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Report No: 56341-LB

PROJECT APPRAISAL DOCUMENT
ON A
PROPOSED LOAN

IN THE AMOUNT OF
US$200 MILLION

TO THE
LEBANESE REPUBLIC

FOR THE
GREATER BEIRUT WATER SUPPLY PROJECT

OCTOBER 13, 2010

Sustainable Development Department
Middle East and North Africa Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective August 9, 2010)

Currency Unit	=	Lebanese Pound
LBP1	=	US$0.00066
US$1	=	LBP 1,507.5

FISCAL YEAR
January 1 – December 31

ABBREVIATIONS AND ACRONYMS

BMLWE	Beirut Mount Lebanon Water Establishment
CDR	Council for Development and Reconstruction
CPS	Country Partnership Strategy
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
GoL	Government of Lebanon
MoE	Ministry of Environment
MoEW	Ministry of Energy and Water
MoF	Ministry of Finance
PIM	Project Implementation Manual
PMU	Project Management Unit
RAP	Resettlement Action Plan
QCBS	Quality and Cost Based Selection
QBS	Quality Based Selection
ICB	International Competitive Bidding
NCB	National Competitive Bidding
SBD	Standard Bidding Document
WTP	Water Treatment Plant

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PAD DATA SHEET

LEBANON

GREATER BEIRUT WATER SUPPLY PROJECT

PROJECT APPRAISAL DOCUMENT

MIDDLE EAST AND NORTH AFRICA
Sustainable Development Department

Date: October 13, 2010 Country Director: Hedi Larbi Sector Director: Laszlo Lovei Sector Manager: Francis Ato Brown Team Leader: Parameswaran Iyer Project ID: P103063 Lending Instrument: Specific Investment Loan		Sector(s): Water (100%) Theme(s): Water resource management (80%), Other public sector governance (20%) Environmental Assessment Screening Category: A

	Project Financing Data:	
	Proposed terms: [X] Loan [ ] Credit [ ] Grant [ ] Guarantee [ ] Other:	
Source		Total Amount (US$M)
Total Project Cost: Co-financing Total Bank Financing: IBRD IDA New Recommitted		370.0 170.0 200.0 0.0 00.0 0.0

Borrower: Lebanese Republic
Implementing Ministry: Ministry of Energy and Water
Other Responsible Agencies: Council for Development and Reconstruction (CDR); Beirut Mount Lebanon Water Establishment (BMLWE)

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	Estimated Disbursements (Bank FY/US$ m)						
FY	2011	2012	2013	2014	2015	2016	2017
Annual	0	20	40	60	50	20	10
Cumulative	0	20	60	120	170	190	200

	Project Implementation Period: Start: June 2011 End: June 2016 **Expected effectiveness date**: June 15, 2011 **Expected closing date**: June 30, 2016	
	Does the project depart from the CAS in content or other significant respects?	○ Yes ● No
	If yes, please explain:	
	Does the project require any exceptions from Bank policies? Have these been approved by Bank management? Is approval for any policy exception sought from the Board?	○ Yes ● No ○ Yes ○ No ○ Yes ● No
	If yes, please explain:	
	Does the project meet the Regional criteria for readiness for implementation?	● Yes ○ No
	Project Development Objective: The project development objective is to increase the provision of potable water to the residents in the project area within the Greater Beirut region, including those in the low-income neighborhoods of Southern Beirut, and to strengthen the capacity of the Beirut Mount Lebanon Water Establishment in utility operations.	
	Project description: The Project consists of the following three components: Component 1: Bulk Water Supply Infrastructure Component 2: Supply Reservoirs, Distribution Network and Metering Component 3: Project Management, Utility Strengthening and National Studies	

	Safeguard policies triggered	
	Environmental Assessment (OP/BP 4.01)	● Yes ○ No
	Natural Habitats (OP/BP 4.04)	○ Yes ● No
	Forests (OP/BP 4.36)	○ Yes ● No
	Pest Management (OP 4.09)	○ Yes ● No
	Physical Cultural Resources (OP/BP 4.11)	○ Yes ● No
	Indigenous Peoples (OP/BP 4.10)	○ Yes ● No
	Involuntary Resettlement (OP/BP 4.12)	● Yes ○ No
	Safety of Dams (OP/BP 4.37)	○ Yes ● No
	Projects on International Waters (OP/BP 7.50)	○ Yes ● No
	Projects in Disputed Areas (OP/BP 7.60)	○ Yes ● No

Conditions and Legal Covenants:

Loan/Project Agreement Reference		Description of Covenant	Date Due
1.		Core team of Project Management Unit (PMU) in place.	By Loan Effectiveness
2.		An interim progress report, in form and substance satisfactory to the Bank, on the findings on the internal control environment for fiscal year 2010, to be performed as part of a special purpose audit for BMLWE by independent auditors acceptable to the Bank.	By Loan Effectiveness
3.		Accounting software in the PMU, with specifications acceptable to the World Bank, operational.	By June 30, 2011
4.		Special purpose audit report on BMLWE statement of cash receipts and disbursements for year 2010 and Statement of changes in fund balance as of December 31, 2010.	By September 30, 2011
5.		Yearly audits of BMLWE's financial statements, starting fiscal year 2012	By September 30 of each year following the preceding fiscal year
6.		Technical team of PMU operational.	By June 30, 2011
7.		Legal Agreements fully executed and ratified by respective parties and related legal opinions.	By Loan Effectiveness
8.		Subsidiary Agreement between the Borrower and CDR plus related legal opinion.	By Loan Effectiveness
9.		Subsidiary Agreement between the Borrower and BMLWE plus related legal opinion.	By Loan Effectiveness

I. Strategic Context

A. Country Context

1. Lebanon is a small country on the Mediterranean coast with a population of 4.2 million. The country is highly urbanized with more than 85 percent of the population living in cities. Lebanon's service-based economy, while fragile and subject to frequent political shocks, is driven by a dynamic private sector and is highly reliant on the Arab Gulf economies. The country has long been known for its human talent in banking, education and engineering and for its open capital market and liberal press.

B. Sectoral and Institutional Context

2. Despite the relative abundance of water resources, the Lebanese water supply and sanitation sector has not achieved service provision in line with the country's level of economic development. The cost of inaction in the water sector is estimated at about 1.8 percent of GDP (US$433 million per year[1]). The environmental degradation caused by the discharge of untreated wastewater is estimated to cost an additional 1 percent of GDP per year. Furthermore, household expenditure on private water supply can be as high as 3.4 percent of household income.

3. The main institutional players in the Lebanese water sector include:

(a) ***The Ministry of Energy and Water (MoEW):*** is the main agency with oversight and regulatory power in the water sector, including water resource management. MoEW is in charge of budget-financed investments and exercises technical oversight over the four Regional Water Establishments (RWEs) and is responsible for setting water standards and pollution control legislation.

(b) ***The Council for Development and Reconstruction (CDR):*** is a financially autonomous public institution accountable to the Council of Ministers in charge of planning, securing financing & executing public investment projects. It was created in 1977 to coordinate the re-construction effort and to implement the associated investment programs in collaboration with line ministries.

(c) ***Regional Water Establishments (RWE):*** Municipal water across Lebanon is provided by four consolidated RWEs and one pre-existing river basin agency (the Litani River Establishment). The four RWEs are responsible for: (i) the implementation, operation, maintenance and renovation of potable water supply, irrigation and wastewater according to the General Master Plan and as per the instructions of MoEW; (ii) setting water tariffs for potable water supply and irrigation, taking into account socio-economic conditions; and (iii) quality control of potable water and water for irrigation.

4. In recent years, the Government of Lebanon (GoL) has undertaken a number of key sector reforms. A new water sector law (Water Law 221) was promulgated by Parliament in May 2000 defining the role of MoEW for policy formulation, bulk water supply (both for potable and

[1] [1] Public Expenditure Review for the Water Sector, World Bank, 2010.

irrigation use), strategic planning and regulatory functions, while consolidating the number of water servicing establishments from 22 to 4 RWEs (North, South, Beka'a, Beirut/Mt. Lebanon described above) in order to improve efficiency in service provision. Initially these RWEs were only responsible for water supply and irrigation services; however, an amendment to the water sector law stipulating the reallocation of the wastewater sector responsibilities to MoEW and the RWEs was ratified by Parliament in December 2001.

5. The water supply sector in Lebanon has been the subject of numerous and comprehensive studies and has repeatedly been identified as a high-priority sector that requires immediate action to alleviate the impacts of the following key sector issues:

(a) ***Unfinished Reform Agenda***: Law 221/2000 has not been fully enforced and implemented, thus creating institutional uncertainty over sector responsibilities. As a result, the four RWEs severely lack managerial and financial autonomy and are impeded by limited inter-agency coordination and weak central government oversight. They have not been able to effectively operate and maintain water supply networks, fully engage with the private sector, recover costs and hire qualified staff. This situation is further exacerbated by: (i) low bill collection rates caused by widespread consumer dissatisfaction and the inability of RWEs to enforce the law; (ii) a tariff system based on an annual fixed fee rather than volumetric charges which does not provide incentives for demand management; and (iii) lack of qualified technical and financial staff.

(b) ***Unclear regulatory arrangements for setting tariffs have led to inadequate cost recovery levels.*** Significant investments have been made in recent years without concurrent adjustments to the tariff structure to take account of increased operations and maintenance costs.

(c) ***Wastewater collection coverage averages 58 percent and wastewater treatment facilities are few and small.*** The RWEs have yet to take full responsibility for wastewater collection and treatment, which is *de facto* provided and financed by MoEW, municipalities, NGOs, donors and small private sector operators. Whereas the large municipalities generally have sewerage networks, a large number of small cities lack such infrastructure. Most of the networks are very old, damaged or undersized. In addition, and despite recent efforts to increase the number of wastewater treatment facilities, there are still too few treatment plants in operation, all of which are small. Several larger wastewater treatment plants have been developed (in coastal areas), but are not yet operational because of limited Beirut Mount Lebanon Water Establishment (BMLWE) capacity and unfinished water supply networks.

6. ***The Greater Beirut and Mount Lebanon area*** houses about half of the total Lebanese population. While the municipal connection rate is about 90 percent in the area of coverage, continuity of water supply is low and drops to as little as 3 hours per day in the lean summer season. This seasonal water imbalance is primarily caused by very low water storage capacity, high amount of water lost to the sea, growing water demand and the deficiency of existing water networks. Average technical and commercial losses are as high as 40 percent and further aggravate supply. In this context, small scale private water vendors, most of whom are

unregulated and many of whom are illegal, provide water of dubious quality. If no actions are taken to improve distribution efficiency and increase storage capacity, it is estimated that there would be chronic water shortages by as early as 2020.

7. The Beirut Mount Lebanon Water Establishment (BMLWE) is the RWE responsible for the Greater Beirut and Mount Lebanon area comprising the areas of Jbeil, Barouk, Metn, Ein el Delbi and Keserwan and serving a population of 2.11 million, of whom approximately 350,000 reside in the low-income neighborhoods in Southern Beirut. BMLWE was established in 2000 through Law 221(2000) which merged numerous "water establishments", including the "Beirut Water Establishment" and "Ein El Delbi Water Establishment" among others into a unified "Beirut Mount Lebanon Water Establishment". BMLWE operates as a commercial entity, and is headed by a Director General who also chairs the Board. BMLWE currently employs 600 people against an authorized staff strength of 1,120. The water utility is thus considerably understaffed, mainly due to a longstanding hiring freeze in the GoL and natural attrition.

8. BMLWE delivers water to a "gauge" flow-device installed in every apartment building, the most common form of residence across urban Lebanon. The gauge is designed to allow a flow of 1 m^3/day for every apartment of 200 m^2 area or less. Larger apartments are allocated larger volumes of water per day. Only 16 percent of registered users are metered, with 11 percent of these representing large industrial and commercial users of significantly higher consumption quantities. Since water rationing is frequent and water supply drops as low as 3 hours per day in the summer, most residences have installed communal pumps and individual roof-top reservoirs to store water when it is delivered.

9. The current gauge water tariff is LBP 236,000 (US$157) per year per household for 1 m^3/day for each 200 m^2 of household area, and LBP 324,000 (US$216) per household for the limited metered connections. Metered connections have more regular water services, and have a price adjustment at the end of the year reflecting the volume of consumed water. On average, BMLWE collection rate has been consistent at almost 90 percent per year.

10. The combination of: (i) a relatively high yearly gauge tariff (equivalent to approximately 4 percent of minimum wage income) due in full yearly; (ii) the water shortages across the Greater Beirut Mount Lebanon area; and (iii) the relatively satisfactory collection rate, given the low quality of service, has resulted in BMLWE accumulating over US$170 million as cash surplus. BMLWE's strong financial position has enabled it to contribute US$140 million towards the Greater Beirut Water Supply Project (36 percent of the total project cost).

Higher Level Objectives to which the Project Contributes

11. The Greater Beirut Water Supply Project is consistent with the overall GoL's objective to reconcile economic development with environmental and social sustainability, through better public services for all, especially the poor. The project is also aligned with the Bank's Country Partnership Strategy (CPS) pillar for economic infrastructure, which concentrates on energy, water and urban transport. Finally, the project is consistent with the World Bank Water Strategy's pillars of urban water access and reform.

12. **World Bank Prior Engagement**: Between 1997 and 1998, the World Bank led several identification missions to Lebanon to assist the GoL in the preparation of the Awali Beirut Water Conveyor Project and the Greater Beirut Water Supply and Wastewater Project.

13. The Awali Beirut Water Conveyor Project involved a possible World Bank partial guarantee to a BOT (Build Operate Transfer) scheme. This project however was abandoned due to: (i) the lack of enforceability of the proposed BOT structure under the then existing Lebanese Law (in particular Article 89 of the Constitution); and (ii) an operational BMLWE not being in place to contractually receive the treated water from the BOT Operator.

14. The proposed wastewater collection and treatment investments under the Greater Beirut Water Supply and Wastewater Project were dropped as other donors provided financing.

II. Project Development Objectives

A. PDO

15. The project development objective is to increase the provision of potable water to the residents in the project area within the Greater Beirut area, including those in the low-income neighborhoods of Southern Beirut, and to strengthen the capacity of the Beirut Mount Lebanon Water Establishment in utility operations.

B. Beneficiaries

16. Direct beneficiaries of the project include residents who directly benefit from increased access to reliable potable water supply, equivalent to approximately 1.2 million people living in the Baabda, Aley, parts of the Metn and Southern Beirut areas of the Greater Beirut and Mount Lebanon region; they include 350,000 low-income residents of the Southern Beirut suburbs. Indirect beneficiaries include residents of other Greater Beirut Mount Lebanon regions, whose water supply will no longer be diverted to the project areas. Half of the direct resident beneficiaries are expected to be women. Indirect benefits will also include an expected reduction in the number of unauthorized wells drilled and a reduction in coastal salt-water intrusion.

C. PDO Level Results Indicators

17. Achievement of the development objective will be assessed through the following key performance indicators:

(a) Volume of additional potable water distributed in the project area.
(b) Piped household connections benefitting from rehabilitation works undertaken under the project.
(c) New piped household connections for poor households resulting from the project intervention.
(d) Percentage of customers in the project area receiving 24/7 water supply.

III. Project Description

A. Project Components

18. The Greater Beirut Water Supply Project will consist of three components described in the subsequent paragraphs. (See Annex II for a detailed project description).

Component 1: Bulk Water Supply Infrastructure.

19. *Component 1 will comprise: (a) the construction and construction supervision of bulk water supply infrastructure consisting of (i) two water tunnel conveyors of 3 km and 21 km respectively a*nd will include the intake, flow regulation and washout structures and related vent and surge shafts and a distribution chamber; (ii) two transmission twin pipelines of 7.6 km and 2.7 km respectively; (iii) three storage reservoirs of 35 ML, 50 ML and 20 ML capacity respectively; (b) design, construction and construction supervision of a water treatment plant (WTP) of 250,000 cubic meters a day capacity; (c) all related equipment including pumps and valves; and (d) support to CDR for Project management related to the above.

Component 2: Supply Reservoirs, Distribution Network and Metering.

20. *Component 2 will comprise: (i) Design, construction and construction supervision of 16 supply reservoirs* of storage capacities varying between 500 and 1,000 m^3 each, dispersed within the project area, and associated pumping stations; (ii) design, construction and construction supervision of water supply distribution network of about 187 km of pipelines across the project area in southern Beirut and parts of the Metn, Baabda and Aley areas; (iii) installation of 200,000 household meters in selected project areas; and (iv) installation of about 30 bulk water meters at reservoirs and distribution chambers.

Component 3: Project Management, Utility Strengthening and National Studies.

21. *Component 3 will focus on utility strengthening and will also strengthen the c*apacity of the MoEW for project oversight. It will comprise of: (i) setting up and operation of a Project Management Unit (PMU) consisting of key specialist staff to implement, monitor and report on project progress, and operating costs; (ii) capacity building and technical assistance for BMLWE, and MoEW's capacity for Project oversight, and financing consultant services for BMLWE's special purpose audits; (iii) the procurement of utility strengthening systems, equipment and technical advisory services; and (iv) high priority national studies to be undertaken on key sector areas in alignment with the priorities set forth in the National Water Sector Strategy (NWSSS) currently under preparation by the GoL.

22. Both CDR and the BMLWE have confirmed that the wastewater collection and treatment facilities located within the Greater Beirut area (namely the existing wastewater treatment plants at Dora and Ghadir, which are currently being upgraded and expanded to handle the wastewater generated by 3 million population equivalent) have been designed to collect and treat the additional water volume generated by the Greater Beirut Water Supply Project. To this end, the

project will not have any impact on the capacity of wastewater treatment and collection infrastructure.

B. Project Financing

Lending Instrument

23. The lending instrument will be a Specific Investment Loan. The Ministry of Finance has selected a variable spread loan of US$200 million for the project. Repayment will be level, with a total maturity of 23 years, including 6 years of grace period.

Project Financing Table

24. Total project financing requirements are estimated at US$370 million, inclusive of price and physical contingencies, taxes and the front-end fee. The project will be financed as follows: BMLWE will finance US$140 million; GoL will finance US$30 million for land acquisition; the IBRD loan of US$200 million will finance goods, works, consultants, reasonable associated taxes and contingencies (see Table 1 below).

Table 1: Project Costs by Component

Project Cost By Component	Total $ million
A. Works, Goods and Consultants	
Component 1: Bulk Water Supply	
A. Raw and treated water tunnels (Works and supervision)	130
B. Water treatment plant (Works and supervision)	51
C. Transmission pipelines, bulk reservoirs (Works and supervision)	54.5
D. Project Management	0.5
Component 2: Reservoirs, Distribution, Metering	
A. Distribution and reservoirs (Design, works and supervision)	41
B. Metering	20
Component 3: Project Management, Utility Strengthening and Studies	
A. Project Management Unit	5
B. Utility Strengthening/ MOEW Project Oversight Capacity	5
C. Studies	5
Subtotal	312
B. Land Acquisition	30
Total Baseline Cost	**342**
C. Contingencies	21.5
D. Taxes	6
Total Project Costs	369.5
Front-End Fee	0.5
Total Financing Required	**370**

IV. Key Risks

25. The proposed project is of significant engineering complexity due to the tunnelling involved. The proposed institutional arrangements will also require close coordination between the implementing agencies involved. The overall project risks are rated Medium-Impact and considered manageable with mitigation measures in place. Potential risks and mitigation measures are summarized in the Operational Risk Assessment Framework (see Annex IV).

26. MoEW will delegate implementation of the more complex engineering components (namely the raw and treated water tunnels, the transmission pipelines and bulk reservoirs) to CDR which has successfully implemented many large infrastructure projects, including those financed by the World Bank. In addition, Components 2 and 3 will significantly strengthen the technical, financial and managerial capacity of BMLWE as well as the project oversight capacity of MoEW during the project implementation period. A Project Management Unit (PMU) in BMLWE, staffed by experienced professionals who may be housed at MoEW and BMLWE, will assist in effectively and efficiently implementing the project, and there will be direct oversight by MoEW through a Project Steering Committee.

V. Implementation

A. Institutional and Implementation Arrangements

27. **Oversight arrangements**: MoEW will be responsible for executing the project. It will establish a Project Steering Committee headed by the Minister for Energy and Water, with representatives from key stakeholders including the Ministry of Finance (MoF), CDR and BMLWE. The Project Steering Committee will maintain a Secretariat consisting of the PMU's Operations Advisor, the Monitoring and Evaluation Specialist and an Administrative Assistant. The role of the Steering Committee Secretariat will be to monitor progress on the project as a whole and report to the Minister of Water and Energy on all major operational milestones.

28. **Implementation arrangements**: MoEW will implement the project through a Project Management Unit (PMU) that will be based at BMLWE (respective specialists may be housed at BMLWE and MoEW). MoEW will delegate implementation of Component 1 (excluding the Ouardaniyeh WTP) to CDR and manage implementation of Components 2 and 3 and the Ouardaniyeh WTP through the BMLWE's PMU. The secretariat of the Steering Committee, which is part of the PMU, will be based at MoEW.

29. The PMU will be headed by a Project Coordinator and will be responsible for the day-to-day and overall project management, monitoring and reporting, including the implementation of the Resettlement Action Plan (RAP) and the Environment and Social Management Plan (ESMP).

30. The PMU will have a Core Management Team and a Technical Team. The Core Management Team will comprise: (i) a Project Coordinator; (ii) a Procurement Specialist; (iii) a Financial Management Specialist; (iv) an Environmental and Social Specialist; and (v) an engineer. The Technical Team will comprise: (i) an electro-mechanical engineer: (ii) two

civil/water engineers; (iii) one structural engineer: and (iv) a process/water quality engineer. There will also be an Administrative Assistant in the PMU.

31. As part of the PMU, one Civil Engineer, who will also act as a Procurement Specialist, will be based at CDR and will assist in the management of the large works contracts under Component 1, except for the WTP which will be procured by BMLWE. In addition, a financial specialist will be based in CDR to handle financial management of the project's CDR-implemented component.

32. Financial management arrangements including accounting, reporting, and auditing functions will be centralized at the PMU in BMLWE and at CDR, with each handling their respective component activities. CDR and the PMU will each manage its own project Designated Account. The PMU will consolidate the project financial reports and submit them to both the Project Steering Committee and the Bank as part of project progress reports.

B. Results Monitoring and Evaluation

33. Monitoring and evaluation of outcomes and results during implementation will follow standard Bank practice. The PMU will collect and present data and reports for bi-annual review by the Project Steering Committee in conjunction with World Bank supervision missions. Discussions during supervision missions related to institutional capacity building, financial viability, technical reviews and site visits will also provide effective means of monitoring progress. The progress reports will be published and will be accessible to managers and decision makers.

C. Sustainability

34. Sustainability of the proposed project will ultimately be determined by the sustainability of the water utility operations as a whole, including the proper operation and maintenance of the project financed assets. Specifically, the sustainability of the project will largely depend on: (i) the professionalization of BMLWE and its staff; (ii) successful implementation of international corporatization procedures, including accounting and billing standards, non-revenue water reduction, and targeted staff training to operate and maintain the new infrastructure; and (iii) the adoption of full metering on a volumetric basis across the entire BMLWE service area, thereby providing an incentive to control water consumption.

VI. Appraisal Summary

A. Economic and Financial Analysis

Financial Analysis

35. Upon its establishment, BMLWE inherited the cash balance previously accumulated by the Beirut and Mount Lebanon Establishment, and held at the Central Bank. Since 2005, BMLWE has consistently registered annual cash surpluses between US$18 to 32 million per year. As a result, BMLWE currently holds more than US$170 million in cash and will finance a significant share of the project.

36. A financial analysis has been carried out in order to assess the impact of the proposed investments on the future financial situation of BMLWE. The financial analysis is based on a cash flow simulation of BMLWE's revenues and expenses.

37. BMLWE's annual cash surplus is expected to decrease as a result of the project investments as operating costs will increase, while tariffs will be retained at current levels in real terms. However, cash flows will continue to remain positive. BMLWE will have adequate cash surplus accumulated between 2010 and 2016 to carry out additional network rehabilitation and equipment replacement, and potentially contribute to the financing of additional storage capacity for bulk water supply. Details of the financial analysis are available in the project files.

Economic Analysis

38. A project cost benefit analysis was carried out, based on the assessment of the reduction in coping costs expected to be associated with the improvement in service quality as a result of the project investments. The project is expected to significantly improve the quality and reliability of water supply to the population in the project area. The project Net Present Value (NPV) is estimated to be around US$100 million, using a discount rate of 10 percent. The Economic Rate of Return (ERR) is estimated to be about 18 percent. A sensitivity analysis has been carried out and confirms the robustness of the project's benefits. The detailed economic analysis is available in the project files.

B. Technical

39. GoL has been preparing the investments financed under this project for many years. During the preparation of the current project, existing feasibility studies and detailed designs were revised, re-examined and updated by CDR. The Bank team, including an international tunneling expert, reviewed the designs of the raw and treated water tunnel conveyors and downstream infrastructure. Because of the topography of the project region, all options, whether piped or tunneled, require the first stretch of the conveyor from Joun to the Ouardaniyeh WTP to be tunneled in order to access the Joun reservoir and intake point.

40. **Tunnel versus Pipeline Alternatives**. For the remaining transmission infrastructure, tunnel options were considered technically superior to pipelines due to the following factors:

- Exposure to damage from seismic activity, given that the alignment is through a seismically active zone;
- The high pressure pipelines (+25 bar rating requirement) due to elevation differences could result in very severe consequences in the event of a pipe burst;
- Extensive land expropriation and service corridor requirements, in the highly urbanized areas towards the end of the pipe route;
- Aesthetic and environmental implications due to the extensive construction through rural and natural areas; and
- Security concerns, given that an exposed rural pipeline would be more vulnerable to damage.

41. Upon detailed technical and economic comparison, the tunnel option remains the least-cost and technically preferred option for the conveyance of raw and treated water over a distance

of 24 km. Specifically, the selected tunnel option has the further advantage of being the shortest route and is able to follow the hydraulic grade line with fewer design constraints. Also, given the minimum economical size of a tunnel, the tunnel option provides for additional capacity for any future expansion, and some degree of storage within the tunnel space itself. Finally, the tunneled solution has a significantly smaller surface disruption footprint.

42. **Ouardaniyeh versus Khalde Water Treatment Plant (WTP) Alternatives**. Two options were considered for the location of the WTP. The first option was at Khalde, in close proximity to suburban Beirut and at the point where tunneling options would terminate and treated water would be transferred to pipelines connecting to the supply reservoirs. The second option was at Ouardaniyeh, a location in the hills in close proximity to the start of the scheme at Joun. Although the Khalde location would ensure that the tunnel remains continuous from the intake to the reservoirs, the Ouardaniyeh site was found to be the best option due to its elevation, easy accessibility, lower cost of land, and the opportunity to provide treated water to coastal towns along the tunnel route.

43. **Supply Augmentation Options**: The project has been designed to be compatible with future supply augmentation infrastructure options for the medium and long term provision of increased volumes of water to select zones of the BMLWE area.

C. Financial Management

44. The Bank team undertook an assessment of the financial management systems within BMLWE and updated its assessment of those at CDR. The assessment concluded that with the implementation of agreed-upon actions, the proposed financial management arrangements will satisfy the Bank's minimum requirements under OP/BP10.02. Annex III provides additional information on the financial management assessment and the recommended mitigation measures. The detailed financial management capacity assessment and arrangements are available in the project files.

45. The PMU will manage one Designated Account to make payments to finance activities in Component 1 (WTP only) as well as Component 2 and Component 3, according to the financing percentages specified in the Loan Agreement. The PMU will send withdrawal applications to the World Bank to claim advances, replenishments, direct payments, and special commitments. It will install accounting software to produce consolidated financial reports for all project components by compiling on a regular basis the financial reports produced by CDR on the implementation of Component 1 (excluding the WTP). An internal auditor will be hired based on terms of reference (TORs) acceptable to the Bank and in compliance with the mandate of internal audit within the BMLWE financial system. An external auditor, acceptable to the Bank, will also be appointed based on TORs acceptable to the Bank to audit project produced financial statements. In addition, an external auditor will be hired to conduct a special purpose audit resulting in the submission of: (i) interim progress report on the BMLWE internal control environment for year 2010 by project effectiveness and (ii) an audit of statement of cash receipts and disbursements for the year 2010 and a statement of fund balance as of December 31, 2010.

46. A Project Implementation Manual (PIM), acceptable to the Bank, will describe the roles and responsibilities of CDR, BMLWE and MoEW in relation to financial management.

D. Procurement

47. **CDR Procurement Assessment**. CDR is capable of handling large and complex projects although it sometimes still faces difficulties in managing procurement issues due to shortage of manpower relative to the number of projects being implemented. CDR has handled the procurement of several World Bank Projects and as such is experienced with Bank procurement guidelines.

48. **BMLWE Procurement Assessment**. BMLWE has dedicated procurement staff managing small contracts. The staff is not trained to participate in the bid evaluation process and guide evaluation committees. Experienced procurement staff will need to be hired for the project and significant capacity building will be required to strengthen BMLWE's procurement capacity.

49. **Procurement risks** include BMLWE's lack of experience in tendering and managing large infrastructure packages and the weak capacity of BMLWE staff. Mitigation measures include close coordination with CDR, targeted training and capacity building of BMLWE staff, and close supervision by the Project Steering Committee.

E. Social

50. A socio-economic survey of the impact of the project has been carried out by the Environmental and Social Impact Assessment (ESIA) consultant. The overall social impact of the project is positive as the project will improve the water supply and distribution network within the Greater Beirut Area, including in the low-income neighborhoods in Southern Beirut. Villages along the transmission tunnels will also benefit from additional water supply through designated points for optional connection to local distribution networks.

51. Negative social impacts are associated with land acquisition, temporary effects of construction and temporary disturbances in circulation and access. These impacts are in general limited and considered manageable through consultations with potentially affected communities and the implementation of necessary mitigation measures, described in the Environmental and Social Management Plan (ESMP) and the Resettlement Action Plan (RAP).

52. The project involves land acquisition as well as temporary restrictions on land due to the construction of water conveyors and pipelines: (i) full acquisition of land for the purpose of building surface structures (infrastructure related to the conveyor, WTPs and storage reservoirs); and (ii) establishment of easement right of ways (ROW) where the water conveyor will pass underneath the surface. The latter restrictions on the lots depend on the depth of the tunnel beneath, such as prohibition of placing deep foundation and prohibition of drilling wells. Apart from losses associated with a minor agriculture business (greenhouses), there will be no other impact on any other businesses, loss of income-generating activities, or physical relocation of people. A family of farmers working and residing at the greenhouse site at Ouardaniyeh will be offered alternative employment and housing at another location under similar conditions as

currently provided by the owner. This arrangement has been confirmed in a letter to the World Bank that is attached to the RAP.

53. A RAP was developed by GoL, reviewed by the Bank and was disclosed in the Infoshop on August 6, 2010. The RAP describes land acquisition issues and easement right restrictions under each project component and describes previous land acquisition undertaken by CDR for the purpose of this project as well as consultations with affected landowners, users and other stakeholders. As described in paragraph 13 above, prior Bank engagement was later abandoned and the World Bank has not been involved with any of the previous expropriations. This has been confirmed in a letter to the Bank from CDR attached to the RAP. The letter also confirms that no pending appeals or otherwise outstanding claims are associated with the expropriations, and that they were all carried out in full compliance with Lebanese Law. The records of expropriations are filed with the CDR.

54. Lebanese Law has established general provisions for prior compensation of expropriated assets and easement fees for ROW restrictions imposed on property. The RAP establishes procedures and mechanisms to address gaps between Lebanese expropriation legislation and the requirements of OP 4.12, in particular as regards the mode of compensation payment for land acquisition and an affordable and accessible grievance mechanism for third-party settlement of disputes arising from resettlement. The institutional capacity of the RAP implementing agencies, CDR and BMLWE, and the Steering Committee has been reviewed by the Bank and are regarded as being adequate for implementation of the RAP.

F. Environment

55. Consistent with the geographical scale of the project and the diversity of its components, as well as the need for land expropriation, the project has been classified as Category "A", triggering the safeguard policy to prepare a full ESIA with public consultation and the preparation of a RAP for all project components as described above.

56. The existing comprehensive EIA (dated April 1998) was revised and updated by GoL alongside previous studies, with special attention to rights of way, expropriation, and potential resettlement. The EIA was revised and updated into an ESIA and examined the potential impacts of the project on various parameters including: (i) ambient air quality; (ii) soil, landscape and visual amenity; (iii) water resources (groundwater and surface water bodies); (iv) biodiversity (fauna and flora); (v) noise and vibration; (vi) archeology; and (vii) socio-economic and public community.

57. The proposed tunnel configuration was justified through a series of alternative analyses that were examined in the EIA of 1998 and the revised ESIA of 2010 based on the feasibility studies presented at both occasions. The alternatives included: (i) the No-project option; (ii) transmission options (tunnel with varied alignments and construction methods, pipeline with various materials (concrete, ductile, steel); (iii) treatment plant location and technology; and (iv) sludge management. The project does not intend to prejudge the sequencing of construction of the future reservoirs considered by the Lebanese authorities in order to enhance further the Greater Beirut water supply system although the greater likelihood for the construction of the

Bisri Dam led to an increase of the design diameter of the water conveyance tunnel to be built under the project.

58. The Greater Beirut Water Supply Project will have significant long-term positive impacts on the economy, employment, infrastructure and services, water supply, environment and public health sectors among others. It will also have several negative impacts during implementation that can be minimized with the proper implementation mitigation measures described in the ESMP. The ESMP also includes: (i) references to control guidelines and standards; (ii) a description of the responsibilities for the implementation and supervision of the plan; (iii) verification, monitoring and training requirements, (iv) record keeping and documentation requirements; and (v) the level of funding required for implementing the plan.

59. Public consultations were carried out as part of the 1998 EIA and the revised 2010 ESIA. In both documents, the public feedback was documented and taken into account into the final report.

60. The ESIA report has been widely disseminated, with copies kept publicly accessible at the CDR, MoEW, BMLWE, MoE, InfoShop, concerned municipalities and immediate stakeholders.

Annex I: Results Framework and Monitoring

PDO		The project development objective is to increase the provision of potable water to residents in the project area within the Greater Beirut region, including the low-income neighborhoods of Southern Beirut, and to strengthen the capacity of BMLWE in utility operations.									
			Target Values						Data Collection and Reporting		
Project Outcome Indicators	**Core Indicator?**	**Baseline**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**Frequency and Reports**	**Data Collection Instruments**	**Responsibility for Data Collection**
Volume (m^3 /day) of additional potable water distributed in the project area (cumulative)	X	0	0	0	0	0	250,000	250,000	Semi-annual progress report	Bulk meter and Pumping Reports; Subscriber reports	BMLWE
New Piped Household connections for poor households in Southern Beirut that are resulting from the Project's intervention (cumulative)	X	0	0	0	0	5,000	10,000	20,000	Semi-annual progress report	BMLWE reports	BMLWE
Piped household connections benefitting from rehabilitation works undertaken under the project (cumulative)	X	0	0	0	0	50,000	100,000	200,000	Monthly reports	BMLWE reports	BMLWE
Percentage of customers in the project area receiving 24/7 water supply		0	0	0	0	0	20%	50%	Semi-annual progress report	Bulk meter and Pumping Reports; Subscriber reports	BMLWE
Component 1: Bulk water supply infrastructure											
Tunnels (kms)		0	0	0	0	0	24	24	Quarterly reports	Progress Reports	CDR
Water treatment plant		0	0	0	0	1	1	1	Quarterly reports	Progress Reports	BMLWE
Transmission lines		0	0	0	0	2	2	2	Quarterly reports	Progress Reports	CDR
Bulk reservoirs		0	0	0	0	0	3	3	Quarterly reports	Progress Reports	CDR

			Target Values						Data Collection and Reporting		
Project Outcome Indicators		**Baseline**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**Frequency and Reports**	**Data Collection Instruments**	**Responsibility for Data Collection**
Component 2: Supply reservoirs, distribution network and metering											
Supply Reservoirs		0	0	0	5	5	6	0	Quarterly reports	Progress Reports	BMLWE
Bulk Meters		0	0	0	5	10	20	30	Quarterly reports	Progress Reports	BMLWE
Pipelines (Km)		0	0	20	40	100	187	187	Quarterly reports	Progress Reports	BMLWE
Household Meters		0	0	0	0	10,000	100,000	200,000	Quarterly reports	Progress Reports	BMLWE
House Connections in poor areas		0	0	0	0	5,000	10,000	20,000	Quarterly reports	Progress Reports	BMLWE
Component 3: Project Management, utility strengthening and studies											
PMU Staff hired		6	10	10	10	10	10	10	Quarterly reports	Progress Reports	BMLWE/MOEW/CDR
Telemetry/Scada System		-	TA hired				Report finalized satisfactorily				BMLWE
GIS System		-	TA hired				Report finalized satisfactorily				BMLWE
Customer Information System		-	TA hired				Report finalized satisfactorily				BMLWE
TA for Design and operation of distribution system for 24/7 supply		-	TA hired				Report finalized satisfactorily				BMLWE
Implementation of international accounting standards.		Accountant hired	Audited Financial Statements						Quarterly reports	Quarterly reports	BMLWE
Studies completed satisfactorily		0	1	2	3	4	4	4	Quarterly reports	Quarterly reports	MOEW

Annex II: Detailed Project Description

1. The Greater Beirut Water Supply Project will consist of three components described below. The total project investment cost is estimated at US$370 million financed as follows: the Bank US$200 million; BMLWE US$140 million; and GoL US$30 million.

Component 1: Bulk Water Supply Infrastructure (Cost: US$236 million)

2. Component 1 will comprise: (a) the construction and construction supervision of bulk water supply infrastructure consisting of (i) two water tunnel conveyors of 3 km and 21 km respectively and will include the intake, flow regulation and washout structures and related vent and surge shafts and a distribution chamber; (ii) two transmission twin pipelines of 7.6 km and 2.7 km respectively; (iii) three storage reservoirs of 35 ML, 50 ML and 20 ML capacity respectively; (b) design, construction and construction supervision of a water treatment plant (WTP) of 250,000 cubic meters a day capacity; (c) all related equipment including pumps and valves; and (d) support to CDR for Project management related to the above.

3. The two tunnels will each be concrete tunnels, 2.8 meter in diameter with a steel lining, and will be constructed using tunnel boring machines. The first tunnel will carry raw water from the intake at Joun reservoir to the WTP located in Ouardaniyeh at a distance of 3 km, while the second tunnel will carry the treated water at a distance of 21 km to a distribution chamber at Khaldeh. The water will then be transmitted via twin pipelines to the three storage reservoirs at Hadath and Hazmieh.

4. The WTP will comprise common water treatment processes including aeration, ozonation, filtration, disinfection and sludge dewatering, and will be modular with the first treatment line to handle the project design flow of 250,000 m^3/d. Civil works (exclusive of any electro-mechanical equipment) required to treat eventual larger flows (up to 750,000 m^3/d) will also be constructed under Component 1. The WTP will be tendered on a Design-Build-Operate (DBO) basis.

Component 2: Supply Reservoirs, Distribution Network and Metering (Cost: US$ 61 million)

5. Component 2 will comprise: (i) design, construction and construction supervision of 16 supply reservoirs of storage capacities varying between 500 and 1,000 m3 each, dispersed within the project area, and associated pumping stations; (ii) design, construction and construction supervision of water supply distribution network of about 187 km of pipelines across the project area in southern Beirut and parts of the Metn, Baabda and Aley areas; (iii) installation of 200,000 household meters in selected project areas; and (iv) installation of about 30 bulk water meters at reservoirs and distribution chambers.

Component 3: Project Management, Utility Strengthening and National Studies (Cost: US$15 million)

6. *Component 3 will focus on utility strengthening and will also strengthen the c*apacity of the MoEW for project oversight. It will comprise of: (i) setting up and operation of a Project Management Unit (PMU) consisting of key specialist staff to implement, monitor and report on

project progress, and operating costs; (ii) capacity building and technical assistance for BMLWE, and MoEW's capacity for Project oversight, and financing consultant services for BMLWE's special purpose audits; (iii) the procurement of utility strengthening systems, equipment and technical advisory services; and (iv) high priority national studies to be undertaken on key sector areas in alignment with the priorities set forth in the National Water Sector Strategy (NWSSS) currently under preparation by the GoL.

(a) ***Project Management Unit (PMU)*** for key specialist staff and equipment to implement the project, and monitor and report on project progress.

(b) ***Utility Strengthening Systems, Equipment and Technical Advisory services***:

(i) **Telemetry/SCADA system**: SCADA (Supervisory control and data acquisition) systems to control geographically dispersed assets (such as water valves, pumps, motors etc), often scattered over hundreds of square kilometers and technical assistance for the full and sustainable implementation of the telemetry system, including elaboration of technical specifications, prequalification of bidders, bid evaluation and technical implementation advisory service during installation of the telemetry system.

(ii) **Geographical Information System:** A geographic information system (GIS) and technical assistance for the full implementation and training on the GIS software, including staff training.

(iii) **Customer Information System.** To increase efficiency and improve customer service, particularly in light of the plan to implement full metering.

(iv) **Transition to 24/7 water supply :** Technical assistance on reduction of technical water losses and pressure management, including appropriate network design, zoning, improved installation and maintenance of meters and house connections, improved network maintenance and operation and real-time management of the network.

(v) **International accounting systems:** Assist BMLWE in transitioning to international financial reporting standards through the installation of, and training on, these systems.

(c) ***National studies***

Select high priority national studies will be undertaken in alignment with the priorities set forth in the National Water Sector Strategy (NWSS) under preparation by the GoL. Potential areas of focus include:

(i) **Wastewater management**: Analysis of legal and institutional constraints, identification of financing gaps, review of technical norms, preparation of regional master plans.

(ii) **Utility operations and regulation of the water, sanitation and irrigation sector:** Analysis of current practices and gap analysis for improvement of utility operations at the national level. Review of options for national and regional regulatory structures, priorities and frameworks for performance assessment, benchmarking and incentives for improved utility operations.

(iii) **Water resources management, water supply augmentation and inter-basin transfers:** Identification of national priorities and strategies for optimizing water storage capacity and distribution at the national level.

Annex III: Implementation Arrangements

A. Project Administration Mechanisms

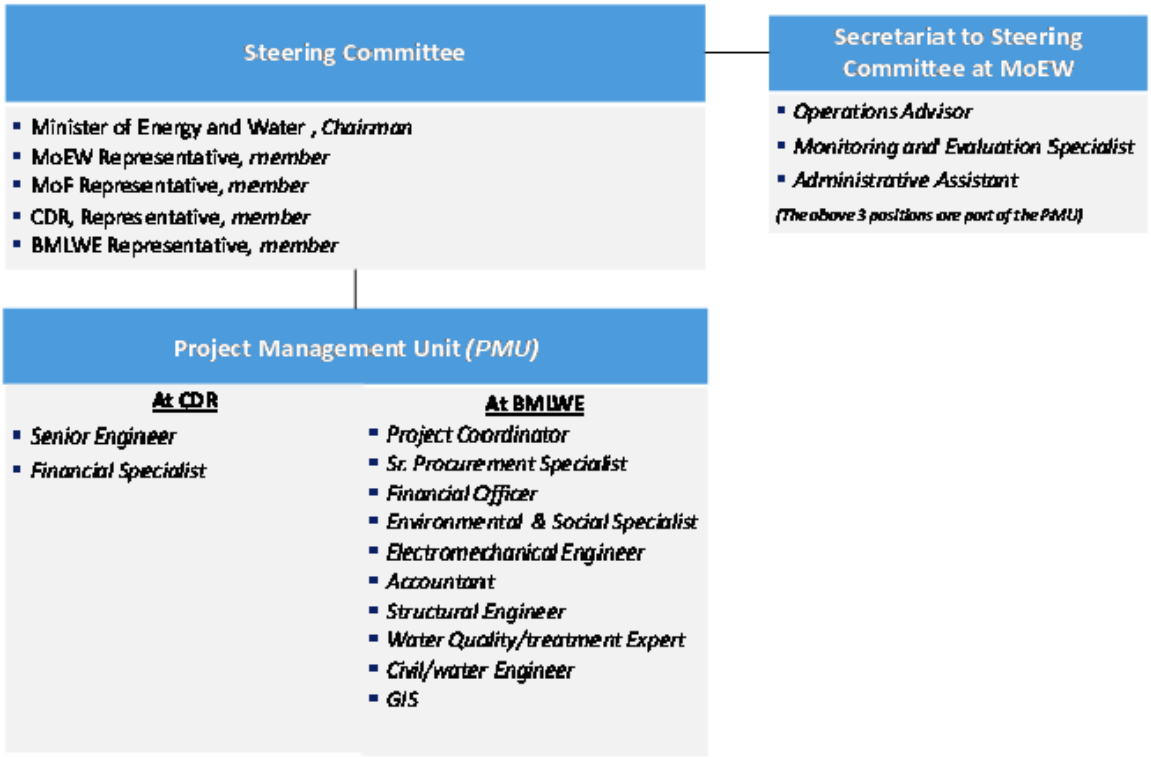
Project implementation and institutional arrangements

1. The MoEW will be the administrative Ministry with responsibility for the project. It will have a Project Steering Committee headed by H.E. the Minister, with representatives from key stakeholders including the MoF, CDR and BMLWE. A Project Management Unit (PMU) will be established at BMLWE. MoEW will delegate implementation of Component 1 (excluding the Ouardaniyeh WTP) to CDR and manage implementation of Components 2 and 3 through the PMU in BMLWE.

2. There will be a Secretariat to the Project Steering Committee, which will be situated at MoEW and consist of the following PMU specialists: (i) an Operations Advisor; (ii) a Monitoring and Evaluation Specialist; and (iii) an Administrative Assistant. The Secretariat will monitor progress of the project as a whole and report to the Minister of Water and Energy on all major operational milestones.

3. The PMU will be headed by a Project Coordinator and will be responsible for the day-to-day and overall project management, monitoring and reporting, including the implementation of the Resettlement Action Plan (RAP) and the Environment and Social Management Plan (ESMP). The PMU will have a Core Management Team and a Technical Team. The Core Management Team will comprise: (i) a Project Coordinator; (ii) a Procurement Specialist; (iii) a Financial Management Specialist; (iv) an Environmental and Social Specialist; and (v) an engineer. The Technical Team will comprise: (i) an electro-mechanical engineer; (ii) two civil/water engineers; (iii) one structural engineer; and (iv) a process/water quality engineer. There will also be an Administrative Assistant in the PMU.

4. As part of the PMU, one Civil Engineer, who will also act as a Procurement Specialist, will be based at CDR and will assist in the management of the large works contracts under Component 1, except for the WTP which will be procured by BMLWE. In addition, a financial specialist will be based in CDR to handle financial management of the project's CDR-implemented component.



5. A Project Implementation Manual (PIM) will cover topics including project implementation arrangements, including the inter-agency roles and responsibilities, procurement, disbursement and financial management procedures.

B. Financial Management, Disbursement and Procurement

Financial Management

6. Project financial management arrangements, including accounting, reporting, and auditing functions will be centralized at the PMU (both at BMLWE and at CDR) with each handling their respective component activities as described earlier. The flow of funds process will be undertaken by each through two Designated Accounts to be opened for the project. The consolidation of the project financial reports will be done by the PMU and submitted to both the Project Steering Committee and the Bank along with the project progress reports.

7. CDR has significant experience of implementing construction components for Bank-supported projects and its financial management (FM) performance on past and current projects is considered satisfactory. It has a functional unit undertaking FM responsibilities, including funds flow management, accounting, reporting, and facilitating an acceptable external audit. CDR external auditor will conduct the audit of the World Bank-financed projects. The key FM issue for CDR projects is the delay in receiving audit reports and lack of proper maintenance of asset lists. However, compliance rates have improved over the past years and 67 percent of the due audit reports have been received on time.

8. The following steps are thus to be taken to mitigate FM-related risks and are set forth in the PIM:

(a) CDR will recruit an acceptable external auditor to enable consistent audit compliance.

(b) CDR will operationalize the assets module of its accounting software to ensure proper management of assets purchased under its component.

(c) BMLWE will appoint an experienced Financial Management Specialist and Accountant with qualifications acceptable to the Bank and will establish accounting software with specifications acceptable to the Bank to generate the project financial reports.

(d) BMLWE will appoint and finance from project funds an acceptable external auditor within six months of project effectiveness as per terms of reference acceptable to the Bank to audit the project financial statements. In addition, an acceptable external auditor will be appointed to conduct a special purpose audit for BMLWE and submit (i) an interim progress report on the internal control environment of BMLWE for year 2010, and (ii) an audit of statement of cash receipts and disbursements and statement of fund balance as of December 31, 2010. The audited annual project financial statements will be publicly disclosed.

(e) BMLWE will hire an internal auditor based on terms of reference acceptable to the Bank and in compliance with the mandate of internal audit within the BMLWE financial system. The internal auditor will ensure that the processes and procedures of BMLWE are properly applied and will report to the Managing Director of BMLWE. Internal audit reports will also be submitted to the Project Steering Committee.

(f) An audit committee will be created from independent members to: (i) oversee the effective management of risks; (ii) ensure clear and accurate financial reporting; and (iii) foster and maintain a strong internal control environment.

9. **Budgeting and Funds Flow.** A project budget and periodical disbursement plan, based on the procurement plan and implementation schedule, will be developed by CDR and the PMU respectively and consolidated by the PMU for all projects components. Advances will be channeled through two Designated Accounts, managed respectively by CDR and the PMU. Disbursement methods will include advances, replenishments, reimbursements, direct payments, and special commitments. In requesting disbursements into the DA for expenditures incurred, CDR and the PMU will make use of a Statement of Expenditure (SOE) record. The SOE could be used for: (i) civil works contracts to a value less than USD500,000 equivalent each; (ii) goods contracts costing less than US4250,000 equivalent each; (iii) service contracts for individual consultants costing less than US$50,000 equivalent each and for firms costing less than US$100,000; and (iv) incremental operating costs. Disbursements for services and goods exceeding the foregoing limits would be made in accordance with the respective procurement guidelines and provisions in the Loan Agreement and the Disbursement Letter against submission of full documentation and signed contracts.

10. **Accounting and Reporting.** CDR has accounting software for Bank-supported projects**.** By June 30, 2011 BMLWE will obtain accounting software compatible with that of CDR to enable timely reporting, sharing financial information and consolidation of financial reports. The project will produce quarterly consolidated interim unaudited financial reports (IFRs) and annual project financial statements in compliance with International Public Sector Accounting Standards (IPSAS). The quarterly consolidated IFRs will be submitted by the PMU to the Bank within 45 days after the end of the concerned quarter. CDR will submit its financial reports to the PMU within 30 days of the end of the quarter in order to allow adequate time for consolidation.

11. **Internal Control and Internal Audit.** CDR has adequate internal controls in place for preparation and approval of transactions and segregation of duties related to Bank-supported projects. BMLWE has an internal audit mandate but the position of auditor is vacant. BMLWE will hire an internal auditor who will report to the Director General of BMLWE. Internal audit reports will also be submitted to the Project Steering Committee and the Audit Committee (see below).

12. An Audit Committee will be established from independent members and will review internal audit reports and internal control systems. The project will be required to have internal audits twice a year with reports submitted to the Bank within 45 days of completion of the review.

13. **External Audit.** An auditor acceptable to the Bank will be hired by BMLWE to audit project financial statements, including the activities implemented by CDR related to Component 1. The project audit report and management letter will be submitted to the Bank within 6 months after the end of the audit period. In addition, a special purpose audit of BMLWE will be conducted in accordance with terms of reference acceptable to the Bank by an external auditing company acceptable to the Bank. The special purpose audit of BMLWE will result in the submission by the auditors of two reports: (i) an interim progress report on findings on Internal control environment for year 2010 by Loan effectiveness: and (ii) audited statement of cash receipts and disbursements for the year 2010, and a statement of changes of fund balance for BMLWE as of December 31, 2010 by September 30, 2011. Once its accounting records and chart of accounts are aligned to international accounting standards, starting fiscal year 2012, BMLWE will submit to an entity audit by September 30 of the succeeding year.

14. **Training and Implementation Support.** The Bank will provide training to PMU staff on Bank FM and disbursement guidelines and procedures, and will provide FM implementation support during project supervision. BMLWE will also rely on the available capacity in CDR to obtain assistance on FM issues as needed.

Disbursement Arrangements

15. Tables 2 and 3 below indicate the loan allocations and disbursement percentages for each component**.**

Table 2: Project Cost Summary and Financing Allocations

	Cost	% of Total	IBRD Financing	% Financing
A. Component 1 : Bulk Water Supply				
1. Raw and treated water tunels	130	35.1%	130.00	100.0%
2. Water treatment plant	51	13.8%	2.55	5.0%
3. Transmission pipelines and reservoirs	54.5	14.7%	54.50	100.0%
4. Project Management	0.5	0.1%	0.50	100.0%
B. Component 2 : Distribution and Metering				
1. Distribution and reservoirs	41	11.1%	1.03	2.5%
2. Metering	20	5.4%	1.00	5.0%
C. Component 3 : Project Management, Utility Strengthening and Studies				
1. Project management unit	5	1.4%	3.30	66.0%
2. Utility Strengthening and MOEW Capacity for Oversight	5	1.4%	3.30	66.0%
3. Studies	5	1.4%	3.30	66.0%
Land acquisition	30	8.1%	0.00	0.0%
Contingency	21.5	5.8%	0.00	0.0%
Taxes	6	1.6%	0.00	0.0%
Total Project Costs	369.5	99.9%	199.5	54.0%
Front-End Fee	0.5	0.1%	0.50	100.0%
Total Financing Required	370	100.0%	200.0	54.0%

Table 3: Yearly Disbursement Plan by Component

	2011	2012	2013	2014	2015	2016	2017	Total
A. Component 1 : Bulk Water Supply								
1. Raw and treated water tunels	13.00	26.00	39.00	32.50	19.50	0.00	0.00	130.00
2.Water treatment plant	0.00	5.10	10.20	20.40	10.20	5.10	0.00	51.00
3. Transmission pipelines and reservoirs	5.00	11.00	16.50	13.75	8.25	0.00	0.00	54.50
4. Project Management	0.05	0.10	0.10	0.10	0.10	0.05	0.00	0.50
B. Component 2 : Distribution and Metering								
1. Distribution and reservoirs	8.20	16.40	12.30	4.10	0.00	0.00	0.00	41.00
2. Metering	0.00	0.00	0.00	6.60	6.60	6.80	0.00	20.00
C. Component 3 : Project Management, Utility Strengthening and Studies								
1. Project management unit	0.50	1.00	1.00	1.00	1.00	0.50	0.00	5.00
2. Utility Strengthening and MOEW Capacity for Oversight	0.50	0.50	1.00	1.00	1.00	1.00	0.00	5.00
3. Studies	0.00	1.00	1.00	1.00	1.00	1.00	0.00	5.00
Land acquisition	9.90	9.90	10.20	0.00	0.00	0.00	0.00	30.00
Contingency	1.91	2.20	2.58	2.54	1.28	0.99	10.00	21.50
Taxes	0.53	1.17	1.56	1.55	0.91	0.28	0.00	6.00
Total Project Costs	39.59	74.37	95.44	84.54	49.84	15.72	10.00	369.50

16. Retroactive financing of up to US$12 million will be allowed for eligible expenditures made on or after October 1, 2010 and up to the date of Loan Agreement signing. Payments will be made only for items procured in accordance with applicable Bank procurement procedures.

17. Two Designated Accounts will be opened for this project, each managed respectively by CDR and the PMU. The disbursement methods will be: advance, direct payments,

reimbursement, and special commitments. The minimum amount per withdrawal application is US$100,000 for BMLWE and US$500,000 for CDR. Project disbursement guidelines are documented in the disbursement letter. All documentation showing expenditures shall be retained by CDR and BMLWE and shall be made available to the Bank and its representatives for audit, if requested.

18. Operating Costs comprise the PMU's reasonable and necessary incremental expenditures related to the management and implementation of the Project, including on account of office rental, communication costs, maintenance, insurance and fuel for vehicles and equipment; maintenance and spare parts of equipment; miscellaneous utilities; stationary and office supplies, and advertisement costs, translation and interpretation services, office stationary and consumables expenses based on periodic budgets acceptable to the Bank, but excluding salaries or honoraria of officials and employees of the Borrower's civil services.

19. The PMU will be responsible for the procurement of all project contracts under Components 2 and 3 and the WTP under Component 1. CDR will procure all contracts under Component 1, except for the WTP which will be procured by the PMU. Procurement will be carried out in accordance with the 'Guidelines On Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants' known as the '2006 Anti-Corruption Guidelines', and the "Guidelines: Procurement under IBRD Loans and IDA Credits" dated May 2004, revised in October 2006, and May 2010, and "Guidelines: Selection and Employment of Consultants by World Bank Borrowers" dated May 2004, revised in October 2006 and May 2010; and the provisions stipulated in the Loan Agreement.

Procurement

20. **Procurement of Works**. Works procured under this project under Components 1 and 2, including the raw and treated water tunnels, WTP, storage reservoirs, transmission pipelines and distribution networks, will be undertaken using the Bank's Standard Bidding Documents (SBD) for all ICB packages and for NCB, if any, a translated version or the version in English of the Bank's NCB document, acceptable and cleared by the Bank.

21. **Procurement of Goods**. Goods procured under this project will include supply and installation of water meters and purchase of vehicles using the Bank's SBD for all ICB packages and for NCB, if any, a translated version or the version in English of the Bank's NCB document acceptable and cleared by the Bank.

22. **Procurement Plan and Procurement Arrangements**. The 18-month Procurement Plan for the project, prepared by BMLWE, has been reviewed by the Bank and accepted. This plan will be updated annually to reflect the latest circumstances. The Procurement Plan comprises 8 ICB contracts, as indicated in Table 4 below.

Table 4: Procurement Plan for Goods and Works

Packages	Project Title and Scope	Proc. Method	Pre-qualify. (Yes/No)	Domestic Preference (Yes/No)	Bank Review(Prior/Post)	Expected Bid Opening Date
Component 1						
BWW1-A	Tunnels	ICB	Yes	No	Prior	March 2011
BWW1-B	WTP	ICB	Yes	No	Prior	August 2011
BWW1-C	Trans. Line & Res.	ICB	Yes	No	Prior	July 2011
Component 2						
BWW2-1	Dist. network 1	ICB	No	No	Prior	Jan 2012
BWW2-2	Dist. network 2	ICB	No	No	Prior	Feb 2012
BWW2-3	Dist. network 3	ICB	No	No	Prior	March 2012
BWW2-4	Dist. network 4	ICB	No	No	Prior	April 2012
BWW2-5	Water meters	ICB	No	No	Prior	May 2012

23. **Selection of Consultants** includes: (i) Design and Supervision Consultants for the supply tunnel, WTP, transfer line and water reservoirs under Component 1; (ii) Design and Supervision Consultants for construction of distribution network under Component 2; (iii) and Supervision Consultants for installation of water meters; and consulting services for studies under Component 3. In addition, individual consultants will be selected to strengthen the project implementation capacity. Short lists of consultants (firms) for services estimated to cost less than US$200,000 equivalent per contract may be composed entirely of national consultants in accordance with the provisions of paragraph 2.7 of the Consultant Guidelines. The short lists should normally be composed of firms of similar experience or of not for profit organizations (NGOs, Universities, UN Agencies, etc.) acting in the same field of expertise. If mixing is used, the selection should be made using Quality Based Selection. The short lists shall not include individual consultants.

Table 5: Procurement Plan for Selection of Consultants

Ref. No.	Description of Assignment	Selection Method	Review by Bank (Prior / Post)	Expected Proposals Submission Date
BWC1-A	Des/Supervision of Tunnel	QCBS	Prior	November 2010
BWC1-B	Design/Supervision of WTP	QCBS	Prior	March 2011
BWC1-C	Des/Sup Trans/Reservoir	QCBS	Prior	February 2011
BWC2-1	Des/Supervision of Dist. Net.	QCBS	Prior	July 2011
BWC2-2	Supervision of Meters installation	QCBS	Prior	March 2012
BWC1	Other consultancies	QCBS-IC	Prior	December 2011

24. **Prior-Review Thresholds**. The initial prior review thresholds are indicated in Table 6. These may be increased with increased capacity of the agency during project implementation. There are no post-review packages planned, hence procurement supervision will be along with regular supervision missions planned for the project (twice a year).

Table 6: Procurement Thresholds

	Prior Review Thresholds (US$ million)	**Procurement Method Thresholds (US$ million)**							
		ICB	NCB	Shopping	QCBS	**Q**BS	CQS	Least Cost	SSS
Goods	0.25	≥0.2	<0.2	<0.05					
Works	0.5	≥5	<5	<0.05					
Consulting Services	0.1 for firm 0.05 for individuals SSS: all				default	TBD	TBD	TBD	TBD

C. Environmental and Social Safeguards

25. **Environmental Impacts**. Given the geographical scale of the project and the diversity of its components, as well as the need for land expropriation, the project has been classified as Category "A" triggering the safeguard policy to prepare a full ESIA with public consultation and the preparation of a RAP for all project components as described above.

26. The existing comprehensive EIA (dated April 1998) was revised and updated by the GoL alongside previous studies with special attention to rights of way, expropriation, and potential resettlement. The EIA was revised and updated into an ESIA and examined the potential impacts of the project on various indicators including: (i) ambient air quality; (ii) soil, landscape and visual amenity; (iii) water resources (groundwater and surface water bodies); (iv) biodiversity (fauna and flora); (v) noise and vibration; (vi) archeology; and (vii) socio-economic and public community.

27. The proposed tunnel configuration was justified through a series of alternative analyses that were examined in the EIA of 1998 and the revised ESIA of 2010 based on the feasibility studies presented at both occasions. The alternatives included: (i) No-project option; (ii) transmission options (tunnel with varied alignments and construction methods, pipeline with various materials – concrete, ductile, steel; (iii) treatment plant location and technology; and (iv) sludge management.

28. While it is anticipated that the Greater Beirut Water Supply Project will have significant long-term positive impacts on the economy, employment, infrastructure and services, water supply, environment and public health sectors among others, it will also have several negative impacts during its various stages of implementation that can be minimized with the proper implementation of the ESMP which describes mitigation measures during the construction and operation phases, references control guidelines and standards, outlines responsibilities for the

implementation and supervision of the plan, verification, monitoring and training requirements, record keeping and documentation requirements as well as the level of funding required for implementing the plan.

29. **Social Impacts**. The overall social and economic impact of the project is considered positive. The additional supply expected to meet the city's demand for water will limit the exploitation and distribution of low-quality water. Villages along the tunnels will also benefit from additional water supply options through designated points for potential connection to local distribution networks.

30. Potentially negative social impacts are associated with land acquisition, easement right of way restrictions (ROW), temporary effects of construction and temporary disturbances in circulation and access. These impacts are in general limited and considered manageable by establishing the necessary mitigation measures, as described in the ESMP and the RAP.

31. **Resettlement**. The main impacts of the project that give rise to resettlement are the following: (i) full acquisition of land for the purpose of building surface structures; and (ii) establishment of Right-of-Way (ROW). A RAP has been developed by the GoL and includes land acquisition measures related to all project components. The RAP also describes land acquisitions previously undertaken by CDR. Prior Bank engagement was later abandoned and the World Bank has not been involved in any of these previous expropriations and this has been confirmed in a letter to the Bank from CDR attached to the RAP. The letter also confirms that no pending appeals or otherwise outstanding claims are associated with the expropriations, and that they were carried out in full compliance with Lebanese Law. The records of expropriations are filed with CDR.

32. **Potential Indirect Impact**. Indirect beneficiaries include residents of other Greater Beirut Mount Lebanon regions whose water supply will be augmented due to reduction in diversions of their local water sources as well as a highly likely reduction in the number of unauthorized wells drilled and a reduction in coastal salt-water intrusion. Districts along the conveyor may be able to tap into the water resources through agreements with BMLWE. There are no long-term adverse impacts as a result of project activities.

33. GoL has acceptable environmental, health and safety policies in place. No potential environmental liabilities were identified in the existing elements serving the proposed project. In addition, none of the project components is located close to areas of ecological or cultural significance. A review of other projects which are physically connected to activities under this project confirmed that these are not directly or significantly related to project activities.

34. The Emergency Preparedness and Response procedures and Worker Health and Safety requirements of the CDR Health, Safety and Environment (HSE) were reviewed by the Bank team and found to be consistent with international good practice.

Key Measures to be taken by the Borrower to Address Safeguards Policy Issues

35. Lebanese Law has established general provisions for prior compensation of expropriated assets and easement right fees for other restrictions imposed on property. The project RAP establishes procedures and mechanisms to address gaps between Lebanese expropriation legislation and the requirements of OP 4.12, in particular as regards the mode of compensation for land acquisition and an affordable and accessible grievance mechanism for third-party settlement of disputes arising from resettlement. The RAP was disclosed locally and in the InfoShop on August 6, 2010.

36. Mitigation Measures. Environmental impacts will be mitigated according to measures set out in the EMP, which include: (i) sprinkling construction sites with water; (ii) limiting construction activities to normal working hours, and notifying the local community in advance, if construction activities have to be performed outside these hours; (iii) removing contaminated soils and solid waste, and their disposal to sites approved by local authorities; and (iv) highlighting the prohibition of equipment containing PCB in bidding documents. The EMP will be included in the bidding documents and contracts as legal obligations for contractors. The EMP will be transferred to the respective operating entities for implementation.

37. Compensation/Resettlement Assistance. Involuntary land acquisition will be compensated at prior replacement cost as decided by independent judicial Expropriation and Appeals Commissions in accordance with established legislation and procedures. Compensation is being assessed based on the principle of equitable compensation, interpreted to mean the applicable price on the day of the decision in accordance with the standards prevailing in the immediate neighborhood, and taking into consideration whatever is necessary to restore the affected party to the state before the expropriation. Establishment of Right-of-Way (ROW), as well as restrictions on drilling on plots along the corridor of the conveyor, will also be compensated according to estimations by the Commission on a case-by-case basis depending on the depth of the tunnel and the nature of the restrictions.

38. Apart from losses associated with a minor agricultural business, there will be no loss of any other business or income-generating activities. A family of farmers working and residing temporarily at a greenhouse located within the proposed treatment plant site at Ouardaniyeh was aware of the status of the land when taking up their temporary engagement with the affected landowner. This family will be offered alternative employment and housing under the same conditions through an arrangement with the landowner. This arrangement has been confirmed in a letter to the World Bank that is attached to the RAP.

39. **Capacity for Safeguard Implementation**. An Environmental and Social Specialist in the PMU will be in charge of coordination, monitoring, and supervision of the ESMP as well as land acquisition and resettlement activities. In coordination with various direct stakeholders, the PMU will develop a capacity building and training program. One component of the program targets on-site contractors and supervising consultants regarding the preparation of Construction Environmental Management Plans to ensure the proper implementation of the ESMP. Another component targets on-site employees and introduce them to the ESMP and its requirements.

40. **Community Participation and Public Consultations**. GoL carried out extensive consultations with affected communities, municipalities and stakeholders as part of ESIA preparation, including individual face to face interviews and public consultations. Flyers summarizing the project were distributed to inform the resident population and stakeholders of public consultation sessions. Public consultations were undertaken in accordance with Lebanese legal requirements on public works on May 12, 2010 and July 27, 2010.

41. **Disclosure.** The ESMP and the RAP have been disclosed in the Infoshop in accordance with Bank policy on August 6, 2010.

Monitoring and Evaluation

42. Project progress will be monitored by the Monitoring and Evaluation Specialist. During the early stages of project implementation, progress monitoring will focus on progress of procurement activities against the agreed procurement plan, implementation of the agreed RAP and ESMP, and construction progress on sub-components.

43. The Bank team will work closely with the PMU to evaluate implementation progress during regular supervision missions. The cost of data collection, monitoring and evaluation will be covered by the administrative budget of the Project Steering Committee.

Annex IV: Operational Risk Assessment Framework (ORAF)

Project Development Objective(s)	
Description: The project development objective is to increase the provision of potable water to the residents in the project area within the Greater Beirut region, including those in the low-income neighborhoods of Southern Beirut, and to strengthen the capacity of the Beirut Mount Lebanon Water Establishment (BMLWE) in utility operations.	
PDO Level Results Indicators:	1. Number of people in low-income neighborhoods of Southern Beirut provided with access to potable water supply under the project. 2. Volume of additional potable water (m^3) distributed in project area. 3. Increase in water supply hours to customers served under the project. 4. Number of BMLWE staff trained in utility operations

ORAF Risk Levels	Risk Rating	Risk Description	Proposed Mitigation Measures
Project Stakeholder Risks			
	L	Residents along the water conveyor tunnel alignment may object if they lack access to water supplied by the project.	Monitoring implementation of the project design to allow for water off take by communities along the water conveyor alignment.
Implementing Agency Risks			
	M-L	Lack of effective coordination among different implementing agencies could result in delays in consolidated project financial reports, audit report and payments to contractors and procurement. Procurement may not be performed according to Bank procurement guidelines. Weak capacity at BMLWE for FM, procurement, and safeguards implementation.	The PMU will be responsible for project coordination and reporting under the overall supervision of the Project Steering Committee. Bank supervision missions will assess the status of coordination on an on-going basis and work with the top level officials in resolving issues. A Project Implementation Manual is in place, and describes project implementation arrangements, procurement and FM procedures, including the inter-agency roles and responsibilities. Technical assistance is being provided under the project to strengthen BMLWE capacity to implement the project in accordance with Bank requirements. Mitigation measures have been agreed on the basis of the procurement and FM capacity assessments, and ESMP and RAP (acceptable to the Bank) are in place. Bank supervision teams will monitor implementation of these

			measures/documents carefully and address issues promptly.
Project Risks			
• Design	M-I	The 24 km tunnel design may not meet international engineering standards.	An international consultant in tunneling and tunnel boring machines (TBM) has reviewed the designs.
• Delivery Quality	M-I	BMLWE and CDR may not have adequate engineering expertise/experience to efficiently supervise the extensive tunneling works involved in Component 1. Lack of BMLWE technical and financial capacity to operate and maintain large water supply infrastructure works.	A specialized supervising consultant is included in the consulting services under Component 1. A TBM expert will be a part of select Bank supervision missions. A PMU staffed by experienced professionals will assist BMLWE management in effectively and efficiently implementing the project infrastructure. Training and capacity building is also a key component of the project.
• Social and Environment	M-L	Standards for compensation for land expropriations and implementation of the EMP may not be adequately met.	Implementation of Bank approved project specific Environment and Social Management Plan (ESMP) and Resettlement Action Plan (RAP) will be carefully supervised by the task team.
• Program and Donor	L	No specific risks identified.	None

Overall Risk: Preparation	Risk Rating: Implementation	Comments
M-I	**M-I**	This project has been under preparation by the GoL for many years and has been updated as part of project preparation to reflect the most up to date detailed designs and engineering standards, particularly on the extensive tunneling involved. CDR is an established agency which has successfully implemented many Bank projects in the past and will be responsible for the implementation of Component 1. BMLWE will implement Components 2 and 3, under the supervision of MoEW. For all three components, appropriate mitigation measures are in place to address these risks; these will be monitored on a regular basis throughout implementation.

Legend: L - Low;
M-L - Medium, driven by likelihood
M-I - Medium, driven by impact
H - High

Annex V: Implementation Support Plan

Strategy and Approach for Implementation Support

1. The strategy for implementation support (IS) has been developed based on the nature of the project and its risk profile. It will aim at making implementation support to the client more flexible and efficient, and will focus on implementation of the risk mitigation measures defined in the ORAF, namely the delivery quality and design risk which are rated as M-I, as well as the traditional supervision focus areas including safeguards and fiduciary aspects.

2. Formal supervision and field visits will be carried out semi-annually, and will focus on:

(a) **Technical inputs**. Engineering inputs are required to review bid documents to ensure fair competition through proper technical specifications and fair assessment of the technical aspects of bids. An international tunneling expert will review the detailed designs for the tunnel. During construction and commissioning, technical supervision will be provided to ensure technical contractual obligations are met. The team's water and sanitation engineer will conduct site visits on a semi-annual basis throughout project implementation.

(b) **Fiduciary requirements and inputs**. Training will be provided by the Bank's financial management specialist and the procurement specialist before the commencement of project implementation. The team will support BMLWE in its financial management capacity and to improve procurement management efficiency. The financial management specialist and the procurement specialist will both be based in the country office to provide timely support. Supervision of financial management arrangements will be carried out semi-annually as part of the project supervision plan and support will be provided on a timely basis to respond to client needs. Procurement supervision will be carried out on a timely basis as required by the client.

(c) **Safeguards.** The environment specialist will ensure that training is provided to relevant counterpart staff. On the social side, supervision will focus on the implementation of the agreed RAP. Field visits will be made on a semi-annual basis. The social and environmental specialists will both be country office based.

(d) **Financial review of BMLWE**. A financial specialist will conduct regular reviews of financial status of BMLWE to monitor progress in establishing commercial financial management and accounting practices. This exercise will be combined with regular supervision missions.

(e) **Client Relations**. The Task Team Leader will coordinate the Bank team to ensure project implementation is consistent with Bank requirements, as specified in the legal documents. S/he will meet with senior officials on a regular basis to keep them apprised of project progress and issues requiring resolution at their level.

Implementation Support Plan

3. Staff skill mix required is summarized below.

Skills Needed	Number of Staff Weeks	Number of Trips	Comments
Water Supply Engineer	6 SWs first year, then 2 SWs annually in the following years	Two each year.	
Procurement	4 SWs annually	Fields trips as required.	Country office-based
Social Specialist	4 SWs annually	Fields trips as required.	
Environment Specialist	4 SWs annually	Fields trips as required.	Country office-based
Financial Management Specialist	2 SWs annually	Fields trips as required.	Country office-based
Sector Financial Analyst	2 SWs annually	One per year.	
Task Team Leader	6 SWs annually	Two each year.	

Annex VI: Team Composition

World Bank staff and consultants who worked on the project:

Name	Title	Unit
Parameswaran Iyer	Task Team Leader, Senior Water and Sanitation Specialist	MNSWA
Claire Kfouri	Water and Sanitation Specialist	MNSWA
Mohammed Benouahi	Consultant	MNSSD
Lene Natasha Lind	Senior Social Development Specialist	MNSSO
Sepehr Fotovat	Senior Procurement Specialist	MNAPR
Julie Rieger	Counsel	LEGEM
Augustin Maria	Economist	MNSWA
Mutasem El Fadel	Consultant/Environmental Safeguards	MNSWA
Mona El Chami	Senior Financial Management Specialist	MNAFM
Rima Koteiche	Senior Financial Management Specialist	MNAFM
Raja Iyer	Consultant/Operation Adviser	MNSSD
Hyacinth D. Brown	Senior Finance Officer	CTRFC
Alexander Danilenko	Senior Water and Sanitation Specialist	ETWWP
Zaileen Rahim	Consultant	MNSWA
Philip Morley	Consultant – Tunneling	MNSWA
Asim Gaba	Consultant – Tunneling	MNSWA
Josephine Salang	Senior Program Assistant	MNSWA
Mouna Couzi	Operations Analyst	MNCLB
Vivianne Zoroob	Procurement Assistant	MNCLB

Annex VII: Economic and Financial Analysis
(Additional Annex)

Financial Analysis

1. **Cost recovery.** Table 1 below indicates the current water tariffs in the four RWEs in Lebanon.

Table 1: Water tariffs by RWE (Annual Fees, LBP)

	BML	North	South	Beka'a
Annual fee (based on $1m^3$/day)	200,000	180,000	175,000	140,000
Gauge maintenance	35,000	10,000	22,000	20,000
Total	**235,000**	**190,000**	**200,000**	**160,000**

Note: does not include government VAT (10 percent) and stamp fee (1,000 LBP).
Source: World Bank, 2010, Lebanon - Water Sector: Public Expenditure Review.

2. Around 16 percent of connections are equipped with meters. However, the annual flat fee system remains in place for domestic consumers. Only large consumers, representing around 1 percent of the connections, are levied a volumetric charge. In spite of the current low level of service offered to its customers, BMLWE has achieved relatively high rates of bill collection. Over the 2006-2009 period, around 70 percent of the amounts billed each year have been collected during the same year, and arrears collected each year represented around 20 percent of the amounts billed the same year. As a result, for the last three years, revenues from water bills have represented around 90 percent of the amounts billed.

3. Wastewater services are under the formal jurisdiction of the RWEs as per Law 221. However, these services are currently provided mainly by the municipalities or by unregulated small private operators. Municipalities currently do not charge user fees for wastewater collection services, which are financed by general taxation.

4. **Financial situation of the BMLWE.** According to Law 221, the newly created RWEs are to provide audited financial statements according to corporate accounting principles and auditing standards similar to international practice. However, to date, BMLWE has only prepared financial statements on a cash basis. The information currently available is therefore similar to a revenue and expenditure statement, reporting the amounts billed and collected as well as the different expenditures incurred each year. Since the time of BMLWE's establishment, there have been neither major investment activities nor significant borrowing. BMLWE does not have either outstanding long term liabilities or accounts payable. It does not have debts to any service providers to the company, including electricity providers.

5. At the time of its establishment, BMLWE inherited the cash balance previously accumulated by the Beirut and Mount Lebanon Establishment (BMLE), and held at the Central Bank. Since 2005, BMLWE has consistently registered net operating cash surpluses amounting to US$18 to 32 million per year, leading to the current situation where the utility holds more than US$170 million in cash.

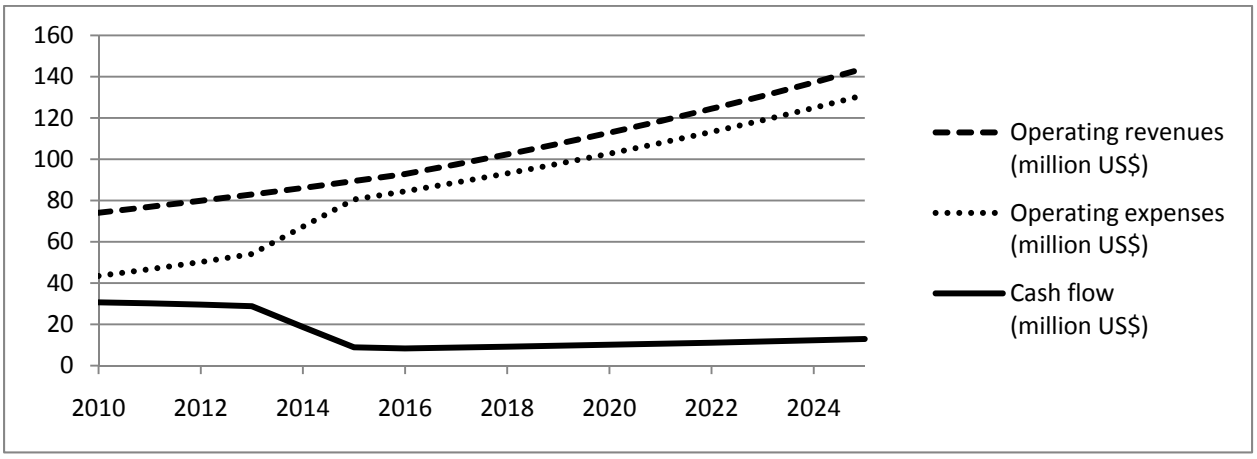
6. **Financial analysis of the proposed Project**. .A financial analysis has been carried out on a cash basis in order to assess the impact of the project investments on the financial situation of BMLWE. The financial simulation is based on the available unaudited data on operating revenues and expenses for years 2006 to 2009 (see Table 2 below), and assumptions described in the next paragraphs.

Table 2: Unaudited Financial Statements from BMLWE (2006 to 2009)
(US$ Million)

Year	2006	2007	2008	2009
# of Subscriptions	357,501	359,071	364,597	371,703
Amount billed	58.1	59.8	61.6	63.2
Collection of amounts billed for the current year	38.0	41.7	42.1	43.7
Collection of amounts billed for previous years	6.1	10.2	14.3	14.1
Subtotal of amounts collected (current and previous years)	44.1	51.9	56.4	57.8
Collection rate	76%	87%	92%	91%
Other revenues	9.5	10.9	11.5	14.5
Total revenues	**53.6**	**62.8**	**67.9**	**72.4**
Salaries, Wages, Compensation & their supplements	15.1	14.9	17.4	19.2
Administrative & General Expenses	2.5	5.0	0.9	1.1
Maintenance Expenses	3.5	3.4	4.9	5.9
Electricity Power	12.5	17.2	13.1	11.5
Investment & Laboratory Expenses	1.8	2.2	3.0	2.3
Total Operational Expenses	**35.5**	**42.7**	**39.4**	**40.0**
Cash Surplus	**18.1**	**20.2**	**28.5**	**32.4**

7. The cash flow projection only looks at the potential evolution of BMLWE revenues and expenses in a scenario that considers only the project investments, without taking into account the effects and financial requirements of other future investments. Within this framework, the utility's client base is assumed to grow from 2010 to 2015, after which it is assumed that the installed infrastructure is fully utilized. Other assumptions used to derive projections of revenues and expenses are presented in the detailed financial simulation report included in the project files. Based on these assumptions, the nominal annual cash surplus of the utility is expected to decrease significantly between 2010 and 2016, from an initial cash surplus of over US$30 million to an expected cash surplus in 2016 of around US$8.3 million. This decrease is due to the assumed incremental O&M costs, not only in production and transport, but also in distribution. Consistent with the assumptions described above, both the operating revenues and operating expenses - as well as the cash surplus - simply follow inflation after 2016.

Figure 1: Results of the Financial Simulation (2010-2025)



Economic Analysis

8. Project beneficiaries live in parts of Beirut municipality and its suburbs of Baabda, Aley and parts of the Metn with populations of 960,000 and 331,000 respectively and do not have 24 hour water supply. The average daily hours of supply vary from 13 hours in the winter to less than 6 hours in the summer. The utility's customers have to cope year round with the unreliability associated with intermittent supply. The costs of coping with intermittent supply include the costs of investment and operation of ground level reservoirs, pumps, and roof tanks. In addition to these costs, it is estimated that around 25 percent of the population connected to the public network in the project area has also to buy water from vendors to meet their needs during the summer season. For the purpose of this analysis, an average coping cost of US$28 per person per year was used.

Project scope and benefits to the population

9. The project will significantly improve the quality and reliability of water supply to Beirut and parts of Metn, Baabda and Aley, including the low-income southern suburbs of Beirut. BMLWE will introduce pressure zones, increase pressure in the distribution network, and implement supervisory control and data acquisition system (SCADA).

10. Benefits for the population consist in the avoided cost of coping with intermittent water supply and with the reduction of volumes supplied in summer. The reduction of water supply interruptions and improved pressure management are also expected to decrease the risk of contamination of the water supplied. However, the associated potential health benefits, and the potential savings associated with reduced consumption of packaged water were not quantified for the purpose of this analysis.

11. Using a discount rate of 10 percent, the Net Present Value (NPV) of the project is estimated at US$100 million, with an Economic Rate of Return (ERR) of 18 percent.

Sensitivity analysis

12. A sensitivity analysis has been carried out for the following alternative scenarios:

(a) Two year delay in project implementation.
(b) 25 percent increase in project costs.
(c) Two year delay in project implementation and 25 percent increase in project costs.

13. The results of the sensitivity analysis, presented in the following table, indicate the robustness of the Project's benefits.

	NPV in US$ 10% Discount Rate	**ERR (%)**
Expected scenario	100 million	18%
Two-year delay in project implementation	67 million	16%
25% increase in project costs	49 million	13%
Two-year delay in project implementation and 25% increase in project costs	19 million	11%

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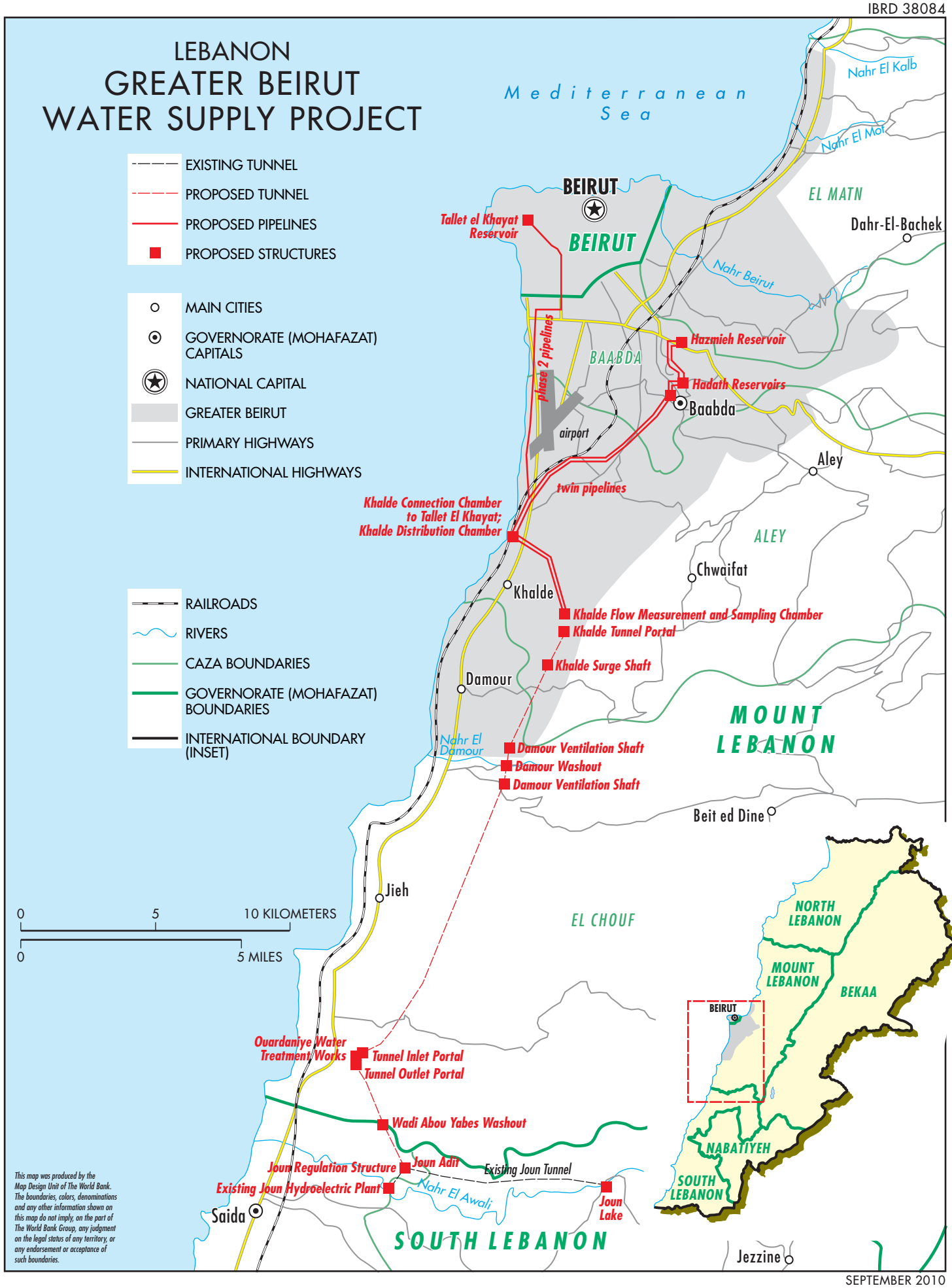
GREATER BEIRUT WATER SUPPLY PROJECT



SEPTEMBER 2010