs and PLAs, while centralizing the administrative/fiduciary functions in a PMU, which would ensure coordination and streamlined monitoring and reporting to the Bank and to the Ministry of Finance and Planning. The flowchart below summarizes the implementation arrangements.

Figure 3.1 Implementation Arrangements Chart



MONITORING & EVALUATION (M&E)

6. The PMU will have overall responsibility for quality assurance, M&E, and reporting of project development objectives (PDOs) and intermediate results, in coordination with the PIAs (SLLRDC and UDA) and PLAs. M&E responsibilities will be allocated as follows:

- The SLLRDC, UDA, and Colombo Municipal Council (CMC) will be responsible for compiling data, executing surveys, and regular evaluations to monitor progress on project outcomes and intermediate indicators for Component 1.
- Each of the PLAs will be responsible for compiling data, executing surveys, and regular evaluations to monitor progress on project outcomes and intermediate indicators for Component 2.
- The PMU will be responsible for coordinating the collection and compilation of outcome and intermediate indicators, providing technical assistance on M&E to the PIAs and PLAs, and consolidating the outcome and intermediate indicators based on the results framework presented in annex 1.

7. The SLLRDC, UDA, and PLAs will submit a bi-annual report covering their outcomes and intermediate results indicators. The PMU will compile the information received and produce a consolidated report on a bi-annual basis for submission to the World Bank.

8. The project will build monitoring capacity at both the central (PMU and PIAs) and local (PLAs) level. To this end, the PMU, PIAs, and PLAs will designate one person with responsibility for project M&E in their team, and a customized M&E capacity-building program will be developed as part of the Implementation Support subcomponent.

9. Annex 1 provides the results framework, including outcome indicators and intermediate outcome indicators for each project component. The data collection strategy will to a large extent rely on existing reporting instruments and formats. User satisfaction surveys will be carried midterm and at project closure to evaluate users' satisfaction with the Beira Lake Development and Beddagana Bio-diversity Wetland Management Park (Component 1.4), and the demonstration subprojects in Colombo City (Component 2.2). Target values for the Component I outcome indicator will be refined based on the results of the hydraulic models that are expected to become available during the first year of the project's implementation.

FINANCIAL MANAGEMENT AND DISBURSEMENTS

Financial Management

10. The MoDUD will be the principal implementing entity for the project and will be responsible for the overall management through a ring-fenced PMU. Under the overall responsibility of the PMU, the other agencies implementing the project are the UDA, SLLRDC, CMC, Dehiwela–Mt. Lavinia Municipal Council (DMLMC), the Sri Jayewardenapura-Kotte Municipal Council (SJ-KMC), and the Kolonnawa Urban Council (KUC). Given the involvement of several implementing agencies in the project and the necessity of the specialized staff required, the MODUD has created a PMU to handle, inter alia, the project fiduciary tasks including financial management.

11. The Ministry of Defence and Urban Development and all other implementing agencies have decided to keep the project fiduciary responsibilities centralized at the PMU. The PMU is headed by an additional secretary of the MoDUD as the project director. The PMU will handle the day-to-day project management activities as well as the administration of all the components. The project implementation will be subjected to the oversight and supervision of a project steering committee, chaired by the Secretary of the MoDUD. The PMU will be responsible for day to day project management and to ensure coordination between the various government agencies involved in the project. The PMU will be responsible for project financial management arrangements and activities.

12. To ensure that the PMU has adequate financial management arrangements and capacity to carry out project financial management responsibilities, a comprehensive financial management assessment was carried out by the task team during the preparation of the project.

Financial Management Assessment – PMU

13. The PMU FM responsibilities will include ensuring compliance with all financial covenants in the legal agreement. This entails managing funds in an efficient, effective and transparent manner, obtaining funds from the Bank and making payments on behalf of all implementing agencies, furnishing financial reports to the Bank, forwarding project audit reports to the Bank and any other requests relating to FM made by the Bank team. The head of PMU will be responsible for the day-to-day management of the activities implemented under the project and will be supported by the full time finance manager who will be responsible for carrying out all project FM activities. The finance manager will be supported by two assistants seconded from the MoDUD.

14. The finance manager who is a fully qualified chartered accountant seconded from the Central Bank of Sri Lanka to the project on a fulltime basis, will be responsible for all project financial management activities including project budgeting, disbursement planning and forecasting, operation of the designated account (DA) including claiming replenishments, disbursement of project funds, making project payments, maintaining books and records for project financial transactions, submission of quarterly project interim financial reports to the IBRD, preparation of annual project financial statements and interact with project auditors on the audit issues and their follow up.

15. The PMU will also be responsible for preparing and submitting the Interim Unaudited Financial Reports (IUFs) to the Bank. The PMU shall ensure that IUFs of the project are prepared and submitted to the World Bank not later than forty five (45) days after the end of each calendar quarter, covering the quarter. The PMU will follow the GOSL Financial Regulations (FRs). The internal controls stated in the FRs are considered to be adequate for accounting and reporting the utilization of the project funds.

16. Based on the financial management that is detailed out below, it was concluded that the FM capacity and the FM arrangements of the PMU were sufficient to handle the FM aspects of the project in compliance with the Bank's fiduciary requirements.

Budgeting

17. The budget of the MoDUD includes a budget line item for the MCUDP. The approval of the Cabinet of Ministers and the Parliament for the project budget line item has been obtained. The IBRD funds will be accounted under the overall annual budget of MoDUD.

18. The PMU has sufficient procedures to ensure accurate project budgeting. The finance manager will ensure that the project budget is prepared for each financial year and is included in the MoDUD annual budget. Detailed budgets and procurement plans are prepared by all agencies involved in project implementation. The budget approval process of participating local authorities takes time as the budgets need to be approved by the respective councils. The PMU needs to coordinate with all the implementing agencies in determining the overall project budget figures and follow-up with any agency that delays the submission of project budgets to the PMU. Once all implementing agencies submit their budgets, the PMU should compile these reports and prepare the annual project budget, which will include monthly break-up of project cost to ensure effective progress monitoring.

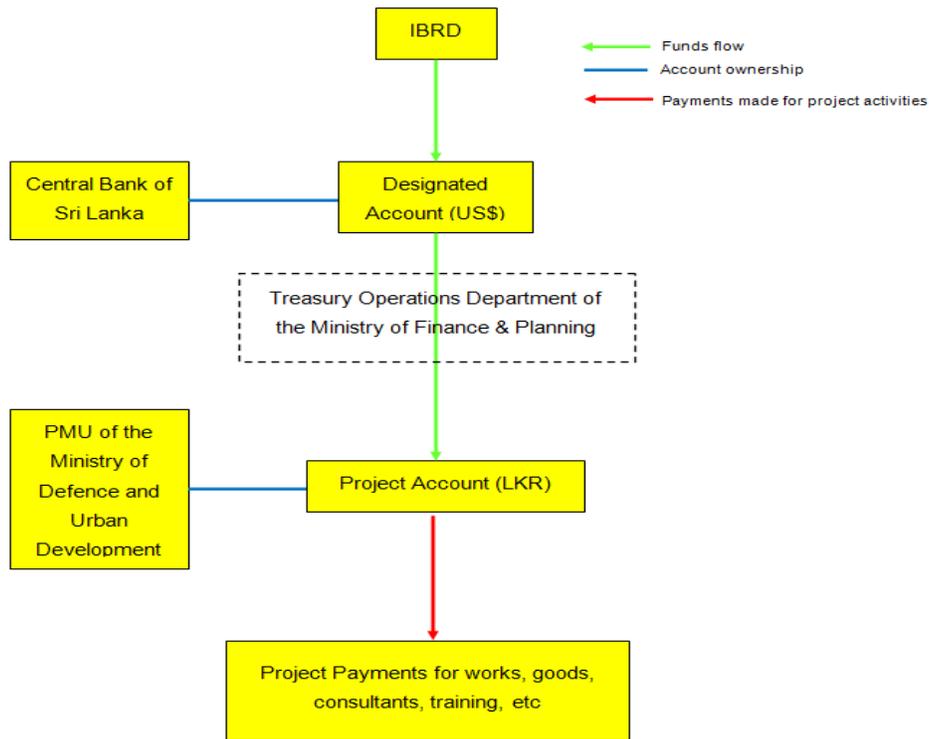
19. During the financial management assessment, it was noted that there have been no delays in the transfer of budgeted funds from the Ministry of Finance to the MoDUD.

Fund flows and disbursement arrangements

20. A designated account (DA) in US Dollars will be maintained at the Central Bank of Sri Lanka (CBSL). The DA will be operated by the PMU of the MODUD. IBRD will advance funds to the designated account maintained at the CBSL and the funds to meet project expenditures for next 6 months, as forecasted within the quarterly interim unaudited financial reports (IUFRRs). The IUFRR incorporates financial, physical and contract monitoring procurement reports and is submitted to the Bank on a quarterly basis. Withdrawal applications will be prepared by the PMU and replenishments to the DA will be based on the IUFRRs approved by the Bank.

21. The MODUD will open a dedicated Sri Lankan Rupee (LKR) account operated by the PMU to make payments for eligible project expenditures. It is envisaged that all project payments will be made directly by the PMU to contractor/supplier on the basis of certification received from the implementing agencies. These payments will be authorized by the project director and the finance manager of the PMU

Figure 3.2 Funds Flow Diagram



22. Presently, the participating local authorities have a practice of obtaining council approval for all procurements and related payments. This process creates a bottleneck in making payment to the contractors and suppliers as obtaining council approval takes time. But this practice does not affect the project disbursements as all project payments will be centralized at the PMU under the MoDUD and made according to the instructions given by the participating implementing agencies including local authorities.

23. Bank loan proceeds will be used to finance productive expenditures necessary to meet the development objectives of the MCUDP with due attention to considerations of economy and efficiency in accordance with the provisions of the Legal Agreement. If the Bank determines that loan funds have been used to finance ineligible expenditures, the amounts used for such expenditures should be refunded to the IBRD by the GoSL.

24. The Government has requested the Bank to agree to a retroactive financing amount of up to US\$5 million for eligible expenses incurred after June 1, 2011 to be refinanced from IBRD credit at effectiveness. The expenditure must be backed by adequate documentation including evidence of payment and will have been procured according to IBRD procurement guidelines. The retro-active financing would finance 100% of the Works, Goods and equipment, Consultants services and Incremental Operating Costs under Components 1 and 2.1.

25. The proceeds of the loan would be disbursed against eligible expenditures in the following categories, excluding local taxes and duties

Table 3.1: Disbursement categories and allocated amounts

Category	Amount of the Loan Allocated (expressed in USD)	Percentage of Expenditures to be financed (exclusive of taxes and duties)
(1) Goods, works, non-consulting services and consultants' services, under Parts 1 and 2.1 of the Project	212,467,500	100%
(2) Front-end Fee	532,500	Amount payable pursuant to Section 2.03 of this Agreement in accordance with Section 2.07 (b) of the General Conditions
(3) Interest Rate Cap or Interest Rate Collar premium	0	Amount due pursuant to Section 2.07(c) of this Agreement
TOTAL AMOUNT	213,000,000	

26. The counterpart contribution of \$108.00 will cover the cost associated with the following:
- a. Contribution equivalent to an estimated value of US\$53 million to the implementation of the Resettlement Policy Framework in the form of 1,500 government flats and a proportional number of commercial units and social facilities earmarked under a separate government re-housing scheme to meet the potential resettlement requirements for the MCUDP.
 - b. Counterpart funds of \$55.00 million to finance the following: (i) US\$5.10 million to finance Sub-component 2.2 aimed to strengthen local and central authorities (ii) US\$ 4.01 million to finance Component 3 comprising (i) implementation support in the areas of project management, monitoring and evaluation (M&E), procurement, financial management, and environmental and social safeguards; (ii) public awareness and communications support; (iii) technical support to the SLLRDC, UDA, and PLAs; (iv) purchase of cars, office furniture, and IT equipment for the Project Management Unit (PMU); and (v) operating costs of the PMU, PIAs and PLAs; and (iii) US\$ 45.00 million for taxes and duties.

Staffing

27. The PMU is staffed with a core group of mid career professionals who will be responsible for the overall implementation of the project. A fully qualified chartered accountant has been seconded from the Central Bank of Sri Lanka to the PMU on a fulltime basis to function as the project finance manager. The finance manager has sufficient experience in both public and private sector and has the capacity to handle the FM activities of the project. The finance manager is assisted by two assistants with sufficient knowledge of GoSL financial procedures. The FM assessment concluded that there is adequate FM capacity in the PMU to ensure transparency and to account and report for project resources and expenditures.

28. All staff of the PMU are expected to work on a full-time basis for the project. PMU staff hired for the project will be paid according to the Management Circular 33 issued by the Management Services Department of the Ministry of Finance and Planning.

Accounting Policies and Procedures

29. All funds for the Project will be routed through the recently set up PMU which will be responsible for funding all project expenditures, accounting for them, and for reporting on the financial and physical progress of the project. Coordination will be required with several agencies for the various components which will make the accounting function difficult and for this purpose close liaison will be required with the accounting staff of these agencies especially in the area of project cash forecasting.

30. The PMU's accounting practices are governed by the GoSL financial regulations. The PMU will maintain accounts on the cash basis of accounting and will also comply with the government finance regulation. Bank accounts will be reconciled on a monthly basis and trail balances and financial statements will be prepared on monthly basis to facilitate monitoring of the progress of the project.

31. A new off-the-shelf accounting software package will be procured by the PMU to maintain accounting records of the project. The system will be voucher based and its functions will be based on the double entry accounting system. The accounting software will facilitate the monitoring of funds utilization of the project. This system will have the capacity to handle the any volume of financial transactions and be capable of generating project specific FM reports.

Financial Reporting

32. All project funds will be routed through the PMU and the PMU will be responsible for the funding of all project expenditures, accounting for them and for reporting the financial and physical progress of the project. The PMU will coordinate with government agencies and local authorities involved in the project implementation and prepare financial reports required by the stakeholders. The IBRD related reporting requirements including the IUFs are spelled out in the financing agreement. The formats of IUFs, designed in accordance with the guidelines issued by the IBRD will be agreed during negotiations and the agreed formats will be attached to the disbursement letter. The IUF includes the financial progress reports, physical progress reports and procurement/contract progress information to enable monitoring of progress on an integrated basis. The PMU will submit quarterly IUFs to the IBRD within 45 days of the end of the quarter, starting from the end of the first calendar quarter after effectiveness. Disbursements of the project will be based on the quarterly IUFs submitted by the project which includes the cash forecast for the next six months.

Internal Controls

33. The framework of financial control procedures followed by the GoSL in expending and reporting on public funds are laid out in the Financial Regulations. These regulations provide a good guidance on how to maintain a sound FM system with effective internal controls. It addresses all aspects of procedures and controls necessary for authorizing, approving, executing, recording, and reporting expenditure and covers important areas such as delegation of financial authority and inventory control.

34. The PMU will comply with the government financial regulations and all applicable circulars issued by the Ministry of Finance and Planning when incurring project expenditures

and recording payments. The internal control environment and activities of MoDUD were reviewed during the financial management assessment and concluded to be adequate to ensure that projects funds will be used for the purposes intended with due attention to considerations of economy and efficiency. The level of compliance of the PMU to the GoSL financial regulations and other applicable circulars will be assessed semi-annually by internal auditors and annually by the Auditor General of Sri Lanka. Any non compliance identified during the internal/external audits will be communicated to IBRD through the internal/external audit reports.

Internal Audit

35. Internal Audit is an important part of the overall governance and financial management arrangements of the project. The MoDUD has an internal audit department headed by an experienced government accountant which has sufficient capacity to conduct the internal audits of the project. The internal auditor of the Ministry reports directly to the Secretary of the MODUD to ensure functional independence of the internal audit.

36. In addition to the annual financial statement audit, the Project will be subjected to a semi-annual internal audit by the internal audit department of the MoDUD to assess whether the funds have been disbursed on a timely basis and used effectively and efficiently for the intended purposes. The internal audit will also examine the physical and qualitative aspects of the assets constructed or procured under the project. This will provide further assurance on the legitimacy and the eligibility of the payments made from the loan proceeds.

37. The overall scope of the internal audit will include (i) evaluating the internal control systems of the project and the integrity of the financial information produced by the project; (ii) assess whether the project funds have been used for the purpose intended, (iii) assessing the internal controls over disbursements made from the project account (iv) appraising the economy and efficiency of resource utilization in accordance with the financing agreement; and (vi) determining whether the PMU has complied with the GoSL financial regulations, circulars and any other applicable laws and regulations.

38. The first internal audit of the project will begin in July 2012 and will be continued on a half-yearly basis. The project internal audit report will be addressed to the Secretary of the MODUD with a copy to the Project Director to initiate necessary follow up actions as required. The PMU will share the internal audit reports with the IBRD.

External Audit

39. The annual financial statements of the project will be prepared by the PMU and audited by the Auditor General of Sri Lanka which is the supreme audit institution of the country to maintain full transparency and provide reasonable assurance to all the stakeholders on the use of project funds. The audit will also review the procurement undertaken by the project to ensure that it has followed the IBRD guidelines for procurement. A reasonable level of physical verification will also be conducted under the project audit. The external audit will cover project activities carried out by all implementing agencies involved in the project and all payments made from the project account maintained by the PMU. The external audits would be conducted every fiscal year and will be submitted within 8 months of the end of the fiscal year. These external

auditing arrangements have been agreed with the Auditor General's Department of Sri Lanka. The PMU is responsible for the timely submission of the annual audited financial statements to the IBRD.

40. Presently, the MoDUD do not implement any Bank project. Hence, there are no overdue audit reports or ineligible expenditure pertaining to the MoDUD.

Audit Reports

41. The following audit report will be monitored in the Audit Reports Compliance System (ARCS). According to the Bank's Access to Information Policy, the audit reports received by the Bank for the project will be disclosed in the Bank's external Website for public access.

Implementing Agency	Audit Report	Auditor	Date
PMU	Project Annual Financial Statements	Auditor General	June 30

Assets Management

42. The responsibility of managing project assets created or procured remains with the implementing entity that created/procured the asset. But, the PMU will also maintain a project fixed asset register to keep track of all fixed assets procured/built under the project. This will facilitate effective audit trail of the project fixed assets. The finance manager is responsible for updating and maintaining the project fixed asset register. The respective implementing entities are responsible for adequately insuring the project assets owned by them.

Financial Covenants

43. The Financial covenants are :

- (i). Audited annual project financial statements to be submitted to the IBRD no later than six months of the following fiscal year
- (ii). Consolidated project IUFRRs to be submitted to the IBRD no later than 45 days following the end of the reporting quarter.

PROCUREMENT

44. Procurement for the proposed project would be carried out in accordance with the World Bank's "Guidelines: Procurement of Goods, Works and Non-Consulting Services under IBRD Loans and IDA Credits & Grants by World Bank Borrowers" dated January 2011 (Procurement Guidelines); and "Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits & Grants by World Bank Borrowers" dated January 2011 (Consultant Guidelines) and the provisions stipulated in the Financing Agreement. For each contract to be financed by the Bank, the different procurement methods or consultant selection methods, the need for prequalification, estimated costs, prior review requirements, and time frame are agreed between the Borrower and the Bank project team in the Procurement Plan. The Procurement Plan will be

updated at least annually or as required to reflect the actual project implementation needs and improvements in institutional capacity.

45. ***Retroactive Financing:*** Retroactive financing will be provided for activities agreed with the Bank and subject to procurement procedures having been followed satisfactory to the Bank.

46. ***Procurement of Works:*** Works procured under this project would include construction of works for flood management, drainage system, improvement of road networks etc . The Works which do not involve environmental and social issues will be taken up in the first phase; the procurement plan has been developed accordingly. These works will be procured following National Competitive Bidding (NCB) and may involve shopping or force account in some cases. The procurement of civil works is not likely to involve any International Competitive Bidding (ICB). The Standard Bidding Documents (SBDs) of the Bank (Small Works) will be used for procurement of all NCB civil works. A model document had been prepared for one of the construction works and reviewed by the Bank.

47. ***Procurement of Goods:*** Goods procured under this project would include goods and equipment proposed under the institutional strengthening sub-component, in particular the purchase of compactor trucks to strengthen the solid waste collection and transportation capacity of the Local Authorities. The purchase of equipment for PLAs will have to be coupled with an improved asset-management capacity and allocation of appropriate budget for O&M. Procurement under asset management may involve procurement of IT Equipment (computers, printers, PDA, network infrastructure and servers), office equipment and furniture. While some software being proprietary in nature will be procured by direct contracting, other goods and software will be procured by ICB, NCB, shopping. The NCB standard bidding documents of the Bank as agreed with GoSL will be used for procurement of all NCB Goods. For ICB contracts, the Bank's latest SBDs will be used.

48. ***Requirements under National Competitive Bidding (NCB).*** In order to ensure economy, efficiency, transparency and broad consistency with the provisions of the Procurement Guidelines, goods, works, and non consultant services procured under the National Competitive Bidding (NCB) method shall be subject to the following requirements

- (i). Only the model bidding documents for NCB agreed with the Bank shall be used for bidding;
- (ii). Invitations for bids will be advertised in at least one widely circulated national daily newspaper, and bidding documents will be made available at least twenty one (21) days before, and issued up to, the deadline for submission of bids;
- (iii). Qualification criteria will be stated in the bidding documents, and if a registration process is required, a foreign firm declared as the lowest evaluated responsive bidder shall be given a reasonable time for registering, without let or hindrance;
- (iv). Bids will be opened in public in one location, immediately after the deadline for the submission of bids, as stipulated in the bidding document (the bidding document will indicate the date, time and place of bid opening);
- (v). Except in cases of *force majeure* or exceptional situations beyond the control of the implementing agency, the extension of bid validity will not be allowed;

- (vi). Bids will not be rejected merely on the basis of a comparison with an official estimate;
- (vii). Except with the prior concurrence of the Bank, there will be no negotiation of price with bidders, even with the lowest evaluated bidder;
- (viii). A bidder's bid security will apply only to the specific bid, and a contractor's performance security will apply only to the specific contract under which they are furnished; and
- (ix). Bids will not be invited on the basis of percentage premium or discount over the estimated cost, unless agreed with the Bank.

49. ***Selection of Consultants.*** Some of the major consultancies may include architectural, design and supervision services for improvement of public buildings and facilities, landscaping, street rehabilitation, development of internet-based information systems, development of geographic information system (GIS), upgrading of business systems, and so on. Short lists of consultants for services estimated to cost less than \$300,000 or equivalent per contract may be composed entirely of national consultants in accordance with the provisions of paragraph 2.7 of the Consultant Guidelines. The Bank's Standard Request for Proposal (RFP) (October 2011) will be used as a base for all procurement of consultancy services under the Project. The following methods will be applicable for selection of consultants, consistent with the relevant sections of the Bank's Consultant Guidelines:

- (a) Quality- and Cost- Based Selection (QCBS)
- (b) Quality-Based Selection (QBS)
- (c) Least Cost Selection (LCS)
- (d) Fixed Budget Selection (FBS)
- (e) Selection based on Consultants' Qualifications (CQS): for services estimated to cost less than US\$300,000 equivalent per contract, in accordance with the provisions of paragraph 3.7 of the Consultant Guidelines
- (f) Single-Source Selection (SSS)
- (g) Procedures set forth in paragraphs 5.2 and 5.3 of the Consultant Guidelines for the Selection of Individual Consultants
- (h) Sole Source Procedures for the Selection of Individual Consultants

Table 3.2: Thresholds for Procurement Methods and Prior Review

Expenditure Category	Contract Value (Threshold)	Procurement Method	Contracts/Processes Subject to Prior Review
Works	>= US\$4,000,000	ICB	All contracts
	<US\$4,000,000	NCB	First contract awarded by each implementing agency. All other contracts subject to post review.
	<=US\$50,000	Shopping	All contracts subject to post review
Goods	>=US\$600, 000	ICB	All contracts
	<US\$600,000	NCB	First contract awarded by each implementing agency. All other contracts subject to post review.
	<=US\$50,000	Shopping	All contracts subject to post review
		DC	All contracts
Consultant Services (firms)	>=US\$300,000	All competitive methods; advertize internationally	All contracts over US\$500,000
	<US\$300,000	All competitive methods; advertize locally	First contract awarded by each implementing agency subject to prior review. All other contracts subject to post review.
	<US\$300,000	CQS	
		SSS	All contracts
Individual Consultants		IC (Section V of Consultant Guidelines)	All contracts over US\$200,000
		IC- Sole source	All contracts

Assessment of the agencies' capacity to implement procurement

50. Procurement under this project will be carried out mainly at the PMU under the supervision of the Project Director. Technical support for procurement in relation to activities carried out by SLLRDC, CMC and UDA will be done by themselves. Other LAs, namely Kotte, Dehiwala and Kaduwela do not bear capacity to handle procurement under the project within the existing staffing. While procurement for the LAs will be handled by PMU. Project Support Consultant is being procured to support the LAs for technical matter and preparation of BOQ. The assessment of the capacity of the implementing agencies reviewed the organizational structure for implementing the project and the interaction between the staff responsible for procurement. Newly setup PMU has recruited a qualified engineer to handle procurement. Though, his main expertise is engineering, he has potential to handle procurement with his limited experience in procurement of works. The strength at PMU is being augmented with one Senior Engineer. Two Engineers and two engineering assistants. Three institutions SLLRDC, CMC and UDA have experience in procurement under national guideline as well as under funded project. Staff of these institutions has adequate procurement experience, though only limited knowledge in the selection of consultants. The knowledge of procurement at key implementing agencies will be complimentary in the centralized procurement at PMU. There is no system in place for procurement monitoring and reporting which is being addressed as part of risk mitigation.

Procurement Risks and Mitigation Measures

51. *Procurement Risk Mitigation:* The main procurement risks that can be perceived at this stage, are:

- Limited experience in procurement particularly in selection of consultants;
- Absence of systematic procurement performance and compliance monitoring.
- Limited experience in dealing with complaints, and fraud and corruption issues.
- lack of established system of public disclosure of information on procurement actions, and
- possible collusive practices in procurement of works.
- procurement of goods and works has normal fiduciary risks of transparency, fairness and varying capacity
- varying capacity in designing appropriate qualification requirements as per Bank's SBD Goods and Works with an ability to influence the market in receiving appropriate pricing and delivery commitments,

52. The corrective measures which have been agreed are:

- SLLRDC, CMC and UDA will ensure that staff assigned to carry out the activities under the project will continue throughout the project period.
- Procurement Staff will be seconded /recruited by the PMU in MOD&UD for the duration of the project. They will be responsible for procurement carries out at the PMU. In addition, they will be responsible for inter-department procurement activities like technical inputs from other agencies , project procurement monitoring and reporting, and providing training and guidance to SLLRDC, CMC and UDA staff, as necessary, during project implementation. PMU has identified staffing requirement and will recruit additional procurement trained staff to the PMU during implementation to assist the procurement officer to handle high quantum of work expected during implementation.
- Procurement staff will be imparted with sufficient training (supported by the Bank) specifically on fraud and corruption flags, and addressing of complaints.
- Dedicated staff of SLLRDC, CMC and UDA will be provided suitable training on procurement. A project Procurement Manual will be compiled to include all procurement procedures to be followed under each component of the project, together with the standard/model documents, formats and templates to be used, as agreed with the Bank.
- PMU will prepare and forward to the Bank a semiannual procurement progress report, which will include, inter alia, procurement plan updates and post review reports.
- The following key indicators will be used for assessing procurement performance and risk rating:
 - Percentage of procurement activities which have more than 25% delay in bid/proposal evaluation.

- Percentage of contracts which have been extended and/or have more than 15% modifications by value.
- Percentage of post reviewed contracts with notable irregularities.
- Percentage of procurement activities which had complaints.
- The Bank will carry out its own procurement post reviews annually, discuss the findings, and agree with MOD&UD and project implementing staff on corrective actions to address deficiencies.

53. The overall project procurement risk is rated substantial, and will be upgraded to moderate once the remedial measures, as listed above, are in place.

54. **Disclosure:** The following documents shall be disclosed on the Borrower's Website: (i) procurement plan and updates, (ii) invitation for bids for goods and works for all ICB and NCB contracts, (iii) request for expression of interest for selection/hiring of consulting services, (iv) contract awards of goods and works procured following ICB/NCB procedures, (v) list of contracts/purchase orders placed following shopping procedure on quarterly basis, (vi) short list of consultants, (vii) contract award of all consultancy services, (viii) list of contracts following DC or CQS or SSS on a quarterly basis, and (xi) action taken report on the complaints received on a quarterly basis. The PMU is developing a website covering disclosures and complaint handling mechanism, which would be ready within one month from project effectiveness.

55. The following details shall be sent to the Bank for publishing in the Bank's external website and United Nations Development Business (UNDB): (a) invitation for bids for procurement of goods and works using ICB procedures, (b) request for expression of interest for consulting services with estimated cost more than \$300,000, (c) contract award details of all procurement of goods and works using ICB procedure, (d) contract award details of all consultancy services with estimated cost more than \$300,000, and (e) list of contracts/purchase orders placed following SSS or CQS or DC procedures on a quarterly basis.

56. **Complaint Handling Mechanism:** To deal with the procurement complaints received by the PMU, a complaint handling mechanism for the project will be developed and will be published on the Borrower's website. On receipt of complaints, immediate action will be initiated to acknowledge the complaint and redress in reasonable time frame. All complaints will be dealt at levels higher than that of the level at which the procurement process was undertaken. Any complaint received will be forwarded to the Bank for information and the Bank will be kept informed after the complaint is redressed.

57. **Procurement Plan (PP):** PMU has prepared by appraisal a draft procurement plan for project implementation which provides the basis for the procurement methods and review by the Bank. This plan will be agreed between the Borrower and the Bank's project team by negotiations, and is available in the project file. It will also be published on the website and on the Bank's external website.

ENVIRONMENTAL AND SOCIAL (INCLUDING SAFEGUARDS)

Environment

Measures taken by the borrower to address environmental safeguards issues:

58. The project is expected to trigger many positive environmental impacts that will ultimately lead to improved environmental management, public health, and safety in the Colombo Metropolitan Area (CMA). But in realizing the anticipated benefits, the project needs to ensure that environmental risks and challenges in planning and implementing subprojects, as discussed below, need to be managed to ensure that project benefits outweigh potential adverse impacts. In this regard, the GOSL has undertaken the preparation of several safeguards documents including an Environmental Management Framework (EMF) for the project, an Environmental Assessment (EA) for a long list of subprojects earmarked for implementation during the early phase of project implementation, and detailed screening reports with site-specific Environmental Management Plans (EMPs) for the short list of eight subprojects identified by the GOSL as ready for implementation in Year 1. The EMF provides the overall environmental safeguards management framework for the MCUDP and specifies the principles and procedures to be followed and instruments to be applied in identifying, managing, and monitoring potential adverse environmental impacts of subprojects. The criteria set out in the EMF primarily recommends that each subproject be subjected to a detailed screening, using the template provided, based on which the requirement for a stand-alone and site-specific assessment and the type of assessment are determined.

59. Application of the EMF to the first batch of eight subprojects have been carried out and detailed screening reports have been prepared with the conclusion that site-specific EMPs are suffice to commensurate with the issues identified in each of the subproject. For all other subprojects in the pipeline the same methodology will be systematically applied wherein first the detail screening will be carried out for each sub-project soon after the technical designs have been completed and the sub-project scope has been defined. Based on the screening outcome, the appropriate safeguard instrument will be determined and carried out, as necessary, with any proposed consequent changes to the designs in effect prior to commencing the procurement process. As guidance to the PMU, the EMF provides a classification of sub-projects in the pipeline in accordance with (a) safeguard categories of OP 4.01 and (b) prescribed thresholds of the Sri Lanka National Environmental Act (NEA), and recommends the type of environmental analysis suited for each type of investment commensurate with the magnitude of potential impacts. This classification is only a broad guidance and will be re-evaluated at the time of screening for each specific subproject.

60. The general environmental footprint of a majority of the investments is associated with construction impacts (such as air pollution, noise, debris disposal, public safety, inconvenience, restricted access, traffic congestion, removal of vegetation in the work sites, extraction of construction material, etc), which would be localized and temporary in nature and mitigatable with known technologies. Currently, the water quality in the canal network show high levels of

pollution, especially in the lower part of the basin which is slow-flowing and receives a considerable load of wastewater and sewage from domestic and commercial establishments. Therefore, impacts on water quality from canal rehabilitation work will be insignificant and temporary. Since drainage and wastewater discharge are the main functions of the canal network there will be no impacts resulting from restriction on other uses due to construction work. The terrain of the project area being flat, there will be no major concerns of soil erosion and sedimentation. Of the project sites, the only ecologically important areas are the remaining wetlands in the Colombo Water Basin, which at present exists as several blocks of inter-connected marshes covering an area of approximately 286 hectares. Protecting these wetlands from further shrinking has been identified as an absolute priority for effective flood management within the city and its suburbs. In addition to flood detention, the wetlands offer great potential for nature conservation, recreation, and education and the project will seek to optimize this through investments such as the Beddagana Wetland and Kotte Ramparts Park. Other parts of the basin are highly modified and urbanized and as such, there will be no serious ecological impacts.

61. Under the category of improvements to main canals/lakes, dredging would be undertaken to increase the water flow and storage capacity in selected strategic locations of the basin, including the Beira Lake and its immediate catchment. This would generate the most significant of potential environmental issues under the project. Dredging would generate large volumes of sediments and sludge, the quality of which would determine how and where it could be disposed. Given the level of urban/industrial activity, the risk of pollution by hazardous elements could be particularly relevant for sediments from the lakes/canals in the lower sections of the Colombo Water Basin. Therefore, the project will manage the disposal of dredged material in a systematic way in accordance with the technical guidelines provided in the EMF. The EMF specifies that it is necessary to undertake adequate assessment of sediment quality prior to the commencement of dredging activities. An analysis of sediments in a sample of significant locations in the Colombo Water Basin has already been initiated and according to the findings, the need to prepare a special Dredged Material Disposal Plan will be determined. This will be a contribution to SLLRDC's and CMC's future O & M plans for the Primary and Secondary Canals.

62. During preparation of the EMF, EA and screening reports for the eight selected sub-projects for implementation in year 1, communities in project sites have been consulted to hear their concerns about the projects' environmental impacts and the outcomes have been documented. In general, public opinion of the project from an environment perspective is largely positive and welcomed. In addition, consultations with other primary stakeholders such as the implementing partners (SLLRDC, UDA and the 4 LAs) and regulatory agencies (CEA) have been carried out during this time and documented. The EMF and EA have been placed in public domain in-country and through the World Bank's Infoshop since 16/11/2011 and will comply with the disclosure requirement of a Category A project. The documents will be finalized with a public hearing which will be organized and announced in order to provide an opportunity for interested members of the public to discuss the project and share their views/concerns verbally. Similarly, for all types of environmental analyses conducted subsequently, affected communities would be consulted, process documented and account taken of the results of consultation, including any actions agreed resulting from the consultation. Public disclosure of the relevant safeguards documentation will be a pre-requisite for bidding of works contracts. The contract documents for each contract package should mandatorily include the relevant environmental

mitigation provisions stipulated in the EMPs for the given subprojects to ensure contractor compliance with the safeguards requirements.

63. By and large, the environmental policy and regulatory framework in Sri Lanka is consistent with the safeguards policies of the World Bank. Under the NEA, all development projects that fall into prescribed categories are required to undergo a comprehensive environmental screening and mitigation planning process (EIA or IEE). The Central Environmental Authority (CEA), which is the country's key environmental regulatory agency, has demonstrated technical expertise and a good track record of evaluating environmental impact assessments. It has been determined that the NEA will not apply to the 8 sub-projects ready for implementation at project onset as none of the investments exceed the prescribed thresholds, and is unlikely to apply to sub-projects in the pipeline. In the event it does become applicable, EIA requirements under the NEA and OP 4.01 will be harmonized. Even though the CEA will be little involved in the approval of sub-project, as a member of the project Steering Committee its expertise and guidance is expected to be available to the project. Furthermore, some of the key stakeholders of the project, such as the UDA, CMC, etc. have enough experience in EIA-related work required by the GoSL regulations as well as those of multi-national donors. Hence, the basic knowledge and skills necessary to understand and manage environmental issues are existing within implementation agencies. Some of the other environmental legislations that may have an important bearing on the project design and implementation are the FFPO¹⁴, CCA¹⁵ and the MPPA¹⁶. While project implications on the FFPO and CCA are largely positive (promoting conservation and beneficial use of natural resources) and hence will not trigger lengthy assessments, its implications on MPPA would need careful planning and consultations in the event any of the subprojects in the pipeline would require clearance to use the existing open-sea disposal site for potentially contaminated dredge material.

Institutional arrangements for environmental management

64. The main responsibility of ensuring compliance with environmental safeguards requirements of the project will be borne by the PMU which is supported by a full-time environmental specialist who is suitably qualified and experienced in managing urban environmental issues. Among its key tasks, the PMU will be responsible for providing the overall policy direction, technical assistance, review and endorsement of screening reports, environmental assessment and management plans, capacity building for effective safeguards management to the implementing agencies, monitoring of environmental compliance and progress reporting to the World Bank. In addition, the SLLRDC, UDA, CMC and the 3 local authorities will appoint an Environmental Officer as the nodal point directly responsible for the day-to-day implementation and monitoring of the safeguards at the agency level. While the SLLRDC and the UDA are regularly staffed with Environmental Officers and the project is expected to benefit from the available expertise, Environmental Officers will be appointed to assist the CMC and the other local authorities. They will be primarily responsible for sub-project screening, preparation of environmental assessments/plans, ensuring EMPs are reflected in bid

¹⁴ Fauna and Flora Protection Ordinance No 49 of 1993

¹⁵ Coast Conservation Act No 57 of 1981 and amended by Act No 64 of 1988

¹⁶ Marine Pollution Prevention Act No 59 of 1981

documents, implementation of EMPs at the site level together with site engineer and the Environmental focal point of the contractor and progress reporting to the PMU. The PMU together with the project units in the implementing agencies will encourage community participation in the planning, management, operation and monitoring of sub-projects.

65. To ensure safeguard procedures, instruments, and monitoring needs of the MCUDP are well understood by its implementing partners, the capacity of the PMU and project units in the partner agency will be strengthened with resources available under the institutional capacity component. The PMU will hire consultants to aid the implementing agencies in carrying out subproject specific screening for the first five subprojects under each agency. The respective environmental officers of each agency will work closely with the consultants to receive an on-the-job training. The technical assistance thus provided will create the necessary understanding, standards, and capacity within the agencies to carry out screening for subsequent subprojects independently. Where stand-alone EAs and EMPs are required as screening outcomes, the PMU will hire independent consultants. All screening reports, EAs, and EMPs will be prior reviewed and cleared by the PMU. In addition, screening reports, EAs, and EMPs for all Category A type of subprojects and a sample of Category B type subprojects will be prior reviewed by the World Bank.

66. For contracts such as dredging in sites proven to be contaminated and for the subsequent disposal of such dredged material, the PMU will hire specialist services who will prepare disposal plans, carry out additional sampling (if needed) and site monitoring, conduct awareness for implementing agencies and contractors of disposal plan, monitor compliance and ensure control measures are adequately implemented. The project will also explore the possibility of building long-term capacity, especially within the participating local authorities, on the management of urban environmental issues, with a focus on solid waste management and environmental monitoring, through training programs and procurement of necessary equipment.

67. The MCUDP will focus strongly on effective environmental monitoring. While day-to-day monitoring will be largely confined to compliance monitoring based on a monitoring checklist and is expected to take place through regular site supervision by the responsible officers, monitoring of environmental parameters (such as air, water, salinity, sediment quality, and so on) will be conducted based on the requirements specified in the EMPs. Most importantly, the project will support independent environmental audits on an annual basis throughout project implementation.

Environmental risks beyond coverage of safeguards

68. Sewer and solid waste accumulation in canals and drains are key environmental issues that pose challenges to the project that go beyond the coverage of safeguards. While long-term sustainability of project outcomes will be closely linked to maintaining city's waterways free of wastes, finding solutions to these complex and multi-faceted environmental issues are beyond the scope of this specific project. However, the project will benefit from a number of on-going initiatives by the Government to improve waste management in the country, such as the programs implemented by the Solid Waste Management Center at the Ministry of Local Authorities and Provincial Councils and parallel programs by the Ministry of Environment. As solid waste accumulation is one of the main causes of poor drainage in the city's canals and

drains, the project will complement on-going efforts through assistance to participating Local Authorities to improve efficiency of waste collection at the local level, where underinvestment in operations and maintenance has been recognised as one of the reasons for scattered waste accumulation on roadsides, canals and drains. On the long-term, the project will assist the GOSL to find practical and affordable solutions for the treatment and disposal of municipal waste generated in the Colombo Metropolitan area through a feasibility study which will pave the way for the preparation of potential follow-on projects. The project will also fund a sewer collector line to capture informal sewerage discharges in the Beira Lake which is one of the main sources of pollution in the lake and a feasibility study for enhanced sewerage collection, treatment and disposal covering the metropolitan area. It is anticipated that both feasibility studies are much needed timely interventions that will greatly contribute to the sustainability of project outcomes by facilitating long term solution to the solid waste and sewerage related drainage and pollution issues of water bodies in the project area.

Social

69. ***Social Assessment:*** A Social Assessment was carried out for the Project to understand the larger development context of the Metro-Colombo Area (CMA), legal-institutional setting, socio-economic situation, social risks and impacts, legal framework for handling involuntary resettlement, implementation arrangements and experience with regard to involuntary resettlement management, and for addressing social inclusion, accountability and gender issues. Only 49% of the dwellings in CMA are formal with the rest being informal settlements, many of which are located close to the drainage and canal systems and suffer flooding during the monsoon. The SA has identified both positive and some negative impacts of the project. The Project is likely to benefit households likely to be relocated to safe and formal housing away from flood prone areas. The key positive impacts identified are: formal ownership of house for squatters likely to be affected by the project, social recognition and security associated with formal tenure, improvement in living conditions in new condominiums, integration of the younger generation in the middleclass mainstream of the capital region, enhanced credit-worthiness, and poverty alleviation. Among the negative impacts, the flood control measures may involve minimal land acquisition and some involuntary resettlement impacts, even as the majority of the works, chiefly improvement of existing infrastructure such as canals, micro/storm drainage, streets, recreation areas, and similar works will have only temporary impacts relating to access, mobility, health, and safety.

70. ***Survey Findings:*** The sample social survey showed that the male-female ratio in the sample under-served settlements (slums) was 49-51. Some 38.6 % were Sinhalese, 31.4% were Muslim/Malay, 28.5% were Tamils, and 1.2% households were Burghers (descendants of mixed European-Lankan parentage). Religion wise, the composition was also mixed: 34.8% Buddhists, 31.7% Muslims, 16.8% Hindus, 14.3 Roman Catholics, and 2.4% Anglican, and other faiths. The school going children had access to schools with 1-2 kilometers distance. 39.7% of the sample households lived in the slums for over 20 years, 24.9% lived for 10-20 years, 21.8% for over 5 years and the rest 13.6% for less than 5 years. These squatters possess Municipal Registration cards and consider they have ownership, which is legally not correct. 37% of the houses surveyed did not have electricity, whereas 61% received power from Colombo Electricity Board. 50% of the sample households have piped water supply, whereas the rest use public stand posts. Only 26% houses have private toilet facilities whereas the rest use public toilets. Some

73% of the affected households were engaged in the informal sector with 30% households being unskilled laborers; 23% self-employed, and 12.4% skilled laborers, and 8% having unspecified skills. The rest 23% worked in public or private sector agencies.

71. **Key Social Risks:** The key social risks and issues identified for the project are associated with: (i) mitigating potential involuntary resettlement (OP/BP 4.12) and any adverse impacts on physical and cultural resources (OP/BP 4.11), (ii) promoting social inclusion and accountability, and (iii) supporting sustainable management for resettlement sites developed to re-house displaced households. Even as the exact number of affected households is not known, the SA estimates that some 1,500 squatter households living in underserved settlements (USSs) may be relocated from along the Beira Lake and canal banks¹⁷. The detailed negative impacts listed in the SA include: loss of habitat, loss of location advantage, likely loss of informal incomes of women, impact on community living, psychological attachment to old dwellings, disruption in education of students, loss of access to free basic services such as water, sanitation facilities, etc. The sustainable management of the condominiums being developed to resettle the affected households is also highlighted as a risk.

72. **Social Management Framework:** Based on the SA, as the actual impacts of all investments is not know except for eight front-runner sub-projects to be implemented in the first batch, a Social Management Framework has been prepared to provide guidelines on safeguards management. The SMF has been prepared through a series of stakeholder interactions and consultations with the likely to be affected community groups in the under-served settlements. This SMF provides procedures for legal framework, entitlements, procedures for assessing impacts, and planning and implementing resettlement action plans for the proposed activities, including grievance redress mechanism, monitoring and evaluation, linking social management and civil works activities, implementation arrangements, and budget. The SMF offers: compensation at replacement value for land and structures, alternative houses to the displaced squatters, shops on lease to relocated commercial units, rental allowance to the tenants, income restoration assistance to shops, property owners, and residences losing employment or income, reconstruction of affected community facilities and mitigation measures for temporary impacts. Summarized below are mitigation measures proposed in the SMF to address negative impacts identified in the Social Assessment.

Impacts and Risks	Mitigation Measures
Loss of habitat; impact on community living	Collective relocation to condominiums, management committees will be formed to sustain collective living through sharing of common assets and responsibilities
Loss of location advantage	Condominiums located within a distance of 1-5 kms
Likely loss of informal incomes of women	Special income assistance proposed for women headed households and vulnerable households; all shops will get income restoration/livelihood assistance
Psychological attachment to old dwellings	Enhanced security and safety, social recognition associated with formal tenure expected to neutralize this; NGOs to provide hand holding support.
Disruption in education of students,	Access to education facilities to be ensures;

¹⁷ This figure does not include some 200 squatter families who were living on public lands identified for the construction of resettlement sites, all these households will be resettled once the new buildings are ready.

	condominiums will have day care centers; and primary schools if there is no school nearby.
Loss of access to free basic services such as water, sanitation facilities, etc	Each dwelling unit will have piped water supply and attached toilets
Sustainable management of resettlement buildings	Condominium management funds to be established and management committees to be established to ensure sustainability; support strategies will be planned before relocation and implemented through NGOs..
Complaints regarding the project and the R&R benefits provided, or the lack of it may affect the relocation process and slow down project implementation due to non-cooperation or resistance from the affected people.	Establish responsive grievance handling system which is accessible, transparent and is able to resolve people's grievances effectively in a timely manner.

73. **Implementation Arrangements:** The actual LA requirement for this Project is not known, however, may be required in the later stage sub-projects. GoSL has in place well developed Land Acquisition Act and National Involuntary Resettlement Policy (NIRP, 2001) to deal with LA and IR risks. The capacity and experience related to the application of these law and policies in the country have been diverse across projects. The country has different agencies for coordinating and implementing land acquisition and urban housing activities. The Ministry of Land is responsible for policy and implementation of LA and R&R; the Urban Settlement Development Authority (USDA) is responsible for formulation and enforcement of policies and schemes relating to housing estate management; National Housing Development Authority (NHDA) is responsible for planning and undertaking housing schemes across the country; and the Urban Development Authority (UDA) is responsible for land acquisition for urban development schemes, including the resettlement of households living in informal under-served settlements. The SMF clearly explains that no project affected household or person shall be displaced or evicted under any existing country legislation or administrative instruction without the necessary provision of compensation and rehabilitation benefits as per the entitlement matrix provided in the SMF.

74. The PMU has identified UDA as the nodal agency for coordinating development of resettlement sites and relocation of affected people for the Project. The PMU has appointed a senior officer of the UDA managing the urban resettlement scheme as the director of its social unit. UDA has a large social survey team and has established database management systems for planning and implementing the urban resettlement scheme. In Sri Lanka, land acquisition is undertaken by Ministry of Land through their divisional secretaries, and the PMU will appoint a special officer for coordinating LA activities. Each major PIA such as the SLLRDC and UDA has special land acquisition cells.

75. Key institutional arrangements for implementing SMF/RAP will include: (a) establishment of Social Management Cell at the PMU and, as necessary, and establishment of Land Acquisition cells and R&R teams/officer in each PIA to carry out/coordinate social screening and impact survey; (b) prepare and implement RAPs for the Stage-II activities (with the help of consultants if needed); (c) unified mechanism at UDA to address and monitor post-resettlement sustainability issues; (d) a multi-stage Grievance Resolution Mechanism; (e) Independent Safeguard Monitoring and Review Mechanisms. A Metro Colombo Stakeholder Forum (MCSF) will be established, which will be an advisory body including representatives from government, professional experts and civil society for discussing overall progress, issues of

importance, and providing advice to the PMU. A Steering Committee of relevant government departments will be established to review progress and ensure implementation coordination at the highest level. These bodies will meet periodically, in which the designated officers or their representatives will participate.

76. At the field level, local resettlement committees (LRC) will be established at the settlement level including local elected representatives and community representatives. The LRC will also include community development officers (CDO) who will be assigned the responsibility of resettling and rehabilitating a fixed number of households (30-50) through consultation and mobilization. The MoDUD has hired a full-time social development professional to reinforce the social management capacity in the PMU. In addition, the PMU will mobilize Social Development Officers and second them to the major implementing agencies such UDA, CMC and SLLRDC-to assist them with technical support for implementing preparing and implementing RAPs. Depending on the scale of resettlement, the PMU will hire consultants to carry out SIA and prepare RAPs for stage-II activities. The PMU will also hire an NGO to assist with post resettlement support activities.

77. **Linking Social Management Actions to Civil Works:** Social Screening will be carried out for each activity and based on the magnitude of impacts and scale of resettlement required, SIAs will be commissioned through independent consultants or will be carried out by the Social Development Officers with the help of Community Development Officers. Based on the SIA, RAPs will be prepared in consultation with the affected communities and disclosed. The eligibility lists will be disclosed at the community and at the implementing agency level for objections before finalizing the same. Eligibility will be determined on the basis of census survey and once the beneficiary list is finalized, the affected families will be issued Family Identity Cards. The LA and R&R benefits will be provided before handing over the site for civil work. The Chief Engineer from the concerned implementing agency will certify that the necessary actions have been completed as per the RAP for handing over encumbrance free land for civil work. The SMF provides for giving rental allowance to the affected families till final relocation in permanent buildings in the case of emergency shifting.

78. **Consultation and Disclosure:** The SMF was prepared through a series of consultations with the stakeholder agencies and the affected communities where the sample survey was carried out. The SMF provides a framework for holding consultations during planning and implementing the RAPs. Consultations will be carried out and documented while preparing and designing the sub-projects to discuss alternatives, during Screening/SIA to discuss risks and impacts, and while preparing the RAP to discuss entitlements, disseminate the implementation process and time schedule for disbursement of compensation and benefits. During implementation, consultations will be held to plan actual relocation to the condominiums and to help with income restoration support. All the relevant safeguard documents will be disclosed at the MoDUD website, and on the websites of the implementing agencies, whereas key information will be disclosed through the newspapers depending on the requirement. The eligibility lists, entitlements, implementation schedule, etc will be disclosed at the level of settlements affected by the project. Each implementing agency and the PMU will establish public information centers where the relevant project documents will be available for public reference

79. **Social Inclusion, Accountability and Gender:** Sri Lanka is a democracy with inbuilt accountability systems. The end of ethnic conflict offers opportunities for strengthening the social accountability with wider citizen and civil society participation in urban development. The SMF provides guidelines for social accountability measures including information disclosure, civil society participation in planning and monitoring of the project; and grievance resolution mechanisms. The SMF emphasizes social inclusion measures including special support for displaced vulnerable households to restore livelihoods affected by relocation. Gender considerations suggested in the SMF include: (a) provision of title of the alternative house in the joint name of spouses and in the name of the mother, in case of deceased husband; (b) special attention to women headed households with livelihood restoration support; (c) equal provision of employment training opportunities for male and female youths; and (d) gender sensitive provision of facilities in resettlement sites including women and day care centers.

80. **Grievance Redress Mechanism (GRM), Disclosure:** There shall be a multistage GRM, with five levels of decision making. At the bottom, the Community Development Officers (CDOs) will receive and try to resolve grievances, failing which the aggrieved party will approach the local resettlement committee (LRC) working as the first grievance redress committee (GRC). If the LRC fails to resolve the case, the party will approach the GRC established at the implementing agency level, failing which s/he will approach the Project Director and the Additional-Secretary, MoDUD for redressing his/her grievance. The LRC will comprise the local ward representative, two beneficiaries, the community development officer, and one officer from the Project Partner Agency in charge of the concerned sub-project. At the second level, the Project Manager of the PIA shall head the GRC, which will include the Social Specialist. Above this, there shall be an **Independent Grievance Panel (IGP)** established comprising representatives from the Ministry of Land, Department of Valuation, Ministry of Women Affairs, an eminent NGO, a lawyer and a retired civil servant of the rank of a Secretary of the GoSL to hear and resolve complaints unresolved by GRCs operating in the Project. There shall be a Technical Assessment Committee instituted by the PMU comprising structural engineering and survey experts to aid and advise the LARC and IGP in resolving compensation related issues.

81. **Monitoring and Evaluation:** The PMU will hire external consultants/NGO for providing need-based implementation support to the PIAs and for carrying out independent monitoring and quality assurance. The Project will have a participative implementation monitoring system established at the bottom, which will enable the local resettlement committee to participate in the implementation process in planning and monitoring roles. The PMU will submit quarterly social safeguard progress and quality monitoring reports with yearly “safeguard reviews” which will be carried out by independent consultants. These will form the basis for any improvements to be brought about in the safeguard policy framework and implementation arrangements.

82. **Remaining Risks and Capacity Building Measures:** Despite considerable experience the country has in urban resettlement, in view of the limited experience of the counterpart department in resettlement, the large number of households affected and the initiative to resettle affected people in high rise condominiums (ground+12 floors) enhances the risk perception. In this context, Bank has already organized workshops on urban resettlement during project preparation for the PMU and the stakeholder agencies to enhance their understanding of the challenges, and share relevant experience and best practices from other

countries. More such workshops and interactions are proposed to be held during planning and implementation of sub-projects. The Bank is working with the client to enhance the latter's safeguards management capacity through training and exposure visits, and with technical support for planning and implementation. Training program will be implemented for the key implementing staff as a part of the capacity building plan. Independent monitoring and annual safeguards review will help to identify critical issues and undertake mid-course correction necessary during implementation. The Bank's implementation support strategy will involve intensive technical support and close supervision of the social safeguards management process and outcomes.

83. **Budget:** The client estimates that about 1500 squatter households will have to be resettled in permanent buildings, provided with 400 square feet of dwelling units at the rate of LKR 3 million each, including services and infrastructures and excluding land costs. Added to this the value of land and the cost of hiring staff, consultants for preparation, implementation, monitoring, and post resettlement activities, it is estimated that the overall budget for implementing the SMF will be around USD 53 million.

Annex 4 -Operational Risk Assessment Framework (ORAF)

SRI-LANKA- METROPOLITAN COLOMBO URBAN DEVELOPMENT PROJECT

Project Development Objective(s)				
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> The project development objective (PDOs) is to support the Borrower to (i) reduce flooding in the catchment of the Colombo water basin, and (ii) strengthen the capacity of local authorities in the Colombo Metropolitan Area (CMA) to rehabilitate, improve and maintain local infrastructure and services through selected demonstration investments. </div>				
PDO Level Results Indicators:	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px;">1. Reduction in the area under risk of flooding (50-year return period) in the project area.</td> </tr> <tr> <td style="padding: 2px;">2. Increase in the percentage of total urban road network in good and fair conditions in the 4 PLAs.</td> </tr> <tr> <td style="height: 15px;"> </td> </tr> </table>	1. Reduction in the area under risk of flooding (50-year return period) in the project area.	2. Increase in the percentage of total urban road network in good and fair conditions in the 4 PLAs.	
1. Reduction in the area under risk of flooding (50-year return period) in the project area.				
2. Increase in the percentage of total urban road network in good and fair conditions in the 4 PLAs.				

Project Stakeholder Risks	Rating	Moderate
<p>Description: <i>Borrower Relations.</i> The GoSL Vision for Development (Mahinda Chintana) identifies Urban Development and the transformation of Colombo into a world-class capital as top priorities for the country. The Bank upcoming Country Partnership Strategy is fully aligned with the vision of the GoSL and likewise recognizes the critical importance of Colombo in spear-heading post-conflict development in the country. Since Colombo and the Western Province constitute by far the most prosperous region in the country, investing more in Colombo might be perceived by the population living outside the Western Province as an inequitable concentration of resources in the capital area.</p>		<p>Risk Management: The GoSL just formally approved the National Physical Plan for Sri Lanka that heavily emphasizes support to regional development in other 4 provinces across the country (North East, Center and South). - Resp: Client Stage: Prep Due Date: November 2011 Status: Completed</p> <hr/> <p>Risk Management: The Bank CPS will include a strong emphasis to support an integrated Regional Development Program hinged on Secondary Cities and their economic linkages with their hinterland. - Resp: Bank Stage: Imp Due Date: 05/02/2012 Status: Not yet Due</p>

Implementing Agency Risks		
Capacity	Rating:	Substantial
<p>Description: <i>Resources.</i> Despite the Ministry of Defence and Urban Development has no track record as implementing agency of Bank's projects, the PMU is already staffed with all the necessary full-time professional core staff: FM, Procurement, Social, Environment and engineer. This motivated professional staff has already demonstrated to perform well during project implementation and more training opportunity will be required during project implementation to continue to strengthen their respective capacity. Except for CMC, Project Local Authorities do not have sufficient planning, engineering, and monitoring capacity to quickly come to speed with the high volume of investments during project implementation.</p>	<p>Risk Management : During the early stages of Project preparation, the PMU is already successfully carrying out procurement and FM transactions following Bank guidelines, hence steadily building its fiduciary capacity. More fiduciary training opportunities will be provided during the course of project implementation.</p> <p>- Resp: Bank Stage: Implementation Due Date NA Status: Ongoing</p>	
	<p>Risk Management: Component 3 of the project includes budget allocation to mobilize specialized senior advisors and Design and Supervision consultants to strengthen and complement the expertise of the existing core staff of the PMU and other project Agencies.</p> <p>- Resp: client Stage: Implementation Due Date : N.A. Status: Ongoing</p>	
	<p>Risk Management : Design and Supervision consultants have been made available under the project to each Project Local Authority to be mobilized from the onset of implementation. Resp: client Stage: Implementation Due Date : 02/03/2012 Status: Not yet Due</p>	
Governance	Rating:	Moderate
<p>Description: <i>Decision-making and Ownership:</i> The successful fast-tracked preparation of the project greatly depended upon (i) the leadership and commitment of the Ministry of Defence and Urban Development to the project objectives, and (ii) full ownership of the project design and its specific components by all the project agencies. These two factors would continue to remain in place during project implementation.</p>	<p>Risk Management : The Project Steering Committee is chaired by the Secretary of Defence, and will meet every two months and on call, when necessary, and to continue to ensure inter-agency coordination across line ministries involved in the development of Metro Colombo.</p> <p>- Resp: client Stage: Implementation Due Date every two months Status: Ongoing</p>	
	<p>Risk Management : During implementation the PMU will continue to hold monthly progress review meetings with all the agencies involved in the Project to ensure that they continue to timely delivery on their responsibilities and exchange information and experience among each other..</p> <p>- Resp: client Stage: Implementation Due Date : monthly Status: Ongoing</p>	
	<p>The organization of project implementation will continue to follow the successful decentralized approach adopted during preparation, by which the various levels of management of the project agencies are equipped/empowered to make decision related to their specific areas of expertise and responsibility.</p> <p>- Resp: client Stage: Implementation Due Date: NA Status: Ongoing</p>	
Project Risks		

Design	Rating:	Moderate
<p>Description:</p> <p><i>Technical Complexity.</i> The project will be implemented by highly specialized agencies who are technically very strong in their specific areas of expertise. The only sub-component that might introduce technical complexities that could go beyond the capacity of the implementing agency (SLLRDC) is Sub-Component 1.1, dealing with the system of primary and secondary canals, whereas the use of some state-of-the-art technical solutions might be necessary.</p>	<p>Risk Management : The Global Facility for Disaster Reduction and Recovery (GFDRR) made funds available during preparation to mobilize a firm with international expertise to carry out the updaters of the hydraulic model of the Colombo Water Basin, validate the viability and final design of proposed flood structures, and provide design engineering support during the final stage of the revision of structure design.</p> <p>- Resp: GFDRR Stage: Prep Due Date: 12/01/2011 Status: Done</p>	
Social & Environmental	Rating:	High
<p>Description:</p> <p><i>Environmental.</i> - As documented by the general Environmental Assessment of the project, the MCUDP environmental impacts will be mostly positive. It is not expected to have any major environmental negative impact beyond the typical temporary impacts associated with the management of works and building sites, which will be managed through EMPs and sound site supervision. Since the project will support the improvement of canals and lake systems that might involve some dredging, the disposal of dredged material that might contain hazardous sediments, especially in the lower part of the basin, would require particular attention given that the country does not operate engineered landfills.</p> <p>- The project focuses on addressing flood risk and it does not finance investments aimed at improving water quality beyond few demonstration/targeted interventions (e.g. collector of informal sewage discharges along Beira lake and support to improve solid waste collection of PLAs).</p>	<p>Risk Management : A sediment quality assessment will be undertaken in selected locations of the basin to evaluate the composition of the dredged material and provide information of its potential risk level. Accordingly, a dredge material disposal plan will be prepared as per the guidelines of the project Environmental Management Framework (EMF), identifying suitable disposal alternatives, dredging equipment and techniques, environmental monitoring requirements and financial implications.</p> <p>Resp: client Stage: Prep and Impl Due Date: 06/31/2012 Status: Not yet Due</p> <p>Risk Management: The project has allocated substantial resources to carry out comprehensive strategies and feasibility studies both for Solid Waste Management and Sewerage Disposal for the Metro Colombo area. TORs are under preparation to be able to launch these studies by project start.</p> <p>Resp: client Stage: Prep and Impl Due Date: 04/30/2012 Status: Not yet Due</p>	
<p><i>Social.</i> The Project is not expected to cause any major social impact beyond those typical temporary ones associated with the management of works and building sites, which will be managed through sound management of works and site supervision, as per the guidelines of the Social Management Framework (SMF). As it is typically the case for projects aimed to reduce flood risk, the MCUDP might</p>	<p>Risk Management: The PMU, SLLRDC, UDA and CMC will all be staffed with dedicated Social Development Officers and the project allocates enough resources to mobilize expert's advice from Social Experts and Consultants with prior experience in urban resettlement In Sri Lanka.</p> <p>-Resp: Client, Stage: Impl; Due Date: 04/30/2012 I Status: Not yet due</p> <p>Risk Management :</p>	

<p>involve a combination of targeted preventive resettlement of informal settlements in highly floodable areas and/or spot specific resettlement necessary to successfully implement a number of selected sub-projects. The Project has a sound SMF to deal with the expected limited extent of resettlement and any critical post-relocation issues, however the Client might not have enough hand-on experience in urban Resettlement/Relocation (R/R), which could slow-down the implementation of those first subprojects involving R/R</p>	<p>The SMF provides guidelines regarding critical steps to ensure sustainability of the post relocation process.</p> <p>Resp: client Stage: Prep Due Date: 01/12/2012 Status: Not yet Due</p>
<p>Program & Donor</p>	<p>The Borrower repeatedly expressed interest to apply for funds to carry out South-South Knowledge Exchanges to learn from the experience of other countries that successfully carried out resettlement in the region and in other one (like Latin America and East Asia).</p> <p>Resp: Client, Stage: Impl; Due Date: 12/30/2012 I Status: Not yet due</p>
<p>Description: <i>Interdependence with other projects.</i> The project targets a self-contained basin, however the strategy adopted to partially reduce the water load in the Colombo Water Basin would include diverting water from the upper part of the catchment to the adjacent Weras Ganga Basin through the Madiwela South Diversion. This investment is financed by a separate loan from the Government of China (under a different project also managed by SLLRDC and already under implementation) and works are due to start in about 2 years.</p>	<p>Rating: Low</p> <p>Risk Management : SLLRDC is the implementing agency also for the Chinese funded Weras Ganga project and will ensure coordination between the two initiatives.</p> <p>- Resp: partners Stage: Prep Due Date : 05/02/2012 Status: Not yet Due</p> <p>Risk Management : The ongoing update of the hydraulic model for the Colombo Water Basin will also be a critical instrument to validate the criticality of the proposed Madiwela South Diversion project to the overall capacity of Colombo Water Basin and assess all possible alternative scenarios with and without this proposed diversion.</p> <p>- Resp: Client and Bank Stage: Prep Due Date: 05/02/2012 Status: Not yet Due</p>
<p>Implementation & Sustainability</p>	<p>Rating: Moderate</p>
<p>Description: <i>Implementation.</i> While the centralization of fiduciary and coordination responsibilities under the PMU at the Ministry of Defence and Urban Planning ensures effective and speedy project implementation this implementation arrangements might also be perceived as undermining the institutional strengthening of other project agencies.</p> <p><i>Sustainability.</i> The large scale of the project capital investments as compared to the typical low volume of such investments managed by PLAs over the last decade could overstretch the capacity of PLAS to deliver and maintain project deliverables after project completion.</p>	<p>Risk Management : The project implementation arrangements have been designed to ensure that PLAs and other central agencies involved in the project retain critical responsibilities with regard to selection, design and supervision of sub-projects.</p> <p>- Resp: partners Stage: Prep and Impl Due Date : NA Status: Ongoing</p> <p>Risk Management : Component 2 of the project makes resources available to PLAs to develop and run asset management systems for urban roads and for O&M equipment, which could later be replicated for the management of all municipal assets.</p> <p>- Resp: client Stage: Prep Due Date: 12/30/2012 Status: Not yet Due</p>

Overall Preparation Risk Rating	Moderate
Stakeholder Risk	Moderate
Implementing Agency Risk	
- Capacity	Substantial
- Governance	Moderate
Project Risk	
- Design	Moderate
- Social and Environmental	High
- Program and Donor	Low
- Delivery Monitoring and Sustainability	Moderate
Overall Implementation Risk	High

Annex 5: Implementation Support Plan

SRI-LANKA- METROPOLITAN COLOMBO URBAN DEVELOPMENT PROJECT

(a) Strategy and Approach for Implementation Support

1. The strategy for implementation support has been developed based on the nature of the project and its risk profile. It lays out the support activities that the Bank team will implement, as well as the project design and monitoring features (provided in the result framework) that it will adopt, in order to mitigate the most significant risks identified in the Operational Risk Assessment Framework (ORAF). The Implementation Support Plan (ISP) also identifies the requirements to meet the Bank's fiduciary obligations.

2. The Implementation Support emphasizes on the key risks identified during project preparation, which are listed below:

- (a) **Implementation risk.** The Ministry of Defence and Urban Development (MoDUD) has no track record as implementing agency of Bank's projects. Possible procurement risks that may impede or delay implementation include lack of familiarity with Bank Guidelines. As implementation support measures, it is expected that by project effectiveness, due to the ongoing procurement activities by the PMU during the preparation stage, the PMU would be familiar with Bank Guidelines and equipped to effectively carry out procurement under the project. To further mitigate this risk, a capacity needs assessment of the PMU, PIAs, and PLAs will be conducted on a periodic basis over the course of project implementation to identify monitor quality standards of procurement and strengthen areas where technical assistance and capacity building might be required.
- (b) **Social and environmental risks.** The main social risk is associated with the possible preventive relocation/resettlement of vulnerable households living in low-lying lands, as part of the flood and drainage management investments under Component 1. Interventions involving resettlements will have a long gestation period, and will therefore be implemented in Stage II. Environmental risks have the potentials to be significant given the nature of some of the interventions planned under the project. To mitigate the risk, particular attention will be placed to post-SIA and post-EIA monitoring of compliance with agreed mitigation measures. A number of workshops on urban resettlement have also been organized over the course of project preparation for the PMU and the stakeholder agencies to build capacity.

3. The Implementation Support Strategy is based on several mechanisms that will enable enhanced implementation support to the project executing agencies, and timely and effective monitoring. The implementation support thus comprises: (a) implementation support missions; (b) regular technical meetings and field visits by the Bank between formal review missions; (c) reporting from the Project Management Unit (PMU) on Results Monitoring and Evaluation, compiled in coordination with the Project Partner Agencies (SLLRDC and UDA) and the PLAs, and (d) reporting and monitoring of financial management, procurement and safeguards (environmental and social).

(b) Implementation Support Plan

4. Most of the Bank team members will be based in the Sri Lanka Country Office and other country offices in the region to ensure timely, efficient, and effective implementation support to the client. Formal supervision and field visits will be carried out semi-annually, with more frequent technical implementation support missions during the first years of the Project. Detailed inputs from the Bank team are outlined below:

- **Technical inputs:** technical inputs are required to review the preparation of the proposals and bids to ensure fair competition through proper technical specifications and fair assessment of the technical aspects of bids. Technical supervision is required to ensure that technical contractual obligations are met. The team's technical specialists will conduct site visits on a semi-annual basis throughout project implementation.
- **FM Supervision Plan:** the proposed project has a **Moderate** financial management risk rating. The project is implemented by a PMU with sound FM capacity. Hence, in consistent with the risk based approach to supervision, the supervision activities will consist of visits to PMU, supplemented by desk reviews of internal & external audit reports, quarterly financial reports and dialogue with the project staff as needed. The Bank will carry out a field level FM supervision mission at least once every six months. The financial management supervisions will assess the adequacy of the FM arrangements and assess the FM risk and performance of the project. As and when required, other financial management supervision tools such joint missions with procurement will be used in an effort to periodically monitor the adequacy of financial management arrangements.
- **Environment Safeguard:** The GOSL has valuable past experience in managing environmental safeguard risks in large-scale urban upgrading work including the Metropolitan Urban Environmental Improvement and Lunawa Environmental Improvement Projects implemented by international donor agencies. The Central Environmental Authority, which brings in its expertise to the project through the steering committee, has almost two decades of experience and specialized skills in environmental management and monitoring of development projects. The UDA is a designated Project Approving Agency under the NEA and has experience in EIA review and monitoring. The project will build on this existing capacity and support implementation of environmental safeguards under the project through (i) dedicated staff appointed in each participating institution (ii) clear safeguard procedures and instruments to apply at investment level (iii) short-term and long-term capacity building of implementing staff through training and procurement of environmental monitoring equipment (iv) technical assistance for preparing EAs and EMPs (v) forums for inter-agency co-ordination and (v) independent environmental audits

The PMU will take a leading role in establishing the recommended implementation arrangements and mobilizing necessary support to the implementing agencies. The Bank Task Team will assist the client by (i) providing close supervision and necessary implementation support in the initial stages of the project in conducting

screening, preparation of EAs and EMPs, (ii) undertaking prior and post reviews, (iii) undertaking regular missions to review overall safeguards performance and provide further implementation support, (iv) share knowledge on technologies and best practices, and (v) provide training support on Bank's safeguard policies and requirements of the project

- **Social Safeguard:** GoSL's has past experience in urban resettlement management including the innovative Lunawwa and Southern Highway projects implemented with support from external aid agencies. However, considering the diversity in quality of implementation experience and outcomes thereof, the Bank will have in place a robust social safeguard supervision system, which will ensure more intense monitoring during the first 12 months of implementation, with a provision to hire a dedicated STC to support Bank's careful management and monitoring of safeguards on a regular basis. In particular, the Bank will monitor the establishment, early in year one of implementation, of (a) robust institutional mechanism for managing social safeguards with well qualified and experienced professionals, (b) frameworks for efficient inter-agency coordination, (c) mechanisms for independent safeguards quality monitoring; (d) processes for preparing social action plans; (e) robust consultation, disclosure and grievance redress mechanisms; and (f) capacity building of implementing staff through training and exposure visits.

The Ministry of Defence and Urban Development will establish these implementation arrangements following the recommendation of the Social Assessment and of the Bank, whereas the Bank will assist the client with necessary technical, training and knowledge sharing support, enabling it to meet the Bank's safeguard policy requirements. The Bank team will undertake regular missions and provide necessary hand holding support to the client in the initial stages for preparing and implementing social action plans. The Bank team will support the Client to organize exposure visits for the client to enable them to address the post-resettlement sustainability issues. The Client will hire professional consultants to prepare safeguard plans, NGOs for implementation support, hire independent consultants to carry out quarterly monitoring and annual social safeguard quality audit in order to review project's compliance with stipulated social safeguard standards. Other consultancy inputs may relate to post resettlement livelihood support activities. The Bank will ensure that intensive technical support is available to the client for social safeguards management, and the process and outcome of social safeguards is closely monitored and documented.

- **Procurement.** Implementation support will include: (i) *ex-ante* and *ex-post* reviews of Project procurement; (ii) review of the Procurement Plan and procurement performance; and (iii) assisting MODUD in identifying capacity building needs, providing information on training resources in Sri Lanka and South Asia, preparation of training material and modules and needs based training on the Bank's procurement guidelines to the implementing agencies. In addition, guidance on the any necessary revisions to the Procurement Manual, the Procurement Plan and the bidding documents will be provided by the Bank's procurement specialist as deemed necessary based on actual implementation experience. Procurement supervision

mission will be carried out at least semi annually and will include visits to implementing agencies to verify the implementation arrangements *in situ* and make recommendations for their refinement as necessary.

5. The implementation support and estimated minimum requirement of resource required expressed in Bank staff time is summarized below, with an emphasis on more intense support during the first 12 months of implementation:

Time	Focus	Skills Needed	Resource Estimate Staff Week (SW)
First twelve months	Team Leadership	– Senior Urban Specialist	12 SW
	Technical review/ Support	– Hydrologist	8 SW
		– Municipal Engineer	8 SW
		– Urban Strategic Planner	6 SW
		– Urban Development Specialist	4 SW
		– Urban Economist	4 SW
– Urban Regeneration Specialist		6 SW	
– Solid Waste Management Spec.		6 SW	
– Urban Transport Specialist		4 SW	
FM training and supervision	FM Specialist	3 SW	
Environment and Social monitoring & reporting	– Environment Specialist	8 SW	
	– Social Specialist	10 SW	
	– Social Development Specialist short-term consultant (STC - local, unidentified)	15 SW	
Procurement review of bidding documents and training (as needed)	– Procurement Specialist	4 SW	
12-48 months	Team Leadership	– Senior Urban Specialist	8 SW /Year
	Technical review/ Support	– Hydrologist	4 SW/Year
		– Municipal Specialist	4 SW/Year
		– Urban Strategic Planner	4 SW/Year
		– Urban Development Specialist	4 SW/Year
		– Urban Regeneration	2 SW/Year
– Municipal Management		2 SW/Year	
– Monitoring and Evaluation Spec.		1 SW/Year	
FM training and supervision	– FM Specialist	2-4 SW/Year	
Environment and Social monitoring & reporting	– Environment Specialist (unidentified local consultant)	2-3 SW/Year	
	– Social Development Specialist (unidentified local consultant)	2-3 SW/Year	
Procurement review of bidding documents and training (as needed)	– Procurement Specialist	2-4 SW/Year	

Annex 6: Team Composition

SRI-LANKA- METROPOLITAN COLOMBO URBAN DEVELOPMENT PROJECT

Name	Title	Unit
Rosanna Nitti	Senior Urban Development Specialist (Task Team Leader)	SASDU
Elisa Muzzini	Economist	SASDU
Samantha Wijesundera	Water and Sanitation Specialist	SASDU
Satya Mishra	Social Development Specialist	SASDS
Sumith Pilpiatiya	Lead Environmental Specialist	SASDI
Zhiyu Jerry Chen	Urban Specialist	SASDU
Khalanidi Subarrao	Social Protection Specialist (Consultant)	SASHD
Supul Wijesinghe	Financial Management Specialist	SARFM
Chau-Ching Shen	Lead Financial Management Specialist	SARFM
Minneh Mary Kane	Lead Counsel	LEGES
Jose Molina	Lead Financial Officer	BDM
Geoffrey Read	Lead Municipal Engineer (Consultant)	SASDU
Mohommed D.E Feghoul	Lead Municipal Engineer (Consultant)	SASDU
Sunethra Samarakoon	Procurement Specialist	SASPS
Debabrata Chakraborti	Senior Procurement Specialist	SASPS
Nadeera Rajapakse	Environmental Specialist(Consultant)	SASDI
Indika Samarakoon	Institutional Specialist,(Consultant)	SASDU
Stephen George Karam	Lead Urban Economist	ECSS6
Henk Ogink	Hydrologist (Consultant)	SASDU
Richard Clifford	Consultant	SASDU
Gianni Brizzi	Urban Regeneration and Cultural Heritage Expert (Consultant)	SASDU
Angelo D'Urso	Strategic Urban Planning Expert (Consultant)	SASDU
Lilian MacArthur	Program Assistant	SASDO
Farahnaz Azoor	Program Assistant	SASDO
Shane Andrew Ferdinandus	Program Assistant	SASDO

Annex 7- Economic Analysis - Flood and Drainage Management

SRI-LANKA- METROPOLITAN COLOMBO URBAN DEVELOPMENT PROJECT

FLOOD AND DRAINAGE MANAGEMENT - SUB-COMPONENTS 1.1, 1.2 AND 1.3

1. The overall EIRR for Component 1 is estimated at 12 percent, and is considered a lower bound estimate since non-market benefits (e.g. recreational benefits) could not be quantified. The sensitivity analysis shows that the estimated EIRR is robust to different scenarios, including a 20 percent increase in costs and a 20 percent decrease in benefits. The results of the economic analysis are summarized in the Table below and presented in the Annex by Sub-component.

Sub-/Component	EIRR	NPV ¹⁸ (US\$ m)
Flood and Drainage Management (Sub-components 1.1, 1.2 and 1.3)	11	8.6
Beira Lake Development (Sub-component 1.4)	28	18.3
Flood and Drainage Management (Component 1)¹⁹	12	26.1

Flood and Drainage Management - Sub-components 1.1, 1.2 and 1.3

2. This Annex presents (a) the economic justification of the flood and drainage management program; (b) a quantitative assessment of the costs and benefits of flood and drainage management based on a CBA scenario analysis; (c) the screening criteria that will be used to assess the economic viability of the flood control and drainage management program once the updated hydraulic model becomes available.

A. Economic Justification

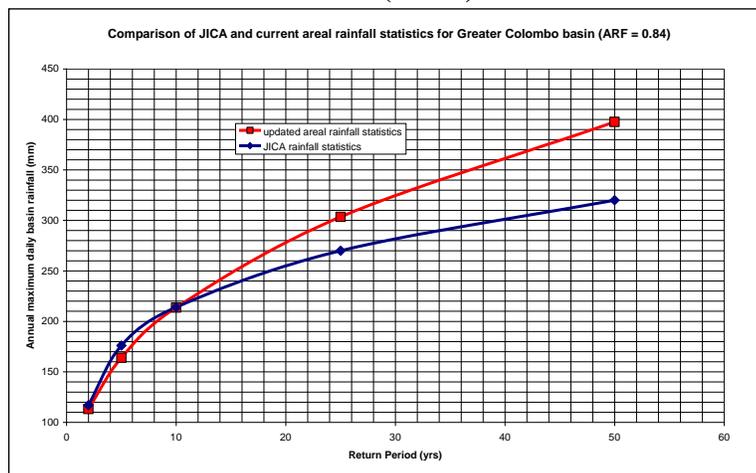
3. **The CMA, a low-lying flood plain, is one of the Sri Lanka urban areas most exposed to floods.** The occurrence and damage of urban floods in the Colombo Metropolitan Area has steadily increased over time due to a combination of climatic and non-climatic factors.²⁰ On one hand, rainfall frequency has almost doubled in Colombo over the last 30 years. Figure A.1 compares the annual maximum daily rainfall statistics applicable to the Greater Colombo Water Basin according to JICA (2002) and the updated statistics based on maximum daily rainfall measured at Colombo Meteorological Office in the period 1981-2010. On the other hand, investments in the drainage systems have lagged behind, and storage capacity in the basin has reduced considerably in the last decade due to uncontrolled landfills and flood plain encroachments by illegal settlements. As a result, the storm water retention area has diminished from 382 ha to at present 268 ha, a reduction of 30 percent since 2002. The CMA has experienced nine flood events in 2010, including two major floods in May 2010 and November 2010.

¹⁸ Based on exchange rate US\$ 1 = LKR 113.

¹⁹ Beddagana bio-diversity Wetland Management Park excluded.

²⁰ The area is largely influenced by the water levels of Kelani River which is bordering the northern peripheries of the CMA, and frequently over-flowing into low-lying areas of CMA causing severe inundation.

**Figure A.1: Rainfall statistics for Greater Colombo Water Basin
2002 (JICA) and 2010**



4. **The reduction of flood damage expected from the project would benefit, directly or indirectly, about 2.5 million people.** The project is expected to mitigate the effects of floods on the lives of approximately 232,000 people (“direct beneficiaries”) in the Colombo Water Basin. The indirect beneficiaries comprise 2.5 million people, and include the entire population of the Colombo District, within which the Colombo Water Basin is contained.. In addition, in Colombo City alone, 68,000 housing units are estimated to be located in under-served pockets, most of which are in flood-prone areas, and subject to the environmental and health risks of flood hazards.

5. **Climate change will have a significant impact on the expected probability of urban floods, and the associated costs, in coastal cities.** A recent World Bank climate change study based on case studies for two Asian coastal megacities (Manila and Bangkok) finds that, in 2050, there is an increase in the area likely to be flooded under different climate scenarios compared to a situation without climate change.²¹ Both cities are likely to witness increases in temperature and precipitation linked with climate change and variability (Table A.1 presents parameters for various climate change scenarios in the three cities). Inundation areas are expected to increase between 0.1 and 0.9 percent per annum over 2008-2050 under alternative climate change scenarios. The associated expected average annual flood damage cost increase for the two cities is equivalent to 0.6 and 1.1 percent per annum for the first and second climate scenarios, respectively (see Table A.2). In Bangkok, for instance, under the conditions that currently generate a 1-in-30-year flood, but with the added precipitation projected for a high emissions scenario, there will be approximately a 30 percent increase in the flood-prone area. The increased cost associated with climate change (in a high emission scenario) from a 1-in-30-year flood is US\$1.5 billion, or approximately 2 percent of Gross Regional Domestic Product.

²¹ World Bank, ADB and JICA (2010). “Climate Risks and Adaptation in Asian Coastal Megacities – A Synthesis Report”. Washington DC. The downscaling technique used for the climate estimation differs across cities. The city studies for Bangkok and Manila are based on statistical downscaling techniques. The city study for HCMC is based on dynamic downscaling.

Table A.1. Climate Change and Land Subsidence Parameters

Climate Change Scenario	Temperature Increase (C)	Precipitation Increase (%)	Sea Level Rise (cm)	Storm Surge Height (m)	Land Subsidence (m)
<i>Bangkok</i>					
B1	1.2	2%	19	0.61	0.05 to 0.3
A1F1	1.9	3%	29	0.61	0.05 to 0.3
<i>Manila</i>					
B1	1.17	9%	19	0.91	NA
A1F1	1.8	14%	29	0.91	NA

Source: WB, ADB and JICA (2010).

Table A.2. Annual Damage Cost Increase Relative to Baseline Scenario (2008-2050)

	Return	Damage Increase, percentage change per annum (2008-2050)	
		Climate scenario 1 (B1)	Climate scenario 2 (A1F1)
<i>Bangkok</i>			
	1/10	0.9%	1.4%
	1/30	0.7%	1.0%
	1/100	0.5%	0.6%
<i>Manila</i>			
	1/10	0.1%	0.6%
	1/30	1.3%	1.7%
	1/100	1.4%	1.7%
<i>Weighted Average</i>			
		0.6%	1.1%

Source: WB, ADB and JICA (2010).

B. Cost and Benefit Analysis

A scenario CBA analysis has been carried out to estimate the EIRR for the entire flood control and drainage management program based on available data. The methodological approach adopted for the analysis is presented in this section.

B.1 Probability of Flood Events

6. The Storm Water Drainage Master Plan Study of 2002 (also referred to as the JICA study) presents an estimation of flood frequency-damage for a number of flood events based on historic flood data for the Greater Colombo Water Basin. Such estimates, projected to the year 2010, have been revised to account for the increase in historic rainfall patterns since 2002. The avoided costs of localized floods have been estimated based on data provided by the Colombo Municipal Council. The impact of climate change on the probability of flooding is an important variable affecting total flood damage costs – in the absence of city-level data for Metro Colombo, the impact of climatic factors on probability of flooding and damage costs is estimated based on the weighted average of the expected increase in damage costs associated with climate change for two Asian mega-cities – Bangkok, and Manila – the impact of climatic factor is equivalent to a

0.8 percent annual increase in flood damage costs.²² Alternative scenarios are explored as part of the sensitivity analysis.

B.2 Benefit estimation

7. The benefits associated with the flood control and drainage management are broadly classified into two categories: (A) tangible (direct and indirect) socio-economic benefits; and (B) intangible (non-market) benefits.

8. The tangible benefits are calculated through the avoided damage cost method, measured as the cost of flood damage, which the project would cause to be avoided. The probability distribution function of the cost of flood damage is estimated based on the frequency of floods with different intensities, which constitutes the “without project” damage cost scenario. The cost of flood damage in terms of 2010 unit costs is estimated for the most significant damage headings, which were included in the Drainage Master Plan for Colombo (JICA), namely (a) the damage to residential and commercial property (75 percent of total avoided costs), (b) the damage to physical infrastructure (21 percent), (c) the loss of economic activity for businesses in the CMA (4 percent), and (d) the damage to paddy production (0.1 percent).²³ The damage costs corresponding to “without project” scenario are assumed to grow at 5 percent per annum over the years, based on an assumed long term average annual real GDP growth rate for the Western Province.²⁴ The “avoided cost” corresponds to the difference of tangible flood damage associated with the two scenarios, namely “without” and “with” the implementation of the project.

9. The non-market benefits associated with the improvements in the retention areas are mostly of environmental nature, encompassing recreational benefits (increase in the recreational value of the retention areas of the Colombo’s primary and secondary canal system); (b) environmental and aesthetic benefits (improvement in the overall environment and aesthetic value of Colombo and its canal system) and (c) biodiversity benefits (preservation of the local ecosystem). These non-market benefits will indirectly contribute to harness the economic potential of Colombo City as a tourist destination. Since the non-market benefits could not be quantified and have not been included in the benefit assessment, the scenario analysis under-estimates the overall economic benefits of the investments.

B.3 Cost estimation

10. The flow of costs consists of estimated costs and the economic level of operation and maintenance costs. The costs include both structural and non-structural measures. Structural measures corresponded to all type of investment works to be done, such as, drainage pipelines, Defence works, pumping stations, etc. The investment comprises not only the project costs but also replacement costs of equipment and assets whose lifetime is shorter than the project life (40

²² Average weighted by the probability of the flood events. Data based on World Bank, ADB and JICA (2010). “Climate Risks and Adaptation in Asian Coastal Megacities – A Synthesis Report”.

²³ Data based on updated statistics from Storm Water Drainage Plan for the Colombo Metropolitan Region – Master Plan (also known as JICA study), Final Report, Volume III, Annex 1, Nippon Koei Co. Ltd, 2002. Percentage of total avoided costs within bracket.

²⁴ The current real GDP growth rate of Sri Lanka is over 8% per annum, and the Western Province has been growing slightly slower than the overall economy.

years).²⁵ Non-structural measures included interventions aimed at improving the capacity of institutions to reduce risks related to floods, such as the development of the Integrated Flood Management System.

B.4 Results and Sensitivity Analysis

11. The CBA is performed with an economic perspective. The unit costs and benefits are converted into “economic” costs and benefits using an Aggregate Conversion Factor applicable for the Sri Lankan economy, estimated based on trade data for the year 2010.²⁶ The flow of costs and benefits are measured for the lifetime of the assets, which is estimated according to the life cycles of individual capital items. The net benefits are discounted using the economic Discount Factor at 10 percent.²⁷ The estimated net benefits are lower bound thresholds since the non-market benefits associated with urban flooding in the CMA could not be estimated. The analysis is conducted for a 40 year period (2011-2051).

12. The overall net flood damage avoidance benefits pertaining to each level of flood are summarized in the Table A.3 below. With the project, the damage caused in the SLLRDC area will be completely avoided up to 50 year return period, while the damaged caused in the CMC area (localized floods) will be completely avoided up to 10 year return period.

Table A.3: Annual Avoided Flood Damage by Flood Return Period (2011-2051)

Flood Return Period (Years)	Avoided Flood Damage (Rs Mn)		
	2011	2051	
		No Climate Change Scenario	With Climate Change Scenario
1-in-2	931	6,558	9,019
1-in-5	1,520	10,770	14,716
1-in-10	2,104	14,811	20,371
1-in-25	3,884	26,656	36,663
1-in-50	6,740	46,031	63,310
Expected damage²⁸	1,062	7,474	10,280

Source: project team estimates based on updated JICA data and CMC data.

13. Over the project period, the expected value of the flood damage avoidance benefit is estimated at Rs 1.1 Billion (US\$ 10 Mn) in 2011, Rs 7.4 Billion (US\$ 66 Mn) in 2051 (without climate change scenario) and Rs 10 Billion (US\$ 91 Mn) (with climate change scenario).²⁹ The 2051 without project damage cost function for the *No climate change* versus *Climate change*

²⁵ The life of the assets is estimated to be 10-30 years depending on the investment types.

²⁶ Trade data sourced from the Annual Report (2010) of the Central Bank of Sri Lanka.

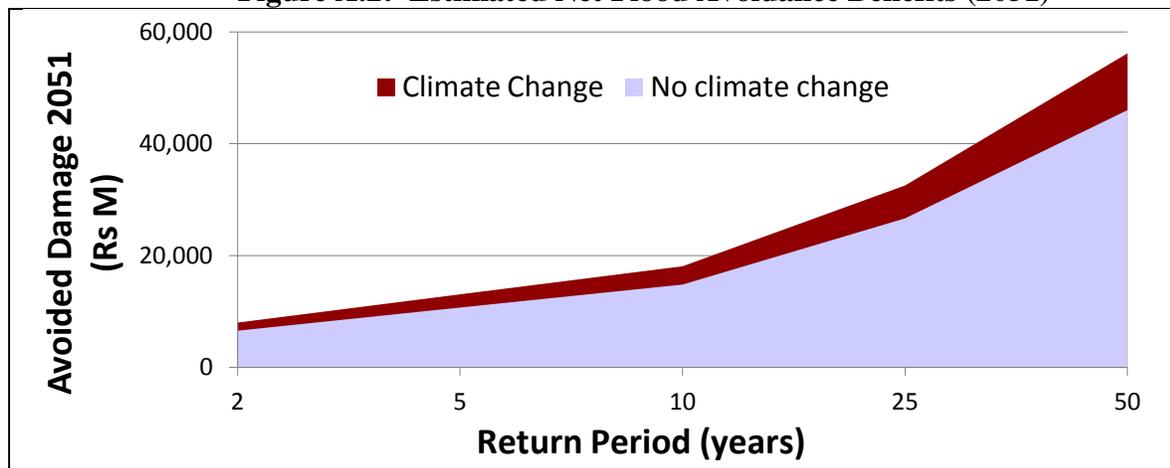
²⁷ Based on World Bank's Handbook of Economic Analysis of Investment Operations, 10-12 percent is traditionally used as a notional figure for evaluating Bank-financed projects. This notional figure is not necessarily the opportunity cost of capital in borrower countries, but is more properly viewed as a rationing device for World Bank funds. A minimum 10 percent discount rate is considered appropriate for the Component I investments, given that an important part of the project benefits are non-market benefits, which could not be quantified.

²⁸ The expected flood damage is equal to the damage costs weighted by the probability of flooding.

²⁹ At the present local currency conversion rate of LKR 113 per US\$.

scenario is presented in Figure A.2, where the difference of height between the two curves corresponds to the flood damage costs associated with climate change for each flood level.

Figure A.2: Estimated Net Flood Avoidance Benefits (2051)



14. The EIRR for the flood control and drainage management program is estimated at 11 percent, and the NPV amounts to US\$ 15.4 million, at a 10 percent Discount Factor. The sensitivity analysis shows that the EIRR remains robust to a number of scenarios such as a 10 percent cost escalation, a 10 reduction in benefits, and to different climate change scenarios. For example, a reduction in the cost increase associated with climate change from 0.8 to 0.5 percent per annum will yield an EIRR of 10.5 percent.

C. Economic Viability of Flood Control and Drainage Management Program - Screening Criteria

15. The CBA will be updated for the entire flood control and drainage management program as soon as the new hydraulic model becomes available. The CBA will be used as a screening tool to (i) identify the flood damage reduction options with the highest economic return and (ii) assess the economic viability of the overall investment program. *An investment program is defined to be economically viable if it delivers a minimum ERR of 10 percent (intangible benefits excluded).*³⁰ The CBA will be based on the results of the new hydraulic modeling. The following guidelines will be applied for the CBA:

- An updated *flood frequency-damage curve*, which relates the costs of flood hazards to the probability of their occurrence, will be developed based on the results of the hydraulic model to estimate the probability of flooding.
- The *tangible benefits*, equivalent to the avoided socio-economic damage costs, will be estimated for (i) the residential sector, (ii) the public sector (urban infrastructure), and the (iii) industrial and commercial sectors.

³⁰ A minimum 10 percent discount rate is considered appropriate for the Component I investments, given that an important part of the project benefits are non-market benefits (e.g. improved environmental conditions) and cannot be quantified..

- The *annual growth of direct benefits* will be estimated, and the expected damage will be adjusted accordingly overtime, due to: (a) the increase of dwellings in the area as well as their contents; (b) the expansion and improvement of non-residential activities; (c) the increase in traffic; and (d) income growth.

Sub-component 1.4– Beira Lake Development and Beddagana Park

16. The main benefits of the Beira Lake Improvement investments (Sub-component 1.4) comprise: (a) the environmental and recreational benefits associated with the improved stability of the embankments and the enhanced accessibility to the lake; (b) the increase in the market value of the land adjacent to the lake.

17. Beira Lake development will have a significant positive impact on the real estate value of the waterfront area, estimated to include 100 hectares of developable land in the immediate vicinity of the lake (the “primary catchment area”). The Beira Lake development is also expected to have a positive impact on real estate value beyond the waterfront area for an additional 250 hectares of land (the “secondary catchment area”).

18. Based on the Beira Lake Business Plan Study/Master Plan,³¹ the entire Beira Lake development, including public and private investments, would add a market premium of Rs 42,970 or US\$ 380 per square meter (at 2010 prices) to current land prices.³² Based on expert estimates it is assumed that the project investments would generate about 10 percent of the estimated market premium in the primary catchment area equivalent to Rs 4,297 (US\$ 38 million), and about 8 percent of the estimated market premium in the secondary catchment area equivalent to Rs 8,594 (US\$ 76 million).³³ The annual benefits (rental values) are estimated at 6 percent of the increase in the market value of the land, in line with conservative real estate estimate for the annual return of investment rental property.

19. The EIRR for the Beira Lake development investments is estimated at 28 percent, and the NPV amounts to Rs 1,979 Mn, or US\$ 18.3 million (at a 10 percent Discount Factor). The EIRR is considered a lower bound estimate since recreational benefits are excluded. The sensitivity analysis shows the estimated EIRR is robust to different scenarios. Benefits need to be 70 percent lower, and costs 130 percent higher, for this Sub-component to yield a negative NPV.

20. The economic benefits of the Beddagana Park (Sub-component 1.4) are mostly environmental in nature, ranging from increase in the recreational value of the park, improvements in the aesthetic beauty of the environment to the preservation of the local ecosystem. The interventions will also contribute to harness the economic potential of Colombo City as a tourist destination. The economic valuation of the sub-project is based on cost effectiveness

³¹ Urban Development Authority (1996).

³² The Beira Lake Business Plan Study/Master Plan calculates the increase in land value as a consequence of a larger set of investments would amount to 42,970 Rs per square meter. According to urban planning specialists, assuming 10 percent of such increase in value is due to the investments in sub-component 1.4 of this project is a conservative estimate.

³³ The annual benefits (rental values) are estimated at 6 percent of the increase in the market value of the land, in line with conservative real estate estimate for the annual return of investment rental property.

given the difficulty of assigning a monetary value to environmental benefits and the small scale of the investment (below US\$ 1 million).

Component 2: Urban development, infrastructure rehabilitation, and capacity building for Metro Colombo local and central authorities.

21. This Sub-component would support small demand-driven infrastructure investments (sub-projects) identified by the four PLAs. The investment sub-projects are classified into the following broad categories:

- Rehabilitation of municipal roads. The main economic benefits comprise improvements in the quality, coverage and efficiency of local provision of streets, and associated reduction in vehicle operating costs and travel time.
- Rehabilitation of drainage infrastructure. The main economic benefits comprise improvement in the quality, coverage and efficiency of local provision of micro-drainage infrastructure.
- Targeted area-based interventions. The main economic benefits are the improvement in recreational value, aesthetic beauty and bio-diversity of local areas.

22. The overall economic rationale of the Sub-component is to support the PLAs in rehabilitating local roads and drainage and basic amenities based on local priorities. The economic valuation is based on the effectiveness and the sustainability of the investments.

- Cost effectiveness is considered the appropriate economic valuation technique since the individual sub-projects are small-scale demand-driven interventions aiming at rehabilitating existing infrastructure, services and areas, as opposed to construct or expand new infrastructure and facilities. Cost effectiveness analysis is required as part of feasibility assessment of each sub-project. The objective of the cost effectiveness analysis is to demonstrate that the selected sub-projects' design option is the most cost effective for a given level of output. The following documentation will be provided to prove that the most cost effective design option has been selected: (i) list of sub-project parameters for which cost effectiveness analysis has been conducted, including justification for the parameters' selection; (ii) comparison of unit costs of project alternatives for each of the selected parameters; (iii) identification of the cost effective solution.

23. The economic sustainability of the rehabilitation investments will be guaranteed through the setting and monitoring of appropriate minimum service standards, the establishment of adequate asset management systems for road and drainage and the provision of equipment and technical assistance for the proper maintenance of the assets.

Annex 8 Technical Annex -Flood and drainage component

SRI-LANKA- METROPOLITAN COLOMBO URBAN DEVELOPMENT PROJECT

BASIN DESCRIPTION AND METEOROLOGICAL AND HYDROLOGICAL CONDITIONS

1. The Greater Colombo Water Basin comprises some 85 km² of land around Colombo. The basin is bordered by the Kelani Ganga in the North, the Weras Ganga in the South-East and the sea (Indian Ocean) in the West. The layout of the basin including the Parliament Lake and surrounding storage areas is shown in Figure 1. The basin slopes from south-east to north-west, with elevations of 10-20 m+MSL in the upper reaches to about 1 m+MSL downstream.



Figure 1 Layout of Greater Colombo Water Basin

2. The hydraulic infrastructure is formed by a micro-drainage system managed by the municipalities of Colombo (CMC), Sri Jayawardenapura Kotte (SJK) and Dehiwala-Mt Lavinia (DML) and a macro-drainage system maintained by the Sri Lanka Land Reclamation and Development Corporation (SLLRDC) under the Ministry of Defence. The micro-drainage system consists of storm water drains that drain to the macro-drainage system of secondary and main canals (see Figure 2). The latter canals drain by gravity north-eastward to the Kelani Ganga via the Madiwela East Diversion Canal (20 m³/s) and North Lock (30 m³/s) in the Saint Sebastian North Canal, westward to the sea via Dehiwala (30 m³/s) and Wellawatta (60 m³/s) outfalls and at its downstream end via the Main Drain through Mutwal Tunnel (5 m³/s) outlet.

Current outlet capacity under extreme flood conditions is estimated at 145 m³/s, equivalent to 147 mm/day of excess rainfall in the basin. Furthermore, water can be discharged to Beira Lake via a pumping station at South Lock in the St. Sebastian South Canal. The installed capacity here is about 3 m³/s, now reduced to 1 m³/s. The storage capacity in the main canals and lakes between normal operation level of 0.8 m+MSL and design level of 1.75 m and 1.85 m+MSL in respectively the canals and Parliament Lake is about 56 mm rainfall equivalent over the basin.

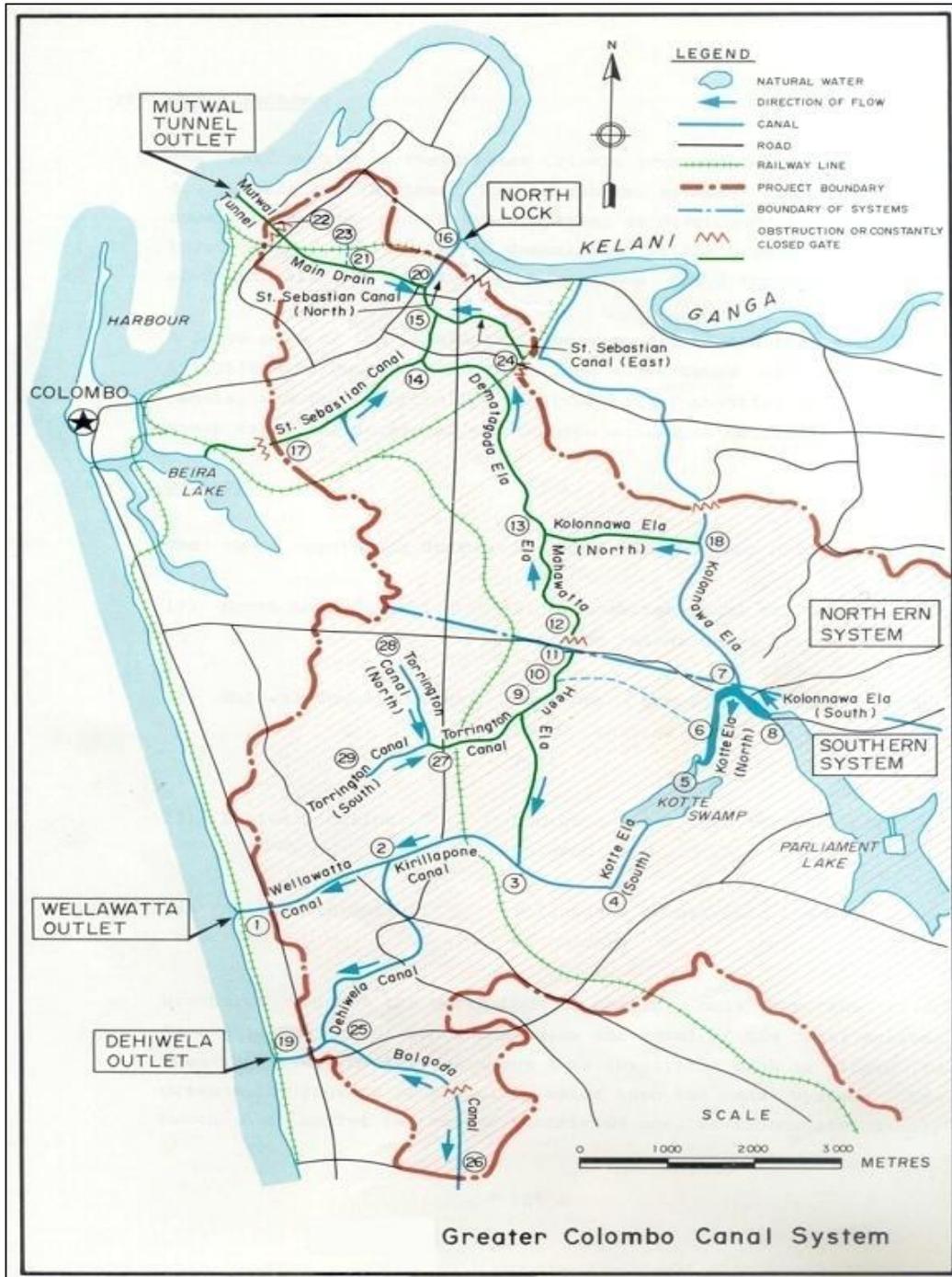


Figure 2 Greater Colombo Canal System

3. Colombo's waste water is discharged through a separate sewerage system having two long sea outfalls, viz. at Mutwal and Wellawatta, operated by the NWSDB. An estimated 60% of the city is connected to this sewerage system; the rest discharges onto septic tanks and the micro-storm water drains; the latter drain finally to the main canals, heavily polluting the system.

4. Colombo is at 7° N and 80° E. At that location the climate is governed by the migration of the Inter Tropical Convergence Zone (ITCZ), creating two principal monsoon seasons: the South-West Monsoon season (SWM) from May to September and the North-East Monsoon season (NEM) from December to February, separated by two inter-monsoonal periods: First Inter-monsoonal Period (FIM) from March to April and the Second Inter-monsoonal Period (SIM) from October to November.

5. The annual rainfall in Colombo on average amounts 2,400 mm. The monthly averages are shown in Figure 3. Highest amounts are seen to occur in April-May-June at the beginning of the SWM and in the SIM from October to November. For Colombo records from 1869 onward show an upward trend for SWM-rainfall, whereas rainfall during SIM is significantly higher in El Niño-years than in La Niña-years (Malmgren et al., 2003). Maximum daily rainfall per month in Colombo follows roughly the same pattern as the monthly averages. Highest values are also found here in the periods April-June and October-November. Whether the above quoted trend and ENSO-effects for seasonal rainfall are also present in the daily extremes is yet to be investigated.

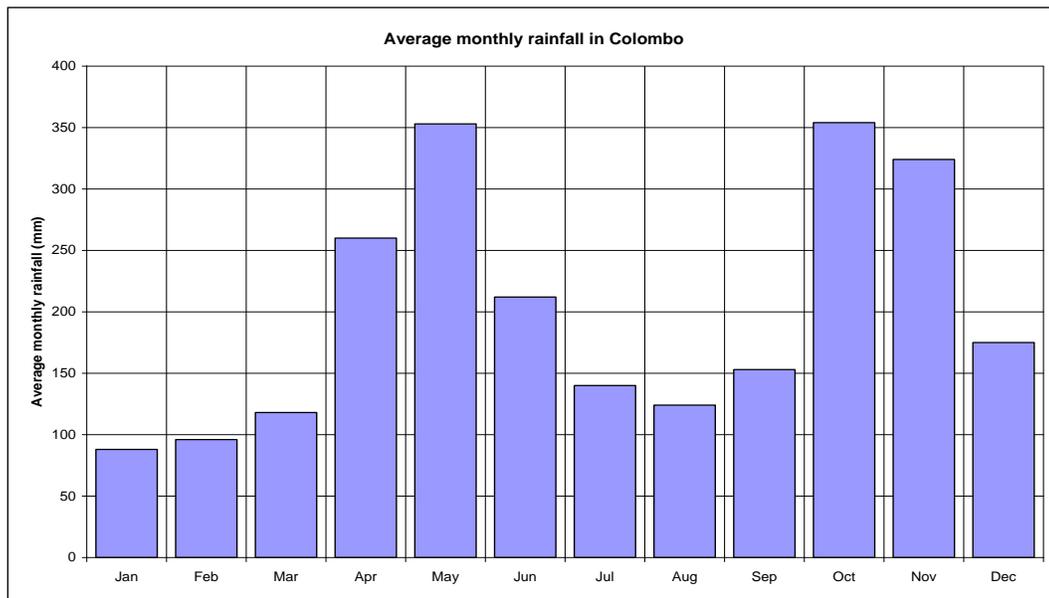


Figure 3 Average monthly rainfall in Colombo (Data Centre/Centre for Climate Change, 2011)

6. During the monsoons the rainfall is generally wide spread, whereas in the inter-monsoonal period storms are convective and limited of extent. It follows that in April-May-June high rainfall in Colombo is likely to coincide with high discharges and associated water levels in Kelani Ganga. In October-November the probability of this coincidence will be small. Hence, gravity drainage from the basin to Kelani Ganga is likely to be possible during SIM, but may be blocked during SWM. This is to be confirmed from Kelani Ganga water level data.

7. Annual maximum daily rainfall amounts for Colombo are available since 1869, see Figure 4. The average annual maximum daily point rainfall is about 150 mm. The annual extremes are generally less than 300 mm except for the values of 1992 and 2010, which years showed daily totals between 400 and 500 mm. It follows that the annual maximum daily rainfall statistics will be sensitive to the period chosen for the analysis. Nippon Koei (2003) in their Master Plan study for the Greater Colombo Water Basin applied rainfall statistics based on records of 4 stations of the period 1970-2000 and used a 50-year return period 24 hour basin design rainfall of 320 mm (Nippon Koei, 2003, Annex 3 Hydrology, page A3-10). In the Master Plan study an hourly rainfall pattern has been assumed scaled from the observed 1999 extreme rainfall event. Prof. S Wijesekera of the University of Moratuwa (pers. comm., 2011) stated that this pattern leads to serious underestimation (40% less) of the required outlet capacity for the city.

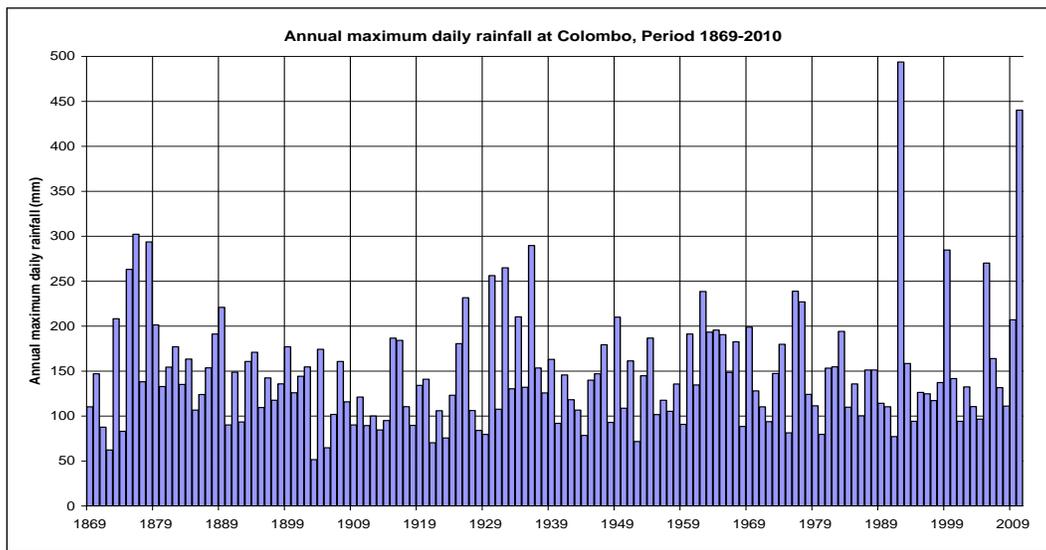


Figure 4 Annual maximum daily rainfall in Colombo, Period 1869-2010

8. The changed rainfall conditions have impact on the rainfall statistics. In Figure 5 the 2 to 100 year return period annual maximum daily rainfall values for Colombo are shown for 30 years periods shifted each time 10 years forward as a kind of a 30-year moving average. The estimates are based on the General Extreme Value (GEV) distribution with its parameters estimated by Probability Weighted Moments (PWM). It is observed that the statistics show some periodicity, with a clear deviation for the last 40 years, particularly for return periods of 25 years and higher. From this figure it seems prudent to use only the last 30 years to develop rainfall statistics representative for the current conditions. The rainfall statistics of the period 1981-2010 lead to a 50-year return period annual maximum daily point rainfall of 473 mm, which is equivalent to a 24-hour basin rainfall of 450 mm (areal reduction factor of 0.84), i.e. 40% higher than used by Nippon Koei in their Master Plan Study of 2003 mentioned under 6. The difference with the current practice is even larger. The rainfall statistics used by CMC and SLLRDC are based on the records of 1960-1985, analyzed by Dharmasena and Premasiri (1990), transferred to IDF-curves by Ranatunga (2000) and applied in the study on the Outer Circular Highway to the City of Colombo (2005). For a 24 hour duration the period 1981-2010 leads to an 88% higher

50-year return period rainfall for Colombo than indicated in the cited studies. It follows that the changed rainfall conditions have very serious consequences for the designs.

9. Some cautioning with respect to rainfall maxima is required. Angoda rain gauge station (near the outlet of the Madiwala East Diversion Canal to Kelani Ganga) revealed that the applied standard rain gauge can catch only up to 300 mm of rain per day; higher amounts would overflow the gauge. It is to be sorted out whether this applied for Colombo as well in the early years of operation of this station. Also the environs of the station were not in accordance with the WMO standards for rain gauges. An under-catch at Angoda is likely.

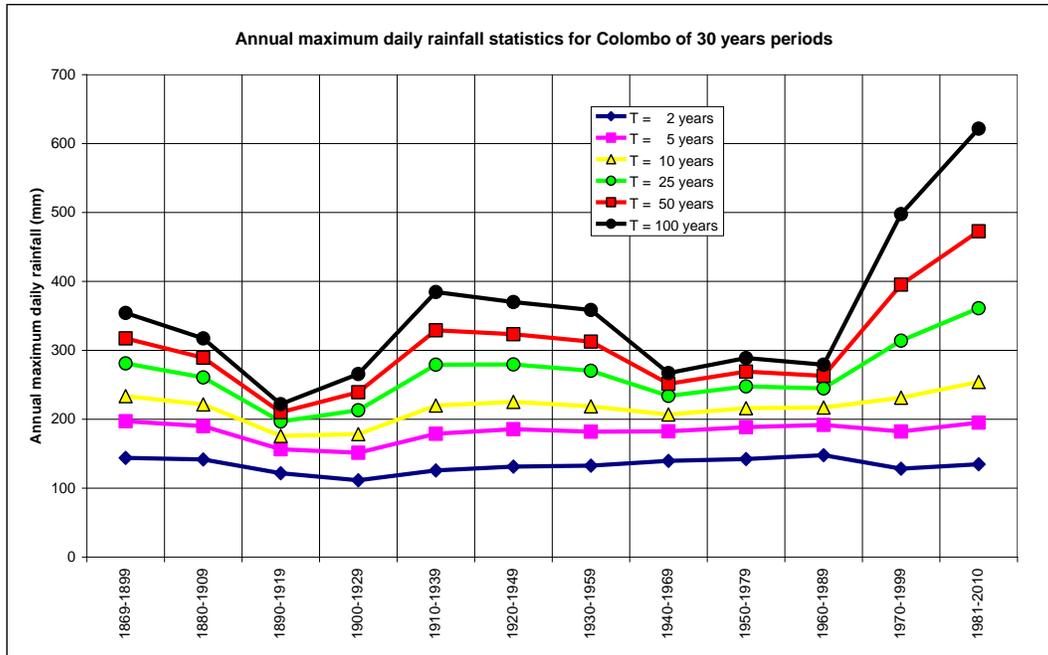


Figure 5 Annual maximum daily rainfall statistics for Colombo for overlapping 30 year periods from 1869 to 2010

10. CMC applied for their design of the micro drainage system the Rational Method, using a design storm of 50 mm/hr. Recently, a 10 year return period design rainfall is being used in the designs to which intensities ranging from 80 to 100 mm/hr are attached. These latter short interval rainfall statistics are based on the data by Humphreys of the period 1921-1967 (Nippon Koei, 2003) and Dharmasena and Premasiri (1990), using the period 1960-1985 and do not include yet the last decade. According to mr.L. Chandrapala, director of the Department of Meteorology of Sri Lanka (pers. comm., 2011), short interval intensities seem to have gone up in the last decades but detailed analyses are lacking. In 7 it was shown that for 24-hour rainfall the used statistics strongly underestimate the current rainfall conditions. To what extent this applies to short duration rainfalls is being investigated. Paper chart records of the period 1981-2010 of the pluviograph of Colombo have been digitized for that purpose.

11. No quantitative precipitation forecasts are being made by the Department of Meteorology. According to the Department such forecasts would be of little value as these would be highly inaccurate for convective storms with very small lead time. At Gongula, south of

Colombo the establishment of a 2800 MHz Doppler radar is planned, which is expected to improve the rainfall measurements also over Colombo.

12. Colombo is protected against flooding from Kelani Ganga by bunds. Bunds are available on both sides of the river, but the left bank (Colombo side) is higher than the right bank bund. Between the river and the bund an unprotected detention area is existing, which capacity has diminished by illegal settlements. Kelani Ganga discharges and water levels are observed by the Irrigation Department. Discharge series is available from station Hanwella u/s of Colombo covering some 30 years of data. River water levels at Colombo are available from a recorder at Nagalagam Street (North Lock). The concentration time in the Kelani Ganga basin is 12 hrs. Water level forecasts are made 6 hrs in advance. The quality of the data is to be assessed. Sedimentation in the lower reach of Kelani Ganga is not occurring. A lot of sand mining is said to take place.

13. The sea water level is recorded by a German made autographic water level recorder, which was installed around 1974 at the Colombo Port and the gauge is operated by the Sri Lanka Ports Authority (SLPA) . No information was available about earlier measurements. Tidal variation at Colombo is about 1m and the levels deviate only slightly from the astronomical tide. In December 2004 the recorder was overtopped by the tsunami, reaching a level of about 2.15 m+LWOST. The recorder was found in good condition, though an outside staff gauge was missing to check the connection of the stilling well with the sea. The intake pipe was said to be cleaned regularly. Next to the recorder a benchmark is available at level 1.139 m+LWOST. Records for Colombo are available since 1946. Levels are archived relative to LWOST, which differs 0.43 m with MSL. The continuous graphical record is manually tabulated into 15 minute water levels, which have not been digitized.

14. The bed levels at the outfalls are surveyed by the SLLRDC. Nippon Koei (2003) mentioned that in the dry season sedimentation at Welawatta outfall takes place in the aftermath of the construction of groins at the Dehiwala outfall. SLLRDC disputes this statement.

CAUSES OF FLOODING IN MACRO AND MICRO-DRAINAGE SYSTEMS

15. Floods in Colombo are caused by heavy rainfall on a drainage system with insufficient storage, conveyance and outflow capacity, to be elaborated below.

16. Severe flooding have taken place in the Greater Colombo Water Basin in the last few decades, particularly on the following days:

- 4-5 June 1992, when a rainfall amount of 494 mm in 19 hrs was recorded, with maximum clock hour intensities up to 90 mm/hr.
- 13-21 May 2010, when in 9 days 616 mm was recorded, though the daily value never exceeded 155 mm/day nor did the hourly rainfall exceed 56 mm/hr.
- 10-11 November 2010, when 440 mm was recorded in 16 hrs, with hourly values up to 123 mm/hr.

17. Storage capacity in the basin has reduced considerably in the last decade due to uncontrolled landfill and flood plain encroachments by illegal settlements. In the Nippon Koei Master Plan a storm water retention area of 382 ha was envisaged and acquired by SLLRDC, which has diminished to at present 268 ha, a reduction of 30%. These landfills and illegal settlements still seem to be continuing though with demarcation of the retention areas by secondary canals SLLRDC tries to eliminate/discourage such activities.

18. Conveyance capacities of the canals are limited by solid waste, floating debris and bottlenecks in the canals. A number of sewers are discharging to the canals creating floating waste and depositing waste on the river bed. The waste is regularly removed and dumped at different locations on the canal banks, though waste dump areas have recently been allocated. Floating debris generally originates from the detention areas, but is collected behind informally constructed structures in the canals. This doubles the wetted perimeter at those sections and hence reduces the hydraulic radius and so the conveyance capacity considerably. A number of hydraulic bottlenecks have been identified in the canals, like encroaching structures, unguided bridge piers and rock outcrops limiting the conveyance of the flow.

19. The outflow capacity of the drainage system is too small, particularly in the north. The existing Mutwal tunnel outfall has a limited capacity, which was earlier further reduced by rock in the outlet. The capacity of the North Lock sluice at the outlet of St. Sebastian North Canal to Kelani Ganga is inadequate, which was particularly felt during the November 2010 flood. The capacity of the pumping station at South Lock in St. Sebastian South Canal, which drains to Beira Lake, is reduced to 30% of its original capacity as only one of the three pumps is operational. A pumping station was needed here as Beira Lake is operated at a higher level (1.85 m+MSL) than the canal (0.80 to 1.75 m+MSL).

20. The outflow from the basin is further limited for monsoon season floods. Then the probability that high rainfall amounts in the city coincide with high levels in Kelani Ganga is high. When this occurs discharge via North Lock is not possible.

21. Beira Lake discharges via a fixed circular weir the excess rainfall of its own basin, further enlarged by inflow from Norris Canal and pumped inflow from St. Sebastian Canal. The water quality of these inflows is extremely poor. The Mission identified these canals as heavily polluted open sewers.

22. Quality of the water at a number of locations in the canal system is extremely bad. This poor quality will aggravate the occurrence of floods by spreading diseases in inundated areas. Consequently, water quality management should therefore be integrated in the design of efficient flood mitigation measures for Colombo.

23. Localized floods are regularly taking place in the micro-drainage system, operated by the municipalities of Colombo (CMC), Kotte and Mt Lavinia. E.g. CMC counted 45 flood prone areas. Main problem is unauthorized constructions and waste dumps obstructing c.q. blocking free flow. Manual desilting takes place. According to CMC only 60% of the system functions well. The functioning of the remaining 40% is problematic due to understaffing and lack of funds. During major floods which affect the macro-system as well, backwater from the main canals impedes the drainage from the micro-system also. Furthermore, short duration rainfall amounts were said to have increased in the past decade.

24. Climate change will aggravate the flood conditions in the Greater Colombo Water Basins as current rainfall trends hint at larger rainfall amounts in future, particularly in the Second Intermonsoonal period, while sea level rise will further impede gravity drainage. To cope with climate change the designs will be based on updated rainfall statistics using the data of the most recent decades, projected forward based on existing trends. Changing sea level boundary conditions are dealt with by applying recent updates of IPCC on sea level rise, as is common engineering practice nowadays. Sensitivity analyses, including predictions on possible future state of the boundary conditions from latest studies will be carried out. Note, however, that coastal flood defences, which may be further threatened in future by increasing levels at sea and changing wind/wave climate, are not part of the project

FLOOD DRAINAGE AND MANAGEMENT PLAN

25. A number of storm water drainage and water quality studies have been carried for the Greater Colombo Water Basin of which an overview is given in “Proposed Remedial Measures for Floods in the City of Colombo” (SLLRDC, March 2011). Reference is usually made to the Nippon Koei (2003) Master Plan study. This study applies a 50-year return period daily basin rainfall and assumes an allowable water level in the canals of 1.75 m+MSL and 1.85 m+MSL in the Parliament Lake. The plan further assumed a 10-year high water level in Kelani Ganga, making drainage via North Lock impossible, and a statistically unspecified but fairly high tide at sea. The study investigated 24 alternatives and finally proposed the following measures as most feasible:

- Drainage of the south-eastern part of the basin to Weras Ganga via the construction of a Madiwela South Diversion Channel
- Restoration of the existing Mutwal tunnel to 5 m³/s
- Construction of a new Mutwal tunnel with a capacity of 15 m³/s, and
- Storm water retention area of 380 ha.

26. During this period only the existing Mutwal tunnel has been restored, but not its outfall, and the total retention area has reduced to 260 ha. Furthermore, in this study capacities have been assigned to canals, like the Madiwela East Diversion Canal, which seem to be too high. This casts doubt on the adequacy of the proposed measures even when the required storm water retention area would have been available. Recent projects comprised dredging of retention ponds around Parliament Lake and raising of the spill level of the causeway at Awerihena Tank to reduce to inflow to Parliament Lake.

27. SLLRDC has proposed a number of short term and long term flood management measures for their macro-drainage system, including (see also Annex 2 under 6):

A. Improvement of Primary and Secondary Canals and Lakes, including:

- (a) In and around St. Sebastian Canal, Main Drain and Dematagoda Canal:
 - (i). Protection/rehabilitation of canal banks and clearing of reservations
 - (ii). Upgrading of gates and construction of a pumping station at North Lock
 - (iii). Construction of St. Sebastian South Diversion Canal
 - (iv). Rehabilitation of Aluth Mawatha culvert, Mutwal Box Drain and Mutwal Tunnel inlet and outlet
 - (v). Construction of a new Mutwal Tunnel
- (b) Welawatta and Dehiwala Canals
 - (i). Protection of canal banks and clearing of reservations
 - (ii). Removal of rock outcrops Dehiwala Canal
 - (iii). Widening of Galle Road Bridge across Welawatta Canal
- (c) Madiwela East Diversion Scheme:
 - (i). Enlargement of capacities of Talangama Tank spillway and Amaragoda culvert

- (ii). Rehabilitation of bank protection of Madiwela East Diversion Canal
- (d) Restoration and creation of retention areas around Parliament Lake
 - (i). Creation of Lakes No 6 and 7 with outflow control structure
 - (ii). Creation of Lakes No 1, 8 and 10
- (e) Restoration of Kollonawa retention area
 - (i). Construction of gate and pumping station at Gotatuwa
 - (ii). Restoration of retention area
- (f) Improvement of secondary canals, including:
 - (i). Rehabilitation of canal banks and improvement of culverts of Sethsiripaya and Sarana Mawatha Canals
 - (ii). Rehabilitation of banks of Poorwarama and Sri Wickrama Canals
 - (iii). Interception of sewerage of canals draining to Beira Lake to improve the water quality

B. Capacity enhancement for Flood and Drainage Management

- (a) Improvements along canals and in retention areas
- (b) Provision of construction machinery and equipments for maintenance and computer hardware and software
- (c) Development of an Integrated Flood Management System including a.o. real time water quantity and quality monitoring.

28. With respect to implementation of these projects following has to be taken into consideration:

- a. The time window for implementation along canals may be limited to the periods January-March and July-September in view of the expected flow conditions in the canals.
- b. Bank protections should not all be carried too early to ensure the availability of sufficient funds in the Project to implement the drainage capacity and retention improvements; bank protections improve maintenance conditions but not the drainage capacity.

29. The strategy for the south-eastern part of the basin is to increase the storage capacity and to divert all water via the Madiwela East and South Diversion Canals to limit the inflow to Parliament Lake. This will substantially reduce the basin area draining towards the lake and the north-western and western outfalls, see Figure 6. The implementation of the Madiwela South Diversion Canal is assumed to be taken up before long in a Chinese Project and is not to be financed through this project. The east diversion is supported though additional measures will be required to achieve full diversion, including a flood gate in the weir of Thalangama Tank to the Link Canal, further heightening of the causeway at Awerihena Tank, maintenance of the outlet canal of Awerihena Tank to enlarge its capacity and re-evaluation of the capacity of reaches of the Madiwela East Canal to ensure that all flood water of the north-eastern part of the basin can be conveyed. The present capacity of the Madiwela East Diversion Canal seems rather

undersized also due to collapsed banks and this may cause backwater on the weir at the outlet canal from Awerihena Tank, thereby reducing the outflow capacity



Figure 6 Diversion of south-eastern part of Greater Colombo Water Basin towards the Madiwela East and Madiwela South Diversion Canals

30. The strategy to create lakes/retention areas around Parliament Lake to, apart from recreational purposes, delay the inflow to the Parliament lake is essential to regain some of the storage capacity in the drainage system. Storage of water in the upper reaches will stretch the base of the outflow hydrograph and hence will reduce its peak discharge value. By controlling the outlet of the Baddegana Park this area will also enlarge the retention capacity of the basin.

31. Removal of bottlenecks in the system in the downstream reaches is essential to maximize the conveyance capacity of the canals. Rock outcrops are to be removed, canal banks to be improved, bridges are to be streamlined as much as possible, floating debris (water hyacinth) is to be blocked at the source, i.e. at the outlets of the retention areas, and waste dumps on the canal banks are to be eliminated by transfer of the material to the allocated places.

32. The originally proposed rehabilitation of South Lock pumping station has been re-evaluated. In view of the poor water quality in the St Sebastian Canal this water should not be pumped into the Beira Lake. Instead it is now proposed to connect the St. Sebastian Canal directly to the sea partly by a tunnel parallel to the railway tracks, see Figure 7. The northern fingers of the Beira Lake can be filled and developed to avoid wider sections in the proposed canal outlet to

eliminate sedimentation problems in that reach. This can be integrated in the beautification of Beira Lake. Also the southern railway track should be re-aligned north-eastwards to make space for development.

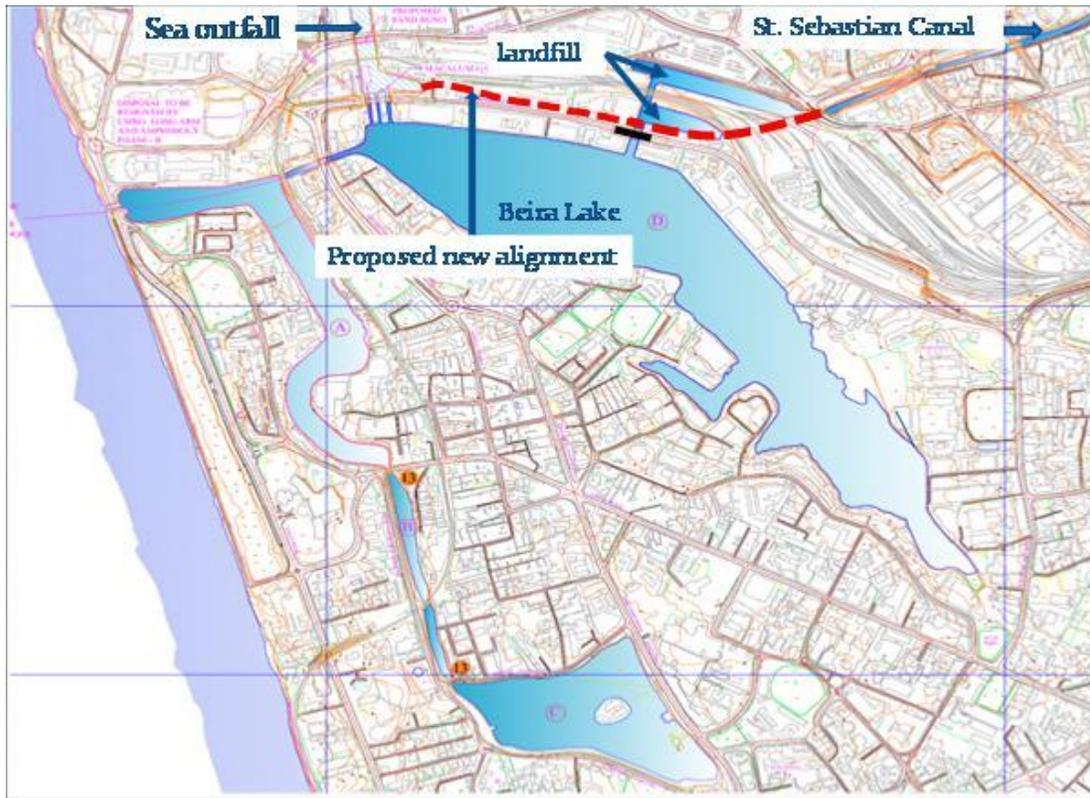


Figure 7 Proposed alignment of St Sebastian South Canal

33. In view of the enlarged outflow capacity proposed in the previous paragraph at South Lock the required capacities of the proposed outlet structures at Mutwal, pumping stations at North Lock and Gotatuwa have to be re-evaluated for favorable and unfavorable flood conditions on Kelani Ganga and their role in improving water quality conditions. It is essential that water quality improvement is integrated in the proposed flood management measures. This may require additional gates in the canal system to be able to direct fresh water flows through the canals. A pumping station at Gotatuwa should be combined with a flood gate to reduce power use.

34. The improvement of McCallum lock gate at Beira Lake is part of the Beira Lake Development included in the Metro Colombo Urban Development Project.

35. The dredging and widening of secondary canals would require a more detailed evaluation on their hydraulic and social impacts. Enlarged capacities of canals upstream may not be beneficial further downstream, as it reduces the base length of the flood hydrograph.

36. The introduction of a real-time water quantity and quality monitoring system for the canal system of Colombo is an essential and indispensable tool for management of the water quantity and quality not only in times of flood but also during low flows. This system can provide input to the modeling system presented in paragraph 36 to assist in selecting best management options.

This system is a part of an Integrated Flood Management System (IFMS) which will also include monitoring and management of the retention/wetland areas, O&M system for wetlands, canals and drainage systems, monitoring and enforcement of land-use planning to safeguard the capacity of the basin to cope with floods, inter-agency coordination protocols and mechanisms.

37. CMC identified 45 flood prone areas where flooding is regularly taking place. The main problems that cause recurrent flooding can be identified in a combination of (i) unauthorized constructions on and along drainages, (ii) dumping of waste in the drainages, obstructing/blocking free flow, (iii) backwater from the main canals system during major floods impedes the drainage also, and (iv) lack of regular maintenance and cleaning of the drainage system. Furthermore, short duration rainfall amounts were reported to have increased in the past decade. CMC has proposed 15 projects under Component 1 for their micro-drainage system, listed in their document of 24 May 2011 “Proposed Remedial Measures for Floods in the City of Colombo”. The 15 projects have been listed in Annex 2 under 8.

38. The CMC Projects have been discussed and suggestions have been made on clubbing and sequencing of implementations. The Projects 8.2 - Prevention of flooding along K.Cyril. C. Perera Mw from George R. De Silva Mw up to Arthur De Silva Mw. Junction -, 8.4 - Prevention of flooding at Amour Street, Sangaraja Mawatha, Jethawana Road opposite Diesel and Motor Engineering (PCL) and Prince of Wales Avenue - and 8.5 - Prevention of flooding at Green Lane, George R. de Silva Mw and Ratnam Play Ground Area - have to be considered together. These areas drain to the Main Drain via the Bloemendahl Canal, but an alternative could be drainage via a connection to St. Sebastian South Canal. Implementation of the Marine Drive Projects (8.15) is clubbed in two groups: sub-catchments 2, 4 and 5, and sub-catchments 1, 3, 6 and 7.

CAPACITY ENHANCEMENTS REQUIRED - INSTITUTIONAL

39. Currently, there is no urban drainage model available and the hydraulic model of the canal system needs to be updated with GIS tools to quantify the flooded areas in extent and depth. There is an urgent need for the development and use of a flexible user friendly up to date urban drainage and updated canal system model of Greater Colombo Water Basin:

- (a) to evaluate the micro-drainage system capacity and its shortcomings;
- (b) to assist in the design of new and improvements of existing drainage conduits;
- (c) to determine the inflow (in terms of water quantity and quality) to the secondary and main canals of the macro-drainage system as a function of present and future land use and capacities of the micro-drainage hydraulic infrastructure;
- (d) to determine the required capacities of the canals, storage areas, outfalls and pumping stations;
- (e) to simulate the extent flooding under current and future conditions of land use and hydraulic infrastructure for selected combinations of rainfall, river stages and tide;
- (f) to design effective flushing strategies for water quality improvement in the canals;

- (g) to assist in the operational management of the micro and macro-drainage infrastructure by using input from the proposed monitoring system.

40. The updated canal system hydraulic quantity and quality model will include:

- (a) Update of the storage capacities of the retention areas from a new DTM, to be obtained by LIDAR survey, in GIS;
- (b) Latest canal and outfall dimensions obtained from echo-sounder measurements and hydrographic surveying;
- (c) Appropriate inflow hydrographs based on the hydraulic characteristics of the micro-drainage system;
- (d) Representative boundaries on Kelani Ganga and at sea;
- (e) Reviewed design rainfalls (frequency and time-distribution), accounting for joint occurrence with Kelani Ganga water levels and the tide at sea.

41. The development of the urban drainage and canal system model requires for its set up, calibration/verification and application the following activities:

- (a) Development of an accurate digital terrain model of the basin, using LIDAR technology. Latest topographical data is available from photogrammetric surveys carried out in 1999 and does not include latest landfill developments. Based on this survey maps were made with 1 m contour interval. In view of the flatness of the terrain a higher accuracy is required. LIDAR technology claims accuracies up to 5 cm vertically. Similarly maps of current and future land use are to be prepared in GIS. This will also require input from Survey Department.
- (b) Digitization of the micro-drainage infrastructure, from presently available hardcopy drawing into GIS needs to be carried out urgently. A very large number of maps are to be digitized with the aid of hired skilled. .
- (c) Purchase of echo-sounders to survey the canals and outfalls.
- (d) Acquire needed updates of Mike software, including Mike Urban and Mike GIS.
- (e) Update the short duration rainfall statistics (15 minutes to 4 days) for Colombo based on the records of the years 1981-2010. This activity is to be carried out in close collaboration with the Department of Meteorology.
- (f) Acquire water levels and discharge series of Hanwella and Nagalagam Street from Irrigation Department of the period 1981-2010, daily rainfall data from Department of Meteorology for the same period, as well as the tidal levels for this period from the Ports Authority. Determine their marginal and multivariate distributions for input in the assessment of flood damages and design of flood mitigation measures.

42. Development/upgrading of the hydrologic-hydraulic models of the micro- and macro drainage systems will be guided by an international drainage expert with experience in advanced modeling for urban drainage and canal systems and in GIS applications. The consultancy for the guidance of the development of the models started its activities mid-December 2011.

Annex 9: Profile of Project Local Authorities

SRI-LANKA- METROPOLITAN COLOMBO URBAN DEVELOPMENT PROJECT

The Economy

1. Colombo being a port city; the four PLAs have a substantial industrial base given the close proximity to the port. In CMC, the majority of economic activity is centered on wholesale and retail trade, which makes up 67% of the commercial activity. Rentals and business activities make up about 8% of all commercial activity, while 7% is transport, storage and communication related services. There are approx. 2383 industries located in the CMC area that employ close to 97,904 persons. SJKMC industrial base has declined as it has become more residential in nature. Nonetheless, there are a total of 66 industries³⁴ classified as large scale, with another 426 classified as small scale. Given the rapid growth in residential land use in the area, the number of business registered annually is approx. 2845. KUC which is in close proximity to the port has a large number of warehouses. It has 41 industries registered in the Urban Council area, with the main industries being the Ceylon Petroleum Corporation and Ceylon Electricity Board whose power houses are located in KUC. DMMC has the largest number of industries located within its limits given that the area was designated for industrial activity in the 1949 Abercrombie plan. There are 225 industries currently located in DMMC. 140 are large scale industries. Tourism and the hotel industry contribute towards DMMC economy as well. The National Zoological Gardens, located in DMMC receives about 1.2 million visitors annually.

Economic Drivers and Potential

2. Colombo's port is the main economic driver for CMC. The port has seen an increase of 8.4% in the volume of containers handled in the first quarter of 2011³⁵. The tourism sector has potential, but the city lacks good entertainment and shopping facilities to compete with other major cities in the region. Business Processing Operations (BPOs), IT based businesses and finance are the current economic drivers of the city. There is an increased demand for office space within the CMC limits which it lacks, thus resulting in the conversion of residential space to business or retail.

3. Given the large number of residences in SJKMC, retail and banking outlets have increased in this municipality. The majority of business is service and retail oriented. In 2009, a total of 1005 service related businesses were registered.

4. DMMC has seen a decline in its industrial base as most have moved to where production costs are lower. Thus leading to a loss in revenue from property tax. Commercial establishments in the form of retail outlets have increased with the large residential population. The tourism sector is expected to develop as UDA has designated the area along the coastline for tourism. With the extension of the Marine Drive to DMMC, the area will see a change in its land-use pattern along the coastal belt. In addition, a new industrial zone has been established comprising of 25 factories.

³⁴ Sri Jayawardenapura-Kotte Divisional Secretariat Profile, 2009.

³⁵ www.island.lk, 16th May, 2011.

5. KUC has seen an increase in retail trade. Given the land constraints in the urban council, it is unable to attract large industries. The main economic driver is the CPC in terms of its tax contribution. In addition, there 30-40 factories located in KUC that contribute towards its economy in the form of employment opportunities.

PLAs Capacity

6. All four PLAs do not have adequate staff to provide efficient service delivery. CMC, DMMC, and SJKMC require staff for operation and maintenance activities, while KUC requires skilled administrative staff. In addition, the lack of equipment in good condition, especially for services such as solid waste management, septage removal, roads and drainage have lead to the weak operation and maintenance of these services. All four PLA’s highlighted the need for computerized systems, especially for asset and inventory management, and integrated GIS systems. A computer network is also required to ensure better coordination and communication among departments in the PLAs. These systems would also require IT units for the daily operation and maintenance as well. In terms of capacity, CMC is the only PLA which has the staff skills and capacity to manage a GIS system as it is currently in the process of digitizing current land use maps and drainage systems. DMMC, SJKMC and KUC would require capacity building before an integrated GIS system is introduced. KUC has the least amount of staff capacity especially to oversee projects in roads and drainage as it has one technical officer, while DMMC, SJKMC and CMC have chief engineers.

Service Delivery and Constraints of Participating PLAs

7. **Water Supply:** In all four PLA’s operation and maintenance of water supply assets has been transferred to the National Water Supply and Drainage Board (NWSDB), which is the central government agency responsible for water supply. At the local authority level, PLAs are only responsible for the maintenance and operation of public standpipes, which are being gradually phased out by NWSDB in order to reduce the non-revenue water supply cost. Coverage in the PLA’s are 94% in Sri Jayawardenapure-Kotte (SJKMC), 99% in Kolonnawa Urban Council (KUC) and 100% in Colombo (CMC) and Dehiwela-Mount Lavinia (DMMC). The main constraints are the low pressure due to systems that are about 100 years old (CMC), inadequate transmission, water leaks and illegal connections. There is also a lack of coordination especially among SJKMC and KUC with the NWSDB, which leads to higher costs for all agencies.

8. **Urban Roads:** The PLA’s are responsible for the maintenance and operation of roads designated as municipal roads, while Road Development Authority and the Provincial Road Development Authority are responsible for main arterial roads that run through the PLA’s. Although there are categories of roads that come under three separate agencies, PLA’s such as CMC do maintain all roads within the municipal limits regardless of which agency it belongs to.

Table 1: Lengths by Ownership of Urban Roads within PLAs.

	CMC	DMMC	SJKMC	KUC	Total 4 PLAs
PLA owned (kilometers)	412.00	226.00	127.27	17.15	782.42
Owned by RDA and PRDA (kilometers)	68.00	40.00	255.81	3.00	366.81
Total (kilometers)	480.00	266.00	383.08	20.15	1,149.23

9. The main constraints faced by PLAs are the lack of sufficient cadre for Operation and Maintenance (O&M), lack resources such as new technology, design software and lack of funds to replace old equipment.

10. **Drainage:** PLA's have a moderately good network of drains that include both open and closed storm water drains. Some of these drains feed into the main canal network within the CMR. De Jure law of the PLA's provide the power to plan, lay, operate and maintain drains within the municipal and urban council limits. However, in practice PLA's tend to maintain drains that are located alongside road networks owned by the local authority (i.e. KUC). Main constraints faced by PLA's are lack of sufficient cadre for O&M, insufficient capacity of current drainage system, lack of technology (i.e. GIS systems), unauthorized structures built over drains making O&M difficult, and resources to upgrade and construct new drains. The drainage in CMC also has cross connections between the sewer and storm water drainage system leading to cross contamination of water bodies. During heavy rains flood occurs in various location in all four PLA's. For instance, in CMC floods occur in 45 locations, SJKMC has 10 locations which get flooded and KUC has identified 5 locations affected by floods.

11. **Sewerage and Sanitation:** Except for CMC who still manages its own sewerage assets, SJKMC, KUC and DMMC have transferred all sewerage assets to NWSDB for operation and maintenance. In terms of public sanitation, all four PLA's to varying degrees still maintain and operate public sanitation facilities that tend to cater mainly to under-served settlements. All four PLA's sanitation coverage is about 100%, with the majority of households using septic tanks. Sanitation coverage for 80% of properties in CMC are connected to a sewage scheme, while the balance 20% use septic tanks. In terms of septage removal, the PLA's are responsible for operation and maintenance, given a large number of households use septic tanks. Main constraints faced by PLA's are old and dilapidated systems that need replacement (i.e. CMC), lack of skilled staff to operate and maintain new technology, lack of updated equipment and resources.

12. **Solid Waste Management:** All four PLA's are responsible for collection and transportation of solid waste within the local authority limits. CMC and KUC share a disposal site that is operated and maintained by the former, while DMMC and SJKMC dispose waste at a Waste Management Authority disposal site. The main disposal method is open dumping as no sanitary landfill exists. This is a need that the PLA's have collectively voiced is urgently needed as population increases in the CMR. PLA's on a pilot basis have started recycling and composting centers. KUC has constructed a compost site with assistance from the Government's *Pilisaru program*, adjacent to the current disposal site.. CMC collects on average 700-750 metric tons; SJKMC collects 100 metric tons, DMMC approx. 145-150 metric tons and KUC 36 metric tons per day.

Table 2: Daily Solid Waste Collection by PLAs.

PLA	Area Covered (Km ²)	Average Daily Solis Waste collected (Metric Tonne)
CMC	37.31	700-750
SJKMC	17.04	100
DMMC	27.17	145-150
KUC	10.06	36

13. Except for KUC, the three municipalities of CMC, SJKMC and DMMC have outsourced collection and transport of waste to private companies. However, this has added to the operation and maintenance cost of the PLA's as private companies are paid for these services. No user fees are charged as costs are covered by the property assessment tax. All four PLA's main constraint is the disposal of waste, given that current locations are reaching its capacity (i.e. CMC and KUC waste disposal site has a capacity of 800 metric tonnes, and is projected to reach its limit in the next two years). In addition, PLA's face constraints in the form of old machinery and equipment that needs replacement, lack of resources and staff.

14. **Recreation:** All four PLAs are responsible for the operation and maintenance of parks, playgrounds, reception halls and community halls that fall within the administrative limits. In the case of CMC, Gall Face Green which comes within its municipal limits is now owned and operated by the Urban Development Authority. CMC has outsourced some of its larger playgrounds to private clubs for operation and maintenance for an annual fee. Access to parks and playground for the general public is free of charge. Only large events at playgrounds are charged a fee for usage. In terms of reception halls, all four PLA's charge nominal fees. PLA's such as DMMC and KUC provide gym's at nominal rates as well. The main constraints faced by the PLA's are the lack of sufficient cadre for O&M, current staff being close to retirement, lack of resources for capital investments and daily O&M costs. For CMC in particular, the fragmentation of responsibilities among several divisions within the CMC has created obstacles for efficient operation and maintenance.

Table 3: Distribution of Recreation Spaces within PLA's.

	CMC	DMMC	SJKMC	KUC
Children's Parks	36	11	18	2
Playgrounds	37	12	7	3
Sports Complexes	1	-	-	
Pavilions		9	-	2
Reception Halls	32		3	2
Community Halls	58		1	11
Gyms	-	16	12	2
Other	-	1	1	-

15. **Public Lighting:** All four PLA's are responsible for the operation and maintenance of street lights within their administrative boundaries. In terms of coverage, the majority of public streets have lighting in the four PLAs. As electricity comes under the Ceylon Electricity Board (CEB), one of the main constraints faced by the PLA's is approval to install new street lights has to be obtained from the CEB. Currently, the CEB does not approve new street lights. As the city grows, the demand for increased illumination on streets increases. In practice, PLA's operate existing street lights and maintain the fixtures. Constraints faced include the need for an automated system, lack of sufficient staff for daily O&M, insufficient illumination in the city.

16. **Public Transport:** While De Jure laws provide the PLAs with the ability to maintain and operate their own public transport systems, in practice this is no longer done as public transport comes under the Central Government.

17. **Welfare Services:** PLAs operate and maintain crematoriums, cemeteries, public markets, libraries and public health services. User fees are charged for these services, but are nominal and not adequate to cover all operation and maintenance costs. By law, PLAs are responsible for overseeing the public health of its residents, and includes the inspection of premises, businesses and any nuisances that can cause negative impacts on the city's population. PLA's not only have powers vested under the Municipal and Urban Council laws for public health, but also under the Food Act, Nuisances Ordinance and the House and Town Improvement ordinances. Public Health Inspectors in each PLA are responsible for monitoring solid waste management, public sanitation, business and commercial establishments, public markets and food related entities. The PLAs work in collaboration with the Ministry of Health to provide medical clinics and dispensaries for its residents as well. These medical services are often provided free of charge, as it targets low income families.

18. **Fire department services** are only available in CMC, DMMC and SJKMC and often these services cover adjacent local authorities as well for a nominal service fee. Within the PLA limits fire department services are free of charge. In addition, the fire department is responsible for inspection of business and commercial establishments to ensure fire safety regulations are followed. To obtain trade licenses, businesses must obtain a recommendation from the fire department. KUC is the only PLA that does not have its own fire brigade, and must rely on the CMC brigade.

19. Although **Pre-school education** services are not covered by law in the municipal and urban council ordinances, all four PLA's do provide pre-school services that tend to target low income families. These services are free of charge, and thus operation and maintenance expenses are covered by the Municipal and Urban Funds.

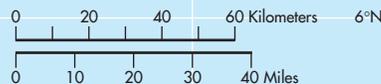
20. **Investment Financing:** although by law both the municipal and urban council ordinances provide the ability to borrow funds with the approval of the Minister in charge to purchase equipment, machinery and plant for public services, or through debentures and housing bonds; in practice the PLA's do not borrow under these laws as repayment is difficult given limited resources. In practice funds are either obtained from the Municipal Fund by annual budget allocations or through funds received for infrastructure schemes through Provincial Council Decentralized budget or Parliament MPs who allocate funds to the PLAs.

SRI LANKA

- SELECTED CITIES AND TOWNS
- ⊙ PROVINCE CAPITALS
- ⊛ NATIONAL CAPITAL
- ~ RIVERS
- MAIN ROADS
- RAILROADS
- PROVINCE BOUNDARIES
- · - INTERNATIONAL BOUNDARIES



This map was produced by the Map Design Unit of The World Bank. The boundaries, colors, denominations and any other information shown on this map do not imply, on the part of The World Bank Group, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries.



SRI LANKA METRO COLOMBO URBAN DEVELOPMENT PROJECT

- AREA OF PROJECT INTERVENTION
- METRO COLOMBO BOUNDARY
- LOCAL GOVERNMENT BOUNDARIES, METRO COLOMBO
- COLOMBO WATER BASIN BOUNDARY



This map was produced by the Map Design Unit of The World Bank. The boundaries, colors, denominations and any other information shown on this map do not imply, on the part of The World Bank Group, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries.