Global Environment Facility

GEF

Leonard Good
Chief Executive Officer
and Chairman

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May 10, 2004

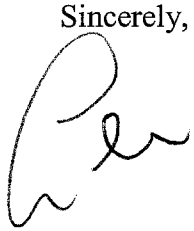
Dear Council Member,

The World Bank, as the Implementing Agency for the project, ***China: Guangdong-Pearl River Delta Urban Environment***, has submitted the attached proposed project document for CEO endorsement prior to final approval of the project document in accordance with the World Bank procedures.

The Secretariat has reviewed the project document. It is consistent with the proposal approved by the Council in March 2004, and the proposed project remains consistent with the Instrument and GEF policies and procedures. The attached explanation prepared by the World Bank satisfactorily details how Council's comments and those of the STAP have been addressed. I am, therefore, endorsing the project document.

We have today posted the proposed project document on the GEF website at www.gefweb.org. If you do not have access to the Web, you may request the local field office of the World Bank or UNDP to download the document for you. Alternatively, you may request a copy of the document from the Secretariat. If you make such a request, please confirm for us your current mailing address.

Sincerely,



cc: Alternate, Implementing Agencies, STAP

THE WORLD BANK/IFC/M.I.G.A.

OFFICE MEMORANDUM

DATE: April 20, 2004

TO: Mr. Leonard Good, CEO/Chairman, GEF

FROM: Steve Gorman, GEF Executive Coordinator

EXTENSION: 35865

SUBJECT: **OP 10 China: Guangdong - Pearl River Delta Urban Environment Project (P075728) Submission for Final CEO Endorsement**

1. Please find attached the electronic file of the GEF Project Document for the above-mentioned project for your final review and endorsement. This project was approved for Work Program entry at the February 2004 Intersessional Council meeting, under streamlined CEO endorsement procedures. The scheduled Board date for this project is **June 3, 2004**. We would appreciate receiving your response, so that we may finalize the Bank Board submission, by **May 3, 2004**.

2. The GEF Project Document is fully consistent with the objectives, scope, and overall cost of the proposal approved at the February 2004 Intersessional Council meeting. GEFSEC, STAP, and Council comments have also been addressed. Modifications to the Project Document and how comments have been addressed are detailed below (***comments are in bold italics***).

Comments from the GEF Secretariat:

3. At CEO endorsement, the GEF Secretariat requested the IA to report on progress in defining a replication strategy of the stress reduction measures being piloted in Guangdong Province within the broader context of the South China Sea an other LMEs of East Asia, including through a strategic partnership approach.

The World Bank has achieved significant progress in defining the possible components of and modalities for delivering a proposed replication strategy and strategic partnership over the past four to five months.

A GEF Project Concept Note on a possible World Bank/GEF Strategic Partnership for a Land-based Pollution Reduction Investment Fund for the LMEs of East Asia was prepared in late 2003. The concept note was informally shared with the GEF Secretariat, UNDP and UNEP, and with the secretariats of the GEF PEMSEA and South China Sea/Gulf of Thailand LME projects. All these GEF partners were either supportive of or had no objections to the concept. Their suggested improvements were incorporated in a revised project concept note.

The revised project concept note was then reviewed by the World Bank East Asia Region's Director of Infrastructure Sector Operations and Director of Urban Development

Operations, both of whom expressed their full support for it. The proposed project was then formally submitted to the GEF Secretariat for entry into GEF pipeline 15 and was approved by the GEF CEO for pipeline entry on March 19, 2004.

Subsequently, the East Asia Region's Director of Urban Development Operations has appointed a Task Team Leader for the proposed project, who is in the process of assembling her task team. The formal East Asia Region management review of the proposed project is scheduled to take place very shortly.

Comments from Council Member from Germany:

4. The promotion of inter-municipal collaboration in waste management facilities investment and operation, is a reasonable way for achieving more cost efficiency with respect to investment and operation cost, as it offers possibilities of economies of scale and streamlining of operation. However given figure of a possible 35% decrease in overall costs established in the preliminary review of existing plans through better rationalisation of treatment plants seem to be greatly overrated. Furthermore, it has to be stressed, that effects of economy will be limited, when a certain size of wastewater treatment plants is achieved and even reverse effects might be observed as centralised systems will require elongated and expensive main sewer connections and often as well as pumping stations and energy consumptions for pumping. Therefore each case has to be analysed and individually planned with care, solutions may comprise centralised inter-municipal installations but shouldn't exclude local and decentralised systems. Nevertheless, the inter-municipal collaboration in pollution control will have positive effects and has to be enhanced.

The Council member's comments that a potential 35% increase in efficiencies appear unrealistically optimistic, are well founded. We agree that the plant size and length of the sewers are cost and efficiency sensitive. The task team will not recommend adoption of large centralized systems as a rule; rather each case will be examined and where appropriate, smaller decentralized systems would also be considered in planning. The current practice in Guangzhou region is for each jurisdiction to construct plants sized between 10,000 m3/d - 25,000 m3/d; the project encourages larger, more efficient plants.

The 35% figure cited in the GEF documentation refers to preliminary work already completed in the Guangdong region based on an analysis which compared one 100,000 m3/d plant versus 5 to 6 plants of average size 20,000 m3/d, which indicated a possible cost reduction of about 35%. The project team interpreted this as an upper limit and in the Log Frame presentation of outputs, a more modest 5% increase in efficiencies through economies of scale is used. This reflects the valid issues of potentially greater sewerage pumping and piping costs, impacts of larger facilities, and greater design and operating sophistication.

5. The Executive Summary differs in some detail from the GEF Project Brief

The Executive Summary has been reviewed for consistency with the project brief.

6. Please let me know if you require any additional information to complete your review of the project document. We look forward to receiving your endorsement of the project for Bank Board approval.

Many thanks.

Attachments

cc: Messrs./Mmes. King, GEF Program Coordination (GEFSEC); Varma, Zearley, Hoornweg, Godavitarne, Fernandes (EASUR); Broadfield (EASES); Hatziolos, Maber, Khanna, Wedderburn, Aryal (ENV); ENVGC ISC, EASUR Files, IRIS

Document of
The World Bank

FOR OFFICIAL USE ONLY

Report No: 27165-CHA

GEF PROJECT DOCUMENT

ON A

PROPOSED CREDIT

IN THE AMOUNT OF US$128 MILLION

AND A

GRANT FROM THE

GLOBAL ENVIRONMENT FACILITY TRUST FUND

IN THE AMOUNT OF US$10 MILLION

TO THE

PEOPLE'S REPUBLIC OF CHINA

FOR THE

GUANGDONG PEARL RIVER DELTA URBAN ENVIRONMENT PROJECT

April 12, 2004

Urban Development Sector Unit
China Country Unit
East Asia and Pacific Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective January 1, 2004)

Currency Unit = Yuan (Y)
Y 1.00 = US$0.13
US$1.00 = Y 8.0

FISCAL YEAR
January 1 -- December 31

ABBREVIATIONS AND ACRONYMS

BOT	Build, Operate Transfer
EA	Environmental Assessment
EMP	Environmental Management Plan
FMS	Financial Management System
GEF	Global Environment Facility
GEMC	Guangdong Environmental Monitoring Center
GDEPB	Guangdong Environmental Protection Bureau
GDFB	Guangdong Financial Bureau
GDPMO	Guangdong Project Management Office
GM	Guangzhou Municipality
GP	Guangdong Province
GPG	Guangdong Provincial Government
GSTC	Guangzhou Sewage Treatment Company
GTDC	Guangdong Tunnel Development Company
GHWMC	Guangzhou Hazardous Waste Management Center
GZPMO	Guangzhou Project Management Office
ICB	International Competitive Bidding
IPCAP	Industrial Pollution Control Action Plan
IST	Institutional Strengthening & Training
MIS	Management Information Systems
MOF	Ministry of Finance
NCB	National Competitive Bidding
PRD	Pearl River Delta
PSP	Private Sector Participation
RAP	Resettlement Action Plan
SAR	Special Administrative Region
SBD	Sample Bidding Document
SDRC	State Development and Reform Commission
SEPA	State Environmental Protection Agency
SOE	Statement of Expenditure
WWTP	Wastewater Treatment Plant

Vice President:	Jemal-ud-din Kassum, EAPVP
Country Manager/Director:	Yukon Huang, EACCF
Sector Manager/Director:	Keshav Varma, EASUR
Task Team Leader/Task Manager:	Thomas Zearley, EASUR

CHINA
GUANGDONG PEARL RIVER DELTA URBAN ENVIRONMENT PROJECT

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MAP(S)
IBRD No 32949

CHINA
Guangdong Pearl River Delta Urban Environment Project

GEF Project Document

East Asia and Pacific Region
EASUR

Date: April 12, 2004
Sector Manager/Director: Keshav Varma
Country Manager/Director: Yukon Huang
Project ID: P075728
Lending Instrument: Specific Investment Loan (SIL)

Team Leader: Thomas L. Zearley
Sector(s): Sewerage (70%), Solid waste management (20%), Sub-national government administration (10%)
Theme(s): Water resource management (P), Environmental policies and institutions (P), Pollution management and environmental health (P), Infrastructure services for private sector development (S)

Global Supplemental ID: P084003
Sector Manager/Director: Keshav Varma
Lending Instrument: Specific Investment Loan (SIL)
Focal Area: I - International waters
Supplement Fully Blended? No

Team Leader: Thomas L. Zearley
Sector(s): Sewerage (70%), Solid waste management (20%), Sub-national government administration (10%)
Theme(s): Pollution management and environmental health (P) , Water resource management (P), Infrastructure services for private sector development (S)

Project Financing Data

[X] Loan [ ] Credit [X] Grant [ ] Guarantee [ ] Other:

For Loans/Credits/Others:
Loan Currency: United States Dollar
Amount (US$m): 128.00 + Global Environment Facility (GEF) Grant: 10.00
Borrower Rationale for Choice of Loan Terms Available on File: ☒ **Yes**
Proposed Terms (IBRD): Variable-Spread Loan (VSL)
Grace period (years): 5 **Years to maturity:** 20
Commitment fee: 0.75% **Front end fee (FEF) on Bank loan:** 1.00%

Financing Plan (US$m): Source	Local	Foreign	Total
BORROWER/RECIPIENT	293.90	10.48	304.38
IBRD	24.70	103.30	128.00
GLOBAL ENVIRONMENT FACILITY	7.52	2.48	10.00
Total:	326.12	116.26	442.38

Borrower/Recipient: PEOPLE'S REPUBLIC OF CHINA
Responsible agency:
GUANGDONG PROVINCE, through the Guangdong Provincial Finance Bureau's World Bank Project Management Office
Address: 26 Cang Bian Road, Guangzhou, China
Contact Person: Mr. Yuchang Zeng, Executive Director General
Tel: (86 20) 8333 6405 Fax: (86 20) 833 30007 Email:

P075728 Estimated Disbursements (Bank FY/US$m):									
FY	2005	2006	2007	2008	2009	2010			
Annual	7.90	11.90	33.50	51.30	16.80	6.60			
Cumulative	7.90	19.80	53.30	104.60	121.40	128.00			

P084003 (GEF) Estimated Disbursements (Bank FY/US$m):								
FY	2005	2006	2007	2008	2009	2010		
Annual	0.40	1.30	2.80	3.70	1.00	0.80		
Cumulative	0.40	1.70	4.50	8.20	9.20	10.00		

Project implementation period: 01/01/2004 - 06/30/2009

Expected effectiveness date: 12/01/2004 **Expected closing date:** 12/31/2009

OPCS PAD Form: Rev. March, 2000

A. Project Development Objective

1. Project development objective: (see Annex 1)

1. The development objective of the project is to assist in addressing the environmental problems of the Pearl River Delta in Guangdong Province and the South China Sea, through the improvement and rationalization of environmental service delivery based on a regional planning approach.

2. Global objective: (see Annex 1)

The project's global environmental objective is to improve the environmental condition of the South China Sea's large marine ecosystem (LME), by addressing the major threat of land-based pollution.

The Global Environment Facility (GEF) has agreed to help the littoral states manage and sustain the South China Sea's LME to achieve global environmental benefits. With the cooperation of the GEF/UNDP/IMO Partnerships in Environmental Management for the Seas of East Asia and the GEF/UNEP Project on Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand, GEF-supported analyses have identified land-based pollution as one of the most serious trans-boundary threats to the South China Sea, and China's Pearl River Delta as one of its land-based pollution "hot-spots" and the largest source of land-based pollution emanating from China. By reducing land-based pollution from the Pearl River Delta, the project will help reverse the degradation of the South China Sea, and generate trans-boundary environmental benefits for the millions of people whose livelihood and health depend on it.

3. Key performance indicators: (see Annex 1)

Key performance indicators relating to the development objective are:
(a) Increased percentage of domestic wastewater collection and treatment
(b) Increased pretreatment of industrial wastewater before discharge, and relocation of highly polluting industries
(c) Increased collection and treatment of hazardous wastes
(d) Improved water quality monitoring information, and data sharing for environmental management
(e) Increased collaboration between Guangdong and Hong Kong Special Administrative Region (SAR) for environmental management of the PRD and the South China Sea region.

B. Strategic Context

1. Sector-related Country Assistance Strategy (CAS) goal supported by the project: (see Annex 1)
Document number: R2002-0218 (IFC/R2002-0224) **Date of latest CAS discussion:** 1/22/03

CAS Memorandum of January 22, 2003 and Country Program Matrix (FY03-05)

The project is consistent with the themes and specific goals of the CAS. It will facilitate the urban transition that is underway in China, by helping to enhance the productivity of cities, create employment opportunities, and improve environmental infrastructure and urban living conditions. Project investments it will support the environmentally sustainable development process, by improving the management of water resources and hazardous waste.

1a. Global Operational strategy/Program objective addressed by the project:

The initiative in this project will be one of the first major elements of a planned large-scale, long-term program of GEF co-financed assistance to the littoral states of the Seas of East Asia. It will help them address the worsening land-based pollution which is threatening these seas. The strategic frameworks for this program are the GEF/UNDP/IMO-catalyzed "Sustainable Development Strategy for the Seas of East Asia," endorsed on December 12, 2003 by a Ministerial Forum on the Sustainable Development of the Seas of East Asia in Putrajaya, Malaysia, and the emerging GEF/UNEP Strategic Action Plan for Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand.

The project is consistent with GEF's Operational Program in that it will help China reduce land-based pollution of the South China Sea and the Seas of East Asia. The "Sustainable Development Strategy for the Seas of East Asia" has identified land-based pollution as one of the region's most urgent trans-boundary marine environmental action priorities. The Strategy regards the Pearl River as China's largest source of land-based pollution of the South China Sea and Guangdong Province as the most concentrated source of that pollution.

In addition, the project is consistent with GEF's Operational Program 10. The project provides an opportunity for creative solutions to reduce the contamination of an international body of water. The goals of the project are innovative in themselves – to identify joint municipal environmental investments and private-public and private-private investments. So is the proposed use of GEF resources as an incentive for municipalities to undertake joint investments to demonstrate the cost-effectiveness of this approach.

The project is also consistent with GEF's Strategic Priorities 1 and 3 for the International Waters Focal Area in FY2004-06. With respect to Priority 1, the project will support China's efforts to make more effective use of resources for implementing policy and to promote legal and institutional reforms China had previously agreed to with assistance from GEF and/or its equivalent. As called for under this strategic priority, the project (a) is fully mainstreamed into the World Bank's country assistance and lending program for China, (b) promotes engagement of the private sector, and (c) is consistent with the GEF principle of incremental cost financing. Furthermore, by 2004-06, GEF plans to double the number of trans-boundary bodies of water that it has had a positive impact on; this project will contribute to the achievement of that goal. With respect to Priority 3, GEF assistance focuses on ways to demonstrate, test and replicate innovations to (a) reduce barriers to policy reform, (b) achieve more efficient use of public resources by promoting inter-municipal collaboration on large-scale waste management investments, (c) increase private sector investment in, and operation of waste management facilities, and (d) promote international collaboration on reducing land-based pollution of a shared water body. The project will pilot test and demonstrate two particularly innovative GEF financial incentive measures, *viz:* (i) the development of incentives for inter-municipal shared infrastructure and for private investment and/or management contracting and public/private partnerships in the reduction of land-based pollution; and (ii) the potential to use "revolving funds," such as reimbursable no-interest loans and guarantees, to accelerate private sector participation. This project represents one of the three to four pilot programs that the GEF has committed to support in FY2004-06.

2. Main sector issues and Government strategy:

Background. The Pearl River Delta (PRD) region has witnessed phenomenal economic growth, with the GDP rising by an average 14.7 percent annually over the period 1990-2000. The Delta region has become a major outlet for manufactured goods to the rest of the world. In 2002, Guangzhou made the highest contribution to the GDP of the Province, with Yuan 644 billion/year (US$80.5 billion). The population of Guangdong Province was 86.4 million (2000 Census), of which 39.7 million was in the PRD. Guangzhou City had a migrant population of over 4 million in 2000 (about 47 percent of total population).

The PRD's rapid economic growth has come at a heavy environmental cost. Water quality in many stretches of the Pearl River, especially around Guangzhou, Foshan and Dongguan, is worse than Class V standard, which makes the river system unsuitable for irrigation, aquaculture, and potential recreational uses, and also contributes to serious pollution of the South China Sea. Related sector issues are discussed in the following paragraphs.

Regional Planning. Planning for environmental infrastructure in the PRD, and Guangzhou is based on narrow administrative boundaries rather than drainage catchments or rational planning. The recently announced PRD Clean-up Campaign (PRDCC) calls for the construction of 162 wastewater treatment plants, estimated to cost over Yuan 45 billion. The result would be a proliferation of uneconomic small capacity plants that will require high capital and recurrent costs. Current planning does not lay adequate emphasis on regional planning considerations, economies of scale and least-cost strategies. Opportunities for regional environmental planning and management for the PRD and the South China Sea, involving a range of stakeholders in Guangdong, Hong Kong and Macao, have not been adequately explored.

Wastewater Management and River Water Quality. Many sections of the Pearl River, especially in the vicinity of Guangzhou, Foshan, Dongguan and Shenzhen, have pollution levels that result in the water quality being lower than Class V. Main pollution sources entering the river system are from untreated domestic and industrial wastewater and non-point sources. The water is unsuitable for use as drinking water, for leisure purposes, and for preservation of aquatic life. An accelerated investment program to collect and treat domestic wastewater has begun.

In 2000, total wastewater generation (domestic and industrial) was estimated to be about 11.5 million m3/day. By 2010, it is projected to rise to about 12.3 million m3/day by 2010, of which 2.1 million m3/day is industrial wastewater. In terms of total wastewater generation, Guangzhou contributes about 25% of the total load; other PRD cities of Dongguan, Shenzhen and Foshan follow at 15%; 14% and 13%, respectively. Total treatment capacity in the PRD is about 2.6 million m3/day, treating approximately 28% of domestic wastewater. By 2010, the PRD expects to add about 8.81 million m3/day treatment capacity.

Hazardous Waste and Sludge Management. The growing volumes of hazardous wastes, and the reported illegal dumping, pose considerable risks to health, and surface and ground water sources. There is one hazardous waste treatment plant is in Shenzhen, and construction of incinerators is being considered by PRD towns.

Furthermore, disposal of large volumes of sludge, of over 1,500 tons/d, will be a problem as the PRD increases its wastewater treatment capacity. The first sludge treatment facility, of 800 tons/d capacity, is currently under construction in Guangzhou. The heavy metal content in sludge is a concern; however, recent data indicate a reducing trend, due largely to the Province's industrial pollution control action program. Guangdong has started to address this problem through increased monitoring and enforcement.

Water Quality Monitoring and Data Management. Uncoordinated and inadequate monitoring of environmental conditions, and lack of real time data in the PRD, hamper planning, regulation and enforcement of standards by agencies responsible for regulation, particularly with regard to drinking water standards, river water quality, pollutant contribution from industry, and municipal and non-point sources. Guangdong has begun a pollution monitoring and enforcement drive, and publishing some environmental data.

Vulnerable Population. Some PRD cities are facing growing social pressures from vulnerable populations. Informal migrants are particularly vulnerable; often they lack access to basic environmental infrastructure services, or are provided access at higher prices through intermediaries (e.g., landlords). Ensuring affordable access to services for all segments of PRD's vulnerable population has become a major challenge for these cities.

Pricing of Urban Services. Charges for water supply and wastewater services recover only a portion of the true cost of providing the services. There is no cost recovery for transfer and disposal of municipal solid wastes – except for a new garbage fee in Guangzhou, and a small charge for collection of wastes from houses to the collection points. Availability of adequate funding to pay for these services becomes especially important in light of a trend to engage private service providers in environmental infrastructure.

Guangdong Provincial Government's Strategy.

Guangdong's Urban Environmental Plan for Pearl River Basin within Guangdong (112,000 km2) is summarized below:

Targets	**2005**	***2010***
River reaches satisfy water quality objectives	75%	80%
Industrial wastewater treated to standards	85%	90%
Larger cities: domestic wastewater treated to standards	60%	70%
PRD cities: domestic wastewater treated to standards	50%	60%
Investment for environmental protection, as a percentage of GDP	2.5%	3.0%

Guangdong has adopted a plan to accelerate wastewater management in the Pearl River Delta through the PRD Cleanup Campaign (PRDCC), which sets out phased targets to meet water quality standards. Objectives of the PRDCC would be achieved through: (i) industrial pollution control: monitoring and control of discharges from 179 key polluting industries, including relocation of the worst polluting industries; (ii) domestic wastewater treatment: construction of 162 wastewater treatment plants (WWTPs) to treat about 12.23 million m3/day; (iii) agriculture and livestock pollution control: banning and relocation of poultry industries from water supply catchments of the PRD, and enforcement of provincial and national SEPA guidelines; and (iv) river rehabilitation: comprising integrated (a) rehabilitation of key rivers, (b) water pollution control and management in Guangzhou, Dongguan and Foshan, (c) integrated rehabilitation of urban creeks, (d) domestic solid waste treatment, and (e) ecosystem development and protection.

In addition, GPG plans to pursue a regional approach to wastewater management planning, including environmental infrastructure development in cooperation with Hong Kong SAR.

The Guangdong regional hazardous waste management program to be completed by 2005, includes: (a) Guangzhou Hazardous Waste Secured Disposal Center, (b) Guangdong Hazardous Waste Comprehensive Treatment Demonstration Center (Phase I); (c) Shenzhen Hazardous Waste Treatment Station and Secured Landfill (Phase II); and (d) Yuexi Hazardous Waste Treatment Center (Phase I) and Guangdong Toxic Chemical Waste Treatment Center.

Under the Tenth Five-year Plan, the Guangdong EPB is required to install automatic water quality monitoring, and report water quality of surface waters daily and monthly. Implementation of this program

began in early 2003.

Guangzhou has an approved industrial pollution control program (2002–2015) under implementation, which includes monitoring and enforcement of industrial wastewater discharges, and a phased program to relocate the worst polluting industries to special industrial locations.

3. Sector issues to be addressed by the project and strategic choices:

The project will assist Guangdong Province in addressing environmental service delivery and associated investment in an integrated manner, through support for: (i) regional planning of environmental infrastructure; (ii) inter-municipal jointly-managed environmental infrastructure development; (iii) cost-effective wastewater management; (iv) environmentally safe treatment and disposal of hazardous wastes; (v) environmental management on a wider regional basis; (vi) public-private partnerships and private sector service provision; and (vii) industrial pollution control.provision; and (vi) industrial pollution control.

C. Project Description Summary

1. Project components (see Annex 2 for a detailed description and Annex 3 for a detailed cost breakdown):

In addition to financing environmental infrastructure investments, the project would support regional planning reform, preparation of a regulatory framework, public-private partnerships, inter-municipal cooperation, as well as institutional strengthening and training (IST) at both provincial and city levels, as follows:

(1) *Wastewater Management*: Enhancement of wastewater facilities in Guangzhou, through construction of two wastewater treatment plants of 200,000 m3/d capacity each, and about 500 km. of sewerage networks, including preparation of a sludge management plan;

(2) *Regional Hazardous Waste Management*: Construction of the first phase of the hazardous waste treatment center comprising a pre-treatment center and landfill of 150,000 m3/d capacity to treat wastes from Guangzhou and neighboring municipalities, including preparation of a regulatory framework for hazardous waste management, and support for public-private partnerships;

(3) *Inter-Municipal Environmental Infrastructure*: The component is a pilot activity to promote environmental infrastructure development for three groups of two or more municipalities, districts or towns willing to plan, construct and manage shared facilities. Two subprojects have already been identified, and memoranda of understandings have been signed by the cooperating parties. A portion of the GEF grant will be used to provide grants to support this initiative . Implementation will follow preparation of a framework for cooperation among contiguous municipalities, districts or towns in environmental infrastructure development, and appraisal of eligible subprojects. The review and update of the PRD wastewater management plan (a.k.a the PRD Cleanup Campaign) is a key initiative under this component that would result in more economic and least cost wastewater facility planning, and promote inter-municipal collaboration;

(4) *Water Quality Monitoring and Information Systems:* The component will finance physical investments and information systems to enhance the capacity of the Provincial Environmental Protection Bureau (GDEPB) for water quality monitoring, consistent with the national program of the State

Environmental Protection Agency (SEPA). This would include installation of a network of automatic monitoring stations; real- time data assembly and processing at control center, development of databases, a website, management information system, and data sharing arrangements with Hong Kong. Implementation will follow the formulation and appraisal of the water quality monitoring program. A portion of the GEF grant will be used to support the capacity-building technical assistance activities, which will be implemented as complete package; and

(5) *Institutional Strengthening & Training*: Technical assistance for (i) financial, institutional and project management support; (ii) public hygiene promotion; (iii) strategic studies for regional planning and urban development; and (vi) training and study tours.

Component	Indicative Costs (US$M)	% of Total	Bank financing (US$M)	% of Total	GEF financing (US$M)	% GEF financing
(1) Wastewater Management	325.00	73.5	111.22	86.9	0.00	0.0
(2) Hazardous Waste Management	24.00	5.4	9.60	7.5	0.50	5.0
(3) Inter-Municipal Environmental Infrastructure[1]	64.90	14.7	0.00	0.0	7.60	76.0
4) Water Quality Monitoring and Information Systems[1]	11.60	2.6	0.00	0.0	1.90	19.0
(5) Institutional Strengthening and Training	6.40	1.4	5.90	4.6	0.00	0.0
Global Components	0.00	0.0	0.0	0.0	0.00	
Total Project Costs	431.90	97.6	126.72	99.0	10.00	100.0
Interest during construction	9.20	2.1	0.00	0.0	0.00	0.0
Front-end fee	1.28	0.3	1.28	1.0	0.00	0.0
Total Financing Required	442.38	100.0	128.00	100.0	10.00	100.0

1\ Loan amounts for components 3 & 4 above, are indicative pending finalization of the investment proposals, satisfactory to the Bank

Global Environment Facility (GEF) Co-financing

The project-specific GEF grant of US$10 million will support three broad areas, as indicated in the table below:

Environmental Monitoring and Information Sharing	
(i) MIS, software, and applications	1,200,000
(ii) Website development and information dissemination	200,000
(ii) Air & water quality database on PRD-South China Sea pollution	200,000
(iii) Conference on PRD-South China Sea environmental management framework	50,000
(iv) Pollution monitoring information sharing, in Pearl River stretches near Guangzhou	200,000
Public- Private Partnerships	
(i) Preparation of regulatory framework, and bid document to select a private service provider for pretreatment facility and landfill	400,000
(ii) Preparation of a waste survey and corporate market assessment	50,000
(iii) Bid document to select PSP or BOT for wastewater management	400,000
Inter-municipal Environmental infrastructure	
(i) Study of constraints to inter-municipal infrastructure development	100,000
(ii) Subprojects to support inter- or intra-municipal infrastructure development	6,800,000
(iii) Review and updating of PRD CC(i.e., wastewater master plan)	400,000
Total	*10,000,000*

2. Key policy and institutional reforms supported by the project:

Policy and institutional reforms supported by the project include: (a) regulatory framework for hazardous waste management; (b) framework for private sector participation; (c) cost-effective models for inter-municipal cooperation in planning and management; (d) improved regional planning; (e) utility institutional and financial reform.

3. Benefits and target population:

The project will generate important benefits. These include: (a) a cleaner environment due to improved water quality of the PRD river systems; (b) reduced health risks due to reduction in water source pollution from wastewater and hazardous wastes; (c) an expansion of the environmental infrastructure, which will contribute to an improved quality of life for the PRD residents; the latter includes vulnerable migrant populations; (d) less need for government subsidies due to enhanced cost recovery for services; (e) institutional reforms which will facilitate public-private participation in the provision of utility services; (f) improvements in the quality, quantity and sustainability of public utility services; and (g) continued economic growth in the PRD which should generate increased employment opportunities.

The target population is about 30 million within the PRD, including the 14 million residents of Guangzhou metropolitan area, who would benefit through improved quality of the environment and river systems. Approximately 6.9 million residents of Hong Kong would also benefit through protection of the vital drinking water supply from the PRD, and from reduced water pollution in the South China Sea.

4. Institutional and implementation arrangements:

The Guangdong Provincial Government Office for World Bank Projects (GDPMO), established within the Guangdong Provincial Finance Bureau (GDGB) is responsible for the overall coordination of the project. Its responsibilities include: (a) annual budget preparation; (b) project-wide quality assurance; (c) progress reports to GPG and the Bank, which address cost management, project impact and an assessment of improvements to the environment; (d) inter-agency coordination and procurement support; (e) administration of the GEF Grant; and (f) the implementation of the institutional strengthening and training component. Guangzhou city has also setup its own Project Management Office (GZPMO) to oversee preparation and implementation of its components. In accordance with national practice, other cities that intend to participate in the project (viz. the Inter-municipal Environmental Infrastructure component) would establish their own project management offices.

The sector agencies will implement their respective components. For example, the Wastewater Management component will be implemented by the recently-established Guangzhou Sewage Treatment Company (CSTC). It will contract the Guangzhou Tunnel Development Company (GTDC) to manage the construction of the investments. The Hazardous Waste Management component will be carried out by the Guangzhou Hazardous Waste Management Center (GHWMC). When completed, the facility will be operated by a private service provider selected under a bidding process to be financed under the project. The Guangdong Environmental Monitoring Center (GEMC), within the Guangdong Provincial Environmental Protection Bureau (GDEPB) will be responsible for implementation of the water quality monitoring component.

Proposed Inter-municipal Environmental Infrastructure. Implementation of this component will commence after satisfactory appraisal by the Bank of the framework and of investment proposals consistent with the approved framework. The framework would establish the overall principles and

guidelines for sharing the costs, ownership, operation and maintenance of environmental facilities, and provide institutional models for construction and management of shared facilities. Investment proposals would describe the specific institutional arrangements, capital cost sharing and operating plans for the proposed facilities. The framework would be completed for review by the Bank by no later than July 31, 2005, and investment proposals submitted by no later than December 31, 2005. The sub-projects would be financed solely from local sources of funds. Notwithstanding the source of financing, the subprojects will be prepared to standards applicable to loan-financed components, and procured in accordance with Bank procurement guidelines.

To promote this initiative, incentives would be provided, including GEF grants for capital cost and O&M support for each eligible subproject. It is expected that each eligible subproject would be implemented by the respective entities of the municipal governments, districts or towns.

Proposed Water Quality Monitoring and Information Systems. Implementation of this component will commence after formulation of a water quality monitoring program, satisfactory to the Bank. The GDEPB will have overall responsibility for the proposed Water Quality Monitoring component, and also be responsible for implementing the GEF-financed review and update of the PRD Cleanup Campaign - PRDCC (i.e., wastewater master plan). The GDEPB will implement the GEF-supported technical assistance as a complete package, without unbundling. The physical investments (i.e. goods and works) would be financed solely from local sources of funds. Notwithstanding the source of financing, the component will be prepared to standards applicable to loan-financed components, and procured in accordance with Bank procurement guidelines.

Under a separate GEF project - Livestock Waste Management in East Asia, GDEPB has agreed to prepare a Terms of Reference for preparation of an Action Plan for Livestock Waste Management.

Procurement. The CMC International Tendering Corporation, No.1 Department, in a joint venture with the GMG International Tendering Company Limited, has been retained as the procurement agency for all aspects of civil and electrical and mechanical works requiring International Competitive Bidding (ICB).

Onlending Arrangements: The proposed loan of $128 million will be made to the People's Republic of China at the Bank's standard interest rate for LIBOR-based US dollar single currency loans. The loan will be for 20 years, including a five-year grace period. China will onlend to Guangdong Province (GP), on the same terms and conditions. GP will onlend part of the loan proceeds to Guangzhou Municipality (GM) on the same terms and conditions. GM will onlend part of the loan proceeds to the Guangzhou Sewage Treatment Company (GSTC) for 15 years, including a five year grace period, at the same interest rate and commitment charge as applicable to the Bank loan to China.

The loan would be disbursed as follows: (a) civil works - 50 percent; (b) goods- 100 percent of foreign exchange, 100 percent local (ex factory) and 75% local expenditures, (c) consultant services- 91 percent; and (d) training- 100 percent.

A Special Account in the amount of US$10 million will be set up. Retroactive financing in the amount of US$5 million has been provided for expenditures incurred for advance works and consultant services procured after October 1, 2003, as agreed with the Bank.

Utilization of the GEF Grant. A portion of the GEF-supported grant (US$6.8 million) will be used to provide incentives for up to three subprojects under the Inter-municipal Environmental Infrastructure Component. Each shared facility will receive a capital cost grant of about US$ 1.6 million equivalent, paid

in two installments, 30 percent and 70 percent of the grant upon completion of 30 percent, and 100 percent of the appraised estimated cost of the subproject, and an O&M support grant of about US$ 0.67 million equivalent, disbursed in two equal amounts, paid at 6 and 18 months after commissioning of the facility. US$0.1 million will be used to develop the framework/study of the component. The GDEPB will utilize US$2.25 million of the grant to implement the GEF-supported technical assistance, and the review and update of the PRD wastewater management plan. The balance of the funds (US$0.85 million) will finance the preparation of a regulatory framework, selection of an operator for the facility, and a waste survey for hazardous waste management, and for preparation of a bid document for BOT or other public-private partnerships. A Special Account of US$175,000 will be set up to finance the technical assistance activities only. Payment of the capital and O&M grants will be made upon certification by the Task Team Leader that the conditions to its disbursement have been met.

Monitoring and Evaluation Arrangements: The project will be supervised during semi-annual Bank missions. Headquarters and staff members of the World Bank Office in Beijing would cooperate in this activity. During implementation, GDPMO will prepare semiannual progress reports on the physical and financial progress of all components, and project performance compared to objectives. Bank missions will also monitor progress in implementation of the non-Bank financed (a) Industrial Pollution Control Action Plan (IPCAP), (b) the Inter-municipal Environmental Infrastructure component; and (c) the Water Quality Monitoring component. The first monitoring report would be prepared by January 31, 2005; the last on January 31, 2010. In addition, GDPMO will prepare an implementation completion report within six months of the closing date of the project. It will refer to the objectives and the achievements of the project, costs and benefits derived, and the performance and contribution of all parties associated with it.

D. Project Rationale

1. Project alternatives considered and reasons for rejection:

(i) A coherent regional development approach has been selected in preference to planning based on the smaller jurisdictional boundaries.
(ii) During project identification, the use of an Adaptable Program Lending (APL) instrument was considered, following on the model of Shanghai. There was not sufficient support for this from the central government, as it had not yet gained sufficient confidence on the process. Moreover, in Guangdong, there was only one city- Guangzhou - seeking financing, and to pursue the approach would have resulted in delays, and Guangzhou might have lost interest. Therefore the APL option was rejected.
(iii) Originally, the task team believed that to have an impact it was necessary for more than one city to participate in the project. That could still happen during the implementation. Nevertheless, Guangzhou has made a firm commitment to proceed with the Bank whether or not other cities participate. Investments in Guangzhou city, plus incentive-based investments for two or more town with a shared infrastructure, will be a significant step forward.
(iv) GPG's strategic plan to construct many small wastewater treatment plants was considered and rejected. The plan was expensive, and it did not meet the Bank's criteria as a least cost option. The review and updating of the PRD wastewater management plan is a key activity under the project.
(v) Project intervention to treat only municipal wastewater considered and rejected. Without complementary interventions to control pollution from industries, limited benefit will accrue. Therefore, GPG has prepared an Industrial Pollution Control Action Plan (IPCAP) to be implemented in parallel with the project using own funds, to address the worst polluting industries.
(vi) Use of incinerators to treat hazardous waste was considered during the early stages. Indeed, incineration of some types of hazardous wastes may be appropriate in cement kilns, which have high temperatures and a long retention period. Shenzhen has a hazardous waste incinerator for specific waste

generated in Guangdong Province. Therefore, there was no apparent need for a new waste incinerator. For inorganic hazardous wastes, however, the most economical solution is to provide treatment and stabilization followed by a landfill. The proposed hazardous waste landfill, equipped with pre-processing facilities, is necessary to minimize transportation and maximize regional waste disposal.

2. Major related projects financed by the Bank and/or other development agencies (completed, ongoing and planned).

Sector Issue	Project	Latest Supervision (PSR) Ratings (Bank-financed projects only)	
		Implementation Progress (IP)	Development Objective (DO)
Bank-financed			
Urban environment including wastewater and solid waste	Yunnan Environment Project	S	S
Urban environment including waste water and solid waste	Guangxi Urban Environment Project	S	S
Urban environment: wastewater and tariff reform policy	Second Shanghai Sewerage Project	S	S
Urban environment including wastewater and district heating	Shandong Environment Project	U	S
Urban environment including wastewater and solid waste	Shanghai Environment Project	S	HS
Urban environment including wastewater and solid waste	Sichuan Urban Environment Project	S	S
Urban Environment including wastewater and solid waste	Chongqing Urban Environment Project	S	S
Urban environment including wastewater	Hebei Urban Environment Project	S	S
Urban environment including wastewater and solid waste	Liaoning Environment Project	S	S
River Basin Pollution Control including wastewater and industrial pollution	Huai River Pollution Control Project	S	S
River Basin Pollution Control including wastewater and industrial pollution	Liao River Basin Project	S	S
Urban Transportation	Guangzhou City Center Transport Project	S	S
Urban Development, including pollution management and environmental policies	Shanghai Urban Environment Project (APL1)	S	S
Other development agencies			
The Asian Development Bank and various bi-lateral donors (Austria, Australia, Denmark, Finland, Germany, Japanese, UK) are active in urban environment projects and sector policy dialogues/capacity building initiatives.	ADB has had generally successful investment operations, and is currently expanding its support to the urban sector in China. Other donor agencies have reported satisfactory results with their programs, although they are pressing participating utilities to give more attention to institutional and financial		

	matters.		

IP/DO Ratings: HS (Highly Satisfactory), S (Satisfactory), U (Unsatisfactory), HU (Highly Unsatisfactory)

3. Lessons learned and reflected in the project design:

Since its first loan in 1985, the Bank has committed US$2.2 billion under 22 projects for water supply and wastewater operations in China. A 2002 Operations Evaluation Department (OED) Report (China: Review of the Bank's Assistance to the Urban Water Supply and Wastewater Sector, Report No. 24979) rates the outcome of the Bank's assistance moderately satisfactory, its sustainability as likely, and its institutional impact as modest. OED also rates both Bank performance and borrower performance satisfactory. The key lessons learned and recommendations are:

(i) least-cost analysis of future Bank-financed projects should always include improved incentives and support for water demand management;
(i) tariffs in future Bank-financed projects should be set by the level of average incremental costs, which signals future costs;
(iii) recent policy of conditioning future Bank financing on the establishment of autonomous wastewater companies be continued;
(iv) future Bank financing should give priority to cities and provinces that are willing to contribute a larger share of planned investments from internal cash generation; and
(v) next generation of Bank sector projects should include private sector participation where there is political support in favor of such participation.

All of these lessons and recommendations have been taken into account in designing and preparing project.

4. Indications of borrower and recipient commitment and ownership:

Guangdong Province and Guangzhou Municipality have demonstrated their commitment to the project by their fast track preparation, the retention, from previous projects, of dedicated project management offices, and their identification of candidate investment projects within an evolving strategic planning framework. GDPMO has made exceptional efforts to promote the concept of inter-municipal environmental infrastructures. It has taken the lead in guiding preparation of the overall strategic framework and the design of the proposed project cities, while Guangzhou has spent considerable time and resources preparing individual investments for funding under the proposed project. With financial support from Canada, France, Denmark and Singapore, GDPMO has shown leadership in mobilizing teams of international consultants to assist with project preparation. Moreover, GDPMO held a high-level conference, chaired by the Governor of Guangdong, in January 2003, to present the overall strategic framework and highlights of the proposed project to key provincial and municipal authorities. The conference's goal was to gain the support of the Governor and other participants for the project’s strategy. GDPMO also published a series of articles in the Guangdong Finance periodical to promote the new project among cities in the PRD.

The Guangdong Provincial Government (GPG) has begun to collaborate with Hong Kong on a framework for control of air and water pollution. Seven committees are addressing various related issues and annual meetings are taking place. For example, a comprehensive database to identify pollution sources in the PRD and South China Sea is in the planning stages.

Further, Guangzhou has created a financially autonomous wastewater company to own and operate existing and future wastewater assets. Guangzhou is also exploring options for private sector participation (PSP) in environmental service provision. It already has a Build, Operate and Transfer (BOT) operation in a wastewater treatment facility and a sludge treatment plant, and a private service provider is operating a

modern solid waste landfill. A private service provider will be selected to operate the hazardous waste treatment center and landfill upon its completion.

5. Value added of Bank and Global support in this project:

The Bank brings considerable international experience, in particular in economic and financial analysis and systematic consideration of alternatives. Bank assistance to Guangdong Province will also draw upon its growing experience in addressing regional environmental issues, gained from urban environment projects throughout China (including Hebei, Hubei, Jiangsu, Jilin, Liaoning, Shandong, Sichuan, Yunnan and Zhejiang Provinces, and in the mega-cities of Beijing, Chongqing, Shanghai and Tianjin). In addition, the Bank has addressed issues relating to water bodies and river resources and management, including the clean-up of Dianchi Lake (part of the Yunnan Environment Project), the Huai River Basin in Anhui Province, and the Liao River Basin in Liaoning Province.

Bank involvement has helped include initiatives on inter-municipal cooperation, improvements to wastewater management planning, regional cooperation with Hong Kong, and transparency in information sharing. It will also enhance the design and construction quality control of the physical investments, and accelerate institutional and financial strengthening and training. The project will build on the past experience of Guangdong Province and Guangzhou city, which have been sub-borrowers of the Bank for major infrastructure projects.

E. Summary Project Analysis (Detailed assessments are in the project file, see Annex 8)

1. Economic (see Annex 4):

○ Cost benefit NPV=US$ million; ERR = % (see Annex 4)
● Cost effectiveness
○ Incremental Cost
○ Other (specify)

Economic Benefits. After many years of neglecting pollution control, the PRD region is suffering from serious pollution problems, especially from water pollution in key urban sections of the Pearl River. It is now recognized that economic prosperity has come at a high environmental costs.

Responding to these concerns, the Guangdong Provincial Government (GPG) set up its long term environmental objectives for the PRD to include achieving Category III Standard for river water quality, which would make the river system suitable as a source of drinking water supply. The investments proposed under the project would provide environmental improvements and associated economic benefits to the PRD and Guangzhou by improving river water quality. The benefits of the project have been identified, and cover a wide range, from public health, amenities, land values, to agriculture and fishery. However, it is difficult to put a value on incremental improvements in environmental quality and even more challenging to attribute such improvements to specific interventions using cost-benefit analysis. Therefore, the cost-effectiveness approach has been adopted in the analysis to enable the project to select the least-cost option towards achieving well-stated environmental goals in the Guangzhou city area of the PRD.

Project investment selection has been based on several alternative designs, and selection of least cost designs. A cost effectiveness analysis of the overall project and each individual investment component has been prepared prior to appraisal. The economic viability of each component is based on least cost towards achieving specific water quality or other environmental objectives. Estimates were made for each component of the net present values of project costs (NPV), average incremental cost (AIC), financial

internal rate of return (FIRR) and affordability. The component designs with lowest NPV and AIC have been selected to minimize any economic subsidy and ensure that tariffs are affordable, especially to the lowest income groups.

2. Financial (see Annex 4 and Annex 5):
NPV=US$ million; FRR = % (see Annex 4)

The base cost estimates of the project reflect preliminary engineering designs and price levels prevailing in December 2003. The unit prices were derived from the following sources: (a) quotations obtained from manufacturers and suppliers; (b) prices of goods and works from recent contracts; and (c) construction costs according to prices published by the Central and Guangdong Governments, all adjusted for inflation. Experience gained from recent sector operations reveal that bid prices have been consistently around 60 percent of estimated costs, resulting in loan savings and excessive commitment charges. The primary reason for this disconnect is attributed to the use of proforma unit prices guidelines provided in the provincial cost schedules. Therefore, adjustments have been made to the proforma unit rates to reduce the disconnection referred to above.

Physical contingencies have been applied to base costs, as follows: civil works, equipment and materials, technical assistance and training - 10 percent. Project management and engineering overhead costs of 10 percent are also included. Price contingencies have been applied to expenditures at projected global foreign and local inflation rates, as follows: local: 2.5 percent in 2004; 1.8 percent in 2005; 2.0 percent in 2006; 1.9 percent in 2007 and 1.8 percent in 2008 and thereafter; foreign; -0.37 percent in 2004; 1.53 percent in 2005; 0.89 percent in 2006 and thereafter. Base costs have been converted at Y8.00/$1 and the Dollar/Yuan exchange rate has been assumed to vary in order to maintain purchasing power parity.

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The financial objectives set by GM for Guangzhou Sewage Treatment Company (GSTC) are to achieve full cost recovery on its operations. GSTC increased its tariffs by 133 percent in January 2003, to Y0.70/m³ towards meeting the financial objectives for 2003. Financial projections have been completed for GSTC indicating the levels of tariffs required annually to meet the stated objectives. However, in practice, wastewater (and water) companies' tariffs are adjusted only every two or three years, taking into account the tariff requirements of other utilities, e.g., power, gas and telephone. It is possible, therefore, that in the intervening years between tariff adjustments, the utilities may not be able to meet their annual targets. In such eventualities, the agencies' operating revenues would need to be supplemented from the general revenues of the parent municipality in order to remain financially viable.

Hazardous waste management services have traditionally been funded from the general revenues of local governments. However, where individual users of the services have been identified, local governments have, as a policy matter, charged such users for the services provided. Local governments expect to rely increasingly on user fees and charges to finance these services in the future. Under the project however, charges would be introduced gradually for treating and disposing of hazardous wastes. This phased

approach is necessary to encourage enterprises producing hazardous wastes to bring the wastes to the facility rather than dispose them in an environmentally unsafe manner.

Under the Inter-municipal Environmental Infrastructure component, participating cities, districts and towns would commence charging tariffs or fees one year after commissioning of the shared investments. The objective would be to achieve full cost recovery over time for the services provided.

The Guangdong Environmental Protection Bureau (GDEPB) would be responsible for the water quality monitoring and the information systems component, and would rely on government budget to fund their capital and operating budgets.

Fiscal Impact:

Provincial fiscal on-budget receipts and expenditures in 2003 totaled about Yuan 1,322 billion equivalent) and Yuan 1,673 billion equivalent), respectively. The central government, in keeping with the current fiscal arrangements between the central and provinces, provides annual transfers to Guangdong. Taken together, Guangdong enjoys a modest surplus. Receipts and expenditures are both projected to grow at about 10 percent per year in current terms. GPG expects to pass on about 85 percent of the Bank loan to Guangzhou Municipality (GM) and its sub-borrowers. Should GM and its sub-borrowers be unable to fulfill their obligations, GPG would have no difficulty in covering debt service through its own resources as the debt service represented by the project is small compared to total provincial receipts. GPG would provide all funding not met by (a) the proceeds of the Bank loan, (b) municipal contributions, and (c) funds, if any, generated internally by the implementing agencies. Guangdong Finance Bureau (GFB) has independently assessed Guangzhou's ability to generate the required counterpart funds from assured sources.

3. Technical:

The following issues have been critically examined during project preparation to develop least-cost sustainable investments to be financed under the proposed project:

(a) The far-field impact of wastewater discharges to the PRD River system were examined through computer modeling, for the whole river system, and the near field conditions for larger cities such as Guangzhou. The water modeling was also be used to help determine the appropriate treatment process and levels in order to optimize the environmental benefits of the proposed treatment plant investments. Water quality modeling has been done by an international consulting firm (using Danish trust funds), and a local Design Institute.

(b) An important planning and technical issue is to develop least-cost solutions for environmental investments in the PRD. Regional planning approaches were used to rationalize the current planning of environmental infrastructure, to avoid the proliferation of environmental infrastructure, specifically, wastewater treatment plants. The provision of regional, shared and managed infrastructure facilities were thoroughly examined. This also included a study of institutional models for construction and management of shared facilities across jurisdictions. The findings from this activity (to be financed under the Project) would be used to influence and revise GPG's plan to construct some 162 wastewater treatment plants under its US$5 billion accelerated cleanup campaign (PRDCC).

(c) Use of tunneling as an option for large conveyors to transport wastewater flows designed on the basis of shared management, or for conveying downstream of cities, with lower levels of treatment, was considered.

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(c) Use of tunneling as an option for large conveyors to transport wastewater flows designed on the basis of shared management, or for conveying downstream of cities, with lower levels of treatment, was considered.

(d) Incineration was considered, but was deferred for consideration in the future. Three issues were addressed under the hazardous waste component: the design of a treatment plant for hazardous wastes, physio-chemical treatment and landfill; planning for sufficient disposal capacity for Guangzhou and neighboring municipalities; the siting of the treatment plant, and a secure landfill site from an environmental perspective.

4. Institutional:

4.1 Executing agencies:

Utility reform consistent with national policy was a key goal of the project. The formation Guangzhou Sewage Treatment Company (GSTC) as a self-funding, self-accounting state-owned enterprise), prior to appraisal, represents a major step forward, which will also serve as a model for the rest of Guangdong Province**.** Staff from Guangzhou's existing municipal engineering administration department will be transferred to Guangzhou Sewage Treatment Company (GSTC), and it would start with operations experience, it would as yet lack a "corporate" culture. Therefore, additional specialist staff would need to be recruited to manage its operations.

The Guangzhou Hazardous Waste Management Center (GHWMC), under the GZEPB, would implement the hazardous waste management component. Upon completion of construction, a new company – Hazardous Wastes Treatment Center will be formed, and PSP operator will be selected to operate the facility. With GEF support, the project will finance the procurement of the PSP operator.

It is not reasonable to require districts or towns participating in the Inter-municipal Environmental Infrastructure component to establish a separate wastewater company such as the Guangzhou Sewage Treatment Company, if one does not already exist. In such cases, the Bank would accept operations being

retained in the existing drainage departments responsible for the service.

The framework to be developed for implementing and managing the investments under the Inter-municipal Environmental Infrastructure component will determine the appropriate institutional arrangements. It may not be practical to require districts or towns participating in the Inter-municipal Environmental Infrastructure component to establish a separate wastewater company such as the Guangzhou Sewage Treatment Company, if one does not already exist. In such cases, the Bank would accept operations being retained in the existing drainage departments responsible for the service.

GDEPB's environmental management effectiveness will depend on its capacity and willingness integrate and share environmental databases with neighboring jurisdictions, including Hong Kong, to cooperate on regional pollution control and environmental management, and share data with the public. Collaboration with Hong Kong SAR is an important part of this strategy, which is supported by the GEF grant.

4.2 Project management:

The GDPMO would be strengthened and the personnel mix adjusted to reflect the needs of the implementation and construction phases of the project. Guangzhou has formed, budgeted and staffed its own project management office (GZPMO), which has been involved throughout project formulation and preparation; it is expected these offices would significantly enhance project launch and subsequent implementation.

4.3 Procurement issues:

No major procurement issues were identified in the Procurement Capacity Assessment. See Annex 6 for further details.

The newly formed GSTC plans to employ the Guangzhou Tunnel Development Company, as experienced project management firm, as its agent to carry out all procurement and project management activities. A procurement agent has been appointed to manage all international tendering as required by the national regulations.

4.4 Financial management issues:

No major issues were identified during preparation of the Financial Management assessment. (See Annex 14)

5. Environmental: Environmental Category: A (Full Assessment)

5.1 Summarize the steps undertaken for environmental assessment and EMP preparation (including consultation and disclosure) and the significant issues and their treatment emerging from this analysis.

An extensive environmental assessment (EA) has been carried out for the project. During its preparation and evaluation Chinese national procedures and those required by the Bank Group were diligently followed. Environmental assessment (EA) documents comprising an Environmental Assessment Report and Executive Summary have been prepared, incorporating Bank comments, reviewed and found satisfactory. An Environmental Management plan (EMP) is an integral part of the EA process. An Environmental Management Framework has also been prepared to deal with impacts of subprojects that will be identified later. A detailed note covering environmental assessment and impact, together with mitigation measures, has been prepared (Annex 14). The EA documentation fully reflects the findings of the Chinese EAs on the various components as well as the preparation and appraisal missions.

Potential Impacts: The environmental impact of the project is on balance, substantially positive and the benefits greatly outweigh the negative impacts. Positive impacts include: increased wastewater collection

and treatment rates, improved water quality in the rive sections near Guangzhou, increase the regional availability of facilities for disposal of hazardous waste. The potential adverse impacts include: construction spoil and noise, and operational phase impacts of the hazardous waste facility, e.g., transport of hazardous materials and possible generation of leachate at the landfill. More details are provided in Annex 14.

Mitigation Measures: The EA specified the appropriate mitigation measures, environmental monitoring plans, institutional arrangements and training and equipment requirements together with cost estimates for the implementation of the mitigation measures and monitoring plans. Mitigation measures for construction-related impacts, and the hazardous waste management are described in Annex 14.

Public Consultation and Feedback: Local people were consulted twice during the EA process, once at the EA Terms of Reference (TOR) stage and the other time during the draft EA report preparation, in accordance with the requirements of OP 4.01. The approaches used for public consultation were: consultation meetings with local government representatives and questionnaire analysis of public opinions supplemented by interviews, focused on the public to be directly impacted by the various project components. Details of these activities with dates, participants, public notifications and locations are provided in Annex 14. Feedback from the public consultation program was collected by the EA team, which in conjunction with design engineers has addressed the concerns and issues raised by the public in the final EA report and EMP.

Information Disclosure: The EA Report and Executive Summary were submitted to the Bank in November 2003, as were draft Resettlement Action plans (RAPs). Both reports were reviewed and found to be satisfactory. Copies were submitted to the Bank group information center on December 5, 2003 and copies are also in the Project File (Annex 8). Notice of availability of these reports was publicized in local newspapers of Guangzhou in early January, 2004, prior to the appraisal completion date. Details of documents, disclosure dates and locations are provided in tabular form in Annex 14.

5.2 What are the main features of the EMP and are they adequate?

The EMP includes plans for mitigation of the impacts of the project components, the implementation of which will be the responsibility of the implementing agencies, principally GSTC, GTDC and GZHWMC. The EMP includes detailed and comprehensive environmental monitoring plans of the impacts of the project and the effectiveness of mitigation measures during both the construction and early operation phases. GDPMO and the GZPMO will be responsible for monitoring. The EMP also contains training programs for environmental management staff and key component facility operators. GDPMO and GHWMC will be responsible for conducting training programs. An organizational chart is included in the EMP to identify the agencies/organizations to be involved in environmental management in this project and their specific responsibilities.

During the construction phase, the contractor will be required to prepare a detailed Management Plan for Spoil Transportation and Disposal for PMO-ESD review and approval prior to the start of construction. During the operational phase, the EMP recommends the city to prepare an Environmental Management System Pan for the sludge management center to ensure the operation of center and the eventual reuse or disposal of treated sludge be performed in accordance with the objective of the project and local regulations. The operator of the hazardous waste facility will be required to prepare a satisfactory plan for the environmentally safe operation of the hazardous waste facility.

Details in Annex 14. Specific action plan prepared for Guangzhou Sludge Management.

5.3 For Category A and B projects, timeline and status of EA:
Date of receipt of final draft: January 2004. See Annex 13

The Guangzhou Research Institute of Environmental Protection (GRIEP), which holds a Class A credential for EA, was engaged to prepare the EA for the proposed Guangzhou wastewater treatment and the hazardous waste disposal facility components, as well as the EMP and EA Summary. Its work was supported by international consultants for design review and advisory services, who have substantial experience in preparing EAs for similar Bank-funded projects in China. GDPMO has already submitted a draft EA summary and an Environmental Management Plan, which was distributed to the Banks' Executive Directors.

5.4 How have stakeholders been consulted at the stage of (a) environmental screening and (b) draft EA report on the environmental impacts and proposed environment management plan? Describe mechanisms of consultation that were used and which groups were consulted?

Consultations were undertaken in three ways: news releases to the local press, public opinion questionnaires surveys and stakeholder meetings. The surveys covered residents and community committees and the meetings with the public and officials of relevant agencies which have a stake in this project. The consultation results show that the project is well received and supported by the public. Details in Annex 14.

5.5 What mechanisms have been established to monitor and evaluate the impact of the project on the environment? Do the indicators reflect the objectives and results of the EMP?

Project environmental impact monitoring indicators (Annex 1) have specifically been identified within the project and investments (in equipment and training) included in project financing to ensure attention to environmental issues. The project includes strengthening of a number of institutions in the environmental services sectors in Guangdong Province. See also Annex 14.

6. Social:

6.1 Summarize key social issues relevant to the project objectives, and specify the project's social development outcomes.

The key adverse social impacts of the project are largely related to land acquisition and demolition of structures for project components. In accordance with local laws, regulations and the World Bank OP 4.12 on Involuntary Resettlement, GPG arranged for the preparation of Resettlement Action Plans (RAP) for the wastewater treatment plants and landfills. The RAPs are based on detailed census of the affected people, inventory of affected assets, socioeconomic surveys and extensive consultations with the project-affected people.

Land acquisition and/or house demolition will affect 44,641 people in 11,262 households. Both cash compensation and replacement housing would be offered to those who lose their residence as well as affected enterprises. They could choose either one of them. For the employees whose employment would be affected temporarily, cash compensation would be paid for their income losses. Annex 15 provides detailed description of the census, inventory, project resettlement policy, compensation rates and budget, compensation and rehabilitation programs, institutional and monitoring arrangements.

Complementary parallel resettlement will take place in connection with road and embankment construction. The Government has provided funds for this resettlement under separate budgets.

A retroactive review was done for the related resettlement activities which have already been completed

(e.g., Liede Wastewater Treatment Plant). That review provided detailed information of the number of affected people and the livelihood rehabilitation status.

The Resettlement Policy Framework, which is a key part of the RAP, has been prepared in accordance with local laws, regulations and World Bank OP 4.12 on Involuntary Resettlement for all project components, and for the inter-municipal environmental infrastructure component..

Another key social issue of the project is the affordability of improved wastewater services, especially among lower income households. A willingness-to-pay and affordability survey has been conducted by Zhongshan University. The findings of the survey would be integrated into the new tariffs for wastewater services for Guangzhou to ensure they are affordable.

6.2 Participatory Approach: How are key stakeholders participating in the project?

The project was prepared in a participatory manner. The GDPMO, with its team of international and national consultants, have organized various consultative meetings with representatives of the provincial and municipal governments to apprise them of the environmental and development issues. These have facilitated participatory consultations, garnering stakeholder support for the project concept, and educating these stakeholders beforehand on their roles and responsibilities in project execution.

6.3 How does the project involve consultations or collaboration with NGOs or other civil society organizations?

Local government officials, non-government community organizations and business associations in the areas affected have been consulted and participated in the resettlement program preparation. The RAPs contain provisions for continuing consultation.

6.4 What institutional arrangements have been provided to ensure the project achieves its social development outcomes?

Internal and independent monitoring would be carried out during the implementation period. Detailed institutional arrangements have been included in RAP.

6.5 How will the project monitor performance in terms of social development outcomes?

Standard monitoring requirements for project social development performance set out in the Bank's procedures would be implemented.

7. Safeguard Policies:

7.1 Are any of the following safeguard policies triggered by the project?

Policy	Triggered
Environmental Assessment (OP 4.01, BP 4.01, GP 4.01)	● Yes ○ No
Natural Habitats (OP 4.04, BP 4.04, GP 4.04)	○ Yes ● No
Forestry (OP 4.36, GP 4.36)	○ Yes ● No
Pest Management (OP 4.09)	○ Yes ● No
Cultural Property (OPN 11.03)	○ Yes ● No
Indigenous Peoples (OD 4.20)	○ Yes ● No
Involuntary Resettlement (OP/BP 4.12)	● Yes ○ No
Safety of Dams (OP 4.37, BP 4.37)	○ Yes ● No
Projects in International Waters (OP 7.50, BP 7.50, GP 7.50)	○ Yes ● No
Projects in Disputed Areas (OP 7.60, BP 7.60, GP 7.60)*	○ Yes ● No

7.2 Describe provisions made by the project to ensure compliance with applicable safeguard policies.

An EA, including an Environmental Management Plan (EMP), and RAPs have been prepared by GDPMO in conjunction with Guangzhou Municipality and these have been appraised for their compliance with Bank policies and guidelines, and found satisfactory.

F. Sustainability and Risks

1. Sustainability:

The project is expected to be sustainable in three respects: (a) financially; (b) institutionally; and (c) in achieving its development objectives. Tariff reforms would enhance the financial viability of municipal service providers, and of the new facilities that the project will finance. Institutionally, the creation of a financially autonomous wastewater company and continued technical assistance for the participating institutions would strengthen utility management and water quality monitoring capacity. The complementary hazardous waste facility is not expected to be financially viable at the beginning without support from Guangzhou Municipality, because a culture has to be first developed for hazardous waste producers to bring their wastes to the facility. Therefore charges would be kept low initially, and will be increased in time when the practice is well established. Finally, the project addresses an issue of high priority to both the local and the national governments: vital self-interest in achieving environmental conditions necessary for sustained economic growth, which would be a strong motivation to continue implementing the long-term environmental improvement program, and water resources management.

1a. Replicability:

The project has considerable local, national, regional and perhaps even global replication potential. Locally, the fact that it is the first phase of a long-term environmental program means that there is already a plan and a commitment to replicate its successes in the PRD through its participating provincial and municipal institutions and this plan already has financial resources allocated. Nationally, there is enormous scope in China's many other large metropolitan areas for replicating its policy and institutional reforms, its pioneering concept of joint municipal wastewater and solid waste treatment facilities, and its initiative to expand the role of private-public and private-private partnerships in waste management investment and service provision. National replication will be facilitated by the Chinese Government and by the Bank. The latter will also apply the lessons learned to its regional portfolio of environmental management projects and disseminate them globally through the World Bank's Infrastructure Operations Network.

The World Bank is fully committed to helping design and deliver a comprehensive and long term assistance strategy for environmental management of the Pearl River Delta and this is the first project in an expected series of investments in water quality improvement. Assistance would be both broadened to neighboring regions and deepened to provide follow on investments such as tertiary waste water treatment and industrial waste water minimization. Project funds, supplemented by GEF funds will assist in the development of a long term aggressive water quality improvement program which could be a model for other countries that share the South China Sea. In order to help ensure the likelihood of this replicability, project preparation was coordinated with the UNDP/GEF/IMO PEMSEA and the UNEP/GEF South China Seas regional program.

Although GEF funds are limited *vis-a-vis* the enormous environmental infrastructure requirements, they will provide a catalytic and illustrative role. The replication strategy includes regional and international workshops to discuss plans and progress. The Bank will also play an active role by sharing project experience with senior government officials, and through publication of project experience in readily

available 'public information documents'.

2. Critical Risks (reflecting the failure of critical assumptions found in the fourth column of Annex 1):

Risk	Risk Rating	Risk Mitigation Measure
From Outputs to Objective		
Lax enforcement of pollution control policies and regulations will diminish impact of project investments on river water quality.	M	Preparation, and implementation of a satisfactory Industrial Pollution Control Action Plan to address the worst polluters will be a legal requirement of the project (even though not funded under the project).
Individual project designs are inappropriate or over/under dimensioned.	N	Bank's preparation team will closely review project designs and estimated costs proposed by participating cities and the international consultants to ensure that over design of facilities will be avoided. Also, future service demands of unregistered population will be taken into account.
Provincial and city-level governments will not support proposed shared infrastructure management, least cost solutions or location of wastewater facilities.	M	Bank preparation team and international consultants will inform the GDPMO and municipalities of the advantages of shared jointly-managed infrastructure. Project may not include components for other smaller cities, if the criteria are not met. During project preparation, least cost and environmentally safe solutions will be developed.
Provincial and city-level authorities do not continue to support sector reforms related to creation of autonomous utilities and full cost recovery.	N	Creation of financially autonomous companies, and implementation of tariffs to meet the projects' financial objectives will be a condition of project appraisal.
From Components to Outputs		
Autonomy of wastewater and hazardous waste companies is not realized.	M	Financial and management performance of the new companies will be monitored during project implementation, to ensure compliance with loan conditions. Changes will take place gradually, and Bank's continued association with GPG in this sector could assure this outcome.
Risk of damage to liner in hazardous waste landfill during operation.	M	Extra precautions in the design and construction of the liner, safe operation through an experienced operator procured through a management contract, and setting up a monitoring system with a system of boreholes.
Jointly managed utility services will not be realized in a cost effective fashion because of political or other resistance.	M	At least one example of jointly-managed infrastructure will be demonstrated under the project, along with adequate technical assistance.
Insufficient interest by provincial and local governments to carry out capacity building and strategic studies, and then to	M	Realistic reforms will be agreed with GPG, and covenanted. Even with some initial resistance, changes will come, as GPG and China are

implement appropriate reforms.		taking a number of measures to address institutional problems that are remnants of the past central planning system, in order to remain competitive.
Overall Risk Rating	M	

Risk Rating - H (High Risk), S (Substantial Risk), M (Modest Risk), N(Negligible or Low Risk)

3. Possible Controversial Aspects:

Public reaction to (a) wastewater tariff increases to maintain the financial viability of the wastewater company, and (b) introduction of fees and charges for hazardous waste disposal.

G. Main Conditions

1. Effectiveness Condition

- Execution of subsidiary loan agreement between Guangzhou Municipality and Guangzhou Sewage Treatment Company, satisfactory to the Bank

2. Other [classify according to covenant types used in the Legal Agreements.]

Disbursement Conditions

- The signing of contracts by the Guangzhou Sewage Treatment Company with consultancy firms for (i) institutional and financial technical assistance; (ii) construction supervision and quality control; and (iii) design review and certification, as a condition of disbursement of the civil works category

- The signing of contracts on behalf of the Guangzhou Hazardous Waste Management Center with consultancy firms for (i) design review and certification, and construction supervision services; and (ii) preparation of a regulatory and institutional framework, and a bid document for selection of an operator for the facility, as a condition of disbursement of the civil works category

Implementation Covenants

At negotiations, assurances would be obtained from GP that it would:

- implement or cause to be implemented the Institutional Strengthening and Training (IST) component in accordance with a schedule acceptable to the Bank and discuss and agree any revisions with the Bank
- carry out or cause to be carried out the resettlement of persons affected by the project in a manner and according to the Resettlement Action Plan satisfactory to the Bank
- cause the project agencies to carry out, in a manner satisfactory to the Bank, the findings of the Environmental Assessment and related implementation program
- maintain the Guangdong Project Management Office (GDPMO) and the Guangzhou Project Management Office (GZPMO) throughout implementation, with functions and responsibilities satisfactory to the Bank, and with competent staff in adequate numbers for the duration of the project
- make available US$6.8 million of the GEF grant, comprising about US$1.6 million equivalent as

capital cost grant in two installments, and an O&M support grant of about US$0.67 million equivalent over two years as specified, for each sub-project for implementation of the inter-municipal environmental infrastructure component, as agreed with the Bank

- carry out or cause to be carried out the time-bound Industrial Pollution Control Action Plan (IPCAP) in accordance with a schedule acceptable to the Bank and discuss and agree any revisions with the Bank
- by January 1, 2005, arrange for the signing of a contract with a consultancy firm for updating of the PRD Wastewater Master Plan (i.e., PRD Clean-up Campaign)
- Prepare by July 31, 2005, a framework, criteria, and investment proposals submitted by no later than December 31, 2005, satisfactory to the Bank, for the proposed Inter-municipal Environmental Infrastructure component
- Prepare by December 31, 2005, a water quality monitoring program and investment proposals, satisfactory to the Bank, for the proposed Water Quality Monitoring and Information Systems Component

Financial Covenants

At negotiations, assurances would be obtained from Guangdong Province (GP) that it would:

- cause Guangzhou Municipality to onlend part of the loan proceeds to the Guangzhou Sewage Treatment Company, on terms and conditions satisfactory to the Bank
- arrange to pass on the proceeds of the GEF grant to (i) the Guangzhou Hazardous Waste Management Center for the Hazardous Waste Component for preparation of the regulatory framework and bid document to select a private operator for the treatment center and landfill; (ii) selected cities, districts or towns for inter-municipal environmental infrastructure development for the grant incentive; and (iii) the Guangdong Environmental Protection Bureau for water quality monitoring, preparation of a management information system, software, website development, pollution monitoring in the Guangzhou river section, and updating of the PRD Wastewater Master Plan, and development of a database for air and water pollution in the PRD and South China Sea, in collaboration with Hong Kong SAR
- operate financial matters in accordance with the guidelines set out in the FMS Manual, and arrange for the following annual audits to be submitted to the Bank within six months after the end of the financial year, commencing with fiscal year 2004: (a) audit of the project accounts maintained by (i) the Guangdong Project Management Office (GDPMO), (ii) the Guangzhou Tunnel Development Company (GTDC); (iii) the Guangzhou Hazardous Waste Treatment Center (GHWTC); (iv) the Guangdong Environmental Protection Bureau (GDEPB); (v) audit of the Special Account; (vi) audit of statements of expenditures (SOE); and (vii) audit of the financial statements of the Guangzhou Sewage Treatment Company (GWTC)
- commencing with fiscal year 2005, cause (GSTC) to (a) produce revenues sufficient to cover operations and maintenance costs (including depreciation), and the amount by which debt service requirements exceed the provision for depreciation; and (b) incur no additional debt without the Bank's agreement, unless a reasonable forecast shows that the entity would have a debt service coverage of at least 1.3 times
- cause GSTC to prepare, before September 30, 2005, and in each of the following fiscal years, forecasts satisfactory to the Bank, (a) to review whether it would meet the covenanted requirements set forth above in such year and the following fiscal year, and (b) to furnish the results of such review to the Bank; if any such review would show that the entity would not meet the requirements set out above, the entity would take all necessary measures, including adjustments to the structure of its tariffs and charges, in order to meet the requirements

- cause Guangzhou Hazardous Waste Treatment Center (GHWTC) to complete, not later than July 1, 2006, a study of the fees and charges needed for full cost recovery of hazardous waste disposal services to industrial and commercial users, the report of that study shall include a detailed time-bound action plan acceptable to the Bank, enabling such recovery commencing January 1, 2007, and thereafter implement such action plan taking into account the Bank's comments
- cause cities, districts or towns participating in the Inter-municipal Environmental Infrastructure component to commence collecting tariffs, fees or charges one year after commissioning of the shared investments with the objective of achieving full cost recovery over time for the services provided

Reporting and Monitoring

At negotiations, assurances would be obtained from GP that it would:

- cause each implementing agency to prepare semiannual project progress reports; the GDPMO would then send a consolidated report to the Bank by the thirtieth of the following month, commencing January 2005
- carry out with the Bank a mid-term review of the project by June 30, 2007, and implement, or cause to be implemented, agreed recommendations

H. Readiness for Implementation

☒ 1. a) The engineering design documents for the first year's activities are complete and ready for the start of project implementation.
☐ 1. b) Not applicable.

☒ 2. The procurement documents for the first year's activities are complete and ready for the start of project implementation.
☒ 3. The Project Implementation Plan has been appraised and found to be realistic and of satisfactory quality.
☐ 4. The following items are lacking and are discussed under loan conditions (Section G):

- Consultants for detailed design and bid document preparation have been appointed;
- Recruitment of international consultants for Design Review, and construction supervision;
- Recruitment of international consultants for preparation of regulatory framework for the hazardous waste component and bid document to procure a PSP contractor has commenced;
- Overall procurement plans, and detailed procurement plan by contract, for the wastewater and hazardous waste components have been prepared;
- Two international consultants have been engaged for preparatory work, on the basis of retroactive financing; and
- Advance site work of piling has commenced for one wastewater treatment plant.

I. Compliance with Bank Policies

☒ 1. This project complies with all applicable Bank policies.
☐ 2. The following exceptions to Bank policies are recommended for approval. The project complies with all other applicable Bank policies.

Thomas L. Zearley **Team Leader**	Keshav Varma **Sector Manager/Director**	Yukon Huang **Country Manager/Director**

Annex 1: Project Design Summary

CHINA: Guangdong Pearl River Delta Urban Environment Project

Hierarchy of Objectives	Key Performance Indicators	Data Collection Strategy	Critical Assumptions
Sector-related CAS Goal: Facilitate rural-urban transition underway in China by helping to enhance the productivity of cities, where the overwhelming majority of jobs will be created, and the quality of urban environment and living conditions.	**Sector Indicators:** Growth in employment and incomes in urban areas. Quality and service coverage levels of environmental infrastructure in urban areas.	**Sector/ country reports:** Occasional Bank urban and environmental reports. Bank urban sector supervision missions.	**(from Goal to Bank Mission)** Future urban development, service delivery and environmental conditions encourage investment and job creation in Chinese cities. Expanded investments in environmental infrastructure and ongoing policy and institutional reforms will lead to sustainable improvements in environmental quality.
GEF Operational Program: Reduce pollution loading to the Pearl River Delta and South China Sea through increased inter and intra-municipal environmental services delivery.	**Outcome / Impact Indicators:** Increased volume of wastewater treated (190,000,000 m^3) and solid waste disposed (10,000,000 tonnes).	Operational reports	Local governments have political will to share common facilities.
Improve water quality data for PRD and South China Sea.	Regional agencies collecting and sharing relevant water quality data.	EPB management reports, international conference.	Commitment and sufficient financial allocations by Guangdong EPB and neighboring jurisdictions.
Reduce pollution loading to the Pearl River Delta and South China Sea through increased private sector participation in environmental services delivery.	Increased volume of wastewater treated (60,000,000 m^3) and solid waste disposed (5,000,000 tonnes).	Operational reports	Local governments have political will to involve the private sector in environmental infrastructure.
Output from each Global Component: Larger volume of least cost municipal wastewater and waste management investments constructed and operated through increased inter and intra-municipal cooperation.	**Output Indicators:** Two or more contiguous municipalities/cities using shared facilities.	Operating and financial reports	Municipal cooperation in constructing and providing environmental service delivery of reduced capital and operating cost.
Strengthening South China	Reliable and relevant water	EPB management reports,	Relevant data will be

Sea regional water quality data monitoring system. Catalyzing regional, e.g. Hong Kong and Macau SAR, pollution reduction measures. Larger volume of least cost municipal wastewater and waste management investments constructed and operated through increased private sector involvement.	quality data readily available and shared. Rate and scale of pollution reduction progress in neighboring jurisdictions. At least one additional facility funded or operated in part with private sector partners	website operations, public documentation. Through regional conferences and international water quality reporting. Operating and financial reports.	generated on a timely basis and readily shared with the public and other interested jurisdictions and agencies. Political will to reduce pollution will be maintained and expanded across neighboring jurisdictions. Inter-municipal cooperation in constructing and providing environmental service delivery of reduced capital and operating cost.
Project Development Objective: Improve the quality of the environment in key cities in the PRD, by following an integrated regional planning approach, in order to facilitate continued economic and social development.	**Outcome / Impact Indicators:** Percentage of samples from key PRD rivers meeting Chinese surface water quality standard (of Class III) increased gradually. Enforcement of environmentally safe manifesting, transporting and treatment of hazardous waste. Increased volume of hazardous waste handled and disposed of in an environmentally safe manner. Strengthened management capacity of provincial and municipal agencies responsible for water pollution control and hazardous waste management.	**Project reports:** Annual project reports with performance indicators. Annual Review. Annual Review. Mid-term Review. Implementation Completion Report. OED Sector Assessment Reports	**(from Objective to Goal)** Provincial and local authorities have political will and regulatory tools to ensure that all major sources of pollution are effectively controlled, and that lax enforcement does not diminish impact of proposed investments on river water quality. Effective management and financing continue beyond project implementation into operational phase.
Output from each Component: Improved and expanded	**Output Indicators:** Increased percentage of	**Project reports:** PMOs to monitor project	**(from Outputs to Objective)** Executing agency will have

wastewater treatment infrastructure in Guangzhou City.	municipal and industrial wastewater intercepted and treated to relevant Chinese treated effluent discharge standard. A 90% increase in treatment of collected wastewater. Collection sewer networks expanded to collect most of the wastewater generated. Increased percentage of total generated wastewater load is captured by the sewer system. Increased percentage of load captured receives appropriate treatment. Increased effectiveness of treatment system in removing pollutants.	progress and submit periodic reports. Bank to conduct regular supervision missions. Joint review of project progress to take place annually and at the project mid-term.	financial and technical capacity to successfully implement project investments. City authorities will support least-cost technical solution or location of treatment plants and discharge infrastructure. Individual project designs are appropriate and not over designed.
Piloting of improved and expanded environmental infrastructure facilities constructed and operated on a shared basis by more than one municipality in PRD region.	Establishment of shared infrastructure facilities that are planned, constructed, and operated in an integrated and cost effective manner. Increased percentage of environmental infrastructure services provided in a cost effective and sustainable fashion.		Provincial and city-level governments will support proposed shared infrastructure management, least cost technical solutions or location of treatment plants and discharge infrastructure.
Improved and expanded hazardous waste treatment facility for Guangzhou metropolitan area.	Increased proportion of hazardous waste generated in the PRD collected, treated and safely disposed. A minimum 50% increases in hazardous waste safely collected and treated in the Guangzhou Region.		Local government support sustained for proposed technical solution or location of hazardous waste treatment facility, and for shared use of facilities. Local authorities are able to create sufficient incentives, and enforce regulations to ensure that special waste is safely transported to proposed project facilities for disposal.
Enhanced water quality	Timely availability of reliable		Provincial authorities (EPB)

monitoring systems and capabilities in PRD.	water quality information for decision-making purposes on investment priorities and regulatory actions.		will have adequate resources for staffing and operating the enhanced water quality monitoring system. Water quality information and new systems used by decision-makers
Strengthened institutional arrangements for planning, financing and managing of wastewater treatment in PRD region.	Guangzhou wastewater utility corporatized, number of regional/inter-municipal wastewater companies formed and financial situation of municipal wastewater utilities participating in project improved.		Provincial and city-level authorities continue to support sector reforms related to creation of autonomous utilities, full cost recovery for services, and piloting of new initiatives for inter-municipal cooperation in provision of municipal services. Staff knowledge gained is incorporated into professional practice at Provincial and municipal levels.
Project Components / Sub-components:	**Inputs: (budget for each component)**	**Project reports:**	**(from Components to Outputs)**
Wastewater management in Guangzhou City	Construction of 1 wastewater treatment plant and extension of an existing one in Guangzhou City to increase the total capacity by 400,000 m3/day --- US$325.00 million.	Provincial and Guangzhou PMOs to prepare regular progress reports. PMO provides Bank with periodic progress reports which compare planned and actual progress for each project component in terms of cost and physical works. Monthly (or quarterly) disbursement reports which compare planned with actual disbursements for each component.	Wastewater company in Guangzhou City established, and facilities operated in a sustainable manner.
Hazardous Waste Management in Guangzhou metropolitan area.	Construction of landfill for treatment of about 10,000 tons/year of hazardous waste in Guangzhou City and environs --- US$24.00 million.		A company to manage special waste treatment established in Guangzhou City, and operated in a sustainable manner. Possibility for the plant to accept such wastes from nearby towns.
			Jointly managed water supply,

Environmental infrastructure in other PRD towns.	Incentive-based lending for 4 groups of two or more districts/towns willing to construct shared infrastructure. MoUs signed for 3 subprojects, to be appraised in first year. Project allocation --- US$64.9 million.		or wastewater treatment plants, or landfills or incinerators constructed, and operated in a sustainable manner, under joint management by two or more towns.
Water Quality Monitoring and Information System.	Installation of water qualitymonitoring equipment, data collection and decision support systems for the Guangdong Province --- US$11.6 million.		Provincial Environmental Protection Bureau has comprehensive database of water quality in PRD rivers, and capability to effectively enforce pollution control.
Institution Strengthening and Training.	Consultant services for p roject implementation support, institutional strengthening, strategic studies and training --- US$6.40 million.		Sufficient interest by Provincial and local governments to carry out capacity building and strategic studies, and to implement appropriate reforms.

Project Performance Monitoring Indicators

The baseline and targets would be reviewed and updated during the Project Launch Workshop.

Indicators (Physical)	**2004 Base**	**2007**	**2009**
1. Wastewater Volume Treated (%)	35	50	70
2. Compliance with discharge standard (%)	80	85	90
3. Compliance with water quality objectives (%) in Guangzhou PRD Area (%)	70	75	80
4. Quantity of hazardous waste treated and disposed of (tons/year)	0	25,000	75,000

Indicators (Financial)	**2004 Base**	**2007**	**2009**
Wastewater tariffs implemented to meet financial projections (Yuan per m^3)	0.70	2.0	2.4
Hazardous waste fees and charges implemented to cover costs of collection and disposal	0	20.00	40.00

Annex 2: Detailed Project Description
CHINA: Guangdong Pearl River Delta Urban Environment Project

The project will promote a regional planning approach to environmental management, to help reverse the serious deterioration of water quality in the Pearl River Delta and the South China Sea. This goal will be achieved through support to reduction of the largest source of land based pollution emanating from China, thereby generating trans-boundary environmental benefits for the millions of people whose livelihood and health depend on it.

Specific interventions in the project would address: (a) regional planning of environmental infrastructure, (b) inter-municipal jointly-managed environmental infrastructure development, (c) environmentally safe treatment and disposal of hazardous wastes, (d) public private partnerships for infrastructure service provision, and (f) industrial pollution control.

Project components are described below:

By Component:

Project Component 1 - US$325.00 million

Wastewater Management (Total Cost Yuan 2641.8 million)
In Guangzhou, the project would finance: (a) construction of a new treatment plant at Dashadi with capacity of 200,000m3/d, (b) expansion of Liede III, comprising expansion of the existing plant by 200,000m3/d, and (c) about 500 km of trunk sewers to convey wastewater from the drainage catchments of Dashadi and Liede III, and four other drainage catchments (i.e., Xilang, Lijiao, Datansha and Liede II).

Project Component 2 - US$24.00 million

Regional Hazardous Waste Management (Total Cost Yuan 194.0 million)
The project will finance construction of a pre-processing center, comprising a collection and transferring area, a physical/chemical treatment workshop, stabilization and solidification workshop, and a secure landfill of 150,000 m3 capacity, to treat hazardous wastes and incinerator ash.

In addition to design review, and construction supervision services, the project will finance consulting services for preparation of a regulatory framework for hazardous waste management, and a bid document to engage a PSP operator for the facility, and a waste market survey and corporate market assessment.

Project Component 3 - US$ 65.00 million

Inter-municipal Environmental Infrastructure (Total Cost Yuan 524.9 million)
The component is a pilot activity to promote environmental infrastructure development by groups of two or more municipalities, districts or towns willing to plan, construct and manage shared facilities. A parallel related key activity is the review and updating of the PRD wastewater master plan (also referred to as the PRD Cleanup Campaign-PRDCC). GEF grant incentives will be provided to participating municipalities/districts or towns, to support capital and recurrent costs.

To be eligible for participation, subprojects would have to be: (a) owned and managed by two or more cities, districts or towns, (b) revenue earning investments, (c) environmental infrastructure, and (d)

prepared to standards satisfactory to the Bank, and meet safeguards requirements

In order to promote this initiative, incentives totaling US$6.8 million equivalent, will be provided from the GEF grant for a maximum of three subprojects. Each eligible subproject will receive: (a) capital cost grant of about US$1.6 million equivalent, paid in two installments upon reaching 30 percent and 100 percent of the appraised estimate cost of the subproject; and (b) an O&M support grant of about US$0.67 million equivalent, paid at 6 and 18 months after commissioning of the facility. Additionally, a GEF grant of US$0.4 million will also be provided for the review and update of the PRD wastewater master plan (PRDCC), in order to rationalize the 162 plants now envisaged.

Implementation of this component will commence after satisfactory appraisal by the Bank of the framework and individual investment proposals consistent with the approved framework. A GEF grant of US$0.1 million has been provided to support the preparation of a framework establishing the overall principles and guidelines for sharing costs, ownership, operation and maintenance of environmental facilities, and provide institutional models for construction and management of shared facilities.

Investment costs for all three subprojects will be financed with own funds. Approved subprojects will receive the capital grant and O&M grant support only. `Notwithstanding the source of funds, the subprojects will be prepared to the same standards as those funded under the loan proceeds, and procurement will be carried out in accordance with Bank procurement procedures.

Memoranda of Understanding (MoU) have been signed by two groups of towns willing to develop jointly-managed environmental infrastructure. Feasibility studies for these two subprojects are in an advanced state of preparation. The third subproject will be selected later. Two subprojects are described briefly below.

Shenzhen Pingshang River Wetland Treatment Works. The subproject is intended to improve water quality of the Pingshang River in Shenzhen. It is proposed to treat about 230,000 m3/day average river flow period (and 60000 m3/d in dry river flow period), with preliminary treatment and traverse through wetlands. Preliminary base cost Yuan 115.2 million.

Luoxi Island Wastewater Wastewater Treatment System. Wastewater from Luoxi Island currently being discharged untreated to Pearl River, will be intercepted and conveyed to the Lijiao Wastewater treatment plant in Guangzhou through a conveyor will be designed for a planned wastewater flow of 60,000 m3/d. Preliminary base cost is estimated at Yuan 113.1 million.

Project Component 4 - US$11.60 million

Water Quality Monitoring and Information Systems (Total Cost Yuan 94.0 million)
The component would include: (a) renovation and updating of 5 existing monitoring stations; (b) construction of 18 new automatic monitoring stations (7 regional, 7 municipal level, and 4 in the estuary); (c) a provincial control center, including hardware and software and applications; (d) a website with information and data; (e) a decision support system including management information system, databases, pollution control monitoring applications, and GIS, and (f) support for data sharing, comprehensive pollutant database development, and collaboration with Hong Kong for regional environmental management.

The component will be implemented following satisfactory appraisal by the Bank. Physical investments (i.e., works and goods) under the component will be financed with own funds. A portion of the GEF grant

amounting to US$1.85 million will be provided to implement the technical assistance package. Notwithstanding of the source of funds, the component will be prepared to the same standards as those funded under the loan proceeds, and procurement will be carried out in accordance with Bank procurement procedures.

Project Component 5 - US$6.40 million

Institutional Strengthening and Training (Total Cost Yuan 51.8 million)
The project would finance consultant services for: (a) financial/institutional support, training and equipment for the Guangzhou Sewage Treatment Co; (b) metropolitan and regional planning to develop management strategies for the Gangzhou-Foshan (Guang-Fo) region, (d) public hygiene promotion program; and (e) study tours and training.

Annex 3: Estimated Project Costs

CHINA: Guangdong Pearl River Delta Urban Environment Project

CHINA
Guangdong Pearl River Delta/Urban Environment Pr

Expenditure Accounts Project Cost Summary	(RMB Million)			(US$ Million)			% Foreign Exchange	%Total Base Costs
	Local	Foreign	Total	Local	Foreign	Total		
I. Investment Costs								
A. Civil Works	1,007.1	443.0	1,450.0	125.9	55.4	181.3	31	48
B. Equipment & Materials	280.1	132.8	412.9	35.0	16.6	51.6	32	14
C. Construction Management Services	5.5	22.1	27.6	0.7	2.8	3.5	80	1
E. Technical Assistance	63.0	79.3	142.3	7.9	9.9	17.8	56	5
F. Training	6.5	26.0	32.5	0.8	3.3	4.1	80	1
G. Global Environment Facility	58.3	21.3	79.6	7.3	2.7	10.0	27	3
H. Land Acquisition & Resettlement	652.2	-	652.2	81.5	-	81.5	-	21
I. Engineering & Management	251.5	-	251.5	31.4	-	31.4	-	8
Total BASELINE COSTS	2,324.2	724.5	3,048.6	290.5	90.6	381.1	24	100
Physical Contingencies	214.3	68.4	282.7	26.8	8.5	35.3	24	9
Price Contingencies	127.5	47.7	175.2	11.2	4.2	15.5	27	4
Total PROJECT COSTS	2,665.9	840.6	3,506.5	328.5	103.3	431.9	24	113

CHINA
Guangdong Pearl River Delta/Urban Environment Project
Table 2. Hazardous Waste Management Detailed Costs
(RMB Million)

	Base Cost							Totals Including Contingencies						
	2004	2005	2006	2007	2008	2009	Total	2004	2005	2006	2007	2008	2009	Total
I. Investment Costs														
A. Civil Works														
HWM1.1 Site Works, Access Roads	0.4	3.6	-	-	-	-	4.0	0.4	4.1	-	-	-	-	4.5
HWM1.2 Buildings & Leachate Treatment Facility	-	17.9	17.9	-	-	-	35.7	-	20.2	20.7	-	-	-	40.9
HWM1.3 Landfill Earthworks & HDPE Liner	-	19.9	6.6	-	-	-	26.5	-	22.5	7.7	-	-	-	30.2
HWW1.4 Office & Other Buildings	-	10.1	3.4	-	-	-	13.5	-	11.5	3.9	-	-	-	15.4
Subtotal Civil Works	0.4	51.5	27.9	-	-	-	79.7	0.4	58.2	32.3	-	-	-	90.9
B. Equipment & Materials														
HWM2.1 Landfill Equipment & Vehicles	-	14.9	14.9	-	-	-	29.8	-	15.3	15.7	-	-	-	31.0
C. Technical Assistance & Training														
HWM3.1 Feasibility Study Preparation (incl. SOGREAH Contract)	1.4	-	-	-	-	-	1.4	1.6	-	-	-	-	-	1.6
HWM3.2 Detailed Design of Facility	4.2	-	-	-	-	-	4.2	4.7	-	-	-	-	-	4.7
HWM3.3 Geotechnical Survey	0.5	-	-	-	-	-	0.5	0.6	-	-	-	-	-	0.6
HWW3.4 Design Review & Certification														
Construction Supervision & Quality Control	1.8	0.9	0.9	-	-	-	3.6	2.0	1.0	1.0	-	-	-	4.1
HWM3.5 GEF-supported Regulatory & Institutional Framework														
& Bid Document for Selection of	-	1.8	1.8	-	-	-	3.6	-	1.8	1.8	-	-	-	3.6

Operator														
HTM3.6 GEF-supported Preparation of Waste Market Survey & Corporate Market Assessment	-	0.2	0.2	-	-	-	0.4	-	0.2	0.2	-	-	-	0.4
HWW3.7 Training & Study Tours	-	-	0.8	0.8	-	-	1.5	-	-	0.9	0.9	-	-	1.8
Subtotal Technical Assistance & Training	7.9	2.9	3.7	0.8	-	-	15.2	8.8	3.0	3.9	0.9	-	-	16.6
D. Land Acquisition & Resettlement	35.3	-	-	-	-	-	35.3	39.1	-	-	-	-	-	39.1
E. Engineering & Management														
Civil Works	0.0	5.1	2.8	-	-	-	8.0	0.0	5.8	3.2	-	-	-	9.1
Equipment & Materials	-	1.5	1.5	-	-	-	3.0	-	1.7	1.7	-	-	-	3.4
Land Acquisition & Resettlement	3.5	-	-	-	-	-	3.5	3.9	-	-	-	-	-	3.9
Subtotal Engineering & Management	3.6	6.6	4.3	-	-	-	14.5	4.0	7.5	5.0	-	-	-	16.4
Total	47.2	75.9	50.7	0.8	-	-	174.5	52.3	84.1	56.8	0.9	-	-	194.1

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Guangdong Pearl River Delta/Urban Environment Project
Table 3. Inter-municipal Environmental Infrastructure
Detailed Costs
(RMB Million)

	Base Cost							Totals Including Contingencies						
	2004	2005	2006	2007	2008	2009	Total	2004	2005	2006	2007	2008	2009	Total
I. Investment Costs														
A. Civil Works														
IMI1.1 Civil Works for Luoxi Island Wastewater System	6.8	40.7	20.4	-	-	-	67.9	7.5	46.1	23.6	-	-	-	77.2
IMI1.2 Civil Works for Shenzhen-Pingshan River Wetland Treatment Works	6.9	41.5	20.7	-	-	-	69.1	7.7	46.9	24.0	-	-	-	78.6
IMI1.3 Civil Works: (To be determined)	7.2	43.2	21.6	-	-	-	72.0	8.0	48.9	25.0	-	-	-	81.9
Subtotal Civil Works	20.9	125.4	62.7	-	-	-	209.0	23.2	141.9	72.7	-	-	-	237.7
B. Equipment & Materials														
IMI2.1 Equipment for Luoxi Island Wastewater System	-	36.2	9.0	-	-	-	45.2	-	40.9	10.5	-	-	-	51.4
IMI2.2 Equipment for Shenzhen-Pingshan River Wetland Treatment Works	-	36.9	9.2	-	-	-	46.1	-	41.7	10.7	-	-	-	52.4
IMI2.3 Equipment & Materials: (To be determined)	-	38.4	9.6	-	-	-	48.0	-	43.5	11.1	-	-	-	54.6
Subtotal Equipment & Materials	-	111.4	27.9	-	-	-	139.3	-	126.1	32.3	-	-	-	158.4
C. Technical Assistance & Training														
IMI3.1 Consultants Services for Design Review & Certification	-	2.5	2.5	-	-	-	5.0	-	2.8	2.9	-	-	-	5.7
IMI3.2 Design Review Services, Investigations	-	5.0	5.0	-	-	-	10.0	-	5.7	5.8	-	-	-	11.5
IMI3.3 GEF-supported Preparation of Bid Document to Select Operator (BOT) for Wastewater Operation	-	1.6	1.6	-	-	-	3.2	-	1.6	1.6	-	-	-	3.2
IMI3.4 GEF-supported Study & Workshops on Inter-or Intra-municipal Cooperation	-	0.4	0.4	-	-	-	0.8	-	0.4	0.4	-	-	-	0.8
IMI3.5 GEF-supported Updating PRD Wastewater Management Plan & Detailed Study of Forshan Wastewater Master Plan	-	0.8	1.6	0.8	-	-	3.2	-	0.8	1.6	0.8	-	-	3.2

Subtotal Technical Assistance & Training	-	10.3	11.1	0.8	-	-	22.2	-	11.3	12.3	0.8	-	-	24.4
D. Global Environment Facility Support														
Capital Grant	-	-	11.7	27.3	-	-	39.0	-	-	11.7	27.3	-	-	39.0
O&M Grant	-	-	-	-	7.0	7.0	14.0	-	-	-	-	7.0	7.0	14.0
Subtotal Global Environment Facility Support	-	-	11.7	27.3	7.0	7.0	53.0	-	-	11.7	27.3	7.0	7.0	53.0
E. Land Acquisition & Resettlement	-	-	5.0	5.0	-	-	10.0	-	-	5.3	5.4	-	-	10.6
F. Engineering & Management														
Civil Works	2.1	12.5	6.3	-	-	-	20.9	2.3	14.2	7.3	-	-	-	23.8
Equipment & Materials	-	11.1	2.8	-	-	-	13.9	-	12.6	3.2	-	-	-	15.8
Land Acquisition & Resettlement	-	-	0.5	0.5	-	-	1.0	-	-	0.6	0.6	-	-	1.2
Subtotal Engineering & Management	2.1	23.7	9.6	0.5	-	-	35.8	2.3	26.8	11.1	0.6	-	-	40.8
Total	23.0	270.8	127.9	33.6	7.0	7.0	469.3	25.5	306.1	145.3	34.1	7.0	7.0	524.9

CHINA
Guangdong Pearl River Delta/Urban
Environment Project
Table 4: Water Quality Monitoring and
Information Systems Detailed Costs
(RMB Millions)

	Base Cost							Totals Including Contingencies						
	2004	2005	2006	2007	2008	2009	Total	2004	2005	2006	2007	2008	2009	Total
I. Investment Costs														
A. Civil Works														
WQM1.1 Installation & Testing Equipment (Renovation & Upgrading of 7 existing AMS)	-	0.1	0.5	0.3	-	-	0.9	-	0.1	0.6	0.3	-	-	1.0
WQM1.2 Installation and Testing Equipment (New AMS)	-	0.5	3.2	1.6	-	-	5.4	-	0.6	3.8	1.9	-	-	6.3
WQM1.3 Laboratory Construction	-	0.2	0.2	-	-	-	0.4	-	0.2	0.2	-	-	-	0.5
Subtotal Civil Works	-	0.8	4.0	1.9	-	-	6.7	-	0.9	4.6	2.2	-	-	7.8
B. Equipment & Materials														
WQM2.1 Equipment for renovation & Upgrading of existing AMS	-	-	-	3.8	1.0	0.3	5.1	-	-	-	4.5	1.2	0.3	6.1
WQM2.2 Quality Assurance Equipment (11 new AMS)	-	-	-	1.4	0.4	0.1	1.8	-	-	-	1.6	0.4	0.1	2.1
WQM2.3 AMS Equipment and Devises (11 new AMS)	-	-	-	21.6	5.8	1.4	28.8	-	-	-	25.6	7.0	1.8	34.3
WQM2.4 Laboratory Quality Control Equipmenrt, Spare parts & Accessories	-	-	-	0.5	0.1	0.0	0.7	-	-	-	0.6	0.2	0.0	0.8
WQM2.5 Spare Parts, Accessories	-	-	-	0.5	0.1	0.0	0.6	-	-	-	0.5	0.1	0.0	0.7
WQM2.6 Computer Hardware for Provincial Control Center	-	-	-	3.0	0.8	0.2	4.0	-	-	-	3.6	1.0	0.2	4.8
WQM2.7 Software	-	-	-	1.0	-	-	1.0	-	-	-	1.2	-	-	1.2
WQM3.1 Aeration, Temperature Control System (new AMS)	-	-	0.7	0.7	-	-	1.4	-	-	0.8	0.8	-	-	1.6
WQM3.2 Lightning Protection (New AMS)	-	-	-	1.4	-	-	1.4	-	-	-	1.7	-	-	1.7
WQM3.3 Water, Electrical Supplies and Security	-	-	-	1.4	0.7	0.2	2.4	-	-	-	1.7	0.9	0.3	2.9
WQM3.4 Power & Water Services to Laboratory	-	-	-	0.1	0.1	0.0	0.2	-	-	-	0.1	0.1	0.0	0.2
Subtotal Equipment & Materials	-	-	0.7	35.4	9.0	2.3	47.4	-	-	0.8	41.9	10.9	2.9	56.5
C. Technical Assistance & Training														
WQM4.1 GEF-supported Database Development & Management	-	0.2	0.4	0.3	0.1	-	1.0	-	0.2	0.4	0.3	0.1	-	1.0
WQM4.2 GEF-supported AMS Data Collection	-	0.3	0.6	0.5	0.2	-	1.6	-	0.3	0.6	0.5	0.2	-	1.6
WQM4.3 GEF-supported Pollution Source Investigitation Research & Data Mining	-	0.6	1.2	0.9	0.3	-	2.9	-	0.6	1.2	0.9	0.3	-	2.9
WQM4.4 GEF-supported GIS Development	-	-	2.7	-	-	-	2.7	-	-	2.7	-	-	-	2.7
WQM4.5 GEF-supported Database	-	-	1.4	-	-	-	1.4	-	-	1.4	-	-	-	1.4

Software														
WQM4.6 GEF-supported QA/QC Regulations Compiling	-	0.3	0.3	0.3	0.3	-	1.0	-	0.3	0.3	0.3	0.3	-	1.0
WQM4.7 GEF-supported Staff Training & Documentation	-	0.3	0.3	0.3	0.3	-	1.0	-	0.3	0.3	0.3	0.3	-	1.0
WQM4.8 GEF-supported Shared Air & Water Quality														
Database on PRD-South China Sea Pollution	-	0.4	0.4	0.4	0.4	-	1.7	-	0.4	0.4	0.4	0.4	-	1.7
WQM4.9 GEF-supported Conference on PRD-South China Sea														
Environmental management Framework	-	-	0.4	-	-	-	0.4	-	-	0.4	-	-	-	0.4
WQM4.10 GEF-supported Pollution Monitoring Information Sharing	-	0.4	0.4	0.4	0.4	-	1.7	-	0.4	0.4	0.4	0.4	-	1.7
Subtotal Technical Assistance & Training	-	2.5	8.1	3.0	1.9	-	15.4	-	2.5	8.1	3.0	1.9	-	15.4
D. Land Acquisition & Resettlement	3.2	3.2	-	-	-	-	6.4	3.5	3.6	-	-	-	-	7.2
E. Engineering & Management														
Civil Works	-	0.1	0.4	0.2	-	-	0.7	-	0.1	0.5	0.2	-	-	0.8
Equipment & Materials	-	-	0.1	3.5	0.9	0.2	4.7	-	-	0.1	4.2	1.1	0.3	5.6
Land Acquisition & Resetlement	0.3	0.3	-	-	-	-	0.6	0.4	0.4	-	-	-	-	0.7
Subtotal Engineering & Management	0.3	0.4	0.5	3.7	0.9	0.2	6.1	0.4	0.5	0.5	4.4	1.1	0.3	7.1
	3.5	6.9	13.2	44.0	11.8	2.5	82.0	3.9	7.5	14.0	51.6	13.8	3.1	94.0

CHINA
Guangdong Pearl River Delta/Urban Environment Project
Table 5. Institutional Strengthening & Training Detailed Costs
(RMB Million)

	Base Cost							Totals Including Contingencies						
	2004	2005	2006	2007	2008	2009	Total	2004	2005	2006	2007	2008	2009	Total
I. Investment Costs														
A. Technical Assistance														
Package A.1 Guangzhou Wastewater Treatment Co: Financial/Institutional Support Training & Equipment /a	-	2.5	2.5	2.5	2.5	-	10.0	-	2.8	2.9	3.0	3.0	-	11.7
Package B.1 Metropolitan Guanfo Development & Management Strategies & Regional Planning	-	-	5.0	5.0	5.0	5.0	20.0	-	-	5.8	5.9	6.0	6.2	23.9
Package B.2 Public Hygiene Program Public Education & Master Plan Preparation	-	0.7	0.7	0.7	0.7	-	2.8	-	0.8	0.8	0.8	0.8	-	3.3
Package B.3 Study Tours & Training	-	2.8	2.8	2.8	2.8	-	11.0	-	3.1	3.2	3.3	3.3	-	12.9
Total	-	6.0	11.0	11.0	11.0	5.0	43.8	-	6.7	12.7	13.0	13.2	6.2	51.8

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\a 100 nat, 35 intl m/m plus trg & eq. Y1.5m

Annex 4: Cost Effectiveness Analysis Summary
CHINA: Guangdong Pearl River Delta Urban Environment Project

PRD Region and Guangzhou-Foshan Metropolitan Area

The Pearl River is China's third longest river and is second only to the Yangtze in terms of annual average flow. The Pearl River Delta (PRD) is home to over 40 million people who live in 25 administratively-defined cities and three counties (further divided into 534 towns, townships and sub-municipal districts) in Guangdong Province, and in two Special Administrative Regions-SAR-(Hong Kong and Macau). The Delta is also complex geographically. The Pearl River has three major branches -- Xi Jiang, Bei Jiang and Dong Jiang—and discharges into the South China Sea through eight principal tributaries.

The PRD region of Guangdong Province is one of the most heavily populated, industrialized and urbanized regions in China and was an early experimental site of China's open-door policy in late 1970s. Since then, most of PRD in Guangdong Province has benefited significantly from the nation's economic reform and export-oriented development and witnessed phenomenal economic growth, mostly due to large inflows of direct foreign investment, initially in low value-added manufacturing, and more recently in higher value-added manufacturing and services, and powered by large inflows of low-cost migrant workers from peripheral areas in Guangdong and from poor provinces.

The GDP of the PRD region (including HK and Macau) was US$273 billion in 2001. The GDP of the region (excluding HK and Macau) grew at an average annual rate of 14.7% over the period 1990-2000. The region captures 85% of all foreign direct investment into China and represents 33% of China's exports (Newsweek, October 20, 2003). Some 280 of the world's 500 largest companies have a presence in the PRD. The delta has become one of the engines driving China's economic growth and is looming as 'the new workshop of the world'. It is predicted that the economic growth of the PRD region will continue in the years ahead.

The PRD region can be further divided into seven urban clusters (Chreod, 2003). A major one is known as is "Guang-Fo" metropolitan region, comprising Guangzhou City, Foshan City, Nanhai, and Shunde. As the provincial capital, Guangzhou City is the political, economic and cultural hub of the PRD. It is the primary area of the proposed project; Foshan City and other neighboring cities may participate in the inter-municipal cooperation in provision of environmental infrastructure and services.

Table 1. Population and income data of major cities in PRD in 2001.

	Population (million)	Urban Population Density (persons/km^2)	GDP (billion Yuan)	Income *per capita* (Yuan)
Guangzhou	7.1	1,551	268	38,007
Foshan	3.4	6,416	119	32,991
Shenzhen	1.3	678	195	152,099
Dongguan	1.5	624	58	37,777

Source: China City Statistical Yearbook 2002.

The PRD's rapid economic growth has come at a heavy environmental cost. . In 2000 the PRD region (excluding HK and Macau) generated 11.5 million tons of wastewater per day, in the order of 80% of that generated in Guangdong province as a whole. Investment in environmental protection has not kept pace

with the region's rapid economic advance, as is evident in the serious deterioration in river water quality and significant impacts on public health and the quality of life. Wastewater treatment capacity in the PRD region is only 2.6 million tons per day, equivalent to only 28% of total wastewater generated.

Environmentally safe disposal of sludge from wastewater treatment plants is only just beginning in the PRD, with a first plant, currently in the bidding stage for a joint-venture operation, to serve Guangzhou city. Treatment of sludge from the expanded wastewater treatment plant capacity now being installed is a major challenge to the PRD cities. Except for wastewater collection and simple landfills for solid wastes, most cities in the PRD have limited facilities for waste management and little experience with least cost planning, designing, financing, managing, and operating wastewater, solid waste, and hazardous waste treatment facilities.

According to China 2002 Environment Statement, the water quality at 9 of the 49 monitoring stations scattered along the entire Pearl River was at Class IV or V and 4 others were even worse than Class V. Many urban sections of the Pearl River, especially in the vicinity of Guangzhou, are at Class V or worse. This deteriorating environmental situation poses a serious threat to drinking water sources, including the drinking water supply to Hong Kong. It also renders the river system unsuitable for irrigation, aquaculture, and potential recreational uses, and contributes to serious pollution of the South China Sea.

GPG Environmental Programs – The PRD Clean-up Plan

Public awareness of these environmental threats has risen in recent years in the PRD. The Guangdong Provincial Government (GPG) is committed to achieving sustainable development in the PRD through controlling pollution and environmental degradation in PRD. In response to the urgent demand for Pearl River clean-up, GPG recently set up its long term environmental objectives for the PRD region, including achieving Class III Standard for water quality, which would allow the river system to be used as a source of drinking water supply.

To achieve its goals, GPG is also introducing a number of policy actions, including the Pearl River Clean-up Plan, the introduction of cost-recovery pricing, more efficient allocation of investment resources, and the promotion of innovative forms of private sector involvement. Prepared and announced by the Guangdong Environmental Protection Bureau (GDEPB), the Pearl River Clean-up Plan requires US$5 billion investment in 162 wastewater treatment facilities in a time span of eight years.

For the Guang-Fo metropolitan region the wastewater treatment strategy is to treat 50-60% of domestic wastewater and 85% of industrial wastewater by 2005. By 2010, the percentage of domestic wastewater treated will reach 70% with treatment capacity of 4.9 m3/d in 34 WWTP distributed widely. It has been proposed that all urban administrations with a population over 10,000 would have a waste water treatment facility.

These PRD pollution control plans are ambitious and not without questions on their cost-effectiveness and the feasibility of implementation. For instance, many of the WWTPs planned in the Pearl River Clean-up Plan are on the basis of narrow administrative jurisdictions rather than drainage catchments and they take little into account of the economies of scale. In addition, the Plan does not effectively address the non-point source pollution challenge (e.g. agriculture and industrial livestock). Considerable opportunities exist to improve the planning approach through making the plan more realistic in implementation, least cost and financially feasible, operationally efficient, and providing a larger role for the private sector. The proposed lending project is specially designed to make a difference in this respect.

The Baseline and the "Without-project" Scenario

The quantities of industrial waste water discharges in Guangdong have declined over the period 1992 – 2001 from 1.419 to 1.13 billion m3/year. However, the domestic water consumption and wastewater flows have increased at a greater rate, having almost doubled form 2.688 to 5.110 billion m3/year during the same period. Table 2 projects the average daily wastewater flows (ADWF) in Guangzhou City during the period 2000 - 2025. Although *per capita* wastewater flows decrease over the period the overall flows and pollution loads continue to increase as a consequence of economic development and population growth.

Table 2: Summary of ADWF Projections for Guangzhou City

	2000	2005	2010	2015	2020	2025
8 Old districts ADWF (m3/day)	1 524 077	1 569 495	1 549 377	1 525 823	1 563 720	1 597 364
Total Guangzhou City (m3/day)	2 467 520	2 567 161	2 561 297	2 549 832	2 644 003	2 731 785
Average DWF per capita (l/cap/day)	248	239	221	203	195	186

In Guangzhou there are only two major WWTPs (Liede I and II, Datansha I and II) and a few small-scale WWTPs (Conghua I and Economic Zone WWTP). Their total operational capacity is only about 670,000 m3/day, approximately equivalent to only 32% of total municipal wastewater discharges. As a result, water quality in many urban sections of the Pearl River, especially in the vicinity of Guangzhou, is at Class V or worse. Water pollution impacts and water quality management of the PRD region are further complicated by tide effects, which mean that discharges from a downstream city can be largely responsible for the water quality of an upstream city. Water quality management of the PRD region has to be handled through collaboration of all cities in the region, in particular the neighboring cities of Guangzhou and Foshan.

Without the project the water quality of Pearl River would decline further. The consequences of increasing deterioration of the water quality would be an increase in the costs of water supply and treatment, public health problems, and constraints on the development of tourism, fishing and other uses of the river. At a certain point environmental problems in PRD might jeopardize the economic development of the region. Moreover, without the project, which demonstrates innovative, cost-effective, and collaborative pollution abatement methods to the region, the pollution clean-up of the PRD would be at a higher cost later, possibly threatening the economic development and sustainability of the region.

Summary of benefits and costs:

The ultimate objective the Guangdong Pearl River Delta Urban Environment Project (GPRDUEP) is to provide a safe environmental setting for the sustainable long-term economic growth of the main urban areas of the PRD region of Guangdong Province. In particular, the project aims primarily at developing cost-effective pollution management strategies, investment plans, and institutional models which can serve as a "blue-print project" for the whole PRD Region.

The project would support several important themes and specific goals of the CAS: the safeguarding of the environment and the reduction of infrastructure bottlenecks. The project would also help China meet one of the Millennium Development Goals (Goal 7), which is to "improve the environment by implementing national strategies for sustainable development by 2005".

Specifically, the project will support the following investments:

- **Urban Wastewater Management:** Construction of a wastewater treatment plant (WWTP), extension of an existing WWYP, and construction of a large network of trunk sewers in Guangzhou; **Hazardous Waste Management:** construction of a pre-processing treatment center and development of a landfill in Guangzhou;
- **Inter-municipal Environmental Infrastructure: c**onstruction of jointly-owned and managed environmental infrastructure for groups of at least two contiguous cities/municipalities;
- **Water Quality Monitoring and Information Systems:** rehabilitation of existing monitoring stations, purchase of equipment and software; and
- **Institutional Strengthening and Training:** capacity-building for planning and managing the urban environment, specifically, river basin/delta management of water, wastewater and solid and hazardous waste, and project and financial management and utility operations.

The wastewater and hazardous waste components are the two major investments covered by the US$165 million World Bank loan. The other three components for the project are strong complements to these two and also crucial to the implementation and the success of the entire project. Even with 100% collection and treatment in Guangzhou, certain reaches of the Guangzhou Section of the PRD will remain polluted and water quality objectives will not be attained, and the environmental assessment demonstrates that a broader river basin management approach should be adopted. This requires improvement of existing water quality monitoring and management information systems and enhancement of inter-municipal cooperation and private participation in provision of environmental infrastructure and services in the PRD region.

The potential benefits of the project have been identified; these include reductions in water supply/treatment costs and public health costs and positive impacts on amenities, tourism, land values (especially those of water fronts), agriculture, and fishery. Currently, the low water quality (Class V or worse) of Pearl River in many urban areas requires costly treatment for water supply or more investments in new water sources. It is also a constraint on the appreciation of land and other property values, especially in those water front residential areas. Polluted environment has caused illness, incurred higher preventive and medical costs and loss of productivity, and damaged local tourism, agriculture and fishery.

However, it is very difficult to value those benefits in monetary terms due to limited data available, the complexity of the causes of pollution, and uncertainties related to the linkage between pollution reduction and the benefits. It is also because the project is only the first step of a long-term program and part of a much bigger scheme of PRD environmental clean-up. The size of the project is small relative to the total investment required for achieving the goals of the Pearl River clean-up although the blue-print project will have a strong demonstrative effect.

Main Assumptions:

Cost-effectiveness indicators:

Because it is difficult to put a value on incremental benefits in environmental quality and even more challenging to attribute such benefits to specific interventions of the proposed project in the manner of the cost-benefit analysis, the cost-effectiveness approach has been adopted in the analysis. Given the fact that there have been well-established pollution clean-up objectives in the region, the cost-effectiveness is appropriate to this analysis.

The cost-effectiveness analysis has been used to select the interventions that are the least-cost options to achieve the well-stated pollution reduction targets. First, a set of alternatives have been proposed and examined in terms of their effectiveness to achieve a pollution control target, the net present value (NPV) of total investment costs and average incremental cost (AIC). Second, the option with the least AIC, a reasonable size of saving in NPV, and an acceptable FIRR was selected and proposed as project components. Third, an institutional and tariff reform scheme was presented to minimize any economic subsidy, make waste discharge fees or tariffs affordable, and ensure a successful project implementation. Finally, the affordability and impacts of each project component on different social groups, especially on the poor and vulnerable groups, were reviewed to ensure that the project is affordable and at no cost of further deteriorating the living standard of the low-income group.

The details of the cost-effectiveness analyses for the wastewater and hazardous waste treatment components are presented below.

The Wastewater Treatment (WWT) Component

During the project preparation, a number of WWT interventions (the number, location and capacity of WWTPs, wastewater collection networks, and treatment processes) and their alternatives were proposed and analyzed. The interventions include not only the shortlist of project items proposed for this project but also include examination of the impacts of cleaning up other wastewater sources and other approaches.

Project alternatives. Starting with the initial Guangzhou Wastewater Master Plan (the base scheme) in which a large number of treatment plant sites were initially defined, the alternatives consider amalgamating small WWTPs proposed in the master plan into the Dashadi WWTP in eastern Guangzhou and modifying wastewater collection networks.

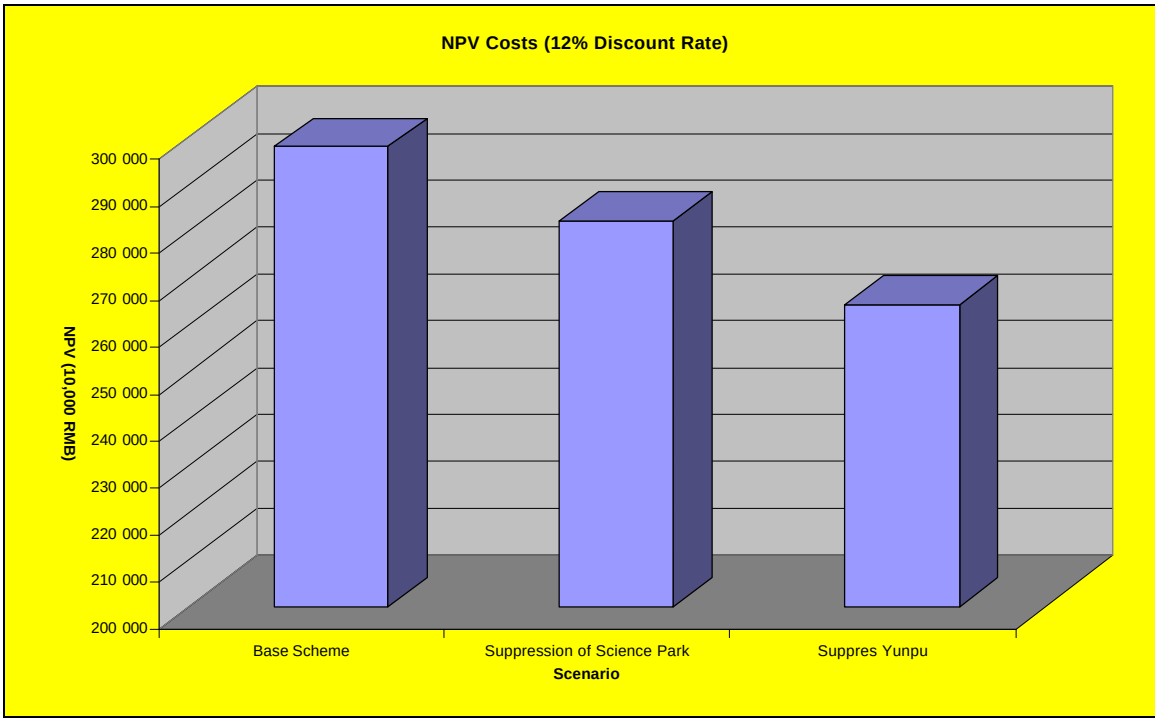
In the feasibility study of the WWT component, the base scheme derived from the master plan and two alternatives were detailed and analyzed to calculate their contribution to wastewater treatment and their net present values (NPV) of project costs.

- The base scheme (option 2 as recommended in Guangzhou Wastewater Master plan)
- Alternative 1 – amalgamating the Science Park WWTP with the Dashadi WWTP
- Alternative 2 – amalgamating both the Science Park and Yuanpu WWTPs with the Dashadi WWTP.

For these options, capital and operating costs over 50 years were estimated and discounted to calculate the net present values. The costs common to all schemes covering such items as secondary networks, house connections, sewerage, design, supervision and contingencies, however, have been excluded from the estimates.

The NPV for these schemes are presented in Figure 1, which shows that the least cost option is centralized treatment at Dashadi WWTP. It is therefore decided to concentrate wastewater treatment at one major new site (the Dashadi site) to the east of the city, together with extending the existing Liede site.

FIGURE 1. COMPARISON OF THREE OPTIONS FOR EASTERN GUANGZHOU SEWERAGE



The final option proposed for funding under GPRDUEP comprises following facilities: (a) a new wastewater treatment plant (WWTP) of capacity 200,000 m3/d each at Dashadi; (b) expansion of the capacity of Liede wastewater treatment plant (Liede III) by 200,000 m3/d; and (c) about 500 km of trunk sewers in six drainage catchments of Liede (East), Datansha, Lijiao, Dashadi, Liede (West), and Xilang.

High treatment levels would be required to conform with wastewater discharge standards and more critically to enable water quality objectives to be met in the associated river reaches. Further technical study and cost-effectiveness analysis was also undertaken comparing different treatment processes in relation to the Guangdong Wastewater Discharge Standards on the basis of current and future wastewater concentrations. The processes compared include: primary treatment, enhanced primary treatment, traditional activated sludge process, A2O Process or similar with good phosphorus and nitrogen removal (such as SBR), primary + A2O, and enhanced primary + AOO. The process of A2O combined with chemical treatment has been found suitable and proposed. The process should be able to achieve the discharge requirements, even for the stricter Guangdong Standards. The detailed conclusion of the treatment process study can be found in the technical annex of the PAD.

Water quality improvement and economic benefits. The WWT component will help improve water quality of the Pearl River Guangzhou section to meet the government's environmental targets. Mathematical modeling has shown that the project as proposed will improve the overall water quality of the Guangzhou Section of the PRD substantially. Dissolved oxygen concentrations will increase by on average 3.5 mg/l over the section receiving discharges from the Liede and Dashadi WWTPs. This will enable aquatic life to return to these watercourses for the first time in many years.

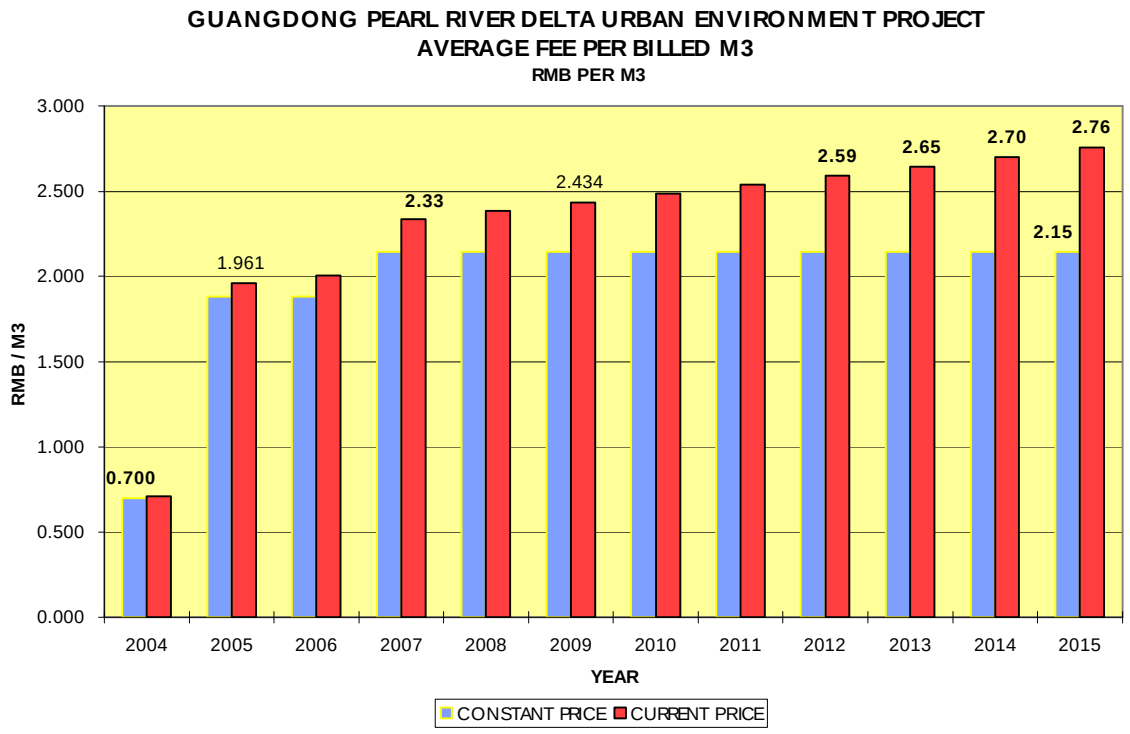
The benefits of water quality improvement include savings in water supply and treatment investment, reduction in public health costs, improvements in amenities and living environment, and increases in

tourism, land values (especially those of waterfronts), agriculture, and fisheries. These economic benefits have not been quantified as this would require considerable amounts of data that are not easily available. However, the amount of money Guangzhou residents spent on bottled water - one of avoidance costs – gives an indication of the magnitude of the potential benefits.

A household survey indicates that serious waterborne and water-related diseases are not prevalent, presumably reflecting the fact that the vast majority (96%) of the population obtains water supplies from the public network and that water is traditionally boiled prior to drinking. Moreover, sizeable proportions of the population using water filters (16%) and/or bottled water (31%). The expenditure on average per family using bottled water for drinking was Y31 RMB per month, almost equivalent to the average monthly water bill of Y32.3. On this item alone, residents of Guangzhou urban districts are spending Y305 million (US$38 million) per year Under the assumptions of 8.60 million population living in downtown and urban districts of Guangzhou City, the average household size 3.25 persons, and 31% households consuming bottled water. This expense, however, is only part of the overall environmental health-related preventive spending which further includes incremental costs of water treatment at water treatment plants and the expenses on water filters and boiling at home.

Tariff increase. Domestic water and wastewater tariffs in Guangzhou are Y0.9/m³ and Y0.7/m³ (also for commercial enterprises), respectively, the wastewater tariff having been raised from Y0.30/m³ in March 2003. These tariffs are, however, insufficient to provide the revenue required to maintain and operate the systems. There will have to be an increase in wastewater tariff for recovery of the investment and sustainable operations of the existing and proposed WWTPs and sewerage systems. Financial analyses suggest that in order to recover the costs operation and adequate maintenance together with those of debt service or depreciation, whichever is the higher, the average wastewater tariff in 2004 prices needs to be Y1.96/m³ in year 2005 for all user groups, rising to Y2.34/m³ in 2007 and Y2.43/m³ in 2009. The assumptions used in the financial projections are set out in the financial analysis annex.

Under the assumptions of 8.60 million population living in downtown and urban districts of Guangzhou City, the average household size 3.25 persons, and 31% households consuming bottled water.



Affordability. Surveys were undertaken in Guangzhou to determine the attitude of residents to the project and to prospective tariff increases. The surveys, although preliminary, highlighted in particular the poor sanitary conditions of the poorer migrant populations of Guangzhou. Census information indicates that these migrant populations are found towards the periphery, east of Guangzhou and on Haizhu Island, areas that are particularly targeted by the network extensions. The surveys indicated unanimous support by those interviewed and there was a concomitant understanding and demand for improved services.

The PRD region is one of the wealthiest regions in China; the *per capita* GDP in Guangzhou (including the rural area within the jurisdiction of the city) was 38,000 Y in 2001, even higher than those of Shanghai and Beijing. The current level of wastewater tariff in Guangzhou, although raised recently, is still only similar to those in other major Chinese cities (e.g., Shanghai 0.62 Yuan RMB, Beijing 0.60 Yuan RMB and Wuhan 0.80 Yuan RMB). The social surveys revealed that total current expenditure on water and wastewater tariffs represents only 1% or less of the household budgets for those interviewed; the current monthly sewerage tariff is equivalent to the price of a packet of Chinese-made cigarettes (9 RMB). It was concluded that increases in wastewater tariffs would largely go unnoticed.

Poverty and distributional aspects. Although the suggested increases in wastewater tariff are broadly affordable, the impacts on low-income families need also to be considered. While for China as a whole the proportion of the population with income below the US$1 a day poverty line (Y750 per month for a household of three persons) was 16.1% in 2000, for the urban areas the figure is only 0.5 %. As the wealthiest region in China.

Guangzhou and the rest of the PRD cities have an even lower percentage of the population below the poverty line. Nevertheless the impact on this small portion of population still needs to be evaluated and possibly mitigated. Options could be to provide compensation through their monthly social protection payments or to introduce tiered tariffs with lower tariff rates for the lowest levels of water consumption and

wastewater discharge typical of the poorest consumers.

Hazardous Waste Management Component

By definition, hazardous wastes are dangerous to public health because of their hazardous properties which could cause not only physical harm to humans but also environmental damage. The risks from hazardous wastes occur at the point of generation and throughout the chain of storage, handling, transport, treatment and disposal.

Waste generation. Total waste generation in Guangdong Province in 2000 was estimated at approximately 46 million tons, of which 44 million tons was domestic or non-hazardous industrial waste. Total hazardous industrial waste generation was estimated at 930 000 tons and non-radioactive medical waste accounted for a further 42 000 tons.

It was estimated in a survey conducted for Guangzhou in 2001 that total industrial waste generations was about 4.2 million tons, of which 263,571 were classified as hazardous waste. Of the hazardous wastes, 121,351 tons were reused, 138,221 tons were treated, 1,156 were disposed, and 3,085 tons were stored for future handling. For the PRD as a whole industrial waste production in 2000 was estimated at 16.4 million tons of which 930 000 tons (5.67%) were regarded as hazardous and of this 165 000 tons were considered not to be adequately treated.

Based on existing statistical data, the hazardous waste generation *per capita* in Guangzhou was calculated at 35 kg/year, much lower than that in European countries such as France and Germany, where hazardous waste generation rates *per capita* are all over 100 kg/year. Although such a difference may be in part due to different systems of classification of hazardous waste in each country, it would still appear that the amount of hazardous waste were probably significantly under-estimated.

Current situation of waste treatment. Throughout Guangdong province waste treatment capacity is inadequate and most of the existing facilities are in a poor condition and have not been generally constructed to modern or international standards. A large amount of hazardous waste in Guangdong are either incinerated or co-disposed with domestic waste to landfills many of which do not have protective liner systems. In the entire PRD region there is currently only one secure landfill for hazardous solid waste located in Shenzhen with an annual capacity of 20 000 tons. Guangdong Domestic Waste Treatment Center is one of the three treatment units that treat medical waste, but the treatment rate is only 16%.

Approximately 500 tons per day of hazardous waste are taken from Guangzhou to Shenzhen because of the lack of local treatment and environmentally secure disposal facilities. There are not only a large known quantity of hazardous waste that is improperly or inadequately treated or disposed of, but also probably significant quantities of hazardous waste that are currently unrecorded. This latter portion of the waste stream may pose the greatest environmental and health risk.

Provincial solid waste pollution control program. The region has begun to address hazardous waste management seriously. Guangdong Provincial EPB has recently established a Provincial Solid Waste Pollution Control Program. The Program includes hazardous waste treatment with targets of utilization of hazardous waste of 50% and 60% by 2005 and 2010 respectively and treatments rates of 20% and 30% respectively for 2005 and 2010.

As part of the Program, an implementation plan for hazardous waste treatment facilities in 2001-2010 has been developed. The plan involves the construction by 2010 of 11 inter-region hazardous waste treatment

centers (six treatment facilities and five secure landfill sites) at an estimated cost of 3 billion Y (US$375 million). One of the centers is planned for Guangzhou.

Potential benefits of hazardous waste component. A major benefit of the component is to protect human health and the environment. Although a direct link between human health and poor hazardous waste management has been difficult to prove conclusively, there have been a number of spectacular cases worldwide where the cost of clean-up or compensation would more than justify investment in such a facility. In addition to external health and environmental benefits, the component will also provide industries with a cost-effective treatment and disposal solution.

At present, the treatment facilities for hazardous waste in Guangzhou are generally small-scale and thereby expensive and there is not currently an environmentally acceptable final disposal site nearby. By centralizing treatment and disposal at one site, economies of scale can be achieved, thereby enabling tariffs to be reduced and encouraging industries to use such facilities. From the transportation point of view, there is clearly a need for a treatment center serving Guangzhou and Foshan (the Guang-Fo area) as the distance to the nearest treatment center in Shenzhen already exceeds 100 km.

Project alternatives

During the project preparation a number of different project alternatives were considered together with different site locations. The following three configurations of treatment facilities have been considered for the hazardous waste treatment center for Guangzhou:

- Alternative 1, consisting of an office, an analytical laboratory, a chemical reception center, storage for chemicals, physical/chemical treatment area, a 10,000 tons/year incinerator and a series of landfills with an initial storage capacity of 150,000 m3
- Alternative 2, including the above offices, pre-treatment facilities and landfill, a smaller incinerator (4,000 tons/year) and an external thermal treatment unit (arranged though cement kiln).
- Alternative 3, including only the offices, pre-treatment facilities and landfill; incineration and thermal treatment would be undertaken by external units.

It is understood that there are currently plans to develop new cement works (which may utilize some forms of hazardous waste as fuel) and incinerators for the treatment of hazardous waste. On this basis clearly option 3 would the least-cost alternative.

Seven alternative sites for the Guangzhou hazardous waste treatment facility were considered. After the initial analysis, the following three options for the site were selected for further examination.

- The Liangtian site in Liangtian Town, Baiyun District;
- The Shatian site in Liangtian Town, Baiyun District; and
- The Xin Feng Site in Taihe Town, Baiyun District.

Studies of accessibility to waste producers and potential operational impacts, notably geo-hydrological, were undertaken the report concluded that the Liangtian site was the preferred option. The EA and RAP for this component demonstrate that there would be no major adverse impact (either environmental or social) associated with this site. The site is particularly well located from the transportation point of view because of the immediate proximity of a major highway.

The treatment facility proposed at the Liangtian landfill site will include total landfill capacity of 860,000 m3, adequate for 25 years operation, of which 150 000 m3 would be provided in GPRDUEP. The facility

will also have physico-chemical treatment plant of capacity 5 000 tons per year and a stabilization/solidification plant of capacity 50 000 tons per year. The facility will be located on a 22 hectare site and will serve as a regional facility. It is expected to receive hazardous wastes from Guangzhou, Foshan, and surrounding municipalities. The total project cost is Y196 million RMB (24.5 million US$).

Market analysis. Industries producing hazardous wastes are legally obliged to take measures to treat the wastes in an environmentally safe manner. The Guangzhou EPB will set up a monitoring and inspection system to enforce the mandated requirement, and adopt a structure of fines to be levied on offenders. Based on the 2001 survey, the proportion of total hazardous wastes generated in Guangzhou that need to be treated at the proposed hazardous waste treatment facility has been estimated at 17% (about 46,000 tons per year). This is expected to increase to 64 000 tons per year by 2010 and 71 000 tons per year by 2020. Hazardous wastes will be transported to the treatment facility either by the waste producers or by a newly created or licensed collection company.

Hazardous waste treatment tariff. An appropriate level of hazardous waste treatment tariff will be levied per ton of hazardous wastes delivered to the treatment center. The charge should be adequate to meet the projected operating costs of the center (including depreciated capital investments) and its introduction could be phased to enable businesses to adapt to the rising prices. In addition, the tariff must be equitable, realistic and affordable to the customers of the hazardous waste treatment facility. It should encourage waste reduction and reuse activities while not discouraging the industries to use the facility. On the basis of the market analysis the average tariff levels required to order to recover operation and maintenance costs (including depreciation) would be Y1020 per ton of waste in 2004 prices) for the design throughput, allowing the operator to operate without Government subsidies.

For throughput levels greater than the design figure the required tariff would fall, although not in proportion because of the relatively high fixed costs of the facility. For a throughput of 75 000 tons per year (about 150% of the design throughput) the required tariff (at 2004 prices) would fall to about Y950 per ton. If, however, the throughput of the plant is only 25 000 tons per year, the required tariff increases to an average of about Y1 480 per ton, again at 2004 prices.

Ability and willingness of companies to pay. An initial market survey has been undertaken covering 46 industries of different sectors and sizes in both Guangzhou and Foshan. The results suggest that small enterprises would be willing to pay approximately Y1000 Yuan/ton and larger (particularly international) companies would be willing to pay more. On the basis of the above study it has been possible to determine a matrix of company turnover (in the range Y10 – 1000 million per year) in relation to hazardous waste generation (in the range 5 – 50 000 tons/year). This has been used to assess the affordability of the proposed tariff to industries.

In relative terms a company with a turnover of Y10 Million/year and producing 50 tons of hazardous waste per year would generally be able to afford such a facility (relative cost less than 1% of turnover); the impact would be similar for a company producing 5000 tons with a turnover of Y1000 Million /year. Companies producing high amounts of waste per unit of turnover could not afford to use the facility; for example, a company with a turnover of Y 10 million/year and producing 500 tons of hazardous waste per year would face a hazardous waste treatment charge equivalent to about 5% of turnover. Such companies would dump the waste illegally (as they are probably already doing), close down or change processing systems/undertake recycling.

It should be remembered that industries are extremely price sensitive in relation to fulfilling their environmental obligations; nevertheless, the proposed prices would appear affordable, while encouraging those industries currently producing large amounts of waste to review their operations.

Annex 5: Financial Summary

CHINA: Guangdong Pearl River Delta Urban Environment Project

Provincial and Municipal Finances

1. An analysis of the availability of counterpart funds was undertaken by reviewing revenues and expenditures of Guangdong Province and Guangzhou Municipality. Tables 1 and 2 below present a summary of this analysis. The receipts data represent net receipts (i.e. after transfers made to higher authority) of the province and municipality, respectively. The data analyzed refer to on-budget and off-budget receipts and expenditures. On-budget receipts include receipts from statutory taxes and levies. Off-budget receipts are non-tax receipts such as net income remitted from provincial or municipally-controlled enterprises, and some types of user charges collected by administrative departments. On-budget expenditures include infrastructure investment, government administration, public health, education and safety. Off-budget expenditures are typically earmarked by revenue source and include enterprise investment, urban infrastructure maintenance and administrative expenses.

2. The principal sources of counterpart funds will be (i) urban construction and maintenance funds; (ii) commercial bank loans; and (iii) proceeds of the wastewater tariff (in the initial years). Guangzhou Municipality have an annual budget of about Y2.6 billion of its urban construction and maintenance funds allocated to water supply, wastewater and solid and hazardous wastes and other municipal services. Commercial bank loan terms are stated to be for a term of 10 years including a grace period of two years and at an interest rate of 5 percent per year.

3. The analysis reveals that the project and its components are easily affordable by Guangdong Province should Guangzhou Municipality and other participating agencies not repay their loans. The annual projections of project costs to Guangdong Province do not exceed 0.05 percent of annual receipts. For Guangzhou Municipality, the highest annual cost relative to annual receipts is 1.8 percent.

4. **Assumptions for Financial Projections.** The assumptions made when calculating the projections of on and off-budget revenues and expenditures of (a) Guangdong Province; and (b) Guangzhou Municipality for the period 2003-2010 are set out below.

5. **Revenue Forecast**. The actual (2000-2002) revenue figures have been derived from data provided by the provincial and municipal governments. Between 2003-2010, the average annual increase in revenue is projected to be about 10 percent and 11 percent in current terms for Guangdong Province and Guangzhou Municipality, respectively.

6. **Expenditure Forecast**. Historically, expenditures have registered between about 14 to 33 percent over revenues. The central government transfers amounts to make up the shortfalls in keeping with the current fiscal arrangements between central and local governments. To estimate future expenditures, an overall average annual increase of about 10 percent for Guangdong, and about 8.8 percent for Guangzhou, in current terms, have been assumed using 2002 as the base year.

7. The following tables summarize projected revenue and expenditure data from 2003 to 2010 for Guangdong Province and Guangzhou Municipality. Projected project expenditures are also included.

Table 1: Guangdong Provincial Finances
(Y billion, current terms)

	Actual	Projected						
	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
Receipts	1,201.6	1321.8	1453.9	1599.3	1754.2	1935.2	2128.7	2341.5	2575.7
Expenditures	1,521.1	1673.2	1840.5	2024.5	2226.9	2449.6	2694.6	2964.1	3260.5
Project Expenditures	-	-	0.5	0.5	0.8	0.9	0.5	0.2	-
Project as % of Receipts	-	-	0.03	0.03	0.05	0.05	0.02	0.01	-

Table 2: Guangzhou Municipal Finances
(Y billion, current terms)

	Actual	Projected						
	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
Receipts	24.6	26.1	28.2	32.1	35.6	39.6	43.9	48.7	54.1
Expenditures	32.7	33.5	36.2	39.5	43.0	46.8	50.9	55.4	60.3
Project Expenditures	-	-	0.5	0.5	0.7	0.7	0.3	0.2	-
Project as % of Receipts	-	-	1.8	1.6	2.0	1.8	0.7	0.4	-

Wastewater Financial Analysis

8. Prior to the establishment of the Guangzhou Sewage Treatment Company (GSTC) in November 2003, wastewater collection, treatment and disposal were the responsibility of the Guangzhou Municipal Garden Bureau (GMGB). Budgetary allocations were made to fund the service. As is the practice in bureau and departmental operations, no provision was made for depreciation.

GSTC will have responsibility for the ownership, construction and management of urban wastewater assets, including wastewater treatment plants, pumping stations and network. By 2006 it will have taken over wastewater treatment plants currently in operation or under construction. These comprise Datansha I and II, Liede I and II, Lijiao and Xilang. It has delegated the construction of the investments proposed under the project to the Guangzhou Tunnel Development Company (GTDC). However, GSTC will sign all procurement contracts and be responsible for borrowing and repaying World Bank loan proceeds onlent to it by the Guangzhou Municipal Government (GMG).

8. The financial objectives of Guangzhou Municipality (GM) for GSTC are that it should be permitted to set and maintain its tariffs at levels that, at the least, would permit them to break even (i.e., wastewater revenues to cover operating costs and the greater of depreciation and debt service). GSTC would incur no additional debt without the Bank's agreement unless reasonable forecasts show it would have a debt service coverage of at least 1.3 times.

9. In January 2003, GMG adjusted wastewater tariffs from Y0.30/m^3 to Y0.70/m^3, based on 90 percent of water consumption for both domestic and non-domestic consumers. Wastewater tariffs will be collected by the water supply company and the proceeds passed to GSTC, less handling charges. Industries with self-supply but which discharge to the sewer system will be billed by the water saving

department. The proceeds of these collections will be passed to GSTC.

GSTC.

10. The actual and projected average tariffs over the implementation period of the project are given in Table 3. The assumptions used in the financial projections are set out below.

11. The projected financial statements (Income Statement, Sources and Applications of Funds and Balance Sheet) and operational and financial indicators statements are included in the Project File.

Table 3: Actual and Projected Tariffs
(Y/m3, current prices)

	Actual	**Projected**									
	2003	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
GWTC	0.70	0.70	0.77	0.85	1.02	1.42	1.71	2.22	2.22	2.67	3.60	3.60

Table 4 below includes key operational and financial indicators.

Table 4: Key Operational and Financial Indicators
(Y million, unless noted; current prices)

	2004	2005	2006	2007	2008	2009	2010
Water Sales (million m^3)	403	481	486	492	497	502	508
Sewage Quantity (million m^3)	322	385	389	393	398	402	408
Sewage Tr. Capacity (million m^3)	200	200	200	470	470	533	544
Sewage Treated (%)	35	35	81	81	81	90	90
Net Income	18.6	67.7	92.0	26.3	9.6	61.5	-40.2
Average Tariff (Yuan per m^3)	0.70	0.77	0.85	1.02	1.42	1.71	2.22
Capital Expenditures	373	332	508	549	264	120	
Financial Covenants							
Revenue	297	330	400	566	687	772	783
Op. Exp +> of Depreciation	217	220	223	399	565	612	762
or							
Debt Service							
Debt Service Coverage (times)	N/A	N/A	16.2	10.0	6.4	5.4	5.2
	8.0	7.7	6.2	2.4	5.0	5.8	1.6

ASSUMPTIONS TO UTILITY FINANCIAL PROJECTIONS

12. Assumptions to the projections of the main financial statements of Guangzhou Sewage Treatment Company (GSTC) for the period 2004-2019 are set out below.

13. **Inflation and Exchange Rates.** Yearly general domestic inflation rates used in the projections are 2.5 percent in 2004, 1.8 percent in 2005, 2.0 percent in 2006, 1.9 percent in 2007, 1.8% in 2008 and thereafter. Foreign price increases are estimated at -0.37 percent in 2004, 1.53 percent in 2005, 0.89 percent in 2006 and thereafter. The exchange rate used to convert foreign costs to local currency, where

applicable, was Y 8.0 per $1.0. It is assumed that exchange rate adjustments would, on average, maintain purchasing power parity over the projection period.

Income Statement

14. **Sales.** Projections of sewage quantities are based on "minimum demand" and maximum capacity figures, and at the equivalent of 90 percent of water bills.

15. **Tariffs.** Tariffs quoted are average tariffs and prices are expressed in Yuan/m3 in current terms.

16. **Operating Costs.** Salaries, wages and staff benefits are assumed to increase at the rates given in para. 12 above. Energy, materials and other costs are assumed to increase in line with general inflation also. Sludge from Wastewater Treatment Plants will be transported, treated and disposed of by a separate company (BOT). GSTC is contracted to pay Y195.00 per ton of wet sludge to this Company, with a minimum revenue of the equivalent of 695 tons per day. The following depreciation rates have been applied: (a) assets over 15 years – 3.7 percent; and (b) assets under 15 years - 6.6 percent. GSTC is assumed to pay 5.5 percent in sales taxes and 33 percent in income tax.

17. **Interest and Amortization Expenses.** The proceeds of the IBRD loan are assumed to be onlent to GSTC at 3.0 percent a year for 15 years including a grace period of five years and a commitment charge of 0.75% p.a. Amortization of the loan would be on the basis of equal payments of principal and interest. GSTC would bear the foreign exchange risk. Guangzhou Municipality (GM) would provide part of the local capital counterpart funds as capital grants, the balance will come from commercial bank loans at about five percent per annum payable over 10 years, including a grace period of two years.

Balance Sheet

18. Inventories have been projected to take into account general inflation as well as any expanded levels of operations and construction.

19. **Accounts Receivable.** Accounts receivable is assumed to be at 65 days.

Source and Application of Funds

20. **Working Capital Needs.** Working capital needs represent the excess, or otherwise, of the current year's current assets (net of cash), less the excess of the previous year's current assets (net of cash) over current liabilities.

21. **Change in Cash.** Change in cash (which includes short-term investments) calculates the balance sheet cash balance for the current year.

Annex 6(A): Procurement Arrangements
CHINA: Guangdong Pearl River Delta Urban Environment Project

Procurement

Procurement Capacity Assessment

1. The assessment was conducted under the framework of the Operational Procurement Review (OPR) of China which was approved in March of 2003.

2. The assessment found that all the Project Management Office (PMOs) have designated specific departments and personnel to be responsible for preparation and implementation of procurement.

3. Areas that need strengthening, such as procurement training, bidding document preparation and technical assistance have been identified and an action plan has been agreed upon. The action plan includes (a) GDPMO has appointed an experienced tendering company to assist implementing agencies, and undertake all ICB and NCB procurement; (b) all implementing agencies would be required to adopt the Bank's procurement procedures and use the model bidding documents agreed between the Ministry of Finance and the World Bank, and/or the World Bank Standard Bidding Documents; (c) GDPMO and GZPMO would create sub-units within their respective organizations, and appoint experienced staff dedicated to procurement activities; (d) GDPMO has prepared a consolidated procurement implementation plan based on the individual procurement plans prepared by the PMOs; (e) GDPMO would appoint international project management consultants to assist both itself and GZPMO to carry out procurement activities; (f) GDPMO would prepare a Procurement Manual describing all the procurement procedures to be followed in Bank-financed procurement. The Manual would also cite common examples of procurement practices that are not acceptable under the Bank's procurement procedures; (g) GDPMO would organize periodically, procurement training seminars and workshops of procurement staff in GZPMO and all PMOs; (h) GDPMO would collect procurement information from each implementing agency and create a comprehensive database on procurement activities; and (i) GDPMO would prepare annual reports on procurement performance under the project.

4. The assessment identified some deviations in the provincial or municipal regulations which are not at variance with the World Bank's Procurement Guidelines, in addition to those identified in the OPR of China. The deviations would be incorporated into the Project Agreement to confirm exemptions for Bank-financed procurement from the provincial/municipal regulations and the Bidding and Tendering Law of China in case of discrepancies.

5. Procurement procedures and arrangements satisfactory to the Bank, were agreed upon with GDPMO, GZPMO and the implementing agencies. All procurement would be undertaken in accordance with the Bank's Procurement Guidelines--"Procurement under IBRD Loans and IDA Credits" dated January 1995 and revised in January and August 1996, September 1997 and January 1999, and "Selection and Employment of Consultants by World Bank Borrowers" dated January 1997 and revised in September 1997, January 1999 and May 2002. Model bidding documents (MBD) will be used for most procurement. The Bank's SBDs would be used for all procurement categories for which a corresponding MBD has not been prepared and approved.

6 The Guangdong Project Management Office (GDPMO) under the Guangdong Provincial Finance Bureau would oversee the Bank-financed activities in the project. The GDPMO has successfully managed all World Bank-financed projects in Guangdong Province (GP) ever since the mid-80's, including the

Guangzhou Urban Transport Project, 1993. In Guangzhou Municipality (GM), the Guangzhou Project Management Office (GZPMO) has been established with the participation of the municipal finance bureau, urban construction commission, and municipal and gardening bureau. The GZPMO would coordinate the preparation and implementation of the wastewater and hazardous waste management components, which would be implemented by Guangzhou Tunnel Development Company (GTDC) and Guangzhou Waste Management Department.

Procurement methods (Table A)

7. CMC International Tendering Corporation, No. 1 Department, in a Joint Venture with GMG International Tendering Company Limited, has been selected as the procurement agent for international competitive bidding (ICB) and national competitive bidding (NCB). The General Procurement Notice (GPN) was published in the *UN Development Business,* No.592756, dated December 22, 2003..

8. All contracts have been grouped. where practical, into bid packages estimated to cost the equivalent of US$7.0 million or more each for works, and the equivalent of US$500,000 or more each for goods. All civil works contracts estimated to cost the equivalent of US$7.0 million or more, and goods contracts estimated to cost the equivalent of US$500,000 or more, would be procured using ICB procedures, and would be advertised as Special Procurement Notices published in *Development Business* and/or well-known technical magazines, newspapers and trade publications of wide international circulation.

9. **Civil Works**. The total value of civil works (including contingencies) is estimated at about US$ 208.9 million, of which about US$ 22.0 million (11%) would be procured using ICB procedures. Civil works that are small, scattered or scheduled too far apart to be packaged into larger contracts to be of interest to foreign firms, would be awarded through NCB procedures, acceptable to the Bank. The NCB procedures recently adopted by the Government have been reviewed and approved by the World Bank Group. Interested foreign bidders would be allowed to bid for NCB contracts. Procurement of land and resettlement and power supplies, would be carried out using procedures applicable to locally-financed procurement, and would not be eligible for reimbursement under the loan.

10. **Equipment and Materials**. The total value of equipment and materials is estimated at about US$58.6 million, of which about US$ 29.5 million (50%) would be procured using ICB procedures. Equipment and materials contracts estimated to cost less than US$500,000 equivalent would be procured using NCB procedures acceptable to the Bank. Contracts for computer hardware and software, and miscellaneous equipment, costing US$50,000 equivalent or less would be procured through national or international shopping procedures acceptable to the Bank, i.e., on the basis of comparison of price quotations solicited from at least three suppliers, or in the case of international shopping, price quotations solicited from three suppliers in two different countries. Reserve procurement would be undertaken for providing power supplies.

11. **Technical Assistance and Training.** All consultants to be retained under the project would be recruited in accordance with the World Bank's "Guidelines for Selection and Employment of Consultants by World Bank Borrowers-January 1997," and revised in September 1997, January 1999 and May 2002 (Table Al of this Annex). Drafts of Letters of Invitation and Terms of Reference for institutional and financial technical assistance, construction supervision services and water and wastewater utility pricing, and sector institutional strengthening for (a) Package A.1-financial/institutional support for the Guangzhou Sewage Treatment Company (GSTC); (b) Construction supervision services and quality control for GSTC; and (c) services for design review and certification for GSTC, were reviewed at negotiations. Details of the

institutional strengthening and training component are summarized in Annex 2. *A disbursement condition for civil works of the respective components is: (a) the signature of contracts by GSTC for(i) institutional development and financial management,(ii) construction supervision and quality control, and design review and certification; and(bi) GHWMC for (i) design review and certification and construction supervision, (ii) development of a regulatory and institutional framework for waste management, and (iii) preparation of bid documents for the selection of an operator of the facility.* The Terms of Reference for the main consultancy assignments are in the Project File (Annex 8).

12. Engineering and management overhead of implementing agencies, not financed under the project, is estimated at US$34.6 million equivalent, inclusive of contingencies.

Annex 6A: Table A1: Project Costs by Procurement Arrangements
Bank and GEF–financed components
(US$ million equivalent)

Expenditure Category	**Procurement Method[1]**				**Total Cost** (including Contingencies)
	ICB	**NCB**	**Other[2]**	**NBF[3]**	
1. Works	22.00	154.70	0.00	32.20	208.90
	(10.80)	(76.03)	(0.00)	(0.00)	(86.83)
2. Goods	29.50	0.40	1.00	27.70	58.60
	(24.94)	(0.30)	(0.80)	(0.00)	(26.04)
3. Services	0.00	0.00	18.30	13.50	31.80
	(0.00)	(0.00)	(16.95)	(0.00)	(16.95)
4. Miscellaneous	0.00	0.00	6.90	125.70	132.60
	(0.00)	(0.00)	(6.90)	(0.00)	(6.90)
5. Interest during construction	0.00	0.00	0.00	9.20	9.20
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
6. Front-end Fee	0.00	0.00	1.28	0.00	1.28
	(0.00)	(0.00)	(1.28)	(0.00)	(1.28)
Total	**51.50**	**155.10**	**27.48**	**208.30**	**442.38**
	(35.74)	**(76.33)**	**(25.93)**	**(0.00)**	**(138.00)**

Notes:
1 Figures in parentheses include the amounts to be financed by the Bank Loan and GEF Grant.
2 Other = procurement through national shopping, consultant services and training, GEF capital and O&M Grant disbursements and front-end fee.
3 NBF = Not Bank-Financed includes land acquisition and resettlement, reserved procurement, some works, goods and services contracts, design and administration, and interest during construction

Annex 6A: Table A2: Project Costs by Procurement Arrangements
Bank–financed components
($ million equivalent)

Expenditure Category	Procurement Method[1]				Total Cost (including Contingencies)
	ICB	NCB	Other[2]	NBF[3]	
1. Works	22.00	154.70	0.00	32.20	208.90
	(10.80)	(76.03)	(0.00)	(0.00)	(86.83)
2. Goods	29.50	0.40	1.00	27.70	58.60
	(24.94)	(0.30)	(0.80)	(0.00)	(26.04)
3. Services	0.00	0.00	15.20	13.50	28.70
	(0.00)	(0.00)	(13.85)	(0.00)	(13.85)
4. Miscellaneous	0.00	0.00	0.00	125.70	125.70
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
5. Interest during construction	0.00	0.00	0.00	9.20	9.20
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
6. Front-end Fee	0.00	0.00	1.28	0.00	1.28
	(0.00)	(0.00)	(1.28)	(0.00)	(1.28)
Total	**51.50**	**155.10**	**17.48**	**208.30**	**432.38**
	(35.74)	**(76.33)**	**(15.93)**	**(0.00)**	**(128.00)**

1 Figures in parentheses include the amounts to be financed by the Bank Loan.

2 Other = procurement through national shopping, consultant services and training, and front-end fee.

Annex 6A: Table A3: Project Costs by Procurement Arrangements
GEF-financed components
($ million equivalent)

Expenditure Category	Procurement Method[1]				Total Cost
	ICB	NCB	Other[2]	NBF	
1. Works	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
2. Goods	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
3. Services	0.00	0.00	3.10	0.00	3.10
	(0.00)	(0.00)	(3.10)	(0.00)	(3.10)
4. Miscellaneous	0.00	0.00	6.90	0.00	6.90
	(0.00)	(0.00)	(6.90)	(0.00)	(6.90)
Total	**0.00**	**0.00**	**10.00**	**0.00**	**10.00**
	(0.00)	**(0.00)**	**(10.00)**	**(0.00)**	**(10.00)**

1 Figures in parentheses include the amounts to be financed by the GEF Grant.

2 Other = GEF capital grants and operations and maintenance grants, and consultant services and training.

Annex 6A: Table A3: Consultant Selection Arrangements
(US$ million equivalent)

Consultant Services Expenditure Category	Selection Method							Total Cost (Including Contingencies)
	QCBS	QBS	SFB	LCS	CQ	Other	NBF	
A. Firms	13.10 (11.75)	5.00 (5.00)	0.00 0.00	0.00 0.00	0.20 (0.20)	0.00 (0.00)	13.50 (0.00)	31.80 (16.95)
B. Individuals	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00
Tota1	13.10 (11.75)	5.00 (5.00)	0.00 (0.00)	0.00 (0.00)	0.20 (0.20)	0.00 0.00	13.50 (0.00)	31.80 (16.95)

Notes: QCBS = Quality- and Cost-Based Selection
QBS = Quality-based Selection
SFB = Selection under a Fixed Budget
LCS = Least-Cost Selection
CQ = Selection Based on Consultants' Qualifications
Other = Selection of individual consultants (per Section V of Consultants Guidelines), Commercial Practices, etc.
NBGF = Not Bank-financed.
Figures in parenthesis are the amounts to be financed by the Bank loan and GEF Grant

13, Prior-review procedures would be used for (a) all civil works contracts estimated to cost US$6.0 million or more each; (b) all equipment and materials contracts estimated to cost US$500,000 or more each; and (c) consultant services contracts with an estimated contract cost of more than US$200,000 for firms and US$50,000 for individuals. In the case of consultant service contracts, all terms of reference and single-source selections, regardless of the value of the contract, would be subject to prior review. For contracts below the above-mentioned limits, post-review procedures would be followed. An estimated 30 percent of the value of all contracts proposed to be financed by the Bank would be subject to prior review.

Procurement Contract Packaging and Procurement Plan

14. The contract packaging for the project is provided in Tables C and D, showing the goods, works, and service contracts, respectively, proposed for each component. A procurement plan, indicating detailed procurement activities for the first year, and indicative plan for the subsequent years is provided in the Project File (Annex 8).

Disbursement

15. **Procurement Plan for Civil Works, Equipment and Materials.** This plan is in the Project File (Annex 8).

16. **Retroactive Financing.** Retroactive financing of up to US$5 million would be applied to expenditures made after October 1, 2003 for (a) civil works for sites preparation and access roads; and (b) consultant services for preparation of the hazardous waste component.

Table B: Thresholds for Procurement Methods and Prior Review[1]

Annex 6A:

Expenditure Category	Contract Value (Threshold) $ thousands	Procurement Method	Contracts Subject to Prior Review[1] $ millions (base costs)
1. Works			
	More than $6.0 million	ICB	2 contracts $18.90m **subject to prior review**
		NCB	32 contracts $133.90m **not subject to prior review**
2. Goods	More than $0.5 million	ICB	3 contracts $25.80m **subject to prior review**
	Between $0.5 million and $0.05 million	NCB	2 contracts $0.40m **not subject to prior review**
	Up to $0.05 million	National Shopping	$1.0m **not subject to prior review**
3. Services	More than $0.10 for firms, more than $0.05 for individuals	QCBS or QBS	$16.60m **subject to prior review**

Total value of contracts subject to prior review:	US$61.30 million (27%)
Overall Procurement Risk Assessment:	**Average**
Frequency of procurement supervision missions proposed:	One every six months (includes special procurement supervision for post-review/audits)

Annex 6A: Table C - Procurement Contract Packaging[1]

	Contract Packages	Yuan Million	Procure-ment Type
	Urban Wastewater Management		
Liede III WWTP			
Civil Works Contracts			
LDP/C1	Advance site preparation works (services, piling, etc.)		NBF
LDP/C2	WWTP structures, jetty and other facilities		ICB
Liede: Trunk Sewer Network			
Civil Works Contracts			
LDP/C3	Network in Lin Jian Da Dao area (5.6 km)		NCB
LDP/C4	Network in Zhong Shan Da Dao area (15.8 km)		NCB
LDP/C5	Network in Guang Shan Gong Lu (15.3 km)		NCB
LDP/C6	Network in Guang Yuan Dong Lu northeast area (46.1 Km)		NCB
LDP/C7	Nettwork in Ke Lun Yu area (15.6 Km)		NCB
LDP/C8	Network in Tan Xia Cun area Hua Nan Lu (6.1 km)		NCB
LDP/C9	Network in Che Bei Chong (16.0 km)		NCB
LDP/C10	Network in Yuan Cun District (26.3 km)		NCB
Materials and Equipment Contracts			
LDP/E1	WWTP: Supply and installation of plant and equipment		ICB
LDP/E2	Vehicles and office equipment		NCB/NS
Electrical "Supply and Erect" Contracts			
LDP/E3	Power and water supply		NBF
Dashadi WWTP			
Civil Works Contracts			
DSDP/C1	Advance site preparation works (services, piling, etc.)		NCB
DSDP/C2	WWTP structures, jetty and other facilities		ICB
Dashadi: Trunk Sewer Network			
Civil Works Contracts			
DSDP/C3	Network Wu CHong Outh (21.5 km)		NCB
DSDP/C4	Network Huangpu EastLu (12.2 km)		NCB
DSDP/C5	Network Zhong Shan Da Dao (10.5 km)		NCB
DSDP/C6	Network Shen Chong (18.2 km(		NCB
DSDP/C7	Network Hi Lin Lu (18.4 km)		NCB
DSDP/C8	Network Hai Yuan Lu (3.8 km)		NCB
DSDP/C9	Network in Miscellaneous sewers		NCB

[1] A detailed contract procurement implementation Schedule was prepared, and is in the Project File (see Annex 10).

DSDP/C10	Network in Zhu Jiang Chong area (9.1 km)	
Materials and Equipment Contracts		
DSDP/E1	WWTP: Supply and installation of plant and equipment	
DSDP/E2	Vehicles and office equipment	
Electrical "Supply and Erect" Contracts		
DSDP/C3	Power and water supply	
Trunk Sewers for Four Other Catchments		
Civil Works Contracts		
	Datansha sewer network	
DTSSN/C1	Network in Guang Qin Lu	
DTSSN/C2	Network in East- North (74-120)	
DTSSN/C3	Network in East – Middle	
DTSSN/C4	Network in West	
DTSSN/C5	Pump station (No. 8 and 9)	
	Xilang sewer network	
KLSN/C6	Network in Long Xi Lu East	
	Liede sewer network	
LDSN/C7	Network in Hua Nan Lu	
	Lijiao sewer network	
LJSN/C8	Network in Jian Xiao Lu	
LJSN/C9	Network in Dong Xiao Nan Lu	
LJSN/C10	Network in Gong Ye Da Dao	
LJSN/C11	Network in Xin Jiao Nan Lu East	
Technical Assistance & Training Contracts		
WWT/T1	Consultant services for investigations and detailed design [awarded]	
WWT/T2	Consultant services for investigations and detailed design]	
WWT/T3	Consultant services for design review and certification	
WWT/T4	Consultant services for construction supervision & quality control (FIDIC terms)	
WWT/T5	Project organization, implementation and management (GTDC)	
WWT/T6	Institutional support and training	
Land and Resettlement		
Total Base Cost-Wastewater Management		**2083.9**

	Hazardous Waste Management		
Civil Works Contracts			
HWM1.1	Site works: Access roads		NCB
HWM1.2	Treatment Facilities: Reception building, collection & distribution building, physical & chemical treatment, solidification & stabilization, storage, and leachate treatment		NCB
HWM1.3	Landfill: earthworks (0.54), waste dam, cell separation dykes, storm drainage, leachate collection, supply and lay clay / bentonite layer, double HDPE liner, gas collection		NCB
HWM1.4	Buildings including equipment: office building, worker's residence, cafeteria, workshop, laboratory, power facilities building; ventilation and distribution; compressor and storage, and ancillary facilities:(workshop, well water supply incl. treatment; sewer and sewage treatment), site roads, parking lot, landscaping and greening		NCB
	Sub-total civil works		
Materials and Equipment Contracts			
HWM2.1	Laboratory and Office, Landfill Equipment and Vehicles Package 1: Environmental monitoring equipment Package 2: Landfill equipment-excavator, wheel loader Package 3: Waste transport vehicles (liquid and solids) Package 4: Office vehicles Package 5: Landfill automation equipment (Weighbridge with radiation)		ICB/NCB/ NS
	Sub-total materials and equipment		
Technical Assistance & Training Contracts			
HWM3.1	Feasibility study preparation [incl. $73,000 Sogreah retroactively financed contract]		CQ
HWM3.2	Detailed Design of Facility incl. international input		NBF
|HWM3.3	Geotechnical survey, etc.		QBS
HWM3.4	Design review and certification, and construction supervision [20mm]		QCBS
MWM3.5	GEF-supported regulatory and institutional framework, and bid document for selection of operator		QCBS
HWM3.6	GEF-supported preparation of waste market survey and corporate market assessment		QCBS
HWM3.7	Training and study tours		QBS
	Sub-total technical assistance and training		
Land and Resettlement			NBF
Total Base Cost-Hazardous Waste Management		**160.0**	

Inter-municipal Environmental Infrastructure			
Civil Works Contracts			
IMI1.1	Luoxi Island Wastewater System		NBF
IMI1.2	Shenzhen-Pingshan River Wetland Treatment Works		NBF
IMI1.3	Civil Works (To be determined)		NBF
Materials and Equipment Contracts			
IMI2.1	Equipment for Luoxi Island Wastewater System		NBF
IMI2.1	Equipment for Shenzhen-Pingshan River Wetland Treatment Works		NBF
IMI2.3	Equipment & Materials (To be determined)		NBF
Technical Assistance and Training Contracts			
IMI3.1	Consultants Services for Design Review & Certification		NBF
IMI3.2	Construction Supervision Services and Project Management		NBF
IMI3.3	GEF-supported Preparation of Bid Document to Select Operator (BOT) for Wastewater Operation		QCBS
IMI3.4	GEF-supported Study and Workshop for Inter/Intra-Municipal Cooperation		QCBS
IMI3.5	GEF-supported Updating PRD Wastewater Management Plan and Detailed Study of Foshan Wastewater Master Plan		QCBS
GEF Support to Participating Municipalities/Districts			
	Capital Grant		NBF
	O&M Grant		NBF
Land and Resettlement			NBF
Total Base Cost-Inter-municipal Environmental Infrastructure		**443.5**	

	Water Quality Monitoring and Information Sharing		
Civil Works Contracts			
WQM1.1	Installation and testing equipment (Renovation & upgrading 7 existing AMS)		NBF
WQM1.2	Installation and testing equipment (New AMS)		NBF
WQM1.3	Laboratory construction		NBF
Materials and Equipment Contracts			
WQM2.1	Equipment for Renovation & upgrading existing AMS		NBF
WQM2.2	Quality assurance equipment (11 new AMS)		NBF
WQM2.3	AMS equipment and devices (11 New AMS)		NBF
WQM2.4	Laboratory quality control equipment, spare parts and accessories		NBF
WQM2.5	Spare parts, accessories		NBF
WQM2.6	Computer hardware, GPS for provincial control center, and website development		NBF
WQM2.7	Software		NBF
"Supply and Erect Contracts			
WQM3.1	Aeration, temperature control system (New AMS)		NBF
WQM3.2	Lightning protection (New AMS)		NBF
WQM3.3	Water, electrical supplies and security		NBF
WQM3.4	Power and water services to laboratory		NBF
Technical Assistance & Training [GEF Supported Package]			
WQM4.1	Database development and management		QCBS
WQM4.2	AMS Data collection		QCBS
WQM4.3	Pollution source investigation, research, data mining		QCBS
WQM4.4	GIS development		QCBS
WQM4.5	Database software		QCBS
WQM4.6	QA/QC regulations compiling		QCBS
WQM4.7	Staff training and documentation		QBS
WQM4.8	Shared air & water quality database on PRD-South China Sea pollution (Guangdong-Hong Kong), including data sharing costs		QCBS
WQM4.9	Conference on PRD-South China Sea environmental management framework (Guangdong-Guangzhou-Hong Kong)		QBS
WQM4.10	Pollution monitoring information sharing, in Pearl River stretches near Guangzhou (by Guangzhou EPB)		QCBS
Land and Resettlement			NBF
Total Base Cost Water Quality Monitoring and Information Sharing		**75.9**	

Annex 6A: Table D - Procurement—Institutional Strengthening and Training

Ref.	Title	Person-months National	Person-months Int'l/a	Training/ Equipment Y million	Base Cost Y million
A	**PACKAGE A: FINANCIAL/INSTITUTIONAL SUPPORT/ EQUIPMENT**				
A.1	Guangzhou Wastewater Treatment Company				
	Sub-total Package A Procurement: QCBS				
B	**PACKAGE B: OTHER**				
B.1	Metropolitan Guang-fo Development, Management Strategies & Regional Planning				
B.2	Public Hygiene Program				
B.3	Study Tours & Training				
	Sub-total Package B Procurement Type: QCBS and QBS				
	Total Packages A and B				**43.8**

/a Person-months budgets include personnel and systems development and equipment.

1/Thresholds generally differ by country and project. Consult "Assessment of Agency's Capacity to Implement Procurement" and contact the Regional Procurement Adviser for guidance.

Annex 6(B): Financial Management and Disbursement Arrangements
CHINA: Guangdong Pearl River Delta Urban Environment Project

Financial Management

1. Summary of the Financial Management Assessment

Guangdong Province has the requisite systems and staff to carry out the financial management of the project. GP already has ongoing Bank-financed projects in other sectors and the Guangdong Finance Bureau (GDFB) is familiar with the Bank's disbursement procedures. Guangdong prepared a Financial Management Systems (FMS) Manual, satisfactory to the Bank, which would be the basis for financial management during project implementation.

2. Audit Arrangements

As with other Bank-financed projects in China, the Foreign Investment Audit Bureau of the China National Audit Office (CNAO), established in 1983 under the name of State Audit Administration, would have overall responsibility for auditing the accounts of the project. The actual auditing work would be conducted by the Guangdong Provincial Audit Department under CNAO's supervision. The Bank currently accepts audits performed under the responsibility of CNAO. Audits of the financial statements of implementing agencies and audit of the Special Account would be submitted to the Bank within six months after the end of the financial year. The audit reports of the implementing agencies would include opinions on whether the agencies were in compliance with their respective financial covenants, and whether these agencies had taken out adequate insurance on goods and works financed from loan and credit proceeds.

3. Disbursement Arrangements

The project will be disbursing on the traditional disbursement techniques and will not be using PMR-based disbursements, in accordance with the agreement between the Bank and MOF. See also Annex 15, Section XV.

Allocation of loan/grant proceeds (Table C)

Expenditure Category	Amount in US$ million	Financing Percentage
Works (WWM)	77.40	50%
Works (HWM)	5.30	50%
Goods	24.77	100% of foreign exchange, 100% local (ex-factory) and 75% local expenditures
Consulting Services	12.00[1]	91%
Training	4.35	100%
GEF Capital Grant	4.90	100%
GEF O&M Grant	2.00	100%
Unallocated	6.00	
Total Project Costs with Bank/Grant Financing	136.72	
Interest during construction	0.00	
Front-end fee	1.28	
Total	138.00[2]	

1\ Includes $3.1m from GEF grant
2\ Includes $10.0m GEF Grant

Use of statements of expenditures (SOEs):

Financial Management: The Statement of Expenditure (SOE) limits will be set up in line with procurement prior-review thresholds, as follows: (i) all contract for goods estimated to cost the equivalent of US$ 500,000 or less; (ii) all contract for civil works estimated to cost the equivalent of US$ 6,000,000 million or less (iii) consultant contract estimated to cost US$ 100,000 (firm)/US$ 50,000 (individual) or less.

Special account:

To facilitate disbursements two Special Accounts would be opened. For the loan, a Special Account would be opened with an authorized allocation of US$10.0 million, equivalent to the estimated average expenditures to be financed by the Bank over about a four-month period. The account would be opened in US dollars in a bank acceptable to the Bank and be managed by the Guangdong Finance Bureau**.** For the GEF grant, a Special Account with an authorized allocation of US$175,000 would be opened in a bank acceptable to the Bank and be managed by the Guangdong Finance Bureau**.**

Auditing Arrangements: As with other Bank-financed projects in China, the Foreign Investment Audit Bureau of the China National Audit Office (CNAO), established in 1983 under the name of State Audit Administration, would have overall responsibility for auditing the accounts of the project. The actual auditing work would be conducted by the Guangdong Provincial Audit Department under CNAO's supervision. The Bank currently accepts audits performed under the responsibility of CNAO. Audits of the financial statements of implementing agencies and audit of the Special Account would be submitted to the Bank within six months after the end of the financial year. The audit reports of the implementing agencies would include opinions on whether the agencies were in compliance with their respective financial covenants, and whether these agencies had taken out adequate insurance on goods and works financed from loan and credit proceeds.

A detailed contract procurement implementation Schedule was prepared, and is in the Project File (see Annex 10).

/a Person-months budgets include personnel and systems development and equipment.
/b Includes xxx person-months of core national personnel including: _____
/c Construction Supervision Services & Quality Control calculated as follows: Civil Works @ 2.5 percent of investment cost; and Materials &Equipment @ 1.0 percent of investment cost.

Annex 7: Project Processing Schedule

CHINA: Guangdong Pearl River Delta Urban Environment Project

Project Schedule	Planned	Actual
Time taken to prepare the project (months)	12	14
First Bank mission (identification)	01/07/2002	01/07/2002
Appraisal mission departure	12/10/2003	12/09/2003
Negotiations	03/29/2004	03/30/2004
Planned Date of Effectiveness	12/31/2004	12/31/2004

Prepared by:
Guangdong Municipal Government and its Agencies.

Preparation assistance:
Formulation of the project Development Strategy and the development framework assisted by national consultants, financed mainly by Guangdong, and grant funds from France, Denmark, Canada and Singapore.

Bank staff who worked on the project included:

Name	Speciality
Thomas Zearley	Lead Operations Officer and Task Manager
Chandra Godavitarne	Municipal Engineering Specialist
Vellet Fernandes	Program Assistant & Document Production
Dan Hoornweg	Sr. Environmental Engineering Specialist
Dahong Li	Resettlement Specialist
Xiaofeng Li	Program Assistant
Patrick McCarthy	Financial Analyst
Hoi-Chan Nguyen/Margaret Png	Legal Counsel
Robert O'Leary	Disbursement Officer
Bekir Onursal	Sr. Environmental Specialist
Chongwu Sun	Environmental Specialist
George Taylor	Water Quality & Wastewater Treatment Specialist
Chaogang Wang	Resettlement Specialist
Yan Xiang Wang	Industrial Pollution Control Specialist
Hardy Wong	Environmental Specialist
Jian Xie	Project Economist
Dong Yi	Financial Management Specialist
Chaohua Zhang	Resettlement Specialist
Hao Zhang	Municipal Engineering Specialist
Zhun Zhang	Institutional Specialist
Liu Zhentu	Procurement Specialist

Annex 8: Documents in the Project File*

CHINA: Guangdong Pearl River Delta Urban Environment Project

A. Project Implementation Plan

(i) Detailed Procurement Plans for Wastewater Management and Hazardous Waste Management components.

B. Bank Staff Assessments

(i) Procurement Capacity Assessment

C. Other

Document List Produced by Consultants for the Proposed PRD I Project.

Sogreah Consultants Limited :

1. R1: Inception Report (produced in October, 2002);
2. R2: Evaluation of Environmental Strategic Options, English & Chinese Versions
3. R3: Environmental Assessment Report, English Version,
4. R4: Resettlement Action Plan, English Version (Overall Version), published in December 2003
5. R5: Feasibility Study for the Guangzhou Wastewater Component, English Version
6. R6: Technical Assistance and Training Report, English Version (Published in August 2003)
7. R7: Assignment Completion Report, English & Chinese Versions.
8. R8: Feasibility Study for Hazardous Waste Component

Chreod Co.:

1. Inception Report: Technical Assistance on Project Framework Development - Pearl River Delta Urban Environment Project - 31 December, 2001.
2. Situational Analysis Report: Technical Assistance on Project Framework Development - Pearl River Delta Urban Environment Project - 31 May, 2002.
3. Strategic Options Report: Technical Assistance on Project Framework Development - Pearl River Delta Urban Environment Project - 19 September, 2002.
4. The Pearl River Delta Megalopolis: Development Trends and Key Priorities, January, 2003

CPG Limited:

1. Guangzhou – Pear River Delta Urban Environment Project Solid Waste Management Sector Assessment Report

DHI Limited:

1. Water Quality Model Study for Pear River (East River Section) (To be confirmed later)

-Financial Projections of Guangzhou Sewage Treatment Company 2004 – 2019, dated 5, 2004
-Terms of Reference for Guangdong's Wastewater Management Plan for the Pearl River Delta
-Terms of Reference for Sludge Management Plan
-Conformation from DRA consultant that the layout plan for the Dashadi WWTP site is satisfactory
-Revised procurement plans for the wastewater and hazardous waste components
-Project Indicators

*Including electronic files

Annex 9: Statement of Loans and Credits

CHINA: Guangdong Pearl River Delta Urban Environment Project

30-Mar-2004

			Original Amount in US$ Millions					Difference between expected and actual disbursements[a]	
Project ID	FY	Purpose	IBRD	IDA	GEF	Cancel.	Undisb.	Orig	Frm Rev'd
P069852	2004	CN-Wuhan Urban Transport	200.00	0.00	0.00	0.00	200.00	0.00	0.00
P066955	2004	CN-ZHEJIANG URBAN ENVMT	133.00	0.00	0.00	0.00	133.00	0.00	0.00
P065463	2004	CN - Jiangxi Integrated Agric. Modern.	100.00	0.00	0.00	0.00	100.00	1.50	0.00
P073002	2004	CN-Basic Education in Western Areas	100.00	0.00	0.00	0.00	100.00	0.00	0.00
P065035	2004	CN-Gansu & Xinjiang Pastoral Development	66.27	0.00	0.00	0.00	65.61	4.53	0.00
P077615	2004	CN-GEF-Gansu & Xinjiang Pastoral Develop	0.00	0.00	10.50	0.00	10.50	0.80	0.00
P068058	2003	CN-Yixing Pumped Storage Project	145.00	0.00	0.00	0.00	133.25	-5.57	0.00
P040599	2003	CN-TIANJIN URB DEV II	150.00	0.00	0.00	0.00	148.50	-1.50	0.00
P067337	2003	CN-2nd GEF Energy Conservation	0.00	0.00	26.00	0.00	14.60	16.57	0.00
P076714	2003	CN-Anhui Hwy 2	250.00	0.00	0.00	0.00	250.00	15.33	0.00
P058847	2003	CN-3rd Xinjiang Hwy Project	150.00	0.00	0.00	0.00	106.13	9.47	0.00
P070191	2003	CN-SHANGHAI URB ENVMT APL1	200.00	0.00	0.00	0.00	198.00	-2.00	0.00
P070441	2003	CN-Hubei Xiaogan Xiangfan Hwy	250.00	0.00	0.00	0.00	156.78	-20.56	0.00
P064729	2002	CN-SUSTAINABLE FORESTRY DEV. PROJECT	93.90	0.00	0.00	0.00	76.07	1.58	0.00
P058846	2002	CN-Natl Railway Project	160.00	0.00	0.00	0.00	34.62	-2.04	0.00
P060029	2002	CN-Sustain. Forestry Dev(Natural Forest)	0.00	0.00	16.00	0.00	14.11	3.00	0.00
P070459	2002	CN-Inner Mongolia Hwy Project	100.00	0.00	0.00	0.00	88.82	6.49	0.00
P071147	2002	CN-Tuberculosis Control Project	104.00	0.00	0.00	0.00	91.20	-12.80	0.00
P068049	2002	CN-Hubei Hydropower Dev in Poor Areas	105.00	0.00	0.00	0.00	87.68	12.84	0.00
P058845	2001	Jiangxi II Hwy	200.00	0.00	0.00	0.00	132.10	7.44	0.00
P056516	2001	CN - WATER CONSERVATION	74.00	0.00	0.00	0.00	39.83	8.40	0.00
P056596	2001	CN-Shijiazhuang Urban Transport	100.00	0.00	0.00	0.00	85.41	52.47	0.00
P047345	2001	CN-HUAI RIVER POLLUTION CONTROL	105.50	0.00	0.00	0.00	87.18	-18.32	0.00
P051859	2001	CN-LIAO RIVER BASIN	100.00	0.00	0.00	0.00	70.70	28.00	0.00
P056199	2001	CN-3rd Inland Waterways	100.00	0.00	0.00	0.00	80.46	5.96	0.00
P045915	2001	CN-Urumqi Urban Transport	100.00	0.00	0.00	0.00	52.54	47.34	0.00
P049436	2000	CN-CHONGQING URBAN ENVMT	200.00	0.00	0.00	3.70	154.56	62.23	0.00
P056424	2000	TONGBAI PUMPED STORA	320.00	0.00	0.00	100.00	151.53	91.87	0.00
P045264	2000	CN-SMALLHLDR CATTLE DEV	93.50	0.00	0.00	0.00	12.20	6.24	0.00
P045910	2000	CN-HEBEI URBAN ENVIRONMENT	150.00	0.00	0.00	0.00	119.36	46.36	0.00
P058844	2000	3rd Henan Prov Hwy	150.00	0.00	0.00	0.00	57.58	23.24	0.00
P064924	2000	CH-GEF-BEIJING ENVMT II	0.00	0.00	25.00	0.00	26.09	18.84	2.86
P058843	2000	Guangxi Highway	200.00	0.00	0.00	0.00	102.57	46.57	0.00
P042109	2000	CN-BEIJING ENVIRONMENT II	349.00	0.00	25.00	0.00	286.54	180.67	0.00
P064730	2000	CN - Yangtze Dike Strengthening Project	210.00	0.00	0.00	0.00	111.52	95.52	0.00
P041268	1999	CN-Nat Hwy4/Hubei-Hunan	350.00	0.00	0.00	0.00	59.72	37.72	0.00
P051856	1999	ACCOUNTING REFORM & DEVELOPMENT	27.40	5.60	0.00	0.00	17.89	17.84	0.00
P051705	1999	Fujian II Highway	200.00	0.00	0.00	0.00	65.73	63.07	0.00
P050036	1999	Anhui Provincial Hwy	200.00	0.00	0.00	9.60	32.99	32.19	0.00
P057352	1999	CN-RURAL WATER IV	16.00	30.00	0.00	0.00	21.81	15.87	8.72
P058308	1999	CN-PENSION REFORM PJT	0.00	5.00	0.00	0.00	1.77	1.75	0.00
P056216	1999	CN - LOESS PLATEAU II	100.00	50.00	0.00	0.00	24.54	26.67	0.00
P060270	1999	CN-ENTERPRISE REFORM LN	0.00	5.00	0.00	0.00	2.71	4.29	4.07
P038121	1999	CN-GEF-RENEWABLE ENERGY DEVELOPMENT	0.00	0.00	35.00	0.00	24.14	27.18	7.95
P051888	1999	CN - GUANZHONG IRRIGATION	80.00	20.00	0.00	0.00	32.27	25.50	0.00
P046051	1999	CN-HIGHER EDUC. REFORM	20.00	50.00	0.00	0.00	5.70	7.31	0.00
P043933	1999	CN-SICHUAN URBAN ENVMT	150.00	2.00	0.00	0.00	91.74	78.60	24.15
P042299	1999	TEC COOP CREDIT IV	10.00	35.00	0.00	0.00	36.03	-11.40	0.00
P041890	1999	CN-Liaoning Urban Transport	150.00	0.00	0.00	0.00	33.14	33.14	0.00
P036953	1999	CN-HEALTH IX	10.00	50.00	0.00	0.00	36.85	22.30	0.00
P003653	1999	CN-Container Transport	71.00	0.00	0.00	18.61	3.16	21.74	0.32
P049665	1999	CN-ANNING VALLEY AG.DEV	90.00	30.00	0.00	0.00	19.19	10.38	0.00
P046829	1999	RENEWABLE ENERGY DEVELOPMENT	100.00	0.00	0.00	0.00	12.87	99.87	8.23

			Original Amount in US$ Millions					Difference between expected and actual disbursements[a]	
Project ID	FY	Purpose	IBRD	IDA	GEF	Cancel.	Undisb.	Orig	Frm Rev'd
P046564	1999	CN - Gansu & Inner Mongolia Poverty Red.	60.00	100.00	0.00	13.30	40.00	29.66	-11.15
P035698	1998	HUNAN POWER DEVELOP.	300.00	0.00	0.00	145.00	31.45	173.45	-18.46
P003619	1998	CN-2nd Inland Waterways	123.00	0.00	0.00	37.00	16.35	51.71	3.63
P003566	1998	CN-BASIC HEALTH (HLTH8)	0.00	85.00	0.00	0.00	38.58	23.63	0.00
P003539	1998	CN - SUSTAINABLE COASTAL RESOURCES DE	100.00	0.00	0.00	2.06	46.65	45.38	35.83
P037859	1998	CN-GEF Energy Conservation	0.00	0.00	22.00	0.00	0.71	22.06	0.00
P049700	1998	CN - IAIL-2	300.00	0.00	0.00	0.00	3.97	3.97	0.66
P040185	1998	CN-SHANDONG ENVIRONMENT	95.00	0.00	0.00	1.40	20.07	21.47	1.58
P003614	1998	CN-Guangzhou City Transport	200.00	0.00	0.00	20.00	100.31	120.31	100.31
P046563	1998	CN - TARIM BASIN II	90.00	60.00	0.00	2.67	7.14	9.24	0.00
P045788	1998	Tri-Provincial Hwy	230.00	0.00	0.00	0.00	19.18	16.12	0.00
P003606	1998	ENERGY CONSERVATION	63.00	0.00	22.00	0.00	33.80	16.74	0.00
P051736	1998	E. CHINA/JIANGSU PWR	250.00	0.00	0.00	86.00	47.81	133.81	10.72
P036414	1998	CN-GUANGXI URBAN ENVMT	72.00	20.00	0.00	0.00	71.56	66.02	25.79
P046952	1998	CN - FOREST. DEV. POOR AR	100.00	100.00	0.00	0.00	29.62	-71.61	9.25
P036949	1998	CN-Nat Hwy3-Hubei	250.00	0.00	0.00	0.00	21.15	21.15	0.00
P003590	1997	CN - QINBA MOUNTAINS POVERTY REDUCTIO	30.00	150.00	0.00	0.00	13.16	16.34	-0.95
P003637	1997	CN-NAT'L RURAL WATER 3	0.00	70.00	0.00	0.00	0.56	3.77	3.35
P003650	1997	TUOKETUO POWER/INNER	400.00	0.00	0.00	102.50	37.31	139.81	27.57
P035693	1997	FUEL EFFICIENT IND.	0.00	0.00	32.80	0.00	6.83	32.81	0.00
P036405	1997	CN - WANJIAZHAI WATER TRA	400.00	0.00	0.00	75.00	22.58	97.58	10.00
P003654	1997	Nat Hwy2/Hunan-Guangdong	400.00	0.00	0.00	0.00	48.52	48.52	20.68
P044485	1997	SHANGHAI WAIGAOQIAO	400.00	0.00	0.00	0.00	75.02	46.56	34.56
P038988	1997	CN - HEILONGJIANG ADP	120.00	0.00	0.00	0.00	7.72	7.72	4.54
P003602	1996	CN-HUBEI URBAN ENVIRONMENT	125.00	25.00	0.00	28.32	39.72	70.08	32.41
P003599	1996	CN-YUNNAN ENVMT	125.00	25.00	0.00	19.48	35.68	56.92	7.10
P003594	1996	CN - GANSU HEXI CORRIDOR	60.00	90.00	0.00	0.00	73.92	58.83	0.00
P003589	1996	CN-DISEASE PREVENTION (HLTH7)	0.00	100.00	0.00	0.00	1.88	10.93	0.00
P034618	1996	CN-LABOR MARKET DEV.	10.00	20.00	0.00	0.00	5.66	7.75	0.00
P040513	1996	2nd Henan Prov Hwy	210.00	0.00	0.00	19.00	16.69	35.69	23.69
P003648	1996	CN-SHANGHAI SEWERAGE II	250.00	0.00	0.00	0.00	33.80	33.80	-1.34
P003571	1995	CN-7th Railways	400.00	0.00	0.00	119.00	10.28	129.28	20.28
P003647	1995	China Economic Law Reform -LEGEA	0.00	10.00	0.00	0.00	0.50	0.83	0.00
P003639	1995	CN-SOUTHWEST POVERTY REDUCTION PROJE	47.50	200.00	0.00	0.01	1.21	25.36	25.36
P003596	1995	CN-Yangtze Basin Water Resources Project	100.00	110.00	0.00	1.92	0.34	4.75	4.75
P003603	1995	CN-ENT HOUSING & SSR	275.00	75.00	0.00	57.46	37.71	93.09	1.41
P003540	1994	CN-LOESS PLATEAU	0.00	150.00	0.00	0.00	1.12	0.50	0.00
P003632	1993	CN-ENVIRONMENT TECH ASS	0.00	50.00	0.00	0.00	1.11	1.73	1.41
		Total:	11919.07	1722.60	214.30	862.02	5100.95	2850.24	429.31

CHINA
STATEMENT OF IFC's
Held and Disbursed Portfolio
Feb 29 - 2004
In Millions US Dollars

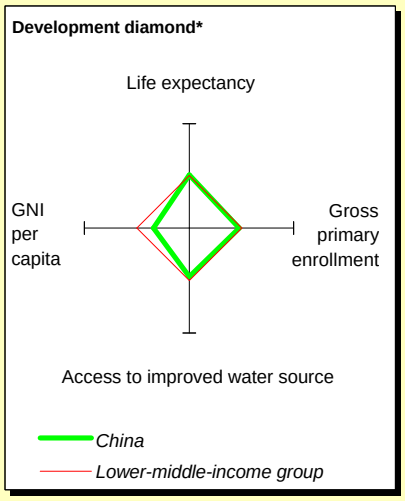
		Committed				Disbursed			
		IFC				IFC			
FY Approval	Company	Loan	Equity	Quasi	Partic	Loan	Equity	Quasi	Partic
2001	Peak Pacific	0.00	0.00	25.00	0.00	0.00	0.00	0.00	0.00
2003	SAIC	12.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2004	SBTS	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00
2000	SSIF	0.00	4.50	0.00	0.00	0.00	1.02	0.00	0.00
1998	Shanghai Krupp	27.50	0.00	0.00	61.43	27.50	0.00	0.00	61.43
1999	Shanghai Midway	0.00	16.02	0.00	0.00	0.00	16.02	0.00	0.00
1993	Shanxi	15.36	0.00	0.00	0.00	12.81	0.00	0.00	0.00
2002	Shenzhen PCCP	3.76	0.00	0.00	0.00	3.76	0.00	0.00	0.00
2001	Sino Gold	0.00	4.00	0.00	0.00	0.00	4.00	0.00	0.00
1995	Sino-Forest	23.33	0.00	0.00	0.00	18.33	0.00	0.00	0.00
2000	Suzhou PVC	0.00	2.48	0.00	0.00	0.00	2.48	0.00	0.00
1996	Wanjie Hospital	13.64	0.00	0.00	0.00	13.64	0.00	0.00	0.00
2004	Weihai Weidongri	1.06	0.00	0.00	0.00	1.06	0.00	0.00	0.00
2003	Wumart	0.00	6.48	0.00	0.00	0.00	6.48	0.00	0.00
1993	XACB	0.00	19.93	0.00	0.00	0.00	0.00	0.00	0.00
2003	Yantai Cement	4.73	0.00	0.00	0.00	4.73	0.00	0.00	0.00
2002	Zhengye-ADC	15.00	0.00	0.00	7.00	2.00	0.00	0.00	0.00
2003	ASIMCO	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00
2003	Anjia	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
1999/00/02	BCIB	0.00	0.00	11.60	0.00	0.00	0.00	0.00	0.00
2002	Bank of Shanghai	0.00	24.67	0.00	0.00	0.00	24.67	0.00	0.00
2003	CDH China Fund	0.00	15.17	0.00	0.00	0.00	2.09	0.00	0.00
2004	CSMC	0.00	12.00	0.00	0.00	0.00	7.20	0.00	0.00
1998	CUNA Mutual	0.00	12.00	0.00	0.00	0.00	0.00	0.00	0.00
1998	Chengdu Huarong	6.28	3.20	0.00	7.04	6.28	3.20	0.00	7.04
1992	Chengxin-IBCA	0.00	0.36	0.00	0.00	0.00	0.36	0.00	0.00
2004	China Bicycles	4.50	0.00	0.00	0.00	4.50	0.00	0.00	0.00
1994	China Re Life	0.00	15.41	0.00	0.00	0.00	15.29	0.00	0.00
1995	China Walden Mgt	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00
1994	Dupont Suzhou	7.79	0.00	0.00	0.00	7.79	0.00	0.00	0.00
2003	Dynamic Fund	0.00	8.05	0.00	0.00	0.00	6.40	0.00	0.00
1999	Great Infotech	0.00	3.50	0.00	0.00	0.00	2.10	0.00	0.00
2002	Hansom	0.00	0.08	0.00	0.00	0.00	0.08	0.00	0.00
2004	Huarong AMC	9.00	3.00	0.00	0.00	9.00	0.49	0.00	0.00
2002	IB	0.00	52.18	0.00	0.00	0.00	0.19	0.00	0.00
1998	IEC	20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2001	Leshan Scana	5.21	1.35	0.00	0.00	3.61	1.35	0.00	0.00
2001	Maanshan Carbon	9.00	2.00	0.00	0.00	9.00	2.00	0.00	0.00
2001	Minsheng Bank	0.00	23.50	0.00	0.00	0.00	23.50	0.00	0.00
1996	NCCB	0.00	26.58	0.00	0.00	0.00	26.46	0.00	0.00
2001	Nanjing Kumho	0.00	3.81	0.00	0.00	0.00	3.81	0.00	0.00
1995	New China Life	0.00	30.70	0.00	0.00	0.00	23.32	0.00	0.00
1997	Newbridge Inv.	0.00	1.95	0.00	0.00	0.00	1.95	0.00	0.00
	Orient Finance	6.67	0.00	0.00	8.33	6.67	0.00	0.00	8.33
	Total Portfolio:	184.83	306.97	36.60	83.80	130.68	174.50	0.00	76.80

		Approvals Pending Commitment			
FY Approval	Company	Loan	Equity	Quasi	Partic
2002	ASIMCO	0.00	0.01	0.00	0.00
2004	CCB-MS NPL	0.00	0.00	0.00	0.00
2003	Cellon	0.00	0.00	0.01	0.00
2002	Darong	0.01	0.00	0.00	0.01
2002	Huarong AMC	0.02	0.00	0.00	0.00
2002	IEC	0.00	0.01	0.00	0.00
2002	KHIT	0.00	0.00	0.00	0.00
2004	NCFL	0.00	0.00	0.02	0.00
2004	Nanjing Kumho Ex	0.03	0.00	0.01	0.00
2003	Peak Pacific 2	0.00	0.00	0.01	0.00
2004	SIBFI	0.00	0.00	0.00	0.00
2002	SML	0.00	0.00	0.00	0.00
2002	Sino Mining	0.01	0.00	0.00	0.01
2004	Vetroarredo	0.01	0.00	0.00	0.00
2002	Zhong Chen	0.03	0.00	0.00	0.03
	Total Pending Commitment:	0.10	0.01	0.05	0.05

Annex 10: Country at a Glance

CHINA: Guangdong Pearl River Delta Urban Environment Project

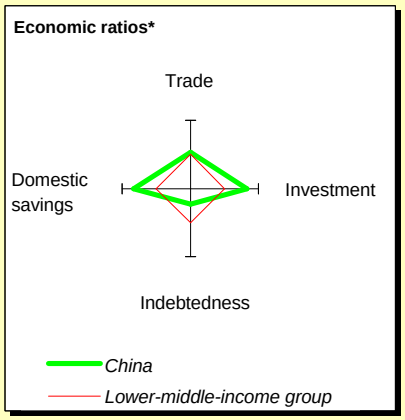
POVERTY and SOCIAL	China	East Asia & Pacific	Lower-middle-income
2002			
Population, mid-year *(millions)*	1,281.0	1,838	2,411
GNI per capita *(Atlas method, US$)*	950	950	1,390
GNI *(Atlas method, US$ billions)*	1,219.1	1,740	3,352
Average annual growth, 1996-02			
Population *(%)*	0.8	1.0	1.0
Labor force *(%)*	0.9	1.2	1.2
Most recent estimate (latest year available, 1996-02)			
Poverty *(% of population below national poverty line)*	5	..	..
Urban population *(% of total population)*	38	38	49
Life expectancy at birth *(years)*	71	69	69
Infant mortality *(per 1,000 live births)*	30	33	30
Child malnutrition *(% of children under 5)*	10	15	11
Access to an improved water source *(% of population)*	75	76	81
Illiteracy *(% of population age 15+)*	14	13	13
Gross primary enrollment *(% of school-age population)*	106	106	111
Male	105	105	111
Female	108	106	110



KEY ECONOMIC RATIOS and LONG-TERM TRENDS

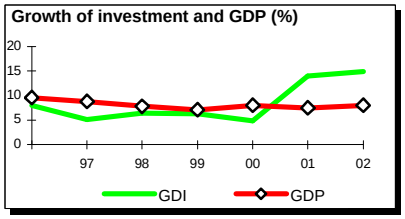
	1982	1992	2001	2002
GDP *(US$ billions)*	221.5	454.6	1,167.1	1,232.7
Gross domestic investment/GDP	33.2	36.2	38.5	41.0
Exports of goods and services/GDP	8.9	19.5	25.5	29.5
Gross domestic savings/GDP	34.8	37.7	40.9	44.0
Gross national savings/GDP	35.1	38.0	40.0	43.8
Current account balance/GDP	2.4	1.9	1.5	2.9
Interest payments/GDP	0.2	0.6	0.5	0.5
Total debt/GDP	3.8	15.9	14.6	12.6
Total debt service/exports	8.0	8.6	7.7	6.1
Present value of debt/GDP	..	..	14.1	..
Present value of debt/exports	..	..	51.8	..

	1982-92	1992-02	2001	2002	2002-06
(average annual growth)					
GDP	9.7	9.0	7.5	8.0	7.5
GDP per capita	8.1	8.0	6.7	7.2	6.6

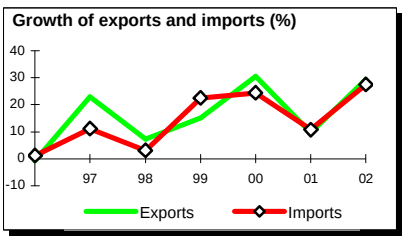


STRUCTURE of the ECONOMY

	1982	1992	2001	2002
(% of GDP)				
Agriculture	33.3	21.8	15.8	14.5
Industry	45.0	43.9	50.1	51.7
Manufacturing	37.3	33.1	34.2	44.5
Services	21.7	34.3	34.1	33.7
Private consumption	50.7	49.2	45.7	42.5
General government consumption	14.5	13.1	13.4	13.5
Imports of goods and services	7.3	18.0	23.1	26.5

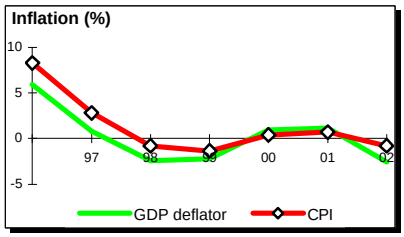


	1982-92	1992-02	2001	2002
(average annual growth)				
Agriculture	4.6	3.7	2.8	2.9
Industry	11.6	11.3	8.4	9.9
Manufacturing	11.2	10.4	9.0	8.1
Services	11.7	8.4	8.4	7.3
Private consumption	11.4	8.1	2.8	1.9
General government consumption	9.9	8.4	10.5	7.0
Gross domestic investment	9.5	9.7	13.9	14.9
Imports of goods and services	9.7	12.8	10.8	27.5



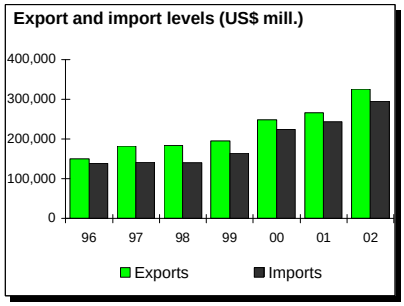
PRICES and GOVERNMENT FINANCE

	1982	1992	2001	2002
Domestic prices				
(% change)				
Consumer prices	6.0	6.4	0.7	-0.8
Implicit GDP deflator	-0.2	7.9	1.2	-2.6
Government finance				
(% of GDP, includes current grants)				
Current revenue	22.9	14.7	17.1	17.9
Current budget balance	..	2.0	1.1	0.0
Overall surplus/deficit	-0.3	-1.0	-4.7	-3.0



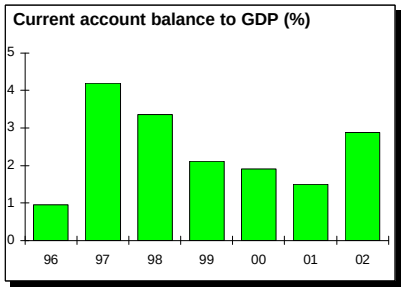
TRADE

	1982	1992	2001	2002
(US$ millions)				
Total exports (fob)	22,321	84,940	266,155	325,565
Food	2,908	8,309	12,780	14,623
Fuel	5,314	4,693	8,420	8,372
Manufactures	12,271	67,936	239,802	297,085
Total imports (cif)	19,285	80,585	243,610	295,203
Food	4,201	3,146	4,980	5,237
Fuel and energy	183	3,570	17,495	19,285
Capital goods	3,204	31,312	107,040	137,030
Export price index *(1995=100)*	41	85	83	78
Import price index *(1995=100)*	71	95	91	86
Terms of trade *(1995=100)*	58	89	91	90



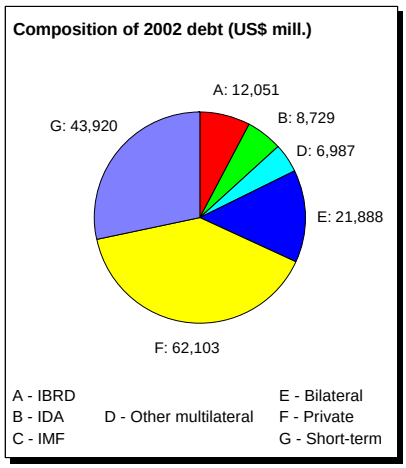
BALANCE of PAYMENTS

	1982	1992	2001	2002
(US$ millions)				
Exports of goods and services	24,906	94,198	299,409	365,395
Imports of goods and services	20,555	86,752	271,325	328,013
Resource balance	4,350	7,446	28,084	37,383
Net income	376	249	-19,174	-14,945
Net current transfers	486	1,155	8,492	12,984
Current account balance	5,212	8,850	17,401	35,422
Financing items (net)	-995	-10,952	30,046	40,085
Changes in net reserves	-4,217	2,102	-47,447	-75,507
Memo:				
Reserves including gold *(US$ millions)*	..	24,842	220,051	297,721
Conversion rate *(DEC, local/US$)*	2.4	5.9	8.3	8.3



EXTERNAL DEBT and RESOURCE FLOWS

	1982	1992	2001	2002
(US$ millions)				
Total debt outstanding and disbursed	8,358	72,428	170,110	155,678
IBRD	0	3,752	11,550	12,051
IDA	1	4,287	8,654	8,729
Total debt service	2,125	8,618	24,297	23,688
IBRD	0	460	1,550	1,631
IDA	0	30	151	175
Composition of net resource flows				
Official grants	47	327	240	..
Official creditors	657	2,343	2,156	-839
Private creditors	-122	8,949	-4,017	-13,593
Foreign direct investment	430	11,156	44,241	49,308
Portfolio equity	0	1,243	3,015	2,286
World Bank program				
Commitments	330	1,865	782	563
Disbursements	1	1,331	1,791	1,733
Principal repayments	0	197	904	1,157
Net flows	1	1,134	887	576
Interest payments	0	293	797	649
Net transfers	1	841	90	-73



Additional GEF Annex 11: GEF Incremental Cost Analysis
CHINA: Guangdong Pearl River Delta Urban Environment Project

The Program and Project Area

China's Pearl River Delta (PRD) is one of the largest and most complex urban systems in Asia. It is home to over 40 million people who live in 25 administratively-defined cities in Guangdong Province and in two Special Administrative Regions (Hong Kong and Macau). The PRD has ranked at or near the top nationwide in economic growth over the past decade (averaging 14.7% per annum during 1990-2000), mostly due to large inflows of direct foreign investment, initially in low value-added manufacturing and more recently in higher value-added manufacturing and services. The program encompasses all of this area and is mainly overseen by Guangdong Province with cooperative agreements between other jurisdictions such as Hong Kong and Macau.

The Delta is also complex geographically. Three major branches of the Pearl River (Zhu Jiang) join at the city of Guangzhou, the river's political, economic and cultural hub. The Pearl is China's third longest river, and second only to the Yangtze in annual average flow. It discharges into the South China Sea through eight principal tributaries across flat terrain, which is criss-crossed by numerous canals and streams.

The project area for the Guangdong Pearl River Delta Urban Environment Project which is the first phase of a larger scale and longer term program, is mainly within Guangzhou and consists of civil works (wastewater treatment and hazardous waste) for the city and capacity building and institutional strengthening activities for the program area such as environmental data collection (provincial scale), industrial pollution abatement programs (provincial and city level). The program area is all of the Pearl River Delta, including the city of Guangzhou.

The GEF Guangdong Pearl River Delta Urban Environment Project would support activities in the entire program area with a key focus of reducing, as fast as possible, total pollution loading to the South China Sea. Efforts would focus mostly within Guangdong province but they would be structured in a manner to encourage replicability in the rest of China and similar activities in other countries discharging wastes into the South China Sea.

The Pearl River Delta's Environmental Condition and Causes

Environmental protection policies and investments have not kept pace with economic growth, and the PRD's rapid economic growth has come at a heavy environmental cost. Many of the lower reaches of the Pearl River, especially around Guangzhou, the water quality standards are Class V or worse, and therefore unfit for drinking water source and unsuitable for irrigation, aquaculture or recreational use.

Domestic and industrial wastewater discharges, urban storm-water runoff and agricultural and livestock farm run-off are the main pollution sources. Most municipal wastewater is collected, but discharged into the river systems without treatment. Environmentally safe sludge disposal is just beginning, with the first plant under construction in Guangzhou. Growing volumes of hazardous wastes also present considerable risks to health, surface and ground water sources. Regional treatment facilities are needed, plus complementary activities such as waste minimization and safe transportation of dangerous goods.

Charges for water supply and wastewater are a fraction of the true cost of providing these services, which is draining municipal resources and reducing operational performance. Charges for hazardous waste disposal are low or non-existent in Guangzhou. Only a small fraction of the waste is properly disposed.

At present, every town builds and manages its own urban utility system and potential economies of scale and operation are not realized. The recently announced Provincial waste water management program of constructing more than 162 wastewater treatment plants to clean up the PRD river system perpetuates this fragmented approach to planning, investment and operation. While the Guangdong Provincial Government (GPG) and municipalities recognize that regional planning approaches present opportunities for inter-municipal cooperation, jointly managed facilities, reduced costs, and economies of scale for provision of environmental infrastructure, they have not addressed the institutional challenges inherent in this approach. The problem is compounded by the lack of a strategic framework at the provincial, metropolitan and city levels for planning and implementing least-cost priority investments and policy/institutional reforms.

Little private sector participation in environmental investments and service provision has been mobilized. In all of Guangdong Province there is just one private water supply concession (in Tanzhou), one private wastewater treatment plant (in Guangzhou), one privately-operated municipal solid waste landfill (for Guangzhou), and a proposed Build-Operate-Transfer sludge treatment plant, also for Guangzhou. No initiatives have been taken to facilitate entry of private service providers for the distribution of drinking and wastewater collection, where the greatest gains in efficiency and service levels are possible.

Guangdong Provincial Government Strategy.

Guangdong Province (GP), through its provincial Environmental Protection Bureau (GDEPB), has recently announced a plan to clean-up the PRD, the main feature of which is a proposed eight-year, US$5 billion program of investment in wastewater treatment facilities. However the program perpetuates the fragmented approach to infrastructure planning, contains too many treatment plants, is too ambitious and costly, and fails to realize potential economies of scale. Preliminary reviews of the plan suggest that better rationalization of treatment plants could yield a 35% decrease in overall costs.

Guangdong Province is also preparing master plans for municipal and industrial solid waste management. These plans are also likely to suggest a fragmented and non least-cost approach. Nevertheless, the GPG is committed to achieving increased sustainable development of the PRD and expanding provision of urban environmental services, including the use of innovative forms of private involvement. It realizes that environmental infrastructure investment should be guided by a regional development strategy that better reflects the goals of sound environmental management and fiscal sustainability across PRD as a whole. However this is difficult and capacity-building assistance and incentives are needed to help achieve those outcomes.

The Project's Global Environment Objective

The South China Sea, into which the Pearl River flows, is one of World's Large Marine Ecosystems (LMEs). The GEF, especially concerned with such a critical international water body is helping the littoral states to better manage this shared resource. Analyses of the major threats to the Sea, facilitated by the GEF/UNDP/IMO Partnerships in Environmental Management for the Seas of East Asia and the GEF/UNEP Project on Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand, have identified land-based pollution as one of the most serious threats and the Pearl River Delta

as a critical land-based pollution "hot-spot". This project's global environment objective is to improve the environmental condition of the South China Sea LME by helping Guangdong province reduce land-based pollution of the Sea from the Pearl River Delta area.

Baseline Scenario

This scenario comprises of previously agreed plans and initiatives of the Chinese Government to address water related problems at national and local levels. It reflects the likely situation concerning the Pearl River Delta and its key cities in the absence of GEF support.

Under the baseline scenario, the GPG and its many cities and towns will make substantial investments in wastewater treatment and in improving solid and hazardous waste management in the next fifteen years that will reduce the volume of pollution entering the South China Sea. Some of these facilities will however be delayed by jurisdictional squabbles; neighboring municipalities will each build their own, inadequately sized facilities that will waste investment resources, raise operating costs and threaten their sustainability. Also, little effort will be made to involve the private sector in service provision, even though this is often the least-cost and most efficient option. The project in the absence of the GEF project would co-finance Phase one of the Program and would consist of the following components:

- The Dashadi and Liede III wastewater treatment and network expansion
- The regional hazardous waste facility
- An industrial pollution control program
- Related capacity building activities

The longer term program described in the baseline would suffer from the following strategic shortcomings:
- minimal action to accelerate private sector involvement
- absence of collaborative sharing of environmental data with other municipalities and other countries
- an ad-hoc system of water-quality monitoring
- inefficiencies resulting from municipalities desire to build their own facilities
- insufficient management and technical operator capacity

GEF Alternative

The proposed GEF Program for the Guangdong/Pearl River Delta Urban Environment Project will encourage a more comprehensive integrated approach than outlined under the baseline scenario by addressing its strategic shortcomings. This will help give direction and ensure that various plans of the agencies involved in the Pearl River Delta are coordinated and properly integrated.

Under the GEF Alternative Scenario, the proposed project would constitute the first-phase of a cost-effective, long-term and very large-scale environmental management program that will address the key weaknesses of the Baseline Scenario and thereby achieve significantly larger and more cost-effective environmental improvements in the PRD and in the South China Sea, into which it flows. The GEF Alternative project would support a larger volume of collaborative, least-cost municipal waste management investments; be funded from a wider variety of sources, including the private sector; and would promote greater financial sustainability of these investments than the Baseline Scenario. To achieve these outcomes, the project would support the implementation of physical investments, policy and institutional reforms, and financial management improvements. Its over-arching goal would be to achieve the maximum sustainable environment benefits for the PRD area and the South China Sea by identifying and funding the most environmentally efficient, least-cost investment program that can be afforded and sustained with sound

financial management. The project and program will commence with the highest priority investments in the city of Guangzhou, which is the largest contributor to pollution in the PRD, with smaller cities also implementing jointly-managed environmental infrastructure investments on a pilot basis. It would also demonstrate innovative service delivery and financing approaches, including private sector provision of environmental infrastructure and services. The Guangdong component of the parallel World Bank/GEF Livestock Waste Management Project would address this specific issue as an integral part of the provincial environmental management program.

GEF support would catalyze three key, innovative aspects of the GEF Alternative strategy. First the GEF would promote the planning and construction of shared municipal wastewater treatment and waste management facilities. This collaborative approach to wastewater and waste management would achieve significant capital and operational cost savings, which in turn would accelerate investment in wastewater treatment and landfill development, and expand the volume of investment and enhance its financial sustainability. These actions would achieve faster and larger reductions in pollution loads. Second, the GEF would stimulate greater private sector involvement in waste management and wastewater treatment investment and operation by (i) encouraging the municipalities to actively seek private sector partners, and (ii) assisting potential private sector investor/operators to prepare facility management investment and operational service proposals for consideration by the municipalities and ensuring that such proposals are evaluated solely on their technical and financial merits and implemented when they are both least-cost and financially sustainable options. Third, the GEF would provide additional funding for water quality testing that would improve the collection and dissemination of water quality data that would enable a collaborative sharing of data with other municipalities and other countries.

The GEF's support for Phase One of the PRD Environment Program through this project would also promote greater inter-municipal cooperation and private sector involvement in the subsequent phases of the Program by piloting and demonstrating innovative ways to achieve these two objectives and by promoting their replication in subsequent phases of the Program.

The global environment objective of the GEF Alternative would be faster improvement of water quality in the Pearl River Delta and reduced pollution of the South China Sea. This objective will be achieved by (a) allocating public pollution reduction investment resources more efficiently and by operating public waste management facilities more efficiently and sustainably; and (b) accelerating private sector investment in waste management and participation in waste management operations. In combination, these advances will allow Guangzhou City to treat an additional 250 million m3 of waste water over the next 15 years than under the Baseline Scenario. This outcome will be monitored through a comprehensive and replicable water quality testing regime. Key outputs of the GEF assisted project components would be the number of facilitated agreements to share waste treatment facilities among the municipalities and the expanded service levels achieved through private sector involvement.

Incremental Costs

In order to achieve these additional global environment benefits, GEF support is requested for the following project components: 1) encouragement of inter-municipal environmental infrastructure (urban wastewater and waste management) in Guangdong; 2) Water Quality Monitoring and Information Systems, and; 3) facilitation of private sector involvement in environmental infrastructure and operations (see Table 2 below).

In the case of component (1) GEF resources totalling $6.8 million are requested to finance the incremental costs of promoting innovative, collaborative, more cost-effective and more sustainable joint municipal

environmental infrastructure investments by helping to identify the first of these options and by providing modest incentives to the concerned municipalities to collaborate on jointly designing, constructing and operating several joint facilities. This GEF component will have measurable efficiency outcomes by increasing the total amount of wastewater treated over fifteen years from 1 Billion m3 to 1.15 Billion m3, i.e. supporting an incremental global benefit of 150 million m3 extra of waste water treated. This represents about a 15% decrease in the total amount of waste entering the South China Sea from the Program area by 2019. This GEF component will also support increases in daily municipal solid waste disposal capacity by a similar 10% improvement. The GEF investment incentive funds would only be committed if and when viable joint municipal projects were identified by the GEF-supported identification efforts. This GEF support would catalyze both a greater volume of environmental investment and a greater number of financially sustainable investments than the municipalities would make or could sustain under the Baseline (business-as-usual) Scenario.

GEF co-financing for component (2) of US$2.25 million would enhance water quality monitoring facilities and staff capacity and strengthen both the project's impact assessment and the PRD's contribution to the UNEP/GEF South China Sea Project's M & E program. This would result in greater international environment quality data and allow for better targeted pollution reduction interventions. Regional and international pollution reduction conferences would be organized to bring together the parties impacting the South China Sea. These workshops would provide a forum to discuss pollution reduction plans and report on achievements, and help to speed-up the reduction of pollution loading to the South China Sea. The first of these ongoing meetings is proposed to be in Guangzhou in early 2005.

In the case of component (3), GEF resources are requested to finance the incremental costs of identifying and preparing viable proposals for private sector involvement to finance and operate additional environmental infrastructure facilities, which total US$0.95 million. Without GEF support for this component (business as usual), the PRD's constituent municipalities will be reluctant to explore and develop such innovative options and will not fully tap the potential for joint municipal and/or private sector environmental investment and service provision. GEF support would thus supplement scarce public sector environmental investment resources with private sector investments and thereby accelerate pollution reduction in the PRD and from the PRD area into the South China Sea. This component is estimated to result in an extra 60 million m3 of waste-water treated over the next 15 years, a 5% decrease in total pollution loading to the South China Sea by 2019.

Through this combination of incremental activities, GEF support would catalyze an innovative regional (PRD-wide) and more comprehensive approach to water quality improvement. No single municipal investment program is capable of providing all of the treatment facilities and behavioral modifications needed to have a marked improvement to the South China Sea water quality. For example, complementary action on industrial livestock waste and other directed interventions to increase water treatment capabilities and reduce industrial waste discharges is also needed. The GEF Alternative will thus be the first of what is planned to be a series of such integrated yet independently delivered water quality improvement interventions.

The following incremental cost matrix summarizes the positive impacts that GEF support have on the pace and scale of pollution abatement programs within the Pearl River Delta. The Baseline Scenario is based on the Guangdong PRD Environmental Strategy Plan. This plan outlines an investment program of about 162 wastewater treatment plants estimated to cost about US$5 billion. For wastewater and landfill development, total expenditures under the GEF scenario are estimated to be the same as the baseline scenario. However, through more efficient use of capital and faster development, the GEF Alternative Scenario results in a 20% decrease in the total pollution loading from the region to the South China Sea by

the 2019. This is a staggering amount of avoided pollution. These improvements are brought about through component 1, inter-municipal cooperation, and component 3, increased private sector involvement.

The second component, water quality monitoring, has a baseline scenario cost of US$9.25 million and a US$11.5 million cost for the GEF Alternative Scenario, of which US$2.25 million would be co-financed by the GEF. Provincial and municipal governments have committed to this increased investment level and to support the international aspects of data collection and dissemination if the GEF support is forthcoming.

Table 2 presents both 'program' (i.e. some 162 wastewater treatment plants over 15 years within the PRD) and 'project' (Phase 1 of the program - this specific investment activity involving at least one wastewater treatment plant). The GEF assistance is not expected to change the overall costs of the program, but rather enhance the efficiency and treat an additional 250,000,000 m^3 of wastewater.

Table 2: Incremental Cost Matrix

	Cost Category	**US$ Million**	**Domestic Environment Benefit**	**Global Environment Benefit**
1. Urban Wastewater and Solid Waste Management in Guangzhou City and Inter-Municipal Environment Infrastructure	Baseline	WWT 5,000 (program cost) MSW 300 (program cost)	1.25 Billion m3 of wastewater treated 100 million tonnes of MSW disposed	1.25 billion m3 of WW treated and resulting pollution reduced Reduced water pollution from waste properly managed
	With GEF Alternative - a 15% increase in WW treated and a 10% increase in solid waste treated	WWT 5,000 (Program cost) MSW 300 (program cost)	1.44 Billion m3 of wastewater treated 110 million tonnes of MSW disposed; reduced pollution	1.44 Billion m3 of Waste Water treated Reduced water pollution from waste properly managed
	Increment	6.8 (project cost)	190,000,000 m3 extra WW treated	Reduced water contamination from an extra 190,000,000 m3 WW treated and 10,000,000 tonnes of waste landfilled
2. Water Quality Monitoring and Information Systems	Baseline	9.25 (project cost)	Modest expansion of existing data collection system	Greater international environment quality data Better targeted interventions
	With GEF Alternative	11.50 (project cost)		

	Increment	2.25		
3. Private Sector Involvement in Environment and Infrastructure	Baseline	WWT 5,000 (program cost) MSW 300 (program cost)	1.25 Billion m3 of wastewater treated 100 million tonnes of MSW disposed	1.25 Billion m3 of WW Treated and resulting pollution Reduced water pollution from waste properly managed
	With GEF Alternative - a 5% increase in WW treated and a 5% increase in solid waste treated	WWT 5,000 (program cost) MSW 300 (program cost)	1.31 Billion m3 wastewater treated 105 million tonnes of MSW disposed; reduced pollution	1.31 Billion m3 of WW Treated Reduced water pollution from waste properly managed
	Increment	0.95 (project cost)	60,000,000 m3 extra WW treated	Reduced water contamination from an extra 60,000,000 m3 WW treated and 5,000,000 tonnes of waste landfilled
Total	Baseline	5,305,000,000		
	With GEF Alternative	5,315,000,000		
	Increment	10,000,000		

Additional GEF Annex 12:STAP Review
CHINA: Guangdong Pearl River Delta Urban Environment Project

STAP Review Comments on the brief of the GEF project by:

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The Pearl River Delta (PRD) is one of the most populated and industrialized areas in China. The water quality in many parts of the PRD has rated Class V or worse, particularly near large cities like Guangzhou, although in the upper reaches of the Pearl River in the main branches the water quality is generally good.

In recent years there has been a major emphasis on building wastewater treatment plants in the PRD. However, there is still a long way to go before water pollution in the PRD will be abated. One important reason for this slow progress is because of China's general lack of experience to address environmental problems with modern management skills and to involve private sectors in public works. In this sense, the integrated regional planning approach as evidenced by Project Components 2-4 is most noteworthy. The willingness of the Guangzhou municipality to support/participate in this undertaking is also most encouraging. Thus, I fully recommend approval of this proposed GEF project.

In the following, I have four technical comments for the authors to consider when finalizing the proposal:

1. As it presently stated the Project development objective is "***to improve the quality of the urban environment in key cities in the Pearl River Delta (PRD)****, by following an integrated regional planning approach, in order to facilitate continued economic and social development*". However, it is not clear that the 8 points stated in the next paragraph of the proposal are all direct progress-measures to the objective shown in bold face above. I would suggest rewording the objective to bring up the importance of demonstrating to the public and local officials the effectiveness of the '*integrated regional planning approach*'.

2. If the global objective of the Project is to be related to the South China Sea, the important land-based pollutants are principally POPs and nutrients. However, river-borne dissolved/particulate pollutants have significant impacts on the marine environment and ecosystems only in shallow coastal water with depths less than, say, 50 m. For the South China Sea Proper, it is the atmosphere-borne pollutants, i.e., in the form of aerosols, which exert influences. Thus, rationales given here, as well as related arguments stated elsewhere in the brief, need to be re-worded to reflect this fact.

3. The brief sounded apologetic, in my view unnecessary, when it stated under Section B.3 that "….the project would be processed even with this one city….". The city referred to here is Guangzhou. As an administrative unit, the word "city" in China encompasses a large region with many district level and small-city level administrations. Although they are all under the jurisdiction of Guangzhou City, implementation of integrated regional planning approach advocated by the proposed GEF Project does not come by any easier. I would suggest the

proposal simply sets its minimum goal to implement the approach in Guangzhou City.

4. Lastly, usage of English needs to be checked. For example, it is better to say "low-wage", not "low-cost", migrant workers. The word "distributaries", rather than "tributaries", should be used when referring to river branches through which the Pearl River discharges its water to the sea.

Response to Review comments by SU Jilan, Second Institute of Oceanography State Oceanic Administration, Hangzhou, Zhejiang, China. STAP Review.iew.

Dr. SU Jilan's support of the project is very welcome. His agreement with the project's integrated approach, and practicalities of starting with Guangzhou are encouraging. Also, the need to focus on modern management skills and involvement of the private sector is supported.

With regards to the four specific technical comments, they will be reflected in the project's final design and documentation.

1. The project's broad objective "to improve the quality of the urban environment in key cities in the Pearl River Delta' will be broadened to also include "and highlight the need for an integrated approach to environmental management".
2. The point that a keen focus is needed on POPs and nutrient loading for attainment of measurable water quality improvement in the South China Sea is very valid. Programs are underway to address these issues through other means, e.g. the regional livestock waste management project being supported by GEF. This project is intended to start with improved wastewater treatment and hazardous waste management as part of an overall comprehensive, multi-level effort. As suggested the rationale will be revised to reflect these facts.
3. The suggestion to be more positive on the exemplary role of the city of Guangzhou is appreciated. As related to point two, efforts will be made during project implementation to maximize the municipal governments and public learning that derives from the project. Guangzhou is certainly the best place to start within the Pearl River Delta region.
4. As recommended the project team will change "low-cost" to "low-wage" and "tributaries" to "distributaries" where warranted.

Again, the project team expresses its appreciation of Dr. SU Jilan's comments and his depth of understanding in the water quality of the South China Sea and its current impacts.

a) Response to comments from Secretariat and other Agencies

The project design should include a replication strategy, stakeholder participation plan, M&E indicators.

The project has a detailed replication strategy. First, the collected and collated water quality data will be made available broadly and consistently. The data will be presented in a user-friendly manner both on a readily accessible web-site and in annual environmental status reports. Data collection and distribution will endeavor to use common, and readily available, equipment and software to help other neighboring jurisdictions and countries set up similar and compatible systems.

The project is starting with the city of Guangzhou. Guangzhou (the capital of Guangdong) is an important city for piloting any activities within the region since results are quickly and easily seen by neighboring cities. Water quality data will be presented by cities which will enable quick comparisons. Guangzhou is also able to discuss regional approaches with Hong Kong SAR.

On specific project aspects such as private sector involvement in facility operations and joint municipal development of environmental infrastructure this project has clear terms of reference for any contract development to be carried out in a manner that includes a common structure which can be easily replicated by other cities. There are also specific funds identified for ongoing training programs where the lessons from Guangzhou's efforts will be discussed among other neighboring municipalities.

Stakeholder participation programs have been developed in at least four broad areas; siting and operation of wastewater treatment facilities, siting and operation of the hazardous waste facility, design and progress of the industrial pollution control program (IPCP), and collection and dissemination of Pearl River water quality. In the wastewater and hazardous waste facilities stakeholder participation has been built into the ongoing environmental management system EMS. This EMS forms part of the reviewed and legally binding environmental impact assessment. Although the public will be presented with the progress of industrial activities to reduce pollution on the web-site and annual environmental reports, the key stakeholder will be neighboring industries who the project intends to work with to reduce their overall pollution loadings. This will be done through technical workshops, in-house waste audits, and other technical and policy fora. Public stakeholder participation will occur mainly through existing and strengthened municipal (and higher levels of government) programs. This includes easy access to the web-site (with a question and answer section), schools educational program, annual municipal 'state of the environment' reporting.

The project has a comprehensive monitoring and evaluation program. Specific items to be monitored include; quantity of wastewater treated; efficiency of wastewater treatment, amount and efficiency of hazardous waste treated, number of operating contracts for environmental infrastructure that include private sector involvement, and number of intra and inter-municipally developed environmental infrastructure programs. These items will be monitored through various means such as regular project supervision, monthly/annual reports, real-time water quality data.
The Bank agreed to develop a strategic framework for other GEF supported interventions in the Region. The Bank also agreed to explore closer links between livestock waste reduction programs.

During project preparation discussions were held with Ministry of Agriculture representatives to design a complimentary agricultural waste program (livestock and run-off). A plan is now in place to monitor agricultural waste reduction programs (integrating them with the water quality objectives outlined in this project) and report the results to the general public and the agricultural community. The GEF is supporting a regional livestock waste management project which can also be monitored through the water quality monitoring program being supported through this project.

Guangdong Province also agreed to hold at least one (and likely an annual event) regional (i.e. international) workshop or conference for all jurisdictions bordering the Pearl River Delta (including municipalities and countries). This forum will be used to develop regional pollution reduction strategies and disseminate best practices.

The implementation of a revolving fund to support environmental infrastructure was also discussed. The first pilot activities in the project are designed to be initial project suitable for support from a revolving capital fund. Discussions are still underway with GEF to broaden the fund (outside of the Pearl River Delta) and increase its size.

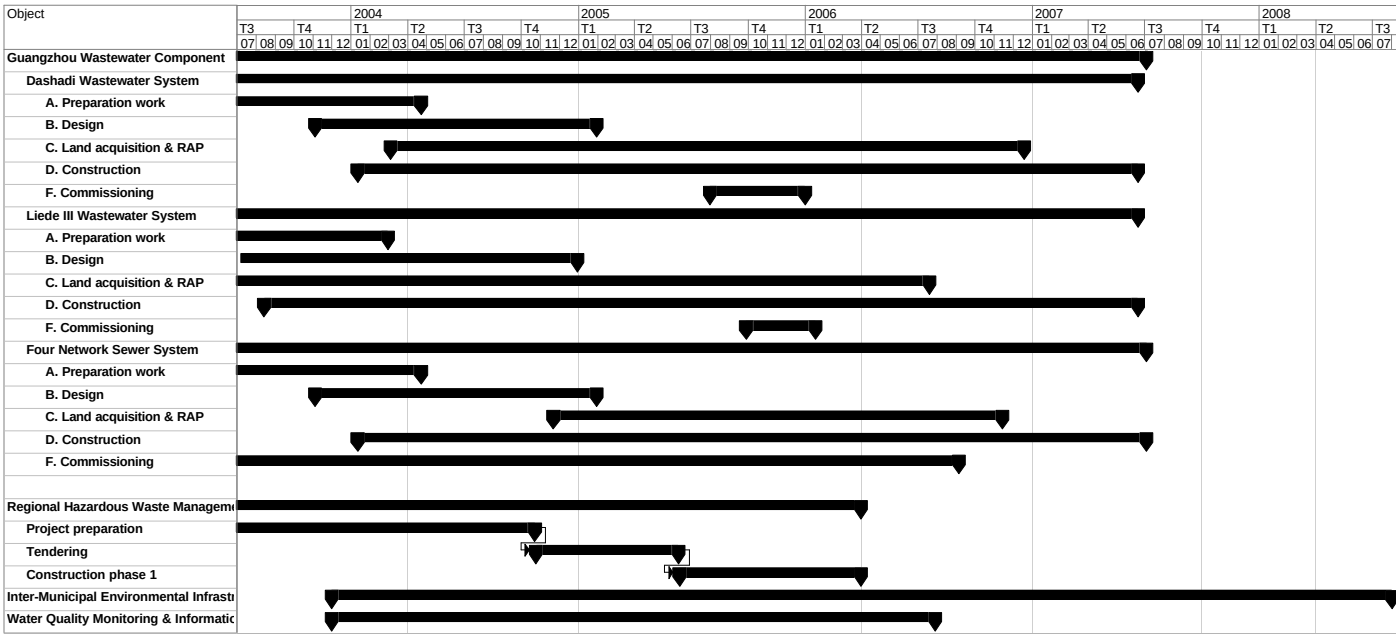
The Province of Guangdong (EPB) agreed to prepare a livestock management action plan. This plan, where appropriate, would be integrated into activities supported by this project. Capacity building activities for relevant agencies would be supported by this project where staff capacities overlap in EPB – this would help maximize any synergies between the two GEF supported activities. The Guangdong EPB also agreed to carryout pilot activities in the livestock waste area, e.g. emissions trading.

The Bank would investigate institutional coordination and support.

The Bank has an extensive investment program in the Pearl River Delta area. Already a second PRD is under preparation and discussion has started on a third. The lessons learned from the GEF supported activities are already being incorporated in follow-on project designs. There is keen interest within the PRD and within all urban areas of China, especially those along the eastern sea-board, to see how inter-municipal cooperation can be made to work and how best to involve the private sector in the development and operation of environmental infrastructure.

The Bank will actively participate in the international conferences being proposed by Guangdong Province. The Bank has also facilitated discussions with Hong Kong SAR, PEMSEA and UNDP. Information on the program (the overall objective of improving the water quality in the PRD in general – and specifically the mechanics and objectives of this project) is being widely distributed.

Additional GEF Annex 13: Project Implementation Schedule
CHINA: Guangdong Pearl River Delta Urban Environment Project



Additional GEF Annex 14:

Environmental Assessment and Mitigation Measures Summary
CHINA: Guangdong Pearl River Delta Urban Environment Project

A. Background

The Guangzhou Research Institute for Environmental Protection (GRIEP) carried out the Environmental Assessment (EA) of the proposed Guangdong Pearl River Delta Urban Environment Project (GPRDUEP) in accordance with Chinese national and Bank procedures, with support from independent international consulting specialists. Various drafts were reviewed and discussed in detail during project preparation. The draft EA documents were submitted to the Bank in November 2003 and reviewed by the Bank during a mission in December 2003. The final EA Report, Environmental Action Plan (EAP) and Executive Summary (ES) were submitted to the Bank in December 2003 and found to be satisfactory. The EA Report was sent to the Bank's Information Center in December 2003. During the EA work, the local people were consulted, and their opinions have been reflected in the project design and environmental mitigation measures as appropriate.

The policy and administrative requirements for environmental assessment of development projects in China were followed during preparation and evaluation of the EA, as well as the Bank's policy. Major laws and regulations applied to the EA are as follows: (a) Environmental protection Law of the People's Republic of China; (b) Atmospheric Pollution Control Law; (c) Environmental Noise Control Law; (d) Water Pollution Control Law; (e) Cultural Heritage Protection Law; (f) Notice of Strengthening the EA Management Work of Construction Projects financed by International Financial Organizations; and (g) Technical Guidelines for Environmental Impact Assessment.

B. Brief Project Description

The Guangdong Pearl River Delta Urban Environment Project includes the following components for which EAs have been completed:

Guangzhou Wastewater Management

Dashadi WWTP and associated trunk sewer network
Liede III WWTP and associated trunk sewer network
Trunk sewer networks for 4 other WWTP catchments

Hazardous Wastes Management

Hazardous waste treatment facility and secure landfill

Central to the project are capacity- and institution-building measures and training.

C. Baseline Environmental Description

Natural Environment

The project area is located within the Guangzhou metropolitan area, located within the Pearl River Delta

(PRD), which in turn forms part of Guangdong Province, of which Guangzhou is the capital. Topographically Guangdong Province is dominated mainly by hills and some small mountains that are cut by numerous rivers and streams with narrow alluvial valleys. The PRD may be described in geographic terms as a triangle with its eastern side extending about 120 km from Guangzhou to Hong Kong, a western side of a similar length between Guangzhou and Macao. The southern side is effectively about 60 km of open water between Hong Kong and Macao.

The PRD has a subtropical climate characterized by a summer wet season from April to October and a dry cold season from November to April. The annual daily average temperature is 21.9 Degree C, which July being the hottest month (average 28.5 Degree C) and January the coldest (average 13.3 Degree C). Annual rainfall averages 1683 mm, the wettest and driest months being May (average 283 mm) and December (average ?? mm) respectively. The wind direction follows the pattern of the monsoon movement, blowing from N to NE during the winter and from S to SE during the summer.

Socioeconomic Situation

The PRD is one of the most populated areas of China with a 2000 population of 39.7 million, some 46% of the total population of Guangdong. Population growth has been rapid in recent years largely as a consequence of migration from other areas of China. Guangzhou is the largest city in Guangdong, with a population of approximately 7.1 million. The PRD is extremely important to the economy of Guangdong, accounting for 70% of gross provincial output. It has experienced among the fastest economic growth rates in China; in recent years annual GDP growth has averaged 13% and reached approximately Yuan 644 billion in 1999.

Guangzhou is the most important municipality in the PRD in terms of contribution to GDP, which was RMB 144 billion in 1999, equivalent to a *per capita* GDP of approximately RMB 20 000. The rapid economic growth in Guangzhou in particular is reflected in rising living standards particularly in respect of housing conditions, *per capita* floor space having increased by more than a factor of 3 since 1980 in spite of the substantial population growth. Up to 40 minorities, principally Hui, Man, Yao, Li and Se, account for about 1.35% of the total population of the Guangzhou Municipality area, living principally in the urban areas.

Water Resources

The Pearl River is the largest river in southern China and the third longest in China after the Yangtze (Chang Jiang) and the Yellow River (Huang He). The overall Pearl River basin has an area of 453 700 km2 drained by the three major branches, the Xi Jiang Bei Jiang and Dong Jiang. The average flow in the Pearl River as a whole is 336 billion m3 (equivalent to 10 650 m3/s), second in China only to that of the Chang Jiang. Of this flow 238 000 billion m3 is accounted for by the Xi Jiang, 39 billion m3 by the Beijiang, 24 billion m3 by the Dongjiang and a total of 35 billion m3 from the other smaller branches of the river.

Some 80% of the annual flow occurs during the wet season from April to September, and 50% occurs during the period June to August. By contrast the average dry season (October to March) flow is only 80 billion m3 (equivalent to 5 090 m3/s), accounting for only 24% of the total annual flow. The Pearl River provides abundant water resources for the population in its watershed. Average *per capita* water resources in the watershed as a whole are 4 700 m3/a, some 1.7 times the national average.

The branches of the Pearl River converge and thereafter diverge at the PRD. The PRD is divided into four distinct hydro-morphological sections known as the Xi Jiang, Bei Jiang, Dong Jiang and the Guangzhou Section of the Pearl River.

Water Quality

The Guangzhou Section of the Pearl River (shown in Fig 1) accounts for a relatively small proportion of the overall flow in the Pearl River as a whole (typically less than 10% in the dry season). Within the urban area of Guangzhou the river divides to form two major branches known as the 'Front' and 'Back' sections. It drains much of the large urban areas of Guangzhou and Foshan and therefore receives substantial discharges of urban wastewater and of industrial wastewater. Current wastewater treatment rates within the Guangzhou Section of the Pearl River are low, approximately 16% in Guangzhou and 10% in Foshan.

As a consequence of these discharges the urban reaches of the river are highly polluted and the situation is exacerbated by the fact that the river is tidal. Water quality in most of the river in the urban areas is typically Category 4 or 5, particularly during the dry season. As a consequence the upstream potable water intakes are progressively threatened by pollution. Monitoring data indicate that the most important pollutants are organic (BOD/COD and ammonia), derived from both urban and industrial wastewater. These impact on concentrations of dissolved oxygen, which fall to close to zero at the Huangsha and Liede monitoring stations.

Future Water Quality Objectives

The Guangzhou Municipal EPB has specified water quality objectives (WQO) for the various reaches of the PRD in the Project area. The WQO for the Guangzhou Section of the Pearl River are as follows:

Upstream of Hujinghai	Category 2
Hujinghai to Liede	Category 3
Downstream of Liede	Category 4

D. Environmental Benefits

The wastewater treatment component of the project contributes substantially to increasing wastewater treatment rates for Guangzhou through the provision of :

- New wastewater treatment plants at Liede and Dashadi; and
- Sewerage facilities within the catchments of other treatment plants, thereby ensuring that the capacity of these plants will be effectively utilized.

The impact of the project interventions on water quality in the Guangzhou Section of the Pearl River has been evaluated by mathematical modeling. The benefits of the project in terms of the 'Front' Section of the river are shown in Figs 2 and 3 for the year 2010 for dissolved oxygen and BOD respectively.

From Fig 2 it can be seen that dissolved oxygen levels are increased by between 2 and 4 mg/l, improving the water quality classification by at least one category, and that the WQO will largely be met even under the critical low flow conditions modeled. A similar substantial improvement is achieved in respect of BOD concentrations as shown in Fig 3. Similar or even more marked improvements in water quality in urban watercourses will be achieved as a consequence of improved wastewater collection.

Water quality declines in the immediate vicinity of the confluence with the Dongjiang as a consequence of poor water quality in the Dongjiang resulting from discharges of urban and industrial wastewater in Dongguan. Pollution of the Dongjiang is to be addressed by substantial wastewater treatment investments by Dongguan Municipality by 2010 as part of the PRD clean up campaign of Guangdong EPB..

The 'Back' section receives discharges of municipal and industrial wastewater from both Guangzhou and Foshan. The project will improve water quality in the 'Back' section but water quality improvements are limited by residual discharges of untreated wastewater from areas of Guangzhou unserved by wastewater treatment plants and from Foshan. This highlights the future need to enhance wastewater collection and treatment for these areas. The most cost-effective development of the required facilities would be by an inter-municipality co-operative approach.

The water quality modeling has been based on the assumption that industrial wastewater discharge direct to the river will comply with local wastewater treatment discharge standards. To safeguard water quality in the river an Industrial Pollution Control Action Plan (IPCAP) will be implemented in parallel with the Project. There is a proposal for the stage relocation of polluting industry from the Guangzhou urban area to designated industrial parks with dedicated environmental infrastructure. This will be carried out in three stages with final completion by 2015. The basis of the IPCAP will be the relocation plan together with controls on major pollution industries for the period up to their relocation.

E. Potential Environmental Impacts and Their Mitigation Measures

The project as a whole is substantially positive in environmental terms, with the benefits greatly outweighing the negative impacts. The wastewater component will greatly increase wastewater collection and treatment rates within the municipality area and will improve considerably water quality both in the main Pearl River reaches in the Guangzhou urban area and in the urban tributaries. The hazardous waste component will substantially increase the regional availability of facilities for hazardous waste management and provide a new environmentally secure disposal route for the categories of waste treated. Nevertheless some negative impacts have been identified in the EA process for all components, and these require mitigation measures. The principal impacts and their appropriate mitigation measures are described below.

Sludge Production.

The principal impact of wastewater treatment is the need to dispose of increasing quantities of wastewater treatment plant residuals, principally sludge. The total quantity of sludge produced by all proposed wastewater treatment plants in Guangzhou is estimated at 900 t/d by 2010, of which 230 t/d are accounted for by the specific project wastewater treatment investments at Dashadi and Liede.

Disposal of sludge from the present limited degree of wastewater treatment in Guangzhou has been by sea dumping and more recently by land reclamation., but it is recognized that these disposal routes are not sustainable. The long term proposal by Guangzhou Municipal Government for disposal of all wastewater treatment plant sludge from Guangzhou is by river transport to a treatment center, where further chemical and thermal treatment will be provided to produce treated sludge suitable for beneficial use in agriculture/horticulture and in brick manufacture. Until such time as sufficient markets are developed to support these uses of treated sludge, the principal disposal route will be by landfill. Guangzhou is served by a major landfill site operated through a PSP arrangement with an international wastes management contractor; this site has adequate capacity to accept the wastewater treatment plant sludge.

Although domestic wastewater treatment plant sludge is understood to be non-hazardous due to the low heavy metal contents as a result of the industry relocation away from the serviced areas, there are uncertainties on related to the sustained market access and/or technologies for brick making and other sludge re-use products. Until such time as the markets to support these uses are sufficiently developed, disposal will be primarily by environmentally secure landfill. Water quality impacts of treated wastewater discharges are minimized by the location of treatment plants in relation to critical river water uses.

Dispersion of Wastewater Discharges.

The potential impact of the treated wastewater discharges on water quality the immediate vicinity of the discharges has been evaluated by mathematical water quality modeling. This modeling indicated that the impact would be very limited, concentrations of the principal pollutant BOD/COD at the closest industrial water supply intakes (750m downstream of Liede WWTP and 250 m upstream of Dashadi WWTP respectively) increasing by only a few per cent even under low river flow conditions; water quality at these intakes would still be well within the local WQO for the river reach. Moreover, it is understood that the intake downstream of Liede WWTP is not currently in use and that upstream of Dashadi is only partially used.

Hazardous Waste Management.

The principal adverse impacts of the operational phase of the hazardous waste component are the road transport of hazardous materials and possible generation of leachate at the landfill. Major mitigation measures for the hazardous waste management component include provisions of a drainage control system to prevent the rain water from entering into the landfill, a rainproof shed during operation and canvas on waste during rain time to prevent rain water from contacting the waste, an impermeable site liner to prevent leachate from infiltrate into the ground and the facility to treat any leachate generated and collected from the landfill. In addition, extensive training will be provide to operators of the hazardous waste disposal facilities to ensure the operators are fully skilled with modern leachate control and treatment technologies and facilities adopted by the landfill. A comprehensive monitoring program will be implemented during the operational phase for groundwater, as well as surface, ambient air quality and noise to detect timely any adverse impacts from landfill operation to allow remedial and corrective actions.

Construction Spoil.

During construction substantial quantities of spoil will be generated from excavation works and demolition of existing buildings and concrete structures, mainly at the Dashadi WWTP site and along the routes of the sewer networks. The estimated total quantity of earth spoil is about 500 000 m3. It is expected that spoil from WWTP construction can be removed from the sites by barge but that from sewer construction will need to be removed by road. A detailed construction spoil management plan will be prepared and the impact of spoil transport minimized by controls on operational procedures.

Impact on Natural Environment.

The project will not involve the use of any land with a valuable natural environment. The Liede WWTP component involves an extension to an existing plant on a site already allocated for that purpose, and the Dashadi site is land already totally developed. Sewer network construction will generally be in urban areas and may involve the cutting of street trees. Any trees cut will be registered and replaced at a rate of not

less than one tree planted for one cut, to be monitored during construction supervision.

Long term impacts of the project on aquatic ecology will be substantially positive in view of the polluted nature of the water environment in the vicinity of the project sites. Impacts during construction will be minimized by controls on the working practices of the contractors.

Other Construction Impacts. Other impacts of construction include noise from construction machinery, generation of dust and disruption of local traffic. These will be minimized by appropriate restrictions on working hours and operational procedures of the contractors concerned.

Other Operational Impacts. The other significant potential impacts of the operation of wastewater treatment plants and pumping stations are noise and, in the case of wastewater treatment plants, odor. These have been minimized by the sitting of the plants and by the provision of buffer zones and landscaping. Where there are sensitive noise receptors close to the facilities, the noise emissions will be minimized by appropriate acoustic insulation of machinery.

F. Public Consultation and Information Disclosure

The following approaches were adopted for public consultation: (a) meetings with city Project Management Offices (PMOs), utility companies, municipal EPBs, and other affected city departments; and (B) surveys to gauge the public perception of the positive and negative impacts of each of the proposed schemes. All schemes proposed were well received by the public.

The public participation exercise was undertaken in three forms: bulletins in the press, public opinion questionnaires and surveys of the public. The phasing of the public participation exercise is shown in the following table.

Public Participation Phasing and Goals

Round	Round separation	Major participation goals
1st round (screening)	Environmental screening	Identify stakeholder groups; secure proponent commitment to public participation program; agree on extent and mode of participation
2nd round	Shortly after environmental screening, before the EA TOR finalized	Identify stakeholders; disclose relevant project information,; determine stakeholder concerns and include them in the TOR
3rd round	After EA report (draft) is prepared	Disclose information on study methods and findings; agree on proposed mitigation measures with stakeholders; let stakeholders determine whether their concerns are adequately addressed

- **Bulletins in the press**: Bulletins were published in the local press in the project city for each of the project components containing the general pollution situation in the basin river, the objectives of the project investments, availability of project EA documents for public access and contact information for the public to voice their concerns and opinions about project and environmental impact and mitigation measures.

- **The Willingness to Pay Surveys:** These surveys were carried out at an early stage of the project preparation to assess the overall acceptability of the project to the people of the project cities in the light of increased tariffs.

- **Public Opinion Questionnaire**: Opinion polls were carried out in the districts affected by the project in the various cities. The questionnaire obtained written individual opinions of the project including their concerns of the different project components. These concerns have been addressed in the final EA report and EMP as appropriate.

- **Survey of the Public**: Survey of the Project-Affected People and the General Public: The survey invited local community and neighborhood committees, district governments, residents along the sewer lines and at the wastewater treatment plant sites, affected enterprises, relevant government agencies and other stakeholders whose opinions were considered and inquiries answered. The surveys are primarily through numerous public meetings of the affected public in various project component areas including both WWTPs and all sewer network regions.

The EA and ES were made public locally in the project areas; this availability was advertised through the local press. Following submission to the Bank the documents were sent to the Bank's Public Information Center.

Details pertaining to the public consultations and information disclosure are provided in the following tables.

Waste Water Treatment

Public Consultation

Substance	By whom	With whom	When	Where	World Bank requirements
Interview during field social economic survey and follow-up field surveys	China Cross Cultural Consulting Center of Sun-Yat Sen University and SOGREAH Consultants	Project Beneficiaries (Domestic and Industrial Users)	November 15th to December 15th 2002 July 30th to August 5th 2003	Foshan and Guangzhou (Districts: Liwan, Huangpu, Haizhu, Baiyun and Tianhe)	OD 4.30 and OP 4.01
RAP outline consultation	GREO	GDEPB, GZEPB, GZMGB, GZWSC, GZWRB, SEPA, GDPMO SOGREAH, World Bank	December 2002 to August 2003	Guangzhou	
Draft EA TOR	GRIEP	GDEPB, GZEPB,	October to	Guangzhou	OP4.0:

consultation		GZMGB, GZWSC, GZWRB, SEPA, GDPMO SOGREAH, World Bank	December 2002		consultation during TOR stage (their work done before OP requirement)
EA TOR consultation	GRIEP	GDEPB, GZEPB, GZMGB, GZWSC, GZWRB, SEPA, GDPMO	January 2003	Guangzhou	OP4.01: consultation during TOR stage (their work done before OP requirement)
Distribution of questionnaires and key EA and RAP messages in bullet point format in first public meetings	GRIEP	Areas potentially affected by the project and beneficiaries	October 2003	Areas affected by project in Guangzhou	
RAP Surveys	Sino-French Research Institute of Zhongshan University	PAPs within the project area	October to December 2003	Areas affected by project in Guangzhou	
Distribution of project information and draft EA and RAP in second public meetings	GRIEP	Areas potentially affected by the project and beneficiaries	November 2003	Areas affected by project in Guangzhou	OP4.01: Consultation prior to finalization of draft report
Final EA	GRIEP in association with SOGREAH		February 2004		
Final RAP	GREO		February 2004		

Information Disclosure

Document	Date of Disclosure	Location	World Bank Requirement
Copies of EA TOR and RAP outline	October 2002 to January 2003		OP 4.01; OD 4.30; BP 17.50
Questionnaires and key EA and RAP messages	October & November 2003		
Draft EA reports	September 2003		
Draft RAP reports	November 2003		
Final EA and RAP reports	February 2004	On Web-Site (World	

		Bank and GRIEP)	
Notice for availability of EA and RAP reports on Web Site	February 2004	Local Newspapers	
Resettlement information booklet	January 2004	Office of the resettlement implementing organization	

Hazardous Wastes Treatment

Public Consultation

Substance	By whom	With whom	When	Where	Bank's requirement
Interview during field social economic survey and follow-up field surveys	China Cross Cultural Consulting Center of Sun-Yat Sen University and SOGREAH Consultants	Project Beneficiaries (Industrial Users)	November 15th to December 15th 2002 October 2003	Foshan and Guangzhou (Districts: Liwan, Huangpu, Haizhu, Baiyun and Tianhe)	OD 4.30 and OP 4.01
RAP outline consultation	GREO	GDEPB, GZEPB, GZMGB, GZWSC, GZWRB, SEPA, GDPMO SOGREAH, World Bank	December 2002 to August 2003	Guangzhou	
Draft EA TOR consultation	GRIEP	GDEPB, GZEPB, GZMGB, GZWSC, GZWRB, SEPA, GDPMO SOGREAH, World Bank	October to December 2002	Guangzhou	OP4.0: consultation during TOR stage (their work done before OP requirement)
EA TOR consultation	GRIEP	GDEPB, GZEPB, GZMGB, GZWSC, GZWRB, SEPA, GDPMO	January 2003	Guangzhou	OP4.01: consultation during TOR stage (their work done before OP requirement)

Distribution of questionnaires and key EA and RAP messages in bullet point format in first public meetings	GRIEP	Areas potentially affected by the project and beneficiaries	September 2003	Liangtian Town	
RAP Surveys	Sino-French Research Institute of Zhongshan University	PAPs within the project area	October to December 2003	Liangtian Town	
Distribution of project information and draft EA and RAP in second public meetings	GRIEP	Areas potentially affected by the project and beneficiaries	November 2003	Liangtian Town	OP4.01: Consultation prior to finalization of draft report
Final EA	GRIEP in association with SOGREAH		February 2004		
Final RAP	GREO		February 2004		

Information Disclosure

Document	Date of Disclosure	Location	Bank's Requirement
Copies of EA TOR and RAP outline	October 2002 to January 2003		OP 4.01; OD 4.30; BP 17.50
Questionnaires and key EA and RAP messages	October & November 2003		
Draft EA reports	September 2003		
Draft RAP reports	November 2003		
Final EA and RAP reports	February 2004	On Web-Site (World Bank and GRIEP)	
Notice for availability of EA and RAP reports on Web Site	February 2004	Local Newspapers	
Resettlement information booklet	January 2004	Office of the resettlement implementing organization	

Additional GEF Annex 15:Resettlement
CHINA: Guangdong Pearl River Delta Urban Environment Project

Project Description

1. The proposed Guangdong Pearl River Delta Urban Environment Project (the Project) consists of four components: a 200,000 m3/day wastewater treatment plant (WWTP) at Dashadi and associated sewerage collection network, a 200,000 m3/day extension of an existing WWTP at Liede and associated sewerage collection network, sewerage network upgrading in four additional urban districts (totaling 324 km), and a regional hazardous waste disposal center, all within the municipality of the provincial capital of Guangzhou. A resettlement action plans (RAP) has been prepared, including a main volume for policy framework which applied to all components and four additional volumes, one for each of the components, for component specific survey results and implementation plans. The RAP has been prepared in accordance with applicable state, provincial and municipal regulations, policies, and compensation standards for resettlement, as well as requirements of OP4.12 of the World Bank.

Resettlement Planning

2. The Guangzhou Road Expansion Office has been responsible for the resettlement planning of the Project and organized different teams to carry out the planning assignment. Resettlement planning included a detailed census of affected people, inventory of impacts and socioeconomic surveys. These resettlement planning activities provide a detailed record of adverse project impacts related to involuntary relocation and resettlement, including land, houses, businesses, institutions, and the number of people affected. Applicable regulations, policies and standards have been compiled and, following extensive discussions with key government agencies and Project proponent, incorporated into the RAP as the main policy framework and compensation standards to be applied in this Project. Socioeconomic surveys were conducted through questionnaires, interviews and group discussions to allow good understanding of the project area baseline conditions as part of the resettlement planning process. The findings of the surveys, together with the results of the census and impact inventory, form the basis for the four component RAPs and implementation plans.

Project Impacts

3. The project components would require land acquisition, temporary leasing of land, and relocation of houses and businesses. The details of these impacts are summarized in the following table.

Summary of Project Impacts

Component	Land acquisition (mu*) Permanent/Temporary		Building demolition (m^2)	Resettlement Households	Population
Dashadi	604.22	0	75,763.00	42	820
WWTP	297.99	980.96	246,314.88	2986	10,242
Dashadi Sewer	902.21	980.96	322,077.88	3028	11,062
Sub-total					
Liede 3	0	0	0	0	0
WWTP	238.84	763.50	113,129	1,454	6,296
Liede 3 Sewer	238.84	763.50	113,129	1,454	6,296
Sub-total					
Datansha	190.73	592.61	175,316.00	2,207	10,700
Sewer	9.07	25.48	5,592.00	60	249
Liede 1-2	92.24	260.15	18,415.00	311	808
Sewer	195.57	630.71	322,906.00	4,200	15,513
Xilang Sewer	487.61	1508.95	522,299.00	6,778	27,270
Lijiao Sewer					
Sub-total					
HW Center	300.40	0	1,128.40	2	13
Sub-total	300.40	0	1,128.40	2	13
Total	1929.06	3253.41	958,564.28	11,262	44,641

*****I mu=0.0667 ha.

Legal Framework

4. The RAP was prepared in line with relevant Chinese laws, regulations and World Bank OP 4.12 on Involuntary Resettlement. The following basic principles were adopted for resettlement planning:

- Compensation to houses will be paid at replacement cost, determined by market surveys of similar or better houses or housing valuation without considering depreciation, whichever is higher;
- Land compensation will be paid before acquisition ;
- House compensation will be paid before construction of the new houses;
- Compensation rates must be finalized through consultation;
- Lack of legal title to a house/building will not bar an affected person from his or her resettlement entitlements;
- If the owner of an illegal building is a government agency or organization, the building may not be compensated, but the user of the building will be compensated for business disruption and moving costs; and
- The objective of resettlement is to enable the affected persons to improve or at least restore their living standard.

Rehabilitation Strategy and Measures

5. The Project would require acquisition of some farm land. For farmers who lose farm land, the livelihood rehabilitation strategy follows the traditional Chinese approach, which is land- and agriculture-based, and depends on village collectives for livelihood restoration. The impacted village would reallocate the remaining land to all farmers in the village to minimize the direct impact to individual farmers, while the compensation fund would be paid to the village and used collectively in the villages for agriculture and sideline development.

6. About 44,641 people in 11,262 households would lose their residential houses due to project activities. The majority of these affected households are urban based. After extensive consultations with the affected population, the project has planned to offer three options for their relocation, i.e., cash compensation, replacement housing or partial cash compensation and partial replacement housing. Urban residents could choose to find and buy their own replacement housing with the cash compensation. For those who do not want to find and buy their own replacement housing, the project would provide ownership of a replacement housing unit in government-built apartments. The affected persons may also choose to accept housing units less than their current housing standards but with a certain amount of cash compensation to make up the difference. For relocating rural residents, the project would provide compensation at replacement cost without considering depreciation. Temporary land acquisition would be compensated at rates equivalent to the productive value of affected land for the affected production period. Allowance would be paid to the affected people for moving to resettlement sites, and for facilitation transition to new houses and jobs. Farmers who lost land will be transferred to non-agricultural residents.

Management Organization

7. The project resettlement work will be primarily organized and executed by Guangzhou Wastewater Control Project Management Office (PMO) in association with Guangzhou Tunnel Development Company (project owner during construction) and Guangzhou Hazardous Waste Disposal Center (project owner). The PMO will also be responsible for internal implementation monitoring and evaluation. Several municipal government agencies and institutions will be involved in review, permitting, administrative arbitration, labor protection and litigation, including the Planning Bureau, State Land and Real Estate Bureau, Urban House Resettlement Management Office, Labor Bureau and the People's Court. In addition, an independent monitoring institution will be appointed to monitor the RAP execution (external monitoring) and to evaluate allocation and utilization of the resettlement funds.

Public Consultation and Participation

8. Public consultation and participation have played a key role in formulating the RAPs. The entire process of resettlement planning has been participatory. The systematic and well structured census and socio-economic surveys were conducted with the full participation of PAPs. Public meetings/hearings have been held in the affected areas in consultation with the affected public. Relevant agencies of the municipal government were fully involved in the process of RAP

preparation. The feedback from the consultation has been incorporated in the RAPs. The RAP contains a list of major consultation sessions.

9. Public consultation and participation would continue during the RAP implementation, which would determine the levels of satisfaction of the PAPs and to identify implementation issues for prompt corrective actions. Project information would be provided to the affected people through television, radio broadcast, newspapers, bulletins and posters. The RAP would be summarized into a resettlement information booklet (RIB) and distributed to every affected household. Regular consultation meetings would be held in the neighborhoods.

Grievance Redressal Mechanism

10. A mechanism has been designed for grievance redressal under each of the project components. All grievances can be filed in either written or verbal form. A small group consisting of five individuals headed by the independent monitoring institution will be set up, to receive written and verbal grievances from PAPs. If the complaining party is not satisfied by the group's opinions and judgment, he/she could raise it to the district government, then municipal government and finally to the People's Court through litigation. The redressal channel lies within the project management and government systems. Recording requirements and timeframe have been established for grievance resolution. This mechanism would be disclosed as part of the RIB.

Resettlement Implementation Monitoring

11. Internal and external monitoring has been designed as part of the project resettlement management. The project resettlement offices would carry out internal monitoring of the resettlement implementation. The monitoring procedures, content, staffing, responsibility, timeframe and reporting have been detailed in the RAPs. An external monitor has been contracted for independent monitoring of the RAP implementation. Independent monitoring would cover physical progress of RAP implementation, including compensation payment, allocation of residential sites, farmland allocation, and restoration of infrastructure. The independent monitor would also review the public consultation process, operation of the resettlement project offices, grievance redressal mechanisms and restoration of livelihood of the affected farmers. Independent monitoring would be conducted twice a year during the project implementation period.

Compensation and Resettlement Budget

12. The RAPs contain compensation rates for various impacts. Land compensation rates include a land compensation and resettlement subsidy. Compensation rates for structures are calculated for replacement costs. The affected infrastructure would be compensated for reconstruction and the compensation budget was finalized through negotiation with the owning government agencies.

13. The RAPs contain a detailed resettlement budget that covers all basic resettlement costs, management costs, contingencies, survey, design and monitoring costs. The basic resettlement cost includes compensation for land, house, other structures, standing crops and trees, business

profit loss, reconstruction of affected infrastructure and relocation subsidies. A management cost is included in the budget as well. A total contingency of 16 percent is provided in the budget. The total resettlement cost is about Yuan 3.3 billion but a cost sharing scheme has been established through discussion of different agencies involved. Under this cost sharing scheme, resettlement costs in new road or road expansion areas will be covered by road projects and those in river banks will be covered by hydrology projects. When the scheme is applied, the resettlement budget for this project is estimated at Yuan 646.2 million. Fund disbursement procedures and monitoring mechanisms have been designed and documented in the RAP.

Additional GEF Annex 16: Project Financial Management System
CHINA: Guangdong Pearl River Delta Urban Environment Project

I. Executive Summary and Conclusion

1. The Financial Management Specialist (FMS) has conducted an assessment of the adequacy of the project financial management system of the Guangdong Pearl River Delta Urban Environment project. The assessment, based on guidelines issued by the Financial Management Sector Board on June 30, 2001, has concluded that the project meets minimum Bank financial management requirements, as stipulated in BP/OP 10.02. In the FMS's opinion, the project will have in place an adequate project financial management system that can provide, with reasonable assurance, accurate and timely information on the status of the project in the reporting format agreed with the project and as required by the Bank.

2. A grant financed by GEF named "Livestock Waste Management in East Asia" will be implemented simultaneously. Three countries (China, Thailand and Vietnam) will be involved in this grant. The objective is to reduce the negative local and global environmental impacts of rapidly increasing livestock production in selected watersheds in the coastal areas of China, Thailand and Vietnam. The Guangdong PMO will also be responsible for the activities in China of this GEF grant, and therefore, this Financial Management Assessment report could also be used by GEF to evaluate the financial management capacity of the Guangdong PMO.

3. Funding sources for this project include Bank loan and counterpart funds. The Bank loan proceeds will flow from the Bank into the project special account to be set up at and managed by the Guangdong Provincial Finance Bureau (GPFB), to project implementing agencies (or project companies), and finally to contractors or suppliers. The Bank loan will be signed between the Bank and the People's Republic of China through its Ministry of Finance (MOF), and on-lending arrangement for the Bank loans will be signed between PRC through its MOF and the Provincial Government of Guangdong through its GPFB and then between GPFB and Guangzhou municipal government through Guangzhou finance bureau and finally between Guangzhou finance bureau and implementing agencies. In terms of disbursement technique, the project will be disbursing based on the traditional disbursement techniques and will not be using PMR-based disbursements, in accordance with the agreement between the Bank and MOF. The constitution of counterpart funds will be appropriation from municipal government and commercial debt.

4. No outstanding audits or audit issues exist with any of the implementing agencies involved in the proposed project. The task team however will continue to be attentive to financial management matters and audit covenants during project supervisions.

II. Summary Project Description

5. The objectives of the proposed Guangdong Pearl River Delta Environment project is to improve the quality of the urban environment in key cities in the Pearl River Delta (PRD) by following an integrated regional planning approach, in order to facilitate continued economic and social development.

6. The main components of the project include:

- *Wastewater Management in Guangzhou City*, would include increase in the wastewater treatment capacity by about 400,000 m3/day in two plants, construction and rehabilitation of sewage networks to

collect wastewater generated, interception of wastewater entering creeks and rivers, and storm water management.

- *Hazardous Waste Management in Guangzhou City*, would include investments in a pretreatment facility and landfill for treatment and disposal of hazardous wastes in Guangzhou and neighboring municipalities.
- *Inter-Municipal Environmental Infrastructure* will promote environmental infrastructure development for three groups of two or more municipalities, districts or towns willing to plan, construct and manage shared facilities
- *Water Quality Monitoring and Information Systems* would include installation of a network of automatic monitoring stations; real- time data assembly and processing at control center, development of databases, a website, and a management information system
- *Technical Assistance and Capacity Building.*

7. The estimated total cost of the proposed project is US$ 431.90 million and the proposed Bank Loan amount is US$128 million, as well as GEF grant of US$10 million.

III. Country Issues

8. To date, no CFAA has been performed for China, though dialogue with the Government of China in respect of the CFAA exercise has been initiated and currently underway. The Bank has relied on a similar exercise carried out by the Asian Development Bank in 2000 for reference.

9. However, based on observations of developments in the areas of public expenditures, accounting and auditing, and Bank experience with China projects for the past few years, we noted that substantial achievement in the aforementioned areas has been made and further improvement is expected in the next few years. As economic reform program further unfolds, the Government of China has come to realize the importance of establishing and maintaining an efficient and effective market mechanism to ensure transparency and accountability, and minimize potential fraud or corruption.

10. Due to rather unique arrangement by the Government of China, funding (in particular Bank loan) of Bank projects is controlled and monitored by MOF and its extension, i.e. finance bureaus at provincial, municipal/prefecture and county level. However, project activities are usually carried out by implementing agencies of a specific industry or sector due to the level and complexity of expertise involved. The above arrangement usually requires more coordination on the project, as the multi-level management of the funding and implementation mechanism sometimes works to the detriment of smooth project implementation.

IV. Risk Analysis

11. The following risks with corresponding mitigating measures have been identified during assessment:

Risk	Risk Rating	Mitigating Measures
I. Inherent Project Risk	Moderate	Many implementing agencies involved in the project have no prior Bank experience; Close monitoring by the task team is extremely important, particularly at the initial stage.

II. Control Risk		
a. Implementing Entity	Moderate	Close monitoring by task team is needed to ensure all the implementing entities are familiar with Bank's procedures and requirements.
b. Funds Flow	Moderate	The task team will ensure that mechanism will be in place to ascertain Bank and counterpart funds will be released to the ultimate beneficiaries on a timely basis.
c. Staffing	Moderate	Periodic checking on accounting work by project management offices at various levels will be performed.
d. Accounting Policies and Procedures	Low	Accounting policies and procedures are already in place.
e. Internal Audit	Moderate	We have not and will not assess the competency of the various internal audit departments due to the cost/benefit of doing such work. But the supervision of provincial PMO and annual external audit could mitigate the risk.
f. External Audit	Low	The external auditors, the Guangdong Provincial Audit Office, have extensive audit experience with previous Bank projects.
g. Reporting and Monitoring	Low	Format of financial statements and frequency of submission have been clearly defined by the Bank and MOF.
h. . Information Systems	Moderate	Checking by the task team at the initial implementation stage to ensure correct setup, which should be followed up by regular supervision missions.

V. Strengths and Weaknesses

12. ***Strengths*** Guangdong provincial finance bureau has extensive experiences with several Bank projects which will benefit the implementation of this project. Guangdong province is considered one of the most developed areas in China, thus, the risk of lack of counterpart funds is considered minimal.

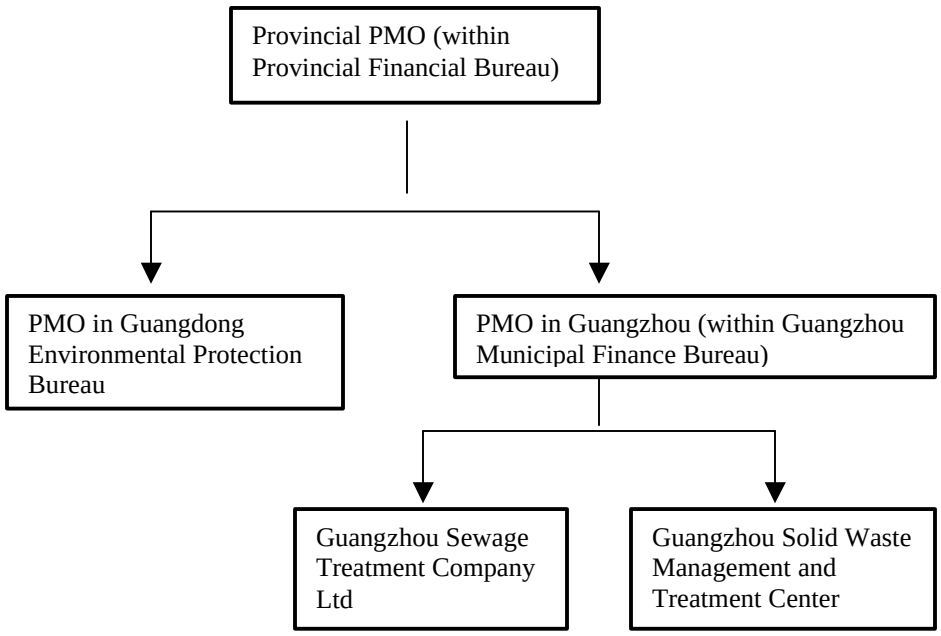
13. ***Weaknesses*** The following significant weaknesses with resolution have been identified:

Significant weaknesses	**Resolution**
1. Some financial staff are new to Bank's project and are short of relevant experiences.	Strong assistance and training program should be provided by provincial PMO.
2. For the waste water management component	Provincial finance bureau should be more active

in Guangzhou city, both the Guangzhou Municipal and Gardens Bureau and the Construction Committee will be involved in the management of this project. The effectiveness of their cooperation and coordination is uncertain at this stage.	in the coordination of the project.

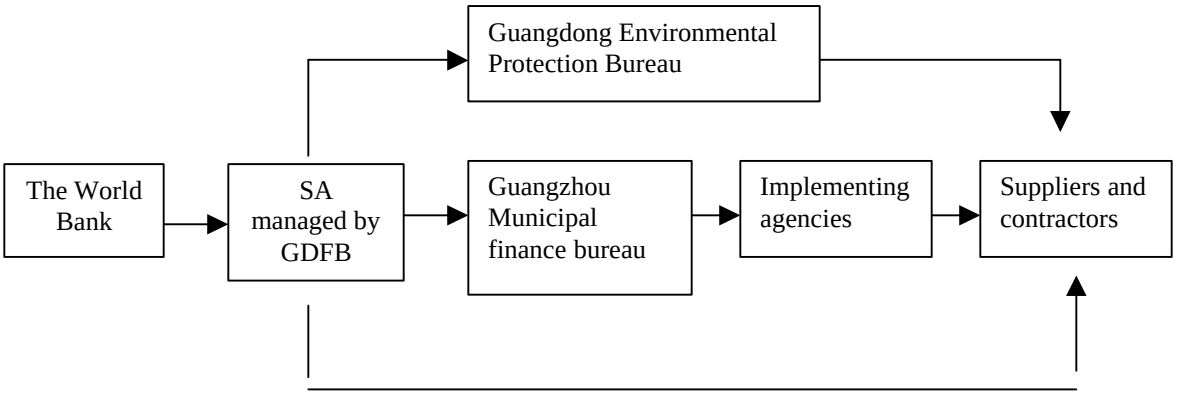
VI. Implementing Entity

14. A Provincial PMO has been established under the Guangdong Provincial Finance Bureau, and two PMOs have also been established in Guangzhou Municipal Finance Bureau and the provincial environmental protection bureau . Sub-PMOs have also been set up in each component to be in charge of their own project management. The organization chart is as follows:



VII. Funds Flow

15. Funding for the project includes Bank loan and counterpart funds. One special account will be set up and managed by the Guangdong Provincial Finance Bureaus (GPFB). The funds flow is as follows:



16. The funds flow of counterpart funds will follow the domestic procedures depending on the source of funding.

VIII. Staffing

1. Adequate project accounting staff with educational background and work experience commensurate with the work they are expected to perform is one of the factors critical to successful implementation of project financial management. Based on discussions, observation and review of educational background and work experience of the staff identified for financial and accounting positions in implementing entities (both "project" and "entity"), the task team note that the staff are qualified and appropriate for the work they are expected to assume.

18. To strengthen financial management capacity and achieve consistent quality of accounting work, the task term has suggested that a project financial management manual (the Manual) be prepared. The Manual will provide detailed guidelines on financial management, internal controls, accounting procedures, fund and asset management and withdrawal application procedures.

19. The provincial financial bureau has agreed to prepare the financial management manual which will be used by all the implementing agencies. The first draft of manual has been submitted for Bank's review and the final manual should be distributed to all the financial staff before project effectiveness.

20. As most implementing entities are new to the Bank's projects, a well-designed and focused training program in project financial management should be provided prior to project effectiveness by provincial PMO to all financial and accounting staff to ensure a good understanding and knowledge of the following:

- Bank's financial management policy and disbursement procedures
- Fund/asset/contract management
- Format and content of project financial statements
- Audit requirement

IX. Accounting Policies and Procedures

21. The administration, accounting and reporting of the project will be set up in accordance with the Circular #13: "Accounting Regulations for World Bank Financed Projects" issued in January 2000 by

MOF. The circular provides in-depth instructions of accounting treatment of project activities and covers the following:

- Chart of account
- Detailed accounting instructions for each project account
- Standard set of project financial statements
- Instructions on the preparation of project financial statements

The standard set of project financial statements mentioned above has been agreed to between the Bank and MOF and applies to all Bank projects appraised after July 1, 1998 and includes the following:

- Balance sheet
- Statement of source and use of fund
- Statement of implementation of credit/loan agreement
- Statement of special account

22. Each of the implementing entities will be managing, monitoring and maintaining respective project accounting records. Original supporting documents for project activities will be retained by originating implementing entities. In addition, each implementing entities will prepare financial statements, which will then be reviewed, approved and consolidated by provincial PMO before sending to the Bank for review and comment on a regular basis**.**

X. Internal Audit

23. Some of the implementing entities have their own internal audit division and the internal auditors will also check the financial status and expenditures of the project. We have not and will not assess the competency of the various internal audit departments due to the cost/benefit of doing such work. As such, reliance will not be placed on work performed by them.

XI. External Audit

24. The Bank requires that project financial statements be audited in accordance with standards acceptable to the Bank. In-line with other Bank financed projects in China, the project will be audited in accordance with ISA and the Government Auditing Standards of the People's Republic of China (1997 edition). The Guangdong Provincial Audit Office has been identified as auditors for the project. Annual audit reports will be issued in the name of Guangdong Provincial Audit Office.

25. The annual audit reports of project consolidated financial statements will be due to the Bank within 6 months of the end of each calendar year. In addition, annual audit reports on financial position and operation results of the Guangzhou Waste Water Treatment Company will be due to the Bank within 6 months of the end of each calendar year. Therefore a single audit report will be furnished to the Bank, comprising the consolidated project financial statements and the financial statements of the above-mentioned company.

Component	Submitted by	Due date
Consolidated project financial statements and the financial statements of Guangzhou	Provincial PMO	June 30

Waste Water Treatment Company. This will all be included under one audit report.		

XII. Reporting and Monitoring and Format of Financial Statements

26. Each implementing entity will prepare its own project financial statements, which will then be consolidated by provincial PMO. The project consolidated financial statements will be sent by provincial PMO to the Bank for reviews and comment on a regular basis.

27. The format and content of the following project financial statements represents the standard project financial reporting package agreed to between the Bank and MOF, and have been discussed and agreed with all parties concerned. In-line with the newly issued Financial Monitoring Report (FMR) guidelines, the un-audited project consolidated financial statements will be submitted as part of FMR to the Bank on a semi-annual basis (prior to August 15 and February 15 of the following year), and will include the following four statements:

- Balance Sheet;
- Summary of Sources and Uses of Funds by Project Component;
- Statement of Implementation of Loan Agreement; and
- Statement of Special Account

XIII. Information Systems

28. There is no uniform accounting software being used by the implementing agencies although all the implementing agencies involved are using a accounting software for their current activities. It is uncertain at this stage if they can integrate the project activities into their current system. The FMS will review the adequacy of their financial accounting and reporting system prior to project effectiveness.

XIV. Impact of Procurement Arrangements

29. Threshold set for procurement post-review will be consistent with that set for SOE for disbursement purpose. To have maximum effectiveness and efficiency, financial management specialist and procurement staff should jointly participate in supervision missions to ensure the following:

- Contracts awarded are in line with the Bank's procurement guidelines;
- Contract payments made are in accordance with the terms of the contract and well supported

XV. Disbursement Arrangements

30. The project will be disbursing using traditional disbursement techniques and will not be using PMR-based disbursements, in accordance with the agreement between the Bank and MOF.

31. Bank loan proceeds would be disbursed against eligible expenditures as follows (i) civil works – 50% of expenditures, (ii) equipment – 100% of foreign expenditures, 100% of local expenditures (ex-factory) and 75% of other items procured locally, (iii) Consulting service – 91% of expenditures, and (iv) TA or training-100% of expenditures.

32. Disbursement methods, such as replenishment, direct payment and special commitment, are available for the project. The Statement of Expenditure (SOE) limits will be set up in line with procurement prior-review thresholds, as follows: (i) all contract for goods estimated to cost the equivalent of US$ 500,000 or less; (ii) all contract for civil works estimated to cost the equivalent of US$ 6,000,000 million or less (iii) consultant contract estimated to cost US$ 100,000 (firm)/US$ 50,000 (individual) or less.

33. Two special accounts (SA) will be established in GPFB; one for the loan and one for the GEF grant. The authorized allocation of SA for the loan is US$10 million. The authorized allocation of SA for the GEF grant is US$175,000. Bank and GEF funds would be disbursed to the special accounts set up at GPFB, and then to project implementing entities and/or suppliers and contractors.